

1	<p>1 STATE OF NEW MEXICO</p> <p>2 BEFORE THE SECRETARY OF ENVIRONMENT</p> <p>3 No. GWB 18-06(P)</p> <p>4</p> <p>5 IN THE MATTER OF THE APPLICATION</p> <p>6 OF NEW MEXICO COPPER CORPORATION FOR</p> <p>7 A GROUNDWATER DISCHARGE PERMIT FOR</p> <p>8 THE COPPER FLAT MINE, DP-1840</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13 TRANSCRIPT OF PROCEEDINGS</p> <p>14</p> <p>15 Volume 1</p> <p>16</p> <p>17 BE IT REMEMBERED that on the 24th day of</p> <p>18 September, 2018, this matter came on for hearing before</p> <p>19 FELICIA ORTH, Hearing Officer, at the Ralph Edwards</p> <p>20 Auditorium in Truth or Consequences, New Mexico, at the</p> <p>21 hour of 9:06 a.m.</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	3
2	<p>1 APPEARANCES</p> <p>2 The Hearing Officer:</p> <p>3 FELICIA ORTH</p> <p>4 Hearing Officer</p> <p>5 20 Barranca Road</p> <p>6 Los Alamos, New Mexico 87544</p> <p>7 felicia.l.orth@gmail.com</p> <p>8 For the New Mexico Environment Department:</p> <p>9 ANDREW P. KNIGHT</p> <p>10 Assistant General Counsel</p> <p>11 New Mexico Environment Department</p> <p>12 Office of General Counsel</p> <p>13 121 Tijeras Avenue, Northeast</p> <p>14 Suite 1000</p> <p>15 Albuquerque, New Mexico 87502</p> <p>16 (505) 222-9540</p> <p>17 andrew.knight@state.nm.us</p> <p>18 For New Mexico Copper Corporation:</p> <p>19 STUART R. BUTZIER</p> <p>20 MODRALL, SPERLING, ROEHL, HARRIS &amp; SISK, PA</p> <p>21 Attorneys at Law</p> <p>22 500 Fourth Street, Northwest</p> <p>23 Suite 1000</p> <p>24 Albuquerque, New Mexico 87102</p> <p>25 (505) 848-1832</p> <p>sbutzier@modrall.com</p> <p>For the Turner Ranch Properties, LP, and Hillsboro</p> <p>Pitchfork Ranch, LLC:</p> <p>CHARLES de SAILLAN</p> <p>NEW MEXICO ENVIRONMENTAL LAW CENTER</p> <p>1405 Luisa Street</p> <p>Suite 5</p> <p>Santa Fe, New Mexico 87505-4074</p> <p>(505) 989-9022</p> <p>cdesaillan@nmelc.org</p>	4
1	<p>1 APPEARANCES (Continued)</p> <p>2 For the Elephant Butte Irrigation District:</p> <p>3 SAMANTHA R. BARNCASTLE</p> <p>4 BARNCASTLE LAW FIRM</p> <p>5 Attorneys at Law</p> <p>6 Post Office Box 1556</p> <p>7 Las Cruces, New Mexico 88004</p> <p>8 (575) 636-2377</p> <p>9 samantha@h2o-legal.com</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	3
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18	<p>1           E X H I B I T S (Continued)</p> <p>2                            ADMITTED</p> <p>3 NEW MEXICO COPPER CORPORATION (Continued):</p> <p>4 NMCC Exhibit 63. Buka Environmental and    281</p> <p>5     Kuipers &amp; Associates, Predicting Water</p> <p>6     Quality at Hardrock Mines, Methods and</p> <p>7     Models, Uncertainties, and</p> <p>8     State-of-the-Art, 2005</p> <p>9 NMCC Exhibit 64. New Mexico Bureau of Mines   281</p> <p>10    and Mineral Resources, Geology and</p> <p>11    Evolution of the Copper Flat Porphyry</p> <p>12    System, Sierra County, New Mexico,</p> <p>13    February 1, 2001</p> <p>14 NMCC Exhibit 65. Environmental Geochemistry   281</p> <p>15    International Pty Ltd, Advances in Acid</p> <p>16    Drainage Prediction Using the Net Acid</p> <p>17    Generating (NAG) Test, 1997</p> <p>18 NMCC Exhibit 66. University of Queensland    281</p> <p>19    and others, Effect of Fracture</p> <p>20    Permeability on Connectivity of</p> <p>21    Fracture Networks, 2009</p> <p>22 NMCC Exhibit 67. MDAG.com Internet Case Study   281</p> <p>23    22, Should a Humidity-Cell Sample Be</p> <p>24    Gently Agitated During Testing? 2006</p> <p>25</p>	20	<p>1           E X H I B I T S (Continued)</p> <p>2                            ADMITTED</p> <p>3 NEW MEXICO COPPER CORPORATION (Continued):</p> <p>4 NMCC Exhibit 72. Mine Water and the        281</p> <p>5     Environment 22, Technical Article, The</p> <p>6     Limnology of Summer Camp Pit Lake: A</p> <p>7     Case Study</p> <p>8 NMCC Exhibit 73. Ministry of Employment and   281</p> <p>9     Investment, Reclamation Section, Energy</p> <p>10    and Minerals Division, Draft Guidelines</p> <p>11    and Recommended Methods for the Prediction</p> <p>12    of Metal Leaching and Acid Rock Drainage</p> <p>13    at Minesites in British Columbia, April,</p> <p>14    1997</p> <p>15 NMCC Exhibit 74. New Mexico Bureau of Geology   281</p> <p>16    and Mineral Resources Open-file report 475,</p> <p>17    The Natural Defenses of Copper Flat, Sierra</p> <p>18    County, New Mexico, August 2003</p> <p>19 NMCC Exhibit 75. Economic Geology, Vo. 98,   281</p> <p>20    Tectono-Magmatic Precursors for Porphyry</p> <p>21    Cu-(Mo-Au) Deposit Formation, 2003</p> <p>22 NMCC Exhibit 76. Oxygen Transport, Chapter 8,   281</p> <p>23    Sulfide Oxidation Mechanisms: Controls</p> <p>24    and Rates of Oxygen Transport</p> <p>25</p>

21	<p>1 EXHIBITS (Continued)</p> <p>2 ADMITTED</p> <p>3 NEW MEXICO COPPER CORPORATION (Continued):</p> <p>4 NMCC Exhibit 77. Minerals Engineering, 22, 281</p> <p>5 Humidity cell tests for the prediction</p> <p>6 of acid rock drainage, 2009</p> <p>7 NMCC Exhibit 78. Elsevier Scientific 281</p> <p>8 Publishing Company, Colloids and Surfaces,</p> <p>9 2, The Interaction of Anions and Weak</p> <p>10 Acids with the Hydrous Goethite (a-FeOOH)</p> <p>11 Surface, 1980</p> <p>12 NMCC Exhibit 79. Bureau of Mines Report of 281</p> <p>13 Investigations, Blast-Produced Fractures</p> <p>14 in Lithonia Granite, 1974</p> <p>15 NMCC Exhibit 80. EPA Industrial Environmental 281</p> <p>16 Research Laboratory, Office of Research</p> <p>17 and Development, Environmental Protection</p> <p>18 Technology Series, Field and Laboratory</p> <p>19 Methods Applicable to Overburdens and</p> <p>20 Minesoils, March 1978</p> <p>21 NMCC Exhibit 81. SRK Consulting, NI-43-101 281</p> <p>22 Preliminary Assessment, THEMAC Resources</p> <p>23 Group Limited, Copper Flat Project,</p> <p>24 Sierra County, New Mexico, 2010</p> <p>25</p>	23	<p>1 MS. ORTH: Good morning.</p> <p>2 My name is Felicia Orth. I'm a Hearing</p> <p>3 Officer appointed by the New Mexico Environment</p> <p>4 Department to conduct a hearing in the matter of</p> <p>5 Discharge Permit 1840.</p> <p>6 This is a Discharge Permit applied for by the</p> <p>7 New Mexico Copper Corporation for the proposed Copper</p> <p>8 Flat Mine. It was docketed by the hearing clerk as</p> <p>9 GWB 18-06(P).</p> <p>10 UNIDENTIFIED SPEAKER: You'll need to turn</p> <p>11 that thing up a little bit.</p> <p>12 MS. ORTH: Okay.</p> <p>13 Does it help if I'm closer to it?</p> <p>14 Okay.</p> <p>15 THE INTERPRETER: And the interpreter is</p> <p>16 ready, as well.</p> <p>17 MS. ORTH: The hearing is being recorded and</p> <p>18 transcribed by Cheryl Arreguin of Kathy Townsend Court</p> <p>19 Reporters.</p> <p>20 There is also simultaneous interpretation</p> <p>21 between Spanish and English.</p> <p>22 Ma'am.</p> <p>23 (SANDRA O. CALDWELL, the interpreter, was duly</p> <p>24 sworn.)</p> <p>25 THE INTERPRETER: Good morning.</p>
22	<p>1 EXHIBITS (Continued)</p> <p>2 ADMITTED</p> <p>3 NEW MEXICO COPPER CORPORATION (Continued):</p> <p>4 NMCC Exhibit 82. SRK Consulting, Geochemical 281</p> <p>5 Characterization Report for the Copper</p> <p>6 Flat Project, New Mexico, May 2013</p> <p>7 NMCC Exhibit 83. SRK Consulting, Predictive 281</p> <p>8 Geochemical Modeling of Pit Lake Water</p> <p>9 Quality at the Copper Flat Project, New</p> <p>10 Mexico, December 2014</p> <p>11 NMCC Exhibit 84. SRK Consulting, Humidity 281</p> <p>12 Cell Termination Report for the Copper</p> <p>13 Flat Project, New Mexico, February 2014</p> <p>14 NMCC Exhibit 85. Pergamon, Applied 281</p> <p>15 Geochemistry 15, Geochemical modeling</p> <p>16 approach to predicting arsenic</p> <p>17 concentrations in a mine pit lake, 2000</p> <p>18 NMCC Exhibit 86. THEMAC Resources Group, Mine 281</p> <p>19 Operation and Reclamation Plan, Copper</p> <p>20 Flat Mine Project, Sierra County, New</p> <p>21 Mexico, July 18, 2012</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	24	<p>1 Sandra Olivares Caldwell, certified court</p> <p>2 interpreter for the State of New Mexico.</p> <p>3 I swear to interpret faithfully between</p> <p>4 English and Spanish languages to the best of my ability</p> <p>5 in accordance with the ethics and protocols of the</p> <p>6 interpreter profession.</p> <p>7 Madam Hearing Officer, may I make the</p> <p>8 announcement?</p> <p>9 MS. ORTH: Yes.</p> <p>10 Use the --</p> <p>11 THE INTERPRETER: Thank you.</p> <p>12 Good morning, ladies and gentlemen.</p> <p>13 I'm here to provide language access to anyone</p> <p>14 who is more comfortable in another language besides</p> <p>15 English. If you are more comfortable in another</p> <p>16 language, no matter what language that is, please let me</p> <p>17 know. If you are here assisting someone or accompanying</p> <p>18 someone who is more comfortable in another language,</p> <p>19 please let me know.</p> <p>20 I'll be making an announcement in Spanish.</p> <p>21 (In Spanish.)</p> <p>22 Everyone present is comfortable in English?</p> <p>23 Thank you very much.</p> <p>24 Madam Hearing Officer, no requests at this</p> <p>25 point for interpreter services, but I will be available</p>

<p style="text-align: right;">25</p> <p>1 at any time during the hearing.</p> <p>2 MS. ORTH: Thank you very much.</p> <p>3 All right. So the hearing will be conducted</p> <p>4 in accordance with the New Mexico Water Quality Act, the</p> <p>5 New Mexico Ground and Surface Water Protection</p> <p>6 Regulations, the Supplemental Permitting Requirements</p> <p>7 for Copper Mine Facilities, commonly known as the Copper</p> <p>8 Mine Rule. And, of course, the procedures that apply</p> <p>9 here come from those sources and also 20.1.4 of the New</p> <p>10 Mexico Administrative Code.</p> <p>11 All testimony will be taken under oath. All</p> <p>12 testimony will be subject to cross-examination.</p> <p>13 A few housekeeping matters.</p> <p>14 The restrooms are through that door at the</p> <p>15 back of the auditorium.</p> <p>16 There is something of a coffee setup over</p> <p>17 here, although I have to explain it. All you'll find in</p> <p>18 the hot water pot is hot water. If you want leaded</p> <p>19 coffee, you cut open one of these Cafe Bustelo. If you</p> <p>20 want unleaded, you open the German decaffeinated coffee.</p> <p>21 And then there are tea bags, half and half and sugar</p> <p>22 cubes.</p> <p>23 There are restaurants nearby, I know. We will</p> <p>24 take a lunch break somewhere 11:30, noon, whenever</p> <p>25 there's a good stopping place in a witness' testimony.</p>	<p style="text-align: right;">27</p> <p>1 essential process is we're making an evidentiary record.</p> <p>2 The transcript will be produced. The parties will have</p> <p>3 a chance to submit posthearing proposed findings and</p> <p>4 conclusions. I do a Hearing Officer report. All of</p> <p>5 that goes to the cabinet secretary. So it will be some</p> <p>6 months before a decision is made around anything we're</p> <p>7 doing here this week.</p> <p>8 Also, I saw some E-mail traffic in the</p> <p>9 administrative record, and I wanted to be clear about</p> <p>10 another aspect of the -- of the public comment, which is</p> <p>11 your comment can come in verbally on this record here,</p> <p>12 with the court reporter, this week, and if we continue</p> <p>13 into the second week, that week, as well. However, when</p> <p>14 we adjourn, nothing further can come in, no public</p> <p>15 comment, no technical testimony, nothing.</p> <p>16 Those are the procedures of the Environment</p> <p>17 Department, and this is the Environment Department</p> <p>18 hearing.</p> <p>19 There is another hearing that will occur the</p> <p>20 week of October 22nd, also in T or C, but that's a</p> <p>21 hearing for another agency, the Mining and Minerals</p> <p>22 Division of the Energy, Minerals and Natural Resources</p> <p>23 Department. They have different rules.</p> <p>24 In that proceeding, they actually invite</p> <p>25 written public comment after adjournment. So if you</p>
<p style="text-align: right;">26</p> <p>1 Public comment will be invited throughout the</p> <p>2 hearing. We also have a special session set aside for</p> <p>3 public comment where we'll hear no technical witnesses.</p> <p>4 That will be starting tomorrow night, that's Tuesday</p> <p>5 night, at 5:00 p.m.</p> <p>6 Otherwise, if you have public comment to</p> <p>7 offer, please let me know. We don't interrupt a</p> <p>8 technical witness' testimony, but at the end of a</p> <p>9 technical witness' testimony, especially if we're about</p> <p>10 to take a break, I will invite your public comment.</p> <p>11 So really just let me know or let John Baca --</p> <p>12 where is John?</p> <p>13 MR. BACA: Right here.</p> <p>14 MS. ORTH: There he is. That's John Baca. He</p> <p>15 is the hearing clerk. You see him there in the striped</p> <p>16 shirt.</p> <p>17 If you have a question, you want to let us</p> <p>18 know about public comment, you've noticed the coffee</p> <p>19 pot's empty, whatever it is, talk to John, and we will</p> <p>20 figure it out together.</p> <p>21 Let's see.</p> <p>22 We will not go past about 7:00 p.m. each day.</p> <p>23 Again, it kind of depends on where the witnesses are in</p> <p>24 their testimony.</p> <p>25 No decisions will be made this week. The</p>	<p style="text-align: right;">28</p> <p>1 have something to say to EMNRD MMD, the Mining and</p> <p>2 Minerals Division, after the evidentiary record, the</p> <p>3 public comment record is closed, you can still do that.</p> <p>4 Just not for this hearing. So just get it in first.</p> <p>5 Let's see.</p> <p>6 Again, we will take a lunch break. We won't</p> <p>7 typically take a dinner break. When we break in the</p> <p>8 early evening, it will be for the night.</p> <p>9 Are there any questions about what I would</p> <p>10 call administrative or housekeeping matters?</p> <p>11 Mr. Butzier.</p> <p>12 MR. BUTZIER: Madam Hearing Officer, just one</p> <p>13 point of clarification.</p> <p>14 Is it the case that if somebody comes after</p> <p>15 work, between the 5 and 7 o'clock time frame, who wants</p> <p>16 to give public comment, that that person will have an</p> <p>17 opportunity during that window regardless of where we</p> <p>18 are in the -- in the technical testimony?</p> <p>19 MS. ORTH: If you mean tomorrow night, the</p> <p>20 answer is yes.</p> <p>21 MR. BUTZIER: But not otherwise?</p> <p>22 MS. ORTH: If someone really wants to be heard</p> <p>23 and that's their chance, if you will, that's their</p> <p>24 window --</p> <p>25 MR. BUTZIER: Okay.</p>

<p style="text-align: right;">29</p> <p>1 MS. ORTH: -- we can take them. I definitely 2 want to make a space for anyone who wants to offer 3 comment. I just want to do it with the least possible 4 disruption. 5 MR. BUTZIER: And I know in the past that 6 you've often invited public comment just before lunch. 7 Is that your intention in this proceeding? 8 MS. ORTH: So that's something we can do. 9 Again, depending on where the technical witness is, 10 breaks are often an excellent time to get some public 11 comment in, either before or after lunch, or before we 12 break for the day. 13 MR. BUTZIER: Thank you, Madam Hearing 14 Officer. 15 MS. ORTH: Yes. Again, just let us know that 16 you're ready to offer comment. 17 Any other questions about administrative 18 matters? 19 Ma'am. 20 Tell me your name. 21 MS. BRITTAN: My name is Rhonda Brittan. 22 I was wondering if -- will public comment be 23 restricted to a time limit? 24 MS. ORTH: I don't like to place time limits 25 on folks. Most folks don't -- don't need them. I will</p>	<p style="text-align: right;">31</p> <p>1 But certainly the application and most 2 relevant parts of it I think we can -- we can have for 3 inspection if someone would like to. 4 MS. ORTH: So that reminds me. If you would 5 reach for your devices, please, and either turn them off 6 or set them on stun. Those of us who are trying to make 7 the record appreciate it. Thank you for that. And if 8 you need to take a call, just step out of the -- step 9 out of the room. 10 Sign-ins. So we have some sign-in sheets. 11 Please sign in, give us as much information as you -- as 12 you'd like, even if it's just your name. The sign-in 13 sheets are used as evidence of public participation and 14 for the correct spelling of your name in the transcript 15 if you ask a question or speak up. 16 No salesmen will call. So please just sign in 17 and indicate on the sheet whether you would like to give 18 public comment. And we might approach you -- if we see 19 that you are desirous of giving public comment, we might 20 approach you and ask you if you have any time 21 constraints. 22 Any other questions at all? 23 No? All right. 24 Oh, ma'am. 25 UNIDENTIFIED SPEAKER: Where's the sign-in</p>
<p style="text-align: right;">30</p> <p>1 ask you not to repeat yourself. I mean, there are other 2 rules about public comment, no personal attacks, don't 3 repeat yourself and don't stray into technical 4 testimony, testimony that would require a scientific 5 background. But other than that, we'd like to hear what 6 you have to say. 7 Are there other questions? 8 No. All right. 9 So I have the pleadings in front of me. 10 You -- anyone is welcome to look at them when we're on a 11 break. We also have the administrative record here 12 somewhere. It's usually maintained by the bureau. 13 Andrew, do you have that? 14 MR. KNIGHT: Madam Hearing Officer -- I'm not 15 sure it's on. 16 MS. ORTH: It's on. 17 MR. KNIGHT: It's on. 18 The administrative record, we have -- we have 19 large portions as -- as the applicant, I imagine, does, 20 as well. But the administrative record was maintained 21 electronically in this proceeding, and it is 18,000-some 22 pages long. So the entire record -- as far as I know, 23 the entire record is not in paper at this point, and I 24 think it would be impractical to print out the entire 25 thing.</p>	<p style="text-align: right;">32</p> <p>1 sheet? 2 MR. BACA: Oh, right here. 3 MS. ORTH: John Baca is running around with 4 the sign-in sheets. We had a number of people come into 5 the room before -- before the sheets were at the sign-in 6 table. 7 Okay. In that case, Mr. Knight, if you would 8 begin the appearances. 9 MR. KNIGHT: Good morning, Madam Hearing 10 Officer. 11 My name is Andrew Knight. I am representing 12 the Mining and Environmental Compliance Section of the 13 Ground Water Bureau of the New Mexico Environment 14 Department. 15 And with me today I have three witnesses, 16 Mr. Kurt Vollbrecht, Mr. Bradley Reid and Dr. Joseph 17 Marcoline. 18 MS. ORTH: And -- 19 MR. KNIGHT: And our division director, 20 Mr. Bruce Yurdin, is with me at the table. 21 MS. ORTH: All right. Thank you. 22 Mr. de Saillan. 23 MR. DE SAILLAN: Thank you, Madam Hearing 24 Officer. 25 My name is Charles de Saillan, and I'm</p>



<p style="text-align: right;">33</p> <p>1 representing Turner Ranch Properties and the Hillsboro 2 Pitchfork Ranch. 3 With me today is Steve Dobrott, who is the 4 former manager of the Ladder Ranch. 5 To his left is Jim Kuipers, who is one of our 6 experts. 7 Directly behind me is Kendra Palmer, who is a 8 paralegal with the New Mexico Environmental Law Center. 9 And to her left is Tom Myers, who is our 10 hydrologist expert. 11 I think Bob Cunningham, who is the owner of 12 the Hillsboro Pitchfork Ranch, should be close by. 13 MR. CUNNINGHAM: Right back here, Charlie. 14 MR. DE SAILLAN: Right there. 15 MS. ORTH: All right. Thank you. 16 MR. DE SAILLAN: Thank you. 17 MS. BARNCASTLE: Good morning, Madam Hearing 18 Examiner. 19 Samantha Barncastle for the Elephant Butte 20 Irrigation District. 21 With me today is the manager of the district, 22 Mr. Gary Esslinger, one of my experts, Dr. Carroll, and 23 three more of my experts, in order, Mr. Fuchs, Dr. King 24 and Mr. Libbin. 25 MS. ORTH: Thank you.</p>	<p style="text-align: right;">35</p> <p>1 And we'll start with the chief operating 2 officer, Mr. Jeff Smith, and I'd like to go ahead and 3 call him, and he will sort of introduce some of the 4 matters for the -- for the hearing today. 5 MS. ORTH: All right. Thank you. 6 Let me just ask if there's anyone else who 7 would like to make an opening statement or reserve. It 8 is your choice. 9 Hearing nothing -- oh. 10 MR. DE SAILLAN: We will reserve our opening 11 statement until the commencement of our presentation. 12 MS. ORTH: Okay. 13 MR. DE SAILLAN: Thank you. 14 MS. BARNCASTLE: I will likewise reserve mine. 15 MS. ORTH: Okay. 16 MR. KNIGHT: Madam Hearing Officer, I have an 17 opening statement I can make at this time. 18 MS. ORTH: Right now. All right. Thank you, 19 Mr. Knight. 20 MR. KNIGHT: Good morning, parties, members of 21 the public, Madam Hearing Officer. 22 We are here this week for a fairly narrow 23 purpose, to determine whether this mine if constructed 24 and operated in accordance with this permit will cause 25 exceedances of groundwater quality standards at places</p>
<p style="text-align: right;">34</p> <p>1 Mr. Butzier. 2 MR. BUTZIER: Madam Hearing Officer, Stuart 3 Butzier of the Modrall Sperling law firm in the Santa Fe 4 office. 5 With me today at the table here are New Mexico 6 Copper representatives, including Mr. Jeff Smith and 7 Ms. Katie Emmer. 8 Mr. Andrew Maloney is in the back over there 9 with Tulla, who you'll hear about from Mr. Smith when he 10 testifies. 11 And then I've got a number of experts here 12 that I think I will wait to introduce as we go forward 13 unless you want me to introduce them now. 14 MS. ORTH: No. That's all right. 15 MR. BUTZIER: Okay. 16 MS. ORTH: Thank you. 17 MR. BUTZIER: Thank you. 18 MS. ORTH: And while I have Mr. Butzier there, 19 are you interested in making an opening statement, or 20 are there preliminary matters we need to address before 21 your opening statement? 22 MR. BUTZIER: I have not prepared an opening 23 statement other than I can just say that we intend to 24 offer five witnesses in support of New Mexico Copper's 25 position in this proceeding.</p>	<p style="text-align: right;">36</p> <p>1 of withdrawal. 2 There are many other peripheral issues, and 3 some of those are important, and they will be discussed, 4 but at its core the decision to issue this permit 5 revolves around that single question. 6 You'll hear from the department's three 7 witnesses this week that we have spent literally years 8 scrutinizing the Mine Plan, the history of this site, 9 the geology and groundwater flow characteristics of the 10 area, and combined that with consultation with multiple 11 other federal and state agencies and lessons learned 12 from decades of our own permitting experience. 13 And through an iterative process, the bureau 14 has created a permit that will allow mining to occur 15 while protecting the quality of groundwater according to 16 both the Copper Rule and the New Mexico Water Quality 17 Act. This permit does not allocate water -- any water 18 for use at the mine, and it's not by itself a permit to 19 operate the mine. It is a permit to discharge water in 20 such a way that surrounding groundwater is protected. 21 The Copper Rule was designed to be a permit by 22 rule, a set of comprehensive, prescriptive requirements 23 that an applicant must show they can meet, and if the 24 department finds those requirements are met, the permit 25 is issued. We do not have the discretion to consider</p>

<p style="text-align: right;">37</p> <p>1 other factors outside the scope of groundwater quality.  2 This permit does not depend on any certain amount of  3 water being available. It only sets maximum discharge  4 limits.  5 In the first public draft of the proposed  6 permit which was released back in February, the bureau  7 imposed a number of additional conditions on the mine  8 operators on top of those required by the Copper Rule.  9 We find that those -- those conditions are both  10 necessary and required in order for this permit to  11 comply with the Water Quality Act.  12 The Water Quality Act also sets the criteria  13 for denying a Discharge Permit. In Section 74-6-5 of  14 the New Mexico Statutes, it states that, quote, a permit  15 shall be denied if the discharge would cause or  16 contribute to water contaminant levels in excess of any  17 state or federal standard. Determination of the  18 discharge's effect on groundwater shall be measured at  19 any place of withdrawal of water for present or  20 reasonably foreseeable future use.  21 A few words about the administrative record.  22 The administrative record contains those materials  23 relied on by the bureau in issuing the permit. It  24 contains the application, records of our consultation  25 with other agencies, all communications with interested</p>	<p style="text-align: right;">39</p> <p>1 this particular hearing. This permit is but one  2 component of a very long process, certainly an important  3 one, but only one piece of the puzzle.  4 Thank you.  5 MS. ORTH: Thank you, Mr. Knight.  6 Mr. Butzier.  7 MR. BUTZIER: Thank you, Madam Hearing  8 Officer.  9 We'd like to call Mr. Jeff Smith as our first  10 witness.  11 JEFFREY SMITH  12 having been first duly sworn or affirmed, was  13 examined and testified as follows:  14 DIRECT EXAMINATION  15 BY MR. BUTZIER:  16 Q. Good morning, Mr. Smith.  17 Would you please identify yourself for the  18 record.  19 A. My name is Jeff Smith. I'm the chief  20 operating officer for New Mexico Copper.  21 Q. And, Mr. Smith, what will you be presenting in  22 the hearing today?  23 MR. SMITH: Katie, can you go to the first  24 slide.  25 This slide is an outline of my presentation</p>
<p style="text-align: right;">38</p> <p>1 parties relevant to the permit and thousands of pages of  2 test results and scientific studies.  3 The administrative record does not contain  4 materials that are not relevant to the issuance of this  5 permit or materials that, while arguably relevant, were  6 not relied upon by the bureau in issuing this permit.  7 There are many issues connected with the  8 operation of this mine, but we are here this week to  9 discuss only one important subset of those issues,  10 potential impacts to groundwater quality and the  11 measures to be taken to prevent those impacts that would  12 lead to exceedances of standards at places of  13 withdrawal.  14 We received a number of thoughtful, reasoned  15 comments on the draft permit from the parties here today  16 and from members of the public. We have made changes to  17 the permit in response to those comments, and those  18 changes impose additional burdens on the applicant. As  19 the additional conditions imposed in the first draft of  20 the permit, we believe those additional conditions are  21 reasonable and necessary, and we have provided an  22 explanation of them as required by the Copper Rule.  23 In closing, there are many -- many other valid  24 topics for discussion related to this mine, and while  25 they are all important, they are not all the subject of</p>	<p style="text-align: right;">40</p> <p>1 that I'll give today.  2 I'll start off with a summary of my  3 qualifications and followed by a summary and overview of  4 New Mexico Copper Corporation.  5 After that, I will talk a bit about the Copper  6 Flat project and give a brief summary of community  7 benefits that will result from the project.  8 Then I will go into a summary of our  9 application for a Discharge Permit and the methods that  10 we are using to protect groundwater.  11 I will discuss the major mine units that are  12 covered by the permit and a summary of our Reclamation  13 and Closure Plan.  14 After that, I will talk about our financial  15 assurance that we have -- our proposal that we have  16 submitted, and then I will conclude with an introduction  17 of our other experts.  18 Q. (BY MR. BUTZIER) And, Mr. Smith, would you  19 please describe your expertise and qualifications to be  20 talking about these topics.  21 A. As I stated in my introduction, I am the chief  22 operating officer of New Mexico Copper Corporation.  23 I have a degree in mining engineering that I  24 earned from the University of Arizona and a master's  25 degree in business management from Stanford University</p>

41	<p>1 Graduate School of Business.</p> <p>2 I have 35 years of experience in mine</p> <p>3 management and mine engineering. My experience includes</p> <p>4 work in the United States, Mexico and South America.</p> <p>5 Excuse me.</p> <p>6 My experience includes time at the Quintana</p> <p>7 Minerals Copper Flat Mine from 1980 to 1983.</p> <p>8 During my career, I served as -- on the</p> <p>9 Economic Development Authority for Pershing County,</p> <p>10 Nevada, and I have knowledge and understanding of the</p> <p>11 New Mexico Copper Rule requirements to prevent water</p> <p>12 pollution.</p> <p>13 Thank you.</p> <p>14 MR. BUTZIER: Madam Hearing Officer, at this</p> <p>15 time, New Mexico Copper would like to offer Mr. Smith as</p> <p>16 a mine management and mine engineering expert who also</p> <p>17 has expertise in connection with compliance with the New</p> <p>18 Mexico Copper Rule.</p> <p>19 MS. ORTH: Objections?</p> <p>20 All right. He's so recognized.</p> <p>21 Q. (BY MR. BUTZIER) At this time, Mr. Smith,</p> <p>22 would you please proceed with the prepared presentation</p> <p>23 that you've made.</p> <p>24 A. New Mexico Copper Corporation is the owner of</p> <p>25 the project assets. The company is the permittee, the</p>	43	<p>1 we're dedicated to providing the local community with</p> <p>2 significant opportunities for employment and economic</p> <p>3 development.</p> <p>4 We recognize the concerns and issues of</p> <p>5 neighboring property owners and the community at large,</p> <p>6 and we have included measures to address these concerns</p> <p>7 in our plans.</p> <p>8 Copper Flat Mine property is accessed by State</p> <p>9 Highway 152, about 20 miles southwest of Truth or</p> <p>10 Consequences and four miles northeast of Hillsboro.</p> <p>11 Mining at the property dates back to the late</p> <p>12 1800s. There has been placer gold and copper mining at</p> <p>13 the property, and the history includes copper mining by</p> <p>14 Quintana Minerals from 1980 to 1983.</p> <p>15 The land -- the property is -- the permit</p> <p>16 boundary at the property encompasses approximately 2,200</p> <p>17 acres. This is a mix of private and public land,</p> <p>18 approximately 40 to 50 percent private ground. The</p> <p>19 public land is administered by the BLM, and our</p> <p>20 unpatented mining claims cover the entirety of the</p> <p>21 public land.</p> <p>22 Reserves at Copper Flat include 675 million</p> <p>23 pounds of copper, 20 million pounds of molybdenum,</p> <p>24 250,000 ounces of gold and 5 to 6 million ounces of</p> <p>25 silver.</p>
42	<p>1 developer and will be the operator of the Copper Flat</p> <p>2 Mine.</p> <p>3 New Mexico Copper Corporation is organized as</p> <p>4 a New Mexico domestic profit corporation. The company</p> <p>5 was organized in 2010.</p> <p>6 New Mexico Copper is a wholly-owned subsidiary</p> <p>7 of THEMAC Resources Group, which is listed on the</p> <p>8 Toronto Stock Exchange. The majority shareholder in</p> <p>9 THEMAC is Tulla Group, which is an Australian family</p> <p>10 investment group.</p> <p>11 Tulla's other mining investments include</p> <p>12 Norseman Gold, which is Australia's longest continuously</p> <p>13 running gold mining operation that has produced over</p> <p>14 5.5 million ounces of gold over 65 years in Western</p> <p>15 Australia.</p> <p>16 Tulla is fully funding the Copper Flat</p> <p>17 project, and Tulla has invested more than \$55 million to</p> <p>18 date in the project for engineering, property</p> <p>19 acquisition, permitting and all the consultants that are</p> <p>20 needed to accomplish that.</p> <p>21 Our plans are designed to meet or exceed</p> <p>22 health, safety and environmental regulatory</p> <p>23 requirements.</p> <p>24 We are committed to developing a long-term</p> <p>25 relationship with our neighbors in Sierra County, and</p>	44	<p>1 The production method at Copper Flat will be</p> <p>2 an open pit mine with a conventional flotation mill.</p> <p>3 The operation is very typical of the industry and very</p> <p>4 straightforward.</p> <p>5 The duration of the project will begin with</p> <p>6 two years of construction, followed by 12 years of</p> <p>7 production, which then in turn will be followed by 10 to</p> <p>8 20 years of reclamation and closure.</p> <p>9 A feasibility study has been prepared on the</p> <p>10 project by M3 Engineering with assistance from a wide</p> <p>11 range of technical experts. That feasibility study</p> <p>12 resulted in a positive result and the decision to move</p> <p>13 forward with development of the mine.</p> <p>14 Permitting is moving forward. Our federal EIS</p> <p>15 and state permits are progressing. We are using a</p> <p>16 common Mine Plan for all agencies, and that includes the</p> <p>17 Reclamation and Operation Plan.</p> <p>18 This slide shows the location of the mine.</p> <p>19 This is the location within -- within a copper belt that</p> <p>20 extends from Arizona to New Mexico and down into Mexico.</p> <p>21 The Copper Flat Mine is located at the star just</p> <p>22 southwest of Truth or Consequences. And Hillsboro is --</p> <p>23 will be in this location here. Highway 152 runs from</p> <p>24 I-25 to Silver City.</p> <p>25 The region is served by rail. There's a rail</p>

<p style="text-align: right;">45</p> <p>1 line that extends over to Arizona and then down into  2 Mexico.  3 As you can see from this, there is a  4 significant number of copper mining and mineral deposits  5 in this belt.  6 This slide shows our production profile that  7 is outlined in our operating plans. It covers a 12-year  8 operating period and shows average head grade and copper  9 production into concentrate in the blue bars. We will  10 be producing a concentrate at the operation and then  11 shipping that away for smelting.  12 The first five years are planned to be higher  13 grade. This will achieve a payback of the financing  14 soon in the operation and then allow production to  15 continue without the -- the financing overhead. First  16 five years will produce approximately 35,000 tons of  17 copper per year and then followed by approximately  18 25,000 tons of copper.  19 The ore at Copper Flat lends itself to a very  20 typical and common crushing and grinding practice that  21 is used throughout the industry today. We will be  22 flotating -- employing flotation to produce a copper  23 concentrate that contains the gold and silver, as well,  24 and produce a separate molybdenum concentrate.  25 We are employing standard flotation reagents.</p>	<p style="text-align: right;">47</p> <p>1 Construction expenditures will include  2 \$45 million spent here in Sierra County and another  3 \$49 million spent in the rest of the state.  4 During the operation, there will be 270  5 full-time direct jobs at the mine. Individual wages  6 will be very good, ranging from 35,000 to 60,000 annual,  7 plus benefits. In addition to that, there will be a  8 large number of indirect and induced jobs here in Sierra  9 County, for a total of 360 to 400 jobs total.  10 Federal and state taxes paid will -- are  11 estimated to be 175 million, in ad valorem, severance,  12 income and gross receipts taxes.  13 After mining, there will be 10 to 20 years of  14 reclamation and closure, and there will be ongoing jobs,  15 wages and tax benefits occurring during that period.  16 Our application for Discharge Permit started  17 in 2010. There was a Sampling and Analysis Plan and  18 Baseline Data Report that was produced by INTERA and  19 issued in 2012.  20 Our initial application for a Discharge Permit  21 was submitted in 2011, which is prior to New Mexico  22 adopting the Copper Rule. As the application was being  23 developed, there were discussions happening in Santa Fe  24 on the Copper Rule, and we were developing our plans to  25 meet the requirements that we felt would be coming</p>
<p style="text-align: right;">46</p> <p>1 There's no leaching on site or any other process. And  2 after the concentrate is produced, it's shipped away for  3 smelting.  4 The concentrate will have low impurities and  5 is expected to yield a clean 28 percent copper grade.  6 There's been metallurgical test work completed on the  7 ore body that has -- has guided us in development of our  8 concentrate quality. We produce it in a lab.  9 In addition, we have the records from the  10 Quintana operation that also describes the  11 characteristics of the concentrate.  12 There will be several community benefits that  13 develop from this -- developing the Copper Flat Mine.  14 These benefits are described and were -- were developed  15 by the Arrowhead Center in a report that was produced in  16 2012.  17 In this report, the Arrowhead Center projects  18 that there will be 1,156 jobs created during  19 construction. This includes direct, indirect and  20 induced jobs. And this number is through the State of  21 New Mexico.  22 Construction of the project will add  23 \$55.6 million to the statewide labor income and will add  24 nearly \$80 million to the value of materials and goods  25 that are produced within the state.</p>	<p style="text-align: right;">48</p> <p>1 through the Copper Rule.  2 In 2017, we completed a revision to the  3 application and reorganized the application to  4 demonstrate compliance with the Copper Rule.  5 Our application is supported by numerous  6 technical reports and supported by a Mining and  7 Reclamation Plan that has been submitted to all of the  8 agencies that are involved in permitting this mine.  9 The application includes extensive water  10 management methodologies and controls for protecting --  11 for protecting groundwater.  12 The application was deemed by NMED to be  13 administratively complete in 2012 and then followed by  14 deemed to be technically approvable on February 1, 2018,  15 and draft DP-1840 was issued by the agency on  16 February 2, 2018.  17 On this slide, I've listed example methods  18 that we've employed in our plans to prevent water  19 pollution as required by the Copper Rule.  20 The plan includes water management planning,  21 engineering and design of facilities and structures with  22 sufficient capacity to contain anticipated storm events.  23 The site grading and -- we have included site  24 grading and construction of diversion structures to  25 direct unaffected stormwater away from the mine</p>

<p style="text-align: right;">49</p> <p>1 facilities and limit stormwater running onto the mine  2 facilities.  3 Stormwater that falls directly onto the mine  4 facilities will be captured for use at the mine.  5 The ore processing is by flotation only.  6 We're not employing ore leaching or solvent extraction  7 processes.  8 We have developed and will implement and  9 follow a waste rock characterization and management  10 program. As testimony continues today, there will be  11 discussion of materials that have been identified as --  12 as potential acid-generating. That material is very  13 small in nature. We have identified -- we have a plan  14 to identify that in the field as we mine it and will  15 segregate it and store it properly in our facilities.  16 We will be constructing fully lined and  17 contained process facilities, including the flotation  18 plan, the tailing storage facility, the process water  19 piping systems and process and affected water  20 impoundments.  21 We will have a solution management process at  22 the tailing storage facility throughout the operation  23 and through the reclamation and closure phases,  24 including facility draindown after processing ends,  25 followed by placement of an engineered cover and</p>	<p style="text-align: right;">51</p> <p>1 open pit, in this area here. This facility -- this  2 facility includes contained and lined facilities, will  3 be utilizing existing foundations in locations in this  4 area here, this disturbed area here.  5 The tailings storage facility is located in  6 the southwest region of the permit area -- or --  7 sorry -- southeast area of the permit area. This will  8 be a synthetically lined storage facility, located  9 adjacent to the process area. The liner for this  10 facility is a high density polyethylene, or HDPE,  11 synthetic liner, 80-mil thick, high quality, standard  12 liner that is used for environmental containment around  13 the world today.  14 The TSF includes solution underdrain and  15 collection and process water recycling systems. The  16 water recovered from this facility will be reused for  17 mineral recovery as part of a Water Conservation Plan.  18 The TSF dam that's at the front of this impoundment will  19 be designed, constructed and will comply with OSE Dam  20 Safety requirements.  21 There are HDPE-lined impoundments and ponds  22 located adjacent to the tailing storage facility, our  23 waste rock stockpiles, the process area. These ponds  24 and impoundments are designed to include capacity for  25 stormwater events.</p>
<p style="text-align: right;">50</p> <p>1 revegetation of the tailings facility.  2 Our plans include reclamation of legacy  3 disturbances that will be completed during construction  4 and operation. Early in our development phase as we're  5 constructing the facility, we will address unreclaimed  6 mine waste stockpiles that exist from previous  7 operations at the property. We will reshape them, grade  8 them, cover and revegetate.  9 We will complete reclamation and closure of  10 the site according to our Reclamation Plan that has been  11 submitted following the operation, and this also  12 includes reshaping and revegetation of the disturbances  13 that we create during the operation.  14 I'd like to introduce now the major mine units  15 that we'll be talking about today. And to accompany  16 this, we have a figure that we'll go to that outlined  17 these major mine units.  18 First on the list is the open pit. The future  19 open pit is located in this area.  20 Just for reference, this outline on this  21 figure, this is the permit boundary that encompasses  22 approximately 2,200 acres. At the west end of the  23 permit area is the open pit. This is located primarily  24 on private ground that is owned by New Mexico Copper.  25 The process facility is to the east of the</p>	<p style="text-align: right;">52</p> <p>1 The mine's waste rock stockpiles are located  2 adjacent to the open pit and the open pit surface  3 drainage area and northeast of the process area. These  4 waste rock stockpiles are located on low permeability  5 andesite bedrock.  6 Included in the facility are roads and  7 administrative areas. The surfaces of these areas will  8 be graded and maintained for stormwater management.  9 This area -- or these areas include a wastewater package  10 treatment facility that will discharge greywater to the  11 tailings facility.  12 I'll describe now elements of our Reclamation  13 and Closure Plan.  14 The engineering for the Reclamation and  15 Closure Plan is complete, and plans have been submitted  16 to the -- along with the Mining Operation and  17 Reclamation Plan, which also serves as the Closure Plan  18 for the Discharge Permit.  19 The New Mexico Copper's Discharge Permit  20 application including the Closure Plan was deemed  21 technically complete by NMED on February 1, 2018.  22 The plan includes salvage of growth media  23 ahead of construction and storage of the growth media  24 for reuse at reclamation.  25 The plan includes three large growth media</p>

<p style="text-align: right;">53</p> <p>1 stockpiles that will be located at strategic areas  2 around the property, the mine property. These  3 stockpiles will be graded and revegetated and access  4 controlled to prevent erosion in the future and maintain  5 those stockpiles for the future.  6 After mining is complete, the material will be  7 removed from those stockpiles and used for covering the  8 facilities and revegetation phase.  9 Shortly after mining ends, the open pit will  10 be filled with freshwater to the equilibrium level of  11 the hydraulic sink and partially revegetated to limit  12 oxidation of the pit walls. The mine rock stockpiles at  13 the tailings facility will be covered with growth media  14 and revegetated.  15 Water from the tailings facility will be  16 removed through evaporation, and following that the  17 surface will be regraded, covered and revegetated.  18 Buildings, pipelines and other surface  19 structures will be removed. The concrete foundations  20 will be broken and removed or buried as appropriate.  21 All pond and trench liners will be removed,  22 and the excavations will be backfilled and revegetated,  23 except as needed for ongoing water management.  24 New Mexico Copper will post financial  25 assurance for the reclamation and closure of Copper</p>	<p style="text-align: right;">55</p> <p>1 SRK and submitted for review totals \$55.8 million. This  2 total includes contractor performance of the work,  3 mobilization and demobilization, agency management and  4 contract administration, closure water management and  5 monitoring.  6 The cost calculations require approval by  7 three agencies. The Copper Flat estimate was submitted  8 for agency review on August 9th, 2018.  9 Documentation of our cost estimate is provided  10 as an exhibit to our notice of intent.  11 We have several experts here to provide  12 testimony on our plans and designs, and I would like at  13 this time to introduce them. The team here today was  14 drawn from a larger group of experts which we have  15 employed over a number of years since 2010 to develop  16 the plans and designs for this project.  17 With us today is Steven Finch from John  18 Shomaker &amp; Associates. Mr. Finch will be presenting  19 testimony on groundwater hydrology at the Copper Flat  20 area.  21 Dr. Ruth Griffiths of SRK Consulting has  22 joined us from Cardiff, UK. Dr. Griffiths will be  23 discussing geochemistry at the Copper Flat Mine.  24 Following Dr. Griffith, we will have a  25 discussion of the tailing storage facility design from</p>
<p style="text-align: right;">54</p> <p>1 Flat, and the financial assurance will be held jointly  2 by NMED, MMD and the BLM.  3 Our financial assurance proposal is based on  4 the estimated cost of reclamation -- the cost of  5 reclamation and closure as performed by third-party  6 contractors under agency management as required by  7 19.10.12 NMAC, which is administered by MMD.  8 Our financial assurance proposal also includes  9 a Closure Water Management Plan as required by  10 20.6.7.33H NMAC, which is administered by NMED.  11 The estimated cost of reclamation and closure  12 has been prepared by SRK Consulting using the Copper  13 Flat Reclamation and Closure Plan that was prepared by  14 Golder Associates as part of our permit applications.  15 The costing for the proposal was prepared using  16 estimating standards and practices that have been  17 accepted by a wide range of regulatory agencies and  18 jurisdictions.  19 The estimate relies on average productivities  20 from the Caterpillar Handbook and other similar  21 references and costing references, not best case. In  22 addition, the estimate -- the proposal includes and  23 incorporates cost factors from agency guidelines, from  24 the MMD agency guidelines.  25 The financial assurance estimate prepared by</p>	<p style="text-align: right;">56</p> <p>1 Dave Kidd, our design engineer from Golder Associates.  2 Todd Stein, also at Golder Associates, was  3 focused on developing our reclamation plans, and  4 Mr. Stein will give an update on our reclamation plans  5 and designs.  6 We have many other experts that have been  7 employed on this project, and they are reflected in the  8 record.  9 That concludes my presentation.  10 Q. I do have a couple of questions, Mr. Smith.  11 In your opinion, do the various plans and  12 proposals included with New Mexico Copper Corporation's  13 application materials that are in the administrative  14 record fully meet or exceed the requirements of the  15 Water Quality Act, the Copper Rule and associated  16 groundwater program regulations administered by the New  17 Mexico Environment Department?  18 A. Yes, they do.  19 Q. In your opinion, will the construction,  20 operation, maintenance, reclamation and closure  21 activities that occur at the Copper Flat Mine in  22 accordance with the plans and procedures that are  23 outlined in the materials -- will those operations,  24 construction reclamation and closure meet or exceed the  25 requirements of the Water Quality Act, the Copper Rule</p>

57	<p>1 and the associated groundwater program regulations</p> <p>2 administered by the New Mexico Environment Department?</p> <p>3 A. Yes, they will.</p> <p>4 Q. And is it the case that Mr. Juan Velasquez</p> <p>5 will be joining you and be available to -- for</p> <p>6 questioning as part of the cross-examination relating to</p> <p>7 the scope of your direct testimony?</p> <p>8 A. Yes. He will.</p> <p>9 Q. And could you please just briefly introduce</p> <p>10 Mr. Velasquez and explain his role in this.</p> <p>11 A. Mr. Velasquez is principal of Velasquez</p> <p>12 Environmental Services. Mr. Velasquez has been</p> <p>13 assisting us for a number of years in developing our</p> <p>14 permit applications and developed the application for</p> <p>15 the Discharge Permit for submittal to the Environmental</p> <p>16 Department.</p> <p>17 Q. Thank you, Mr. Smith.</p> <p>18 With that, Madam Hearing Officer, we'd like to</p> <p>19 make most -- make both Mr. Smith and Mr. Velasquez</p> <p>20 available for cross-examination, as discussed</p> <p>21 previously.</p> <p>22 MS. ORTH: All right.</p> <p>23 If Mr. Velasquez would join Mr. Smith at the</p> <p>24 table, we'll have him sworn in.</p> <p>25 (JUAN VELASQUEZ was administered the oath.)</p>	59	<p>1 company's exhibits?</p> <p>2 Could you tell me what the Arrowhead Center</p> <p>3 is?</p> <p>4 MR. SMITH: The Arrowhead Center is an agency</p> <p>5 within the New Mexico State University. The group is</p> <p>6 focused on economic studies and reporting on economic</p> <p>7 development.</p> <p>8 MR. DE SAILLAN: Okay.</p> <p>9 And did New Mexico Copper Company pay for</p> <p>10 the -- the report that the Arrowhead Center did?</p> <p>11 MR. SMITH: We did.</p> <p>12 MR. DE SAILLAN: Okay.</p> <p>13 And were you involved in preparing the report?</p> <p>14 MR. SMITH: I was not directly involved. I</p> <p>15 have read the report and -- and followed up with it.</p> <p>16 MR. DE SAILLAN: Okay.</p> <p>17 And what did you say the date was on the</p> <p>18 Arrowhead report -- Arrowhead Center report?</p> <p>19 MR. SMITH: 2012.</p> <p>20 MR. DE SAILLAN: Okay.</p> <p>21 And do you have a copy of that handy?</p> <p>22 MR. SMITH: I don't have one in front of me</p> <p>23 right now. I think I can get one.</p> <p>24 MR. BUTZIER: Madam Hearing Officer, I do.</p> <p>25 MS. ORTH: Great.</p>
58	<p>1 MS. ORTH: Okay. Thank you.</p> <p>2 JEFFREY SMITH and JUAN VELASQUEZ</p> <p>3 having been first duly sworn or affirmed, were</p> <p>4 examined and testified as follows:</p> <p>5 MS. ORTH: Mr. Knight, we'll start with you.</p> <p>6 Do you have questions of Mr. Smith or</p> <p>7 Mr. Velasquez?</p> <p>8 MR. KNIGHT: I do not.</p> <p>9 MS. ORTH: Mr. de Saillan.</p> <p>10 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>11 Officer.</p> <p>12 CROSS EXAMINATION</p> <p>13 BY MR. DE SAILLAN:</p> <p>14 MR. DE SAILLAN: Good morning.</p> <p>15 My name is Charles de Saillan. I'm with the</p> <p>16 New Mexico Environmental Law Center.</p> <p>17 I'd like to start out with some questions</p> <p>18 about the benefits to the community that you discussed</p> <p>19 earlier, and I want to direct my questions to Mr. Smith,</p> <p>20 if I could, please.</p> <p>21 First of all, the -- you referred to the</p> <p>22 Arrowhead Center report, which is one of your exhibits?</p> <p>23 MR. SMITH: Yes.</p> <p>24 MR. DE SAILLAN: Okay.</p> <p>25 And that's Exhibit 6, I think, of the copper</p>	60	<p>1 MR. BUTZIER: It is -- Mr. de Saillan</p> <p>2 correctly pointed out that it's Exhibit 6 to the New</p> <p>3 Mexico Copper Corporation's exhibits offered as part of</p> <p>4 the statement of intent to present technical testimony,</p> <p>5 and I'm fine with sharing a copy with Mr. de Saillan, if</p> <p>6 that's acceptable.</p> <p>7 MS. ORTH: I think he wants Mr. Smith to look</p> <p>8 at it.</p> <p>9 MR. BUTZIER: You want Mr. Smith to look at</p> <p>10 it?</p> <p>11 MR. DE SAILLAN: Yes, please.</p> <p>12 MR. BUTZIER: Okay.</p> <p>13 MR. DE SAILLAN: Thank you, Mr. Butzier.</p> <p>14 MR. BUTZIER: Quite welcome.</p> <p>15 MR. DE SAILLAN: Now, what does that say about</p> <p>16 what the unemployment rate was in Sierra County at the</p> <p>17 time that it was published?</p> <p>18 MR. SMITH: I am looking for it. I don't have</p> <p>19 it at my fingertips.</p> <p>20 MR. BUTZIER: Madam Hearing Officer, if</p> <p>21 there's a particular part of the report that</p> <p>22 Mr. de Saillan would like to refer him to, that might</p> <p>23 speed the process.</p> <p>24 MS. ORTH: All right.</p> <p>25 Mr. de Saillan, do you want to refer him?</p>

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1 MR. DE SAILLAN: Yeah. I'm -- excuse me. I'm  
 2 looking for the page here myself. I had it written  
 3 down, but -- I think it's page 18.  
 4 MR. SMITH: I read Unemployed -- this is the  
 5 Civilian Labor Force from Table 3.9.1, Employment Status  
 6 of the Population 18 Year -- 16 Years and Older,  
 7 Unemployed 1.6 percent.  
 8 MR. DE SAILLAN: Okay.  
 9 I would direct your attention to the paragraph  
 10 that's just under 3.9, section 3.9, Labor Force and  
 11 Employment, says Sierra County unemployment rate?  
 12 MR. SMITH: I see that. 4.3 percent.  
 13 MR. DE SAILLAN: Okay.  
 14 And that's pretty low, isn't it?  
 15 MR. SMITH: Compared to today, it is.  
 16 MR. DE SAILLAN: And compared to the national  
 17 unemployment rate at the time?  
 18 MR. SMITH: Yes, compared to the nation's  
 19 unemployment rate of 7.9 percent.  
 20 MR. DE SAILLAN: And compared to New Mexico's  
 21 unemployment rate?  
 22 MR. SMITH: The state -- the state was  
 23 7.2 percent.  
 24 MR. DE SAILLAN: Okay.  
 25 And do you know what the national unemployment

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1 rate is now?  
 2 MR. SMITH: Today, I would estimate it is 4 to  
 3 5 percent.  
 4 MR. DE SAILLAN: Okay.  
 5 And in New Mexico?  
 6 MR. SMITH: Slightly higher than the -- the  
 7 national average.  
 8 MR. DE SAILLAN: Okay. So the unemployment  
 9 rate has gone down.  
 10 Do you know what the unemployment rate in  
 11 Sierra County is at this -- currently?  
 12 MR. SMITH: I believe the unemployment rate in  
 13 Sierra County is higher than the state average.  
 14 MR. DE SAILLAN: Okay.  
 15 But the numbers here are pretty old; is that  
 16 correct?  
 17 MR. SMITH: These are from 2012, and these  
 18 numbers are probably prior to that. The report is dated  
 19 2012. I'm guessing they -- these are statistics from  
 20 2006 to 2010, five-year average estimates.  
 21 MR. DE SAILLAN: Okay. Thank you.  
 22 Now, let's talk a little bit about financial  
 23 assurance issues.  
 24 You mentioned that New Mexico Copper  
 25 Corporation is a wholly-owned subsidiary of THEMAC.

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1 Now, how many mines in New Mexico does New  
 2 Mexico Copper Corporation operate?  
 3 MR. SMITH: New Mexico Copper operates no  
 4 mines in New Mexico at this time.  
 5 MR. DE SAILLAN: So does New Mexico Copper  
 6 have any other businesses in New Mexico?  
 7 MR. SMITH: No. New Mexico Copper is focused  
 8 on developing Copper Flat.  
 9 MR. DE SAILLAN: Okay.  
 10 Does it have any other assets in New Mexico?  
 11 MR. SMITH: Outside of Copper Flat, no, it  
 12 does not.  
 13 MR. DE SAILLAN: Does it have any other assets  
 14 in any other state?  
 15 MR. SMITH: It does not.  
 16 MR. DE SAILLAN: Okay.  
 17 So what happens to New Mexico Copper when the  
 18 ore body at the Copper Flats Mine runs out?  
 19 MR. SMITH: Well, that's speculation into the  
 20 future. The intent would be that New Mexico Copper  
 21 develops additional mines and transfers operations to  
 22 those additional mines.  
 23 MR. DE SAILLAN: Does it have any plans for  
 24 additional mines?  
 25 MR. SMITH: We are certainly always thinking

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1 along those lines and looking ahead for additional  
 2 opportunities, but we have no specific plans at this  
 3 time.  
 4 MR. DE SAILLAN: Okay.  
 5 Where else are you looking?  
 6 MR. SMITH: Well, certainly right now we would  
 7 consider opportunities in New Mexico.  
 8 MR. DE SAILLAN: Okay.  
 9 Now, the cost estimate that has been prepared  
 10 for the -- the Copper Flat Mine assumes that 20 years  
 11 after closure New Mexico Copper Corporation will be able  
 12 to cease all mining -- excuse me -- all monitoring,  
 13 maintenance and water management at the Copper Flat  
 14 Mine; is that correct?  
 15 MR. SMITH: Twenty-five years is the correct  
 16 number.  
 17 MR. DE SAILLAN: Okay.  
 18 And the closure estimate assumes that the --  
 19 that for that period of time the -- the water will  
 20 continue to drain from the tailing storage facility only  
 21 for 25 years; is that correct?  
 22 MR. SMITH: Yes. That's our assumption.  
 23 MR. DE SAILLAN: Okay.  
 24 MR. SMITH: That assumption is based on review  
 25 and analysis of what we believe the draindown curve will



<p style="text-align: right;">65</p> <p>1 be.</p> <p>2 MR. DE SAILLAN: Okay.</p> <p>3 And the closure cost estimate assumes that the</p> <p>4 period of time that groundwater monitoring will be</p> <p>5 necessary is 25 years after the cessation of mining; is</p> <p>6 that correct?</p> <p>7 MR. SMITH: I'm sorry. Can you repeat that?</p> <p>8 MR. DE SAILLAN: The closure cost estimate</p> <p>9 assumes that the period of time that groundwater</p> <p>10 monitoring will be necessary is 25 years after the</p> <p>11 cessation of mining; is that correct?</p> <p>12 MR. SMITH: Yes. The estimate includes</p> <p>13 monitoring during that 25-year closure period as</p> <p>14 required by the Copper Rule.</p> <p>15 MR. DE SAILLAN: Okay.</p> <p>16 And the closure cost estimate assumes that the</p> <p>17 period of time for maintenance is seven years after the</p> <p>18 mining operations cease; is that correct?</p> <p>19 MR. SMITH: Maintenance of --</p> <p>20 MR. DE SAILLAN: Maintenance generally.</p> <p>21 MR. SMITH: What specifically are you</p> <p>22 referring to?</p> <p>23 MR. DE SAILLAN: Maintenance generally.</p> <p>24 MR. SMITH: Maintenance generally. There is</p> <p>25 maintenance ongoing through that 25-year period as the</p>	<p style="text-align: right;">67</p> <p>1 MR. DE SAILLAN: Okay. One of them went into</p> <p>2 bankruptcy, the other one ceased operating perhaps</p> <p>3 without going into bankruptcy.</p> <p>4 MR. SMITH: Yes.</p> <p>5 MR. DE SAILLAN: Is that correct?</p> <p>6 MR. SMITH: That's correct.</p> <p>7 MR. DE SAILLAN: Okay.</p> <p>8 And do you know why that was?</p> <p>9 MR. SMITH: Why what was?</p> <p>10 MR. DE SAILLAN: Why it was that -- first of</p> <p>11 all, that the original company went to -- went into</p> <p>12 bankruptcy?</p> <p>13 MR. BUTZIER: Madam Hearing Officer, I'll</p> <p>14 object. There's been no foundation that the original</p> <p>15 company went into bankruptcy, and it's not clear what</p> <p>16 company Mr. de Saillan is referring to.</p> <p>17 MS. ORTH: All right.</p> <p>18 So, Mr. Smith, with all of these questions, if</p> <p>19 you can answer the question as it's posed, please do</p> <p>20 that. If you need further clarification or you don't</p> <p>21 know the answer, just say so.</p> <p>22 And, Mr. de Saillan, just make sure he is</p> <p>23 properly situated in the -- in the question.</p> <p>24 MR. DE SAILLAN: Okay. Thank you.</p> <p>25 So let me ask the question again.</p>
<p style="text-align: right;">66</p> <p>1 draindown is occurring.</p> <p>2 MR. DE SAILLAN: Do you agree that these</p> <p>3 assumptions are fairly optimistic?</p> <p>4 MR. BUTZIER: Objection as to the form.</p> <p>5 MS. ORTH: Mr. de Saillan?</p> <p>6 MR. DE SAILLAN: I'd ask Mr. Butzier to state</p> <p>7 what he objects to about the form of the question.</p> <p>8 MR. BUTZIER: It's ambiguous, and we haven't</p> <p>9 had a foundation to understand what Mr. de Saillan may</p> <p>10 mean about fairly, et cetera.</p> <p>11 MS. ORTH: Right. So I think it's too broad.</p> <p>12 MR. DE SAILLAN: Do you agree that these --</p> <p>13 that these assumptions in terms of the length of time</p> <p>14 that is going to be necessary for the -- for the mine to</p> <p>15 implement these things that we just talked about is</p> <p>16 optimistic?</p> <p>17 MR. SMITH: I -- I believe that we have done</p> <p>18 the best job we can at estimating the time frames, and</p> <p>19 that's what we have built into our plan.</p> <p>20 MR. DE SAILLAN: All right. Let me ask you a</p> <p>21 little bit about the history of the Copper Flat Mine.</p> <p>22 The mine has gone into bankruptcy twice under</p> <p>23 previous operators; is that correct?</p> <p>24 MR. SMITH: I'm aware of one. I'm not aware</p> <p>25 of two.</p>	<p style="text-align: right;">68</p> <p>1 Was the original company -- or the original</p> <p>2 operation abandoned?</p> <p>3 MR. SMITH: The original operation closed due</p> <p>4 to the economic -- the price of copper, and there was</p> <p>5 reclamation performed. I don't consider that to be</p> <p>6 abandoned.</p> <p>7 MR. DE SAILLAN: But it didn't -- did not</p> <p>8 continue operating, did it?</p> <p>9 MR. SMITH: It did not continue operating.</p> <p>10 You are correct.</p> <p>11 MR. DE SAILLAN: Okay.</p> <p>12 And then was there a subsequent operation that</p> <p>13 went into bankruptcy?</p> <p>14 MR. SMITH: There was a -- I believe you're</p> <p>15 referring to Alta Gold in the late 1990s. It was not in</p> <p>16 operation. They were planning and were forced into</p> <p>17 bankruptcy by circumstances elsewhere.</p> <p>18 MR. DE SAILLAN: Okay.</p> <p>19 And do you agree that the ore grade at the</p> <p>20 Copper Flat Mine is relatively low grade?</p> <p>21 MR. SMITH: The ore grade is -- at Copper</p> <p>22 Flat -- it depends on what you are comparing it to. It</p> <p>23 is lower than other mines that -- that are operating;</p> <p>24 however, it is similar or higher grade than other mines</p> <p>25 in other locations. The grade is -- has been studied,</p>

69	<p>1 and the project has been studied, and the grade is  2 sufficient to support the operation.  3 MR. DE SAILLAN: What percent copper is the  4 ore body?  5 And I recognize there's a range there.  6 MR. SMITH: Yeah. There's a range. The  7 average will be .35 to .4 percent.  8 MR. DE SAILLAN: And what was the volume  9 that -- of ore that will be extracted?  10 MR. SMITH: Extracted by our company, by New  11 Mexico Copper?  12 MR. DE SAILLAN: That's correct.  13 MR. SMITH: Yes. The plan is -- is between  14 25,000 and 30,000 tons per day.  15 MR. DE SAILLAN: Okay.  16 The New Mexico Copper Corporation is currently  17 implementing abatement at the Copper Flat Mine; is that  18 correct?  19 MR. SMITH: We are in discussions on abatement  20 at the property with the agency. We have completed  21 studies and are proposing additional studies towards  22 abatement.  23 MR. DE SAILLAN: Okay.  24 You have submitted a Stage 1 Abatement Plan?  25 MR. SMITH: Stage 1 is a report on the studies</p>	71	<p>1 MR. DE SAILLAN: Okay.  2 And what are the contaminants that are being  3 addressed?  4 MR. SMITH: The -- that area, the -- is  5 characterized by sulfate and TDS, not metals or other  6 constituents.  7 MR. DE SAILLAN: When you say TDS, you mean  8 total dissolved solids?  9 MR. SMITH: Total dissolved solids.  10 MR. DE SAILLAN: Okay.  11 And you mentioned that this -- the original  12 tailings facility was unlined and therefore it's  13 leaking.  14 Do you mean to imply that a lined tailing  15 facility won't also leak?  16 MR. SMITH: I mean to imply that, yes, the  17 lined tailings facility, the potential for leakage is  18 very much reduced.  19 MR. DE SAILLAN: Liners nevertheless leak,  20 though; isn't that correct?  21 MR. SMITH: There are assumptions on that.  22 Yes.  23 MR. DE SAILLAN: Okay.  24 How far along is the company in the abatement  25 process?</p>
70	<p>1 that have been completed.  2 MR. DE SAILLAN: And that has been submitted  3 to the Environment Department?  4 MR. SMITH: That has been, yes.  5 MR. DE SAILLAN: Okay.  6 And when was that?  7 MR. SMITH: That plan would have been  8 submitted, oh, three years ago, approximately.  9 MR. DE SAILLAN: Okay.  10 And why is abatement necessary?  11 MR. SMITH: The abatement is directed at some  12 cleanup of water issues, legacy water from the legacy  13 dumps that we intend to reclaim when we start  14 construction.  15 MR. DE SAILLAN: So there's water  16 contamination at the mine now.  17 MR. SMITH: There are areas of water that are  18 higher than the background. Yes.  19 MR. DE SAILLAN: And what are the sources of  20 that contamination?  21 MR. SMITH: The source is the tailings  22 facility, the existing tailing facility that is present  23 there. That facility was constructed without a  24 synthetic liner, and there has been leakage from those  25 tailings into the groundwater.</p>	72	<p>1 You indicated that a Stage 1 Abatement Plan  2 had been submitted to the Environment Department several  3 years ago.  4 What is the status of that process now?  5 MR. SMITH: The status of that process is  6 waiting for our plans to develop the mine to move  7 forward. Our plan is to address the issues and abate  8 the issues through the construction of the Copper Flat  9 Mine, at which time we will reclaim the legacy  10 disturbances and -- and put a liner at the TSF, which  11 will address those abatement issues.  12 MR. DE SAILLAN: Okay.  13 New Mexico Copper has not yet submitted a  14 Stage 2 Abatement Plan; is that correct?  15 MR. SMITH: That is correct.  16 MR. DE SAILLAN: And what is the schedule for  17 submitting that?  18 MR. SMITH: At this time, we -- we don't have  19 a formal schedule for submitting that. That is --  20 again, we are rolling that into our applications for  21 permits today.  22 MR. DE SAILLAN: Okay.  23 One thing I want to clear up here.  24 You mentioned that the tailings storage  25 facility will be lined with an 80-mil liner. There's</p>

73	<p>1 some references in the record to an 80-millimeter liner.</p> <p>2 I don't know if you've seen that, but I want</p> <p>3 to clarify that those are incorrect based on your</p> <p>4 understanding?</p> <p>5 MR. SMITH: Yes. The -- it's 80 mils --</p> <p>6 MR. DE SAILLAN: Okay.</p> <p>7 MR. SMITH: -- thousandths of an inch.</p> <p>8 MR. DE SAILLAN: Okay. Thank you, Mr. Smith.</p> <p>9 That's all my questions.</p> <p>10 MS. ORTH: Thank you, Mr. de Saillan.</p> <p>11 Ms. Barncastle?</p> <p>12 MS. BARNCASTLE: Thank you.</p> <p>13 CROSS EXAMINATION</p> <p>14 BY MS. BARNCASTLE:</p> <p>15 MS. BARNCASTLE: Mr. Smith, I'd like to direct</p> <p>16 my questions to you.</p> <p>17 I'm starting on slide number 14 in your</p> <p>18 PowerPoint where you refer to vegetation, revegetating</p> <p>19 certain sites.</p> <p>20 What type of vegetation do you plan to use?</p> <p>21 MR. SMITH: There is a seed mix that is</p> <p>22 outlined in our EIS as well as in permit applications,</p> <p>23 but essentially it is native plants that exist at the</p> <p>24 site today and return it back to matching what is there</p> <p>25 today.</p>	75	<p>1 within 15 miles of a major water storage reservoir?</p> <p>2 MR. SMITH: I can't answer that. I believe</p> <p>3 that mines -- there is reservoirs there outside of</p> <p>4 Phoenix, and I believe some of those may be near that,</p> <p>5 but I can't answer that specifically.</p> <p>6 MS. BARNCASTLE: You don't know for sure.</p> <p>7 You don't know for sure?</p> <p>8 MR. SMITH: I don't know specifically.</p> <p>9 MS. BARNCASTLE: We have so many copper mines</p> <p>10 in this copper belt.</p> <p>11 Why do we need another one so close to Caballo</p> <p>12 Reservoir?</p> <p>13 MR. SMITH: The -- the mine is -- is necessary</p> <p>14 to supply a strategic metal and mineral to -- to the</p> <p>15 world for use in developing -- in developing the</p> <p>16 technologies that are necessary. The mine is focused on</p> <p>17 a mineral resource that exists at the location that</p> <p>18 we're planning.</p> <p>19 You don't go anywhere in the world to -- and</p> <p>20 create a mineral resource. You have to go to where the</p> <p>21 mineral resources are located. Copper Flat is the</p> <p>22 location of a mineral resource.</p> <p>23 MS. BARNCASTLE: Now, you just testified that</p> <p>24 there is existing contamination at this site; is that</p> <p>25 correct?</p>
74	<p>1 MS. BARNCASTLE: What percent of cover are we</p> <p>2 looking at having when we revegetate out there?</p> <p>3 MR. SMITH: It will vary from location to</p> <p>4 location, and -- and again the goal is to be similar to</p> <p>5 the cover that's there today. And if you look at the</p> <p>6 site today, it varies, the percent cover varies from</p> <p>7 where you are on the property.</p> <p>8 MS. BARNCASTLE: Will those types of plants</p> <p>9 need to be watered separate from the natural rainfall</p> <p>10 that we receive?</p> <p>11 MR. SMITH: No. The intent is that they will</p> <p>12 survive in the natural environment, and that's -- that's</p> <p>13 our goal.</p> <p>14 MS. BARNCASTLE: I'm looking now at slide</p> <p>15 number 6.</p> <p>16 How many mines are on that slide in the,</p> <p>17 quote, copper belt you referred to?</p> <p>18 MR. SMITH: Well, I would -- I would need to</p> <p>19 count, but there's one to two dozen there, starting with</p> <p>20 Mineral Park and stretching over through Chino and</p> <p>21 Copper Flat.</p> <p>22 MS. BARNCASTLE: Are you generally familiar</p> <p>23 with each of those mining locations?</p> <p>24 MR. SMITH: I am.</p> <p>25 MS. BARNCASTLE: How many of those mines are</p>	76	<p>1 MR. SMITH: Yes.</p> <p>2 MS. BARNCASTLE: What direction is that</p> <p>3 groundwater contamination migrating?</p> <p>4 MR. SMITH: The -- the testimony coming in the</p> <p>5 future will talk about that in detail.</p> <p>6 The plume that is under the tailings facility</p> <p>7 has been proven to actually be shrinking and not</p> <p>8 migrating.</p> <p>9 MS. BARNCASTLE: Nothing further, Madam</p> <p>10 Hearing Officer.</p> <p>11 MS. ORTH: All right. Thank you,</p> <p>12 Ms. Barncastle.</p> <p>13 Is there anyone else who has a question of</p> <p>14 Mr. Smith based on his testimony?</p> <p>15 No?</p> <p>16 Mr. Butzier, do you have any follow-up?</p> <p>17 MR. BUTZIER: Thank you, Madam Hearing</p> <p>18 Officer. I do, just a few questions.</p> <p>19 REDIRECT EXAMINATION</p> <p>20 BY MR. BUTZIER:</p> <p>21 MR. BUTZIER: Mr. Smith, you outlined a</p> <p>22 two-year construction period and a twelve-year</p> <p>23 production period and then reclamation and closure after</p> <p>24 that.</p> <p>25 Do you recall that testimony?</p>

77	<p>1 MR. SMITH: I do.</p> <p>2 MR. BUTZIER: What gives you optimism that --</p> <p>3 that the copper market will be sufficient to allow that</p> <p>4 operation to proceed through conclusion?</p> <p>5 MR. SMITH: There have been many, many studies</p> <p>6 done by market analysts around the world that show the</p> <p>7 demand for copper will increase over the next several</p> <p>8 decades. This demand is being driven by sustainability</p> <p>9 projects such as wind power, solar power, electric</p> <p>10 vehicles, the proliferation of telephones and appliances</p> <p>11 around the world.</p> <p>12 The -- the electric vehicle market is expected</p> <p>13 to grow significantly over the next 10 years. There are</p> <p>14 announcements -- frequent announcements these days of</p> <p>15 car manufacturers that are shutting down their gasoline</p> <p>16 and diesel lines and going solely to electric.</p> <p>17 The -- that's the demand side that is moving</p> <p>18 that way.</p> <p>19 The supply side is tightening. The mines,</p> <p>20 including the mines in this copper belt and elsewhere</p> <p>21 around the globe -- their grades are dropping. Mine</p> <p>22 production is declining, which leads to, you know, a</p> <p>23 shift in the supply and demand curve and the equilibrium</p> <p>24 point, which causes the copper price to rise.</p> <p>25 MR. BUTZIER: Thank you.</p>	79	<p>1 intent from New Mexico Copper?</p> <p>2 MR. SMITH: Yes.</p> <p>3 MR. BUTZIER: And a PowerPoint presentation</p> <p>4 that is Exhibit 2?</p> <p>5 MR. SMITH: Yes.</p> <p>6 MR. BUTZIER: And a resume of Mr. Juan</p> <p>7 Velasquez that is Exhibit 3?</p> <p>8 MR. SMITH: Yes.</p> <p>9 MR. BUTZIER: And a resume of Ms. Katie Emmer</p> <p>10 that is Exhibit 4?</p> <p>11 MR. SMITH: Yes.</p> <p>12 MR. BUTZIER: And the M3 technical feasibility</p> <p>13 study that you referred to in your testimony that is</p> <p>14 Exhibit 5?</p> <p>15 MR. SMITH: Yes.</p> <p>16 MR. BUTZIER: And the New Mexico Copper's</p> <p>17 financial assurance proposal that is Exhibit 7?</p> <p>18 MR. SMITH: Yes.</p> <p>19 MR. BUTZIER: And did you also include as</p> <p>20 Exhibit 8 -- did New Mexico Copper also include as</p> <p>21 Exhibit 8 a Joint Powers Agreement Between the New</p> <p>22 Mexico Energy, Minerals and Natural Resources Department</p> <p>23 and the New Mexico Environment Department relating to</p> <p>24 financial assurance?</p> <p>25 MR. SMITH: Yes. That was included.</p>
78	<p>1 And Mr. de Saillan asked questions about</p> <p>2 whether liners like the one that is going to be employed</p> <p>3 at the tailings facility at the Copper Flat site --</p> <p>4 whether they leak.</p> <p>5 And I think your testimony was that there's</p> <p>6 planning involved to account for the possibility of that</p> <p>7 occurring? Is that -- am I characterizing correctly</p> <p>8 your testimony?</p> <p>9 MR. SMITH: Yes, you are.</p> <p>10 MR. BUTZIER: Is it your understanding that</p> <p>11 New Mexico Copper Corporation's hydrology and</p> <p>12 geochemistry experts have taken into account the</p> <p>13 possibility of leaks from the HDPE liner in this very</p> <p>14 case?</p> <p>15 MR. SMITH: Yes. Our experts have included</p> <p>16 that in their analysis and are reporting on that today.</p> <p>17 MR. BUTZIER: Okay. Thank you.</p> <p>18 Mr. de Saillan referred you to the Arrowhead</p> <p>19 Center's report, which he correctly pointed out was</p> <p>20 Exhibit 6 to the statement of intent to present</p> <p>21 technical testimony from New Mexico Copper; is that</p> <p>22 correct?</p> <p>23 MR. SMITH: Yes.</p> <p>24 MR. BUTZIER: And did you also supply a copy</p> <p>25 of your resume that is Exhibit 1 to the statement of</p>	80	<p>1 MR. BUTZIER: And did New Mexico Copper</p> <p>2 include as Exhibit 9 a Memorandum of Understanding</p> <p>3 Between The New Mexico Environment Department And The US</p> <p>4 Bureau of Land Management New Mexico State Office also</p> <p>5 related to financial assurance, that is Exhibit 9?</p> <p>6 MR. SMITH: Yes.</p> <p>7 MR. BUTZIER: Madam Hearing Officer, I'd like</p> <p>8 to move the admission of New Mexico Copper's Exhibits 1</p> <p>9 through 9 submitted with its statement of intent to</p> <p>10 present technical testimony.</p> <p>11 MS. ORTH: Are there objections?</p> <p>12 MS. BARNCASTLE: No objections.</p> <p>13 MR. DE SAILLAN: No objections.</p> <p>14 MS. ORTH: All right. Thank you.</p> <p>15 MR. BUTZIER: That's all I have, Madam Hearing</p> <p>16 Officer.</p> <p>17 MS. ORTH: NMCC Exhibits 1 through 9 are</p> <p>18 admitted.</p> <p>19 (Exhibits NMCC 1 through 9 admitted into</p> <p>20 evidence.)</p> <p>21 MS. ORTH: Is there anything else with -- in</p> <p>22 connection with Mr. Smith, or can we excuse him?</p> <p>23 Ma'am.</p> <p>24 Tell me your name.</p> <p>25 MS. BRITTAN: Rhonda Brittan.</p>

81	<p>1 MS. ORTH: All right.</p> <p>2 Do you have a question?</p> <p>3 MS. BRITTAN: Yes, I do.</p> <p>4 MS. ORTH: Yeah. So we -- I'm sorry. We need</p> <p>5 you to talk into a microphone.</p> <p>6 MR. BUTZIER: If you want to come to this</p> <p>7 middle table, you can use this mic.</p> <p>8 EXAMINATION</p> <p>9 BY MS. BRITTAN:</p> <p>10 MS. BRITTAN: I just wanted to know about --</p> <p>11 you know, I know you're going to do a reclamation thing</p> <p>12 with vegetation. What about the critters that live</p> <p>13 there? There are prairie dogs and burrowing owls all</p> <p>14 over that place. And I was wondering what's going to</p> <p>15 happen to those little guys?</p> <p>16 MR. SMITH: Well, our -- our plans return the</p> <p>17 property to its premining uses, which includes wildlife</p> <p>18 habitat. So our revegetation will result in vegetation</p> <p>19 that is similar to what's there today, and I anticipate</p> <p>20 that those critters will -- will come back and build new</p> <p>21 nests.</p> <p>22 MS. BRITTAN: Okay. Thank you.</p> <p>23 MS. ORTH: Okay. Thank you, Ms. Brittan.</p> <p>24 Ma'am, if you would come up, please.</p> <p>25 MS. NICOLL: I'm Debora Nicoll.</p>	83	<p>1 microphone.</p> <p>2 MR. GARCIA: Hi.</p> <p>3 Jason Garcia.</p> <p>4 EXAMINATION</p> <p>5 BY MR. GARCIA:</p> <p>6 MR. GARCIA: Just a couple of questions.</p> <p>7 We had discussed, and you had questions from</p> <p>8 this gentleman over here about population, income,</p> <p>9 whatnot.</p> <p>10 Do you currently know what the population</p> <p>11 decline of Sierra County is based off of the facts that</p> <p>12 we don't have good-paying jobs? Also, do you know what</p> <p>13 the median income of the area is based off of the fact</p> <p>14 that we don't have an abundance of good-paying jobs? Do</p> <p>15 you have those numbers?</p> <p>16 MR. SMITH: I don't have the numbers in front</p> <p>17 of me at my fingertips. I do know that the population</p> <p>18 is declining, has been doing so over a number of years.</p> <p>19 But I don't know the specific numbers of that decline or</p> <p>20 current employment.</p> <p>21 MR. GARCIA: The current rate is 6 percent in</p> <p>22 this area.</p> <p>23 MR. SMITH: Thank you.</p> <p>24 MS. ORTH: Anything else before we excuse</p> <p>25 Mr. Smith and Mr. Velasquez?</p>
82	<p>1 EXAMINATION</p> <p>2 BY MS. NICOLL:</p> <p>3 MS. NICOLL: I just wanted to know -- you're</p> <p>4 planning to do the -- there is pollution there so you're</p> <p>5 planning to do abatement during construction.</p> <p>6 MS. BRITTAN: Speak into that microphone,</p> <p>7 please --</p> <p>8 MS. NICOLL: Sorry.</p> <p>9 MS. BRITTAN: -- so we can hear you.</p> <p>10 MS. NICOLL: All right. Sorry.</p> <p>11 Is this better?</p> <p>12 MS. BRITTAN: Yes.</p> <p>13 MS. NICOLL: Okay. Sorry.</p> <p>14 So there is pollution there, and you're</p> <p>15 planning to do abatement during construction.</p> <p>16 In the event that this is not -- this permit</p> <p>17 is not granted, will you do the abatement now, or, you</p> <p>18 know, will there be abatement for the pollution that's</p> <p>19 there now?</p> <p>20 MR. SMITH: We will meet the requirements of</p> <p>21 the Abatement Plan that is required by the agency, and</p> <p>22 we will complete that work as required by the plan.</p> <p>23 MS. NICOLL: Even if you don't get the permit?</p> <p>24 MR. SMITH: Yes.</p> <p>25 MS. ORTH: Sir, come up, please, to the</p>	84	<p>1 Oh, ma'am.</p> <p>2 MS. NICOLL: Sorry.</p> <p>3 Hi.</p> <p>4 Deb Nicoll again.</p> <p>5 FURTHER EXAMINATION</p> <p>6 BY MS. NICOLL:</p> <p>7 MS. NICOLL: The other question is the mine</p> <p>8 when it was operating before closed down after like</p> <p>9 three-and-a-half months because of low copper prices.</p> <p>10 Do you plan to start and stop the mine as</p> <p>11 needed according to the copper prices on the market?</p> <p>12 MR. SMITH: Our -- our plan and our forecast</p> <p>13 is that we will not do that. We intend to start and</p> <p>14 run --</p> <p>15 MS. NICOLL: Continuous?</p> <p>16 MR. SMITH: -- for the entire operation. And</p> <p>17 we believe that the copper prices will stay at a point</p> <p>18 that we will do that. Our operating costs are very</p> <p>19 competitive compared to the price -- the forecasted</p> <p>20 prices.</p> <p>21 MS. NICOLL: Okay. This is a belief, that it</p> <p>22 will be high enough.</p> <p>23 If it does go low, and it is pretty low right</p> <p>24 now, will you continue operations, even though it's</p> <p>25 going to hurt your bottom line?</p>

85	<p>1 MR. SMITH: Even -- even at today's prices, we 2 would be able to continue to operate. Yes. 3 MS. NICOLL: Okay. 4 MS. ORTH: Anything else at all? 5 Yes, ma'am. Come back up, Ms. Brittan. 6 FURTHER EXAMINATION 7 BY MS. BRITTAN: 8 MS. BRITTAN: If there is a need for repairs 9 to the lining of the pit -- first of all, how will they 10 be detected? Any leakage from that -- I don't know for 11 whatever reason they may happen, but will groundwater -- 12 will it be detected before there's groundwater 13 contamination, or does groundwater contamination have to 14 occur before a repair is detect -- needed? And how 15 would a -- once the tailings are in there, how would 16 repairs be effected? 17 MR. SMITH: The -- as the liner is placed, 18 before any material is stacked up on it, there is a 19 quality control/quality assurance program, and as the 20 liner is placed down, it is inspected and vacuum tested 21 to ensure that the fabrication and installment is done 22 properly. So that's done right up front. 23 Then as the facility operates and material is 24 stacked on it, there will be monitoring wells around the 25 base of the facility that are installed to detect if</p>	87	<p>1 EXAMINATION 2 BY MR. BOKICH: 3 MR. BOKICH: Mr. Smith, you mentioned and 4 there's been discussion about copper prices and the 5 effect on the operations. You mentioned earlier that 6 there was other minerals involved, and I seem to recall 7 from previous publications that the gold reserves have 8 increased significantly, moly has increased 9 significantly, the grade was improved, from the drilling 10 that you did five, six years ago. 11 Can you -- isn't that included in your 12 economic analysis? 13 MR. SMITH: You're correct. The gold, silver 14 and molybdenum is included. The grades of those 15 minerals have increased over the knowledge that was in 16 place 35 years ago through improved technologies and 17 additional drilling. So we have a much better handle on 18 the amount of gold and silver that will be included in 19 this production. 20 MR. BOKICH: Okay. Thank you. 21 In addition, there's been a fair amount of 22 discussion about the contamination, the plume from the 23 previous operations. 24 You mentioned in your testimony that was 25 primarily sulfate and TDS, total dissolved solids,</p>
86	<p>1 there are any issues that develop during the operation. 2 MS. BRITTAN: So that would happen before 3 groundwater -- oh. So that would happen before 4 groundwater contamination occurred? 5 MR. SMITH: The monitoring wells would pick it 6 up in the water, and that's where we would detect it. 7 So that's immediately underneath the facility. 8 MS. BRITTAN: Okay. 9 And then how would repair -- any repairs be 10 effected? 11 MR. SMITH: Well, it depends on -- it would 12 have to be analyzed, and the location and extent of any 13 issue would have to be determined, and then a plan would 14 have to be made. 15 MS. BRITTAN: So you'd have to dig those 16 tailings out or something and get down in there? 17 MR. SMITH: That's possible. Yes. 18 MS. BRITTAN: Okay. Thank you. 19 MS. ORTH: All right. Thank you, Ms. Brittan. 20 Anyone else? Any questions of Mr. Smith or -- 21 sir, if you would come up. 22 MR. BOKICH: My name is John Bokich. 23 24 25</p>	88	<p>1 right? 2 MR. SMITH: Yes. That's correct. 3 MR. BOKICH: Aren't those levels of sulfate 4 and TDS very low relative to things like discharge of 5 our hot springs into the Rio Grande River or groundwater 6 samples that are taken in the Mesilla Valley, where 7 we've had effects from agriculture? 8 MR. SMITH: Yes. Relatively speaking, you're 9 correct. 10 MR. BOKICH: Thank you. 11 MS. ORTH: Okay. Thank you, Mr. Bokich. 12 Anything else before we excuse Mr. Smith and 13 Mr. Velasquez? 14 And we'll take a break. 15 No? 16 Thank you very much, gentlemen. 17 MR. SMITH: Thank you, Madam Hearing Officer. 18 MS. ORTH: And let me just say for those of 19 you who might not have been to one of these hearings 20 before, Mr. Velasquez joined Mr. Smith for questioning 21 in the event a question was posed that he had 22 information to offer. 23 It is meant to provide even better information 24 to a questioner who may not have exactly the parameters 25 of someone's expertise. It's not meant to prevent</p>

<p style="text-align: right;">89</p> <p>1 Mr. Smith from being fully questioned or from preventing 2 anyone from directing questions to a particular witness. 3 It really is a way of trying to get the best information 4 out there. 5 So thank you, Mr. Velasquez. Although you 6 didn't get questions, thank you very much. 7 MR. VELASQUEZ: I contributed mildly. 8 MS. ORTH: Yes, you did. 9 Let's take -- Oh. Let's take a 10-minute 10 break. 11 (Proceedings in recess from 10:38 a.m. to 12 10:52 a.m.) 13 MS. ORTH: All right. We are coming back from 14 the break, please. Please take your conversations out 15 of the room if you'd like to continue talking. 16 Hello. 17 All right. We are moving on to another 18 witness for NMCC. 19 Mr. Butzier. 20 MR. BUTZIER: Madam Hearing Officer, New 21 Mexico Copper Corporation would like to call its second 22 witness, Mr. Steven Finch. 23 MS. ORTH: All right. Thank you. 24 We'll swear him in. 25</p>	<p style="text-align: right;">91</p> <p>1 microphone a bit closer so that we can hear you. 2 Thank you. 3 What else will you be talking about today? 4 A. That summarizes -- 5 Q. Sums it up? 6 A. Sums it up. It does. 7 Q. Okay. Thank you. 8 Mr. Finch, why don't you go ahead and 9 summarize your expertise and qualifications to be 10 addressing those topics. 11 A. As presented here on slide 3, I have a 12 bachelor of science in geology and a master of science 13 in geology. My master's has a -- was also -- had an 14 emphasis in geochemistry. 15 I have a few certifications and registrations 16 as a geologist where appropriate. 17 And my relevant experience, been with John 18 Shomaker &amp; Associates for 28 years as a 19 hydrogeologist-geochemist. I was on the Copper Rule 20 Technical Advisory Committee, participated in 21 development of the Copper Rules. And on and off I've 22 had the privilege of performing hydrogeologic 23 analysis -- analyses at the Copper Flat property since 24 1992. 25 Q. Can you briefly describe the Copper Rule</p>
<p style="text-align: right;">90</p> <p>1 STEVEN FINCH 2 having been first duly sworn or affirmed, was 3 examined and testified as follows: 4 DIRECT EXAMINATION 5 BY MR. BUTZIER: 6 Q. Good morning, Mr. Finch. 7 Would you please identify yourself for the 8 record. 9 A. My full name is Steven Taylor Finch, Junior. 10 And I'm a principal hydrogeologist-geochemist with John 11 Shomaker &amp; Associates, water-resource and environmental 12 consulting firm out of Albuquerque, New Mexico. 13 Q. And, Mr. Finch, what will you be presenting as 14 part of your testimony today? 15 A. I have an outline on the slide number 2. 16 I will briefly go over my expertise, key 17 references that I relied on as part of my analysis. 18 And then the hydrogeologic setting for the -- 19 not only the permit area, but the region as required by 20 the Copper Rule. 21 And then various other facilities and the 22 hydrogeologic analysis that went along with it and those 23 components that are required for the Copper Rule, 24 including the Monitoring Plan. 25 Q. And, Mr. Finch, could you please pull your</p>	<p style="text-align: right;">92</p> <p>1 Technical Advisory Committee role that you played and 2 that process? 3 A. Yes. That committee was a fairly large 4 committee of technical experts from industry and state 5 government and others that we had a monthly meeting and 6 we discussed various portions of the Copper Rule as they 7 were being developed. 8 The parts that I participated in most and I 9 gave several presentations on open mine pits, monitoring 10 requirements, how to assess the tailing impoundments and 11 associated discharges with tailing impoundments and the 12 like. 13 MR. BUTZIER: Madam Hearing Officer, I would 14 offer Mr. Finch as an expert testimony in hydrology and 15 geochemistry as well as having significant expertise in 16 connection with the New Mexico's Copper Rule and 17 compliance with the Copper Rule. 18 MS. ORTH: Okay. 19 Any objection? 20 MR. DE SAILLAN: No objections. 21 MR. KNIGHT: No objection. 22 MS. ORTH: All right. Thank you. 23 He's so recognized. 24 Q. (BY MR. BUTZIER) Mr. Finch, would you please 25 go ahead and proceed with the presentation that you've</p>

<p style="text-align: right;">93</p> <p>1 prepared for today's hearing.  2 A. Certainly.  3 First I'd like to introduce some of the key  4 references that I relied on that -- other than the  5 Discharge Plan application packet. These were prepared  6 before the application packet. They're quite extensive  7 and submitted to various agencies and adopted by those  8 agencies.  9 I'll start from on the left here. The  10 Baseline Data Characterization Report, which was  11 prepared in 2012 by INTERA. We were also part of that.  12 Very extensive analysis of the data for the proposed  13 mine site and the surrounding area. That was -- that  14 report's been heavily relied on by other consultants as  15 well as us to prepare this Discharge Plan application  16 packet.  17 The second report cover is results from the  18 stage 1 abatement. There was a Stage 1 Abatement Plan  19 submitted to the Environment Department. That was with  20 an amendment to the Abatement Plan, and that was  21 approved by the Environment Department.  22 And that -- this report shown here details the  23 first year -- results of the first year of the  24 investigation of the stage 1 abatement, which provides a  25 great level of detail on the aquifer conditions within</p>	<p style="text-align: right;">95</p> <p>1 So those four reports, all of them quite  2 extensive, are -- I'll be referring back to them as I go  3 through this presentation as the production of them.  4 Okay. Moving on, the next group of slides  5 will be related to the Hydrogeologic Setting and  6 Conceptual Model of the permit area and the region.  7 This is required as part of the Copper Rule.  8 And you'll see up on my slides here -- this is  9 slide 5 -- I'll have a reference to the Copper Rule.  10 That's what the numbers 20.6.7.11K&amp;P New Mexico  11 Administrative Code. So that comes right out of the  12 Copper Rule. And this is what's required for a Copper  13 Rule -- I mean a Discharge Permit application.  14 You have to submit information on the regional  15 geology, hydrology and a conceptual model, which is how  16 we visualize the system. It's not necessarily a numeric  17 model. I'd like to define the -- or, you know, kind of  18 explain the difference.  19 First we find a conceptual model, and then we  20 take that conceptual model and we put it in mathematical  21 terms to make a numeric model to calculate the effects.  22 What's shown here, slide 6, is a regional  23 geologic map. I'd like to orient where we are on this  24 map.  25 You see -- let's see if this pointer works.</p>
<p style="text-align: right;">94</p> <p>1 the mine permit area, nature and extent of existing  2 contamination and also recommended abatement options.  3 Going in sequence here, the third report cover  4 from the left is called Model of Groundwater Flow in the  5 Animas Uplift and Palomas Basin. That is a report of a  6 numerical model, the numerical groundwater flow model.  7 It's a mathematical representation of the groundwater  8 flow system.  9 This report has been submitted to various  10 agencies. It's been adopted by the New Mexico Office of  11 State Engineer. And it goes in excruciating detail of  12 how the model was constructed, the data used to develop  13 the model, all the ins and outs of the framework of the  14 model and how it was calibrated.  15 And then the final report cover here to the  16 far right is called the Probable Hydrologic Consequences  17 of the Copper Flat Mine Project. And that is a report  18 that's required by the Mining and Minerals Division, and  19 it was submitted, reviewed and then adopted by the  20 Mining and Minerals Division.  21 That report contains -- basically it takes the  22 model, and we use the model to determine what the  23 effects of this mine would be on the groundwater system.  24 It also goes in detail about surface water effects and  25 other things.</p>	<p style="text-align: right;">96</p> <p>1 There we go.  2 This on the right-hand side is I-25, by this  3 little symbol and line.  4 And then you have the Rio Grande and the  5 Caballo Reservoir to the east of that.  6 You'll see Highway 152 coming through the  7 center of this map. Hillsboro is located in the  8 southeast -- southwest corner.  9 We have this box you see that's depicted by  10 this line. That encompasses most of the area. That box  11 is -- defines the area that the model included. The  12 model included not only the mine permit area, shown by  13 this -- this yellow outline, but the larger area around  14 it.  15 To give you an idea of distance, from the mine  16 permit area to the Rio Grande, over here on the right,  17 is 12 miles. And that -- that should give you an  18 orientation of where we are in the world.  19 So now I'll go through and explain some of the  20 geologic detail that's showing here for the region.  21 This -- you see these vertical black lines,  22 some are dashed, and some are solid. These are fault  23 systems, and these fault systems are part of what we  24 call the Rio Grande Rift. The Rio Grande Rift is what  25 forms the valley that comes through New Mexico, and it's</p>



<p style="text-align: right;">97</p> <p>1 centered on the Rio Grande. This valley that formed has  2 mountains on the west and mountains on the east.  3 You'll see here this green color and this  4 brown color represent bedrock that's been uplifted as  5 the first set of mountains on the west in the Rio Grande  6 Rift. This uplift is called the Animas Uplift.  7 The significance of the two colors, the green  8 and the brown. The green is a very competent rock  9 called andesite, and it was formed by a volcano. This  10 volcano is super old, formed in Cretaceous age in  11 geologic time many, many millions of years ago. And  12 then the rocks depicted by the brown color are older  13 than the volcano. This -- so this whole brown and green  14 sequence of rocks was uplifted and exposed at the land  15 surface.  16 As you go east, you see a more orange color.  17 That represents Santa Fe Group sediments. Those  18 sediments filled in the rift, and they're thousands of  19 feet deep and of various types of layers of sand, silt,  20 clay. And that is what is also referred to as the  21 Palomas Basin.  22 You'll also see here a bright yellow color.  23 That is more recent. That's on -- more recently formed  24 because it's within the creek drainages. The major  25 creek drainages, we have Las Animas Creek, and we have</p>	<p style="text-align: right;">99</p> <p>1 of that volcano.  2 The permeability of the andesite is -- my --  3 there we go.  4 The permeability of this andesite that  5 surrounds the ore body has been significantly reduced  6 because there were some fractures in this andesite  7 rocks -- rock, and those fractures, or whatever openings  8 that were in that rock, were filled in with fluids, and  9 those fluids formed minerals, silicate and calcite  10 minerals.  11 And that further reduced the permeability of  12 what would otherwise have been, you know, something that  13 could have transmitted water, but it doesn't transmit  14 water very well at all, is the key point there.  15 The thickness of this andesite hasn't been  16 fully explored, but there was a drill hole, part of the  17 exploration program, that went down 3,000 feet. So we  18 do know that that andesite rock is 3,000 feet thickness,  19 which is quite sufficient.  20 So here I'm going to summarize the regional  21 geology that's required as part of the Copper Rule for a  22 Discharge Plan application permit.  23 I've described briefly the structure, the Rio  24 Grande Rift and the north/south trending faults. We're  25 going to talk -- I'm going to talk in much more detail</p>
<p style="text-align: right;">98</p> <p>1 Percha Creek.  2 And you'll see the recent alluvium. That  3 alluvium is same thing. It's sand, gravel, silts and  4 clays, but it's -- it's not very thick, and it's just  5 along the stream drainages.  6 Next I want to show here as presented as slide  7 7 is what I would call a conceptual model of the  8 regional geology. So we're not only looking at the way  9 it looks like on the surface, but we're looking at the  10 subsurface geology depicted by a 3D diagram here.  11 And so it's -- here north is kind of off --  12 it's slightly tilted so we have these north/south faults  13 that are in the black lines. You see the land surface  14 depicted by this -- this aerial imagery.  15 Here's I-25 on the -- on the right-hand side.  16 And then the Animas Uplift as it's labeled  17 here is this -- this green part. This goes right  18 through the mine permit area as shown identified here,  19 Mine Permit Boundary. So most of the mine permit area  20 is -- resides within the Animas Uplift.  21 This uplift is -- as I mentioned, is the  22 andesite rock that also has in the middle -- what I call  23 the middle of the volcano was intruded with a different  24 type of rock that is called quartz monzonite. That  25 contains the ore body. So it's localized in the center</p>	<p style="text-align: right;">100</p> <p>1 about these faults and how they play a role in  2 groundwater flow beneath the mine permit area.  3 The Animas Uplift, which contains that  4 crystalline bedrock, in the mine permit area is the  5 andesite. This andesite is very low permeability.  6 And then off to the east we have the Santa Fe  7 Group sediments. And those sediments are not all sands  8 and gravels. There's lots of clays and other silts and  9 materials. So with that, depending where you are, the  10 permeability changes -- or can vary. So we have a wide  11 range of permeabilities for the Santa Fe Group  12 sediments.  13 Moving on, I want to zoom in a little bit here  14 and briefly discuss how the surface water or stormwater  15 flows across the land. So what we have here is a map  16 showing different colors, and these colors represent  17 watersheds. So we have Grayback Watershed, Las Animas  18 Watershed, Percha Watershed showing here.  19 The mine permit area, as shown by the outline,  20 yellow outline, is all within the Grayback Watershed.  21 The arroyo that -- for Grayback Watershed, Grayback  22 Arroyo, close to the mine site, is ephemeral. It only  23 transmits stormwater, basically. So it's a -- rarely  24 has flow in it, only after intense, sudden rainstorms.  25 All right. Shown here on slide 10 is another</p>

101	<p>1 map that comes right out of the Discharge Plan</p> <p>2 application packet, and what it is intended to show here</p> <p>3 is the mine permit area, as shown by the yellow outline,</p> <p>4 and then this red line you see around it is a half-mile</p> <p>5 distance from the permit area.</p> <p>6 The purpose of this is to show all the wells</p> <p>7 that we have identified within a half mile -- or within</p> <p>8 a half mile of the permit barrier. Most all of these</p> <p>9 wells are part of the Copper Flat project and are</p> <p>10 monitoring wells.</p> <p>11 So you'll see a group of wells that are in the</p> <p>12 left-hand side of the permit area are wells that were</p> <p>13 drilled around the pit as part of stage 1 abatement and</p> <p>14 before that. We have a high density of wells over there</p> <p>15 along the east side of the permit area, and those were</p> <p>16 related to evaluating the tailings that Quintana built.</p> <p>17 There is one well that is shown outside of the</p> <p>18 permit boundary. It's labeled GWQ-4. That comes from</p> <p>19 our 1993 report. That's actually a stock well that is,</p> <p>20 I believe, operated by the Pitchfork Ranch.</p> <p>21 So we have data on all these wells, and we</p> <p>22 understand their completion, what aquifer they're in and</p> <p>23 all their details.</p> <p>24 The other thing on surface water, the only</p> <p>25 surface water within the permit area is what I described</p>	103	<p>1 It makes it easy when you have 40 years of</p> <p>2 data. I really enjoy -- the more data as a scientist,</p> <p>3 the more data you have, the higher level of confidence</p> <p>4 you have in what you're -- what you're evaluating.</p> <p>5 So from that 40 years of data, we have results</p> <p>6 from several exploration drilling programs.</p> <p>7 Many, many perturbations of geologic mapping.</p> <p>8 Monitor wells. Data from wells is really the</p> <p>9 best way to assess a groundwater system.</p> <p>10 Through aquifer testing.</p> <p>11 Historic water level monitoring, data sets.</p> <p>12 We have groundwater quality samples that go</p> <p>13 all the way back to the beginning of Quintana operation,</p> <p>14 which I believe was in the -- sometime in the late '70s.</p> <p>15 And surface water samples from captured</p> <p>16 stormwater.</p> <p>17 So put all together, that's our -- that's what</p> <p>18 we used to characterize the hydrogeologic setting within</p> <p>19 the mine perimeter area.</p> <p>20 This very busy-looking spreadsheet off on the</p> <p>21 right-hand side is an example of one data set. This is</p> <p>22 a log from the New Mexico Copper geologists when they</p> <p>23 described the core that was drilled.</p> <p>24 So every foot of core drilled, they did a</p> <p>25 super detailed analysis of the type of rock, the</p>
102	<p>1 earlier as Grayback Arroyo, which flows through the</p> <p>2 site, and it conveys stormwater, ephemeral drainage.</p> <p>3 Oh. Sorry. Springs. There are no perennial</p> <p>4 springs within this area that we've identified. And</p> <p>5 that comes from the Baseline Data Report, a very</p> <p>6 detailed assessment we did in 1993. So within this</p> <p>7 area, we do not know of any perennial springs.</p> <p>8 There are -- you'll find in our 1993 report</p> <p>9 there are some what we call seasonal seeps that may come</p> <p>10 out of one of these drainages. You'll have a high</p> <p>11 intense rainstorm, and there will be locally</p> <p>12 concentrated precipitation and stormwater that slowly</p> <p>13 seeps out of the near surface feature. I wouldn't -- I</p> <p>14 do not call that a spring. Matter of fact, they were</p> <p>15 non -- they were nonexistent in the baseline data</p> <p>16 assessment.</p> <p>17 Next, please.</p> <p>18 Okay. As a geologist, I like to look at the</p> <p>19 big picture first, which I presented the regional</p> <p>20 geology, and you've noticed I've been getting closer and</p> <p>21 closer in on the site. And so now I'm going to talk</p> <p>22 about the site hydrogeologic characterization, all the</p> <p>23 data and analysis that we compiled and used to do this</p> <p>24 characterization in support of the DP application</p> <p>25 packet.</p>	104	<p>1 minerals in the rock, the type of fractures, what's in</p> <p>2 those fractures, if it's filled with minerals, what type</p> <p>3 of minerals are in there, all kinds of rock</p> <p>4 characteristics. It's an extremely detailed dataset.</p> <p>5 That information was used to develop what we</p> <p>6 call the geologic model. So we can look at the geology</p> <p>7 in all three dimensions.</p> <p>8 Shown here as part of slide 11 is a core taken</p> <p>9 from -- this is a picture of a core, and this core</p> <p>10 you'll see -- that's what the quartz monzonite looks</p> <p>11 like, this little speckled pattern. Then you have a</p> <p>12 hunk of andesite, this darker color, and you see this</p> <p>13 fracture. This fracture is completely filled with</p> <p>14 silicate minerals.</p> <p>15 So that's a nice, solid core, shows you how</p> <p>16 competent that rock is.</p> <p>17 Presented here, slide 12, I have an aerial</p> <p>18 photograph of the Copper Flat area.</p> <p>19 And so to get you oriented, we have on the</p> <p>20 left-hand side Grayback Arroyo comes through here, it's</p> <p>21 diverted around the Copper Flat existing open pit, which</p> <p>22 is this area in here, in the center, and you see the</p> <p>23 existing open pit water body by this dark color. Animas</p> <p>24 peak is off on the right-hand side.</p> <p>25 And what we have here, each one of these</p>

<p style="text-align: right;">105</p> <p>1 labels represents a drill hole in which a core was  2 obtained and detailed analysis was performed. The  3 yellow highlight there is the location of that core I  4 showed in the previous slide.  5       So with this great level of detail and all  6 different depths of drill holes, we've included that in  7 our analysis.  8       So here is slide 13, which is -- comes -- also  9 comes right out of the Discharge Plan application packet  10 as noted by Figure 11K-2a. So everything is organized  11 according to what's required by the Copper Rule.  12       We have a little more detail in the geology  13 than what was shown on the regional. And that's -- the  14 main details here are -- we'll have these dikes that  15 radiate out in the andesite, and these dikes are filled  16 with minerals.  17       We have the permit area as this yellow line  18 again. And this shows you the area one mile outside of  19 the permit area. That's required for determining the  20 surficial geology.  21       This green andesite, you see it -- it's  22 slightly covered here on the eastern edge of the permit  23 area by the more orange, I guess, yellow-ish-orange  24 color of the Santa Fe Group of sediments. And then  25 barely see it, underneath this green line is a little</p>	<p style="text-align: right;">107</p> <p>1       I prefer feet per day. As an American we're  2 stuck with those units.  3       The wells included in the test range. And  4 then the value used in the model that -- the numerical  5 model, the groundwater flow model, these are the values  6 used. So we have a correlation between model input  7 hydraulic conductivity and the range determined from --  8 from test, from specific wells.  9       Then the source of information.  10       I think the most important thing here is to  11 show that the andesite, which is this nomenclature of  12 Crystalline Bedrock Aquifer, comes from the Baseline  13 Data Report. We've kind of carried it through. But I  14 have a hard time calling the andesite an aquifer. It  15 does have groundwater, but it's very immobilized.  16       Our range of hydraulic conductivity is 0 to  17 .0027, which is extremely low. It's the lowest thing  18 out there. And then many, many orders of magnitude more  19 you see the Santa Fe Group range of hydraulic  20 conductivity.  21       Now, this may be a little -- this just  22 reflects the test data. As shown in the model, we have  23 a larger range in hydraulic conductivity, because it  24 covers a larger area and the variability that we have  25 observed in the region, in the Santa Fe Group sediments.</p>
<p style="text-align: right;">106</p> <p>1 bit of alluvium along Grayback Arroyo on the east side  2 of the permit area, yellow color.  3       We have this fault system coming -- called the  4 East Animas Fault system trending north/south, right on  5 the eastern margin of the permit area. I'm going to go  6 into detail about what that fault system -- how it  7 behaves within the groundwater system and how we know  8 its character.  9       So just more information. One very important  10 parameter that we need and we use for assessing  11 groundwater transport, impacts from dewatering, all  12 kinds of stuff, is called hydraulic conductivity. The  13 hydraulic conductivity basically just represents how  14 water moves through the pore spaces or through  15 fractures. And so it's -- you calculate it from testing  16 wells, is the main way to calculate hydraulic  17 conductivity.  18       So in this table here, which was also  19 submitted as part of the Discharge Plan application, we  20 have -- for each column here, we have water bearing  21 zone, Range of Hydraulic Conductivity in these units,  22 feet per day, and then I also put it in units of  23 centimeters per second so you can see how the  24 different -- some people use one set of units, some  25 people use the other.</p>	<p style="text-align: right;">108</p> <p>1 So those two things are slightly different.  2       Next.  3       All right. So now this slide 15 is a map we  4 have. In the base of the map, you see these fine lines.  5 Those are the -- that's the topography of the land  6 surface. And, you know, it's an elevation. It's like a  7 topographic map.  8       And then shown here in the blue lines, these  9 are groundwater elevation contours. This map was  10 required as part of the Copper Rule so you can determine  11 groundwater elevation, but also direction of groundwater  12 flow across the mine permit area.  13       These arrows show direction of groundwater  14 flow. So basically groundwater flows from a higher  15 elevation to a lower elevation.  16       So there are a few little differences. I  17 mean, we have that regional groundwater flow that goes  18 from west to east, and then we have -- locally we have  19 some -- some things that are a little bit different.  20       So around the existing pit, you see these  21 circles. That means groundwater is flowing into the  22 existing pit, and as that groundwater flows in, where  23 the pit is exposed and the surface water area is  24 evaporated, that pumps it out. So that creates a  25 hydraulic sink, and as defined by those contours.</p>

109	<p>1 Another thing you -- that we look at when --</p> <p>2 when we are analyzing these lines of groundwater</p> <p>3 elevation are the spacing between them. So a close</p> <p>4 spacing means very low hydraulic conductivity,</p> <p>5 generally, and a wider spacing means that there's a</p> <p>6 change in aquifer, hydraulic conductivity or</p> <p>7 transmissivity of thickness and the way it transmits</p> <p>8 water.</p> <p>9 So here you see tight spacing in the contours,</p> <p>10 and then out here you see a wide spacing, where it comes</p> <p>11 out to the Santa Fe Group aquifer, and then you see this</p> <p>12 crazy bunch of lines all mixed with each other, trending</p> <p>13 north/south. What those represent are -- is the</p> <p>14 boundary, the hydraulic boundary that's observed by the</p> <p>15 East Animas Fault.</p> <p>16 That fault we -- we have -- from well data, we</p> <p>17 have defined its location, but we've also -- have</p> <p>18 demonstrated that the water level on the west side of</p> <p>19 the fault is 130 feet higher than on the east side of</p> <p>20 the fault. So that difference tells you -- that's one</p> <p>21 line of evidence that there is some type of boundary</p> <p>22 there.</p> <p>23 I'll go into the other lines of evidence on</p> <p>24 why it's a boundary of groundwater flow due to this</p> <p>25 presentation.</p>	111	<p>1 lines that are black are from the drill holes, where we</p> <p>2 got the drill hole data to use to map this out.</p> <p>3 Here we have the existing pit water body and</p> <p>4 the groundwater contours. On this scale it's hard to</p> <p>5 see, but groundwater is flowing towards the pit on</p> <p>6 either sides.</p> <p>7 Next I'll show a cross-section along Grayback</p> <p>8 Arroyo. Here I've used a different color for the</p> <p>9 andesite, slide 19.</p> <p>10 On this cross-section, the andesite is a gray</p> <p>11 color. Overlying that is the alluvium. That blue</p> <p>12 dashed line is the water table as defined by the well</p> <p>13 data. And then the tan is the Santa Fe Group sediments.</p> <p>14 So along most of this transect, Grayback</p> <p>15 Arroyo is underlain by either alluvium or andesite, and</p> <p>16 then as you get out towards the east, you see it's</p> <p>17 alluvium and Santa Fe Group. This is where majority of</p> <p>18 recharge occurs in this system. We do not have recharge</p> <p>19 occurring in the andesite. It's more readily</p> <p>20 infiltrating out here to the east.</p> <p>21 Okay. On the final one, it's a little off</p> <p>22 kilter here. This red line represents the area of the</p> <p>23 current and future tailings impoundment, which is this</p> <p>24 cross-section of that. It's from west to east. Slide</p> <p>25 21 here.</p>
110	<p>1 Okay. I know you've seen a lot of geologic</p> <p>2 maps, but I'm going to have to use them some more. So</p> <p>3 slide 16 is a site geologic map, and the only difference</p> <p>4 here we have is you a -- you see a red line.</p> <p>5 So what I want to do in the next set of</p> <p>6 slides, I want to show this map with the red line, and</p> <p>7 that red line represents a cross-section for that area.</p> <p>8 And so I'm going to work through the mine permit area,</p> <p>9 start with the pit, and I'll go along Grayback Arroyo</p> <p>10 and then the tailings impoundment area. And I'll show</p> <p>11 you what the underlying geology and aquifer system</p> <p>12 looked like just in the -- in cross-section format.</p> <p>13 Okay. Starting with the pit area, we have</p> <p>14 this hydrogeologic cross-section. On the Y axis here,</p> <p>15 this is elevation in feet. So each one of these is</p> <p>16 250 feet in elevation. And the distance is the same.</p> <p>17 So this -- this -- there's no vertical exaggeration on</p> <p>18 this cross-section.</p> <p>19 You'll -- the andesite here is indicated by</p> <p>20 the green, and then the quartz monzonite and quartz</p> <p>21 monzonite breccia, which is the main part of the ore</p> <p>22 body, is the other two colors, the white and the pink.</p> <p>23 This top line is the land surface as it is</p> <p>24 today. And you'll see here's -- we have existing wells</p> <p>25 shown in the dark black lines, and then these other</p>	112	<p>1 The andesite is also indicated by the gray</p> <p>2 color. And then you see a bunch of busyness in this --</p> <p>3 what is now the Santa Fe Group, and this -- we have</p> <p>4 dashed lines representing beds of the Santa Fe Group,</p> <p>5 and this kind of a red color is a red clay within the</p> <p>6 Santa Fe Group.</p> <p>7 These other dark lines here represent wells,</p> <p>8 and then the little stippled areas on the bottom of the</p> <p>9 screen here are wells for those wells.</p> <p>10 You see a change going right in the middle.</p> <p>11 That change, which is depicted by this dashed black</p> <p>12 line, is the East Animas Fault. So here we define the</p> <p>13 location of this fault by wells on either side of it.</p> <p>14 We have this red clay that's been down-dropped on the</p> <p>15 east side of the fault. You see it's up here, and it's</p> <p>16 here. These beds are -- sediments are actually dipping</p> <p>17 down this way.</p> <p>18 So this is -- comes right out of the stage 1</p> <p>19 abatement and our conceptual model for the existing</p> <p>20 tailings impoundment. And what we determined is that</p> <p>21 the -- there's a little sulfate, TDS, total dissolved</p> <p>22 solids, plume that resides right here that infiltrated</p> <p>23 in this area, and it's -- it's stagnant. It can't go</p> <p>24 anywhere because of this fault system, or this fault</p> <p>25 that's defined as the East Animas Fault.</p>

113	<p>1 Wells on each side of the fault, such as this</p> <p>2 one -- can't read the number, but that well does not</p> <p>3 have sulfate or TDS.</p> <p>4 So we have the difference in geology, we have</p> <p>5 the groundwater data so you see the -- the blue hashed</p> <p>6 line and how it drops across the fault zone, and we have</p> <p>7 the water chemistry, all to provide us lines of evidence</p> <p>8 that this fault provide -- acts as a barrier, not as a</p> <p>9 conduit to flow.</p> <p>10 Okay. There are many other estimates of where</p> <p>11 this fault resides, this fault being East Animas Fault,</p> <p>12 and it's in the published geologic literature, which has</p> <p>13 caused some confusion.</p> <p>14 So these different dashed lines, you have</p> <p>15 pink, green and -- I guess that's purple or reddish.</p> <p>16 Those are different inferred locations of the East</p> <p>17 Animas Fault. But the real location is the blue line.</p> <p>18 And that's what we've identified through extensive study</p> <p>19 at the mine site.</p> <p>20 All right. Moving on to another submittal</p> <p>21 requirement for the Discharge Plan permit application,</p> <p>22 Copper Rule requirement is to provide predischage TDS</p> <p>23 data, predischage to the -- which means anything prior</p> <p>24 to what the permit is -- the proposed mining operation</p> <p>25 discussed in the permit.</p>	115	<p>1 understanding of the -- of the rock type, the map</p> <p>2 faults, structures and rock characteristics.</p> <p>3 We have aquifer characteristics from well</p> <p>4 testing.</p> <p>5 And we have water quality from over 40 years</p> <p>6 of data collected.</p> <p>7 So it's a very robust data set that was --</p> <p>8 gave us a good advantage for providing all the</p> <p>9 submittals needed for the Copper Rule for the Discharge</p> <p>10 Permit application packet.</p> <p>11 Okay. Moving on, we're -- I'm going to go</p> <p>12 into how we analyzed on the hydrogeologic analysis that</p> <p>13 was performed on the open pit, Waste Rock Stockpile 2</p> <p>14 and 3, which is by the -- over there by the header,</p> <p>15 WRSP, and tailing storage facility.</p> <p>16 I'll start with the open pit. And here</p> <p>17 again -- oop. I'll talk about -- when I say closure and</p> <p>18 postclosure, I'm just talking about the -- we're talking</p> <p>19 about the hydrogeologic components that go into closure</p> <p>20 and postclosure, not necessarily the engineering aspect.</p> <p>21 And monitoring I'm referring to the Monitoring Plan.</p> <p>22 Just to clarify that.</p> <p>23 First thing we do when -- which I believe this</p> <p>24 was discussed pretty extensively in the Technical</p> <p>25 Advisory Committee when we were developing the Copper</p>
114	<p>1 So showing here is that same map of the permit</p> <p>2 area and the half-mile boundary with all the wells</p> <p>3 inside of it. So we use data from these wells to</p> <p>4 provide information on predischage total dissolved</p> <p>5 solids. That's what TDS stands for. You've heard it</p> <p>6 several times, but it doesn't hurt to reiterate.</p> <p>7 This table comes right out of the Discharge</p> <p>8 Plan permit application packet. And we have -- here</p> <p>9 again for each one of the columns in the table, we have</p> <p>10 the aquifer, the subaquifer, the predischage</p> <p>11 concentration, the wells from which the data came from,</p> <p>12 the sample date and then their kind of location.</p> <p>13 I think the important thing to point out here</p> <p>14 is that the only thing -- well, let me back up.</p> <p>15 Most all the data at the mine site is less</p> <p>16 than 1,000 TDS except for the little area along Grayback</p> <p>17 Arroyo and then right within the ore body itself.</p> <p>18 Matter of fact, most of the water in the mine site is</p> <p>19 better than the City of Alamogordo La Luz well field,</p> <p>20 which you'll probably hear in Alamogordo you drink that</p> <p>21 in the summertime.</p> <p>22 And just to recap the permit area</p> <p>23 hydrogeology, we discussed the geologic model, which is</p> <p>24 based on those cross-sections and the data, it's a</p> <p>25 conceptual model, not numeric. And we have a great</p>	116	<p>1 Rule, is to define the open pit surface drainage area.</p> <p>2 Shown here on slide 27 is the definition for</p> <p>3 the open pit surface drainage area. In general terms,</p> <p>4 it's just all surface -- it's the area in which the</p> <p>5 water of surface of the -- the surrounding area flows</p> <p>6 into the pit. So it's the -- it's the watershed area</p> <p>7 for the open pit, another way to explain it.</p> <p>8 It's also defined as the underlying</p> <p>9 groundwater as contained by the pit. As I discussed</p> <p>10 earlier how you have groundwater flow into the pit, it's</p> <p>11 pumped out by evaporation. So that's contained.</p> <p>12 Next.</p> <p>13 Slide 28 is -- what we have here is a map of</p> <p>14 the pit area. And you see where Grayback Arroyo is</p> <p>15 diverted around -- as it is now, it is diverted around</p> <p>16 the current and future pit, which is the future pit is</p> <p>17 defined by this -- all these brown squiggly lines, which</p> <p>18 that's those -- those lines represent the benches and</p> <p>19 walls of the pit and also the haul roads. So it's a</p> <p>20 detailed topographic representation of the pit.</p> <p>21 And then this blue area outline is the open</p> <p>22 pit surface drainage area. You'll see it on many other</p> <p>23 maps from here on out.</p> <p>24 All right. So why -- you know, why is that</p> <p>25 really required? Well, part of the -- why is the open</p>

117	<p>1 pit surface drainage area so important is -- it's</p> <p>2 important because it helps define what's required for</p> <p>3 the monitoring program, the groundwater monitoring</p> <p>4 program, and also it helps define what's required to</p> <p>5 protect water pollution as the main objective of the</p> <p>6 Copper Rule.</p> <p>7 So here we have -- this is a map of the open</p> <p>8 pit area shown. And the base map is all those lines or</p> <p>9 the topography. You can see the pit centered here, the</p> <p>10 open pit surface drainage area. Within that open pit</p> <p>11 surface drainage area, there is Waste Rock Storage Pile</p> <p>12 1, and -- so from there, we say, okay, let's develop a</p> <p>13 monitoring program.</p> <p>14 Can you hit the next --</p> <p>15 The monitoring wells were shown there earlier,</p> <p>16 but I'm using these green dots so those back there can</p> <p>17 see them a little easier. We have -- these green dots</p> <p>18 represent the monitoring program -- the groundwater</p> <p>19 monitoring program proposed in the Discharge Permit</p> <p>20 application packet, and they compose of existing wells</p> <p>21 and proposed wells.</p> <p>22 So we have -- on the far left-hand side, we</p> <p>23 have wells upgradient. We have wells around the pit,</p> <p>24 and particularly the higher density wells on the -- what</p> <p>25 could be the downgradient side if it wasn't contained.</p>	119	<p>1 end of mining.</p> <p>2 And so from those lines, we can determine</p> <p>3 direction of groundwater flow. So direction of</p> <p>4 groundwater flow is towards the pit, and then with these</p> <p>5 flow arrows, we can determine what we call open pit</p> <p>6 hydrologic containment, another requirement of the</p> <p>7 Copper Rule.</p> <p>8 So containment is all within the mine permit</p> <p>9 area, and that is demonstrated by the modeling effort.</p> <p>10 That is also referenced in -- and you can reference this</p> <p>11 information in great detail from the Probable Hydrologic</p> <p>12 Consequences report that I mentioned earlier.</p> <p>13 Okay. So that's -- I gave you a snapshot of</p> <p>14 the monitoring system proposed during operations, what</p> <p>15 the groundwater system looks like at the end of mining.</p> <p>16 And then now we'll briefly go into the open pit</p> <p>17 reclamation.</p> <p>18 What we're proposing -- or what New Mexico</p> <p>19 Copper Corporation is proposing for reclamation</p> <p>20 comprises of several components for the open pit.</p> <p>21 There -- we have within the open pit surface</p> <p>22 drainage area -- you'll have a reclaimed watershed, as</p> <p>23 shown in the green there on slide 31. You have --</p> <p>24 you'll have a -- this yellow represents a reclaimed haul</p> <p>25 road. So any water that comes from the watershed will</p>
118	<p>1 And then I always consider the pit itself as a point,</p> <p>2 obviously. That helps define where the elevation of the</p> <p>3 water is.</p> <p>4 There were -- I believe this plan was</p> <p>5 reviewed, accepted, but I believe the Environment</p> <p>6 Department proposed two other wells here, which I don't</p> <p>7 think are necessary. One is in this area up here, by</p> <p>8 the Waste Rock Storage Pile 1. I'm not -- I can't</p> <p>9 remember exactly where it was proposed. And the other</p> <p>10 is down in this corner, where we already have plenty of</p> <p>11 monitoring.</p> <p>12 The way I envision this is like many other</p> <p>13 projects. You develop a Monitoring Plan, and for an</p> <p>14 extensive project like this, you use the groundwater</p> <p>15 flow model to also validate that over time as part of</p> <p>16 a -- a test to see how well it works.</p> <p>17 So with those two tools, you have this network</p> <p>18 and a calibrated model in place, I feel very confident</p> <p>19 this what we have proposed here is very sufficient for</p> <p>20 defining conditions around the open pit.</p> <p>21 Okay. So speaking of the groundwater model,</p> <p>22 the numeric model that's used to calculate effects on</p> <p>23 the aquifer, these blue lines are -- are elevation --</p> <p>24 groundwater elevation contours simulated by the model,</p> <p>25 and they represent the elevation of groundwater at the</p>	120	<p>1 be conveyed down the reclaimed haul road.</p> <p>2 And then in the middle of the pit, it will be</p> <p>3 partially filled with water, what we call rapid fill</p> <p>4 reclamation. So it will be filled with clean water</p> <p>5 to -- to establish hydrologic equilibrium as a</p> <p>6 hydrologic sink. And I'll explain that in more detail.</p> <p>7 So we use the reclaimed watershed, haul road</p> <p>8 and the pit shell and the surface area of the proposed</p> <p>9 rapid fill water body all to develop the water balance</p> <p>10 that goes into understanding what's required to reclaim</p> <p>11 the pit, but that water balance also is directly fed</p> <p>12 into the geochemistry analysis, that extensive analysis</p> <p>13 that SRK did, which they'll testify -- or present later</p> <p>14 on after me.</p> <p>15 Next, please.</p> <p>16 Okay. Just a recap on that. The rapid fill</p> <p>17 will be with low total dissolved solid alkaline</p> <p>18 groundwater. And that has many advantages. I won't go</p> <p>19 into all of them. One is to establish hydraulic</p> <p>20 equilibrium in the pit as a sink. Also to improve water</p> <p>21 quality.</p> <p>22 The rapid fill to steady-state conditions</p> <p>23 maintains that hydraulic sink.</p> <p>24 The steady-state open pit water level for</p> <p>25 maintaining the evaporative sink is 435 feet below the</p>

<p style="text-align: right;">121</p> <p>1 current pit. So if the current pit is a sink, water at  2 extreme depth below the future pit will be a sink after  3 reclamation, even during operations. That's going to be  4 a hydrologic sink from here on out.  5 The evaporation, which is what maintains the  6 pumping of groundwater and water that flows into the  7 pit, the sink -- hydrologic sink conditions.  8 Okay. So now -- next, please.  9 I show this -- back to our cross-section we  10 had of the open pit area, the only difference here you  11 see from the previous one I submitted -- this is slide  12 33 -- this one's oriented west to east instead of north  13 to south. I have the land surface at the existing pit  14 water body. And then the hatched line is the future pit  15 as proposed.  16 And we have these blue lines out in -- in the  17 rock. There's two sets. There's a light blue, which is  18 the model-simulated water level elevation for end of  19 mining. So you see it's the bottom -- it's the very  20 bottom of the pit there. That is dewatered. And then a  21 hundred years after mining, which is in equilibrium with  22 the levels to which rapid fill achieves to maintain that  23 sink.  24 So with the elevation of the groundwater  25 higher than what is in the pit, maintains groundwater</p>	<p style="text-align: right;">123</p> <p>1 Moving on to the Waste Rock Stockpiles 2 and  2 3. Since those are outside of the open pit surface  3 drainage area, the Copper Rule requires an aquifer  4 evaluation. So I'm going to briefly go over the aquifer  5 evaluation, what we propose for monitoring and the  6 calculations that went into demonstrating that what  7 we're proposing is protective of groundwater, and  8 surface water for that matter, being run-off.  9 Next.  10 Okay. Slide 36, I have a very busy geologic  11 map of the Waste Rock Storage Pile 2 and 3 area. You've  12 seen these lines that are shown in the footprint of  13 that. And this geologic map is from the New Mexico  14 Bureau of Geology. I have over here a definition of  15 aquifer evaluation which is from the Copper Rule as  16 cited.  17 On this map, I will -- won't go into too much  18 detail on the geology, but all the green colors  19 represent the andesite. You see under the footprint  20 these yellow colored regions. Those are very thin  21 veneer of what I call colluvium. You can just call it,  22 you know, just stuff that's eroded off from Animas Peak.  23 We know that's very thin because down here in  24 the bottom we have outcrops of andesite that poke  25 through this cover. So this cover material will be</p>
<p style="text-align: right;">122</p> <p>1 flow to the pit and therefore prevents discharges to  2 groundwater.  3 Next.  4 So just a water budget. This water budget  5 comes from the groundwater fill model. And it's  6 calculated from the numeric models.  7 And so we have -- just to show you the  8 differences, we have -- the main thing here, in the  9 bottom, we have the total water going in. These units  10 are in acre-feet per year. Currently it's 25 acre-feet.  11 And that same amount is evaporating out. And that's  12 what maintains that sink that we have out there today.  13 In the future, we'll have 93 acre-feet coming  14 in, 93 acre-feet evaporating out. And the reason why  15 the evaporation is more, because the surface area is  16 greater. The current water surface area is five acres,  17 and the future one will be about twenty-two.  18 Another thing to point out here is that the  19 groundwater flow is a smaller portion of what flows into  20 the pit. You see here for both the current and future  21 pit, the larger -- the larger component of any flow of  22 water to the pit is run-off and precipitation, not  23 groundwater. And that's because the andesite is very  24 low permeability.  25 Next.</p>	<p style="text-align: right;">124</p> <p>1 scraped off, or the alluvial material will be scraped,  2 and then -- down to the andesite, and then this -- the  3 waste rock stockpile placed on top of the andesite.  4 Another thing to show here is you see these  5 red lines are dikes, which all of them are mineralized  6 and filled with minerals, having low permeability,  7 similar to the andesite or less. But even if -- if they  8 for some reason did represent a localized fracture  9 system, none of them are mapped within the footprint of  10 the waste rock storage pile. So we have very -- an area  11 of very competent rock.  12 One of our key lines of evidence for the  13 hydraulic properties of the andesite in this area comes  14 from this big red dot, which I put here, and the label.  15 This well is GWQ-5,R which we did extensive testing on  16 this well as part of stage 1 abatement.  17 Slide 37, I have a graph here of data  18 collected from that well I showed you on the map, called  19 GWQ-5R. And on the Y axis, we have depth to water. And  20 then on the X axis, days since well was drilled.  21 This red line represents the total depth of  22 the well. And when we drilled this well, it was dry.  23 So typically when you drill a hole and it's dry and you  24 expect water, a lot of times someone will move on, say,  25 well, let's don't make a well here. We decide to make a</p>

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1 well, because I had some extreme curiosity and  
 2 suspicions.  
 3 Over time, we had, as shown by this dark line  
 4 and green dots -- we measured to see if there was water  
 5 in the well, and the water slowly seeped in over time.  
 6 Took 90 days for it to come up to where -- what we call  
 7 the -- where the groundwater is actually represented in  
 8 this -- at this location.  
 9 That -- that is an indicator of how low the  
 10 permeability is in this andesite. Matter of fact, this  
 11 well, we were barely able to produce enough water out of  
 12 it every three months to sample for stage 1 abatement.  
 13 It's not -- it wouldn't be adequate for a stock well or  
 14 for any other type of well, for use, that is, just  
 15 sampling.  
 16 All right. So if you were standing at that  
 17 well and you wanted to look across to the north, say  
 18 northwest, you would -- you would be seeing this  
 19 photograph. This is a photograph, presented in slide  
 20 38, looking towards Animas Peak northwest. And on this  
 21 photograph, I have identified several features.  
 22 Down here, lower part, you see kind of this  
 23 line going through. That's the -- that's Grayback  
 24 Arroyo. And then we have an surface water monitoring  
 25 station. That's what SWQ-3 stands for.

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1 This little -- you see this kind of -- what do  
 2 you call it -- pile-looking stuff, that's the andesite  
 3 outcrop. And then this white line here is the  
 4 approximate area of the Waste Rock Storage Piles 2 and  
 5 3.  
 6 So photos like this really provide a good  
 7 indication for me as a hydrogeologist to say how am I --  
 8 if a facility is built here, how am I going to monitor  
 9 this thing. Even though the andesite has low  
 10 permeability, where do I expect -- if there was  
 11 something to emanate out from the pile that could cause  
 12 a discharge to groundwater, where would I put wells.  
 13 So what -- what you see here is -- you'll see  
 14 these little drainage in the footprint of the waste rock  
 15 stockpile. There's drainage here, there's -- you can  
 16 barely see one there, and there's one here.  
 17 I'll show a map here of where the monitoring  
 18 wells are, but they are at those locations at the toe of  
 19 the pile where these drainages are. That's the most  
 20 likely place to be monitoring for discharges for this  
 21 type of a facility.  
 22 Next.  
 23 But before I get to the Monitoring Plan, I'm  
 24 going to talk about a conceptual model that we developed  
 25 as part of the aquifer evaluation.

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1 MS. ORTH: Okay. Mr. Finch --  
 2 MR. FINCH: Yes.  
 3 MS. ORTH: -- I'm sorry to interrupt you.  
 4 It's noon. I'm wondering if you would  
 5 estimate the rest of your comments.  
 6 MR. BUTZIER: Madam Hearing Officer --  
 7 I think your direct's probably only 15 minutes  
 8 more?  
 9 MR. FINCH: Yeah. I'm on slide 39. I believe  
 10 I have 48.  
 11 MS. ORTH: Okay.  
 12 MR. BUTZIER: Maybe that's underestimating.  
 13 MS. ORTH: So my question -- my real question  
 14 is would you like to break for lunch and come back or  
 15 keep going?  
 16 MR. BUTZIER: My own personal preference is  
 17 that we continue at least through the end of his direct  
 18 testimony, but I'm flexible.  
 19 MS. ORTH: Anyone object to that?  
 20 Okay. Thank you.  
 21 Please go ahead.  
 22 MR. FINCH: Okay. Thank you.  
 23 So during operational conditions, this is a --  
 24 has a vertical exaggeration. So it's actually  
 25 exaggerating. So potential discharges during

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1 operational would only occur -- if you had stormwater  
 2 collected on the pile, it would -- it could infiltrate  
 3 through a preferential pathway, would hit the  
 4 andesite -- andesite is on a slope -- and go into the  
 5 toe drain and be conveyed into a lined stormwater pond.  
 6 But that is not what we found through a  
 7 modeling exercise. We used an engineered standard model  
 8 to evaluate potential infiltration, percolation through  
 9 the pile during operations and found that it's not  
 10 likely. So to have a discharge of groundwater at this  
 11 facility or operation, you have to have water go through  
 12 the pile and then go through the andesite.  
 13 And so there's -- I guess what I would say  
 14 there's several lines of defense here to prevent  
 15 groundwater discharges.  
 16 Next.  
 17 The other thing I think is -- which I love  
 18 about the Copper Rule is that there's a very strong  
 19 requirement for stormwater management. And that's one  
 20 of the best things about it. Stormwater that's going to  
 21 be diverted away from the waste rock stockpile.  
 22 The low moisture content of the material in  
 23 the pile prevents downward migration of surface  
 24 infiltration from precipitation.  
 25 The toe drains allow for capture of impacted



129	<p>1 stormwater, of, you know, water that may impact  2 stormwater.</p> <p>3 And the andesite permeability is extremely  4 low, as I've already demonstrated.</p> <p>5 And then from our modeling runs and analysis,  6 we're not expecting anything to infiltrate during the  7 operational period. This is also consistent with what  8 we've seen out there with existing stockpiles that are  9 over 30 years old. And there's no evidence of seepage  10 out from the base -- or the toe of those -- of those  11 facilities.</p> <p>12 Next.</p> <p>13 Okay. That was during operations. This is  14 just a summary of what's -- what we have after  15 reclamation.</p> <p>16 Here again stormwater is diverted away from  17 the facility.</p> <p>18 There is an installation of a  19 store-and-release cover that prevents infiltration for  20 the long term.</p> <p>21 And then our modeling indicates that there --  22 if there is any discharge, you know, like many, many  23 years out, that's going to be extremely small and not  24 even measurable.</p> <p>25 So there's the benefits of what's -- what we</p>	131	<p>1 I believe the -- there is another location  2 where the Environment Department proposed an extra well  3 up in -- on the north side of the facility, and we don't  4 believe that's necessary based on our understanding of  5 groundwater flow in areas for potential discharges.</p> <p>6 In addition to groundwater monitoring, in the  7 proposed Monitoring Plan we have surface water  8 monitoring. And that surface water monitoring relates  9 to stormwater, or wherever water is in Grayback Arroyo.  10 So as part of the stage 1 abatement, we put in  11 autosamplers. They're these whole systems that collect  12 stormwater.</p> <p>13 And -- and you see on this map we have the  14 permit boundary outline, and this blue line is Grayback  15 Arroyo as it goes through the permit area. The yellow  16 is the open pit surface drainage area. And then each  17 one of these green diamonds represents a monitoring  18 point with an autosampler.</p> <p>19 We actually have those in place today. We  20 have -- the upgradient one is SWQ-1, and we have SWQ-2,  21 3 and 4. And let me qualify. Those are in place today.  22 We propose to add SWQ-5. This gives you very valuable  23 data from monitoring stormwater through the mine site.</p> <p>24 Okay. Last but not least, we'll go over the  25 tailings storage facility. And I'll briefly discuss</p>
130	<p>1 have here is that there's limited time between  2 operations and reclamation, and that prevents  3 infiltration. And a store-and-release cover system for  4 the long haul after this system is recovered -- or  5 reclaimed. And then the last line of defense is the low  6 permeability of the andesite.</p> <p>7 We believe this all meets the requirements for  8 the Copper Rule to prevent discharges to groundwater.</p> <p>9 All right. Finally, our -- this is a map of  10 the facility, and I'll briefly go over the proposed  11 monitoring system.</p> <p>12 Can you click the next --</p> <p>13 So we have -- this well up here, PGWQ-3, on  14 slide 42, represents the background. You need a  15 background well -- or upgradient -- I'm sorry -- an  16 upgradient well for each facility.</p> <p>17 And then we have -- as close as possible to  18 the toe of the stockpile, we have wells lined -- or up  19 against it. And each one of these locations are in  20 areas where -- as I described previously, where we  21 expect if there were to be any water coming out from the  22 base of the facility, it would report there in those  23 drainages, underneath it in the footprint.</p> <p>24 And in addition, we have wells downgradient,  25 along Grayback Arroyo.</p>	132	<p>1 aquifer evaluation and proposed Monitoring Plan.  2 You'll find this -- I'm not going to go into a  3 great level of detail, but the aquifer evaluation  4 included an analysis of potential liner leaks. That is  5 because it's a lined facility. That's the only way you  6 would have a discharge, is through leaks in the liner.</p> <p>7 And this comes right -- this Table 3.6 on  8 slide 45 comes right out of the Probable Hydrologic  9 Consequences report. And there's a great level of  10 detail in that report on this. This evaluation or  11 calculation of potential leakage was then used by SRK  12 and others to evaluate discharges to groundwater.</p> <p>13 We also did some precontaminant solute  14 transport modeling of what would happen. Basically it's  15 the same thing. If you had a leakage, what you  16 calculate here would be a very small rate of .5 gallons  17 per minute, and it would stay in the area within the  18 footprint of the tailings storage facility, just as what  19 we've identified in the stage 1 abatement for the  20 existing facility.</p> <p>21 Next, please.</p> <p>22 So to summarize that, it's -- we've used the  23 industry standard for evaluating the potential leakage,  24 and it's a fairly insignificant rate.</p> <p>25 The hydraulic gradient -- so the driving force</p>

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1 for any discharges in groundwater is the hydraulic  
 2 gradient. When you put a lined facility over an area  
 3 that was previously recharged, you reduce that recharge,  
 4 and the hydraulic gradient flattens.  
 5 That hydraulic gradient will flatten and make  
 6 it where groundwater movement is reduced significantly.  
 7 The potential leakage that percolates to  
 8 groundwater will blend or remain beneath the tailing  
 9 storage facility for hundreds of years. This is all  
 10 based on our -- our numeric model analysis and analysis  
 11 of liner leaks. We feel very confident about that.  
 12 Okay. Monitoring. So with -- even though  
 13 it's a lined facility, I think we have a very robust  
 14 monitoring program that --  
 15 Can you hit one and one more.  
 16 There we go. Perfect.  
 17 The green dots represent what we propose for  
 18 monitoring the tailing storage facility. We have an  
 19 upgradient well here as -- as required, and we have  
 20 perimeter wells where we feel are the most important  
 21 areas for monitoring.  
 22 There is the -- the Environment Department had  
 23 proposed a well down here, in the southwest corner. We  
 24 don't believe that's necessary given our understanding  
 25 of the direction of groundwater flow and the fact that

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1 it's -- the andesite is there, you have andesite, you  
 2 have a lined facility, just like -- but nevertheless, we  
 3 feel we've got a good curtain of monitoring points  
 4 around the other parts of the facility.  
 5 And more importantly, here is the East Animas  
 6 Fault. We have wells -- it's hard to tell. We have  
 7 wells on either side of the fault.  
 8 Another thing to point out here, the wells in  
 9 yellow are current -- are wells that exist today, and  
 10 those -- as the facility is built out, they will be  
 11 plugged and abandoned. But I'm sure data will be  
 12 collected as much as possible from those wells until  
 13 they're plugged and abandoned.  
 14 All right. I'm going to summarize it so we  
 15 can go to lunch.  
 16 We have a high confidence in the understanding  
 17 of the hydrogeologic setting and groundwater protection  
 18 measures due to the abundance of site data and detailed  
 19 evaluations.  
 20 The Copper Rule requirements were considered  
 21 for the aquifer evaluation and monitoring for each  
 22 proposed facility. I feel like we've met every aspect  
 23 of that.  
 24 The operational and postmining conditions are  
 25 considered for groundwater protection measures.

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1 So not only that, there is a continuous  
 2 responsibility to prevent discharges to water -- to  
 3 groundwater and to prevent water pollution.  
 4 In my professional opinion, the New Mexico  
 5 Copper DP-14 -- 1840 is compliant with the Copper Rule.  
 6 We've gone over in excruciating detail and provided what  
 7 I would call above and beyond analysis to meet those  
 8 requirements.  
 9 MR. BUTZIER: Thank you, Mr. Finch.  
 10 Madam Hearing Officer, I may have a few  
 11 questions to ask, but I suggest we take -- take a break  
 12 now that he's gotten through his direct testimony --  
 13 MS. ORTH: All right.  
 14 MR. BUTZIER: -- and then pick up with that  
 15 after lunch.  
 16 MS. ORTH: All right.  
 17 MR. BUTZIER: Thank you.  
 18 MS. ORTH: Thank you, Mr. Butzier.  
 19 Let me ask, just show of hands, if I were to  
 20 invite public comment immediately following the lunch  
 21 break, which will be in an hour, is there anyone who  
 22 would want to make that public comment today?  
 23 I see one hand, two hands, three hands. All  
 24 right. So I'd like to do that, then.  
 25 When we come back -- excuse me. Is an hour

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1 enough? Should we do an hour and 15? 1:30?  
 2 So let's do 1:30. And when we come back at  
 3 1:30, I will invite public comment, as many people want  
 4 to give it, and then we'll return to Mr. Finch's  
 5 testimony.  
 6 Thank you.  
 7 (Proceedings in recess from 12:18 p.m. to  
 8 1:31 p.m.)  
 9 MS. ORTH: We are back after a lunch break.  
 10 And pursuant to some earlier comments, there  
 11 were definitely some folks who would like to offer  
 12 public comment after the lunch break and before we  
 13 return to Mr. Finch's testimony.  
 14 Just a few things about public comment.  
 15 One, you will be sworn in. You'll be asked to  
 16 swear or affirm that your comments are true.  
 17 Two, I have to ask you not to stray into  
 18 technical comment. Technical comment is essentially  
 19 scientific comment that would require the education and  
 20 expertise to back it up. So please don't stray into  
 21 technical comment.  
 22 As I explained earlier, I do not set a time  
 23 limit by minutes. I ask only that you not stray into  
 24 science, that you not repeat yourself and that you don't  
 25 engage in any personal attacks.

137	<p>1 I think those are the only three rules we have</p> <p>2 for public comment.</p> <p>3 So we're going to start with this gentleman,</p> <p>4 then we'll move to Ms. Brittan, and I know of at least a</p> <p>5 few other folks to call on when they're completed.</p> <p>6 We'll take public comment until folks in the room are</p> <p>7 done raising their hand.</p> <p>8 One more thing. Public comment can be offered</p> <p>9 either verbally or in writing or both. That is to say</p> <p>10 you can make verbal comment and then hand me the paper</p> <p>11 on which you're basing that verbal comment. That's</p> <p>12 fine.</p> <p>13 However, I do have to ask you to offer public</p> <p>14 comment verbally only once. So please collect your</p> <p>15 thoughts before you go. Repeated appearances don't --</p> <p>16 aren't beneficial. If you think of something you really</p> <p>17 want to add to what you said today, just write it out,</p> <p>18 and it will be added to the written public comment.</p> <p>19 All right?</p> <p>20 So this is not anyone's only chance. There</p> <p>21 will be lots of chances all week long.</p> <p>22 We'll start with you, sir, if you would give</p> <p>23 us your name.</p> <p>24 MR. CHATFIELD: My name is Harvey Chatfield.</p> <p>25 And I live right down a little ways from the</p>	139	<p>1 go around the rules or regulations and everything. We</p> <p>2 had monitor wells all below the tailings dam. We -- I</p> <p>3 worked with the engineering company and -- or</p> <p>4 department, and we had to monitor those wells and take</p> <p>5 elevations on top of the tailings dam and everything</p> <p>6 else to make sure that there weren't any problems.</p> <p>7 And so I could say I think maybe there was a</p> <p>8 leak there maybe where the -- where the bedrock was</p> <p>9 pretty close to the surface, and I think that's the only</p> <p>10 problem that there was. But that will be -- that won't</p> <p>11 be in a new area.</p> <p>12 So I just wanted to say that I think I can see</p> <p>13 no way that with all these liners and new things we</p> <p>14 have -- excuse me -- nowadays. And I've seen those in</p> <p>15 garbage dumps put down, you know. I've never seen them</p> <p>16 in a mine operation. But they look pretty darn</p> <p>17 efficient to me.</p> <p>18 And I think with everything we've got going, I</p> <p>19 don't see how. And I don't see how anything could ever</p> <p>20 get to Animas Creek. There's people here that think</p> <p>21 it's going to get over to Animas Creek, but that's in a</p> <p>22 different drainage, and it -- it's just almost</p> <p>23 impossible.</p> <p>24 So I just think we need the mine, and I think</p> <p>25 there's no way that they're going to contaminate</p>
138	<p>1 mine there on Animas Creek.</p> <p>2 MS. ORTH: All right.</p> <p>3 HARVEY CHATFIELD</p> <p>4 having been first duly sworn or affirmed, gave</p> <p>5 public comment as follows:</p> <p>6 PUBLIC COMMENT</p> <p>7 THE REPORTER: Would you spell your last name</p> <p>8 for me.</p> <p>9 MR. CHATFIELD: Chatfield, C-H-A-T-F-I-E-L-D.</p> <p>10 THE REPORTER: Thank you.</p> <p>11 MS. ORTH: Please go ahead.</p> <p>12 MR. CHATFIELD: Okay.</p> <p>13 Well, I just wanted to say, you know, Burt</p> <p>14 here, when we used to run that ranch there where the</p> <p>15 mine is, one time he told me, he said -- I worked up</p> <p>16 there from the get-go when it started until -- a matter</p> <p>17 of fact, I went to work for the company that tore the</p> <p>18 thing down, and which was a sad day. But anyway, old</p> <p>19 Bert, he says, "Harvey, I imagine this mine job kind of</p> <p>20 saved your ranch, didn't it?"</p> <p>21 And I said, "You just bet it did," because it</p> <p>22 was right there close to home and I could ranch at night</p> <p>23 and work the mine in the daytime, you know.</p> <p>24 But -- and I never saw anything out there that</p> <p>25 was shady or anything else that the mine tried to do to</p>	140	<p>1 anything.</p> <p>2 MS. ORTH: Thank you, Mr. Chatfield.</p> <p>3 Ms. Brittan, if you would tell us your name,</p> <p>4 spell the last name, and speak into the microphone.</p> <p>5 MS. BRITTAN: My name is Rhonda Brittan,</p> <p>6 B-R-I-T-T-A-N.</p> <p>7 RHONDA BRITTAN</p> <p>8 having been first duly sworn or affirmed, gave</p> <p>9 public comment as follows:</p> <p>10 PUBLIC COMMENT</p> <p>11 MS. BRITTAN: Well, I wrote my public comments</p> <p>12 prior to this hearing. I have found out since that the</p> <p>13 tailings storage pit will be 627 acres in size. And</p> <p>14 that's just the tailings pit.</p> <p>15 There is a reason I will not go to Silver</p> <p>16 City. I become horrified and depressed at seeing and</p> <p>17 feeling the mine there. Now, I really do feel the mine.</p> <p>18 Maybe it's an absence of mass that I am sensing. They</p> <p>19 have plumb bobs that will swing toward a mountain</p> <p>20 because it's massive. So there's a definite physical</p> <p>21 attraction, and it -- it doesn't exist. And there's an</p> <p>22 emptiness. There's literally a hole in Silver City.</p> <p>23 This is a monstrous project. Reopening the</p> <p>24 Copper Flat Mine is a terrible idea on several counts.</p> <p>25 I spoke with Brad Reid at the water quality</p>

141	<p>1 bureau in Albuquerque who told me this mine will require</p> <p>2 a water tailing storage facility encompassing several</p> <p>3 hundred acres. That would be 627 acres I heard today.</p> <p>4 Any run-off will flow down the face of the</p> <p>5 dam, into some sort of collection pond. I don't know</p> <p>6 the size of that. What kind of vapors will that give</p> <p>7 off? Toxic elements that will drift into the air around</p> <p>8 the neighbors in the area?</p> <p>9 The absolute destruction of several hundred</p> <p>10 acres of beautiful land and wildlife habitat should be</p> <p>11 enough to block this project, but to dump noxious</p> <p>12 tailing into a huge, plastic-lined pit endangers the</p> <p>13 groundwater, a much more precious resource than the</p> <p>14 copper they hope to extract.</p> <p>15 If the water tailing storage pit develops a</p> <p>16 leak, how could it possibly be repaired or even detected</p> <p>17 before groundwater contamination occurs?</p> <p>18 And from Mr. Smith's testimony this morning,</p> <p>19 he seemed to indicate that there would be some</p> <p>20 groundwater contamination in order to detect the -- you</p> <p>21 know, as a leak is being detected.</p> <p>22 I hear there is a very loud smashing and</p> <p>23 grinding involved in processing the ore on site.</p> <p>24 Besides the noise, there is an airborne dust created,</p> <p>25 which I imagine is not pleasant to breathe either.</p>	143	<p>1 MR. SWINGLE: Thank you.</p> <p>2 My name is Bruce Swingle. That's</p> <p>3 S-W-I-N-G-L-E.</p> <p>4 BRUCE SWINGLE</p> <p>5 having been first duly sworn or affirmed, gave</p> <p>6 public comment as follows:</p> <p>7 PUBLIC COMMENT</p> <p>8 MR. SWINGLE: Thank you.</p> <p>9 My name is Bruce Swingle. I am county manager</p> <p>10 for Sierra County, and I'm speaking on behalf of the</p> <p>11 Sierra County Board of County Commissioners.</p> <p>12 The Sierra County County Commission has and</p> <p>13 continues to support Copper Flat Mine. In determining</p> <p>14 whether to support the mine, as a matter of public</p> <p>15 policy County leadership relied on much data and</p> <p>16 information presented by a number of credentialed</p> <p>17 professionals, professionals with extensive experience</p> <p>18 and expertise in mining.</p> <p>19 After assessing New Mexico Copper</p> <p>20 Corporation's business model and environmental</p> <p>21 safeguards, the County Commission has approved two</p> <p>22 resolutions of support for the mine. The City of</p> <p>23 Elephant Butte and Village of Williamsburg have also</p> <p>24 passed resolutions of support. Suffice it to say the</p> <p>25 vast majority of Sierra County residents support the</p>
142	<p>1 So besides the air pollution, water pollution</p> <p>2 and noise pollution, this project plans to operate right</p> <p>3 next door to the Ladder Ranch, a well known</p> <p>4 environmental preservation project, which as of Friday,</p> <p>5 the 21st, had a total of 191 visitors this year, with a</p> <p>6 full schedule of tours for October lined up.</p> <p>7 The mine is the exact opposite of this</p> <p>8 immediate neighbor's business and is absolutely the most</p> <p>9 ruinous of neighborhood projects imaginable.</p> <p>10 The couple hundred local folks proposed to be</p> <p>11 employed by the mine does not compete with the money</p> <p>12 that hundreds of tourists every year consistently spend</p> <p>13 on local hotels and restaurants so they can observe and</p> <p>14 appreciate the amazing and beautiful natural landscape</p> <p>15 and wildlife that New Mexico is known for and that our</p> <p>16 children will inherit for generations to come.</p> <p>17 The short-term thinking of the bottom line of</p> <p>18 this mine will dry up our local wells with an outrageous</p> <p>19 number of gallons of water usage. Where will we be</p> <p>20 then? Ecotourism will be gone forever if we protect</p> <p>21 this sustainable industry.</p> <p>22 Thank you.</p> <p>23 MS. ORTH: Thank you, Ms. Brittan.</p> <p>24 Mr. Swingle.</p> <p>25 Give your name, and we will swear you in.</p>	144	<p>1 mine.</p> <p>2 Today New Mexico Copper, Jeff Smith, gave a</p> <p>3 great presentation on Copper Flat Mine operations and</p> <p>4 mitigation plans, plans, you know, strategies to protect</p> <p>5 the environment and area resources.</p> <p>6 Let us not forget New Mexico Copper</p> <p>7 Corporation is trying to reopen a mine that has been</p> <p>8 operating on and off for generations in an area where</p> <p>9 the mining of copper and other precious metals has</p> <p>10 occurred since the 1880s. It is absolutely a part of</p> <p>11 this community. Mining is a part of this community.</p> <p>12 Mining particularly at the Copper Flat site is</p> <p>13 culturally and historically connected to Sierra County.</p> <p>14 Hillsboro was originally selected as the county seat</p> <p>15 only because of mining and the mining population that</p> <p>16 existed at the time.</p> <p>17 Many misrepresentations have circulated -- and</p> <p>18 I'm sure you're going to hear many of those tomorrow</p> <p>19 night -- have circulated about how the mine is going to</p> <p>20 harm the Rio Grande Valley. These misrepresentations</p> <p>21 are intended to scare people and create a hysteria</p> <p>22 against the mine.</p> <p>23 The fact is New Mexico Copper is committed to</p> <p>24 responsible mining, reasonable environmental protections</p> <p>25 and safeguarding our community and our state.</p>

145	<p>1 One of the misrepresentations is due to the</p> <p>2 wetter -- a well -- a water contract the mine is</p> <p>3 required to hire members of the Jicarilla Apache Nation.</p> <p>4 Indian preference is language -- is common boilerplate</p> <p>5 language in many contracts with Native American</p> <p>6 entities.</p> <p>7 As a former county manager in McKinley County,</p> <p>8 I entered into a number of Indian preference contracts</p> <p>9 with the Navajo Nation. Indian preference simply means</p> <p>10 that if you have two candidates with equal skills, equal</p> <p>11 experience and equally suitable for the company, you</p> <p>12 would hire the Native American. Ultimately you hire the</p> <p>13 candidates best qualified, best suited for the job,</p> <p>14 which, of course, could be a Jicarilla member.</p> <p>15 Regardless of the contract with the</p> <p>16 Jicarillas, the mine will need to hire many skilled</p> <p>17 workers from outside of Sierra County. Sierra County</p> <p>18 does not have enough skilled workers in the mining</p> <p>19 industry to satisfy the need. Growing our community's</p> <p>20 population is an intended benefit we welcome in Sierra</p> <p>21 County.</p> <p>22 Another misrepresentation is that New Mexico</p> <p>23 Copper Corporation will bus employees to the mine from</p> <p>24 various areas from the state and out of state, thus no</p> <p>25 or limited Sierra County residents will be employed.</p>	147	<p>1 over \$58,000. Sierra County is truly one of the poorest</p> <p>2 counties in one of the poorest states in the country.</p> <p>3 The county's median household income is</p> <p>4 \$29,679, substantially lower than the state's which is</p> <p>5 over \$46,000. The national median household income is</p> <p>6 over 49 -- over 59,000.</p> <p>7 New Mexico has the second worst poverty rate</p> <p>8 in the United States at over 20.4 percent. The national</p> <p>9 poverty rate is 12.7 percent. Sierra County's poverty</p> <p>10 rate is over 22 percent.</p> <p>11 The mean property value in Sierra County is</p> <p>12 \$89,900, compared to the state's rate at \$167,500.</p> <p>13 Properties are not selling, and there's virtually no</p> <p>14 construction -- or new construction in Sierra County.</p> <p>15 As of March, 2018, Sierra County's</p> <p>16 unemployment rate was 8.8 percent compared to New</p> <p>17 Mexico's rate of 5.6 percent.</p> <p>18 To compound the issue, Sierra County is losing</p> <p>19 its population. The county's population has declined</p> <p>20 19 percent since 2000. Unfortunately, without the mine</p> <p>21 and similar economic development projects to create</p> <p>22 jobs, the county's population will continue to decline.</p> <p>23 Currently our youth leave the community to</p> <p>24 seek meaningful employment while our skilled workers</p> <p>25 work for far less than what they can make in nearby</p>
146	<p>1 The truth of the matter is creating van pools</p> <p>2 to transport workers to a job site is positive for all</p> <p>3 concerned. Transporting workers from T or C to the mine</p> <p>4 decreases traffic and serves as a benefit to the</p> <p>5 employees. St. Cloud mine, many other mining operations</p> <p>6 and other operations around the state currently use a</p> <p>7 van pool system to transport employees to the job site.</p> <p>8 The final misrepresentation I'll discuss is</p> <p>9 mining camps. This misrepresentation claims that no</p> <p>10 mine employees will live or shop in our community and</p> <p>11 that employees will be required to -- or forced to live</p> <p>12 on mine property and shop on mine property.</p> <p>13 New Mexico Copper is not creating mining camps</p> <p>14 in Sierra County. Although mining camps, research</p> <p>15 camps, oil and gas field camps and the like serve a</p> <p>16 purpose in extremely remote areas, Copper Flat mine is</p> <p>17 not in an extremely remote area.</p> <p>18 Sierra County and the State of New Mexico need</p> <p>19 Copper Flat Mine. New Mexico and Sierra County rank at</p> <p>20 the bottom of most socioeconomic measures. Copper Flat</p> <p>21 Mine can single-handedly change the economic landscape</p> <p>22 in Sierra County and vastly improve New Mexico's economy</p> <p>23 without compromising the environment.</p> <p>24 Sierra County's per capita income is a meager</p> <p>25 \$20,495, while the national rate is over twice that at</p>	148	<p>1 communities. One can't blame the youth or a skilled</p> <p>2 workforce for leaving. They have to work, and they have</p> <p>3 to receive a reasonable wage.</p> <p>4 From a public policy perspective, the only</p> <p>5 thing worse than the outmigration of residents is for</p> <p>6 the residents capable of working to stay here. They</p> <p>7 will stay unemployed or underemployed, and they'll end</p> <p>8 up collecting unemployment and other social assistance</p> <p>9 programs.</p> <p>10 Sierra County needs this mine. Copper Flat</p> <p>11 Mine will provide a significant economic boost to Sierra</p> <p>12 County and New Mexico through job creation and tax</p> <p>13 revenues. The mine will create approximately 1,300</p> <p>14 direct, indirect and induced jobs. Copper Flat Mine is</p> <p>15 expected to create approximately 275 direct jobs, making</p> <p>16 it the largest employer in Sierra County. The estimated</p> <p>17 taxes paid over construction and life of the mine is</p> <p>18 approximately \$175 million.</p> <p>19 Property taxes alone are projected to exceed</p> <p>20 \$6.5 million. In a county that only collects \$8 million</p> <p>21 a year in taxes, the mine will equate to improved</p> <p>22 services, a better quality of life for our residents and</p> <p>23 provide much needed revenue for our schools. Currently</p> <p>24 the mine pays about \$5,700 a year for the property. The</p> <p>25 numbers are dramatic with the operating -- the mine</p>

<p style="text-align: right;">149</p> <p>1 opening.</p> <p>2 The mine will stimulate population growth,</p> <p>3 improve employment rates, increase earnings per capita,</p> <p>4 positively affect our housing market, improve the</p> <p>5 quality of life of our area residents and certainly</p> <p>6 affect other key industries in the area, such as</p> <p>7 construction, retail, arts, entertainment, recreation,</p> <p>8 health care and tourism.</p> <p>9 The entire state will benefit from Copper Flat</p> <p>10 Mine. As of February, 2018, New Mexico Copper</p> <p>11 Corporation has spent \$38.8 million in New Mexico. Of</p> <p>12 that, 3.4 million in Sierra County, 12.6 million in</p> <p>13 Albuquerque and 22.8 million in other parts of the State</p> <p>14 of New Mexico.</p> <p>15 With respect to the -- to the environment,</p> <p>16 we're all environmentalists -- we're all environmentalists</p> <p>17 to some extent. We all want to protect our natural</p> <p>18 resources. These resources sustain our way of life, our</p> <p>19 culture. However, if somebody is against mining simply</p> <p>20 because of a belief that mineral extraction is an</p> <p>21 assault on the environment, they will never support the</p> <p>22 mine. They will never support any mine for that matter.</p> <p>23 Reasonableness must prevail. Mining is</p> <p>24 accomplished all over the country without harming the</p> <p>25 environment. After hearing New Mexico Copper</p>	<p style="text-align: right;">151</p> <p>1 preservation of the environment and the creation of jobs</p> <p>2 are not mutually exclusive.</p> <p>3 After decades of regulations, state and</p> <p>4 federal oversight and scientific and technological</p> <p>5 advancements, many extremists refuse to acknowledge that</p> <p>6 a win/win scenario can be achieved. Based on the plan</p> <p>7 articulated by the New Mexico Copper Corporation today,</p> <p>8 the Sierra County Commission believes New Mexico Copper</p> <p>9 Corporation mine meets every reasonable standard.</p> <p>10 The commission implores you to make the</p> <p>11 reasonable decision, make the right decision for Sierra</p> <p>12 County and the State of New Mexico and approve Copper</p> <p>13 Flat Mine's groundwater protection Discharge Permit.</p> <p>14 Thank you for giving Sierra County the time</p> <p>15 and opportunity to support the mine today.</p> <p>16 And I do have written comments for you.</p> <p>17 MS. ORTH: Thank you very much, Mr. Swingle.</p> <p>18 I'll make a stack of written comments here on</p> <p>19 the table.</p> <p>20 MR. SWINGLE: Thank you.</p> <p>21 MS. ORTH: Thank you.</p> <p>22 Let's see. The gentleman in the black hat.</p> <p>23 MR. IRWIN: Good afternoon.</p> <p>24 Can everyone hear me?</p> <p>25 MS. ORTH: We need to swear you in.</p>
<p style="text-align: right;">150</p> <p>1 Corporation's presentation today, reasonable --</p> <p>2 reasonable people will agree that New Mexico Copper</p> <p>3 Corporation is implementing reasonable safeguards to</p> <p>4 protect the environment, our community and our state.</p> <p>5 The environmental debate reminds me of the</p> <p>6 Dakota Pipeline protests in 2016. Extremists -- and I</p> <p>7 don't use the term "extremists" carelessly or</p> <p>8 irresponsibly. Extremists from around the country</p> <p>9 reacted to the construction of an oil pipeline running</p> <p>10 from North Dakota to Southern Illinois.</p> <p>11 In reality, it was a pipeline similar to the</p> <p>12 2.4 million miles of energy pipeline running across this</p> <p>13 country. This specific pipeline created no greater</p> <p>14 threat, no greater harm to the environment than any</p> <p>15 other pipeline. But these individuals failed to reason</p> <p>16 and believed that this particular pipeline would cause</p> <p>17 irreparable harm to the environment.</p> <p>18 You're dealing with an extreme element that</p> <p>19 will not reason or rationalize facts. They are against</p> <p>20 mining and this mine in particular regardless of what</p> <p>21 measures New Mexico Copper Corporation employs. They</p> <p>22 believe mining in any fashion will destroy the</p> <p>23 environment. They believe that creating good-paying</p> <p>24 jobs through mineral extraction is harmful to the</p> <p>25 environment. They fail to comprehend that the</p>	<p style="text-align: right;">152</p> <p>1 RAY IRWIN</p> <p>2 having been first duly sworn or affirmed, gave</p> <p>3 public comment as follows:</p> <p>4 PUBLIC COMMENT</p> <p>5 MR. IRWIN: My name is Ray Irwin. I'm a</p> <p>6 registered professional geologist, currently serving as</p> <p>7 exploration manager for Stella Natural Resources, and</p> <p>8 I'm here today on behalf of the New Mexico Business</p> <p>9 Coalition.</p> <p>10 As you may or may not be aware, the New Mexico</p> <p>11 Business Coalition is a grassroots, statewide, pro</p> <p>12 business association. We support job creation and</p> <p>13 reasonable regulation, which includes granting of the</p> <p>14 necessary Discharge Permit for the Copper Flat Mine.</p> <p>15 As vice-president of exploration for THEMAC</p> <p>16 Resources from January, 2012 to December, 2013,</p> <p>17 excluding hydrological studies, I planned and supervised</p> <p>18 all geology-related activities at the Copper Flat Mine</p> <p>19 site. As a result, I have specific knowledge and a deep</p> <p>20 understanding of the project's geology and potential</p> <p>21 environmental impacts due to the planned mining.</p> <p>22 During this and since my time working on the</p> <p>23 project, THEMAC Resources has expended a very</p> <p>24 significant amount of time and money to develop a Mine</p> <p>25 Plan that will safely explore the copper deposit at</p>

153	<p>1 Copper Flat in an environmentally sound manner that</p> <p>2 complies with all state and federal regulations and</p> <p>3 minimizes long-term environmental impact.</p> <p>4 You will probably be hearing opposition to</p> <p>5 this mine that is largely if not completely emotionally</p> <p>6 based. My comments will stick to what I know to be a</p> <p>7 fact. The Copper Flat Mine is going to be a closed loop</p> <p>8 facility which not only minimizes water consumption, but</p> <p>9 also prevents water from leaving the premises except via</p> <p>10 evaporation.</p> <p>11 Additionally, a lined tailing storage facility</p> <p>12 equipped with an impermeable synthetic pond liner will</p> <p>13 be constructed to prevent water used in the milling</p> <p>14 process from seeping into groundwater while</p> <p>15 simultaneously mill tailings are secured by an</p> <p>16 engineered structure to prevent discharge into nearby</p> <p>17 drainages.</p> <p>18 Since the planned operations at the Copper</p> <p>19 Flat Mine will be a zero discharge facility, it will not</p> <p>20 require a natural pollutant discharge elimination system</p> <p>21 permit from the EPA which governs surface water</p> <p>22 discharges. Likewise, under current mine plans and</p> <p>23 designs, Copper Flat will not need a 404 permit from the</p> <p>24 US Corps of Engineers.</p> <p>25 With these plans in place and federal agencies</p>	155	<p>1 Sir.</p> <p>2 Thank you.</p> <p>3 MR. IRWIN: You bet.</p> <p>4 MR. LYON: I'm Kenneth Lyon, chairman of the</p> <p>5 Sierra County Commission.</p> <p>6 KENNETH LYON</p> <p>7 having been first duly sworn or affirmed, gave</p> <p>8 public comment as follows:</p> <p>9 PUBLIC COMMENT</p> <p>10 THE REPORTER: Would you spell your last name,</p> <p>11 please.</p> <p>12 MR. LYON: L-Y-O-N.</p> <p>13 THE REPORTER: Thank you.</p> <p>14 MR. LYON: And, of course, our county manager</p> <p>15 just gave a very articulated, well written talk which</p> <p>16 does certainly express the opinion of the County</p> <p>17 Commission. I just want to add a few quick things to</p> <p>18 that.</p> <p>19 One would be that we appreciate you coming</p> <p>20 down for this hearing to hear input from the county.</p> <p>21 But probably what you're going to get if you're a</p> <p>22 proponent of increasing the tax base and a proponent of</p> <p>23 mining, a proponent of new industry, you're going to</p> <p>24 hear people say yes. If you hate mining to start with,</p> <p>25 you're going to hear people say no. If you're just</p>
154	<p>1 satisfied, NMBC is confident that a groundwater</p> <p>2 Discharge Permit approved by the New Mexico</p> <p>3 Environmental Department would be a prudent step in</p> <p>4 moving the development of the Copper Flat Mine forward.</p> <p>5 From an economic perspective and during the</p> <p>6 18- to 24-month construction period, the Copper Flat</p> <p>7 Mine will generate approximately 1,150 direct, indirect</p> <p>8 and induced jobs in the region and the state.</p> <p>9 Once in operation, the Copper Flat Mine will</p> <p>10 generate approximately 275 to 300 long-term, high-paying</p> <p>11 jobs in the Sierra County location and, similar to the</p> <p>12 construction phase, many more indirect project-related</p> <p>13 service and support jobs in the region and the state.</p> <p>14 The estimated annual income -- or annual</p> <p>15 payroll is approximately \$16 million before payroll</p> <p>16 taxes and benefits. These anticipated new high-paying</p> <p>17 jobs with good benefits is exactly what Sierra County</p> <p>18 and New Mexico needs.</p> <p>19 The NMBC and I therefore ask that your</p> <p>20 decision on this important issue not be swayed by</p> <p>21 negative misinformation and encourage you to approve the</p> <p>22 groundwater Discharge Permit.</p> <p>23 Thank you for your time.</p> <p>24 MS. ORTH: Thank you, Mr. Irwin.</p> <p>25 Did I see another hand over here?</p>	156	<p>1 totally opposed to mining, really the rationale doesn't</p> <p>2 have anything to do with it perhaps.</p> <p>3 What does have to do with it, we're relying on</p> <p>4 the state to make the good judgment whether this mining</p> <p>5 operation is lawful, if it's legal and if it will truly</p> <p>6 protect the environment. And if you people find that to</p> <p>7 be true, certainly we're in support of it.</p> <p>8 We don't have Silicon Valley moving to Sierra</p> <p>9 County. We don't have any big manufacturers or</p> <p>10 corporations coming in to set up business. We don't</p> <p>11 have the opportunity that Las Cruces does for new</p> <p>12 businesses. We don't have the opportunity that</p> <p>13 Albuquerque has for new businesses.</p> <p>14 This is one of the very few shots we have. I</p> <p>15 feel we're very fortunate they're even considering</p> <p>16 opening it up. I'm glad they haven't got discouraged.</p> <p>17 They've spent millions of dollars already.</p> <p>18 And I just want to state again the County</p> <p>19 Commission certainly supports you. Thanks for choosing</p> <p>20 Sierra County to open the mine.</p> <p>21 MS. ORTH: Thank you, Mr. Lyon.</p> <p>22 Did I see another hand on this side of the</p> <p>23 room?</p> <p>24 No?</p> <p>25 Let me focus over here. Other hands over here</p>

<p style="text-align: right;">157</p> <p>1 for public comment?  2 This is not your only opportunity.  3 Anyone?  4 No.  5 All right. We will return to the technical  6 case, then.  7 Where did Mr. Finch go?  8 MR. FINCH: Right here.  9 MS. ORTH: There he is.  10 UNIDENTIFIED SPEAKER: Will we have an  11 opportunity to ask Mr. Finch questions?  12 MS. ORTH: Yes.  13 UNIDENTIFIED SPEAKER: Thank you.  14 MS. ORTH: People in the room have the  15 opportunity to ask questions of every witness. I turn  16 first to the agency, then to the ranches, then to  17 Elephant Butte, then to the audience. That's the order  18 in which I take questions.  19 So, Mr. Finch, you remain under oath, and I  20 believe Mr. Butzier had some wrapping-up questions for  21 you.  22 MR. BUTZIER: Thank you, Madam Hearing  23 Officer.  24  25</p>	<p style="text-align: right;">159</p> <p>1 And could you bring up the green dots again.  2 I think -- yeah.  3 Mr. Finch, you indicated when this slide was  4 up that there's plenty of monitoring.  5 Do you recall that?  6 A. Yes, I do.  7 Q. What is -- what is your response to the notion  8 that there are certain gaps between, for example, the  9 upper right side of the pit facility? Why wouldn't it  10 be necessary to put a monitoring well in between the two  11 that are up there? Upper right.  12 A. Upper right. So looking at slide 29, that's  13 in the neighborhood of Waste Rock Storage Pile 1.  14 I'm sorry. Can you re --  15 Q. I'm just asking, you know, there's a distance  16 between those two monitoring wells, and why do you think  17 it's unnecessary to put another monitoring well in  18 between those two?  19 A. We have numerous other wells to the east,  20 right on the other side of Animas Peak. You want to  21 include the whole monitoring system as a whole.  22 That's -- but I guess to sum it up, I -- with the  23 existing wells we have, which are less than what's  24 proposed here, we're able to define a system that's --  25 and the hydrologic sink aspect of the existing pit. I</p>
<p style="text-align: right;">158</p> <p>1 STEVEN FINCH  2 having been previously duly sworn or affirmed, was  3 examined and testified further as follows:  4 DIRECT EXAMINATION (Continued)  5 BY MR. BUTZIER:  6 Q. Mr. Finch, you referred in your testimony to  7 the diversion of the Grayback Arroyo.  8 When did that happen, and what's going to  9 happen at the end of mining to the arroyo?  10 A. The arroyo diversion was created when Quintana  11 Minerals started their project, which routed Grayback  12 around the open pit. And that will stay that way all  13 the way through every sequence of this proposed project,  14 as my understanding.  15 Q. Okay. Thank you.  16 I think at one point in your testimony you  17 talked about a primary purpose of the -- of the Copper  18 Rule was to protect water pollution.  19 I assume you meant protect against water  20 pollution; is that correct?  21 A. Yes, that is correct.  22 MR. BUTZIER: Could we have slide 29 pulled  23 up, please?  24 Q. Mr. Finch, while we're working to solve the  25 technical -- well, here we go. Sorry.</p>	<p style="text-align: right;">160</p> <p>1 don't see why we would need, you know, so many more  2 wells to do that.  3 And we're proposing additional wells here to  4 the north and one to the southeast. To me, that's more  5 than adequate.  6 MR. BUTZIER: Could we pull up slide 40,  7 please.  8 Q. In connection with this slide, Mr. Finch, you  9 indicated that on the second bullet point there that the  10 low moisture content -- I think your testimony was that  11 that suggested that it would be unlikely there would be  12 water infiltration. That might seem counterintuitive.  13 What -- can you expand on what you meant in  14 connection with that bullet point?  15 A. This is in -- slide 40 is in reference to  16 Waste Rock Stockpile 2 and 3 during operations, and so  17 material that's going to be made up of that pile as  18 it's -- as it's dumped, it will have low moisture  19 content, or zero for that matter, and it's also coarse  20 grain. It's going to be -- there have been numerous  21 studies that evaluate the grain size distributions of  22 these types of facilities.  23 And with the low moisture and the big void  24 spaces within the pile that will develop, these void  25 spaces have air, and the air acts as a -- basically a</p>



161	<p>1 barrier to vertical migration of infiltrated                  2 precipitation.                  3 Q. Okay. Thank you.                  4 And can we go to slide 47, please.                  5 Here again, Mr. Finch, there's -- there's a                  6 ring of monitoring wells, and then there's a gap in the                  7 lower left, this time between two monitoring wells, and                  8 I think you indicated that it's unnecessary to put a                  9 monitoring well in between those.                  10 Could you expand a little bit more on why                  11 that's your opinion?                  12 A. Yes. As was provided in my direct testimony,                  13 the direction of groundwater flow is west to east. It's                  14 not south in the direction of your -- where you're                  15 indicating. Not only that, this corner, this                  16 southwestern corner of the tailings impoundment at slide                  17 47, that's andesite. So we have a -- I just don't see a                  18 need to put another well in the andesite.                  19 Q. Okay. Thank you.                  20 Now, Mr. Finch, did you provide your resume to                  21 me that is now Exhibit 10 of New Mexico Copper                  22 Corporation's exhibits?                  23 A. Yes.                  24 Q. And the PowerPoint presentation that is slide                  25 11?</p>	163	<p>1 that pop-up eclipses the original slide. So I think if                  2 Mr. Butzier could provide us with a copy of the original                  3 slide, we wouldn't have any objections.                  4 MS. ORTH: All right.                  5 MR. BUTZIER: We can certainly do that. Thank                  6 you.                  7 MS. ORTH: All right. Thank you,                  8 Mr. de Saillan.                  9 Anything else?                  10 No?                  11 All right. In that case, NMCC Exhibits 10                  12 through 20 are admitted.                  13 (Exhibits NMED 10 through 20 admitted into                  14 evidence.)                  15 MR. BUTZIER: Thank you, Madam Hearing                  16 Officer.                  17 That's all I have.                  18 MS. ORTH: All right. Thank you.                  19 Mr. Knight, do you have questions of                  20 Mr. Finch?                  21 MR. KNIGHT: I do not.                  22 MS. ORTH: Thank you.                  23 Mr. de Saillan.                  24 MR. DE SAILLAN: Thank you, Madam Hearing                  25 Officer.</p>
162	<p>1 A. Yes.                  2 Q. Okay.                  3 And is Exhibit 12 from New Mexico Copper                  4 Corporation's submission an additional water balance                  5 detail for the Copper Flat mining scenario?                  6 A. Yes.                  7 Q. And then slides -- or -- excuse me -- Exhibits                  8 13 through 20 of New Mexico Copper Corporation were                  9 additional materials that -- that we have included as                  10 exhibits that relate in some way to your testimony; is                  11 that correct?                  12 A. That is correct. That relates to my analysis                  13 that was performed --                  14 Q. Okay.                  15 A. -- as presented here in my direct.                  16 MR. BUTZIER: Madam Hearing Officer, New                  17 Mexico Copper Corporation moves the admission of                  18 Exhibits 10 through 20 that were part of the statement                  19 of intent to present technical testimony package.                  20 MS. ORTH: All right.                  21 Any objections?                  22 MR. DE SAILLAN: Madam Hearing Officer, I have                  23 one issue with the slides, which I believe is                  24 Exhibit 11. Slide 11, at least my copy, shows the                  25 pop-up that Mr. Finch included in his presentation, and</p>	164	<p>1 CROSS EXAMINATION                  2 BY MR. DE SAILLAN:                  3 Q. Good afternoon, Mr. Finch.                  4 A. Good afternoon.                  5 Q. I understand you work for Daniel -- or --                  6 excuse me -- John Shomaker &amp; Associates.                  7 A. That is correct.                  8 Q. I'd like to please ask you to give Dr. John my                  9 regards.                  10 I'm going to go through some questions here                  11 for you, and I'm going to focus for the most part on                  12 your slides, but at the end I'll have a number of                  13 questions that don't exactly relate to the slides.                  14 But I'd like to start now with slide number                  15 12.                  16 And as I understand that, that shows a -- it                  17 looks like a large number of borings that were taken                  18 around the site; is that correct?                  19 A. That's correct.                  20 Q. Okay.                  21 And were there -- were the -- were the                  22 observed water levels in each of those borings recorded?                  23 A. In some of them, they were. A few of these                  24 borings were converted to monitoring wells.                  25 Q. So some of them it was recorded, but some of</p>

165	<p>1 them it was not?</p> <p>2 A. That's correct.</p> <p>3 Q. Do you know approximately how many or what</p> <p>4 percentage it was recorded?</p> <p>5 A. No. I used the geologic data from this --</p> <p>6 from these holes, did not use the -- any water level</p> <p>7 data.</p> <p>8 Q. Okay.</p> <p>9 Is any of that information in the</p> <p>10 administrative record?</p> <p>11 A. Are you -- can you specify? You mean which</p> <p>12 information?</p> <p>13 Q. The information as to the water -- the</p> <p>14 observed and recorded water level in the borings.</p> <p>15 A. The borings that were converted to monitoring</p> <p>16 wells are -- that information is in the Stage 1</p> <p>17 abatement report.</p> <p>18 Q. So that applies just to the ones with -- that</p> <p>19 were converted into monitoring wells.</p> <p>20 A. Correct.</p> <p>21 Q. And as far as the other wells, that's not</p> <p>22 available, that information is not available?</p> <p>23 A. Not to my knowledge.</p> <p>24 Q. Okay. This slide also shows the Grayback</p> <p>25 diversion, which you talked about a little bit at the</p>	167	<p>1 Q. And you discussed some of the faults when</p> <p>2 you -- when you presented this slide.</p> <p>3 Has there been any hydrologic characterization</p> <p>4 of the faults?</p> <p>5 A. The work we perform I would consider is a</p> <p>6 hydrologic characterization. That work would be in the</p> <p>7 Stage 1 Abatement --</p> <p>8 Q. Okay.</p> <p>9 A. -- Report.</p> <p>10 Q. I'm sorry. Go ahead.</p> <p>11 A. In the Stage 1 abatement report.</p> <p>12 Q. Okay.</p> <p>13 Have you placed any monitoring wells in the</p> <p>14 faults?</p> <p>15 A. Not in the fault zone, but very close. As you</p> <p>16 can see on slide 22, those -- there are several wells</p> <p>17 very, very close to the fault.</p> <p>18 Q. How far away from -- excuse me.</p> <p>19 How far away from the fault are they?</p> <p>20 A. Fifty to a hundred feet.</p> <p>21 Q. Okay.</p> <p>22 And did you characterize the faults in terms</p> <p>23 of fracture zones?</p> <p>24 A. Yes. I mean, we have the geologic data from</p> <p>25 these borings on either side of the fault and in the</p>
166	<p>1 end of your testimony.</p> <p>2 Is there a diversion structure associated with</p> <p>3 the -- with the rerouting of Grayback Arroyo?</p> <p>4 A. Yes. The diversion structure is shown on</p> <p>5 slide 12 here, on the far left-hand side. You see a cut</p> <p>6 to the very lower right corner is a cut through the</p> <p>7 topographic high, and then to the north of that is an</p> <p>8 earthen berm.</p> <p>9 Q. So is there anything more to it than -- I</p> <p>10 didn't quite catch it all.</p> <p>11 You said an earthen berm, and what was the</p> <p>12 other part?</p> <p>13 A. A cut in the bedrock high.</p> <p>14 Q. Okay.</p> <p>15 And that -- will that earthen berm need to be</p> <p>16 maintained?</p> <p>17 A. It's been the same since I've seen it over the</p> <p>18 last 40 years -- 30 -- 30 years. I would refer that</p> <p>19 question to the geotechnical engineer.</p> <p>20 Q. Okay.</p> <p>21 Is the Grayback Arroyo a tributary to the Rio</p> <p>22 Grande?</p> <p>23 A. Yes.</p> <p>24 MR. DE SAILLAN: Let's move on to slide 22,</p> <p>25 please.</p>	168	<p>1 Santa Fe Group sediment. So there is no fracture zones</p> <p>2 in the red clay or the other sediments or various grain</p> <p>3 size.</p> <p>4 Q. Okay.</p> <p>5 Could the faults serve as a conduit for the</p> <p>6 migration of contaminants?</p> <p>7 A. Not on the data I have. That red clay is very</p> <p>8 low permeability, and it's smeared along the fault zone,</p> <p>9 and that's why it acts as a barrier. It's like a clay</p> <p>10 pot.</p> <p>11 Q. Do you have any other information to indicate</p> <p>12 that it is a barrier?</p> <p>13 A. Yes. As I explained in my direct testimony,</p> <p>14 we have the geologic data from the holes drilled. There</p> <p>15 were some geophysics done -- I remember prior to the</p> <p>16 stage 1 abatement analysis. There was also the water</p> <p>17 level data we have for the site on either side of the</p> <p>18 fault zone. So we have that 130-foot drop in the depth</p> <p>19 to water.</p> <p>20 We have water quality data from wells on</p> <p>21 either side of the fault zone. So that -- to me, that's</p> <p>22 three lines of evidence.</p> <p>23 Q. How many wells do you have on the east side of</p> <p>24 the fault zone to -- to support that 130-foot drop?</p> <p>25 A. We have two in this area.</p>

169	<p>1 Q. Okay.</p> <p>2 Let's move on to slide 30, please.</p> <p>3 Now, your slide shows the final pit lake</p> <p>4 elevation of 4,894 feet above sea level; is that</p> <p>5 correct?</p> <p>6 A. That is correct. That represents the pit</p> <p>7 water body surface after rapid fill.</p> <p>8 Q. Right.</p> <p>9 Now, how precise is that figure?</p> <p>10 A. You mean the -- are you referring to the</p> <p>11 elevation?</p> <p>12 Q. Yes, I am.</p> <p>13 A. To the foot.</p> <p>14 Q. Does that take into consideration seasonal</p> <p>15 variability?</p> <p>16 A. Yes. We -- as part of the Probable Hydrologic</p> <p>17 Consequences and other document and correspondence with</p> <p>18 various agencies -- whatever it was, the EIS or NMED or</p> <p>19 Mining and Minerals, I -- I apologize. I can't remember</p> <p>20 which one. But we went into that analysis in great</p> <p>21 detail, looking at the potential variations in water</p> <p>22 level over time due to various climate regimes, based on</p> <p>23 the last hundred years of data that we have from</p> <p>24 Hillsboro weather station.</p> <p>25 Q. Okay.</p>	171	<p>1 the future, just a little bit -- the depth is the only</p> <p>2 difference.</p> <p>3 Q. Okay.</p> <p>4 A. So both are hydrologic sinks.</p> <p>5 Q. But this one is a wider hydrologic sink; is</p> <p>6 that not correct?</p> <p>7 A. Yes. Because you have the -- once you get to</p> <p>8 the end of mining, you have the pit as shown here is</p> <p>9 much bigger than the pit we have out there today.</p> <p>10 Q. Right. Okay.</p> <p>11 So for example, in the southwest portion of</p> <p>12 that map, it shows the -- the contours have moved closer</p> <p>13 towards the pit, and the same thing in the northwest</p> <p>14 corner of the picture; is that correct?</p> <p>15 MR. BUTZIER: Madam Hearing Officer, could I</p> <p>16 ask for a clarification on that question?</p> <p>17 MS. ORTH: Yeah. I'm not sure I understood it</p> <p>18 either.</p> <p>19 MR. BUTZIER: It's not clear compared to what</p> <p>20 and exactly what he's referring to.</p> <p>21 MS. ORTH: If you would just rephrase.</p> <p>22 MR. DE SAILLAN: Okay.</p> <p>23 Q. So on the northwest and southwest corner of</p> <p>24 the picture, it appears that the contour levels have</p> <p>25 moved closer to the pit -- or will have moved closer to</p>
170	<p>1 So is that an average number?</p> <p>2 A. No. We have average numbers, and we have</p> <p>3 seasonal variations that have been documented, which the</p> <p>4 seasonal variation is -- is very small. It's a foot or</p> <p>5 two.</p> <p>6 Q. So how much is the seasonal variation?</p> <p>7 A. A foot or two.</p> <p>8 Q. Okay.</p> <p>9 And what about longer-term fluctuations? Did</p> <p>10 you account for that at all as the -- for example, that</p> <p>11 you'll have a period of drought, a period of wetter</p> <p>12 years? Did you look at that type of fluctuation?</p> <p>13 A. Right. We did based on the hundred years of</p> <p>14 data from the Hillsboro weather station.</p> <p>15 Q. And how much variation did you get there?</p> <p>16 A. The same.</p> <p>17 Q. Okay. This slide also indicates that the open</p> <p>18 pit will change the gradient of water flow around the</p> <p>19 pit; is that correct?</p> <p>20 A. Are you referring to the current open pit or</p> <p>21 the future?</p> <p>22 Q. I'm -- this one is the future, correct?</p> <p>23 A. Shown in slide 30, yes, that's the future.</p> <p>24 Q. Okay. So I am referring to the future.</p> <p>25 A. Okay. The current open pit will be similar to</p>	172	<p>1 the pit compared to what they are today.</p> <p>2 A. I do admit that's an awkward question, but I</p> <p>3 will try to answer to the best of my ability.</p> <p>4 MS. ORTH: Do you agree with that statement?</p> <p>5 MR. FINCH: No. For one, the contours are</p> <p>6 different between the current pit and the future pit.</p> <p>7 So if you -- what I need is a reference, like a certain</p> <p>8 elevation or something, and I'd have to go back and</p> <p>9 compare.</p> <p>10 MR. DE SAILLAN: Okay.</p> <p>11 MR. FINCH: I believe to answer your question.</p> <p>12 I'm just -- I'm still -- that's a little confusing to</p> <p>13 me, but --</p> <p>14 MR. DE SAILLAN: Okay.</p> <p>15 The -- let's go to slide 38, then.</p> <p>16 Oh. Let's -- slide 36. Excuse me.</p> <p>17 Q. On slide 36, there is a light green area</p> <p>18 that's labeled as Kap.</p> <p>19 Could you tell us what that refers to?</p> <p>20 I don't think it's labeled on there.</p> <p>21 A. Right. It's not labeled on there. That --</p> <p>22 all the -- but it is in some form or fashion. If you</p> <p>23 look in the box here in the lower left corner, this blue</p> <p>24 with the explanation, everything under Ka, so Kap, then</p> <p>25 you have Ka, that's -- that relates to the -- you have</p>

173	<p>1 Kab -- that relates to the andesite.</p> <p>2 Q. Okay.</p> <p>3 And then what does the P stand for?</p> <p>4 A. I would -- without having full -- this is a</p> <p>5 reference map from the New Mexico Bureau of Geology. I</p> <p>6 would have to go and dig that up to give you their</p> <p>7 specific description for each one of these. But Ka</p> <p>8 represents the andesite, and various other subcategories</p> <p>9 of andesite.</p> <p>10 MS. ORTH: I have to take your comment later.</p> <p>11 I'm sorry, sir.</p> <p>12 MR. DE SAILLAN: Okay. Thank you.</p> <p>13 Let's move on to slide 38.</p> <p>14 Q. Now, slide 38 is a photograph, and you have an</p> <p>15 area that's indicated as being an outcropping of</p> <p>16 andesite; is that correct?</p> <p>17 A. That is correct.</p> <p>18 Q. And does that outcropping appear to be</p> <p>19 weathered?</p> <p>20 A. It is.</p> <p>21 Q. Okay.</p> <p>22 Let's move on to slide 40.</p> <p>23 Now, you indicate that the low moisture</p> <p>24 content of some of the coarse waste rock will prevent</p> <p>25 downward migration of seepage during operations.</p>	175	<p>1 A. Observations from the various field</p> <p>2 investigations that I've done on site that go back to</p> <p>3 our 1993 study that John Shomaker and I did to current</p> <p>4 time, 2010 to about -- well, current day time. I've</p> <p>5 stomped around and done visual inspections of the</p> <p>6 existing waste rock stockpiles.</p> <p>7 Q. Are those observations documented?</p> <p>8 A. In my notes, yes.</p> <p>9 Q. Okay.</p> <p>10 A. I have --</p> <p>11 Q. Are those notes part of the administrative</p> <p>12 record?</p> <p>13 A. That I would have to check. I'd need to -- I</p> <p>14 would have to review some reference materials.</p> <p>15 Q. Okay.</p> <p>16 Okay. Let's move on to slide 41, please.</p> <p>17 You state that the stormwater will be diverted</p> <p>18 away from the waste rock; is that correct?</p> <p>19 A. That's correct.</p> <p>20 Q. What about stormwater that runs off of the</p> <p>21 waste rock? How will that be addressed?</p> <p>22 A. Slide 41 shown here that they're referencing</p> <p>23 is after reclamation. So that -- that would be based on</p> <p>24 the cover and the cover design, which Mr. Stein is going</p> <p>25 to cover -- or is going to do his direct about. So</p>
174	<p>1 I want to ask you about that.</p> <p>2 Isn't it true that a lot of that waste rock is</p> <p>3 going to be removed from below the water table?</p> <p>4 A. That's correct.</p> <p>5 Q. So --</p> <p>6 A. It will be dewatered. The pit's dewatered as</p> <p>7 you mine.</p> <p>8 Q. Okay.</p> <p>9 And that will remove the moisture content from</p> <p>10 the rock?</p> <p>11 A. Not all of it.</p> <p>12 Q. And what is the expected particle size</p> <p>13 distribution?</p> <p>14 A. Could you provide me a reference for what</p> <p>15 material you're asking about?</p> <p>16 Q. For the waste rock. I'm sorry.</p> <p>17 A. From what I've seen in other similar</p> <p>18 facilities, that ranges from giant boulders to sand size</p> <p>19 particles.</p> <p>20 Q. Now, you also state here that the infiltration</p> <p>21 for -- through the -- to the waste rock storage facility</p> <p>22 or waste rock storage pile is not expected through the</p> <p>23 operation period, consistent with observations from</p> <p>24 existing waste rock storage piles on site.</p> <p>25 What observations are you referring to?</p>	176	<p>1 that's a question for another expert.</p> <p>2 Q. Okay. So you don't know the answer.</p> <p>3 A. As far as run-off from the waste rock storage</p> <p>4 pile after reclamation, a better answer and more</p> <p>5 technical answer will come from Mr. Stein.</p> <p>6 Q. So you don't know the answer.</p> <p>7 A. The design should have stormwater conveyance</p> <p>8 features in it.</p> <p>9 Q. Okay.</p> <p>10 You mean in the cover.</p> <p>11 A. Yes.</p> <p>12 Q. Okay. This may be also a question for</p> <p>13 Mr. Stein, but I'm going to ask you anyway.</p> <p>14 Did you model the cover system based on daily</p> <p>15 time steps to consider one-day storm events?</p> <p>16 A. We did consider maximum precipitation events,</p> <p>17 which would be a daily event.</p> <p>18 Q. Okay.</p> <p>19 And where is that reflected?</p> <p>20 A. In the Probable Hydrologic Consequences</p> <p>21 report.</p> <p>22 Q. Okay.</p> <p>23 Let's look at slide 42.</p> <p>24 And this slide shows monitoring wells around</p> <p>25 the waste rock, correct?</p>

177

1 A. Correct.

2 Q. And did you do a hydrologic -- any kind of

3 hydrologic analysis to determine where to locate those

4 monitoring wells?

5 A. Yes. Thank you for asking. That was one part

6 I may have breezed over in my direct.

7 We have the groundwater contours as we

8 understand them today, and then we have various

9 sequences of model-simulated groundwater contours as

10 through the mining period, all the way a hundred years

11 after reclamation. And so we use those contours as we

12 understand today and those simulated by the model to get

13 an understanding of direction of groundwater flow and

14 where is the best location for monitoring based on that

15 understanding of groundwater flow direction.

16 Q. Did you prepare any calculations on how

17 contamination would disperse through the groundwater if

18 it reaches groundwater?

19 A. A colleague in my office, Mike Jones, did

20 numerous calculations to look at transport from the

21 waste rock stockpile.

22 Q. And is that included in any of the reports?

23 A. I believe that is not in the Probable

24 Hydrologic Consequences, it's in the EIS documents. I'd

25 have to verify that.

178

1 Q. Okay.

2 Okay. Let's move on to slide 45.

3 Now, you mentioned here that the potential for

4 leakage to the liner in particular -- that there is a

5 potential for leakage through the liner in the tailing

6 storage facility, right?

7 A. This is an approach that we took to evaluate

8 this particular facility.

9 Q. Okay.

10 And you estimate the leakage to be 0.5 gallons

11 per minute?

12 A. That's correct.

13 Q. Okay.

14 And isn't this really a best case scenario in

15 terms of the amount of leakage?

16 A. The best case scenario would be zero, if you

17 really do a good job of liner installing.

18 Q. Is that practical?

19 A. I don't know. I would defer to a liner expert

20 on that.

21 Q. Did you consider the possibility of a much

22 larger leak?

23 A. We used the industry standard that's

24 documented in great detail in the Probable Hydrologic

25 Consequences report.

179

1 Q. Okay.

2 Let's move to slide 46.

3 You state, I think, in the second bullet

4 there -- yeah, that the hydrologic gradient beneath the

5 tailings storage facility will be reduced due to the

6 reduced recharge.

7 Did you calculate how much the gradient would

8 change?

9 A. No, did not.

10 Q. Okay.

11 You state that the groundwater beneath the

12 tailing storage facility will have a low travel

13 velocity.

14 And what -- were there any calculations on

15 which that was based?

16 A. Yes. We just used basic Darcy's law, the

17 numerous velocity calculations using Darcy's law, and

18 the existing hydraulic gradient that we see under the

19 tailings facility, which is quite flat. I believe

20 that's in the Stage 1 abatement report.

21 Q. Okay.

22 Those calculations are in the report?

23 A. Our results of those calculations.

24 Q. Are the actual calculations in the report?

25 A. There's a lot of material out there. I'd have

180

1 to --

2 Q. I agree.

3 A. -- pull it out.

4 Q. Okay.

5 And what do you mean by low travel velocity?

6 A. Well, low is -- what I mean by that is that

7 it's not going to move. I would say just like as we

8 observed with the existing TDS and sulfate plume beneath

9 the tailings impoundment -- the current tailings

10 impoundment, it has not moved anywhere in 30 years. And

11 so that, to me, is a low travel velocity, that it's --

12 maybe it's going to move a few feet in a decade or a

13 hundred years. It's --

14 Q. Okay.

15 So when you say that the leakage if it reaches

16 groundwater will blend or remain beneath the tailings

17 storage facility for hundreds of years, what is the

18 basis of that statement?

19 A. Well, based on our .5 gpm, the volume of water

20 that's underneath the hydraulic gradient and the travel

21 velocities that we have calculated either through

22 Darcy's law or through modeling exercises within other

23 colleagues in my office.

24 Q. Okay.

25 Let's move on to slide 49, please.

181	<p>1 And --</p> <p>2 MS. EMMER: There is no slide 49.</p> <p>3 MR. FINCH: Yeah.</p> <p>4 MS. ORTH: The slides end at 48.</p> <p>5 Q. (BY MR. DE SAILLAN) Okay. Let me just ask</p> <p>6 you.</p> <p>7 Your -- I forget which slide it was, but you</p> <p>8 referenced a well on the southwest side of the tailings</p> <p>9 facility that the Environment Department had proposed?</p> <p>10 Do you recall that testimony?</p> <p>11 A. Yes.</p> <p>12 Q. And first of all, I think you responded that</p> <p>13 you didn't think it was necessary because it was</p> <p>14 upgradient of the tailing storage facility?</p> <p>15 A. Correct. There's already an upgradient well</p> <p>16 of the tailings facility, as required by the Copper</p> <p>17 Rule.</p> <p>18 Q. Okay.</p> <p>19 But this was upgradient -- more directly</p> <p>20 upgradient or -- upgradient from the different location</p> <p>21 of the tailings facility?</p> <p>22 A. It was to the south of the upgradient well</p> <p>23 we've already proposed.</p> <p>24 MR. BUTZIER: Madam Hearing Officer, could we</p> <p>25 pull up slide 47?</p>	183	<p>1 Q. Okay.</p> <p>2 Now, earlier you testified that the alluvium</p> <p>3 that sits on top of the andesite -- maybe you used the</p> <p>4 term "colluvium." I'm not sure.</p> <p>5 But either way, you indicated that that was</p> <p>6 going to be scraped off? Do you recall that testimony?</p> <p>7 A. I do, reference to the Waste Rock Stockpile 2</p> <p>8 and 3.</p> <p>9 Q. Right. Okay.</p> <p>10 And have you measured the thickness of that</p> <p>11 alluvium or colluvium?</p> <p>12 A. We've made some estimates when we were doing</p> <p>13 the field survey based on the slope of the andesite and</p> <p>14 the rock outcrops, but we -- there's been no drilling to</p> <p>15 confirm that.</p> <p>16 Q. Okay.</p> <p>17 And then you made reference to a clay deposit</p> <p>18 to the east of the Animas fault? Do you recall that</p> <p>19 testimony?</p> <p>20 A. I do. I believe there's clay deposit on the</p> <p>21 west and east side of the fault.</p> <p>22 Q. Okay.</p> <p>23 And is that included in the groundwater model</p> <p>24 that you prepared?</p> <p>25 A. The fault zone is simulated in the groundwater</p>
182	<p>1 I believe that might be what Mr. De Saillan is</p> <p>2 talking about.</p> <p>3 MS. ORTH: Thank you.</p> <p>4 MR. DE SAILLAN: Thank you, Mr. Butzier.</p> <p>5 MR. BUTZIER: You bet.</p> <p>6 MR. FINCH: There you go. Okay.</p> <p>7 Q. (BY MR. DE SAILLAN) So are you opposing</p> <p>8 installation of this additional well?</p> <p>9 A. I don't oppose the installation. I don't see</p> <p>10 the necessity of it.</p> <p>11 Q. Okay.</p> <p>12 Okay. A few more questions here.</p> <p>13 What is the current depth -- or the depth of</p> <p>14 the current pit lake?</p> <p>15 A. Are you referring to the water depth?</p> <p>16 Q. Yes.</p> <p>17 A. Twenty-five to 30 feet, if my memory serves</p> <p>18 me.</p> <p>19 Q. Has it varied over time?</p> <p>20 A. It has.</p> <p>21 Q. By how much?</p> <p>22 A. It's been shrinking over time, and I believe</p> <p>23 my best guess without having reference materials in</p> <p>24 front of me would be it's decreased in depth of about</p> <p>25 10 feet.</p>	184	<p>1 model.</p> <p>2 Q. And does the fault zone include the clay</p> <p>3 layers?</p> <p>4 A. It includes low permeability to simulate the</p> <p>5 clay layer.</p> <p>6 Q. Okay.</p> <p>7 And what is the -- what is the area -- the</p> <p>8 surface area of Waste Rock Piles 2 and 3?</p> <p>9 A. I don't have that number off the top of my</p> <p>10 head.</p> <p>11 Q. Okay.</p> <p>12 And then you stated that you have 40 years of</p> <p>13 data on that -- on this site.</p> <p>14 Do you recall that testimony?</p> <p>15 A. Yes.</p> <p>16 Q. And I want -- I want to ask you how</p> <p>17 consistently that data has been collected over the past</p> <p>18 40 years. Are there time gaps in the sequence?</p> <p>19 A. Yes. And they're based on certain events and</p> <p>20 data collection efforts. So there -- there have been --</p> <p>21 we've compiled -- that was one really nice thing about</p> <p>22 this project, is that this was the first effort to</p> <p>23 really compile all the available data, because there was</p> <p>24 some data that the Environment Department had, there's</p> <p>25 some data that we actually had from way back, you know,</p>

185	<p>1 from the beginning of time when they were opening the</p> <p>2 mine.</p> <p>3 And then all the data that we collected, you</p> <p>4 know, up to current day has been -- has been put into</p> <p>5 one database. But there are a few gaps in that. Yes.</p> <p>6 Q. Okay.</p> <p>7 When were the gaps?</p> <p>8 A. And generally speaking, the gaps would be --</p> <p>9 there was a little bit of a gap -- and it depends on</p> <p>10 what data set you're talking about now. We have a full</p> <p>11 record of climate data from the Hillsboro weather</p> <p>12 station, which is an important piece of data. We</p> <p>13 have -- you know, for some wells, we might have more</p> <p>14 water level data than we do water quality. So that's --</p> <p>15 it really depends on what data set you're referring to.</p> <p>16 Q. Okay.</p> <p>17 I guess I could ask you when you -- when you</p> <p>18 talk about there being 40 years of data, what data sets</p> <p>19 were you referring to. Okay? You mentioned the climate</p> <p>20 data already.</p> <p>21 A. Okay. So we have the climate data. We have</p> <p>22 the water level data. We have surface water quality</p> <p>23 data from -- from the samplers along Grayback,</p> <p>24 stormwater samplers. We have groundwater chemistry data</p> <p>25 from sampling of wells.</p>	187	<p>1 Q. Okay.</p> <p>2 And what about the -- I think the other thing</p> <p>3 you mentioned was water chemistry data?</p> <p>4 A. Right. I believe that's -- that would be --</p> <p>5 that's about the same as the surface water.</p> <p>6 Q. Okay.</p> <p>7 Okay. Thank you, Mr. Finch.</p> <p>8 That's all my questions.</p> <p>9 MR. FINCH: Thank you.</p> <p>10 MS. ORTH: Thank you, Mr. De Saillan.</p> <p>11 Ms. Barncastle, do you have questions?</p> <p>12 MS. BARNCASTLE: Yes.</p> <p>13 MS. ORTH: Okay.</p> <p>14 MS. BARNCASTLE: I do.</p> <p>15 MS. ORTH: The microphone is coming your way.</p> <p>16 MS. BARNCASTLE: Thank you.</p> <p>17 CROSS EXAMINATION</p> <p>18 BY MS. BARNCASTLE:</p> <p>19 MS. BARNCASTLE: I would like to start with</p> <p>20 slide 12.</p> <p>21 Q. All right. Would it be fair to say that each</p> <p>22 of those core samples was drilled not for the purpose of</p> <p>23 determining permeability, but for the purpose of</p> <p>24 determining where to mine or mapping out the ore body?</p> <p>25 A. That was the primary objective. I would agree</p>
186	<p>1 Q. Okay. Well, let's take them one at a time.</p> <p>2 When did you have gaps in the water level</p> <p>3 data?</p> <p>4 A. There is -- here again depending on which set</p> <p>5 of wells, but there is a gap between -- I would say</p> <p>6 about 2000 and 2008.</p> <p>7 Q. Okay.</p> <p>8 A. It's a gap that's pretty common in both the</p> <p>9 water levels and the water quality.</p> <p>10 Q. Okay.</p> <p>11 And --</p> <p>12 A. Groundwater quality, that is.</p> <p>13 Q. Okay.</p> <p>14 Are there any other gaps in the groundwater</p> <p>15 quality?</p> <p>16 A. That's the most significant gap that I can</p> <p>17 think of.</p> <p>18 Q. How about the surface water quality?</p> <p>19 A. There may be a little bit more of a gap.</p> <p>20 There was some stormwater samples that were collected</p> <p>21 before the mine was opened -- the Quintana mine was</p> <p>22 opened in the '70s. And then we collected surface water</p> <p>23 data in the '90s, the early '90s. There was some</p> <p>24 collected in the late '90s. And then we have from about</p> <p>25 2010 on a very solid record of data collection.</p>	188	<p>1 with that.</p> <p>2 Q. And you referred to a detailed analysis that</p> <p>3 was performed on those core samples shown on slide 12.</p> <p>4 What did that detailed analysis entail?</p> <p>5 A. The -- pardon me. Can you specify? Do you</p> <p>6 mean -- are you referring to the cores?</p> <p>7 Q. Yeah.</p> <p>8 Your direct testimony, I believe you referred</p> <p>9 to detailed analysis performed on the core samples --</p> <p>10 A. Right.</p> <p>11 Q. -- shown on this slide? What was that</p> <p>12 detailed analysis?</p> <p>13 A. The detailed analysis included a -- they had</p> <p>14 core samples that were collected, and then they had</p> <p>15 professional geologists on site describing every aspect</p> <p>16 of the geology of those core samples.</p> <p>17 Q. Was there permeability testing done on those</p> <p>18 core samples?</p> <p>19 A. There were permeability tests done on some of</p> <p>20 the core holes that we performed injection tests on.</p> <p>21 Q. Was permeability testing done on all of those</p> <p>22 core holes?</p> <p>23 A. Oh, no. No. But we can take the geologic</p> <p>24 description and infer permeability based on the other</p> <p>25 data sets we have. So we can -- we can cross-reference</p>

189	<p>1 with the geologic description where we have permeability</p> <p>2 and the geologic descriptions where we don't have</p> <p>3 permeability, and there's people look at those similar</p> <p>4 rock characteristics and map that out.</p> <p>5 Q. Did you find places where there was no</p> <p>6 permeability?</p> <p>7 A. Yes. Well, I mean, or we got a -- basically a</p> <p>8 zero result, was at GWQ-5R, which is off this map.</p> <p>9 Q. How did you measure the hydraulic conductivity</p> <p>10 in the andesite?</p> <p>11 A. Various methods that we had. Pressure</p> <p>12 injection tests of open core holes. We did -- there</p> <p>13 were -- not only us, but consultants prior to us, there</p> <p>14 are numerous pumping tests from wells drilled in the</p> <p>15 rocks. And from stage 1 abatement, when we sampled --</p> <p>16 collected a sample from a well, we would measure the</p> <p>17 specific capacity and convert specific capacity into</p> <p>18 hydraulic conductivity.</p> <p>19 Q. Okay. I'd like to go to slide -- give me a</p> <p>20 second.</p> <p>21 Slide 14, please.</p> <p>22 In your Range of Hydraulic Conductivity</p> <p>23 column, how did you measure 0 hydraulic conductivity?</p> <p>24 You have 0 to 0.0027?</p> <p>25 A. 0 is from a pressure injection test on GWQ-5R.</p>	191	<p>1 Copper?</p> <p>2 A. No. The model inputs are in favor of</p> <p>3 calibrating the model to get the most accurate</p> <p>4 representation of the groundwater system.</p> <p>5 Q. Now, you've said multiple times today that</p> <p>6 there is water flowing into the pit through the andesite</p> <p>7 that is 0 permeability.</p> <p>8 How is that possible?</p> <p>9 A. Well, it doesn't necessarily have 0</p> <p>10 permeability. It has a range of 0 to .0027 on the test</p> <p>11 data. That's just a range.</p> <p>12 MR. BUTZIER: Madam Hearing Officer, I think</p> <p>13 the question also mischaracterizes the testimony. I</p> <p>14 don't think that was his testimony at any point.</p> <p>15 MS. ORTH: All right.</p> <p>16 Mr. Finch, would you like to clarify whether</p> <p>17 that was your testimony earlier?</p> <p>18 MR. FINCH: My testimony was on the range of</p> <p>19 hydraulic conductivity. I don't believe I ever said</p> <p>20 that the andesite had 0 hydraulic conductivity, as -- on</p> <p>21 an average or as a whole.</p> <p>22 MS. BARNCASTLE: Thank you for that</p> <p>23 clarification.</p> <p>24 Q. What geophysical data did you use outside of</p> <p>25 the permit boundary particularly to the east of Caballo</p>
190	<p>1 And Dr. Shomaker did that analysis, and -- which is</p> <p>2 appended to the -- the groundwater model report. And</p> <p>3 what he observed in the data collected from that</p> <p>4 pressure injection test is that because the pressures</p> <p>5 got so high we were -- we were creating fractures in the</p> <p>6 rock from the pressure -- from the pressure test,</p> <p>7 that -- and that's the only water that was -- that went</p> <p>8 in.</p> <p>9 So he -- he determined that that was</p> <p>10 basically -- that was so low it was 0.</p> <p>11 Q. That was an assumption?</p> <p>12 A. No. That was his calculation.</p> <p>13 Q. Why are the model values for the Santa Fe</p> <p>14 Group outside the range of the measured values?</p> <p>15 A. As I tried to explain in my direct, there are</p> <p>16 two different regions. So -- and on top of that, the</p> <p>17 model when you'll do hydraulic conductivity domains,</p> <p>18 you're doing a domain for an average for a large area,</p> <p>19 whereas the result here, shown in the -- under the Range</p> <p>20 of Hydraulic Conductivity is from specific points from</p> <p>21 those wells.</p> <p>22 And so the lower end on the model actually is</p> <p>23 for areas outside of where these wells were tested.</p> <p>24 Q. Wouldn't it be fair to say that the model</p> <p>25 assumptions in that category are in favor of New Mexico</p>	192	<p>1 Reservoir?</p> <p>2 A. Could you clarify in -- or what part of the</p> <p>3 analysis?</p> <p>4 Q. Well, would it be safe to say that there's not</p> <p>5 as much data -- I'm on slide 15 -- there's not as much</p> <p>6 data to the east of the fault outside of the permit</p> <p>7 boundaries as there is within the permit boundaries?</p> <p>8 A. Oh, no. We have a wealth of -- a good amount</p> <p>9 of data. The -- there was a groundwater exploration</p> <p>10 program that was conducted in the '70s in relation to</p> <p>11 finding water supply for this mine, and there were</p> <p>12 numerous wells drilled and tested as part of that to the</p> <p>13 east of -- of this whole -- off this map to the east.</p> <p>14 The well down there in the corner, MW-4, was</p> <p>15 one of those wells.</p> <p>16 Q. Okay. So I'll ask you again, then.</p> <p>17 Was there any other geophysical data aside</p> <p>18 from what you just referred to outside of the permit</p> <p>19 boundary to the east, towards Caballo --</p> <p>20 A. We did not use geophysical data. We used well</p> <p>21 data and published geologic data, for the area east of</p> <p>22 the permit area.</p> <p>23 Q. In an effort to avoid mischaracterizing your</p> <p>24 testimony, did I understand you correctly when I thought</p> <p>25 I understood you to say that -- in your direct that</p>



193	<p>1 hydraulic gradient changes are equal to changes in</p> <p>2 hydraulic conductivity?</p> <p>3 A. That is what I said. Correct.</p> <p>4 Q. What data do you have to support that?</p> <p>5 A. It's a fundamental understanding of</p> <p>6 hydrogeology that we get from textbooks, but we have all</p> <p>7 this data on the site that we've talked about that</p> <p>8 describes the hydraulic gradient and the properties.</p> <p>9 And where you have a steep hydraulic gradient, you have</p> <p>10 low hydraulic conductivity, and when you have a flat</p> <p>11 hydraulic gradient, you have a high hydraulic</p> <p>12 conductivity.</p> <p>13 Q. All right.</p> <p>14 You referenced the barrier boundary to flow.</p> <p>15 Does that mean there's no flow across the</p> <p>16 fault?</p> <p>17 A. A barrier doesn't imply no flow. It implies</p> <p>18 limited flow. It could be no flow, but it could be low</p> <p>19 flow to limited flow. And limited here is enough to</p> <p>20 create a 130-foot drop in the water table. And no --</p> <p>21 none of the sulfate- and TDS-elevated groundwater on the</p> <p>22 west side of the fault has migrated across this to the</p> <p>23 other side.</p> <p>24 So we have a very good understanding that this</p> <p>25 fault system limits or prevents groundwater flow across</p>	195	<p>1 MS. ORTH: Right. The half mile thing was, I</p> <p>2 thought, one aspect of it.</p> <p>3 Would you clarify that, Mr. Finch.</p> <p>4 MR. FINCH: The half mile is just a Copper</p> <p>5 Rule requirement. We used -- another Copper Rule</p> <p>6 requirement is providing information on the region,</p> <p>7 which I have. So we have included regional data as well</p> <p>8 as localized data.</p> <p>9 Q. (BY MS. BARNCASTLE) What information is</p> <p>10 available and in the record that you relied upon for any</p> <p>11 of your opinions to tell us what's happening</p> <p>12 downgradient?</p> <p>13 A. Can you clarify downgradient? Of what?</p> <p>14 Q. Well, if the water is flowing to the -- is it</p> <p>15 west? East?</p> <p>16 A. Regionally groundwater flows from west to</p> <p>17 east.</p> <p>18 Q. Okay. So further over, then, down from what</p> <p>19 we're looking at here, on slide 15.</p> <p>20 A. I'm sorry. Can you rephrase that? What was</p> <p>21 the question again?</p> <p>22 Q. So what data and information did you rely upon</p> <p>23 as far as the whole geographic area further to the east,</p> <p>24 toward Caballo Reservoir, to tell us what's happening in</p> <p>25 the groundwater in that area?</p>
194	<p>1 it.</p> <p>2 Q. The only testing across the fault are those</p> <p>3 two wells, though, as far as water quality, correct?</p> <p>4 A. That is correct.</p> <p>5 Q. So your opinion is based on two wells not</p> <p>6 showing a water quality change.</p> <p>7 A. No. It's based on the numerous wells we have</p> <p>8 on the west side and the two wells we have on the east</p> <p>9 side. So as a whole, we're looking at over a dozen</p> <p>10 wells.</p> <p>11 Q. Did the hydraulic testing in stage -- in the</p> <p>12 stage 1 abatement include aquifer testing to determine</p> <p>13 hydraulic conductivity of the red clay in the fault</p> <p>14 zone?</p> <p>15 A. I'd have to check that, but I believe a</p> <p>16 previous consultant that drilled a well into that</p> <p>17 completed it, did test it. But I'd have to verify that</p> <p>18 through examination of the -- of that report.</p> <p>19 Q. The data that you're basing your opinion on is</p> <p>20 solely concentrated within the mine area only plus the</p> <p>21 half mile outside; is that correct?</p> <p>22 MR. BUTZIER: Madam Hearing Officer, I'd</p> <p>23 request a clarification. There have been a number of</p> <p>24 opinions expressed, and it's not clear to which opinion</p> <p>25 she is referring.</p>	196	<p>1 A. As part of other studies that I've referenced,</p> <p>2 the key references in my direct, we had -- the Baseline</p> <p>3 Data Report didn't just include the mine permit area.</p> <p>4 The Baseline Data Report, per Mining and Minerals</p> <p>5 Division requirements and the Sampling and Analysis Plan</p> <p>6 that was approved by the MMD, include a much larger area</p> <p>7 all the way within that whole box I showed for the</p> <p>8 groundwater flow model.</p> <p>9 So we have all the data collected as part of</p> <p>10 that. We developed a conceptual model report. Then we</p> <p>11 developed a numeric groundwater model. All industry</p> <p>12 standards and in the same sequence of things, to analyze</p> <p>13 the system.</p> <p>14 Q. Okay. I'd like to move to slide 34.</p> <p>15 In this slide in your comparison of the</p> <p>16 existing pit to the future pit, we see that the water</p> <p>17 surface area at the existing pit will multiply by a</p> <p>18 factor of more than 4, but we also see that the</p> <p>19 evaporation out doesn't multiply by as much.</p> <p>20 Can you explain why?</p> <p>21 A. Thank you. That's a good observation. And I</p> <p>22 do have an answer for that.</p> <p>23 The existing pit doesn't have much shade or</p> <p>24 cover that's exposed to solar radiation, and so it has a</p> <p>25 higher evaporation rate. The future pit will be</p>

197	<p>1 basically -- what do you want to call it -- say down in 2 a hole, the future pit water body, which will be shaded. 3       So we have data from other mine sites, pits in 4 New Mexico where we calculate that change in evaporation 5 rate. So it has a smaller evaporation rate. For the 6 existing pit, we used an evaporation rate of 65 inches 7 per year, and for the future one we used 50 inches per 8 year. 9     Q. Thank you. 10       I'd like to move to slide 36, please. 11       In the permit and in your testimony, the Waste 12 Rock Stockpiles 2 and 3 are on andesite, but this figure 13 shows it's on alluvium, correct? 14       At least part of 3 is. 15     A. As shown here, correct. 16     Q. Okay. 17       And you testified that the alluvium will be 18 scraped off? 19     A. Based on the plan and what's in the Mine Plan 20 is to remove that and to use it for cover for 21 reclamation. 22     Q. Aren't there existing waste rock stockpiles 23 here? 24     A. The daf label there is -- refers to -- af 25 refers to artificial fill. So some of that -- there is</p>	199	<p>1 report and in the Stage 1 abatement report. 2     Q. Thank you. 3       Slide 39, please. 4       This I understand shows that you are going 5 to -- when I say "you," I use the term colloquially to 6 mean New Mexico Copper Corporation. 7     A. Understood. 8     Q. I apologize. 9       I believe this shows that water will be 10 captured and collected off of the waste rock stockpiles. 11       And what is going to happen with that water 12 then? 13     A. I believe Mr. Smith testified that water gets 14 recycled and used, or it gets -- it gets used in the 15 mining process. 16     MS. BARNCASTLE: Slide 41, please. 17     Q. Here you testified rather quickly about the 18 store-and-release cover system, and I would like you to 19 please describe the properties of the proposed 20 store-and-release cover. 21     A. The properties of the store-and-release cover 22 will be covered by Mr. Stein as part of the reclamation 23 efforts. 24     Q. Okay. 25       Slide 42, please.</p>
198	<p>1 a little piece of it up in the north part of that gray 2 area that is some existing material from a previous 3 operation, my understanding. 4     Q. Is the plan to include scraping off the 5 alluvium from below the existing waste rock stockpiles? 6     A. I would defer that question to whoever is 7 going to talk about the reclamation efforts next. That 8 would be Mr. Stein. 9     Q. Okay. 10       Slide -- let me see here. Slide 37, please. 11       Now, during your discussion of this slide, 12 you, I believe, said that it took 90 days for water to 13 seep into this well? 14     A. As shown here on slide 37, this graph, yes. 15 That's correct. 16     Q. Okay. 17       Is there additional data to justify this low 18 permeability value? 19     A. The pressure injection tests that we did. 20     Q. Is that part of the record? 21     A. Yes. 22     Q. Do you know where in the record we might find 23 that? 24     A. The -- it's in both the model -- the modeling 25 report and also the Probable Hydrologic Consequences</p>	200	<p>1       Would it be fair to say that New Mexico Copper 2 Corporation used existing infrastructure for monitoring 3 purposes shown on this figure? In other words, they 4 didn't develop anything additional for monitoring 5 purposes? 6     A. I'm a little confused. I see lots of 7 additional monitoring. 8     Q. What are -- what are new versus what are 9 existing -- 10     A. Oh. 11     Q. -- as of the time the copper mine closed the 12 last time? 13     A. Thank you. Okay. 14       So -- 15       And maybe the green dots. 16       There you go. Thanks. 17       The green dots were, I think, covering up some 18 of the labels, and so now you just see -- you can see 19 it, the orange triangles. Every well that starts with a 20 P, so PGWQ, is a new -- is a new monitoring well to be 21 installed. Now, if you see a well that is -- we have 22 like over there, off on the right-hand side, there's a 23 blue dot, it says GWQ-3, that's an existing well. 24       So all the triangles here are proposed 25 monitoring wells. Those will all be new.</p>

201	<p>1 MS. BARNCASTLE: Madam Hearing Officer, I'd                  2 like to at this point raise the same concern that                  3 Mr. de Saillan raised regarding slide 11 in that I                  4 couldn't read this initially in the format that it was                  5 given to me. So you might need to do the same thing                  6 with slide 42.                  7 MS. ORTH: Slide 42.                  8 Mr. Butzier?                  9 MR. BUTZIER: Yes. We'll do that.                  10 MS. ORTH: All right. Thank you.                  11 Q. (BY MS. BARNCASTLE) What was done with the                  12 existing infrastructure to ensure its fitness for the                  13 purpose that is now being used? In other words, what                  14 was done with the old infrastructure to ensure that it's                  15 accurately monitored and accurately able to do what                  16 you're wanting it to do here?                  17 A. Can you qualify infrastructure?                  18 Q. The monitoring wells.                  19 A. Oh. Monitoring wells.                  20 So your question is what do we do with the                  21 existing monitoring wells?                  22 Q. To ensure their integrity for the purpose of                  23 what you're using them for now.                  24 A. Well, that was a rigorous analysis we went                  25 through in developing the Monitoring Plan that's</p>	203	<p>1 or less -- I guess it says less.                  2 A. Less, yeah.                  3 Q. Okay. So the andesite is -- has a lower                  4 hydraulic conductivity than the liner.                  5 A. That's the -- that was the previous slide,                  6 whatever that was. That doesn't represent the hydraulic                  7 conductivity of the synthetic liner. It's the material                  8 under it that I believe it's -- it's an input value for                  9 the bed material that we put in for the calculation.                  10 Q. This is -- so why -- why did you use this                  11 number, then, that we're seeing here in the 1 times 10                  12 to the minus-6 power? Where does that come from?                  13 A. That's detailed in the Probable Hydrologic                  14 Consequences report. This is an appendix of expected                  15 values with this type of analysis.                  16 Q. And that just so happens to be the same for                  17 the liner as what you come to for the andesite.                  18 A. No. No. As we just discussed, the andesite                  19 is less than that.                  20 Q. Okay.                  21 Just a moment, Madam Hearing Officer.                  22 MS. ORTH: All right.                  23 MS. BARNCASTLE: I have nothing further.                  24 Thank you.                  25 MS. ORTH: Thank you, Ms. Barncastle.</p>
202	<p>1 submitted as part of the Discharge Plan application. In                  2 that plan, we took everything we knew from stage 1                  3 abatement and said this well is a valid point, we'll                  4 keep it, or we said this well is going to be removed                  5 from the mining process, and we'll replace it, or we                  6 said we need additional wells.                  7 I mean, the whole thing was -- was a very                  8 rigorous analysis. We even considered potential --                  9 around the pit drawdown effects from pit dewatering. So                  10 the monitoring system would be able to monitor for the                  11 duration of time needed.                  12 It's all in that document.                  13 Q. What document specifically?                  14 A. The Groundwater Monitoring Plan that's part of                  15 the Discharge Permit application packet.                  16 Q. Okay.                  17 I'd like to go to slide 45, please.                  18 What data was relied upon to determine that                  19 the andesite is the exact same hydraulic conductivity as                  20 the liner?                  21 A. We never considered the andesite to have the                  22 exact hydraulic conductivity of the liner.                  23 MS. BARNCASTLE: Could you please go to slide                  24 40, please.                  25 Q. Does slide 40 say that the permeability is at</p>	204	<p>1 Is there anyone else who has a question of                  2 Mr. Finch?                  3 Raise your hand.                  4 Ms. Brittan, would you come up, please.                  5 EXAMINATION                  6 BY MS. BRITTAN:                  7 Q. I have a question about the holes that you                  8 drilled, the core -- the core analysis holes.                  9 A. Yes.                  10 Q. What happens to those? Do those get filled in                  11 with something or just leave them?                  12 And I don't know if they collect stormwater                  13 or --                  14 A. They get plugged back.                  15 Q. What do you use?                  16 A. Well, those were -- I couldn't say, but the                  17 State Engineer does have requirements for that.                  18 Q. They do have requirement for --                  19 A. They do have requirements for exploration                  20 holes that count the water.                  21 MS. BRITTAN: Okay. Thank you.                  22 MS. ORTH: Thank you, Ms. Brittan.                  23 Mr. Irwin.                  24 MR. IRWIN: I'm replying to Ms. Brittan's                  25 question here. Since I was in charge of the drilling in</p>

205	<p>1 2012, let me respond to that. Mr. de Saillan also 2 brought up the question. 3 When we permitted the drilling in 2011 and 4 2012, they were permitted as exploration core holes. 5 They're small diameter, approximately three inches in 6 diameter. The purpose of those holes is to understand 7 rock qualities, rock characteristics from a stability 8 point of view and, of course, obtain geological 9 information and geochemical information to upgrade the 10 existing resource. 11 As a result -- as a result, to get the maximum 12 core recovery, all those holes were drilled on the -- a 13 drilling mud. Typically that's a mixture of a bentonite 14 compound, a clay. And at the end of the drilling by 15 state of -- New Mexico State Engineer regulations, those 16 holes are embedded. 17 In the case of why no hydrological studies 18 were done on that, we were paying a driller to drill as 19 many holes as quickly as we could, maximum core 20 recovery. Upon drilling the holes, since we were 21 drilling in a heavy mud fluid, we could not -- there's 22 insufficient water coming into the deposit and certainly 23 not under pressure. We could not sense when we hit the 24 water table. 25 And again, since we -- by state requirements,</p>	207	<p>1 it? 2 A. Andesite? 3 Q. Andesite, which is impervious to water. But 4 since this waste rock storage pile is going to be broken 5 up, andesite seems like it will be porous to water. The 6 natures of -- you know, present in andesite, water won't 7 go through it. But once you break it up, it seems like 8 it's going to be gravelly, which is a classic way to do 9 drainage. 10 And then you said that it will be holding 11 oxygen, which seems like water is heavier than oxygen, 12 would displace oxygen. I didn't catch that right. 13 MS. ORTH: But what's your question, 14 Mr. Mijal? 15 Q. (BY MR. MIJAL) The question is that does not 16 seem like WRSP is impermeable because it's broken up 17 andesite. 18 A. It's -- it's the -- it's not necessarily 19 andesite. It's andesite, quartz monzonite, other parts 20 of the rock mined out at the pit. 21 Q. Well, that just furthers my argument that it's 22 not -- it is permeable. So to me, that's -- 23 MS. ORTH: Mr. Mijal, he didn't say that the 24 tailings or the rock pile would be impermeable. He was 25 speaking to the characteristic of the rock, not the</p>
206	<p>1 we had to abandon the holes, there is no water 2 information on those holes. 3 That gets back to your question. 4 On the slide that Mr. de Saillan was asking 5 what Kap is, I'm not familiar with that geologic map. 6 That's a very generalized map. Kap would represent 7 cretaceous andesite porphyry. 8 On the project, there's three different types 9 of andesite flows, andesite without phenocryst, 10 porphyritic andesite with plagioclase phenocryst and 11 hornblende andesite porphyry. But that -- that's just a 12 general term, andesite porphyry. 13 MS. ORTH: Thank you, Mr. Irwin. 14 MR. IRWIN: Um-hum. 15 MS. ORTH: Are there other folks with 16 questions of Mr. Finch? 17 Sir, come up, and I'll need your name first. 18 MR. MIJAL: Martin Mijal, M-A-R-T-I-N 19 M-I-J-A-L. 20 EXAMINATION 21 BY MR. MIJAL: 22 Q. So all this technical stuff. 23 You have a pile, I guess, WRSP, that you have 24 to move dirt -- or rocks before you can get to the ore. 25 And part of it will be that andesite -- how do you say</p>	208	<p>1 characteristic of the pile. And we will be hearing from 2 Mr. Stein who will talk about the pile. 3 MR. MIJAL: Okay. 4 Q. I don't know if this is appropriate, but the 5 tailings seem like eventually they are dust, the mine 6 tails. In other words, to get the ore, they grind it 7 into fine dust. Then they mix in the water and the 8 reagents. So by the time you're getting the copper out, 9 you have a bunch of dust. 10 And so 40 years of control, you're going to 11 keep it wet? 12 MS. ORTH: So, Mr. Finch, would you address 13 first if the tailings pile is dust. 14 MR. MIJAL: Thank you. 15 MR. FINCH: No. It's the way -- at least my 16 limited understanding of how tailings is made in the 17 process, it includes water. That's how you get it to 18 deposit in the tailings pile. Then you decant that 19 water. 20 I mean, we have numerous examples in New 21 Mexico of -- well, not numerous. There are a couple of 22 operating tailing impoundments in New Mexico, one big 23 one in particular that I won't name. That's how it 24 works. 25 MS. ORTH: All right.</p>

209	<p>1 Q. (BY MR. MIJAL) So you do keep it wet through 2 the whole hundreds of years. 3 A. It stays -- it has moisture. Yes. 4 Q. Good. I just thought it would be dry. 5 Well, thanks. 6 MS. ORTH: Thank you, Mr. Mijal. 7 Are there others with questions of Mr. Finch? 8 I see a hand back there. 9 Ma'am. 10 MS. UPHUS: My name is Lynn Uphus, U-P-H-U-S. 11 MS. ORTH: Thank you. 12 EXAMINATION 13 BY MS. UPHUS: 14 Q. Mr. Finch, you stated that the new tailings 15 holding facility will be 22 acres surface. 16 A. No. 17 Q. No? 18 A. I think -- 19 Q. Currently it's at five acres, and proposed in 20 the future it would be 22 acres of surface exposure? 21 A. That's the -- that's the water body in the 22 pit. 23 Q. So how many cubic feet of water will be tied 24 up in this holding facility? Would it be the surface 25 times the depth? Currently we're at twenty-five feet</p>	211	<p>1 Q. Correct. 2 And what is the projected depth of that water? 3 A. I don't remember. But it's going to be about 4 2,200 acre-feet that will be sitting there. 5 Q. Um-hum. 6 And that reflects how many cubic feet of water 7 that is not usable? 8 A. I can just speak to the acre-foot volume. I 9 would need a calculator to give you cubic feet. 10 Q. Okay. Thank you for that. 11 I guess we can all do a little math when we 12 get home. 13 A. Yeah. 14 Q. You referred to data from four reports when 15 you first started your presentation, Baseline Data 16 Characterization Report, which includes the Stage 1 17 Abatement Plan and an amendment, the Model of 18 Groundwater Flow, numerical groundwater flow model, the 19 Probable Hydrologic Consequences of the Copper Flat 20 Project, and then the fourth one which would refer to 21 the identification of perennial springs. 22 The dates you gave for the perennial springs 23 report was 1993. 24 These other reports, when were they -- and 25 models, when were they designed? And my question in</p>
210	<p>1 with a five-acre surface? 2 A. Right. 3 Q. How many cubic feet of water is being tied up 4 right now that is unusable for any other human use? 5 A. I don't know cubic feet. 6 Q. Cubic feet? 7 A. I don't -- I'd have to calculate that. So I 8 don't -- 9 Q. Okay. 10 A. I'd have to do that, but -- 11 Q. That's a figure that's important to me and 12 maybe others. 13 A. Right. So -- 14 Q. And I would like to know in the future, as 15 well. 16 A. So currently if you take the existing pit at 17 five acres -- 18 Q. Um-hum. 19 A. -- as an area, and let's say an average of 20 twenty feet depth, then it's five times twenty. So 21 that's a hundred acre-feet. 22 Q. A hundred acre-feet. 23 A. That's what's sitting there right now. 24 Q. And in the future, we'll have 22 acre surface? 25 A. And a much larger volume of water in there.</p>	212	<p>1 regards to that is that's 25 years ago. Don't we have 2 any more -- 3 A. So -- 4 Q. -- current models for use? 5 A. The '93 was a report that was -- that we did 6 in -- for a different -- for the same area but for a 7 different client related to the Copper Flat project. 8 The reports that I listed up there were all current, 9 from 2012 to 2014, up to 2017. They have -- embedded in 10 those reports they have all the historical data, 11 including the 1993 data from that report. 12 Q. Thank you. 13 So the statistics that you present today are 14 the most current. 15 A. Yes, ma'am. 16 Q. Okay. Thank you. 17 A. Sure. 18 MS. ORTH: Thank you, Ms. Uphus. 19 Any other questions of Mr. Finch? 20 All right. Mr. Butzier, would you like to 21 follow up? 22 MR. BUTZIER: Yes, please. 23 24 25</p>

213	<p>1 REDIRECT EXAMINATION</p> <p>2 BY MR. BUTZIER:</p> <p>3 Q. Mr. Finch, one of the key documents that</p> <p>4 you've been referring to and that were referred to in</p> <p>5 one of your early slides was the Baseline Data</p> <p>6 Characterization Report; is that correct?</p> <p>7 A. That's correct.</p> <p>8 Q. And would that be what is referred to as part</p> <p>9 of the permit application including Baseline Data</p> <p>10 Characterization Report and appendices that appears in</p> <p>11 the administrative record from July 18, 2012, at Bates</p> <p>12 number 02498 to 05295, just for the record?</p> <p>13 A. Yes.</p> <p>14 Q. You also referred to groundwater -- a</p> <p>15 groundwater flow model; is that correct? As a key</p> <p>16 document?</p> <p>17 A. That is correct.</p> <p>18 Q. And there's an entry at the administrative</p> <p>19 record, entry 123, Model of Groundwater Flow in the</p> <p>20 Animas Uplift and Palomas Basin dated 8/22/2013, at</p> <p>21 Bates number 08042 to 08444.</p> <p>22 Would that be the report you're referring to?</p> <p>23 A. Yes.</p> <p>24 Q. And you also referred to a stage 1 report.</p> <p>25 There's an entry in the administrative record index at</p>	215	<p>1 MR. BUTZIER: I just wanted to reflect, Madam</p> <p>2 Hearing Officer, where those key documents that have</p> <p>3 been referred to pretty extensively appear in the</p> <p>4 administrative record.</p> <p>5 MS. ORTH: All right. Thank you.</p> <p>6 Q. (BY MR. BUTZIER) Now, Mr. Finch,</p> <p>7 Mr. de Saillan asked you whether a well had been -- a</p> <p>8 monitoring well had been placed right in the East Animas</p> <p>9 Fault.</p> <p>10 Do you recall that?</p> <p>11 A. I do.</p> <p>12 Q. And I think your answer was that there was not</p> <p>13 a monitoring well right in the fault; is that correct?</p> <p>14 A. That would be hard to do.</p> <p>15 Q. That was going to be my question, one of my</p> <p>16 questions.</p> <p>17 Why wouldn't you put it right in the East</p> <p>18 Animas Fault?</p> <p>19 A. Because it would be -- you have water that's</p> <p>20 built up on one side, and when you drill a hole, it's</p> <p>21 not necessarily always straight. If you were to drill</p> <p>22 through the fault zone, then you create a conduit</p> <p>23 through it to the other side.</p> <p>24 Q. Okay. Thank you.</p> <p>25 And I think perhaps behind Mr. de Saillan's</p>
214	<p>1 152 that is described as Results from the First Year of</p> <p>2 Stage 1 Abatement Investigation of the Copper Flat Mine</p> <p>3 (Stage 1 Abatement) dated May 14 -- May of 2014, at</p> <p>4 Bates number 09579 to 09915.</p> <p>5 Would that be what you're referring to?</p> <p>6 A. Yes, it is.</p> <p>7 Q. There's also an entry at 159 in the</p> <p>8 administrative record that's described as Model of</p> <p>9 Groundwater Flow in the Animas Uplift and Palomas Basin</p> <p>10 Copper Flat Project, Sierra County, New Mexico, prepared</p> <p>11 by John Shomaker &amp; Associates dated 8/15/2014, at Bates</p> <p>12 number 09969 to 10385.</p> <p>13 Would that be the same model that we talked</p> <p>14 about earlier?</p> <p>15 A. That is the same model we've been talking</p> <p>16 about.</p> <p>17 Q. And you also referred to a key document that</p> <p>18 you described as the Probable Hydrologic Consequences</p> <p>19 document. There's an entry at 321 -- oh, excuse me --</p> <p>20 323 that's described as Probable Hydrologic Consequences</p> <p>21 of the Copper Flat Project (prepared by Shomaker &amp;</p> <p>22 Associates) dated 12/12/2013, at Bates number 17282 to</p> <p>23 17358.</p> <p>24 Would that be that document?</p> <p>25 A. It is.</p>	216	<p>1 question was a concern that there might be a possibility</p> <p>2 of water from the east side of the Animas fault finding</p> <p>3 its way through the fault, the East Animas Fault, all</p> <p>4 the way to the Ladder Ranch.</p> <p>5 In your professional opinion, is that</p> <p>6 something that anybody should be concerned about?</p> <p>7 A. No.</p> <p>8 Q. And why not?</p> <p>9 A. We have -- well, for one, the -- a small</p> <p>10 amount of TDS and sulfate contamination that occurred</p> <p>11 from the existing tailings impoundment did not travel</p> <p>12 east. It mounded up right there underneath the pile,</p> <p>13 with no eastward movement at all. We have -- so that's</p> <p>14 one line of evidence.</p> <p>15 We have a groundwater model that's been</p> <p>16 calibrated to all the data we have that shows that</p> <p>17 that's not the direction in which water would travel</p> <p>18 either. It basically mimics what we've already observed</p> <p>19 from the existing plume. It stays mounded up behind</p> <p>20 the -- underneath the facility behind the fault zone.</p> <p>21 Q. So my question really related to northward,</p> <p>22 moving along the East Animas Fault to the Ladder Ranch.</p> <p>23 A. Right.</p> <p>24 Q. Is that, in your professional opinion,</p> <p>25 something that anybody should be concerned about?</p>

217	<p>1 A. No. They shouldn't be concerned about water</p> <p>2 moving northward.</p> <p>3 Q. And why not?</p> <p>4 A. Because it's -- it's my opinion it's</p> <p>5 physically impossible based on the data we have, the</p> <p>6 observations we've made and the modeling calculations we</p> <p>7 have performed.</p> <p>8 Q. Thank you.</p> <p>9 Let me go back now to what I think you may</p> <p>10 have understood me to be asking.</p> <p>11 Ms. Barncastle asked a number of questions</p> <p>12 relating to your understanding of the hydrology</p> <p>13 conditions to the -- to the east of the East Animas</p> <p>14 Fault, in relation to the sulfate plume that has existed</p> <p>15 since the Quintana days.</p> <p>16 Do you recall that?</p> <p>17 A. Yes.</p> <p>18 Q. In your professional opinion, should anybody</p> <p>19 be concerned that the sulfate plume that exists from the</p> <p>20 Quintana days will find its way to the -- is it the</p> <p>21 Caballo Reservoir or the Elephant Butte Reservoir?</p> <p>22 A. Caballo.</p> <p>23 Q. Caballo Reservoir?</p> <p>24 A. No. There should be no concern with that.</p> <p>25 Q. And why not?</p>	219	<p>1 slide and may have come away with the impression that</p> <p>2 every one of those matters that are identified in the</p> <p>3 little white boxes are core drillings.</p> <p>4 And I just -- I hadn't understood that to be</p> <p>5 the case, and I wondered if you can clarify whether that</p> <p>6 is the case.</p> <p>7 A. Yeah. All those boxes are holes that were</p> <p>8 drilled to characterize the geology.</p> <p>9 Q. So they are core drillings.</p> <p>10 A. They are.</p> <p>11 Q. Okay. That helps me. Thank you.</p> <p>12 That's all I have, Madam Hearing Officer.</p> <p>13 MS. ORTH: All right. Thank you very much.</p> <p>14 Any reason not to excuse Mr. Finch and take a</p> <p>15 break?</p> <p>16 No?</p> <p>17 All right.</p> <p>18 Oh, Mr. De Saillan.</p> <p>19 MR. DE SAILLAN: I didn't quite hear you.</p> <p>20 I do have a couple of recross questions if</p> <p>21 that's permitted.</p> <p>22 MS. ORTH: All right.</p> <p>23 MR. DE SAILLAN: Okay.</p> <p>24</p> <p>25</p>
218	<p>1 A. It hasn't moved anywhere in 30 years, and</p> <p>2 Caballo is still 12 miles away. So I think --</p> <p>3 Q. Okay.</p> <p>4 A. -- that should ease all concerns.</p> <p>5 Q. And now -- and that's -- we're talking now</p> <p>6 about the existing plume from the Quintana days,</p> <p>7 correct?</p> <p>8 A. I understand that. Yes.</p> <p>9 Q. Is there any -- in your professional opinion,</p> <p>10 should there be any concern that any contamination will</p> <p>11 travel from the future mining operation at Copper Flat</p> <p>12 to either the Caballo or the Elephant Butte Reservoir or</p> <p>13 the Rio Grande?</p> <p>14 A. With the way the Copper Rules have been -- the</p> <p>15 requirements of the Copper Rules, I'm a firm believer in</p> <p>16 them, in protecting water sources from pollution, and I</p> <p>17 believe with all the stormwater controls, the design</p> <p>18 features, the monitoring network, and you combine all of</p> <p>19 that together, it's -- that is bulletproof as you can</p> <p>20 make it.</p> <p>21 Q. Thank you, Mr. Finch.</p> <p>22 One last just point of clarification.</p> <p>23 I'd like to have slide 12 on the screen,</p> <p>24 please.</p> <p>25 I think Ms. Barncastle asked you about this</p>	220	<p>1 RECCROSS EXAMINATION</p> <p>2 BY MR. DE SAILLAN:</p> <p>3 Q. Mr. Finch, Mr. Butzier asked you about the</p> <p>4 potential for contaminants to flow to the north from the</p> <p>5 mine site.</p> <p>6 Thank you.</p> <p>7 And I was wondering, the -- whether the</p> <p>8 company had characterized the fault zone north of the</p> <p>9 tailings facility.</p> <p>10 A. Did you say basalt zone?</p> <p>11 MR. BUTZIER: Fault.</p> <p>12 MR. FINCH: Oh, the fault zone.</p> <p>13 MR. DE SAILLAN: Fault.</p> <p>14 MR. FINCH: We have taking -- we have taken --</p> <p>15 yes. So not to the degree that was performed at the</p> <p>16 tailing facility, but yes, we have characterized the</p> <p>17 full length of the fault zone.</p> <p>18 Q. (BY MR. DE SAILLAN) How far north?</p> <p>19 A. As far north as mapped by Dr. Seager,</p> <p>20 Dr. Hawley and others that have done extensive research</p> <p>21 on the geology of the area.</p> <p>22 Q. Is that as far north as the Ladder Ranch?</p> <p>23 A. I would have to look at the geologic map to</p> <p>24 see how far that fault zone goes, but it -- my</p> <p>25 understanding, it's -- that's what forms the Animas</p>

221	<p>1 Uplift. So the Animas Uplift goes -- does go into the 2 Ladder Ranch. Yes.</p> <p>3 Q. Okay. So you believe that the fault has been 4 characterized up to the -- onto the Ladder Ranch 5 property.</p> <p>6 A. We have a good understanding of the fault zone 7 of -- throughout the model domain, which is the larger 8 region.</p> <p>9 Q. Okay. Thank you. 10 I have no further questions.</p> <p>11 MS. ORTH: All right. 12 Anything else before we excuse Mr. Finch? 13 Sir.</p> <p>14 MR. BOKICH: Real quick. 15 MS. ORTH: All right. 16 MR. BOKICH: Hi. 17 I'm John Bokich again.</p> <p>18 EXAMINATION</p> <p>19 BY MR. BOKICH:</p> <p>20 Q. Mr. Finch, I remember in the cross-examination 21 that you were asked if water levels were recorded in all 22 the drill holes, and it's my understanding if you're 23 drilling a core hole, you're using drilling fluids, 24 muds. It's virtually impossible to determine a water 25 level in a drill hole when you're using drilling fluids.</p>	223	<p>1 breaks. The administrative record is available -- or 2 large portions of it are available on breaks.</p> <p>3 Please sign in if you haven't done so.</p> <p>4 Sign-in sheets are with Mr. Baca there at the 5 refreshment table.</p> <p>6 And I can't think of anything else right now. 7 So thank you all very much.</p> <p>8 And we'll turn to Mr. Butzier for -- oh. I 9 knew there was something else.</p> <p>10 We do have an interpreter available here. In 11 the event you are not entirely comfortable with the 12 proceedings in English, we do have an interpreter here.</p> <p>13 Ma'am, why don't you repeat your statement.</p> <p>14 THE INTERPRETER: Yes, ma'am. 15 Good afternoon, ladies and gentlemen. 16 If you're more comfortable in another language 17 besides English, please let me know. I'll be making an 18 announcement in Spanish. 19 (In Spanish.) 20 THE INTERPRETER: Everybody's good in English 21 still? 22 No requests. 23 MS. ORTH: Thank you. 24 All right. Mr. Butzier. 25 MR. BUTZIER: Thank you, Madam Hearing</p>
222	<p>1 A. They -- there have been -- you can use air or 2 mud to drill a core hole, but I think Mr. Irwin's 3 explanation clarified that.</p> <p>4 Q. I know from my experience doing some 5 construction on the site, building drill sites, we were 6 drilling mud pits, most of the holes that we prepared 7 for had -- were using drilling mud to drill the holes. 8 That's all.</p> <p>9 MS. ORTH: Thank you, Mr. Bokich. 10 Anything else before we excuse Mr. Finch? 11 No? 12 All right. Let's take a 15-minute break. 13 (Proceedings in recess from 3:41 p.m. to 14 3:59 p.m.) 15 MS. ORTH: Okay. We are back off a break. 16 Let me repeat just a few housekeeping things 17 from earlier. 18 We will not take a dinner break, a proper 19 dinner break. When we break sometime between now and 20 7:00 p.m., we'll break for the night. 21 Tomorrow night we will end the technical case 22 regardless of where we are before 5:00 p.m. and take 23 public comment between 5:00 and presumably about 7:00 or 24 until folks are done giving it. 25 Again, the pleadings file is available on</p>	224	<p>1 Officer.</p> <p>2 Ms. Griffiths, would you please identify 3 yourself for the record.</p> <p>4 MS. GRIFFITHS: Yes. My name is Ruth 5 Griffiths. I'm a senior geochemist with SRK Consulting.</p> <p>6 THE REPORTER: Hold on.</p> <p>7 MR. BUTZIER: Would you please speak as slowly 8 as you can do that for the -- for the help of the court 9 reporter.</p> <p>10 MS. GRIFFITHS: I will do. 11 THE REPORTER: I have to swear her in. 12 MR. BUTZIER: Oh, I'm sorry. That's -- okay.</p> <p>13 RUTH GRIFFITHS 14 having been first duly sworn or affirmed, was 15 examined and testified as follows: 16 DIRECT EXAMINATION</p> <p>17 BY MR. BUTZIER:</p> <p>18 Q. Ms. Griffiths, what will you be addressing 19 today with your testimony? 20 MS. GRIFFITHS: So if we could move to the 21 next slide, which is an outline of my presentation. 22 Firstly, I will introduce the three technical 23 experts who worked on the geochemical characterization 24 program. 25 I will then go on to explain the objectives of</p>



225	<p>1 the geochemical characterization program that we 2 conducted for the Copper Flat project. This will also 3 include a brief introduction to the fundamentals of acid 4 rock drainage and metal leaching and the requirements of 5 the Copper Rule.</p> <p>6 I'll then go on to explain the methodology and 7 the results of our characterization program.</p> <p>8 And finally, I'll go on to present the results 9 of our water quality predictions for the main mine 10 facilities. So that includes the tailings storage 11 facility, the waste rock stockpiles and the pit lake.</p> <p>12 MR. BUTZIER: Ms. Arreguin, is that speaking 13 slowly enough for your purposes?</p> <p>14 THE REPORTER: Yes. Thank you.</p> <p>15 Q. (BY MR. BUTZIER) Okay. Would you please go 16 ahead and introduce the technical experts.</p> <p>17 A. Yes.</p> <p>18 So firstly, myself, Dr. Ruth Griffiths. I'm a 19 senior geochemist with SRK.</p> <p>20 I have a bachelor's degree in environmental 21 earth science, a master's degree in environmental 22 monitoring and analysis and a PhD in environmental 23 geochemistry from Aberystwyth University.</p> <p>24 And I am a chartered geologist and a certified 25 European geologist.</p>	227	<p>1 technical experts who worked on the geochemistry aspects 2 of this project.</p> <p>3 And firstly, Dr. Rob Bowell, who is here with 4 me today.</p> <p>5 Dr. Bowell has a bachelor's degree in geology 6 with chemistry from the University of Manchester, and he 7 has a PhD in environmental geochemistry from the 8 University of Southampton.</p> <p>9 Dr. Bowell is a chartered geologist and a 10 chartered chemist. He's also a certified European 11 geologist, an accreditation auditor with the Cyanide 12 Code and an adjunct professor with Queen's University in 13 Kingston, Ontario.</p> <p>14 Dr. Bowell has over 30 years experience in the 15 mining industry and specializing in environmental 16 geochemistry and engineering and also mineralogy and 17 process chemistry.</p> <p>18 He's worked on 177 geochemical 19 characterization and modeling projects on almost every 20 continent and has a significant number of published and 21 peer-reviewed conference papers, including books on 22 arsenic and uranium.</p> <p>23 I'd also like to introduce Ms. Amy Prestia, 24 who was a key technical person on the characterization 25 program.</p>
226	<p>1 And I have over eight years experience in the 2 mining industry, specializing in the geochemical 3 characterization of waste rock, water and soils, and 4 also the application of geochemical modeling in mining 5 environments.</p> <p>6 I've worked on over 35 characterization 7 programs across many continents, but mainly focused here 8 in the Western US.</p> <p>9 I also have a number of technical publications 10 related to mining and geochemistry.</p> <p>11 I would also --</p> <p>12 MR. BUTZIER: Madam Hearing Officer, at this 13 time, before she introduces the other participants in 14 the geochemical analyses, I'd like to move for the 15 admission of Ms. Griffiths as an expert in geochemistry, 16 in particular in relation to mining projects.</p> <p>17 MS. ORTH: Okay. 18 Objections?</p> <p>19 MR. DE SAILLAN: No objection.</p> <p>20 MS. ORTH: No?</p> <p>21 Thank you.</p> <p>22 She's so recognized.</p> <p>23 Q. (BY MR. BUTZIER) Please proceed.</p> <p>24 A. Thank you.</p> <p>25 I would also like to introduce the other two</p>	228	<p>1 And Ms. Prestia is a principal geochemist with 2 SRK in Reno.</p> <p>3 And she has a bachelor's degree in geology 4 with a minor in chemistry, and she has a master's degree 5 in geology from the University of Washington.</p> <p>6 She's also a professional geologist in the 7 State of Washington.</p> <p>8 Ms. Prestia has over 17 years experience in 9 the mining industry, specializing in geochemical 10 characterization in mine permitting and closure 11 projects. She also specializes in field and 12 analytical-based geochemistry and the preparation of 13 waste rock management plans.</p> <p>14 Ms. Prestia has contributed to over 20 mine 15 permitting projects in Nevada, Idaho, California and 16 Oregon and has several peer-reviewed papers in the field 17 of geochemistry and mining.</p> <p>18 Q. And, Ms. Griffiths, would you please proceed 19 then with your presentation for today.</p> <p>20 A. I will.</p> <p>21 So the primary objective of the geochemical 22 characterization program was to develop the geochemistry 23 required for permitting the Copper Flat project. And 24 the reason that we need geochemical characterization is 25 severalfold.</p>

<p style="text-align: right;">229</p> <p>1 Firstly, we need to understand the potential  2 reactivity and -- or stability of mine waste that will  3 be extracted by the projects. We also want to assess  4 impacts to receptors. And finally, identify options for  5 management and closure of the mine facilities.  6 I think it's important to note that the  7 geochemistry program that we conducted and starting in  8 2010 builds on the previous geochemical characterization  9 program that was conducted by SRK between 1996 and 1999.  10 So there were several key questions that we  11 were trying to answer as part of our characterization  12 program.  13 Firstly, what is the potential for the  14 development of acid rock drainage and metal leaching  15 from material that will be generated by the project?  16 Secondly, does the geochemistry change due to  17 mining?  18 Thirdly, is there an increased risk to impact  19 groundwater or surface water from the mine facility?  20 And fourthly, what sorts of management or  21 closure actions can be implemented to mitigate any risk?  22 So I will firstly just briefly introduce you  23 to the fundamentals of acid rock drainage and metal  24 leaching.  25 So many mining deposits have sulfide minerals</p>	<p style="text-align: right;">231</p> <p>1 silicate minerals, we may get the development of either  2 acid rock drainage or neutral mine drainage, depending  3 on the relative balance of these two minerals.  4 So if there's sufficient neutralizing minerals  5 present, we would get the development of neutral mine  6 drainage; however, if there are insufficient  7 neutralizing minerals present, then acid rock drainage  8 may result.  9 And I think it's also important to note here  10 that it's not only the presence or absence of sulfide  11 and carbonate minerals that are important here. There's  12 also other factors such as mineral textures or  13 encapsulation of sulfides that have an important role in  14 the potential for acid rock drainage development, and  15 that's something that's very important in the case of  16 the Copper Flat project, and we will discuss later.  17 So just to go on to talk through some of the  18 requirements for characterization under the Copper Rule.  19 And I hope you'll forgive me for the amount of text on  20 this slide, and I will just read off some of the  21 requirements.  22 So under Section 20.6.7.21 of the Copper Rule,  23 there is requirement for waste rock stockpile  24 characterization.  25 So all waste rock that is stored, deposited or</p>
<p style="text-align: right;">230</p> <p>1 associated with them, so pyrite, pyrrhotite, marcasite,  2 et cetera. Now, when these sulfide minerals are in the  3 ground, they're relatively stable; however, when they're  4 brought to surface and they're exposed to air and water,  5 the surface area of that material is increased, which  6 increases the potential for exposure to air and water  7 and may result in acid rock drainage or metal leaching.  8 And because of this, we need to really  9 understand the geochemistry of all the materials that  10 will get extracted by the project. So that includes any  11 waste rock that will be generated and deposited and any  12 tailings that will be deposited in the TSF, any wall  13 rock that will be exposed in the final walls of the pit  14 and, finally, any low-grade ore material.  15 Q. Ms. Griffiths, TSF is a term that means what?  16 A. Sorry. TSF means tailings storage facility.  17 So this schematic just really explains how  18 acid rock drainage may develop.  19 So here on the left, we have our metal sulfide  20 mineral, in this case pyrite. If we react to the  21 sulfide mineral and -- with oxygen and water and there  22 are no neutralizing minerals present, then we may get  23 the development of acid rock drainage.  24 However, if we do have neutralizing minerals  25 present in the form of either calcite, dolomite or</p>	<p style="text-align: right;">232</p> <p>1 disposed of at a copper mine facility shall be evaluated  2 for its potential to generate acid and to release water  3 contaminants at levels in excess of the standards.  4 A plan for determining the potential of the  5 materials to release water contaminants and the method  6 for such evaluations shall be submitted to the  7 department for approval in a Material Characterization  8 Plan, that should include a number of aspects.  9 Moving on, there's also the requirement for a  10 static testing program using, at a minimum, acid base  11 accounting to evaluate the acid generation and  12 neutralizing potential of the material, and also  13 meteoric water mobility procedure to determine water  14 contaminant leaching potential.  15 And I'll just pause here to briefly explain  16 what the term "static testing" means, and also in the  17 next paragraph there the term "kinetic testing."  18 So static testing is really a short-term  19 screening level test that we apply as a first stage in  20 our characterization program. And it's really to  21 evaluate the potential for acid rock drainage or metal  22 leaching to develop. It doesn't look at longer-term  23 rates of those -- of those processes.  24 And that is something that's evaluated through  25 the kinetic testing program, which we'll go on to</p>

<p style="text-align: right;">233</p> <p>1 discuss in a bit more detail later.</p> <p>2       So moving on to the next point, point d, if</p> <p>3 the results of the static testing indicate that a</p> <p>4 material may be acid generating or may generate a</p> <p>5 leachate containing water contaminants, a kinetic</p> <p>6 testing program shall be proposed to evaluate reaction</p> <p>7 rates, provide data to estimate drainage quality, the</p> <p>8 lag time to acidification of the material and primary</p> <p>9 weathering and secondary mineral precipitation or</p> <p>10 dissolution.</p> <p>11       So really the key aspects here as they relate</p> <p>12 to the Copper Rule are a static testing program that</p> <p>13 needs to contain an acid base accounting, a meteoric</p> <p>14 water mobility procedure testing and, finally, a kinetic</p> <p>15 testing program.</p> <p>16       So if we could move on to the next slide.</p> <p>17       This schematic here shows the flow chart that</p> <p>18 we followed for our characterization program. So as you</p> <p>19 can see, we took a phased approach.</p> <p>20       And the first phase included a desk study. So</p> <p>21 this included a review of all the geologic and</p> <p>22 mineralogic information available for the project from</p> <p>23 the drill core logs, et cetera.</p> <p>24       We worked with a projectologist to identify</p> <p>25 the main material types for the projects, and we used</p>	<p style="text-align: right;">235</p> <p>1 hydrologic water balance and surface water and</p> <p>2 groundwater quality data and climatic data to develop</p> <p>3 water quality predictions for each of the main mine</p> <p>4 facilities.</p> <p>5       As you can see, we started this process back</p> <p>6 in 2010. It's been a long process. It's been a very</p> <p>7 comprehensive program that's lasted for seven years, and</p> <p>8 we've collected a lot of good data.</p> <p>9       So just to outline the key aspects that relate</p> <p>10 to the Copper Rule, you'll recall the requirement for</p> <p>11 static testing. This should include at a minimum acid</p> <p>12 base accounting and meteoric water mobility procedure</p> <p>13 testing and finally kinetic humidity cell testing. So</p> <p>14 our program included all of those components and far</p> <p>15 significantly more than that.</p> <p>16       I think it's also important to note that the</p> <p>17 characterization program was consistent with an</p> <p>18 international best practice. So it was carried out in</p> <p>19 accordance with the Global Acid Rock Drainage Guide, or</p> <p>20 the GARD Guide.</p> <p>21       And so this schematic here just shows the</p> <p>22 characterization requirements for each stage of mine</p> <p>23 planning.</p> <p>24       So here we have exploration phase, moving</p> <p>25 through the feasibility and design, construction,</p>
<p style="text-align: right;">234</p> <p>1 this information to select representative samples for</p> <p>2 testing.</p> <p>3       So based on this analysis, we collected 132</p> <p>4 samples of waste rock and low-grade ore and 14 samples</p> <p>5 of tailings material.</p> <p>6       We then submitted these samples for a series</p> <p>7 of static tests. So these are the short-term screening</p> <p>8 level tests. And they included acid base accounting and</p> <p>9 net acid generation testing and multi-element analysis</p> <p>10 on all 146 samples. We also conducted meteoric water</p> <p>11 mobility procedure testing on 49 samples to assess the</p> <p>12 potential constituent mobility. And we conducted</p> <p>13 mineralogy on 28 samples.</p> <p>14       And these screening level test results were</p> <p>15 used to assess -- or used to provide a preliminary</p> <p>16 assessment for the potential for acid rock drainage and</p> <p>17 metal leaching. And we used those results to select</p> <p>18 representative samples for longer-term kinetic testing.</p> <p>19       So this was conducted on twenty-three waste</p> <p>20 rock and low-grade ore samples and nine tailing samples.</p> <p>21 And these were run for a considerable period of time,</p> <p>22 which we'll discuss later.</p> <p>23       The results of this kinetic test program were</p> <p>24 then used in water quality predictions. So they were</p> <p>25 coupled with information from the Mine Plan and from the</p>	<p style="text-align: right;">236</p> <p>1 operation, decommissioning and closure.</p> <p>2       So this red box here represents where we are</p> <p>3 with the Copper Flat project. We're in the feasibility</p> <p>4 and design stage. And if you can recall from the</p> <p>5 previous slide, these were the components that were</p> <p>6 included on flow chart. So define the main material</p> <p>7 types, select samples, static testing, kinetic testing</p> <p>8 and assessment of drainage water quality.</p> <p>9       So the characterization program is also in</p> <p>10 accordance with international best practice.</p> <p>11       So if we walk through some of the specs in the</p> <p>12 program piece by piece, the first stage is the desk</p> <p>13 study. So we reviewed the exploration drill core logs</p> <p>14 available for the project, and we consulted with project</p> <p>15 geologists to make sure that we captured all of the main</p> <p>16 material types.</p> <p>17       So for the purpose of our program, we defined</p> <p>18 material types based on rock type or lithology. So that</p> <p>19 included quartz monzonite, which will comprise the</p> <p>20 majority of waste material, 78 percent. It will include</p> <p>21 also coarse crystalline porphyry which is about</p> <p>22 15 percent of waste and breccia which is 6 percent and</p> <p>23 andesite which is 1 percent of waste.</p> <p>24       We also defined material type based on</p> <p>25 oxidation, so whether it was sulfide material containing</p>

237	<p>1 sulfides with no evidence of oxidation products. So for  2 Copper Flat, this comprised about 96 percent of material  3 was classified as sulfide.</p> <p>4 And there was also oxide material which was  5 entirely oxidized with no evidence of sulfide minerals  6 and transitional material, which is a mixture of sulfide  7 material with some oxidation products. And together the  8 oxide and transitional materials only comprise a very  9 small portion, approximately 4 percent of the overall  10 waste rock for the project.</p> <p>11 We also defined material type based on copper  12 grade, using a cutoff at .164 percent copper. And so  13 any material that contained greater than this was  14 classified as ore, anything less than this was  15 classified as waste.</p> <p>16 So we undertook two phases of sample  17 collection as part of our program, and it was initiated  18 in April, 2010. And then we took further sampling in  19 December, 2011.</p> <p>20 And the reason that we undertook this in two  21 phases was because there was additional drilling that  22 was undertaken in 2011 that captured the new material  23 types, in particular the coarse crystalline porphyry  24 material, and we wanted to make sure that we captured  25 this in our characterization program. Hence why we</p>	239	<p>1 distribution -- good spatial distribution within the pit  2 shell.</p> <p>3 We did collect a number of samples that fall  4 slightly below the base of the pit. These were samples  5 that were collected during the first sampling campaign  6 when the cutoff grade was slightly different. But  7 it's -- you know, these material types are exactly the  8 same as those that will be encountered in the pit.</p> <p>9 I think I should also point out that the  10 different colored blobs here represent the different  11 lithologies.</p> <p>12 We also collected a number of grab samples  13 from the surfaces at the existing facilities. So these  14 samples are representative of materials that have been  15 exposed to weathering in the field for 30-plus years.</p> <p>16 The locations of these samples are shown here  17 by the yellow dots and show good spatial distribution  18 across the site.</p> <p>19 This matrix summarizes our sample collection.  20 And so here we have -- on the left, we have  21 our main material types that were defined for the  22 projects. And this column here shows the percentage of  23 waste for each of those material types and the  24 percentage of ore. And then here we have the number of  25 samples that were collected for each of those material</p>
238	<p>1 undertook two phases.</p> <p>2 So during these two sampling campaigns, we  3 collected 146 samples representative of waste rock ore  4 and tailings. So this included 112 core samples from  5 the exploration drill core and 22 grab samples from the  6 surfaces of the existing waste rock stockpiles and,  7 finally, 12 samples from the metallurgical test work  8 program.</p> <p>9 And we considered the samples to be spatially  10 and lithologically representative of the materials that  11 will be generated by the project.</p> <p>12 And just to highlight these pictures here, so  13 this represents the sulfide material and transitional  14 material and the oxide material.</p> <p>15 So we used a 3D geological modeling software  16 called Leapfrog to aid with our sample selection process  17 and make sure that we could visualize all samples and  18 ensure that they were spatially representative.</p> <p>19 And so these cross-sections here that you see  20 here were taken from Leapfrog. And the gray shape you  21 can see here is the future pit shell for the copper  22 project. I don't know if you can see these black lines  23 here. They are the drill core traces. And the colored  24 discs represent our geochemical samples.</p> <p>25 And so as you can see, there's a good</p>	240	<p>1 types.</p> <p>2 So what we aimed to do was focus the program  3 on material types that will comprise a greater  4 proportion of waste. So for example, the quartz  5 monzonite material comprises the greater proportion,  6 75 percent of -- of waste so we collected a higher  7 number of samples of that material. And conversely, the  8 andesite only makes up a smaller proportion of waste,  9 and so we collected a lower number of samples.</p> <p>10 And this table here summarizes the  11 characterization methods that were used for the Copper  12 Flat project.</p> <p>13 So if you can recall the terms "static" and  14 "kinetic" testing, that's split into these two  15 categories.</p> <p>16 So firstly, looking at the static test  17 methods, which is the screening level assessment, we  18 carried out two test methods to look at the  19 acid-generating potential of the samples, so acid base  20 accounting and the net acid generation test, to look at  21 the balance of acid-generating sulfide minerals and  22 acid-neutralizing carbonate minerals.</p> <p>23 We also conducted a multi-element analysis to  24 look at the bulk geochemical composition of the  25 materials and identify constituents that may be present</p>

<p style="text-align: right;">241</p> <p>1 at the elevated levels and that may be released in  2 contact waters.  3 We also conducted a mineralogical assessment,  4 and this was really to support the rest of the program,  5 to assess mineral textures and potential controls on  6 both acid generation and metal release.  7 In order to look at the potential for metal  8 leaching, we conducted a meteoric water mobility  9 procedure test, which you'll recall is a requirement  10 under the Copper Rule. So this is a 24-hour leach test  11 with deionized water which essentially simulates  12 rainfall events to see what would be leached during  13 rainfall events.  14 On the tailings, we conducted a synthetic  15 precipitation leaching procedure, or SPLP, test, which  16 is a similar test method.  17 And finally, we conducted kinetic testing on a  18 subset of samples and to assess long-term rates of acid  19 generation and metal release, and involves weekly  20 leaching over greater than 20 weeks.  21 So to run through some of the results of the  22 static test program.  23 First of all, so you recall this is the -- the  24 screening level assessment that doesn't look at  25 longer-term rates.</p>	<p style="text-align: right;">243</p> <p>1 material which showed a higher potential for metal  2 release. And again, this only comprises a small  3 proportion of waste.  4 So this plot here is a standard method of  5 characterizing or classifying geochemical behavior from  6 acid base accounting using criteria from the BLM.  7 So here on the X axis we have the sulfide  8 content, and here on the Y axis we have the net  9 neutralizing potential, which is the difference between  10 the neutralizing potential and the acid-generating  11 potential of the samples.  12 So anything that falls in this upper field is  13 classified as nonacid-forming material based on acid  14 base accounting. Anything that falls in this lower  15 field is classed as potentially acid-forming material.  16 And anything that falls all within this gray box in the  17 middle here is classified as having an uncertain  18 potential of acid generation.  19 And as you can see, the majority of samples  20 either fall in this uncertain field or nonacid-forming  21 field. And because there's a large number of samples in  22 this zone of uncertainty, this dictated the requirement  23 for a kinetic testing program, which we'll go on to  24 discuss shortly.  25 There are a few samples of potentially</p>
<p style="text-align: right;">242</p> <p>1 So what we found is that the acid generation  2 potential of the Copper Flat materials is dependent on  3 the sulfide content, and this is because there's limited  4 neutralizing minerals in the form of carbonates, et  5 cetera.  6 We saw that the majority of samples showed  7 either a low or uncertain potential for acid generation  8 and based on acid base accounting.  9 And any potentially acid-generating waste was  10 limited to the transitional material and which is --  11 which only comprises 4 percent of future waste.  12 And what these results showed us is that  13 because there's an uncertain potential for acid  14 generation from some of the material, we needed a  15 kinetic testing program to confirm the longer-term  16 behavior.  17 In terms of the potential for metal leaching  18 from the screening level tests, we did find that the  19 waste rock materials were enriched in a number of  20 elements, and so this included copper, molybdenum,  21 sulfur, selenium and silver.  22 However, during the MWMP tests, so similar  23 to -- simulating rainfall events, neutral leachates were  24 produced with low-metal concentrations.  25 The only exception to this is the transitional</p>	<p style="text-align: right;">244</p> <p>1 acid-forming material. And these red squares here  2 represent the transitional ore and waste, which only  3 comprises a very small proportion, 4 percent of overall  4 waste.  5 The ore -- the transitional ore will be mined  6 out and processed. So it won't be deposited in the  7 final waste rock stockpiles.  8 And similarly, the sulfide ore materials  9 represented by the green crosses won't be deposited in  10 the waste rock stockpiles and will be processed as part  11 of mining activities with an aim of removing the  12 sulfides.  13 This is a similar plot and presenting again  14 the acid base accounting data.  15 So here we have the neutralization potential  16 ratio, which is the ratio between the acid generation  17 potential and neutralizing potential, plotted against  18 the net neutralizing potential, which is the difference  19 between those two components.  20 Again we have different fields, as are  21 dictated by BLM criteria. So here in the upper right,  22 we have materials that are nonacid-forming. And here in  23 the bottom left, we have potentially acid-forming  24 material. And again this gray zone that represents  25 uncertain characteristics.</p>

<p style="text-align: right;">245</p> <p>1 And as you can see, again we have a large  2 number of samples that fall into the zone of  3 uncertainty, meaning there's a requirement for kinetic  4 testing. The potentially acid-forming material again is  5 limited to the transitional waste and ore material with  6 a small amount of the sulfide ore, as well.  7 We also conducted a series of net acid  8 generation tests which is a second method for  9 determining the potential for acid generation.  10 So this uses a strong oxidizing agent called  11 hydrogen peroxide, and it's essentially a very  12 aggressive oxidizing test to provide a high-end estimate  13 of the potential for acid generation if all sulfides in  14 the material were to be oxidized.  15 So this plot here represents our net acid  16 generation testing results. So the way that the results  17 of the tests are reported, it gives you a NAG pH value.  18 And so values close to 0 are more acidic, and pH 7 is  19 around neutral and going to pH 12 which is -- which is  20 alkaline.  21 Anything that has a NAG pH greater than 4 is  22 considered to be nonacid-forming. And you probably  23 can't see very clearly from this plot, but actually the  24 majority of our samples sit right on the axis here. So  25 they have a NAG pH of greater than 4 and a NAG value,</p>	<p style="text-align: right;">247</p> <p>1 potential for metal leaching.  2 If we move on to the tailings material. So we  3 collected and analyzed 12 samples of tailings as part of  4 our characterization program. This included samples  5 representative of future tailings from the metallurgical  6 test work program. And also we had a sampling of  7 historic tailings that we submitted for  8 characterization.  9 And we found that the tailings were -- either  10 had a low potential for acid generation or an uncertain  11 potential based on the screening level test.  12 So tailings produced during the early years of  13 mine life, between years zero and five, are  14 characterized by a slightly higher sulfide content,  15 .53 percent. And based on the screening level static  16 tests, these showed an uncertain potential for acid  17 generation.  18 Tailings produced after year five of mine life  19 are characterized by a lower sulfide content, so less  20 than .2 percent, and are nonacid-generating. And I  21 think it's important to note that these sulfide contents  22 are actually lower than the historic tailings material.  23 So you look -- heard me say that there was  24 uncertainty in some of these screening level tests and  25 because of that we needed to conduct a kinetic humidity</p>
<p style="text-align: right;">246</p> <p>1 which is this second measure here, of 0. So what this  2 means is there's really a very limited potential for  3 acid generation from those materials.  4 We do have a small number of samples that show  5 a higher potential for acid generation. And again  6 that's limited to the transitional material that will  7 comprise a small proportion of waste.  8 We also conducted meteoric water mobility  9 procedure testing to evaluate the potential for metal  10 release and during simulated rainfall events.  11 And what we found is that the potential for  12 metal leaching is generally low with the exception of  13 the transitional waste and ore material.  14 So this plot here is called a Ficklin plot.  15 It's the standard method for characterizing and  16 evaluating mine waters. So it classifies water  17 chemistry based on both pH and also a number of key  18 metal -- base metal contents. So based on where water  19 samples fit, you can either classify it as -- as  20 high-metal or low-metal.  21 And as you can see for Copper Flat, the  22 majority of all samples sit here in this near-neutral,  23 low-metal field, supporting there's a low potential for  24 acid generation and metal leaching. Again the exception  25 is this transitional material which shows a higher</p>	<p style="text-align: right;">248</p> <p>1 cell testing program.  2 So the reason that we did this was to address  3 some of the uncertainties in the static test results and  4 also to provide source term chemistry for the  5 geochemical models, including the waste rock stockpile  6 and the tailings storage facility and the pit lake.  7 So the humidity cell test is a standard  8 accelerated weathering test that's designed to simulate  9 long-term rates of acid generation and metal release.  10 And the testing was carried out according to  11 the ASTM standard method.  12 And so this schematic here just shows how the  13 humidity cells operated. So the massive sample is  14 placed in a column, and dry air is circulated through  15 the column for three days, and followed by wet air, and  16 then on the seventh day the column is leached with  17 water, and the leachate is collected and submitted for  18 analysis for a range of metals and pH.  19 So we had the very comprehensive humidity cell  20 testing program that was conducted for Copper Flat, and  21 we had 32 tests that were started in 2010.  22 And we focused the testing on the more  23 abundant material types as defined by the geologic  24 model.  25 And we really aimed to characterize the range</p>

<p style="text-align: right;">249</p> <p>1 of material types and behavior of each of those 2 materials.</p> <p>3 The ASTM standard method calls for a minimum 4 text work period of 20 weeks, but the Copper Flat cells 5 were run in excess of 20 weeks. So the minimum period 6 we conducted the test for was 28 weeks. But in many 7 cases, the tests were run for considerably longer than 8 the minimum period required and up to a maximum of 122 9 weeks. So we collected a lot of data from this program.</p> <p>10 And the termination of the test was determined 11 when steady-state conditions were achieved.</p> <p>12 So what we found from the humidity cell 13 testing program was that it wasn't only the sulfide 14 content that was important in controlling the potential 15 for acid generation in these materials. There was 16 also -- it was dependent on the mineralogy of the 17 samples. And we'll go on to discuss that in a bit more 18 detail.</p> <p>19 So you'll recall that a lot of the samples 20 showed uncertain potential for acid generation based on 21 these screening level tests. But actually when we 22 submitted these tests for the -- the samples for 23 longer-term tests, 20 out of 23 samples maintained 24 neutral to alkaline conditions throughout the entire 25 duration of the test.</p>	<p style="text-align: right;">251</p> <p>1 weeks that the test was conducted for. And here on the 2 Y axis, we have the pH or the acidity of the solution 3 that was generated.</p> <p>4 So we would consider anything above pH 5 to be 5 nonacid-generating. This is consistent with the MEND 6 guidance. Anything below pH of 5 is acid-generating.</p> <p>7 And as you can see, most samples here have 8 neutral to alkaline pH. The main exceptions are this 9 sample here which produce acid relatively quickly. This 10 is a sample of transitional material that's collected 11 from one of the existing waste rock dumps on site and 12 this sample here which is transitional ore material.</p> <p>13 This sample is -- represents sulfide waste, 14 and we saw very slow decline in pH and very late-stage 15 acid generation.</p> <p>16 Again this Ficklin plot here just classified 17 the humidity cell leachates in terms of their pH and 18 metal content. And you can see that the majority of 19 samples fall in this near-neutral, low-metal field, and 20 with the exception of those three samples that we saw in 21 the previous graph.</p> <p>22 So the blue samples represent the transitional 23 material, and this green sample here represents the one 24 sample of sulfide waste that's produced late-stage. So 25 this is the early part of the test, and this is the</p>
<p style="text-align: right;">250</p> <p>1 The only samples that showed acid generation 2 were two samples of transitional material, which you'll 3 recall is the greater reactivity we saw in the screening 4 level tests, that will comprise about 4 percent of 5 waste.</p> <p>6 But only one sample of sulfide material showed 7 very late-stage acid generation after around 80 weeks of 8 testing.</p> <p>9 And what this tells us is that the screening 10 level tests, so the acid base accounting, et cetera, 11 really overestimated the potential for acid generation 12 for this project, and the kinetic testing procedure is a 13 much more reliable indicator of the longer-term 14 potential for acid generation.</p> <p>15 And in terms of metal leaching results from 16 the humidity cell test, the results were generally 17 consistent with a static test. We saw a number of 18 elements that were enriched in the samples, but 19 typically the leachates that were produced by the tests 20 were near-neutral and had low-metal concentrations, with 21 the exception of the transitional material.</p> <p>22 So this graph here just shows the alkaline pH 23 and over the course of the humidity cell test work of 24 all of our samples.</p> <p>25 So here on the X axis, we have the number of</p>	<p style="text-align: right;">252</p> <p>1 later stage.</p> <p>2 Moving on to the tailings samples, we 3 conducted humidity cell testing on a number of tailing 4 samples. So here we have the pH and over 50-plus weeks 5 of testing.</p> <p>6 As you can see, all samples are well within 7 the nonacid-generating field and produce neutral to 8 alkaline leachates. And all samples fell in this 9 near-neutral, low-metal field.</p> <p>10 What was very important for the Copper Flat 11 characterization program was the mineralogy that was 12 conducted. So this was conducted on 28 samples of waste 13 rock and ore.</p> <p>14 And one of the primary reasons we conducted 15 such a comprehensive mineralogy assessment was because 16 we wanted to understand why we didn't see acid 17 generation in the humidity cell test and despite the -- 18 in some cases the sulfide content and the prolonged 19 testing.</p> <p>20 And what we found is that the lack of acid 21 generation can be attributed to a number of things.</p> <p>22 So firstly, sulfide minerals were often found 23 to be encapsulated in slow-reacting silicate minerals 24 such as quartz and feldspar. So the silicates are 25 essentially kind of shrouded in a nonreactive silicate</p>

<p style="text-align: right;">253</p> <p>1 mass which reduces -- greatly reduces their exposure to  2 air and water.</p> <p>3       We also found that the sulfides are generally  4 medium to coarse grained and disseminated and very well  5 crystalized, and this means that they're more stable and  6 resistant to weathering reactions.</p> <p>7       We also found that there was the presence of  8 acid-neutralizing silicate minerals, such as chlorite,  9 which were contributing to buffering or neutralizing  10 potential in the samples.</p> <p>11       And we undertook a comparison of the Copper  12 Flat deposit with similar analog deposits and similar  13 geologic terrains and in similar climatic conditions.  14 And what we found is that the sulfide contents and the  15 acid-generating potential of the Copper Flat material is  16 towards the lower end of the observed range.</p> <p>17       So this plot here shows the sulfide content  18 for a number of projects in Nevada, Arizona, Chile, and  19 here we'll have -- here we have the Berkeley Pit, which  20 I'm sure some of you are familiar with, and Copper Flat.</p> <p>21       And so as you can see, this kind of square in  22 the middle here represents the median sulfide content.  23 So the median sulfide content at the -- of the Copper  24 Flat deposit is in most cases significantly below or  25 certainly within the range or the low end of the range</p>	<p style="text-align: right;">255</p> <p>1 neutral conditions after -- in excess of a hundred weeks  2 of testing in some cases.</p> <p>3       The only exception to this is the transitional  4 material which shows a greater potential for acid  5 generation and metal release. This material only  6 comprises 4 percent of waste rock and won't be exposed  7 in the final pit walls.</p> <p>8       And this material will also be managed by  9 encapsulation in the waste rock stockpile and presents a  10 low risk to surface water and groundwater.</p> <p>11       So I will go on to discuss the water quality  12 predictions that we undertook for the mine facilities.  13       So we used the geochemical characterization  14 test work results to develop water quality predictions  15 for the waste rock stockpile, for the tailing storage  16 facility and for the pit lake. And these facilities are  17 shown on this figure here. That's the tailing storage  18 facility, waste rock stockpile and on the pit.</p> <p>19       We used a number of data sources as inputs to  20 our model.</p> <p>21       So we used -- initially used mass-balanced  22 results from the humidity cell test work that were  23 scaled to field conditions.</p> <p>24       We used site-specific climate data and  25 information from the hydrologic and hydrogeologic water</p>
<p style="text-align: right;">254</p> <p>1 of similar analog deposits.</p> <p>2       This is also shown on this figure here. The  3 Copper Flat samples are represented by these orange  4 dots. Here the red crosses are the Berkeley Pit which  5 are well within the acid-generating field. And Copper  6 Flat typically falls in the uncertain or nonacid-forming  7 fields based on acid base accounting.</p> <p>8       So just to summarize the results of the  9 characterization program before I go on to discuss the  10 water quality predictions.</p> <p>11       We found that the majority of waste rock shows  12 very low potential for acid generation of metal release.  13 So 96 percent of the material has a low potential.</p> <p>14       Weathering reactions are very slow, and this  15 is because the sulfide minerals are coarsely crystalline  16 and often encapsulated, which means they're more  17 resistant to weathering reactions.</p> <p>18       We found that the screening level tests for  19 the acid base accounting and the net acid generation  20 tests typically overpredicted or overestimated the  21 potential for acid generation.</p> <p>22       And when we conducted the longer-term tests  23 which are more representative of longer-term weathering  24 conditions, we found that the majority of cells maintain  25 neutral conditions. So 20 out of 23 cells maintained</p>	<p style="text-align: right;">256</p> <p>1 balance developed by John Shomaker &amp; Associates.  2       We also used representative groundwater  3 chemistry data that had been collected as part of the  4 baseline program.</p> <p>5       We used published rainwater chemistry data  6 from the National Atmospheric Deposition Program.  7       And finally, we used information from the mine  8 plotting through the information on waste rock and  9 tailings tonnages and facility design and footprints and  10 the composition of the final pit walls.</p> <p>11       And the water quality predictions were  12 undertaken using the US Geological software called  13 PHREEQC, which is the standard method -- standard  14 industry method for water quality predictions and is  15 widely available and applied.</p> <p>16       So if we initially look at the waste rock  17 stockpile, the objectives of this model were to assess  18 the potential for groundwater quality impacts from the  19 stockpile.</p> <p>20       So we used a number of assumptions in our  21 model.</p> <p>22       So the final facility will contain 60 million  23 tons of waste rock, which will mostly comprise quartz  24 monzonite.</p> <p>25       The final facility will have a surface area of</p>



<p style="text-align: right;">257</p> <p>1 180 acres.</p> <p>2       And we undertook our model for a postclosure</p> <p>3 scenario. So after closure, a revegetated</p> <p>4 store-and-release 36-inch cover will be placed on the</p> <p>5 surface of the facility and to promote run-off and</p> <p>6 enhance evapotranspiration and reduce the amount of</p> <p>7 infiltration to the facility.</p> <p>8       Because of this cover, long-term infiltration</p> <p>9 to the facility is assumed to be low, so 2 percent of</p> <p>10 mean annual precipitation.</p> <p>11       We assume that of the total mass of material</p> <p>12 in the facility only 20 percent of this is available for</p> <p>13 geochemical weathering reactions. And this is a</p> <p>14 standard procedure and consistent with a number of</p> <p>15 published literature guidelines which range from 10 to</p> <p>16 30 percent.</p> <p>17       And this is essentially because the majority</p> <p>18 of the reactivity is associated with the fine-grain</p> <p>19 material, so larger boulders, et cetera, and the</p> <p>20 majority of that will be held within the center of the</p> <p>21 boulder and is not available for weathering reactions.</p> <p>22       We assumed that the waste rock stockpile is</p> <p>23 sited on low permeability andesite. However, and based</p> <p>24 on the analysis of John Shomaker &amp; Associates, we're</p> <p>25 not -- we're not assuming that there will be -- or we're</p>	<p style="text-align: right;">259</p> <p>1 predicted to be moderately alkaline.</p> <p>2       Because we'll be covering the facility with a</p> <p>3 revegetated store-and-release cover at closure, this</p> <p>4 means that sulfide oxidation will be limited.</p> <p>5       We're also predicting that no impacts to</p> <p>6 groundwater will occur should there be any seepage from</p> <p>7 the facility. And predicted groundwater chemistry is</p> <p>8 similar if not almost identical to current groundwater</p> <p>9 chemistry.</p> <p>10       Furthermore, all parameters are below New</p> <p>11 Mexico groundwater standards, with the exception of</p> <p>12 fluoride, which is naturally elevated in the existing</p> <p>13 groundwater.</p> <p>14       So this table here, I appreciate there's a lot</p> <p>15 of data. And so here we have -- and if you wish to</p> <p>16 refer this table in more detail, it's contained within</p> <p>17 the Geochemical Characterization Report.</p> <p>18       And here we have the number of constituents</p> <p>19 compared to the New Mexico groundwater standard. Here</p> <p>20 we have the existing groundwater chemistry in the</p> <p>21 andesite and the predicted groundwater chemistry for two</p> <p>22 seepage scenarios.</p> <p>23       And in all cases, groundwater chemistry is</p> <p>24 very similar to existing groundwater chemistry with no</p> <p>25 impacts predicted.</p>
<p style="text-align: right;">258</p> <p>1 not expecting that there will be any seepage to</p> <p>2 groundwater in the future and because of the low</p> <p>3 permeability of this material.</p> <p>4       However, we did conduct an evaluation to see</p> <p>5 if there was seepage from the facility what the</p> <p>6 potential impacts to groundwater might be. So we</p> <p>7 assumed that of the 2 percent of annual precipitation</p> <p>8 that infiltrates the facility a small proportion of</p> <p>9 this, so 5 to 10 percent, may eventually reach</p> <p>10 groundwater.</p> <p>11       This cartoon here is our conceptual model so</p> <p>12 just looking at the main inputs and outputs to the waste</p> <p>13 rock stockpile model.</p> <p>14       And so here we have our facility that contains</p> <p>15 60 million tons of waste rock. It will be covered at</p> <p>16 closure with a revegetated store-and-release cover,</p> <p>17 which will enhance evapotranspiration and prevent</p> <p>18 infiltration.</p> <p>19       But we did assume that there will be a small</p> <p>20 amount of infiltration to the facility and that may</p> <p>21 eventually make its way to groundwater. And we assessed</p> <p>22 the groundwater chemistry under the facility here upon</p> <p>23 mixing in the aquifer.</p> <p>24       Looking at the results of this model, we found</p> <p>25 that the porewater within the waste rock stockpile is</p>	<p style="text-align: right;">260</p> <p>1       Moving on to the model for the tailings</p> <p>2 storage facility, the primary objective of this model</p> <p>3 was to assess potential for groundwater impacts from</p> <p>4 this facility.</p> <p>5       So again we had a number of assumptions.</p> <p>6       The final facility will contain a hundred</p> <p>7 million tons of tailings.</p> <p>8       And we have a surface area of 530 acres.</p> <p>9       The tailings will be deposited in a lined</p> <p>10 facility, and it will be constructed on the site of the</p> <p>11 historic tailings.</p> <p>12       And these historic tailings will be used as a</p> <p>13 liner or a -- sorry -- a subbedding to the lined</p> <p>14 material. And what this will do is essentially isolate</p> <p>15 them from oxidation reactions. So they'll be placed</p> <p>16 under the liner so that no oxygen and water can access</p> <p>17 them.</p> <p>18       A closure -- and the facility will include a</p> <p>19 number of closure actions. So this includes grading of</p> <p>20 the embankment slopes, placement of a 36-inch</p> <p>21 store-and-release cover, similar to the waste rock</p> <p>22 stockpiles, and finally, the management of any</p> <p>23 underdrainage.</p> <p>24       As with the waste rock stockpile model, we did</p> <p>25 assume that there would be a small amount of</p>

<p style="text-align: right;">261</p> <p>1 infiltration to this cover. So we assumed that  2 2 percent of mean annual precipitation would infiltrate  3 the cover.  4 We assumed that 70 percent of the total mass  5 of tailings would be available for reactions. You'll  6 remember this is -- this number is slightly higher than  7 that assumed for the waste rock stockpile model, and  8 that's primarily because the tailings material is much  9 finer grained so generally has a greater reactivity --  10 or greater surface area, I should say.  11 Just moving through some of the additional  12 assumptions, because there will be a liner placed under  13 the tailings, there is a low potential for seepage.  14 However, to assess the potential for groundwater  15 impacts, we did assume that there may be minor seepage  16 through manufacturing defects within the liner.  17 So for the purpose of these calculations, we  18 assumed that there would be one circular defect per acre  19 in the liner. And this was calculated by John  20 Shomaker &amp; Associates and is consistent with Giroud and  21 Bonaparte's guidance.  22 And this will result in minor seepage from the  23 facility.  24 And this seepage will consist of a mixture of  25 processed water that's entrained within the tailings and</p>	<p style="text-align: right;">263</p> <p>1 And critically, no parameters are predicted to  2 exceed New Mexico groundwater standards under the  3 facility.  4 And I think it's also important to note that  5 containment of the historic tailings below the liner  6 will reduce exposure of this material to oxidizing  7 conditions. So it will contain that material.  8 And actually what this means is that water  9 quality is likely to improve over time. So that sulfate  10 plume that exists on site at the moment under the  11 historic tailings is likely to be improved because of  12 the source of that sulfate will essentially be cut off.  13 And further, as you all have heard from  14 Mr. Finch's presentation earlier, particle tracking  15 indicates that any seepage from the facility will remain  16 in the immediate area for several hundred years and is  17 not expected to migrate away from the facility.  18 Again I appreciate there's a lot of  19 information on this table. We have our results here for  20 a number of -- or predicted chemistry for a number of  21 constituents compared to the New Mexico groundwater  22 standards, baseline groundwater chemistry.  23 And we predicted groundwater chemistry under  24 the tailing storage facility for a number of draindown  25 scenarios ranging from 25 percent to 95 percent.</p>
<p style="text-align: right;">262</p> <p>1 also precipitation that may have infiltrated the  2 facility.  3 So this diagram here shows our Copper Flat's  4 well model for the tailings storage facility.  5 Here we have our map of tailing placed on an  6 HDPE liner, which will be placed over the top of the  7 historic tailings. So this is our revegetated 36-inch  8 store-and-release cover that will be placed on top.  9 There will be a small amount of infiltration,  10 2 percent of mean annual precipitation. This will seep  11 through the tailings, mix with the process water, and  12 there may be small seepage through manufacturing defects  13 within the liner, and a small portion of this may  14 eventually make its way to groundwater.  15 And this is where we took our predictions  16 here, in the top zone of the aquifer.  17 So moving on to present some of the results of  18 this analysis.  19 We found that the solution chemistry will be  20 dominated by moderately alkaline process waters, pH 8.2.  21 And seepage through the liner will be so low  22 that impacts to groundwater are absolute or negligible.  23 And predicted groundwater chemistry is almost  24 identical to current groundwater chemistry as a result  25 of these very low seepage estimates.</p>	<p style="text-align: right;">264</p> <p>1 And I don't know how well you can see this,  2 but basically we're predicting no groundwater impacts  3 with predicted groundwater chemistry that's identical or  4 almost identical to an existing groundwater chemistry,  5 with no exceedance of groundwater standards.  6 Finally, I'll move on to the pit lake water  7 quality predictions.  8 So the primary objectives of this were to  9 assess the future pit lake chemistry for the Copper Flat  10 project.  11 Also to compare predicted pit lake chemistry  12 to the existing pit lake.  13 To assess the effects of the proposed  14 reclamation actions on proposed -- on predicted pit lake  15 chemistry.  16 And finally, to demonstrate compliance with  17 the New Mexico Mining Act regulations.  18 So specifically that's the operations must be  19 planned and conducted to minimize change in the  20 hydrologic balance in the permit and potentially  21 affected areas.  22 Secondly, reclamation must result in a  23 hydrologic balance similar to existing conditions.  24 And thirdly, postmining water quality must be  25 similar to baseline premining water quality. So this</p>

<p style="text-align: right;">265</p> <p>1 third point here was really the key aspect that we were  2 considering as part of the geochemical characterization  3 program and the modeling effort.  4       So we completed pit lake predictions for three  5 scenarios.  6       So we developed a calibration model for the  7 existing pit lake that's on site in order to refine our  8 modeling approach.  9       And then we developed two models for the  10 future pit. So we developed one model for the  11 unreclaimed pits with natural fill and also one for the  12 reclaimed pit with rapid fill.  13       Again the predictions were made using the US  14 Geological modeling software, PHREEQC.  15       And predictions were made for a number of  16 postclosure years, ranging from six months out through  17 100 years postclosure.  18       And we have a number of data inputs that we  19 used to our pit lake water quality predictions.  20       So we had information on the pit wall geology  21 and surface areas that came from the feasibility study  22 geologic model and on -- on pit shell.  23       The water balances were provided -- were  24 provided by John Shomaker &amp; Associates for the three pit  25 lake scenarios.</p>	<p style="text-align: right;">267</p> <p>1 itself and, finally, any evaporation from the pit lake  2 surface.  3       Here in green at the top, we have our various  4 chemistry inputs to the model. So this included  5 chemistry from the humidity cell program, groundwater  6 chemistry taken from the baseline monitoring program and  7 precipitation chemistry data.  8       So we combined these two components, so the  9 hydrology inputs and the chemistry inputs, and we  10 determined the amount of rock that will be exposed in  11 the pit wall, and we reacted our water with this amount  12 of rock that will be exposed.  13       And this was scaled from -- from lab  14 conditions to field conditions to reflect the  15 water-to-rock ratio that we will see in the field. So  16 this was conducted for both any run-off entering the pit  17 and any groundwater entering the pit.  18       And this -- these solutions were mixed, and  19 the pit lake was about -- allowed to evaporate. Any  20 oversaturated phases were allowed to precipitate. And  21 finally, that predicted water chemistry was fed into the  22 next time step. So for each step of the model, so six  23 months, one year, two years, et cetera, we conducted  24 this process.  25       As you may be aware, there is an existing pit</p>
<p style="text-align: right;">266</p> <p>1       Groundwater chemistry at the groundwater that  2 will enter the pit came from baseline groundwater data  3 from the monitoring program.  4       For the rapid fill model, we assumed that the  5 pit would be rapidly filled with good quality water from  6 the water supply wells. So we obtained data from wells  7 PW-1 and PW-3.  8       The source term chemistry for the pit walls  9 was obtained from the humidity cell program that was  10 scaled to field conditions.  11       Precipitation chemistry data were obtained  12 from published data from the Gila National Monument  13 meteorological station, which was collected between 1985  14 and 2011.  15       And finally, thermodynamic data was supplied  16 with PHREEQC.  17       Now, I appreciate this schematic contains a  18 lot of information, but I will try and talk you through,  19 because it explains how we approached our pit lake  20 modeling predictions.  21       So here in the bottom in blue, we have our  22 hydrology inputs and hydrogeology inputs to the model.  23 So this included groundwater inflow to the pits, run-off  24 from the pit walls, direct precipitation onto the  25 surface of the pit lake, any storage within the pit lake</p>	<p style="text-align: right;">268</p> <p>1 lake on the Copper Flat property. This was developed  2 during the early 1980s.  3       And the chemistry of this pit lake has been  4 variable, but has been broadly circum-neutral, around pH  5 6.5, throughout the 35-plus years of existence.  6       There are occasional acid wall seep events  7 that we see in the existing pit lake. And these relate  8 to the transitional material that's exposed in the pit  9 walls associated with the Sternberg Lode. And this  10 material will be removed as part of the proposed  11 operation so it won't be present in the future pit. So  12 we're not expecting these acid wall seep events for the  13 future pits.  14       There's a real benefit that we have a good  15 water quality data set for the existing pit, because it  16 helps us to understand the processes that control water  17 chemistry and can be used to verify model assumptions  18 and approach.  19       I think it's important to say -- and Mr. Finch  20 touched on this earlier in his testimony, but the water  21 level in that pit has dropped slightly in its 35 years  22 of existence, and there has been evapoconcentration of  23 solutes within that pit. So that current pit lake is a  24 hydraulic sink so the only water loss is through  25 evaporation. So evapoconcentrated processes are</p>

<p style="text-align: right;">269</p> <p>1 controlling the chemistry.  2 And this has resulted in an increase in --  3 here we have sulfate and chloride concentrations over  4 time. So this represents a sample collected in January,  5 1989 through to January, 2017.  6 So we undertook a calibration model of the  7 existing pit and to verify our future pit lake  8 predictions and calibrate our model.  9 So the water balance of the existing pit was  10 developed by John Shomaker &amp; Associates.  11 And the model results show good calibration  12 for most parameters. With constituent concentration --  13 predicted constituent concentrations are within the  14 range of measured concentrations in the existing pit,  15 which essentially verifies our modeling approach.  16 So we then went on to develop water quality  17 predictions for -- with two scenarios for the future  18 pit.  19 The first of these was for the unreclaimed pit  20 that was allowed to fill naturally with groundwater and  21 run-off.  22 And the second phase was for the reclaimed pit  23 with rapid fill, whereby the pit lake is initially  24 filled during the first six months with 2,200 acre-feet  25 of good quality water from the water supply wells.</p>	<p style="text-align: right;">271</p> <p>1 direct precipitation and pit run-off with a lesser  2 amount of groundwater inflow.  3 Moving on to the reclaimed pit scenario with  4 rapid fill.  5 So during the first six months postclosure,  6 the pit will be filled with 2,200 acre-feet of water  7 from the water supply wells.  8 And this will have a number of beneficial  9 effects. It means that the pit walls will be rapidly  10 submerged. So any sulfide minerals that are exposed  11 will not be exposed to air and water because they're  12 essentially isolated within the pit walls.  13 It limits exposure of these to oxidation  14 processes.  15 It also reduces the effects of the  16 evapoconcentration over time because we're starting with  17 a better initial water quality.  18 Again this pit scenario we're -- the modeling  19 show that this will be a hydraulic sink. So there will  20 be no loss of water to groundwater, there will be no  21 flow through, and the only means by which water will be  22 lost from the pit is through evaporation processes.  23 Sorry. If you could go just one slide. Thank  24 you.  25 So this -- if you compare this stage curve</p>
<p style="text-align: right;">270</p> <p>1 This model also incorporated reclamation from  2 New Mexico Copper's Mine Reclamation Plan. So this  3 included reclamation of the pit haul road, as we can see  4 here, and reclamation of the expanded 4,900 catch bench,  5 which is located here, and reclamation of the pit crest,  6 and, finally, the rapid fill that we discussed earlier.  7 So this conceptual model is for the future  8 unreclaimed pits.  9 So it assumes that postclosure there will be a  10 pit lake that forms in the pits as a result of  11 groundwater inflow to the pit void, run-off of  12 precipitation from the pit walls, direct precipitation  13 onto the pit lake surface and, finally, run-off from the  14 open pit surface drainage area.  15 As Mr. Finch presented earlier, the resulting  16 pit lake will be a hydraulic sink. So what this means  17 is there will be no outflow to groundwater or surface  18 water, and the only means by which water will be lost  19 from the pit lake will be through evapoconcentration --  20 or -- sorry -- evaporation processes.  21 This graph here shows the pit lake stage for  22 the future unreclaimed pit.  23 So we see the elevation of the pit gradually  24 recovering over a number of years. And here we have the  25 various inputs to the pit lake. So it's dominated by</p>	<p style="text-align: right;">272</p> <p>1 here to the reclaimed pit, you will see that the water  2 level reaches the equilibrium level much quicker than  3 the unreclaimed natural fill scenario.  4 We assumed that there would be a certain  5 amount of leaching from the pit walls. So we scaled our  6 humidity cell data from laboratory conditions to field  7 conditions based on the water-to-rock ratio we're likely  8 to see under future conditions.  9 So the volumes of water were provided by the  10 water balance developed by John Shomaker &amp; Associates,  11 and also the massive material in the pit walls were  12 defined by the geologic model and Mine Plan.  13 So we assumed that there would be a certain  14 depth of fracturing within the pit walls. For the  15 purpose of our model, we assumed the fracture thickness  16 of one foot, with a fracture density of around 10  17 percent. And this is -- this is a reasonable estimate  18 for Copper Flat because they'll be using smooth ore  19 blasting techniques and presplit drilling, which  20 essentially reduces fracturing in the future pit walls.  21 Just to run through the results of our pit  22 lake water quality predictions.  23 So pit lakes -- the future pit lake is  24 predicted to be moderately alkaline, between pH 7.9 and  25 8.2. So there will be buffering by the inflowing</p>

<p style="text-align: right;">273</p> <p>1 groundwater. There's also a very limited amount of  2 acid-generating rock exposed in the final pit walls. So  3 the combined effects of these two components means we're  4 expecting neutral to alkaline pH conditions.  5       We do predict there will be an initial -- a  6 slight initial flush in trace element concentrations  7 during the first six months as the pit fills. And this  8 relates to the solubilization of oxidation products from  9 the surfaces of the pit walls and fractures.  10       Similar to the trends observed in the existing  11 pit, we do predict that there will be an increase in  12 total dissolved solids, or TDS, over time because of  13 evapoconcentration effects.  14       So when we compare the predicted chemistry to  15 the existing pit lake, we see that the predicted  16 chemistry is in -- either within the same range or  17 better water quality compared to the existing pits.  18       Critically, we're not predicting the acid wall  19 seep events for the future pit. This is because the  20 transitional material that's currently exposed within  21 the pit walls in the form of the Sternberg Lode will be  22 mined out as part of operations. So that won't exist in  23 the future pit walls.  24       We found that rapidly refilling the pit  25 results in better water quality. This is because the</p>	<p style="text-align: right;">275</p> <p>1 the range in the existing pit lake. For reasons that we  2 see lower predicted concentrations are severalfold.  3       So firstly, certainly in the case of rapid  4 fill, we're reducing the effects of evapoconcentration.  5 We're starting off with better initial water quality.  6       We're also removing that transitional material  7 that contributes sulfate to the pit lake.  8       And the blasting practices that will be used  9 for the future pit are different to what was used back  10 in the 1980s. So blasting practices have improved, and  11 the thickness of fracturing is assumed to be much less  12 as a result of these improvements.  13       Here we have the predicted copper  14 concentrations. In the future pit, again these fall --  15 these fall towards the lower end of the range observed  16 in the existing pit.  17       Similarly here for fluoride, we have  18 concentrations that are either towards the lower end or  19 below the range of existing water quality. So better  20 predicted water quality for the future pit.  21       And similarly here for arsenic, predicted  22 concentrations are either within the range or, in the  23 case of the unreclaimed pit here, it's less than the  24 observed range, representing an overall improvement in  25 water quality as part of the proposed mining operations.</p>
<p style="text-align: right;">274</p> <p>1 long-term effects of evapoconcentration are reduced and  2 predicted constituent concentrations are lower.  3       So I'll just present some graphs showing some  4 of the results for key constituents. Each graph follows  5 a similar format so I'll just briefly explain what it  6 shows.  7       Here on the X axis, we have the number of  8 years postclosure out to 100 years. And then here we  9 have constituent concentrations, or in this case pH.  10       So the red line represents the predicted  11 chemistry for the future reclaimed pit. The green line  12 represents the predicted chemistry for the unreclaimed  13 pit. And these gray lines here represent the range of  14 measured chemistry in the existing pit lake. So  15 minimum, average and maximum.  16       What you see here is that we have moderately  17 alkaline predicted chemistry, which is towards the upper  18 range of pH observed in the existing pit. And the  19 reason we're predicting higher pH is because of the  20 removal of this transitional material from the Sternberg  21 Lode which contributes to acid water events. This will  22 no longer be present in the future at a pit lake.  23       If we look here at the predictions for  24 sulfate, we can see that predicted sulfate  25 concentrations are either within the range or less than</p>	<p style="text-align: right;">276</p> <p>1       Similarly here we have selenium, and we see  2 predicted concentrations well within the range or toward  3 the lower end of the range for the existing pit lake.  4       This Ficklin plot -- you all have seen similar  5 plots several times throughout this presentation, but I  6 think it's a good illustration of how pit lake water  7 quality is predicted to be -- to improve in the future.  8 So -- sorry.  9       The green circles that you can see represent  10 the chemistry -- the measured chemistry of the existing  11 pit. And a lot of those fall in either the acid,  12 high-metal or the near-neutral, high-metal field with  13 some in the near-neutral, low-metal field. Plus it's  14 quite variable.  15       The red squares that you can see represent the  16 predicted chemistry for the future reclaimed pit.  17       And the gray diamonds represent the predicted  18 chemistry for the unreclaimed pit.  19       And the majority of future pit lake  20 predictions fall within this near-neutral, low-metal  21 field, particularly for the rapid fill scenario, which  22 is this -- these red dots here.  23       So just to summarize the results of the pit  24 lake water quality predictions, future pit lake waters  25 are predicted to be moderately alkaline, with</p>

277	<p>1 constituent concentrations within the range of variation  2 seen for the existing pit lake.</p> <p>3 We do predict that there will be an increase  4 in total dissolved solids over time as a result of  5 evapoconcentration effects, which is similar to the  6 trends observed in the existing pit lake.</p> <p>7 We are not anticipating that there will be any  8 acid wall seep events for the future pit, and pit lake  9 water quality is predicted to be estimated -- sorry --  10 is predicted to be better than the existing pit lake.</p> <p>11 Critically, the results demonstrate that the  12 changes to the hydrologic balance of the future pit will  13 be nil or minimal so there will potentially be similar  14 to existing conditions. Future water quality will be  15 similar or better quality than the existing pit lake.  16 And finally, rapid refilling of the pit results in  17 further improvement of the water quality.</p> <p>18 So finally, just to summarize all of the  19 results of the geochemistry program, the majority of  20 waste rock, 96 percent of waste rock, that will be  21 produced by the project shows a low potential for acid  22 generation and metal release.</p> <p>23 Weathering reactions are likely to be very  24 slow due to the coarse crystalline nature of sulfide  25 minerals and also encapsulation in slow-reacting</p>	279	<p>1 than the existing pit lake.</p> <p>2 And that concludes my direct testimony.</p> <p>3 Q. Thank you for your presentation,  4 Ms. Griffiths.</p> <p>5 Did you provide a copy of your resume as New  6 Mexico Copper Corporation's Exhibit 21?</p> <p>7 A. Yes, I did.</p> <p>8 Q. Did you provide PowerPoint presentation as  9 Exhibit 22?</p> <p>10 A. Yes.</p> <p>11 Q. Did you also provide resumes of Mr. Rob Howell  12 and Ms. Amy Prestia as Exhibits 23 and 24?</p> <p>13 A. Yes, I did.</p> <p>14 Q. And then in offered Exhibits 25 through 86,  15 did you also provide a set of materials that provided  16 some of the background analyses and information that  17 goes into your presentation today?</p> <p>18 A. Yes, I did.</p> <p>19 MR. BUTZIER: With that, Ms. -- Madam Hearing  20 Officer, I would like to offer into evidence Exhibits 21  21 through 86.</p> <p>22 MS. ORTH: Objections?</p> <p>23 MR. DE SAILLAN: No objections.</p> <p>24 MR. KNIGHT: No objections.</p> <p>25 MS. BARNCASTLE: I do have a concern. I --</p>
278	<p>1 silicate minerals.</p> <p>2 We found that there -- the screening level  3 tests, including acid base accounting, generally  4 overestimate the potential for acid generation, and  5 overestimated the reactivity of the samples. And in  6 actual fact, these acidic conditions weren't realized  7 when we undertook longer-term weathering tests in the  8 form of humidity cell testing.</p> <p>9 Furthermore, the tests that we conducted  10 showed low potential release or generation of metal-rich  11 solutions.</p> <p>12 The only exception is the transitional  13 material which does show a greater potential for acid  14 generation and metal release. This material only  15 comprises 4 percent of waste rock and will be managed by  16 encapsulation in the waste rock stockpile, and as such,  17 there will be a low risk to impact surface water and  18 groundwater.</p> <p>19 Our water quality predictions show that we're  20 not expecting impacts from -- groundwater impacts from  21 either the waste rock stockpile or the tailing storage  22 facility.</p> <p>23 And finally, pit lake waters in the future pit  24 are predicted to be neutral to moderately alkaline with  25 constituent concentrations that are similar to or less</p>	280	<p>1 test. Hello.</p> <p>2 I have a concern.</p> <p>3 Slide 14 in Dr. Griffiths' presentation  4 doesn't match the slide 14 I have from disclosures.</p> <p>5 MR. BUTZIER: Could we go to slide 14, please.</p> <p>6 Ms. Griffiths -- and, Madam Hearing Officer,  7 with your permission -- would you describe whether this  8 slide is changed and, if so, what was changed in the  9 slide.</p> <p>10 MS. GRIFFITHS: The fundamentals of the slide  11 have not changed, just additional detail has been added.</p> <p>12 So I believe that the slide that's -- is --  13 has been provided previously just shows that the  14 materials are defined by the primary rock type,  15 oxidation and the copper grade. It doesn't actually  16 provide the percentages of material.</p> <p>17 So those percentages have now been added to  18 the slide for additional clarification to support the  19 rest of the presentation.</p> <p>20 MR. BUTZIER: Thank you.</p> <p>21 We would renew our motion to accept all of  22 these exhibits, including the PowerPoint presentation as  23 changed and as it has been added to according to this  24 testimony.</p> <p>25 MS. ORTH: All right.</p>

281	<p>1 Ms. Barncastle, do you have any questions 2 about the addition? 3 MS. BARNCASTLE: I would just like to know if 4 there were any other changes in what's being offered 5 versus what was provided in the disclosures? 6 MS. GRIFFITHS: Not in terms of this 7 presentation. I think there was two typos that were 8 noted, and they've been corrected, but that's it. 9 MS. BARNCASTLE: No objection. Thank you. 10 MS. ORTH: All right. Thank you. 11 NMCC Exhibits 21 through 86 are admitted. 12 (Exhibits NMCC Exhibits 21 through 86 admitted 13 into evidence.) 14 MS. ORTH: Anything further, Mr. Butzier? 15 MR. BUTZIER: Madam Hearing Officer, nothing 16 further, other than I would like to have Mr. Rob Bowell 17 come to the witness stand and made available when the 18 time is appropriate. I don't know if you want to take a 19 break or not. 20 MS. ORTH: I would like to take a break 21 actually before we begin cross. 22 MR. BUTZIER: Before we take a break, could I 23 move -- could I offer that Mr. Rob Bowell be also 24 accepted as an expert in geochemistry as it relates to 25 mine facilities?</p>	283	<p>1 THE REPORTER: Hold on a second. 2 We have to swear in Mr. Bowell. 3 MS. ORTH: Oh, sorry. 4 We have to swear in Dr. Bowell. 5 (ROB BOWELL was duly sworn.) 6 RUTH GRIFFITHS and ROB BOWELL 7 having been first duly sworn or affirmed, were 8 examined and testified further as follows: 9 MS. ORTH: Okay. We're ready. 10 MR. DE SAILLAN: Okay. Thank you. 11 CROSS EXAMINATION 12 BY MR. DE SAILLAN: 13 MR. DE SAILLAN: Good evening, Ms. Griffiths. 14 I'd like to start out with slide 8, please. 15 And this slide indicates ARD and ML leachate 16 treatment. 17 Do you know if any similar treatment is 18 planned for Copper Flat? 19 MS. GRIFFITHS: This is just a general 20 schematic that looks at the processes that may 21 contribute to ARD, acid rock drainage, and metal 22 leaching. As far as I'm aware, no treatment is proposed 23 for the Copper Flat project. 24 MR. DE SAILLAN: Okay. Thank you. 25 Let's go to slide 18 -- well, yeah. Slide 18.</p>
282	<p>1 MS. ORTH: Are there objections? 2 MR. KNIGHT: No objection. 3 MR. DE SAILLAN: No objection. 4 MS. ORTH: Ms. Barncastle? No? 5 MS. BARNCASTLE: No objection. 6 MS. ORTH: All right. Fine. He'll be so 7 recognized. 8 MR. BUTZIER: Thank you. 9 MS. ORTH: Let's take a break, 10 minutes. 10 (Proceedings in recess from 5:22 p.m. to 11 5:39 p.m.) 12 MS. ORTH: All right. We are going to begin 13 the cross-examination of Dr. Griffiths and -- is it 14 Dr. Bowell? 15 MR. BOWELL: That's right. 16 MS. ORTH: Okay. Great. 17 Mr. Knight, do you have questions of the 18 panel? 19 MR. KNIGHT: Madam Hearing Officer, I have no 20 questions for this witness. 21 MS. ORTH: Thank you. 22 Mr. de Saillan. 23 MR. DE SAILLAN: Thank you, Madam Hearing 24 Officer. 25 I do have several questions.</p>	284	<p>1 Now, that shows us 16 samples for 4.5 percent 2 of the ore for QFB sulfide, 22 samples for 75 percent of 3 the ore for QM sulfide. 4 Could you explain why 16 samples for 4.5 5 percent versus 22 samples for 75 percent are equally 6 representative? 7 MS. GRIFFITHS: So this -- this was due to a 8 number of reasons. 9 Firstly, when we started our sample collection 10 program, back in 2010, it was based on the PEA, the 11 preliminary economic assessment, and we didn't at that 12 point have the previous stability study and material 13 tonnages. 14 So as you're probably aware, the cutoff grade 15 on the pit shell has changed, and as a result of this, 16 the relative proportions of each material has changed 17 slightly. So we did collect a higher number of samples 18 of this quartz feldspar breccia sulfide material. 19 Also, this, I believe, shows slightly more 20 variability in terms of behavior so we collected more 21 samples of this material. 22 But yes. Both the 16 samples and the 22 23 samples is considered a reasonable sample number for 24 each characterization of each material type. 25 MR. DE SAILLAN: What do you mean by</p>

285	<p>1 considered a reasonable sample number?</p> <p>2 MS. GRIFFITHS: There is no -- or the official</p> <p>3 guidance on the number of samples is variable. So the</p> <p>4 GARD Guide does provide guidance on the number of</p> <p>5 samples, and it's -- it specifies that you must</p> <p>6 characterize the range of -- of variability in the ore</p> <p>7 material, and -- but it doesn't -- as far as I'm aware,</p> <p>8 it says you have to collect several hundred samples in</p> <p>9 total when you're at the feasibility study stage.</p> <p>10 So we consider this -- this adequate based</p> <p>11 on -- we consider this sample distribution adequate</p> <p>12 based on the geology information that we have seen.</p> <p>13 MR. DE SAILLAN: Did you do any kind of</p> <p>14 statistical analysis to determine if you had an adequate</p> <p>15 number of samples to characterize, to make a</p> <p>16 characterization?</p> <p>17 MS. GRIFFITHS: We did not.</p> <p>18 MR. DE SAILLAN: Okay.</p> <p>19 Now, you referenced in slide 26 ASTM</p> <p>20 D5744-13e1.</p> <p>21 MS. GRIFFITHS: Um-hum.</p> <p>22 MR. DE SAILLAN: Are you aware of a recent</p> <p>23 revision to that standard?</p> <p>24 MS. GRIFFITHS: I believe this is the</p> <p>25 revision, the 2013 revision.</p>	287	<p>1 So based on the BLM criteria, any material</p> <p>2 that has a net neutralizing potential between minus-20</p> <p>3 and 20 has an uncertain potential for acid generation.</p> <p>4 MR. DE SAILLAN: Okay.</p> <p>5 So those were the BLM methodology?</p> <p>6 MS. GRIFFITHS: Correct.</p> <p>7 MR. DE SAILLAN: Okay.</p> <p>8 Then slide 25, I didn't quite understand how</p> <p>9 you sampled the future tailings.</p> <p>10 MS. GRIFFITHS: So those samples came from the</p> <p>11 metallurgical test work program that was conducted in a</p> <p>12 laboratory environment. So we took samples of material</p> <p>13 from that program, and they're considered representative</p> <p>14 of future tailings, and we submitted those for</p> <p>15 geochemical characterization.</p> <p>16 MR. DE SAILLAN: So how did you -- how were</p> <p>17 you able to generate tailings that are representative of</p> <p>18 the future tailings that are going to come from this</p> <p>19 mine?</p> <p>20 MS. GRIFFITHS: We weren't directly involved</p> <p>21 in the metallurgical test work program so I'm afraid I</p> <p>22 can't comment on that.</p> <p>23 MR. DE SAILLAN: Okay.</p> <p>24 MR. BOWELL: Just to clarify, in the mining</p> <p>25 industry, it's essential on a metal mining project that</p>
286	<p>1 MR. DE SAILLAN: What year?</p> <p>2 MS. GRIFFITHS: 2013.</p> <p>3 MR. DE SAILLAN: Okay.</p> <p>4 Were you involved in that revision?</p> <p>5 MS. GRIFFITHS: I was not.</p> <p>6 MR. BOWELL: Just clarification, I am involved</p> <p>7 in the ASTM committee -- I am currently involved in the</p> <p>8 ASTM committee which is looking at the revision of the</p> <p>9 standard.</p> <p>10 MR. DE SAILLAN: Okay. Thank you.</p> <p>11 Let me back up to slide 21.</p> <p>12 You state that the majority of the samples are</p> <p>13 classified as either uncertain or nonacid-generating.</p> <p>14 Looks like the majority of the samples are</p> <p>15 actually uncertain.</p> <p>16 What -- how do you determine whether it's</p> <p>17 uncertain as opposed to acid-generating or</p> <p>18 nonacid-generating?</p> <p>19 MS. GRIFFITHS: So the criteria we apply are</p> <p>20 BLM criteria, and so here they're based on the net</p> <p>21 neutralizing potential, on this slide, and I think the</p> <p>22 next slide shows the neutralizing potential ratio. So</p> <p>23 the BLM defines criteria for classification of</p> <p>24 acid-generating material and nonacid-generating material</p> <p>25 and uncertain material.</p>	288	<p>1 during previous building feasibility study you want to</p> <p>2 take test work in order to segregate the ore minerals so</p> <p>3 you can determine purity, grade and really the value of</p> <p>4 the ore.</p> <p>5 Now, that metallurgical test work mimics the</p> <p>6 processes that will be applied in the field. So it</p> <p>7 generates a waste material. That waste material for all</p> <p>8 intents and purposes has the same material</p> <p>9 characteristics as a process plan would have in reality</p> <p>10 or in our production.</p> <p>11 So tailings produced in test work would show</p> <p>12 the same chemical, mineralogical and physical</p> <p>13 characteristics to those that will be produced during</p> <p>14 operation. So that's considered a suitable analog.</p> <p>15 MR. DE SAILLAN: Okay.</p> <p>16 Okay. Slide 35.</p> <p>17 Can you identify Nevada 1 and Nevada 2?</p> <p>18 MR. BOWELL: Sorry. This is my slide again.</p> <p>19 Nevada 1 is the Liberty Pit which is in the</p> <p>20 Robinson Mining District.</p> <p>21 And Nevada 2 is taken from the Rio Tinto</p> <p>22 project which is in Pershing County in Nevada.</p> <p>23 MR. DE SAILLAN: Okay.</p> <p>24 MR. BOWELL: I think it was the Copper City</p> <p>25 version on -- the Copper City side of the Rio Tinto</p>



289	<p>1 Mining District which was under evaluation in 2004 to 2 2006.</p> <p>3 MR. DE SAILLAN: Okay.</p> <p>4 And of the five sites that are shown, which of 5 them are in porphyry copper deposits?</p> <p>6 MR. BOWELL: They're all porphyry systems, 7 they're all calc-alkaline porphyry systems. The Copper 8 Flat, Chile, both the Nevada examples and the Arizona 9 group of samples all come from very typical low-styled, 10 disseminated sulfides in porphyry.</p> <p>11 Berkeley Pit was put up here as a counterpoint 12 to that. It is a well known porphyry system, but it 13 actually is a sulfide-rich stockwork developed within 14 the same kind of magmatic rock. So it actually has a 15 slightly different geology to the others.</p> <p>16 MR. DE SAILLAN: Okay.</p> <p>17 I want to go back to slide 21.</p> <p>18 No. I am not reading my writing. Which 19 one -- I think it was 27, that showed the -- it's like 20 a structural -- yes. That's the one.</p> <p>21 So this is a like a structural integrity test 22 that you performed? It looks like the sample on the 23 inside there is a solid piece of rock, a monolithic 24 piece of rock; is that correct?</p> <p>25 MS. GRIFFITHS: So this shows the humidity</p>	291	<p>1 Mexico Copper will be able to provide more details.</p> <p>2 MR. DE SAILLAN: Okay.</p> <p>3 Could you explain?</p> <p>4 MS. GRIFFITHS: I am not familiar with how 5 that material will be encapsulated, but I'm sure the New 6 Mexico Copper would be able to provide additional detail 7 on that.</p> <p>8 MR. DE SAILLAN: So the word "encapsulation" 9 is not your term.</p> <p>10 MS. GRIFFITHS: No.</p> <p>11 MR. DE SAILLAN: Okay.</p> <p>12 All right. Slide 41.</p> <p>13 What is the basis for your assumption that 14 infiltration will be 2 percent of total precipitation?</p> <p>15 MS. GRIFFITHS: This came from water balance 16 estimates developed by John Shomaker &amp; Associates. It's 17 considered a relatively reasonable estimate, I believe, 18 for infiltration through a covered waste rock stockpile.</p> <p>19 MR. DE SAILLAN: Okay.</p> <p>20 Considered by you?</p> <p>21 MS. GRIFFITHS: This is not my area of 22 expertise.</p> <p>23 MR. DE SAILLAN: Okay.</p> <p>24 DR. GRIFFITHS: Infiltration.</p> <p>25 MR. DE SAILLAN: Okay. Thank you.</p>
290	<p>1 cell test. So on the right, we have a picture of what 2 the column looked like in the lab, and on the left, we 3 have a schematic of how that column is set up.</p> <p>4 So it contains a sample of crushed waste rock 5 material, so crushed to less than 6.3 millimeters, and 6 that is contained within the column, and that is then -- 7 air is circulated through the column, and it's flushed 8 on a weekly basis.</p> <p>9 MR. DE SAILLAN: Okay. So that rock is 10 crushed?</p> <p>11 Because from here it doesn't look like it.</p> <p>12 MR. BOWELL: It's a poor folks' graphic in 13 that respect, but, yes, the rock inside there is 14 crushed.</p> <p>15 MR. DE SAILLAN: Okay.</p> <p>16 MS. GRIFFITHS: And that crush size is 17 according to the ASTM standard.</p> <p>18 MR. DE SAILLAN: Okay.</p> <p>19 Slide 37.</p> <p>20 You indicated that the -- the waste rock that 21 has a higher acid-generating potential would be 22 encapsulated within the waste rock pile, and I was 23 wondering how that's going to be accomplished.</p> <p>24 MS. GRIFFITHS: I believe the details of that 25 are included in the Waste Management Plan, which New</p>	292	<p>1 I'm going to go ahead and ask the same 2 question with respect to slide 46.</p> <p>3 MS. GRIFFITHS: So the same cover will be 4 applied to the tailings storage facility as will be 5 applied to the waste rock stockpile, so that's a 36-inch 6 store-and-release cover, and revegetated. So we've 7 assumed the same amount of infiltration through that 8 cover because the properties will be the same.</p> <p>9 MR. DE SAILLAN: And again are you basing that 10 on work that was done by John Shomaker &amp; Associates?</p> <p>11 MS. GRIFFITHS: Correct.</p> <p>12 MR. DE SAILLAN: Okay.</p> <p>13 Then slide 42.</p> <p>14 I think with respect to that slide you said 15 that fluoride is naturally elevated? Is it above the 16 applicable water quality standards?</p> <p>17 MS. GRIFFITHS: It is --</p> <p>18 MR. BUTZIER: Madam Hearing Officer, I would 19 like to say that that partially at least calls for a 20 legal conclusion and understanding of the language of 21 the 3103 regulations in NMED's groundwater standards.</p> <p>22 MS. ORTH: All righty. I think he's -- he is 23 not seeking speculation, that her statement is 24 fluoride's already elevated, as I understood it, and 25 that that was the one value -- I believe she said that</p>

293	<p>1 that was the one value that was higher than the 2 standard. 3 So -- 4 MR. BUTZIER: My point, Madam Hearing Officer, 5 if I could elaborate -- 6 MS. ORTH: Yes. 7 MR. BUTZIER: -- is that Ms. Griffiths may not 8 be the right person to ask about the fact that under the 9 3103 groundwater standards in the regulations of the 10 WQCC administered by NMED the numeric standard applied 11 unless existing contamination is higher than the numeric 12 standard. And that's the situation here. 13 And so there was maybe a little 14 misunderstanding about terminology used in that 15 particular slide, and that's the nature of my objection. 16 MS. ORTH: Okay. Now -- I understand now. 17 So, Mr. de Saillan, with that clarification, 18 would you please reask your question. 19 MR. DE SAILLAN: Yes. Thank you, Madam 20 Hearing Officer. 21 So based on your understanding of the 22 regulations, when you say that it's naturally elevated, 23 does that mean it's above what you understand the 24 standards to be? 25 MR. BUTZIER: Same objection.</p>	295	<p>1 Mining District in Arizona, it also had the same 2 approach as an old tailings impoundment, was reused, and 3 new tailings were placed on top of that. 4 I can't remember if they had a synthetic liner 5 or not, but they certainly reused the old tailings 6 impoundment as a means of storage, and one of the 7 aspects that was often quoted about it was that it was a 8 way of mitigating the oxidation of the high-sulfide 9 tailings, which were the older, late 19th century 10 tailings. 11 MR. DE SAILLAN: And was that approach 12 successful? 13 MR. BOWELL: That's a great question. 14 I don't know. I didn't work on that project. 15 I just read a paper on it. It was certainly 16 successful -- like it is successful at Wheal Jane in 17 Cornwall, where an old tailings impoundment was being 18 used for disposal of modern sludges, and a synthetic 19 liner was placed over them, and the groundwater quality 20 in that area has improved over time. 21 And that has been documented in a number of 22 studies. 23 MR. DE SAILLAN: And what was the -- what were 24 the sludges? 25 MR. BOWELL: The sludge came from mine water</p>
294	<p>1 MS. ORTH: Okay. Dr. Griffiths, do you 2 understand the question, whether it exceeds the numeric 3 standard without thought as to whether that means 4 compliance. 5 MS. GRIFFITHS: Yes. I understand the 6 question. 7 MS. ORTH: Okay. Go ahead. 8 MS. GRIFFITHS: And yes, to answer your 9 question. It does exceed the numeric standard. 10 MR. DE SAILLAN: Okay. Thank you. 11 Okay. Slide 44, please. 12 The historic tailings under the tailing 13 storage facility has -- you refer to it as a method 14 mitigating -- of mitigation to prevent further metals 15 leaching into groundwater. 16 Can you tell us of any other locations at 17 which this approach was taken that you're aware of? 18 MS. GRIFFITHS: I defer to Dr. Bowell on this 19 question. 20 MR. BOWELL: I think you'll find that the 21 Chino -- not Chino -- I mean the Cerro Chino project in 22 the Bisbee area also -- 23 THE REPORTER: Say that again, please. 24 MR. BOWELL: Sorry. 25 Cerro Chino project, which is in the Bisbee</p>	296	<p>1 treatment, from underground pumping from an old, 2 abandoned underground mine, and the sludge was present 3 within the water which was treated, the sludge was 4 separated from the water, and the sludge, which was a 5 very fine-grain material, similar to tailings, was then 6 placed on top of a liner which was on top of the old 7 tailings impoundment. 8 And that's the Wheal Jane. Wheal is spelled 9 W-H-E-A-L. It's Cornish for mine. So -- 10 MR. DE SAILLAN: Slide 55, please. 11 Now, could you explain how the model was 12 changed to reflect reclamation of the pit? 13 MS. GRIFFITHS: Yes. So for the reclaimed 14 surfaces, so this included the haul roads, the catch 15 bench and the crest of the pits, we assumed that the 16 reactivity of that material would be effectively greatly 17 reduced, and the chemistry of that material is just 18 represented by essentially run-off chemistry with 19 minimal reactivity, because that -- the pit walls with 20 the fracturing will no longer be exposed to oxygenating 21 conditions. 22 MR. DE SAILLAN: Okay. 23 Okay. Slide 61, please. 24 Now, your assumption here, I think, is based 25 on the pit walls remaining intact?</p>

297	<p>1 MS. GRIFFITHS: Sorry. Are you referring to</p> <p>2 your previous question about --</p> <p>3 MR. DE SAILLAN: No. This is slide 61.</p> <p>4 So your assumption here depends on the pit</p> <p>5 wall remaining intact?</p> <p>6 MS. GRIFFITHS: No. That's not correct.</p> <p>7 If you could go back to slide -- the previous</p> <p>8 slide. Was it 44?</p> <p>9 Sorry. Just -- keep going.</p> <p>10 MS. ORTH: 55.</p> <p>11 MS. GRIFFITHS: That one, sorry, with the</p> <p>12 yellow.</p> <p>13 MS. ORTH: Try 55.</p> <p>14 MS. GRIFFITHS: There we go.</p> <p>15 So if I can point to on this diagram, if you</p> <p>16 can see, sorry, the yellow areas represent the reclaimed</p> <p>17 areas. It's assumed there will still be fracturing, et</p> <p>18 cetera, within these exposed areas of the pit here, the</p> <p>19 nonyellow.</p> <p>20 MR. DE SAILLAN: Okay. So there would be</p> <p>21 fracturing.</p> <p>22 MS. GRIFFITHS: That's correct.</p> <p>23 MR. DE SAILLAN: And what would that be the</p> <p>24 result of? Would that be the result of blasting of the</p> <p>25 pit?</p>	299	<p>1 talked about it's within a range, and I wasn't quite</p> <p>2 sure what that range was that you were referring to,</p> <p>3 that had -- if it was pegged to groundwater quality</p> <p>4 standards or surface water quality standards.</p> <p>5 MS. GRIFFITHS: My apologies. I will explain</p> <p>6 that in a bit more detail.</p> <p>7 So the range I'm referring to is the range of</p> <p>8 chemistry that we've seen measured in the existing pit</p> <p>9 lake. So that's based on measurements made between 1989</p> <p>10 and 2017.</p> <p>11 So these -- these values here represent the</p> <p>12 minimum measured chemistry during that period, the</p> <p>13 average measured chemistry and the maximum measured</p> <p>14 chemistry during this period.</p> <p>15 MR. DE SAILLAN: So -- okay. So it had</p> <p>16 nothing do with standards.</p> <p>17 MS. GRIFFITHS: That's correct.</p> <p>18 MR. DE SAILLAN: Okay.</p> <p>19 Now, how many mine sites have you made major</p> <p>20 geochemical predictions for?</p> <p>21 MS. GRIFFITHS: I couldn't give you an exact</p> <p>22 number, but I would say probably on the order of 10 to</p> <p>23 15.</p> <p>24 MR. DE SAILLAN: Okay.</p> <p>25 And have any of those mine sites been in</p>
298	<p>1 MS. GRIFFITHS: That's correct. Those</p> <p>2 fractures relate to the blasting.</p> <p>3 MR. DE SAILLAN: Okay.</p> <p>4 Over time, are you aware of benches on pits</p> <p>5 sloughing and crumbling?</p> <p>6 MS. GRIFFITHS: Yes. I'm aware of it. It's</p> <p>7 not within my area of expertise. I would consider that</p> <p>8 a geotechnical stability issue.</p> <p>9 MR. DE SAILLAN: Okay. So that was not built</p> <p>10 into your assumptions.</p> <p>11 MS. GRIFFITHS: Please, could you clarify what</p> <p>12 you mean by not built into your assumptions.</p> <p>13 MR. DE SAILLAN: Back to slide 61, you were</p> <p>14 making assumptions about the -- the weathering of the</p> <p>15 pit walls and contribution of the pit walls to</p> <p>16 contamination.</p> <p>17 Were you taking into consideration the</p> <p>18 possibility over the long-term of sloughing or crumbling</p> <p>19 of the pit walls?</p> <p>20 MS. GRIFFITHS: That is not taken into</p> <p>21 consideration.</p> <p>22 MR. DE SAILLAN: Okay. Thank you.</p> <p>23 Okay. Slide 62 through 66.</p> <p>24 And I -- you talk about concentrations of</p> <p>25 contaminants, and I was a little confused here. You</p>	300	<p>1 operation for more than 10 years?</p> <p>2 MS. GRIFFITHS: No.</p> <p>3 MR. DE SAILLAN: Okay.</p> <p>4 Have you had a chance to revisit your</p> <p>5 predictions at any of those mine sites?</p> <p>6 MS. GRIFFITHS: I have not. But as I</p> <p>7 presented in my direct testimony, with the Copper Flat</p> <p>8 project we have an existing pit lake on site that we</p> <p>9 were able to use to calibrate our model and give us</p> <p>10 confidence in our modeling approach.</p> <p>11 We don't often get that opportunity, where we</p> <p>12 have an analog lake or, you know, water quality data for</p> <p>13 the site. So that -- the fact that we were able to</p> <p>14 replicate that chemistry gave us confidence in the</p> <p>15 predictions.</p> <p>16 MR. DE SAILLAN: Okay.</p> <p>17 That is all my questions.</p> <p>18 Thank you very much.</p> <p>19 MS. ORTH: Thank you, Mr. De Saillan.</p> <p>20 Ms. Barncastle.</p> <p>21 CROSS EXAMINATION</p> <p>22 BY MS. BARNCASTLE:</p> <p>23 MS. BARNCASTLE: In the record, Bates page</p> <p>24 number 5529 is the beginning of an existing report where</p> <p>25 testing was done in 1997 regarding potential for acid</p>

301	<p>1 generation, and you didn't discuss that in your direct 2 testimony.</p> <p>3 Why is that?</p> <p>4 MS. GRIFFITHS: That's correct. We didn't 5 provide information on that report. If required, 6 Dr. Bowell worked on that original characterization 7 program so he can provide more detail.</p> <p>8 But from my understanding, the sampling for 9 that program was focused on the existing waste rock 10 dumps and was focused on the finer-grained, more 11 reactive material from those existing waste rock dumps. 12 So it's not considered representative of future mined 13 materials for the Copper Flat project.</p> <p>14 MS. BARNCASTLE: But it is true that it did 15 show more potential for acid generation than the test 16 results you direct -- your direct testimony focused on.</p> <p>17 MS. GRIFFITHS: That's correct to some extent, 18 because those -- as I said, those samples were focused 19 on the finer-grained, reactive material from the 20 existing waste rock dumps. So those existing waste rock 21 dumps primarily received the transitional material, 22 which we heard was the more reactive material, and there 23 will be a very small proportion of that material that 24 will be mined as part of future mining operations. 25 So we're expecting, because the future pit</p>	303	<p>1 of an explanation as to why the samples from the 1997 2 study are not representative of what you expect to see 3 from this mine in the future?</p> <p>4 MS. GRIFFITHS: So the samples that were 5 collected in 1997 were collected from the existing waste 6 rock pile. So that's material that's already been 7 extracted from the pit. So those waste rock piles will 8 be reclaimed as part of the mining operations.</p> <p>9 The future mine materials were represented by 10 the exploration drill core. So samples were collected 11 from -- from drilling within the proposed footprint of 12 the future pit. So that is considered more 13 representative than surface material that was mined 14 previously.</p> <p>15 MS. BARNCASTLE: On slide 35 --</p> <p>16 MR. BOWELL: Can I just elaborate on that? 17 Sorry. Can I just elaborate on that, because I did some 18 of the work on --</p> <p>19 MS. BARNCASTLE: Sure.</p> <p>20 MR. BOWELL: So the test methodologies that we 21 carried out in the field were with a series of what we 22 call paste pH, which is a field assessment, which 20 23 years ago was a very common way of trying to identify 24 high-risk materials. So it's a much smaller sample. As 25 Ruth said, it was done on materials which were</p>
302	<p>1 will go much deeper into the sulfide zone, the 2 reactivity of the future mine materials will be less.</p> <p>3 MR. BUTZIER: Madam Hearing Officer.</p> <p>4 MS. ORTH: Mr. Butzier.</p> <p>5 MR. BUTZIER: Although Ms. Griffiths clearly 6 understood the question and knows exactly what she's 7 talking about in relation to the document, I wonder if 8 Ms. Barncastle could repeat the Bates number, because 9 I'm a little slower and not catching up with her.</p> <p>10 MS. ORTH: All right.</p> <p>11 Ms. Barncastle.</p> <p>12 MS. BARNCASTLE: 5529.</p> <p>13 MS. ORTH: Thank you.</p> <p>14 MR. BUTZIER: Does that have a number in the 15 index to the administrative record, just an item number?</p> <p>16 MS. BARNCASTLE: I can tell you that it's 17 EBID's Exhibit 19. I don't know -- I don't have the 18 administrative record up in front of me.</p> <p>19 MR. BUTZIER: Thank you. That will do it.</p> <p>20 MR. KNIGHT: If I may, that's item 108 in the 21 administrative record.</p> <p>22 MS. ORTH: Thank you, Mr. Knight.</p> <p>23 MR. BUTZIER: Thank you.</p> <p>24 MS. BARNCASTLE: Let's see where I was at. 25 Can you -- can you give me a little bit more</p>	304	<p>1 preexisting in the field.</p> <p>2 With the program that we had for Alta Gold, we 3 only had six cores that were made available for our use 4 for looking at future wall rock.</p> <p>5 So I would probably contend that the 6 characterization part that was done 20 years on is a lot 7 more relevant to looking at future mining of the pit as 8 opposed to the material we had available 20 years ago.</p> <p>9 So we ended up looking at material -- because 10 the Copper Flat deposit is in a porphyry system, these 11 systems are often quite zoned. So part of the issue 12 with early mining of porphyries is that there's more 13 oxides in the transitional material than there is later 14 in the mine life. There's higher copper grades there 15 typically.</p> <p>16 So the material more on the current waste rock 17 pile represent generally more weathered material that 18 was geologically higher in sulfide and higher in metals 19 than the material deeper down in the porphyry system. 20 That's a fairly standard anatomy to a porphyry system. 21 Hence there's some discrepancy between the two 22 characterizations.</p> <p>23 MS. BARNCASTLE: Thank you for that. 24 Slide 35, please. 25 I believe your testimony was that Copper Flat</p>

305	<p>1 is in the range of these other mines; is that correct?</p> <p>2 MS. GRIFFITHS: I believe I said it was</p> <p>3 towards the low end of the range.</p> <p>4 MS. BARNCASTLE: Those other mines are</p> <p>5 contamination sites; is that correct?</p> <p>6 MS. GRIFFITHS: I'm not sure what you refer to</p> <p>7 when you say contamination sites.</p> <p>8 These are essentially other characterization</p> <p>9 programs that we have worked on. So they -- this is the</p> <p>10 characterization data for those sites.</p> <p>11 MS. BARNCASTLE: The Berkeley Pit is a</p> <p>12 Superfund site?</p> <p>13 MS. GRIFFITHS: That's correct.</p> <p>14 MS. BARNCASTLE: Slide 37, please.</p> <p>15 Let's see, where is it.</p> <p>16 I might be on the wrong slide. Oh, no, no.</p> <p>17 Okay.</p> <p>18 Third bullet point down, acid base accounting</p> <p>19 and net acid generation methods generally overpredict</p> <p>20 acid generation.</p> <p>21 The question is overpredict in comparison to</p> <p>22 what?</p> <p>23 MS. GRIFFITHS: So as you'll have heard during</p> <p>24 the direct testimony, there's the two testing types.</p> <p>25 There's the shorter-term screening level test that we</p>	307	<p>1 pulverized material.</p> <p>2 So those screening level tests don't take into</p> <p>3 account mineral textures or anything like that, but are</p> <p>4 taken into account in the humidity cell tests. And</p> <p>5 that's -- as we've heard, the mineral textures at Copper</p> <p>6 Flat are very important in controlling the chemistry.</p> <p>7 MS. BARNCASTLE: And when you say humidity</p> <p>8 cell test, you're referring to the kinetic test.</p> <p>9 MS. GRIFFITHS: That's correct.</p> <p>10 MS. BARNCASTLE: What geochemical data was</p> <p>11 used for the input from the waste rock and tailings</p> <p>12 models?</p> <p>13 MS. GRIFFITHS: For the waste rock model, we</p> <p>14 used data from the humidity cell testing program. So</p> <p>15 from the Mine Plan and the geologic model, we knew what</p> <p>16 materials were going to be deposited in that -- that</p> <p>17 waste rock stockpile, and then we used humidity cell</p> <p>18 data for most materials within our prediction.</p> <p>19 MS. BARNCASTLE: Is that data included in the</p> <p>20 record?</p> <p>21 MS. GRIFFITHS: Yes, it is.</p> <p>22 MS. BARNCASTLE: Can you refer me to where we</p> <p>23 might find those in your reports?</p> <p>24 MS. GRIFFITHS: It's contained in the</p> <p>25 Geochemical Characterization Report for the Copper Flat</p>
306	<p>1 call static test. So that includes acid base accounting</p> <p>2 and net acid generation tests. So those tests are</p> <p>3 screen level tests. They don't take into account</p> <p>4 longer-term weathering reactions, which we see in the</p> <p>5 kinetic humidity cell test.</p> <p>6 So what we found from those screening level</p> <p>7 tests is that there is an uncertain potential for acid</p> <p>8 generation for many material types, but actually when we</p> <p>9 subjected those samples to longer-term weathering in the</p> <p>10 humidity cell tests, we didn't see any acid generation.</p> <p>11 So the uncertain was -- was an over -- the</p> <p>12 uncertain classification was an overestimate of the</p> <p>13 potential for acid generation. And in fact, those</p> <p>14 conditions weren't seen at all in the longer-term</p> <p>15 humidity cell test which we would consider more</p> <p>16 representative of weathering characteristics.</p> <p>17 MS. BARNCASTLE: So the screening tests aren't</p> <p>18 very helpful, then.</p> <p>19 MS. GRIFFITHS: They are helpful, and they're</p> <p>20 also a requirement of the Copper Rule, to carry out</p> <p>21 these screening level tests. But we find the kinetic</p> <p>22 humidity cell tests more representative because they</p> <p>23 take into account mineral reaction rates. So they're</p> <p>24 carried out on the -- on the crushed material, whereas</p> <p>25 the static screen level tests are undertaken on the</p>	308	<p>1 Project.</p> <p>2 MS. BARNCASTLE: Do you have a Bates page</p> <p>3 number?</p> <p>4 MS. GRIFFITHS: Page number? Oh.</p> <p>5 MR. BUTZIER: Madam Hearing Officer, if she</p> <p>6 wants to move on while I look, I'd be happy to see if I</p> <p>7 can answer that question.</p> <p>8 MS. ORTH: All right.</p> <p>9 Can you continue without that number now?</p> <p>10 MS. BARNCASTLE: Yes, I can. Thank you.</p> <p>11 MS. ORTH: Okay.</p> <p>12 MS. BARNCASTLE: On multiple of your slides,</p> <p>13 you refer to seepage assumptions being based on the John</p> <p>14 Shomaker &amp; Associates determinations; is that correct?</p> <p>15 MS. GRIFFITHS: That's correct.</p> <p>16 MS. BARNCASTLE: If JS&amp;A were wrong, does that</p> <p>17 also mean your predictions are wrong?</p> <p>18 MS. GRIFFITHS: How do you define wrong?</p> <p>19 MS. BARNCASTLE: Well, if they were incorrect,</p> <p>20 then your reliance on their incorrect determinations</p> <p>21 would affect your predictions; is that correct?</p> <p>22 MS. GRIFFITHS: Yes. But I think it's</p> <p>23 important to note that we're not just using the</p> <p>24 Shomaker &amp; Associates data. There are, obviously, a lot</p> <p>25 of other data that feeds into those models. So that's</p>

309	<p>1 just one small component.</p> <p>2 MS. BARNCASTLE: Sure, understood.</p> <p>3 Slide 47, please.</p> <p>4 In bold, in the fourth bullet point down, no</p> <p>5 parameters are predicted to exceed New Mexico Water</p> <p>6 Quality Control Commission groundwater standards.</p> <p>7 How close, though, do the predictions come to</p> <p>8 exceeding groundwater impacts?</p> <p>9 MS. GRIFFITHS: I'm not able to answer that</p> <p>10 question without looking at the results directly. I</p> <p>11 know that the predicted watered chemistry is almost</p> <p>12 identical to existing water chemistry. So we're not</p> <p>13 predicting any impacts as a result to groundwater.</p> <p>14 MS. BARNCASTLE: Where in the record could we</p> <p>15 find that actual prediction data?</p> <p>16 MS. GRIFFITHS: That's also contained in the</p> <p>17 Geochemical Characterization Report.</p> <p>18 MS. BARNCASTLE: I think that's all for my</p> <p>19 questions.</p> <p>20 MS. ORTH: All right. Thank you.</p> <p>21 Mr. Butzier, have you found it?</p> <p>22 MR. KNIGHT: Madam Hearing Officer, I just</p> <p>23 want to say I misspoke earlier. The item at Bates 5529</p> <p>24 that Ms. Barncastle was referring to is actually item</p> <p>25 number 110 in the record.</p>	311	<p>1 Mexico.</p> <p>2 MR. KNIGHT: Right. Well -- okay. We'll</p> <p>3 still need to look for that.</p> <p>4 MR. BUTZIER: Actually that may be the very</p> <p>5 same document --</p> <p>6 MR. VOLLBRECHT: It is.</p> <p>7 MR. BUTZIER: -- number 110.</p> <p>8 It's item number 110 with a range of -- Bates</p> <p>9 range of 5529 to 7439.</p> <p>10 MS. BARNCASTLE: I wondered if it was the</p> <p>11 same. I wasn't sure, and I didn't want to say that, but</p> <p>12 I wondered if it was the same one I was using. So --</p> <p>13 MR. BUTZIER: I'm just glad we --</p> <p>14 MS. BARNCASTLE: -- that helps clarify.</p> <p>15 MR. BUTZIER: -- solved it. Okay.</p> <p>16 MS. ORTH: Great. That took a village. All</p> <p>17 right.</p> <p>18 Thank you very much, Dr. Bowell and</p> <p>19 Dr. Griffiths.</p> <p>20 So, Mr. Butzier, it's about quarter after</p> <p>21 6:00. I can ask if anyone is moved to offer public</p> <p>22 comment at this time, or you can leap into your next</p> <p>23 witness.</p> <p>24 What would you like to do?</p> <p>25 MR. BUTZIER: My preference would -- Madam</p>
310	<p>1 MS. ORTH: Okay. Thank you. So we'll correct</p> <p>2 that.</p> <p>3 MR. BUTZIER: I was hoping you were going to</p> <p>4 say what -- where the geochemical study was.</p> <p>5 But I'm still looking, Madam Hearing Officer.</p> <p>6 MS. ORTH: All right. Thank you.</p> <p>7 Is there anyone else who has a question of</p> <p>8 Dr. Griffiths or Dr. Bowell based on their testimony?</p> <p>9 Anyone at all?</p> <p>10 Okay. I see no hands.</p> <p>11 Mr. Butzier, do you have any follow-up?</p> <p>12 MR. BUTZIER: No, I do not, Madam Hearing</p> <p>13 Officer.</p> <p>14 MS. ORTH: You do not. All right. Thank you</p> <p>15 very much.</p> <p>16 If there's no reason not to excuse the panel,</p> <p>17 we'll excuse them.</p> <p>18 Thank you very much.</p> <p>19 MR. KNIGHT: And, Madam Hearing Officer?</p> <p>20 MS. ORTH: Sir.</p> <p>21 MR. KNIGHT: The item that Mr. Butzier is</p> <p>22 looking for in the record, could you give me the title</p> <p>23 of that document? I might -- I might have it here.</p> <p>24 MR. BOWELL: It's May, 2013, the Geochemical</p> <p>25 Characterization Report, Copper Flat Project, New</p>	312	<p>1 Hearing Officer, would be to go with whatever public</p> <p>2 comment is available and then call it a night, and we</p> <p>3 can start fresh in the morning with our last two</p> <p>4 witnesses.</p> <p>5 MS. ORTH: All righty.</p> <p>6 Let me ask if there's anyone who has not yet</p> <p>7 offered public comment who would like to offer public</p> <p>8 comment at this time. There will be other</p> <p>9 opportunities, including tomorrow night. But if you --</p> <p>10 you would have a clear path tonight.</p> <p>11 No?</p> <p>12 All right. Let's reconvene, then, at</p> <p>13 9:00 a.m. in this room.</p> <p>14 Thank you.</p> <p>15 (Proceedings adjourned at 6:19 p.m.)</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

1 STATE OF NEW MEXICO )  
2 ) ss.  
3 COUNTY OF BERNALILLO )  
4

5  
6 I, CHERYL ARREGUIN, the officer before whom the  
7 foregoing proceeding was taken, do hereby certify that  
8 the witnesses whose testimony appears in the foregoing  
9 transcript were duly sworn or affirmed; that I  
10 personally recorded the testimony by machine shorthand;  
11 that said transcript is a true record of the testimony  
12 given by said witnesses; that I am neither attorney nor  
13 counsel for, nor related to or employed by any of the  
14 parties to the action in which this proceeding is taken,  
15 and that I am not a relative or employee of any attorney  
16 or counsel employed by the parties hereto or financially  
17 interested in the action.

18 *Cheryl Arreguin*

19  
20 NOTARY PUBLIC  
21 CCR License Number: 21  
22 Expires: 12/31/2018

23  
24 My Commission Expires: 12/12/19  
25

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<p>1 STATE OF NEW MEXICO                  2 BEFORE THE SECRETARY OF ENVIRONMENT                  3 No. GWB 18-06(P)                  4                  5 IN THE MATTER OF THE APPLICATION                  OF NEW MEXICO COPPER CORPORATION FOR                  6 A GROUNDWATER DISCHARGE PERMIT FOR                  THE COPPER FLAT MINE, DP-1840                  7                  8                  9                  10                  11                  12                  13 TRANSCRIPT OF PROCEEDINGS                  14                  15 Volume 2                  16                  17 BE IT REMEMBERED that on the 25th day of                  18 September, 2018, this matter came on for hearing before                  19 FELICIA ORTH, Hearing Officer, at the Ralph Edwards                  20 Auditorium in Truth or Consequences, New Mexico, at the                  21 hour of 9:06 a.m.                  22                  23                  24                  25</p>	<p>1 A P P E A R A N C E S (Continued)                  2 For the Elephant Butte Irrigation District:                  3 SAMANTHA R. BARNCASTLE                  BARNCASTLE LAW FIRM                  4 Attorneys at Law                  Post Office Box 1556                  5 Las Cruces, New Mexico 88004                  (575) 636-2377                  6 samantha@h2o-legal.com                  7                  8                  9                  10                  11                  12                  13                  14                  15                  16                  17                  18                  19                  20                  21                  22                  23                  24                  25</p>
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<p>1 A P P E A R A N C E S                  2 The Hearing Officer:                  3 FELICIA ORTH                  Hearing Officer                  4 20 Barranca Road                  Los Alamos, New Mexico 87544                  5 felicia.l.orth@gmail.com                  6 For the New Mexico Environment Department:                  7 ANDREW P. KNIGHT                  Assistant General Counsel                  8 New Mexico Environment Department                  Office of General Counsel                  9 121 Tijeras Avenue, Northeast                  Suite 1000                  10 Albuquerque, New Mexico 87502                  (505) 222-9540                  andrew.knight@state.nm.us                  11 For New Mexico Copper Corporation:                  12 STUART R. BUTZIER                  MODRALL, SPERLING, ROEHL, HARRIS &amp; SISK, PA                  13 Attorneys at Law                  500 Fourth Street, Northwest                  14 Suite 1000                  Albuquerque, New Mexico 87102                  (505) 848-1832                  sbutzier@modrall.com                  15                  16                  17 For the Turner Ranch Properties, LP, and Hillsboro                  Pitchfork Ranch, LLC:                  18                  19 CHARLES de SAILLAN                  20 NEW MEXICO ENVIRONMENTAL LAW CENTER                  1405 Luisa Street                  21 Suite 5                  Santa Fe, New Mexico 87505-4074                  (505) 989-9022                  cdesaillan@nmelc.org                  22                  23                  24                  25</p>	<p>1 I N D E X                  2 PAGE                  3 DAVID KIDD                  4 Direct Examination by Mr. Butzier 327                  5 Cross Examination by Mr. de Saillan 354                  6 Cross Examination by Ms. Barncastle 360                  7 Examination by Mr. Mijal 367                  8 Examination by Ms. Browne 369                  9 Examination by Mr. Newman 373                  10 Examination by Ms. Brittan 378                  11 Redirect Examination by Mr. Butzier 380                  12 TODD STEIN                  13 Direct Examination by Mr. Butzier 384                  14 Cross Examination by Mr. de Saillan 430                  15 Cross Examination by Ms. Barncastle 457                  16 Examination by Ms. Brittan 478                  17 Examination by Ms. Blair 479                  18 Examination by Ms. Yarmal 482                  19 Examination by Ms. Browne 484                  20 Examination by Mr. Kent 487                  21 Redirect Examination by Mr. Butzier 489                  22                  23                  24                  25</p>



322	<p>1           E X H I B I T S (Continued)</p> <p>2                    ADMITTED</p> <p>3 NEW MEXICO COPPER CORPORATION (Continued):</p> <p>4 NMCC Exhibit 95. American Society of Agronomy, 428</p> <p>5     Inc., Agronomy, Methods of Soil Analysis,</p> <p>6     Chapter 15, Particle-size Analysis, 1986</p> <p>7 NMCC Exhibit 96. Golder Associates, 428</p> <p>8     Supplemental Soils Investigation, Copper</p> <p>9     Flat Project, July 8, 2013</p> <p>10 NMCC Exhibit 97. US Department of Commerce, 428</p> <p>11    NOAA Atlas 14, Precipitation-Frequency</p> <p>12    Atlas of the United States, 2004</p> <p>13 NMCC Exhibit 98. Heap Leach Pad, Interim 428</p> <p>14    Fluid Management (IFM), March 18, 2010</p> <p>15 NMCC Exhibit 99. Stetson Engineers Inc., 428</p> <p>16    Copper Flat Mine, Order 1 Soil Survey of</p> <p>17    Permit Area, September 14, 2011</p> <p>18 NMCC Exhibit 100. US Department of 428</p> <p>19    Agriculture, National Resources</p> <p>20    Conservation Service, National Soil</p> <p>21    Survey Handbook, June 2018</p> <p>22 NMCC Exhibit 101. US Department of the 428</p> <p>23    Interior, Bureau of Land Management,</p> <p>24    White Sands Resource Area, Resource</p> <p>25    Management Plan, October 1986</p>	324	<p>1           E X H I B I T S (Continued)</p> <p>2                    ADMITTED</p> <p>3 NEW MEXICO ENVIRONMENT DEPARTMENT (Continued):</p> <p>4 NMED Exhibit 5. Resume of Kurt Vollbrecht 542</p> <p>5 NMED Exhibit 6. Resume of Bradley Reid 542</p> <p>6 NMED Exhibit 7. Resume of Joseph Marcoline 542</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
323	<p>1           E X H I B I T S (Continued)</p> <p>2                    ADMITTED</p> <p>3 NEW MEXICO COPPER CORPORATION (Continued):</p> <p>4 NMCC Exhibit 102. US Department of the 428</p> <p>5    Interior, Bureau of Land Management,</p> <p>6    McGregor Range, Record of Decision and</p> <p>7    Resource Management Plan Amendment,</p> <p>8    May 2006</p> <p>9 NMCC Exhibit 103. US Army Corps of Engineers, 428</p> <p>10   Hydrologic Engineering Center, Hydrologic</p> <p>11   Modeling System HEC-HMS, User's Manual,</p> <p>12   Version 4.2, August 2016</p> <p>13 NMCC Exhibit 104. Soil Sci. Soc. Am. J., 428</p> <p>14   Vol. 44, A Closed-form Equation for</p> <p>15   Predicting the Hydraulic Conductivity of</p> <p>16   Unsaturated Soils, 1980</p> <p>17 NEW MEXICO ENVIRONMENT DEPARTMENT:</p> <p>18 NMED Exhibit 1. GWQB draft Discharge Permit 542</p> <p>19   Number DP-1840</p> <p>20 NMED Exhibit 2. Written Testimony of Kurt 542</p> <p>21   Vollbrecht</p> <p>22 NMED Exhibit 3. Written Testimony of Bradley 542</p> <p>23   Reid</p> <p>24 NMED Exhibit 4. Written Testimony of Joseph 542</p> <p>25   Marcoline</p>	325	<p>1           MS. ORTH: Good morning.</p> <p>2           My name is Felicia Orth.</p> <p>3           We're on day 2 of the hearing in the matter of</p> <p>4   the application of New Mexico Copper Corporation for a</p> <p>5   groundwater Discharge Permit for the Copper Flat Mine.</p> <p>6   The Discharge Permit is DP-1840. The matter was</p> <p>7   docketed by the hearing clerk as GWB 18-06(P).</p> <p>8           We do have an interpreter for anyone who is</p> <p>9   more comfortable participating in this hearing in a</p> <p>10   language other than English.</p> <p>11          Ma'am.</p> <p>12          THE INTERPRETER: Good morning, ladies and</p> <p>13   gentlemen.</p> <p>14          If you feel more comfortable in another</p> <p>15   language besides English, that's okay. Just let me know</p> <p>16   you do not speak English very well. I'll be making an</p> <p>17   announcement in Spanish.</p> <p>18          (In Spanish.)</p> <p>19          Everybody's good in English?</p> <p>20          Madam Hearing Officer, no requests for</p> <p>21   interpreter at this time. I will be available</p> <p>22   throughout the hearing.</p> <p>23          MS. ORTH: Thank you very much.</p> <p>24          We went through the housekeeping matters. I</p> <p>25   assume you've all figured out that the restrooms are</p>

326	<p>1 back that way. There's hot water to make coffee or tea 2 on the table back there. 3 If you have a question and we're not on a 4 break, please approach John Baca. 5 John, wave your hand, please. 6 He's the hearing clerk for the department. 7 And we'll figure -- we'll figure it out. 8 When we broke yesterday, we were in the middle 9 of the presentation by New Mexico Copper Corporation. 10 So we'll continue with that this morning. 11 And just a reminder that at 5 o'clock we will 12 stop with the technical case and open public comment and 13 take that until there's no more to be given tonight. 14 There will be other opportunities for public 15 comment, as well, and there will not be a dinner break. 16 When we break after public comment, that will be our 17 break for the evening. 18 Are there any questions or preliminary matters 19 before we return to the technical witnesses? 20 No? 21 All right. Thank you. 22 Mr. Butzier. 23 MR. BUTZIER: Thank you, Madam Hearing 24 Officer. 25 New Mexico Copper would like to call Mr. David</p>	328	<p>1 we've done that's included in the DP. 2 I also want to tie this to the work that we're 3 doing with the State Engineer's Office Dam Safety 4 Bureau. 5 Also, there was some common threads in some of 6 the comments that we reviewed. I'm going to provide 7 some responses to that. 8 And provide summary conclusions. 9 Q. Thank you. 10 And would you go ahead and describe your 11 expertise and background. 12 A. Yes. So my role on this project has been as a 13 project director, lead engineer of record on the design. 14 I've got -- my educational background, I've 15 got a bachelor's degree and a master's degree in civil 16 engineering, master's degree with an emphasis in 17 geotechnical engineering from the University of Arizona. 18 My relevant experience, in the early '80s, I 19 was in the engineering department at Amax Coal Company 20 in Illinois. I went through an MSHA training program to 21 inspect tailing storage facilities, and we would perform 22 weekly inspections of the tailing storage facility we 23 had at that particular mine. 24 After that, I went to grad school and -- and 25 got a -- and have been doing tailing storage facility</p>
327	<p>1 Kidd as its third witness -- fourth witness. 2 DAVID KIDD 3 having been first duly sworn or affirmed, was 4 examined and testified as follows: 5 DIRECT EXAMINATION 6 BY MR. BUTZIER: 7 Q. Would you please identify yourself for the 8 record. 9 A. My name is David Kidd. 10 Q. And who are you with? 11 A. I am with Golder Associates in our Tucson, 12 Arizona office. 13 Q. And what will you be talking about today? 14 A. What I'd like to go over -- 15 Can we move the slide forward there. 16 There we go. 17 So I'd like to talk about my -- my background 18 and experience as it's related to this project and other 19 projects. 20 I want to give an overview of the -- kind of 21 the basics of tailing storage facilities. 22 I'd like to talk about the Copper Rule and how 23 it -- how it interacts with the tailing storage design. 24 I also want to present an overview of the 25 feasibility design, tailing storage facility design that</p>	329	<p>1 design, mine waste design, similar types of things 2 continuously for the last 30 years. 3 Over those 30 years, I've worked on 4 approximately 30 tailing storage facility designs. 5 I'm a registered engineer in New Mexico. 6 I'm also the engineer of record at the Questa 7 Mine for the tailing storage facility. I've been doing 8 that continuously since 2003. 9 I've also worked on tailing mine waste dumps, 10 things like that at Chino and Tyrone. I'm familiar 11 with -- got a lot of experience working in New Mexico. 12 Q. And does your expertise include tailings 13 design construction as well as operation? 14 A. It does. 15 Q. And how about cover design? 16 A. I have done some of that. Yes. 17 Q. Okay. 18 But you consider yourself an expert on the dam 19 safety requirements of the Office of the State Engineer? 20 A. I do. 21 MR. BUTZIER: Okay. Madam Hearing Officer, at 22 this time, I'd like to offer him as an expert in 23 tailings design, construction and operation as well as 24 cover design and also for his expertise in dam safety 25 issues.</p>



<p style="text-align: right;">330</p> <p>1 MS. ORTH: All right.  2 Objections?  3 MR. DE SAILLAN: No objections.  4 MS. ORTH: No?  5 All right. Thank you.  6 He is so recognized, and that's not the first  7 time I'm saying that about Mr. Kidd.  8 Q. (BY MR. BUTZIER) Mr. Kidd, you mentioned in  9 some of your preliminary remarks the feasibility design  10 document that was included as part of the Discharge  11 Permit application; is that correct?  12 A. That's correct.  13 Q. And I'm going to hand you a document and ask  14 you to please identify it.  15 A. This is the design report that we produced as  16 part of the Feasibility Level Design for the tailing  17 storage facility.  18 Q. And is that part of what appears on the index  19 to the administrative record under item number 321,  20 which is generally described as Discharge Permit  21 Application (DPA) for the Copper Flat Mine DP-1 (Revised  22 August 2017) with attached application forms?  23 A. It is.  24 Q. And is that appendix essentially Appendix A to  25 that discharge plan -- permit application?</p>	<p style="text-align: right;">332</p> <p>1 Q. There's also as a separate process  2 administered by the Dam Safety Bureau of the Office of  3 the State Engineer -- a separate permitting process to  4 get dam safety requirements approved, correct?  5 A. That is correct. Yes.  6 Q. Okay.  7 And would you -- with that as background,  8 would you please proceed with your presentation,  9 including giving us a little bit of a background just in  10 general on tailings facilities, and then proceed from  11 there.  12 A. Okay. I will.  13 So kind of apologize in advance for the low  14 level here on this. This is starting at the basics.  15 So tailing by definition --  16 And, Joe, sorry, it's got an S on it.  17 It's finely crushed and ground rock residue  18 and associated fluids discharged from the -- from the  19 milling and concentration process associated with  20 mining.  21 So the tailing storage facility is the  22 engineered structure and -- and associated facility  23 structures that -- that provide permanent storage for  24 those tailing materials.  25 One of the important parts -- or one of the</p>
<p style="text-align: right;">331</p> <p>1 A. It is.  2 Q. And could you briefly just -- just for the  3 benefit of the audience describe what's -- what that  4 consists of.  5 A. So -- so Jeff had spoken about -- Mr. Smith  6 had spoken about the feasibility study that was done in  7 2013, and as part of that feasibility study, we  8 produced -- well, the tailing storage facility is an  9 important part of that so we produced this work which  10 covers the -- the concepts -- the vet -- I would say the  11 vetted concepts, the engineered concepts of our plan to  12 store tailings for the New Mexico Copper Corp. project.  13 Q. And is a significant part of that document an  14 intention to comply with the -- with the Copper Rules?  15 A. It is. The Copper Rule wasn't in effect  16 officially at that time, but we knew it would be so we  17 were designing with the environmental controls that we  18 had anticipated at the time, and it -- and it does  19 comply with the Copper Rule, where also the intent was  20 to be in compliance with the State Engineer's program,  21 too.  22 Q. And just to be clear about that, there are  23 certain requirements within the Copper Rule that  24 specifically relate to tailings impoundments, correct?  25 A. That is correct.</p>	<p style="text-align: right;">333</p> <p>1 important considerations for tailing storage design is  2 that there's not a one-size-fits-all, you know, approach  3 to this stuff. Every design is site-specific, it's  4 material-specific, it's regulatory-specific. So we've  5 taken those factors and incorporated it into this --  6 into this design.  7 A few more basics. There's basically some  8 common types of tailing storage facilities,  9 configurations.  10 One of the -- I would say one of the more  11 common ones is a -- and it's really defined by the  12 topography at the site, the geologic conditions  13 underneath the site, these sorts of things. But a cross  14 valley configuration is commonly a very efficient  15 tailing storage design where you've got a small  16 embankment volume that can contain a large volume of  17 tailings.  18 Our site doesn't have this type of canyon type  19 topography. So we are looking at a side hill design  20 where we're on basically a topography that's -- it's  21 basically a nice mesa type configuration, using the term  22 loosely, but it's pretty well protected by ridges and  23 drainages, and this side hill facility sits on top of  24 that.  25 The other configuration is a ring dyke, and</p>

<p style="text-align: right;">334</p> <p>1 that's typically used in very flat terrain.  2 Next.  3 Again the basics you'll typically -- we'll  4 work with various consistencies of tailings.  5 Slurry is the most common, where you've got 30  6 to 50 weight percent solids in -- in the water stream  7 that is -- that is going out to the -- to the tailing  8 impoundment.  9 Thickened tailing is where they'll use  10 thickeners or mechanical devices to reduce the amount of  11 water in the tailing stream, increase the amount of  12 weight percent solids. You can even get the thickened  13 tailing to the -- to the extent that it -- toothpaste is  14 probably an extreme analogy, but something like a wetter  15 paste that exhibits resistance to flow or has yield  16 strength, sheer strength.  17 Filtered tailing is where they use filter  18 presses, vacuum equipment, that sort of stuff to produce  19 a filtered cake that's typically 80 or plus weight  20 percent solids. And that behaves really just basically  21 like a moist sand that you might buy at a materials  22 yard.  23 So another important part is the -- the  24 tailing embankments, unlike water dams, which are  25 typically the dam is built and then the water level</p>	<p style="text-align: right;">336</p> <p>1 So this slide talks about the next -- this and  2 the next slide really talk about tailing storage and how  3 the copper -- how the Copper Rule applies to tailing  4 storage.  5 So in the rules, they -- they state the -- you  6 know, the practice of engineering. All plans, designs,  7 drawings, reports, specifications require that it -- the  8 work be done under the guidance of a licensed  9 professional engineer in the State of New Mexico.  10 Design plans, specifications and quality  11 control/quality assurance must be submitted, all signed  12 and sealed by the professional engineer.  13 They also state that -- that the -- that the  14 Dam Safety Bureau -- the New Mexico Office of the State  15 Engineer Dam Safety Bureau must submit all the  16 documentation of compliance with that program back to  17 the Environmental Department for -- for approval with  18 the Copper Rule.  19 Q. And, Mr. Kidd, just to be clear, the  20 requirement is for the applicant to submit that  21 documentation of compliance with Dam Safety Bureau  22 requirements; is that correct?  23 A. That is correct.  24 Q. Thank you.  25 A. So in general terms, I would say that the</p>
<p style="text-align: right;">335</p> <p>1 behind the dam fluctuates. So tailing impoundments are  2 typically built with a starter facility, and then  3 everything is raised throughout the life -- throughout  4 the operational life of the facility, both the  5 embankment and the impounding material behind it.  6 And there's some choices to make as to how you  7 configure those embankments, downstream, centerline or  8 upstream.  9 Here's kind of a schematic of that.  10 Downstream, and you've got your storage  11 facility, you keep building the embankment and -- and  12 down away from the tailing material that's stored.  13 Centerline is where you've got your storage  14 facility built, you start building filling tailing, and  15 then you raise basically in a vertical and a bit of a  16 downstream type configuration. And that is what's  17 proposed here at New Mexico Copper Corp. That's what  18 we've got in the feasibility design.  19 And then upstream type construction, where  20 you're actually using competent tailing material to  21 build your embankment on as you go up.  22 All of these are viable, upstream probably  23 less so. It's not good in seismic conditions. It's not  24 good if you've got high rates of rise, that sort of  25 stuff. So we're not doing that here.</p>	<p style="text-align: right;">337</p> <p>1 Copper Rule really applies to the -- the environmental  2 controls that you're -- you're providing with your  3 tailing storage dam design, the release to groundwater,  4 potential release to groundwater, or surface waters.  5 And the Dam Safety Bureau is really the structural  6 component of dam safety, the -- the structural  7 components of the dam.  8 So, you know, I've worked with the Dam Safety  9 Bureau for a number of years, you know, and I must say  10 they run a very good, rigorous program. They're -- it's  11 one of the better ones here in the state that I've been  12 associated with, as I work in other jurisdictions.  13 The Copper Rule, you know, has an area where  14 they talk about, you know, new tailing storage units.  15 New tailing impoundment units are -- and it's  16 stated that the stormwater run-on must be diverted, and  17 our design does that.  18 As I mentioned earlier, this facility is  19 located in a higher area, and it's protected --  20 naturally protected by some arroyos and drainages, but,  21 you know, we've assessed those for run-on controls.  22 They also mandate that seepage from the sides  23 of the TSF shall be captured and contained by headwalls.  24 Groundwater impacted by the TSF in excess of  25 applicable standards shall be captured and contained.</p>

<p style="text-align: right;">338</p> <p>1 The applicant shall submit design plans signed and 2 sealed by the New Mexico PE along with the design 3 report. 4 It also says the department may require 5 additional controls. 6 Okay. 7 So in our feasibility design, we've 8 incorporated a geomembrane liner into this, underneath 9 the entire facility, that -- that I feel complies with 10 the additional controls requirement. 11 Q. And, Mr. Kidd, I'm going to hand you a copy of 12 something we've marked as New Mexico Copper 13 Corporation's Exhibit 105. 14 And can you describe what that is, please? 15 A. Yeah. This is 80-mil thick HDPE geomembrane. 16 This happens to be textured geomembrane, which we're not 17 planning on using under the entirety of the footprint. 18 We may include it some places. But it just adds a 19 little bit of additional friction. And if you need it, 20 you know, we can -- we can incorporate that in the 21 design. 22 The more common would be smooth HDPE 23 geomembrane. 24 Q. Thank you. 25 Please proceed.</p>	<p style="text-align: right;">340</p> <p>1 thick HDPE geomembrane and then a granular drainage 2 network over the top of that, supplemented with 3 perforated pipes to reduce the hydraulic head on the -- 4 on the liner system. 5 On the geomembrane liner, we -- and drainage 6 system, we'll build an earthen starter dam to elevation 7 5,250. That's prior to tailing deposition. That 8 starter dam is -- will have a 2-and-a-half-to-1 inboard 9 slope, 2-to-1 outboard slope. 10 So once tailing filling begins, we're going to 11 use cyclones to -- to segregate the sand fraction from 12 the finer fraction. So you got -- you got sand 13 underflow that is deposited on the centerline of the dam 14 and on the outslope to bring that up. It will also be 15 compacted as it's coming up. And then the cyclone 16 overflow goes into the impoundment. And the upward 17 slope of the sand embankment will be 3-to-1. 18 Again, whole tailing can -- if there's a time 19 we don't need to run the cyclone stations, the whole 20 tailing can go inboard and be deposited inside the 21 embankment, inside the impoundment, as well. 22 Our feasibility design, this gets into the Dam 23 Safety Bureau characterization classification. We've 24 gone forward with the significant hazard potential 25 classification. It was -- it was what the previous</p>
<p style="text-align: right;">339</p> <p>1 A. And it's used everywhere throughout the mining 2 industry. 3 Q. Go ahead and please proceed with your 4 presentation. 5 A. So, you know, we feel our Feasibility Level 6 Design is -- is well in compliance with the -- with the 7 Copper Rule. Okay? 8 Yeah. So the basis of our Feasibility Level 9 Design is we provided storage for 112 million tons of 10 tailing. 11 The nominal input, daily input to the TSF is 12 30,000 tons a day. 13 Stormwater potential run-on is diverted around 14 the facility. 15 We have characterized the site with 82 -- the 16 geotechnical characterization, 82 test pits and 75 17 boreholes between what Golder's done and what Sergent 18 Hauskins &amp; Beckwith did for the earlier design. And 19 that's in addition to the -- also all the well 20 information that -- that Shomaker has already talked 21 about. All of that is applicable to the site 22 characterization of this -- this TSF. 23 The liner system that we've got proposed as an 24 interceptor system is a prepared subgrade, 12-inch thick 25 layer of liner bedding material, and then this 80-mil</p>	<p style="text-align: right;">341</p> <p>1 design was, and, you know, we've done some field 2 checking on that. 3 We've also -- our design incorporates 4 freeboard for wave run-up for the water that's on top of 5 the facility to supernate the water pool, and we've also 6 provided containment for the 72-hour probable maximum 7 precipitation event, which is 26 inches of rain in 72 8 hours. That's a lot. 9 We've also incorporated water reclamation from 10 the facility so the supernatant pool that's on top of 11 the tailing storage facility will be pumped off there 12 and returned to the mill for reuse. 13 And then the underdrain system will drain 14 into -- drain via gravity into a double geomembrane pond 15 located down at the toe of the embankment, and that will 16 be pumped back to the mill for reuse, as well. 17 Q. And -- okay. Go ahead. Sorry. 18 A. Okay. 19 So in our Feasibility Level Design, we've -- 20 we've performed slope stability calculations, and those 21 meet or exceed the specified factor of safety values 22 that are prescribed by the State Engineer's Office. 23 We've performed residual shear strength 24 analyses in our stability models to -- to predict that 25 even post liquefaction, if that were to happen, you</p>

<p style="text-align: right;">342</p> <p>1 know, or we've got saturation conditions, that we've 2 still got a stable embankment.</p> <p>3 We've also performed sensitivity values on 4 the -- under seismic loading conditions on the liner 5 interface, which can -- is typically one of the weaker 6 interface systems that you've got in this whole design 7 system. And so we performed sensitivity values as to 8 what it would take to maintain a stable embankment, and 9 we were well within acceptable or common values for 10 that.</p> <p>11 Q. Okay, Mr. Kidd. Now I'd like you to -- even 12 though you've testified that the OSE process is a 13 separate process from the Discharge Permit process 14 administered by NMED, just for the benefit of the 15 audience and the Hearing Officer, I would like you to go 16 ahead and briefly walk through what the process is over 17 at the State Engineer for dam safety.</p> <p>18 A. Okay. As I've said earlier, New Mexico Office 19 of State Engineer Dam Safety Bureau runs a very rigorous 20 program. They -- so in the State of New Mexico, any dam 21 that is 25 feet or higher measured from the downstream 22 toe and impounds 15 acre-feet of fluid, water, tailing, 23 is considered a jurisdictional dam.</p> <p>24 Also, if it's six feet or higher, again 25 measured from the downstream toe, and impounds fifty</p>	<p style="text-align: right;">344</p> <p>1 and low economic or environmental losses. Principally, 2 you know, the theoretical failure, theoretical dam 3 breach would be contained within the owner's property.</p> <p>4 A significant hazard potential classification, 5 so failure or misoperation results in no probable loss 6 of human life, but can cause economic loss, 7 environmental damage, disruption of lifeline facilities 8 or can impact other concerns. So these are often 9 located in rural or agricultural areas, but not in 10 really populated areas with significant infrastructure. 11 And this is what our Feasibility Level Design is based 12 on.</p> <p>13 High hazard potential classification is that 14 failure or misoperation will probably cause loss of 15 human life.</p> <p>16 And again, these things are important 17 classifications because then further design components 18 are based on -- on this.</p> <p>19 Dam safety also has minimum factor of safety 20 values. I touched on this earlier. So they define 1.5 21 for steady-state long-term stability. Our feasibility 22 design conforms to that.</p> <p>23 They also say 1.5 factor of safety for 24 operational drawdown conditions. That's basically for 25 when water is impounded at the dam. It applies more to</p>
<p style="text-align: right;">343</p> <p>1 acre-feet of water, mobile fluid, tailing, whatever, 2 those are dams regulated by the Dam Safety Bureau group 3 in the Office of the State Engineer.</p> <p>4 They have a dam size classification. This 5 is -- is common throughout, you know, most every 6 jurisdiction. And they say that a small dam -- they 7 state that a small dam is 25 to 40 foot high, also 8 impounds 50 to 5,000 -- or 1,000 acre-feet of fluid; a 9 medium size dam 40 to 100 foot embankment height, 10 impounds between 1,000 and 50,000 acre-feet; a large dam 11 100 foot embankment height and greater than 50,000 feet 12 of storage.</p> <p>13 So at New Mexico Copper Corp., when we build a 14 starter dam, we're going to be in the medium 15 classification, but we're going to quickly advance to 16 the -- to the large classification, and -- but all of 17 our design basis for this is based on the large 18 category.</p> <p>19 It -- this is important because it kind of 20 governs other design factors as you go through, mostly 21 structural, not environmental.</p> <p>22 Also an important consideration is a hazard 23 potential classification.</p> <p>24 So -- so a low hazard potential is failure or 25 misoperation results in no probable loss of life or --</p>	<p style="text-align: right;">345</p> <p>1 a water dam than a tailing storage dam. So during 2 normal operations as water is added or withdrawn, you 3 have to maintain a 1.5 factor of safety.</p> <p>4 And then in unusual conditions where you might 5 have rapid draindown of water conditions, you have to 6 maintain a 1.3 factor of safety. Again that's more for 7 a water storage dam than a tailing storage facility.</p> <p>8 1.3 for end of construction, while maybe some 9 small corporation still exists in your construction 10 zones.</p> <p>11 If you have a high or significant hazard 12 potential -- hazard potential classification, you've got 13 to consider seismic design, and you have to perform 14 seismological investigation to determine the appropriate 15 seismic parameters to use in your design.</p> <p>16 We've done that at a -- at a feasibility level 17 for this, and we will advance that going -- going 18 forward. We've been able to work with USGS database to 19 get seismic response characteristics for this particular 20 site.</p> <p>21 So again the Dam Safety Bureau mandates the 22 seismic design of the embankment for an operating basis 23 earthquake. I don't want to get in the details too much 24 of this. It'll put you all to sleep.</p> <p>25 But, you know, our design is -- is meant to</p>

<p style="text-align: right;">346</p> <p>1 operate for 12 years. That's the operating period, but  2 the State Engineer says you have to design for a  3 100-year period for that.</p> <p>4 And they also state a 50 percent probability  5 of exceedance during that service life. But because  6 we're operating -- or because we've got a significant  7 hazard design classification, we're in -- we're  8 designing to the 2,500-year return period for that  9 seismic event. High hazard dams in the State of New  10 Mexico have to be designed to the 5,000-year return  11 period.</p> <p>12 Again, these are things related to the  13 structural integrity of the facility, not really the  14 environmental considerations of the facility.</p> <p>15 The State Engineer also prescribes dam  16 geometry.</p> <p>17 They define minimum crest widths, or at least  18 a kind of rule of thumb for crest width. We're in  19 excess of that in our design because we've got to have  20 pipelines and things like that and truck traffic on top  21 of our dam. So our crest width is -- it complies with  22 this. It's in excess of that.</p> <p>23 They also state that the longitudinal profile  24 of the embankment must include camber to accommodate  25 future settlement of the facility, and the most</p>	<p style="text-align: right;">348</p> <p>1 State Engineer also mandates that the design  2 must include an Instrumentation Plan, an Operation and  3 Maintenance Manual and Emergency Action Plan. The  4 instrumentation is typically piezometers in the  5 embankment, survey monuments. You can have  6 inclinometers. There's a number of things that are --  7 that are incorporated in an Instrumentation Plan.</p> <p>8 The Operation and Maintenance Manual defines  9 how often those are measured, what -- what happens. So  10 there's alert levels associated with piezometric  11 conditions in the dam. You're looking for normal  12 operating conditions, but if -- if something -- if you  13 get an elevated piezometric condition, water pressure  14 condition, it's a sign that something wrong may be going  15 on.</p> <p>16 So it's continuously monitored for this type  17 of facility -- or, you know, this type of potential  18 failure.</p> <p>19 And then if these things -- so if some of  20 these alert levels are triggered, you've also got an  21 Emergency Action Plan in place that defines the  22 notification process to basically the regulatory  23 officials, the public.</p> <p>24 And, you know, for example, up at Questa,  25 there's 10 parties that have this control document, the</p>
<p style="text-align: right;">347</p> <p>1 settlement typically occurs where the section is the  2 thickest.</p> <p>3 And again this is more applicable to a water  4 dam where the dam is built once and basically just the  5 water goes up and down behind it, but a tailing dam  6 you're continuously building, and so that settlement is  7 compensated, you know, during construction as you're --  8 as you're continuing to add material to the embankment.</p> <p>9 They also prescribe freeboard.</p> <p>10 You know, they state that wave run-up from a  11 100-mile-an-hour wind with a reservoir -- with the water  12 reservoir at the spillway will not overtop the dam.  13 They've -- you know, they've got other criteria along  14 these lines, too.</p> <p>15 We don't have a spillway in our operating  16 tailing dam. So we provide all the -- basically the  17 flood storage within the freeboard or within the  18 operating design pool -- or the contingency design pool  19 on top of the facility. In a tailing impoundment, it's  20 not common to incorporate a spillway, again because it's  21 always going up.</p> <p>22 So we approached that by providing storage for  23 that -- for that storm event. And again we do have --  24 we do have storage for -- for that in our -- in our  25 design.</p>	<p style="text-align: right;">349</p> <p>1 Emergency Action Plan, and we run desktop, you know,  2 simulations once every couple of years where, you know,  3 you simulate an emergency and you run through the  4 protocol on this.</p> <p>5 So again, you know, I will say the Dam Safety  6 Bureau does a really good job here in New Mexico on  7 this -- on this type of stuff.</p> <p>8 So this -- you know, I talked about it in  9 these slides, but again, they've also got a checklist of  10 all the stuff that has to be provided with the design  11 submittal. You know, we've got our feasibility design,  12 but we're also going to be going for the construction  13 permit -- or the permitting construction level design  14 process with these guys. We are in it now.</p> <p>15 They require a dam application form, detailed  16 cost estimate, filing and plan review fees, water rights  17 for the -- or what falls on the -- basically the  18 catchment.</p> <p>19 Again we'll have an engineering design report  20 similar to this, but that will contain more detail for  21 the hazard potential classification and the engineering  22 analysis that support that.</p> <p>23 All the hydraulic analysis from, you know, the  24 precipitation that runs on the upgrading catchments, the  25 diversion facilities.</p>

<p style="text-align: right;">350</p> <p>1 Spillway design for -- for closure of this  2 impoundment, a spillway will be incorporated to get the  3 water that falls on the top surface off the -- off the  4 top and down the side slope.  5 Outlet works design, we've got an outlet works  6 on this facility for startup.  7 The engineering design report is going to  8 include a detailed geological assessment, geotechnical  9 investigation, seepage analysis, stability analysis,  10 seismic analysis, you know, details of the dam geometry,  11 erosion protection, structural design, utility.  12 We've also got to produce construction  13 drawings. They're prescriptive about what that -- what  14 those contained and/or will contain.  15 You know, we have to have a title sheet, have  16 to have an area map. We've got to have -- the  17 topography has got to be in a prescribed datum. We've  18 got to produce dam plans and profile sheets,  19 cross-sections of basically everything.  20 And we also have to describe the -- and show a  21 detail for the permanent benchmarks that are around the  22 facility and which tie to the survey measurements on the  23 dam itself.  24 We have to prepare a technical specifications.  25 We have to have a plat of survey that's</p>	<p style="text-align: right;">352</p> <p>1 off they go. But now through the program that the State  2 Engineer here mandates -- and it's fairly common --  3 there has to be continuity between the design engineers  4 and the operators.  5 And that's really where this Operation and  6 Maintenance Manual kind of at least describes all that  7 stuff. You know, if we were to just give that to an  8 operator, he'd just glaze over. But this is detailed on  9 what to do if the water pool level gets high, how to  10 operate the cyclone stations, all this sort of stuff.  11 Maintenance requirements, State Engineer  12 mandates vegetation control and these sorts of things.  13 So this is where all this information is contained.  14 An Emergency Action Plan has to be developed.  15 So we will be doing a theoretical dam breach  16 analysis, and from that dam breach we'll have, you know,  17 flood routing downstream of how far it goes, what the --  18 what the wave will look like, how far it extends. And  19 again, the emergency protocol is followed that if this  20 needs to get implemented, what happens.  21 So that's --  22 Q. So, Mr. Kidd, thank you for that presentation.  23 In your professional opinion, does the  24 feasibility design document that I put in front of you  25 today, that is included as part of the Discharge Permit</p>
<p style="text-align: right;">351</p> <p>1 stamped by a professional land surveyor in State of New  2 Mexico.  3 We have to have a Dam Site Security Plan so  4 basically the public can't get to this particular dam.  5 This area will all be fenced and contained within these  6 guys' property.  7 I talked earlier about the Instrumentation  8 Plan. It's -- it's a comprehensive document of all the  9 monitoring equipment that's installed in and on the dam.  10 You know, we talk about the -- we have to have  11 logs of the installations.  12 So with the instruments typically come with  13 calibration type certificates, we have to keep --  14 maintain a record of those.  15 And then we also describe the -- the  16 reading -- instrument reading schedule and the data  17 interpretation on that.  18 The Operation and Maintenance Manual is  19 basically again -- describes the instrumentation, the  20 monitoring, and also talks about the operating  21 instructions. So -- and it -- what it really does, it  22 ties the design engineer to the operators of the  23 facility. It's a very important step.  24 And I would say years ago that didn't happen  25 very much. A lot of times they just get a design and</p>	<p style="text-align: right;">353</p> <p>1 application, comply with the requirements of the Copper  2 Rule and associated groundwater discharge regulations?  3 A. Yes.  4 Q. And are you aware that a proposed provision of  5 DP-1840 as submitted by the New Mexico Environment  6 Department with its statement of intent to present  7 technical testimony includes as a condition that New  8 Mexico Copper will provide documentation of compliance  9 with the dam safety requirements that you've just  10 outlined?  11 A. Yes.  12 Q. And that is the -- that is the requirement --  13 a requirement of the Copper Rule, is it not?  14 A. It is.  15 Q. Okay.  16 A. So we have to go through that process  17 described to feed back to this.  18 Q. Pursuant to a condition that's been proposed  19 for DP-1840.  20 A. Yes.  21 MR. BUTZIER: Thank you.  22 That's all we have, Madam Hearing Officer.  23 MS. ORTH: Thank you, Mr. Butzier.  24 Mr. Knight, do you have questions of Mr. Kidd?  25 MR. KNIGHT: Madam Hearing Officer, I have no</p>

354	<p>1 questions for this witness.</p> <p>2 MS. ORTH: Thank you.</p> <p>3 Mr. de Saillan.</p> <p>4 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>5 Officer.</p> <p>6 I just have a few questions.</p> <p>7 CROSS EXAMINATION</p> <p>8 BY MR. DE SAILLAN:</p> <p>9 Q. Early on you stated that the mine is quickly</p> <p>10 going to go from a medium classification to a large</p> <p>11 classification.</p> <p>12 Do you remember that testimony?</p> <p>13 A. Yes.</p> <p>14 Q. When you say quickly, how quickly is that</p> <p>15 going to occur?</p> <p>16 A. We've got filling curves in the report. I</p> <p>17 would say a couple of years. So --</p> <p>18 Q. Okay.</p> <p>19 And then you also stated that the -- the plan</p> <p>20 provided that any spills would be contained within the</p> <p>21 owner's property.</p> <p>22 Do you recall that testimony?</p> <p>23 A. That any spills. I don't think I said exactly</p> <p>24 that.</p> <p>25 Q. Okay. I may have gotten it a little bit</p>	356	<p>1 How does that -- how does that integrate with</p> <p>2 the Contingency Plan that's in the proposed Discharge</p> <p>3 Permit, if at all?</p> <p>4 A. I have not looked at that Contingency Plan</p> <p>5 that's in that particular -- that document.</p> <p>6 Q. Okay.</p> <p>7 The Emergency Action Plan, does it address the</p> <p>8 possibility of contamination of surface water or</p> <p>9 groundwater?</p> <p>10 A. It doesn't respond to -- it doesn't go through</p> <p>11 like a cleanup process. It's more about interacting</p> <p>12 with the public and public safety.</p> <p>13 Q. Okay.</p> <p>14 Are there any aspects of it that deal with</p> <p>15 preventing groundwater or surface water contamination?</p> <p>16 And I realize it's an emergency plan, but preventing</p> <p>17 groundwater or surface water contamination in the</p> <p>18 short-term?</p> <p>19 A. Not in the Emergency Action Plan.</p> <p>20 Q. Okay.</p> <p>21 Okay. You used the tailing storage facility</p> <p>22 report, the Golder report as a basis for your testimony;</p> <p>23 is that correct?</p> <p>24 A. Yes.</p> <p>25 Q. And what is the -- what level of design</p>
355	<p>1 wrong.</p> <p>2 Do you recognize --</p> <p>3 MS. ORTH: I'm sorry, Mr. de Saillan, to</p> <p>4 interrupt.</p> <p>5 We need you to speak into a microphone so the</p> <p>6 people in the back can hear you.</p> <p>7 It's right behind your laptop.</p> <p>8 MR. DE SAILLAN: Sure. Sorry.</p> <p>9 MS. ORTH: Also, I might be able to refresh</p> <p>10 Mr. Kidd's memory.</p> <p>11 It was when you were talking about hazard</p> <p>12 classification, and you mentioned it was one hazard</p> <p>13 classification if it would all be contained.</p> <p>14 MR. KIDD: Right. And that's the low hazard</p> <p>15 classification.</p> <p>16 MR. DE SAILLAN: Right. Okay.</p> <p>17 Q. Okay. So the -- your testimony is that</p> <p>18 doesn't apply here.</p> <p>19 A. We are using -- right. Yeah.</p> <p>20 Q. Okay.</p> <p>21 A. We are not following --</p> <p>22 Q. Okay. I missed --</p> <p>23 (Simultaneous discussion.)</p> <p>24 Q. I'm sorry. I misunderstood.</p> <p>25 You also referred to an Emergency Action Plan.</p>	357	<p>1 completion does this report represent?</p> <p>2 A. It's -- so feasibility design, you do enough</p> <p>3 work to be able to develop an accurate cost estimate to,</p> <p>4 say, 15, 20 percent. So I would say we're probably in</p> <p>5 the 40, 50 percent design complete phase.</p> <p>6 Q. Okay.</p> <p>7 And will you be revising the significant</p> <p>8 hazard potential classification, including an inundation</p> <p>9 analysis?</p> <p>10 A. We will be doing a theoretical dam breach</p> <p>11 analysis and flood routing from that using accepted</p> <p>12 practices. So yes. That then is -- determines the</p> <p>13 hazard rating.</p> <p>14 Q. Okay.</p> <p>15 And what do you expect the result might be</p> <p>16 given more residents downstream of the tailing storage</p> <p>17 facility?</p> <p>18 MR. BUTZIER: Madam Hearing Officer, I'd like</p> <p>19 to interpose an objection. That assumes facts not in</p> <p>20 evidence.</p> <p>21 Q. (BY MR. DE SAILLAN) Well, let's assume that</p> <p>22 there are higher -- a higher level of residences in</p> <p>23 the -- in the area downstream of the tailing storage</p> <p>24 facility.</p> <p>25 What would you expect the result might be?</p>

358	<p>1 A. Well, if -- if the analysis shows that there</p> <p>2 are public at risk, then it would be a high hazard</p> <p>3 potential. If potential loss of life could occur, then</p> <p>4 it would be high hazard. If not, it stays significant.</p> <p>5 Q. All right.</p> <p>6 Now, is sensitivity -- sensitivity analysis a</p> <p>7 standard part of engineering design processes?</p> <p>8 A. It -- yes.</p> <p>9 Q. Okay.</p> <p>10 And why wouldn't you recommend designing for</p> <p>11 the maximum credible earthquake for this dam?</p> <p>12 A. I'm following protocol in the State of New</p> <p>13 Mexico. I feel that it's -- you know, we've -- I feel</p> <p>14 it's adequate.</p> <p>15 Q. Okay.</p> <p>16 And what is that protocol?</p> <p>17 A. What I stated earlier.</p> <p>18 Q. So the --</p> <p>19 A. So if it's significant hazard, the 25 --</p> <p>20 approximately a 2,500-year return period. If it's high</p> <p>21 hazard, then 5,000-year return period.</p> <p>22 Q. Okay.</p> <p>23 Now, seepage analysis is required by the</p> <p>24 Office of the State Engineer in New Mexico; is that</p> <p>25 correct?</p>	360
359	<p>1 I have no further questions.</p> <p>2 MS. ORTH: Thank you, Mr. De Saillan.</p> <p>3 Ms. Barncastle.</p> <p>4 MS. BARNCASTLE: Thank you.</p> <p>5 CROSS EXAMINATION</p> <p>6 BY MS. BARNCASTLE:</p> <p>7 Q. Good morning.</p> <p>8 So you have testified that there has been no</p> <p>9 analysis of the impacted area if the dam was breached?</p> <p>10 MR. BUTZIER: Objection, that misstates the</p> <p>11 testimony.</p> <p>12 MS. ORTH: All right. Ask him to --</p> <p>13 Q. (BY MS. BARNCASTLE) What was your testimony</p> <p>14 regarding dam breach analysis?</p> <p>15 A. We have not performed a theoretical dam</p> <p>16 breach. We have -- we've relied on other site</p> <p>17 reconnaissance by others to -- I'm not going to say</p> <p>18 confirm, but to agree that significant hazard was</p> <p>19 appropriate for our -- for this design.</p> <p>20 Q. So what would happen in the event of a dam</p> <p>21 breach?</p> <p>22 A. Well, that's really hard to say. It would</p> <p>23 depend on the magnitude of the breach.</p> <p>24 Q. What did your -- what did you rely on -- you</p> <p>25 were kind of pointing off in this direction, saying you</p>	361
359	<p>1 A. Um-hum.</p> <p>2 Q. And why didn't you include that in your</p> <p>3 tailings storage facility report to the Environment</p> <p>4 Department?</p> <p>5 A. Well, again, we did a Feasibility Level</p> <p>6 Design, and we had a geomembrane liner in there, and at</p> <p>7 that -- so again the intent of that is for -- you know,</p> <p>8 to get enough information in there for -- to develop</p> <p>9 cost estimates. You're doing the work in line with the</p> <p>10 requirements, but you don't do all of it in the</p> <p>11 beginning.</p> <p>12 So we didn't do a seepage analysis because it</p> <p>13 really wasn't going to affect cost. We've got a liner</p> <p>14 in there so we know what that costs. We don't have</p> <p>15 to -- we didn't have to include well fields or whatever,</p> <p>16 you know, where seepage -- higher seepage might impact</p> <p>17 costs.</p> <p>18 So that's just -- that was the reasoning.</p> <p>19 Q. Okay.</p> <p>20 Now, the emergency -- back to the Emergency</p> <p>21 Action Plan, will you use breach analysis to revise</p> <p>22 hazard ranking?</p> <p>23 A. If it needs to be revised, yes, we will do</p> <p>24 one.</p> <p>25 MR. DE SAILLAN: Okay. Thank you, Mr. Kidd.</p>	<p>1 relied on other --</p> <p>2 A. Well, we didn't do a dam breach analysis.</p> <p>3 They walked the downgradient drainage areas and kind of</p> <p>4 the flood routing areas and -- and rendered an opinion</p> <p>5 that there would be no potential loss of life at this</p> <p>6 point.</p> <p>7 Q. What was the opinion as far as where the water</p> <p>8 would run in the event of a dam breach?</p> <p>9 A. Just downgradient. I don't have the specific</p> <p>10 arroyo, if you will. I haven't done the flood routing.</p> <p>11 Q. So will it reach the Grayback Arroyo?</p> <p>12 A. I haven't done it.</p> <p>13 Q. Okay.</p> <p>14 Has the Dam Safety Bureau approved this</p> <p>15 particular design that you're talking about that you've</p> <p>16 preliminarily designed?</p> <p>17 A. No.</p> <p>18 Q. Do you consider it to be a final design that</p> <p>19 you'll submit?</p> <p>20 A. No.</p> <p>21 Q. Will it change through the Dam Safety Bureau's</p> <p>22 process?</p> <p>23 A. It --</p> <p>24 MR. BUTZIER: Objection, calls for</p> <p>25 speculation.</p>



362	<p>1 MS. ORTH: Yeah.</p> <p>2 Can you rephrase that, please?</p> <p>3 Q. (BY MS. BARNCASTLE) Could the design change</p> <p>4 through Dam Safety Bureau's process?</p> <p>5 MR. BUTZIER: Same objection.</p> <p>6 MS. ORTH: No. I think that's okay.</p> <p>7 Can you answer that question, Mr. Kidd?</p> <p>8 MR. KIDD: Well, I don't -- I don't really --</p> <p>9 it could. I don't know if it will. I mean, we've</p> <p>10 really done all this work with the intent of the design</p> <p>11 criteria for the Dam Safety Bureau. We have to -- as I</p> <p>12 described, there's a lot of refinement that has to be</p> <p>13 done.</p> <p>14 Q. (BY MS. BARNCASTLE) And I think</p> <p>15 Mr. de Saillan covered this, but I'm going to ask</p> <p>16 just -- just in case.</p> <p>17 Your classification of the dam is based on the</p> <p>18 previous classification from the '80s; is that correct?</p> <p>19 MR. BUTZIER: Objection. That misstates the</p> <p>20 testimony, as well.</p> <p>21 MS. ORTH: Yeah. I think it does.</p> <p>22 Would you refresh our -- remind us of what you</p> <p>23 said about the study from the '80s.</p> <p>24 MR. KIDD: Well, that's where it was, but</p> <p>25 we've also done some field verification.</p>	364	<p>1 A. Well, there's been surface hydrology work</p> <p>2 done, and -- so we're able to -- the facility has to be</p> <p>3 designed to prevent run-on. So we contain -- so we'll</p> <p>4 divert flood run-offs, potential run-on, and we contain</p> <p>5 what falls on it.</p> <p>6 Q. Is the diversion design the same PMP as the</p> <p>7 dam?</p> <p>8 A. We will run through that analysis and -- and</p> <p>9 see.</p> <p>10 Q. You have not done that yet, though?</p> <p>11 A. Not completely, no. That's again a</p> <p>12 refinement.</p> <p>13 Q. Okay.</p> <p>14 Slide 22 contains a statement that to comply</p> <p>15 with design requirements a water rights letter from OSE</p> <p>16 WRD is due to you.</p> <p>17 What is the OSE Water Rights District Office</p> <p>18 letter that you're expecting?</p> <p>19 A. From -- from -- that's really not my area of</p> <p>20 expertise. This is excerpted from their checklist. But</p> <p>21 as I understand it, water that falls on the facility, I</p> <p>22 mean, needs to -- you know, we need to have water rights</p> <p>23 for that.</p> <p>24 Q. And those would be surface water rights; is</p> <p>25 that correct?</p>
363	<p>1 MS. BARNCASTLE: Okay.</p> <p>2 Q. So your classification was starting basis from</p> <p>3 the '80s, but you've done additional work.</p> <p>4 Is that a fair statement?</p> <p>5 A. Additional work has been done, but not a dam</p> <p>6 breach.</p> <p>7 Q. Sure.</p> <p>8 Has Dam Safety Bureau approved the</p> <p>9 classification of the dam as significant instead of</p> <p>10 high?</p> <p>11 MR. BUTZIER: I'm sorry. Could we repeat</p> <p>12 that? I didn't quite hear it.</p> <p>13 Q. (BY MS. BARNCASTLE) I believe your testimony</p> <p>14 was that the hazard potential classification is</p> <p>15 significant, as far as you're concerned, right?</p> <p>16 A. As far as what we've got in the feasibility</p> <p>17 study.</p> <p>18 Q. Got it.</p> <p>19 Has Dam Safety Bureau agreed with that</p> <p>20 classification yet?</p> <p>21 A. Not yet.</p> <p>22 Q. Okay.</p> <p>23 What provisions do you have in place to ensure</p> <p>24 that run-on does not exceed the capacity of the dam as</p> <p>25 you've designed currently?</p>	365	<p>1 A. That's what I understand.</p> <p>2 Q. And you do not have those water rights yet?</p> <p>3 A. I'm not sure.</p> <p>4 Q. It's okay if you don't know. That's okay.</p> <p>5 Do you know who of your group might know that</p> <p>6 answer?</p> <p>7 A. The owner.</p> <p>8 Q. Someone not you?</p> <p>9 A. Yes.</p> <p>10 Q. Okay.</p> <p>11 All right. Let me look at my checklist.</p> <p>12 Is all of your design information related to</p> <p>13 what you've just testified about the Dam Safety Bureau</p> <p>14 design -- is that in the NMED record somewhere?</p> <p>15 A. Our design report is -- as stated earlier, is,</p> <p>16 yeah, part of the record.</p> <p>17 Q. And that's just a preliminary design. There's</p> <p>18 not additional --</p> <p>19 A. Well, the feasibility design report is in the</p> <p>20 record.</p> <p>21 Q. Okay.</p> <p>22 And there's not additional information outside</p> <p>23 of that at this particular time?</p> <p>24 A. No.</p> <p>25 Q. Just a moment.</p>

366	<p>1 After the NMED permit is issued, could you</p> <p>2 change your Dam Safety Bureau design?</p> <p>3 So let me preface that.</p> <p>4 You have to provide documentation of</p> <p>5 compliance with Dam Safety Bureau as a condition of the</p> <p>6 NMED permit, but could you change your design later from</p> <p>7 what you've provided to NMED?</p> <p>8 MR. BUTZIER: I'll object to that, Madam</p> <p>9 Hearing Officer, as at least in part calling for legal</p> <p>10 analysis and conclusion.</p> <p>11 MS. ORTH: All right.</p> <p>12 Mr. Kidd, are you able -- as an engineer who</p> <p>13 prepares and submits these plans, are you able to</p> <p>14 address Ms. Barncastle's question without a legal</p> <p>15 conclusion?</p> <p>16 MR. KIDD: I -- I talked earlier about</p> <p>17 refinements that, you know, may happen during the -- you</p> <p>18 know, the advanced engineering phases. Change is kind</p> <p>19 of a pretty loose term. Materially change? I don't</p> <p>20 think you can. Again those are words I don't -- that</p> <p>21 have certain meaning to certain people.</p> <p>22 MS. BARNCASTLE: I have no further questions.</p> <p>23 Thank you.</p> <p>24 MS. ORTH: All right. Thank you.</p> <p>25 I think he gave you the best answer he could.</p>	368	<p>1 How -- in what respect would it relate to the</p> <p>2 testimony he gave this morning?</p> <p>3 MR. MIJAL: If there's like that immense</p> <p>4 downpour of rain, it's going to drain somewhere. So</p> <p>5 apparently that's enough information. Wherever it</p> <p>6 drains now, it's going to affect someone else.</p> <p>7 MS. ORTH: Okay. So he did talk about an</p> <p>8 extreme rainfall event as it pertains to dam safety.</p> <p>9 MR. MIJAL: Well, sort of it's overflowing and</p> <p>10 on the contaminants from the tailings going into nature</p> <p>11 rather than going into their -- you know, apparently</p> <p>12 they want to reuse the water. They like welcome a</p> <p>13 monsoon, because we need water.</p> <p>14 MS. ORTH: But then so what is your question</p> <p>15 as it relates to his expertise which was dam safety</p> <p>16 rather than --</p> <p>17 MR. MIJAL: What happens to the water once it</p> <p>18 leaves the dam.</p> <p>19 MS. ORTH: Okay.</p> <p>20 MR. MIJAL: Yeah. That --</p> <p>21 MR. KIDD: Well, it's -- so we're designed not</p> <p>22 to release water from the facility.</p> <p>23 MR. MIJAL: Yeah, from the facility. So --</p> <p>24 MR. KIDD: Rainfall is contained in the</p> <p>25 facility, recycled back to the mill for reuse.</p>
367	<p>1 MS. BARNCASTLE: Yeah.</p> <p>2 MS. ORTH: All right.</p> <p>3 Is there anyone else in the room who has a</p> <p>4 question of Mr. Kidd based on his testimony?</p> <p>5 Sir, if you would come up to a microphone and</p> <p>6 give us your name first.</p> <p>7 MR. MIJAL: Martin Mijal, M-A-R-T-I-N</p> <p>8 M-I-J-A-L.</p> <p>9 EXAMINATION</p> <p>10 BY MR. MIJAL:</p> <p>11 Q. You have testified on this, but there's also</p> <p>12 talk about the rainwater will flow and be recycled and</p> <p>13 the water coming off the tailings will come off.</p> <p>14 Could you give a description of -- you know,</p> <p>15 it's coming off, it's draining and being pumped</p> <p>16 somewhere.</p> <p>17 Where is that somewhere?</p> <p>18 A. So --</p> <p>19 Q. How much does it contain? How much of that</p> <p>20 water is contained?</p> <p>21 MR. BUTZIER: I believe that's beyond the</p> <p>22 scope of his direct testimony and it's been covered by</p> <p>23 other witnesses.</p> <p>24 MS. ORTH: Okay.</p> <p>25 And I'm not sure I understood the question.</p>	369	<p>1 Q. (BY MR. MIJAL) Including the tailing extra</p> <p>2 water gets recycled?</p> <p>3 A. Um-hum.</p> <p>4 Q. And so your testimony doesn't talk about the</p> <p>5 pipes and storage place of where all that water goes?</p> <p>6 A. Not all the -- yeah. Not all the mechanical</p> <p>7 piping systems, no.</p> <p>8 Q. No. Okay. That's not your area. Good.</p> <p>9 Well, thanks.</p> <p>10 MS. ORTH: Thank you, Mr. Mijal.</p> <p>11 Are there other questions?</p> <p>12 Ma'am, come up and give us your name first,</p> <p>13 please.</p> <p>14 MS. BROWNE: I need to -- do I need to give</p> <p>15 you my name?</p> <p>16 MS. ORTH: If you would, please.</p> <p>17 MS. BROWNE: Candace Browne.</p> <p>18 MS. ORTH: Thank you.</p> <p>19 EXAMINATION</p> <p>20 BY MS. BROWNE:</p> <p>21 Q. I understand that the final analysis hasn't</p> <p>22 been made for a possible breach, but it -- I think you</p> <p>23 did say that you and others have walked where you think</p> <p>24 that might happen and you walked --</p> <p>25 A. I didn't personally walk it, but other people</p>

370	<p>1 on our team did.</p> <p>2 Q. Some of you did.</p> <p>3 A. Yes.</p> <p>4 Q. Okay.</p> <p>5 I just wonder if any of those people are here</p> <p>6 and if they might be able to say as they walked down</p> <p>7 from the dam if they also crossed the highway.</p> <p>8 MR. BUTZIER: I'm not sure that's a question,</p> <p>9 Madam Hearing Officer.</p> <p>10 MS. ORTH: All right. It seems to me the</p> <p>11 question is for you, Mr. Butzier.</p> <p>12 Will you be putting on a witness who walked</p> <p>13 the site?</p> <p>14 MR. BUTZIER: We have no intention to do that.</p> <p>15 We can talk about it, but the witness that walked the</p> <p>16 site has already been on and off in this proceeding, and</p> <p>17 we may very well decide to put him on, but that's for</p> <p>18 the team to decide.</p> <p>19 MS. ORTH: All right. You'll discuss it.</p> <p>20 MS. BROWNE: Okay. Then I'll -- I'd like to</p> <p>21 state that a little differently, then.</p> <p>22 Q. If -- if being a high hazard dam involves any</p> <p>23 possibility that people might be hurt, I'm wondering if</p> <p>24 the dam breach happens and if it involves going across</p> <p>25 the highway, they might be considering the fact that</p>	372	<p>1 so they -- it was mentioned that there were no houses</p> <p>2 downgradient, and that that meant that it wouldn't be --</p> <p>3 the people wouldn't be hurt.</p> <p>4 And so I'm just trying to make this statement,</p> <p>5 I'm trying to ask the question that even though there</p> <p>6 aren't houses downgradient, I think the highway is, and</p> <p>7 so I'm -- that's the statement I'm trying to -- that's</p> <p>8 the question I'm trying to ask, if that is a fact, and</p> <p>9 couldn't it involve, then, cars and people in cars.</p> <p>10 Is that --</p> <p>11 MS. ORTH: So I think I understand.</p> <p>12 So, Mr. Kidd, if you understand the question,</p> <p>13 do you know whether the highway is downgradient?</p> <p>14 That would be a fact.</p> <p>15 MR. KIDD: I -- I do.</p> <p>16 MS. ORTH: And then do you know whether in the</p> <p>17 consideration of the hazard ranking the possibility that</p> <p>18 there would be cars on the highway after a breach was</p> <p>19 considered?</p> <p>20 MR. KIDD: It will be in the theoretical dam</p> <p>21 breach analysis and the associated flood routing that we</p> <p>22 will do. It will.</p> <p>23 MS. ORTH: Okay. So you have an answer. It</p> <p>24 will be considered.</p> <p>25 MS. BROWNE: Okay. Thank you.</p>
371	<p>1 there might be cars on the highway, people might get</p> <p>2 hurt.</p> <p>3 And the other thing is it just -- is that --</p> <p>4 MS. ORTH: I'm sorry.</p> <p>5 So, Ms. Browne, unfortunately, this is not the</p> <p>6 time for public comment. I'm happy to take your comment</p> <p>7 later.</p> <p>8 MS. BROWNE: Okay.</p> <p>9 MS. ORTH: So this is the time to pose a</p> <p>10 question to Mr. Kidd based on his testimony. And his</p> <p>11 testimony wasn't that the dam there would be high</p> <p>12 hazard. It was that the dam would be significant</p> <p>13 hazard, which is in between low and high.</p> <p>14 MS. BROWNE: Okay.</p> <p>15 UNIDENTIFIED SPEAKER: Isn't there public</p> <p>16 comment later on today?</p> <p>17 MS. ORTH: There is. I will take public</p> <p>18 comment later.</p> <p>19 So do you have a question of Mr. Kidd based on</p> <p>20 his testimony?</p> <p>21 MS. BROWNE: Maybe I'm not saying it very</p> <p>22 well.</p> <p>23 MS. ORTH: You can try again.</p> <p>24 MS. BROWNE: I don't know how to -- I don't</p> <p>25 know how to make this statement, that it seems like --</p>	373	<p>1 MS. ORTH: All right. Thank you.</p> <p>2 Are there other questions?</p> <p>3 Sir, come up and give us your name first.</p> <p>4 MR. NEWMAN: Hi.</p> <p>5 My name is Lee Newman, and I have a tree farm</p> <p>6 below the new facility in Animas Creek.</p> <p>7 EXAMINATION</p> <p>8 BY MR. NEWMAN:</p> <p>9 Q. I've got a couple of questions about the</p> <p>10 liner.</p> <p>11 An 80-mil liner, it's going to come in -- does</p> <p>12 it come in rolls or sheets?</p> <p>13 A. Um-hum.</p> <p>14 Q. In rolls.</p> <p>15 How many square feet is in a sheet? Must</p> <p>16 be --</p> <p>17 A. Well, it depends on the thickness, because</p> <p>18 they typically are --</p> <p>19 Q. Sure.</p> <p>20 A. -- constrained by weight.</p> <p>21 Q. Right.</p> <p>22 A. So the thinner the liner, the more area you</p> <p>23 receive.</p> <p>24 Q. Well, the 80-mil, what you're talking about</p> <p>25 here.</p>

374	<p>1 A. Okay. It's -- we have a choice of roll width, 2 and you typically like to work with the wider rolls, 3 which are in general terms around 10 meters wide, 4 30 feet, and then the length is 250 feet long, something 5 like that. Every manufacturer does it a little bit 6 differently.</p> <p>7 Q. You must have quite a few seams in a big 8 project like this.</p> <p>9 A. At every -- at every connection, yes.</p> <p>10 Q. How do you seal the seams?</p> <p>11 A. They -- so for a material like this, they use 12 two methods.</p> <p>13 The primary method is what they call a double 14 wedge weld. So they overlap about four inches, and then 15 they run this machine that creates two heat seams with 16 an air channel in between it, and then you can pressure 17 test that air channel to test the integrity of those 18 two -- two seams.</p> <p>19 Q. It sounds -- sounds complicated.</p> <p>20 Will you be testing all of the seams?</p> <p>21 A. Yes.</p> <p>22 Q. All the seams will be tested?</p> <p>23 A. Yes. It's part of the QA/QC procedure.</p> <p>24 Q. I install liners, and I've installed quite a 25 few liners in ponds and water projects in the Southwest.</p>	376	<p>1 MS. ORTH: So, Mr. Newman, we did have 2 testimony yesterday about potential groundwater 3 contamination from a hydrogeologist yesterday.</p> <p>4 Mr. Kidd's testimony really is about the dam and the 5 embankment and how the tailings go in there.</p> <p>6 Q. (BY MR. NEWMAN) Certainly the liner is one of 7 the major components of what you're talking about. 8 Yesterday -- well, how many square feet is this liner 9 going to be?</p> <p>10 A. Well, ultimately the facility is 640-ish 11 acres. So that.</p> <p>12 Q. So 640 times 43,560.</p> <p>13 A. (Nods head.)</p> <p>14 Q. That's a lot of liner.</p> <p>15 Will this liner perform better than a liner 16 that is used in landfills today and per EPA 17 requirements?</p> <p>18 A. It's very similar.</p> <p>19 Q. Don't most of the liners used in landfills 20 today leak? Isn't that a major problem that we're 21 having with landfills?</p> <p>22 MR. BUTZIER: I'll object. This is outside 23 the scope.</p> <p>24 MS. ORTH: Right.</p> <p>25 Mr. Kidd, do you have the experience or</p>
375	<p>1 Our problem has always been seams leaking. Now, the 2 method we described here sounds really, really good, but 3 I can tell you that it's not waterproof to the standards 4 of, say, leaking for a waterproof container or something 5 that would be approved by the Coast Guard.</p> <p>6 MS. ORTH: So is there a question, though, at 7 the end of this?</p> <p>8 MR. NEWMAN: Yes.</p> <p>9 Q. The question is are you planning for leakage 10 on the seams?</p> <p>11 A. If a leak is -- you know, is observed during 12 the QA/QC procedures, those leaks are repaired.</p> <p>13 Q. Won't the -- won't the liner be covered up and 14 during the life of the -- the use of the liner?</p> <p>15 A. Yes.</p> <p>16 Q. Inspection, visual -- will visible inspection 17 be possible, or will the liner be covered?</p> <p>18 A. Not of the covered liner.</p> <p>19 Q. What method are you using to make sure there 20 is no leakage from the liner?</p> <p>21 MR. BUTZIER: Madam Hearing Officer, I think 22 this gets beyond the scope of his direct, and Mr. Newman 23 may not have had the advantage of hearing the testimony 24 that occurred yesterday that went over essentially these 25 topics.</p>	377	<p>1 knowledge to answer that question?</p> <p>2 MR. KIDD: I'm not a landfill practitioner.</p> <p>3 MS. ORTH: I'm sorry. The questions have to 4 relate to his testimony --</p> <p>5 MR. NEWMAN: Sure.</p> <p>6 MS. ORTH: -- and expertise.</p> <p>7 MR. NEWMAN: Sure.</p> <p>8 Q. Well, we have a lot of data on liners and 9 landfills and leakage, and do you know of a -- of a 10 large commercial landfill that doesn't leak?</p> <p>11 MS. ORTH: Again that's outside the area of 12 his expertise.</p> <p>13 MR. NEWMAN: I understand. It's very 14 important that whether the liner leaks. To me, it's a 15 weak point, the liner.</p> <p>16 MS. ORTH: And I would be happy to take your 17 comment later.</p> <p>18 MR. NEWMAN: Thank you.</p> <p>19 MS. ORTH: Okay. Thank you.</p> <p>20 Are there other questions of Mr. Kidd based on 21 his testimony?</p> <p>22 Ms. Brittan.</p> <p>23 MS. BRITTAN: Hi.</p> <p>24 My name is Rhonda Brittan.</p> <p>25</p>

378	<p>1 EXAMINATION</p> <p>2 BY MS. BRITTAN:</p> <p>3 Q. I'm not sure if you can answer this question,</p> <p>4 but -- hello. Oh.</p> <p>5 MS. ORTH: I can hear you.</p> <p>6 MR. KIDD: We hear you.</p> <p>7 Q. (BY MS. BRITTAN) After the whole project is</p> <p>8 done and there's a reclamation thing, what happens to</p> <p>9 the liner? Do you know? Is -- would you --</p> <p>10 MR. BUTZIER: Madam Hearing Officer --</p> <p>11 I'm sorry to interrupt --</p> <p>12 MS. BRITTAN: That's all right.</p> <p>13 MR. BUTZIER: -- you.</p> <p>14 But that's also outside the scope and will be</p> <p>15 covered by our next witness.</p> <p>16 MS. BRITTAN: Okay. Thank you very much.</p> <p>17 MS. ORTH: All right. Thank you for asking,</p> <p>18 Ms. Brittan.</p> <p>19 Other questions of Mr. Kidd based on his</p> <p>20 testimony? His testimony.</p> <p>21 Ms. Browne.</p> <p>22 MS. BROWNE: I just -- okay. I was here for</p> <p>23 part of the day yesterday, but I don't hear very well,</p> <p>24 and I just want to try to understand where we're at.</p> <p>25 Did they cover -- I mean, I was here for a</p>	380	<p>1 Do you see the rough surface?</p> <p>2 MS. BARNCASTLE: Yes.</p> <p>3 MR. KIDD: So this is called a textured</p> <p>4 geomembrane. We may be using smooth.</p> <p>5 MS. BARNCASTLE: Okay.</p> <p>6 MR. KIDD: So that's the only difference.</p> <p>7 MS. BARNCASTLE: Okay.</p> <p>8 MR. BUTZIER: Ms. Barncastle, if it would</p> <p>9 help, there's no need for us to actually move its</p> <p>10 admission. It was mostly just a demonstrative.</p> <p>11 MS. BARNCASTLE: Oh, got you. Okay.</p> <p>12 MS. ORTH: All right.</p> <p>13 Any other questions of Mr. Kidd based on his</p> <p>14 testimony?</p> <p>15 And I'm getting to you.</p> <p>16 Mr. Butzier, do you have any follow-up?</p> <p>17 MR. BUTZIER: I do. Thank you, Madam Hearing</p> <p>18 Officer.</p> <p>19 REDIRECT EXAMINATION</p> <p>20 BY MR. BUTZIER:</p> <p>21 Q. Mr. Kidd, both Mr. de Saillan and</p> <p>22 Ms. Barncastle asked you some hypothetical questions</p> <p>23 relating to the OSE Dam Safety process, and in</p> <p>24 particular what might happen or what might be the</p> <p>25 consequence of OSE after reviewing the dam breach</p>
379	<p>1 part of the way that they monitor the liner and the</p> <p>2 tailings storage facility, but did they talk about the</p> <p>3 liner yesterday? Did I miss that?</p> <p>4 MS. ORTH: Mr. Butzier.</p> <p>5 MR. BUTZIER: I think we should just, Madam</p> <p>6 Hearing Officer, let the record speak for itself. I</p> <p>7 think in short the answer is yes, we did talk about the</p> <p>8 liner yesterday and also monitoring of various aspects</p> <p>9 of the facility.</p> <p>10 MS. BROWNE: Okay. Okay.</p> <p>11 And could I just ask one more question?</p> <p>12 Is there -- never mind.</p> <p>13 MS. ORTH: All right. Thank you, Ms. Browne.</p> <p>14 Are there other questions based on Mr. Kidd's</p> <p>15 testimony?</p> <p>16 MS. BARNCASTLE: I do have one follow-up</p> <p>17 question.</p> <p>18 MS. ORTH: Oh, Ms. Barncastle.</p> <p>19 MS. BARNCASTLE: And it's related -- we may</p> <p>20 not have gotten there yet, but the Exhibit 105, I think</p> <p>21 I understood the testimony to be that that was not</p> <p>22 representative of what would be going in as a liner?</p> <p>23 MR. KIDD: The only -- so it's made out of the</p> <p>24 same material, it's the same thickness. This -- we may</p> <p>25 or may not use textured sheet.</p>	381	<p>1 analysis, deciding that this particular facility should</p> <p>2 be classified as a high hazard facility rather than a</p> <p>3 significant hazard.</p> <p>4 Do you recall that testimony?</p> <p>5 A. Yes.</p> <p>6 Q. My question to you is bringing it back to what</p> <p>7 we're here to talk about today, is the Discharge Permit</p> <p>8 aspect of this.</p> <p>9 My question is, again hypothetically -- since</p> <p>10 you're an expert, you can speak hypothetically -- my</p> <p>11 question to you is if that were to happen, if OSE</p> <p>12 ultimately concluded that it was a high hazard, would</p> <p>13 that fundamentally change anything relating to the --</p> <p>14 the feasibility design work here in so far as it relates</p> <p>15 to the compliance with the Discharge Permit requirements</p> <p>16 under the ground -- under the Copper Rule and the</p> <p>17 groundwater program?</p> <p>18 A. Not in my opinion. I think, you know, the</p> <p>19 liner is really one of the important considerations for</p> <p>20 the Discharge Permit, and that, I mean, will maintain</p> <p>21 it. I mean, yeah, those things don't change as part of</p> <p>22 the OSE process.</p> <p>23 Q. It would still be a large dam.</p> <p>24 A. Yes.</p> <p>25 Q. Correct?</p>

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1 A. Yes.  
 2 Q. It would still cover essentially the same  
 3 footprint --  
 4 A. Yes.  
 5 Q. -- the tailings facility.  
 6 It would still have the same features in terms  
 7 of -- I forget the terminology, but the sides of the  
 8 facility and what might happen with the sides of the  
 9 facility?  
 10 A. Yes.  
 11 Q. There would still be the monitoring that has  
 12 been proposed for the project, correct?  
 13 A. Correct.  
 14 Q. What would change -- am I -- I'll ask you this  
 15 as a question. Would what changes be the level of  
 16 structural design rigger for the dam itself that is  
 17 something that is separate from issues relating to the  
 18 Discharge Permit and groundwater protection?  
 19 A. That is correct. It's primarily a seismic  
 20 design and -- and storm design.  
 21 MR. BUTZIER: Thank you, Madam Hearing  
 22 Officer.  
 23 That's all I have.  
 24 MS. ORTH: All right.  
 25 Is there any reason not to excuse Mr. Kidd?

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1 No?  
 2 Thank you very much, Mr. Kidd.  
 3 Shall we take a break? Until 10:30?  
 4 (Proceedings in recess from 10:22 a.m. to  
 5 10:38 a.m.)  
 6 MS. ORTH: All right. We are back after the  
 7 break.  
 8 Mr. Butzier.  
 9 MR. BUTZIER: Thank you, Madam Hearing  
 10 Officer.  
 11 One housecleaning matter. I neglected to move  
 12 the admission of Mr. Kidd's resume, his PowerPoint  
 13 slides and one additional exhibit. I'd like to do that  
 14 at this time. If you feel that we need to bring him  
 15 back up, I can do that, whatever your preference.  
 16 MS. ORTH: Are there going to be objections?  
 17 Let's see. I don't see Ms. Barncastle.  
 18 Mr. de Saillan or Mr. Knight, will there be  
 19 objections?  
 20 MR. DE SAILLAN: What were the exhibits?  
 21 MR. BUTZIER: His resume, his PowerPoint  
 22 presentation and the rules and regulations governing dam  
 23 design.  
 24 MR. DE SAILLAN: No objections here.  
 25 MS. ORTH: All right.

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1 MR. KNIGHT: No objection.  
 2 MS. ORTH: No objections. All right.  
 3 So they are admitted.  
 4 I will ask Ms. Barncastle at some point, but  
 5 they're admitted.  
 6 MR. BUTZIER: Thank you.  
 7 (Exhibits NMCC 87 through 89 admitted into  
 8 evidence.)  
 9 MR. BUTZIER: New Mexico Copper would like to  
 10 next call Mr. Todd Stein.  
 11 MS. ORTH: Okay.  
 12 You know what, would you tell me the numbers.  
 13 MR. BUTZIER: The numbers are 87, 88 and 89.  
 14 MS. ORTH: Okay. Thank you.  
 15 87 through 89 are admitted.  
 16 Mr. Stein, so we need to swear you in.  
 17 TODD STEIN  
 18 having been first duly sworn or affirmed, was  
 19 examined and testified as follows:  
 20 DIRECT EXAMINATION  
 21 BY MR. BUTZIER:  
 22 Q. Mr. Stein, would you please identify yourself  
 23 for the record.  
 24 A. My name is Todd Stein. I'm a hydrogeologist  
 25 with Golder Associates. I've been with the firm since

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1 2004. I'm a professional geologist, and I'm here to  
 2 present testimony on the Copper Flat Reclamation and  
 3 Closure Plan.  
 4 Q. Thank you.  
 5 Go to the next slide, please.  
 6 I may repeat some of what you just said -- or  
 7 have you repeat some of what you just said, but can you  
 8 in a little bit more detail let us know what it is you  
 9 will be addressing in your testimony today?  
 10 A. So today I'll be addressing the Reclamation  
 11 and Closure Plan for Copper Flat, as I just mentioned.  
 12 The layout of my testimony is I want to first  
 13 present my background and experience.  
 14 And then I want to describe the reclamation  
 15 and closure components for the main facilities of the  
 16 mine, to just kind of lay out what the plan is for the  
 17 entire facility.  
 18 And then go through the proposed reclamation  
 19 schedule at the tail end of my presentation.  
 20 And then go through a summary of my testimony  
 21 at the end.  
 22 Q. And in a bit more detail, could you please  
 23 describe your expertise and background experience that's  
 24 relevant to this?  
 25 A. So my educational background is I have a

386	<p>1 bachelor's degree in geology from New Mexico Tech, and I  2 have a master's in hydrology from New Mexico Tech.  3 I've worked in the environmental consulting  4 field for over 28 years, and I've worked with both  5 private industry, state and federal agencies on various  6 different projects.  7 As I mentioned before, I've been employed with  8 Golder Associates since 2004, and I've worked and been  9 involved in the development of closure/closeout plans in  10 New Mexico since 2007, and I've been actively involved  11 in developing closure/closeout plans in accordance with  12 the Copper Rules since the Copper Rules were  13 implemented.  14 Q. And does --  15 A. Yes.  16 Q. Does your expertise include detailed  17 familiarity with the Copper Rules insofar as they relate  18 to reclamation and closure issues?  19 A. Yes, it does.  20 MR. BUTZIER: Madam Hearing Officer, I'd like  21 to move that he be accepted as an expert in reclamation  22 design and testing and performance as well as Closure  23 Plan design, testing and performance as well as  24 expertise with the Copper Rule insofar as it relates to  25 reclamation and closure issues.</p>	388	<p>1 We've got -- as you've seen in previous  2 testimonies, there's the new waste rock stockpiles.  3 There's three of those, Waste Rock Stockpiles 1, 2 and  4 3.  5 There's a tailings storage facility, which  6 Dave Kidd just presented the Feasibility Level Design  7 on.  8 And then there's the open pit, which was  9 presented -- has been presented.  10 And the plant area.  11 We've got a series of surface impoundments.  12 These are lined surface impoundments within the  13 facility, HDPE lined.  14 And then we've got -- this is kind of a group  15 of facilities that really -- it's hard to put them into  16 one category. These are pipelines, pipeline corridors,  17 electric utility lines and poles, other various features  18 located throughout the mine that we take care of in the  19 Reclamation and Closure Plan.  20 And then, lastly, as part of the development  21 of the mine, initially sought soils growth -- growth  22 media material will be salvaged from the footprints of  23 the tailing storage facility as well as the Waste Rock  24 Stockpiles 2 and 3, prior to their construction.  25 So just general layout. I know you've seen</p>
387	<p>1 MS. ORTH: Objection?  2 MR. DE SAILLAN: No objection.  3 MR. KNIGHT: No objection.  4 MS. ORTH: All right. Thank you.  5 He's so recognized.  6 I'll offer Ms. Barncastle an opportunity to  7 register an objection later if she wants.  8 MR. BUTZIER: Thank you, Madam Hearing  9 Officer.  10 Q. Mr. Stein, would you please go ahead and  11 proceed with your presentation today.  12 A. Yeah. Just finally on my background and  13 experience is I've been involved in the evaluation and  14 development of reclamation cover designs and performance  15 testing since 1997.  16 So just to lay out what I'm going to be  17 presenting on the Reclamation and Closure Plan, these  18 are the major facilities and -- that are involved in the  19 Reclamation and Closure Plan.  20 We've got the existing waste rock stockpiles.  21 These are the legacy stockpiles. There's four of them,  22 Existing Waste Rock Stockpiles 1, 2, 3 and 4.  23 We've got reclamation of portions of the  24 Grayback Arroyo, or sections of legacy stockpile  25 material that's adjacent to the Grayback Arroyo.</p>	389	<p>1 this before, but these are the major facilities.  2 We've got the existing waste rock stockpiles.  3 Here's 1. And 2 is really two separate smaller areas,  4 and I'll mention -- when I describe this -- these two,  5 2A, 2B, they really get combined into one as part of the  6 reclamation program. And then here's 4 here, down on  7 the southern portion of -- the southeastern portion of  8 the pit. And then Existing Waste Rock Stockpile 3,  9 which is located within the -- the plant area.  10 We've got the pit area here, the three new  11 waste rock stockpiles. We've got 1, 2 and 3. And then  12 we've got the tailing storage facility and the plant  13 area.  14 And I'll show in later slides the locations of  15 some of the other facilities, the growth media  16 stockpiles and other facilities.  17 But these are the major surface area features  18 within the mine.  19 Next slide.  20 So initially the way I have this laid out is  21 for these major facilities I describe what the  22 Reclamation Plan is first, and then I'll show you  23 graphically what the design is for these facilities.  24 So again, as I mentioned previously, there's  25 four legacy stockpiles that we're -- we reclaimed.</p>

<p style="text-align: right;">390</p> <p>1 They're going to be reclaimed in accordance with  2 requirements of the Copper Rule. And the two main  3 requirements are 20.6.7.33, which is closure  4 requirements for the mine facilities, and 20.6.7.34,  5 which is implementation of closure.  6       So for East Waste Rock Stockpile -- and I'm --  7 oh, and one thing I want to mention on this is East  8 Waste Rock Stockpile 1, 2 and portions of 4 are located  9 within the old pit surface drainage area. And according  10 to the Copper Rule, they're not required to be  11 covered -- the outslopes aren't required to be covered  12 for these facilities, but the copper -- the current  13 Reclamation Plan is that they -- the entire facility  14 will be reclaimed and covered and revegetated.  15       So this plan goes above and beyond the Copper  16 Rule requirements.  17       So for East Waste Rock Stockpile 1 and the  18 majority of East Waste Rock Stockpile 2 and portions of  19 East Waste Rock Stockpile 4, they're going to be  20 reclaimed during the preproduction phases of mine  21 operations, which this is concurrent reclamation.  22       East Waste Rock Stockpile 3 is located within  23 the plant area, and that stockpile is going to remain in  24 place until closure of the plant area itself.  25       East Waste Rock Stockpile 4 -- well, let me</p>	<p style="text-align: right;">392</p> <p>1 that's -- I don't know if I need to -- well,  2 20.6.7.33C.(3).  3       And then the maximum uninterrupted slope  4 lengths of 200 feet, of maximum slope length, so  5 200 feet, in accordance with 20.6.7.33C.(4) NMAC.  6       Top surface will be graded to drain with  7 slopes between 1 and 5 percent in accordance with the  8 Copper Rule.  9       And there's going to be about a three-foot  10 store-and-release earthen cover placed on the facilities  11 after they've been graded, in accordance with the Copper  12 Rule, and that's 20.6.7.33F.  13       Once the cover is placed on the stockpiles, it  14 will be ripped, and any disturbed areas outside of the  15 stockpiles due to reclamation construction will be also  16 ripped, and then the -- and then also provide positive  17 drainage away from the facilities. And then if there's  18 not adequate growth material in the disturbed areas, an  19 additional six inches of growth media will be placed in  20 those areas, and those areas will be revegetated.  21       Stormwater conveyance channels have been  22 designed for each of the facilities, and they're  23 designed in accordance with the Copper Rule, to convey  24 100-year return storm and hold events, and that's in  25 accordance with 20.6.7.33A.</p>
<p style="text-align: right;">391</p> <p>1 mention East Waste Rock Stockpile 2. When I say  2 portions of that, majority of -- there's -- like I  3 showed before, there's two lobes to East Waste Rock  4 Stockpile 2, there's 2A and 2B.  5       The portion of East Waste Rock Stockpile 2A, I  6 believe it is -- let me just look here -- yeah. East  7 Waste Rock Stockpile 2A, the majority of that stockpile  8 is going to be removed and placed onto 2B as part of the  9 Reclamation Plan. The portion -- the only portion  10 that's going to remain, which is a smaller portion, is  11 the portion that will be covered over by the new Waste  12 Rock Stockpile 1.  13       So -- the -- for Waste Rock Stockpile 4, the  14 exterior slope, which is the southern slope that runs  15 along Grayback Arroyo -- that slope will be regraded and  16 covered and revegetated during the preproduction phase.  17 So again current reclamation. The top surface is going  18 to be graded to drain toward the pit during operations,  19 and it's going to be used as an equipment laydown yard  20 during operations.  21       Next slide.  22       So the primary closure components for the  23 reclamation of the existing waste rock stockpiles.  24       We're going to regrade to interbench slopes of  25 3-to-1 in accordance with the Copper Rule. And</p>	<p style="text-align: right;">393</p> <p>1       And the revegetation has been designed to  2 create a stable, self-sustaining plant community that  3 conforms to the planned grazing and wildlife habitat  4 postmining land use in accordance with 19.10.5.507.  5       Additionally tied into the Reclamation Plan is  6 the installation of -- and operation and maintenance of  7 groundwater monitoring wells, which Mr. Finch presented  8 earlier in his testimony.  9       And one of the conditions in the draft  10 Discharge Permit is that we will construct a reclamation  11 test plot on one of the existing waste rock stockpiles  12 following the reclamation.  13       And the test plot program is designed to  14 further evaluate the growth media as a reclamation cover  15 material and also to look at vegetation sustainability,  16 erosion characteristics of the cover material as well as  17 the -- the capability of the cover material to reduce  18 infiltration into the cover systems.  19       So that -- New Mexico Copper is committed to  20 that test plot program, and that --  21       So we can go to the next one.  22       So this generally just shows the locations. I  23 showed them in the map, but here's the locations.  24       Here's Existing Waste Rock Stockpile 1, 2A and  25 2B, and the next slide will show the portion of 2A that</p>



<p style="text-align: right;">394</p> <p>1 is -- remains in place.</p> <p>2       Here's 4. And again I mentioned the -- the</p> <p>3 outslope along Grayback Arroyo. This outslope will be</p> <p>4 regraded and reclaimed during the preproduction phase of</p> <p>5 mining.</p> <p>6       Here's Existing Waste Rock Stockpile 3 which</p> <p>7 is located in the plant area.</p> <p>8       Next slide.</p> <p>9       These are just -- it's a little busy, but --</p> <p>10 so these -- this is the reclamation designs for the</p> <p>11 existing waste rock stockpiles.</p> <p>12       Existing Waste Rock Stockpile 3 I'll talk</p> <p>13 about later when I go talk about the plant area.</p> <p>14       So for Existing Waste Rock Stockpile 1, the</p> <p>15 blue lines here are either newly constructed conveyance</p> <p>16 channels or diversion channels, divert surface water</p> <p>17 run-on onto the reclaimed facilities. So these here are</p> <p>18 diversion structures to divert stormwater off and out</p> <p>19 this toe channel that will run along here.</p> <p>20       And these are conveyance channels. So this</p> <p>21 slope here along Grayback Arroyo is going to be pulled</p> <p>22 back away from the Grayback Arroyo diversion. There</p> <p>23 will be no disturbance of the current diversion channel</p> <p>24 as part of this construction. We're pulling back this</p> <p>25 slope, and we're putting in a new toe channel to prevent</p>	<p style="text-align: right;">396</p> <p>1 phase. We've got the conveyance channels here, this</p> <p>2 channel here, but we're on to the -- again to the pit --</p> <p>3 the old pit channel, which I'll discuss later on.</p> <p>4       And then we've got a toe channel here that</p> <p>5 will direct from this face here clean stormwater run-off</p> <p>6 to -- back to Grayback Arroyo.</p> <p>7       Okay.</p> <p>8       I want to briefly just talk about the</p> <p>9 components of the Grayback Arroyo Reclamation Plan.</p> <p>10       So there's legacy disturbances within Grayback</p> <p>11 Arroyo.</p> <p>12       And those disturbances are primarily related</p> <p>13 to the outslopes of the -- there's a plant area, there's</p> <p>14 an outslope area there that's going to be reclaimed.</p> <p>15 And then, like I mentioned before, there's the Existing</p> <p>16 Waste Rock Stockpile 4 slope.</p> <p>17       And then additionally, there's the -- right</p> <p>18 here, the -- there's two land bridges that currently</p> <p>19 cross Grayback Arroyo, and those -- as part of the</p> <p>20 Closure Plan, those will be removed. And the slopes</p> <p>21 associated with the exterior -- the southern end of</p> <p>22 the -- between the two land bridges, that area gets</p> <p>23 reclaimed also.</p> <p>24       That slope -- that's a pullback in that area</p> <p>25 because we don't want to disturb the Grayback Arroyo</p>
<p style="text-align: right;">395</p> <p>1 any erosion of the existing diversion structure from</p> <p>2 run-off from the reclaimed facility.</p> <p>3       Additionally as part of Existing Waste Rock</p> <p>4 Stockpile 1, this area right here currently receives</p> <p>5 run-off from the unreclaimed facility. So right now</p> <p>6 there's ponding in this area. It's a low area. We're</p> <p>7 backfilling this area and with growth -- growth media</p> <p>8 material and sloping it back so that we get clean</p> <p>9 stormwater run-off, report back to Grayback Arroyo.</p> <p>10       So for 2B, as I mentioned before, the portion</p> <p>11 of 2A gets combined into 2B during the preproduction</p> <p>12 phase, and the slopes again get regraded to 3-to-1</p> <p>13 slopes.</p> <p>14       We've got the conveyance channels. And the</p> <p>15 conveyance channel here gets directed to the perimeter</p> <p>16 of the pit. There's a pit perimeter channel that's</p> <p>17 constructed around the pit. And this shows the whole --</p> <p>18 the entire area that's going to be reclaimed here.</p> <p>19       So again covering with three feet of growth</p> <p>20 media, revegetation, sloping and the channel surface</p> <p>21 conveyance channels. This is the run-on -- a run-on</p> <p>22 diversion structure.</p> <p>23       4, again the top surface during operation is</p> <p>24 going to be used as a laydown yard. The outslope here</p> <p>25 again is going to be reclaimed during the preproduction</p>	<p style="text-align: right;">397</p> <p>1 channel. So again all this slope reclamation meets the</p> <p>2 Copper Rule requirement. It's 3-to-1, less than</p> <p>3 200-foot slope lengths, covered with 36 inches of growth</p> <p>4 media and revegetated.</p> <p>5       The existing Grayback Arroyo diversion</p> <p>6 structure is maintained, and there's no additional</p> <p>7 disturbance of that diversion structure itself.</p> <p>8       The revegetation also again, as I mentioned,</p> <p>9 is designed to create a stable, self-sustaining plant</p> <p>10 community.</p> <p>11       So now I'll go on to the new facilities, and</p> <p>12 I'll start with the exist -- the new waste rock</p> <p>13 stockpiles.</p> <p>14       Again there's three new waste rock stockpiles.</p> <p>15 There's the Waste Rock Stockpile 1, 2 and 3. The</p> <p>16 closure for those stockpiles meet the Copper Rules --</p> <p>17 meet or exceed the Copper Rule requirements for closure,</p> <p>18 and that's 20.6.7.33, and as well as implementation of</p> <p>19 closure, that's 20.6.7.34.</p> <p>20       The primary components of the closure of the</p> <p>21 facilities is we're going to regrade to interbench</p> <p>22 slopes between 2.75 -- and that's the Waste Rock</p> <p>23 Stockpile 1 which is located within the old pit surface</p> <p>24 drainage area -- to 3-to-1, which are all the -- the</p> <p>25 Waste Rock Stockpile 2 and 3, those are graded to</p>

<p style="text-align: right;">398</p> <p>1 interbench slopes of 3-to-1, with maximum uninterrupted  2 slope lengths of 200 feet in accordance with the Copper  3 Rule.  4       The top surface will be graded to drain on --  5 graded between 1 and 5 percent in accordance with the  6 Copper Rule.  7       And where we have -- we -- I mentioned before  8 there's -- there are 200-foot interbench slope lengths.  9 So in between the 200-foot slope lengths there's benches  10 built in. Those benches are 25-foot-wide. And there's  11 conveyance channels built on each of the benches that  12 will convey clean surface water run-off off the  13 facilities once they're recovered, revegetated and  14 reclaimed.  15       The stormwater channels are all designed in  16 accordance with the Copper Rule. They're designed to  17 convey a 100-year storm return interval. And that's in  18 accordance with 20.6.7.33A.  19       And then, as I mentioned before, there's  20 three-foot growth media placed on stockpiles following  21 the regrading. And it will be revegetated in accordance  22 with the Copper Rule.  23       The one thing I want to mention on this --  24 there's two things I want to mention.  25       I want to go back to previous testimony, a</p>	<p style="text-align: right;">400</p> <p>1 placed on the stockpiles as well as on the sides and on  2 top. So it's encapsulated within a nonpotentially  3 acid-generating material. So there's a minimum of 10  4 foot of nonpotentially acid-generating material that  5 will be placed over, underneath and on the sides of  6 potentially acid-generating material.  7       And again I just reiterate these points on the  8 installation, operation and maintenance of groundwater  9 monitor wells that require closure/postclosure  10 monitoring, and that's in accordance with the Copper  11 Rule. And that's what Mr. Finch had testified about  12 yesterday.  13       So again overview of the new waste rock  14 stockpile facilities.  15       Here's 1. And I wanted to show you here's the  16 portion of 2A that will be left in place. It gets  17 covered over by the Future Waste Rock Stockpile 1.  18       Here's the footprint for Waste Rock Stockpiles  19 2 and 3. 2 basically sits above 3, which will -- I'll  20 show you a little bit later.  21       Just for reference, here's Grayback Arroyo and  22 the plant area here. And the open pit is in this area.  23       Okay.  24       So this is Waste Rock Stockpile 1. Here's the  25 open pit. And again the blue, blue-ish lines are either</p>
<p style="text-align: right;">399</p> <p>1 question that was -- on that, but I also want to mention  2 that again it -- where we're -- Copper Flat, New Mexico  3 Copper is going above and beyond the Copper Rule is that  4 Waste Rock Stockpile 1 is located within the open pit  5 surface drainage area, and in accordance with Copper  6 Rule, the out slopes aren't required to be regraded or  7 covered within the open pit surface drainage area.  8       Copper Flat, New Mexico Copper is committed to  9 regrade, cover, revegetate and install surface  10 conveyance structures within our channels within the  11 open pit surface drainage area.  12       So that's -- I just wanted to mention that's  13 one area where they've gone above and beyond.  14       And then secondly, a question came up  15 yesterday, I believe, and I think it was on the  16 encapsulation of the new waste rock stockpiles.  17       As part of the Material Handling Plan, and  18 it's included in the Discharge Permit application as  19 well as a condition in the draft DP, is that -- and as  20 Ruth Griffiths mentioned yesterday, there's the  21 potentially acid-generating material and then the non --  22 nonpotentially acid-generating material.  23       As part of the Material Handling Plan, the  24 design of the new waste rock stockpiles, there will be a  25 10-foot zone above -- or below any PAG material that's</p>	<p style="text-align: right;">401</p> <p>1 surface water conveyance structures or they are run-on  2 control structures.  3       So we've got 1 is here, and again we've got  4 the 3-to-1 slopes -- or -- I'm sorry -- 2.75-to-1 slopes  5 on Waste Rock Stockpile 1. And then we've got the  6 surface conveyance channels. This will be covered,  7 revegetated, surface conveyance channels will be built  8 in.  9       And they -- everything gets -- the clean  10 surface water gets diverted to the open pit perimeter  11 surface conveyance channel here and then ultimately gets  12 conveyed to the open pit -- open pit drainage channel,  13 which I'll show later on when I talk about the Open Pit  14 Reclamation Plan.  15       Top surface is graded 1 to 5 percent, and  16 that's graded to drain away and out from the top of the  17 surface.  18       Okay.  19       This is the -- as I mentioned before, Waste  20 Rock Stockpiles 2 and 3 are really combined into what I  21 consider just kind of one facility, but they're  22 separated out.  23       So this is 2, and this is Waste Rock Stockpile  24 3 here. And again we've got top surface is graded  25 between 1 to 5 percent, out slopes 3-to-1 on all the</p>

402	<p>1 facilities here. And we've got three feet of cover and                  2 revegetation. And we've got construction of run-on                  3 controls here and any surface run-off conveyance                  4 channels and down-chutes that will direct clean surface                  5 water back to Grayback Arroyo.</p> <p>6 One thing I want to mention here is these --                  7 these are the operational surface conveyance or toe                  8 drain -- drainage conveyance channels that during                  9 operations these are designed to convey any seepage from                  10 the facilities to a -- this lined surface impoundment.                  11 Those -- during operations, they're going to be built                  12 into -- directly into competent andesite bedrock.</p> <p>13 So this figure -- the tan areas here show                  14 those sections that -- that are still present following                  15 the regrading and reclamation of the Stockpile 3. These                  16 get reclaimed, also. The reclamation on those would be                  17 covering with growth media material, three feet of                  18 growth media material, and revegetation and grading to                  19 drain away from the conveyance structures.</p> <p>20 Okay.</p> <p>21 Okay. So for the tailing storage facility                  22 reclamation, again reclaimed in accordance with the                  23 Copper Rule. Copper -- the closure requirements are                  24 20.6.7.33. And implementation of closure, you know,                  25 with all of those guidelines -- or those requirements,</p>	404	<p>1 conveyance channels get built into those for --                  2 following the cover placement to convey clean surface                  3 water off of the facility and back to the local                  4 drainages.</p> <p>5 Following regrading, the three-foot                  6 store-and-release earthen cover system is placed on in                  7 accordance with the Copper Rule.</p> <p>8 Stormwater channels get built into the tailing                  9 storage facility, convey a 100-year return interval                  10 storm event in accordance with the Copper Rules.                  11 And they're revegetated. They'll be                  12 revegetated to design -- to create self -- a stable,                  13 self-sustaining plant community.</p> <p>14 And again reiterating that the -- just tying                  15 in installation, operation, monitoring of the                  16 groundwater monitoring wells that Mr. Finch described                  17 yesterday, and that's in accordance with the Copper                  18 Rule.</p> <p>19 Okay.</p> <p>20 So this just shows the existing footprint,                  21 this lighter line of the existing tailing storage                  22 facility, or the boundary of it. And then this purple                  23 shading here shows what the ultimate footprint of the                  24 facility will look like.</p> <p>25 Okay.</p>
403	<p>1 also, 20.6.7.34.</p> <p>2 All structures -- the first thing that's going                  3 to happen is all structures, storage facilities,                  4 buildings, pipelines and other equipment either on the                  5 tailing storage facility or within the cyclone plant --                  6 they get removed, and they're disposed of in an approved                  7 manner in accordance with federal and state laws.</p> <p>8 For the disturbed areas outside the tailing                  9 storage facility, those get graded to drain, and then --                  10 they get covered. If there's not adequate growth media                  11 material present at the time of the grading and drain --                  12 grading for drainage, additional six inches of growth                  13 media material gets placed on those.</p> <p>14 Now, on the tailing storage facility itself,                  15 those slopes get graded to between 3-to-1 and                  16 3-and-a-half-to-1 in accordance with the Copper Rule.</p> <p>17 Maximum uninterrupted slope lengths of between                  18 200 feet -- and that 200 feet is for the 3-to-1                  19 slopes -- and 250 feet for the 3-and-a-half-to-1 slope                  20 sections.</p> <p>21 The top surface gets graded between 1 and 5                  22 percent in accordance with the Copper Rule.</p> <p>23 Again to design to the uninterrupted slope                  24 lengths between 200 and 250 feet, there's benches built                  25 into the design. These are 25-foot-wide benches. And</p>	405	<p>1 Okay. So for the tailing storage facility,                  2 there's -- this one I'll just describe in a couple                  3 steps, but for the surface reclamation component, this                  4 shows the regrading the slopes between 3-to-1 and                  5 3.5-to-1 interbench slopes. It shows the bench                  6 channels -- the benches and the bench channels built in                  7 here for conveyance of clean stormwater following the                  8 cover placement.</p> <p>9 Top surface is graded to drain back to the                  10 north, and there's an existing pipeline cut for the                  11 delivery of the tailing from the cyclone plant right                  12 through here. This -- excuse me.</p> <p>13 This pipeline section here gets backfilled to                  14 a certain point with clean growth media, and then a                  15 conveyance channel gets built in here that will direct                  16 surface water off of the top surface. So the top                  17 surface is graded to 1 to 5 percent to drain, this area                  18 here back to Grayback Arroyo.</p> <p>19 The one thing I wanted to mention on the                  20 tailing storage facility both during operations and                  21 prior to regrading, there's a line -- HDPE-lined toe                  22 berm along the outslope of the tailing storage facility.                  23 And that's designed during operations to contain any                  24 surface run-off from the tailing storage facility prior                  25 to it being covered.</p>

<p style="text-align: right;">406</p> <p>1       Once the facility is regraded, the tailing  2 material stays within that lined toe berm. The cover  3 itself gets extended, which is the cover of growth media  4 gets extended beyond the -- the toe berm in order -- it  5 allows us to direct clean surface water off of the slope  6 of the reclaimed tailing facility off -- beyond the  7 lined toe berm and then off to convey the clean surface  8 water to Grayback Arroyo.</p> <p>9       One other component of the -- which I'll  10 discuss here, a couple slides, is we have the existing  11 underdrain collection pond, which lies right in here,  12 but we also have the construction of a new tailing  13 evaporation pond, and that's part of the closure water  14 management of the tailing draindown waters.</p> <p>15       And but this -- what this shows is this is the  16 final Reclamation Plan so it shows the tailing pond to  17 be reclaimed, this evaporation pond. So it shows a  18 configuration with the reflecting for reclamation which  19 is the 3-to-1 side slopes, the covering and grading the  20 surface to drain off and revegetation.</p> <p>21       Okay.</p> <p>22       So as I mentioned, there's as part of the --  23 you know, the management of the process waters from the  24 tailing facility and the tailing draindown water during  25 closure is we have a water management program, and</p>	<p style="text-align: right;">408</p> <p>1       Our estimates based on our current plan is to  2 operate the active evaporation program to where it gets  3 reduced to a point to where we estimate that it can be  4 handled through passive evaporation, which is this  5 second program. In that period of time, the estimate is  6 approximately five years.</p> <p>7       So for the passive evaporation program, I  8 mentioned before there's that additional evaporation  9 pond that's going to be constructed at the southeast toe  10 of the tailing storage facility. And that's going to be  11 a 22-acre, HDPE-lined evaporation pond to manage the  12 long-term draindown water that we expect from the  13 tailing storage facility at the end of the active  14 evaporation phase.</p> <p>15       Excess evaporation, which equals the free  16 water evaporation minus the amount of precipitation that  17 falls on the -- the evaporation pond itself, is  18 estimated to be with this passive evaporation program  19 approximately 113 acre-feet per year, average  20 approximately 70 gallons a minute, using this --  21 utilizing this 22-acre, HDPE-lined evaporation pond.</p> <p>22       One thing I want to mention about this HDPE  23 evaporation pond, it's an extension of the existing  24 underdrain collection pond which is a double-lined HDPE  25 facility, and we are just extending that to -- expanded</p>
<p style="text-align: right;">407</p> <p>1 there's two components to that water management plan.  2       There's a shorter term, active evaporation  3 program, which includes mechanical spray units that will  4 be installed on top of the tailing facility. And that's  5 to get rid of the larger volumes of process water that  6 will be present at closure.</p> <p>7       And additionally, during initial stages of  8 tailing draindown, that's where you get the majority of  9 your draindown water. So these mechanical spray units  10 are designed to enhance evaporation of those process  11 solutions.</p> <p>12       So the active evaporation program includes  13 forced evaporation, and it also includes passive  14 evaporation from the undrained collection pond.</p> <p>15       And what that includes -- and I'll show a  16 figure of this later, but it includes -- on top of the  17 tailing facility, there's a 15-acre area that's  18 dedicated for these mechanical spray units that will  19 evaporate the larger volumes of water that are  20 anticipated to be handled during the initial stages of  21 closure.</p> <p>22       It's a four-unit mechanical spray evaporation  23 unit with capacity to handle 1,520 gallons a minute,  24 with an average evaporation -- estimated evaporation of  25 approximately 789 gallons a minute.</p>	<p style="text-align: right;">409</p> <p>1 to 22 acres to provide this passive evaporation program.  2       So the maximum estimated draindown during the  3 passive evaporation program -- so we're not going to  4 start this program until draindown comes to around 70  5 gallons a minute, and it -- but our estimate is 67  6 gallons a minute at the end of five years, and it  7 reduces to rates below five gallons per minute after 16  8 years, which again that is our estimate based on our  9 evaluation.</p> <p>10       And in the passive evaluation -- evaporation  11 program assumes 20 years of operation following the five  12 years of active evaporation or when the volume of  13 draindown water from the tailing storage facility is  14 reduced to a point to where the evaporation pond is no  15 longer required. This point in time, which we include  16 in our plan, will be determined in collaboration with  17 the agencies.</p> <p>18       Okay.</p> <p>19       Again this is the -- just to show  20 schematically the active evaporation program, that first  21 five years that we have in the plan.</p> <p>22       We have the four mechanical spray units here.  23 These are evaporation -- mechanical spray evaporation  24 units. We have a dedicated 15-acre spray area. And  25 the -- this is where the pipeline is that -- what the</p>

410	<p>1 level of the water to evaporation spray unit.</p> <p>2 And then we've got our existing underdrain</p> <p>3 collection pond which collects the underdrain -- the</p> <p>4 draindown waters from the tailing storage facility.</p> <p>5 We've got our return pipeline here which directs it back</p> <p>6 to the gallons -- spray units.</p> <p>7 Okay.</p> <p>8 This is our passive evaporation pond here, 22</p> <p>9 acres, that will collect water from the tailing</p> <p>10 draindown.</p> <p>11 Surface water at this point gets directed off</p> <p>12 the facility. It's clean surface water. The facility</p> <p>13 is fully covered, revegetated, regraded, and conveyance</p> <p>14 channels are built to direct clean surface water off the</p> <p>15 facility. So it's designed to not allow any ponding on</p> <p>16 the surface, convey surface waters, and the incident</p> <p>17 precipitation significant enough to produce surface</p> <p>18 water would be directed offsite.</p> <p>19 And there's your 22-acre surface evaporation</p> <p>20 pond.</p> <p>21 I guess one thing else I want to mention is</p> <p>22 that the slopes will get reclaimed during the tail</p> <p>23 end -- they'll start to get reclaimed during the tail</p> <p>24 end of the active evaporation program. Because by the</p> <p>25 time we get to the passive evaporation program, we'll --</p>	412	<p>1 So we've got -- those surface water conveyance</p> <p>2 channels are designed in accordance with the Copper Rule</p> <p>3 for the 100-year/24-hour storm return interval.</p> <p>4 We've got grading of any disturbed areas</p> <p>5 associated around the pit perimeter. That's grading,</p> <p>6 and we would also cover and revegetate those areas.</p> <p>7 Installation of a security gate at the haul</p> <p>8 road entrance to the pit.</p> <p>9 So overall, reclamation of the pit, which</p> <p>10 would include both the pit lake and the areas that are</p> <p>11 going to be covered with growth media and conveyance</p> <p>12 channels built and revegetated, includes a total of 55</p> <p>13 acres, which of that 52 acre -- 55 acres approximately</p> <p>14 20 acres is the pit lake, and the other 35 acres is</p> <p>15 reclamation of accessible areas within the pit as well</p> <p>16 as the -- the haul road that goes down into the pit,</p> <p>17 what we reclaim, and then there's a conveyance channel</p> <p>18 built on that, also.</p> <p>19 And then there's the pit shell around the area</p> <p>20 that -- where we have the conveyance -- the pit</p> <p>21 perimeter conveyance channel, and then reclamation of</p> <p>22 the disturbed areas around there. Overall, this</p> <p>23 represents approximately 43 percent of the pit shell</p> <p>24 area reclamation.</p> <p>25 We have revegetation of the disturbed areas,</p>
411	<p>1 the entire slope area is fully reclaimed, because we</p> <p>2 want to allow that clean surface water to drain off at</p> <p>3 that point.</p> <p>4 As well as the top surface when -- prior to</p> <p>5 the start of the passive evaporation program.</p> <p>6 Okay.</p> <p>7 Okay. Now I want to go to the Open Pit</p> <p>8 Reclamation and Closure Plan.</p> <p>9 So we -- first phase of the reclamation would</p> <p>10 be to remove any infrastructure -- that can be pumps,</p> <p>11 piping, electrical systems -- that aren't required for</p> <p>12 the rapid fill reclamation component, so anything that's</p> <p>13 not required per the Implementation and Closure Plan.</p> <p>14 There's rapid filling in the pit, as was</p> <p>15 mentioned yesterday. That's approximately 22 acre-feet</p> <p>16 of water over a period of six months.</p> <p>17 There's construction of an earthen safety berm</p> <p>18 and barbed wire fencing around the perimeter of the pit.</p> <p>19 The berm serves a couple purposes. One is</p> <p>20 that it's a run-on control structure for the -- to</p> <p>21 prevent run-on into the pit itself from surface water,</p> <p>22 but we've also got a surface water conveyance channel</p> <p>23 that collects the surface water from the surrounding</p> <p>24 reclaimed facilities and directs it into clean surface</p> <p>25 water into the open pit.</p>	413	<p>1 35 acres, as well as the accessible areas, and that will</p> <p>2 be in accordance with 19.10.5.507.</p> <p>3 Then we have again installation, operation and</p> <p>4 maintenance of groundwater monitoring wells required for</p> <p>5 closure/postclosure monitoring, and that's in accordance</p> <p>6 with the Copper Rule, and that's what Mr. Finch</p> <p>7 presented yesterday.</p> <p>8 Okay.</p> <p>9 So I have two slides on the Open Pit</p> <p>10 Reclamation Plan. So we've got -- again we've got -- I</p> <p>11 want to -- this is the pit perimeter conveyance channel.</p> <p>12 It collects water from these reclaimed facilities here.</p> <p>13 And they convey it to the open pit -- the haul road,</p> <p>14 open pit conveyance channel. This is the main</p> <p>15 conveyance channel that brings clean surface water to</p> <p>16 the open pit -- to the open pit lake here.</p> <p>17 And then we've got -- again this is 4 at</p> <p>18 the -- once the top surface is reclaimed, that</p> <p>19 conveyance channel is built in there, is directed there,</p> <p>20 also. Then we've got the berm that goes around -- as</p> <p>21 well as barbed wire fencing around the perimeter of</p> <p>22 the -- the pit itself.</p> <p>23 Okay.</p> <p>24 This second slide just shows the areas that --</p> <p>25 in yellow here, these are the areas that would get --</p>

<p style="text-align: right;">414</p> <p>1 would get covered and revegetated. And these are the  2 accessible pit areas. And then the pit shell area here,  3 the perimeter area. That represents approximately 35  4 acres. There's the pit lake following rapid fill.  5 Okay.  6 Next we have the plant area, and that  7 includes -- well, I've shown it, I'll show it again, but  8 there's various fuel tanks, storage facilities,  9 buildings, equipment. Those will be removed from the  10 site initially and disposed of in an approved manner in  11 accordance with federal and state laws.  12 Concrete foundations that are present, the  13 walls will either be toppled, backfilled and covered  14 with 36-inch growth media or they'll be removed and  15 disposed of at a nearby approved construction and debris  16 landfill.  17 There's two impoundments located within the  18 plant area. There's a process water reservoir, impacted  19 stormwater impoundment. These are HDPE-lined  20 impoundments. And I'll discuss those later when I talk  21 about the closure of the surface impoundments.  22 Again we have -- I mentioned before we have --  23 there's an existing waste rock stockpile located within  24 the plant area. And that gets closed in accordance with  25 the Copper Rule where the slopes will be 3-to-1 with</p>	<p style="text-align: right;">416</p> <p>1 and grazing habitat of PMLU.  2 Again installation, operation and maintenance  3 of groundwater monitoring wells in accordance with the  4 Copper Rule.  5 Okay. This shows the plant area.  6 So we've got the -- here's the two  7 impoundments that we were talking about here. And this  8 is Existing Waste Rock Stockpile 3, and you can see the  9 slopes 3-to-1, top surface 1 to 5 percent, got  10 conveyance channels built in following the cover  11 placement. And we've got conveyance channels built into  12 the surface of the plant area here that will direct  13 clean surface water off of the plant area.  14 Also, I want to mention there's the -- this  15 shows there's -- the land bridges in this design drawing  16 here have been removed. So the land bridges -- there's  17 two of them, I believe. The other one is maybe over  18 here. And it may -- access bridge here. The -- both  19 those you can see there's some grading here.  20 This slope here, this is the slope that I was  21 talking about, the southern slope, as well as the slope  22 here along the plant side -- those get regraded, covered  23 and revegetated, also.  24 Okay.  25 Okay. So the surface impoundments -- there's</p>
<p style="text-align: right;">415</p> <p>1 less than 200-foot interbench slope lengths, covered  2 with 36 inches of growth media and revegetated.  3 Pipelines located within the plant area,  4 residual materials will be removed from all the  5 pipelines, aboveground pipelines will be removed and  6 disposed of at a nearby construction and debris landfill  7 or at the tailing storage facility. Buried pipelines  8 will be flushed, like I said, residual materials will be  9 removed, and they will be capped.  10 There's an electric substation, associated  11 transmission lines within the plant area, and those will  12 be removed once they're no longer needed.  13 The top surface of the plant area we graded to  14 be -- to a slope of 1 percent or greater and ripped, and  15 it will be covered with a minimum of six inches of  16 growth media.  17 There's stormwater conveyance channels again  18 built into the design of the plant area following  19 regrading and covering with growth media. And those  20 will be constructed and designed -- they're designed in  21 accordance with the Copper Rule.  22 And following the regrading, cover placement,  23 conveyance channel construction, there's the  24 revegetation in accordance -- well, to create a stable,  25 self-sustaining plant community, conforms with wildlife</p>	<p style="text-align: right;">417</p> <p>1 a series of surface impoundment -- lined surface  2 impoundments at the facility.  3 And the Closure Plan for those, there's -- I  4 believe there's five. So there's the -- there's  5 impacted surface impoundments A through C, and that's  6 stormwater, those are stormwater impoundments that are  7 put in place during the operations. There's a process  8 water reservoir. There's a surge pond at the cyclone  9 plant. The underdrain collection pond. And then the  10 evaporation pond, that's the 22-acre pond. So these  11 really get combined into one pond at closure.  12 So for the closure of the surface  13 impoundments, we have the removal of all aboveground  14 electrical systems, pumps and infrastructure associated  15 with each of the impoundments. That's the first step  16 that occurs during the reclamation.  17 Any residual fluids that are left in the  18 impoundments will get pumped out of the impoundments and  19 on top of the tailing storage facility. And that gets  20 incorporated into the active evaporation program.  21 Flushing of all process water pipelines to  22 remove any residual solutions, and the solutions get  23 disposed of on top of the tailing storage facility. And  24 then the fluids get evaporated in the active evaporation  25 system.</p>

418	<p>1 With the pipelines similar to the plant area,</p> <p>2 the removal and disposal of aboveground pipelines either</p> <p>3 in the TSF or nearby approved construction and debris</p> <p>4 landfill. Capping all buried processed water, tailing</p> <p>5 delivery, water delivery pipelines. These are buried</p> <p>6 pipelines.</p> <p>7 So the surface of the HDPE liners will get</p> <p>8 ripped, and they'll get folded over, and then the entire</p> <p>9 impoundment area gets backfilled with growth media.</p> <p>10 The area gets graded to drain away from the</p> <p>11 footprint of the tailing -- I mean the surface</p> <p>12 impoundments, and then it gets revegetated.</p> <p>13 And this covering with -- the impoundments</p> <p>14 with six inches of suitable cover material, basically</p> <p>15 the backfill on the -- the impoundments themselves is</p> <p>16 going to be reclamation and cover material. So this</p> <p>17 really doesn't apply.</p> <p>18 The -- so again once the surfaces -- the</p> <p>19 impoundments have been backfilled and graded to drain</p> <p>20 away from the impoundments, the area gets revegetated to</p> <p>21 create a stable, self-sustaining community that conforms</p> <p>22 with the planned grazing and wildlife habitat PMLU.</p> <p>23 And then there's also the monitoring well --</p> <p>24 groundwater monitoring wells installed for the</p> <p>25 closure -- postclosure monitoring in accordance with the</p>	420	<p>1 where suitable growth media does not exist.</p> <p>2 Any culverts that are associated with these</p> <p>3 haul roads or access roads that aren't needed for</p> <p>4 stormwater management will also be removed as part of</p> <p>5 that reclamation of that -- that component of the haul</p> <p>6 roads and access roads.</p> <p>7 Existing roads utilized for</p> <p>8 closure/postclosure access that are wider than a single</p> <p>9 vehicle, the section outside the additional area -- some</p> <p>10 of them are like larger haul roads, and we only need a</p> <p>11 smaller width. The area outside of that width that we</p> <p>12 need for access will also be reclaimed, similar to the</p> <p>13 roads that aren't going to be required for access.</p> <p>14 Any pump stations, electric substations no</p> <p>15 longer needed for water management will be removed. And</p> <p>16 overhead -- overhead lines, power lines will be</p> <p>17 disconnected from the 115 kV line owned by Tri-State</p> <p>18 Generation and Transmission.</p> <p>19 Again that's pipelines similar to the way</p> <p>20 they're handled with the surface impoundments in the</p> <p>21 plant area, residual sediments will be removed. They'll</p> <p>22 be flushed. The pipelines on the surface will be</p> <p>23 removed, anything that's buried will be flushed, capped.</p> <p>24 And the fluids -- pipelines may be disposed of</p> <p>25 to the tailing storage facility prior to reclamation or</p>
419	<p>1 Copper Rule in the general vicinity.</p> <p>2 Okay. So this shows the locations of the</p> <p>3 surface impoundments that we closed.</p> <p>4 Again here's the tailing storage -- or the</p> <p>5 tailing evaporation pond, 22-acre pond. Here's the</p> <p>6 surge pond and the cyclone plant. These are the three</p> <p>7 HDPE-lined stormwater -- impacted stormwater collection</p> <p>8 ponds that are installed during operations. There's --</p> <p>9 this is C, this is A, and this is B here. And then this</p> <p>10 is the process water reservoir in the plant area,</p> <p>11 HDPE-lined.</p> <p>12 So it just shows the general location of these</p> <p>13 facilities.</p> <p>14 Okay.</p> <p>15 As I mentioned before in the beginning of my</p> <p>16 presentation, there's -- there's what we kind of put</p> <p>17 into a group as the ancillary facilities, facilities</p> <p>18 that we know that will -- that will have identified that</p> <p>19 we know we're going to have to take care of. They're</p> <p>20 pipeline corridors, they're other general disturbed</p> <p>21 areas in the mine that will be taken care of at closure.</p> <p>22 And so we've got haul roads and access roads</p> <p>23 that are not needed for closure or postclosure access to</p> <p>24 the reclaimed facilities. Those will be ripped to 12 to</p> <p>25 18 inches and covered with six inches of growth media</p>	421	<p>1 in the nearby construction and debris landfill.</p> <p>2 There's some pipeline corridors now for --</p> <p>3 associated with the pipeline delivery to the cyclone</p> <p>4 plant that are HDPE-lined pipeline corridors. There's</p> <p>5 pipeline, and there's an HDPE liner underneath the</p> <p>6 pipeline.</p> <p>7 So once the pipelines are removed, the liner</p> <p>8 is going to be ripped, and then the corridor, the trench</p> <p>9 that -- where the pipeline sits in will be covered with</p> <p>10 growth media. And then the surface will be graded away</p> <p>11 from the corridor itself and then revegetated to create</p> <p>12 a stable, self-sustaining plant community.</p> <p>13 Any disturbed areas associated with these</p> <p>14 ancillary facilities will be ripped to a depth of 12 to</p> <p>15 18 inches. If there's not adequate growth media within</p> <p>16 those disturbed areas, additional six inches of growth</p> <p>17 media will be placed within those disturbed areas and</p> <p>18 revegetated.</p> <p>19 Okay.</p> <p>20 As I mentioned before, there's three growth</p> <p>21 media stockpiles that are going to be built during the</p> <p>22 initial phases of construction. And those are designed</p> <p>23 to contain the suitable reclamation cover material</p> <p>24 within the footprints. So we're going to salvage the</p> <p>25 material within the footprints of the tailing storage</p>

<p style="text-align: right;">422</p> <p>1 facility as well as portions of the Waste Rock  2 Stockpiles 2 and 3.  3       And so the majority of the material within the  4 growth media stockpiles are going to be removed and used  5 as reclamation covers.  6       We are planning -- in our plan, we -- we plan  7 to leave a minimum of six inches of growth media within  8 the footprint of the growth media stockpiles for  9 revegetation and reclamation of those disturbed areas  10 that will be associated with the stockpiling and the  11 removing of that growth media from those stockpile  12 areas.  13       So it's basically just to reclaim the  14 disturbed areas associated with the growth media  15 stockpiles.  16       So again we're going to leave a minimum six  17 inches of growth media in place. We're going to rip the  18 disturbed areas. So we're going to grade, make sure  19 that the facilities are graded to drain from the  20 disturbed areas, and then we're going to revegetate the  21 footprint areas to create a stable, self-sustaining  22 plant community.  23       The growth media stockpiles, current plan is  24 for them to contain approximately 4.5 million cubic  25 yards of media for reclamation cover.</p>	<p style="text-align: right;">424</p> <p>1 you know -- or before 12 years, that's what we're  2 considering concurrent reclamation.  3       So as I mentioned before, we've got Waste Rock  4 Stockpiles 1, 2A and 2B, those are -- the plan is to  5 reclaim those during the preproduction, and that's  6 between years one and two.  7       Stockpile 4, the outslope -- again the  8 southern outslope adjacent to Grayback arroyo is years  9 one and two.  10       And one thing I don't really have on here is  11 the Grayback Arroyo, the disturbed areas in Grayback  12 Arroyo and the outslope for the plant area. Those will  13 be reclaimed also years one and two. So they'll be  14 covered, revegetated during that -- that period of time.  15       Waste Rock Stockpiles 1 and 3, again mine  16 operations projected to continue to 12 years and three  17 months. So you see here approximately two years after  18 the cessation of mine operations, the reclamation -- or  19 actually reclamation on Waste Rocks -- Waste Rock  20 Stockpile 3 reclamation begins before cessation of mine  21 operations. So it begins in year 10.  22       Mine operations are projected to be completed  23 in year -- the year 12 and three months. So Waste Rock  24 Stockpile 3 reclamation begins earlier on.  25       And then these -- the three stockpiles</p>
<p style="text-align: right;">423</p> <p>1       One thing that's not on this slide that I want  2 to mention is that there's going to be a -- these  3 stockpiles during operations, they're going to be --  4 there's going to be an interim -- they're going to be  5 revegetated. There's an interim seed mix and  6 revegetation program to just minimize wind erosion  7 from -- from the stockpiles themselves.  8       So they'll be -- just it's more of a grass  9 type to create erosion and to stabilize those for wind  10 and water erosion during operations.  11       Okay. Again just to show you general location  12 of the stockpiles.  13       So here's the tailing storage facility.  14 Here's Growth Media Stockpile 1. And here's 2 here.  15 And then 3 is here on Waste Rock Stockpiles 2 and 3 here  16 in this area. And again -- so those are the general  17 locations of the three growth media stockpiles.  18       Okay.  19       So this is the proposed reclamation schedule.  20 And one thing I want to mention on this is that there's  21 a footnote here that you probably can't read, several of  22 you probably won't be able to read. Active mining  23 operations are projected to be completed approximately  24 12 years and three months.  25       So where you see anything before the 12 years,</p>	<p style="text-align: right;">425</p> <p>1 reclamation will be completed in year 15, which is  2 approximately three years following closure.  3       Tailing storage facility, the active draindown  4 begins right -- pretty much right -- pretty close to  5 cessation of operations. There's the period of time  6 here where the mechanical spray units need to be -- to  7 be placed -- ordered, placed and -- and put into  8 operation.  9       So there's a -- you know, we have 12 years and  10 three months. We have active evaporation starting year  11 13. So there's a six- to nine-month period where we get  12 piping -- projected piping in the active spray units be  13 put in place.  14       And again there's the five-year operation  15 period.  16       And as I mentioned before, portions of the  17 tailing facility on the outslope of the tailing storage  18 facility, we begin to reclaim those during the active  19 evaporation program. That's the outslope portion.  20       We have construction of evaporation pond  21 begins prior to the completion of the active evaporation  22 program, and that's projected per year.  23       And we have the passive evaporation of  24 draindown waters beginning in year 18 and continuing for  25 20 years.</p>



426	428
<p>1 And then at the -- the completion of that 2 20-year passive evaporation program, we have the closure 3 of the tailing evaporation pond. 4 Plant area reclamation begins in year 15 so 5 approximately a little -- two-and-a-half to three years 6 following cessation of operations. 7 Rapid fill of the pit, again I don't break 8 this out into months, it would be a little busy, but 9 that begins right after closure of the mine. And again 10 it's really a six-month period, but -- 11 And then the pit perimeter, that begins 12 shortly after closure. That's years 14 and 15. And 13 that's -- that includes construction of the pit 14 perimeter conveyance channels, fencing, berming, cover 15 placement, and then the construction of the haul road 16 conveyance channel. 17 Then the ancillary facilities years 16 through 18 20. 19 Okay. 20 In summary, the Copper Flat -- it's my opinion 21 that the Copper Flat Closure and Reclamation Plan meets 22 or exceeds the requirements of the Copper Rule, is 23 designed to create a -- to re-establish a 24 self-sustaining ecosystem that conforms with the planned 25 grazing and wildlife habitat PMLU.</p>	<p>1 90 through 104. 2 MS. ORTH: Objections? 3 MR. DE SAILLAN: No objection. 4 MR. KNIGHT: No objection. 5 MS. BARNCASTLE: No objection. 6 MS. ORTH: All right. Thank you very much. 7 Exhibits 90 through 104 are admitted. 8 (Exhibits NMCC 90 through 104 admitted into 9 evidence.) 10 MR. BUTZIER: And, Madam Hearing Officer, that 11 concludes the direct testimony of Mr. Stein. 12 MS. ORTH: All right. Thank you. 13 Mr. Knight, do you have questions of 14 Mr. Stein? 15 MR. KNIGHT: Madam Hearing Officer, I do not. 16 MR. DE SAILLAN: Madam Hearing Officer, we 17 have quite a few questions for this witness, and I was 18 wondering if we could break for lunch and proceed with 19 the questioning afterwards. 20 MS. ORTH: That's fine. 21 Let me just ask while it is still in my mind. 22 Ms. Barncastle, you joined us just a few 23 minutes after Mr. Stein began. 24 Do you have any objections to register about 25 his expertise or experience on closure and reclamation</p>
427	429
<p>1 New Mexico Copper Corp. has committed to 2 construct -- to concurrent reclamation of legacy 3 stockpiles as discussed in this presentation as well as, 4 you know, portions of the proposed Waste Rock Stockpile 5 2 during operations. 6 And portions of Grayback Arroyo that I 7 mentioned previously. 8 And New Mexico Copper Corp. has committed to 9 conduct the reclamation cover material test plots, and 10 that -- again that's conditioned within the draft 11 Discharge Permit. And that will further demonstrate 12 suitability of the reclamation cover for the Copper Flat 13 Mine. 14 Q. Thank you, Mr. Stein. 15 Did you provide a copy of your resume that's 16 marked as New Mexico Copper Exhibit 90? 17 A. Yes, I did. 18 Q. And is your PowerPoint presentation 19 Exhibit 91? 20 A. Yes, it is. 21 Q. And did you provide other reference materials 22 that are Exhibits 92 through 104? 23 A. Yes, I did. 24 MR. BUTZIER: Madam Hearing Officer, I'd move 25 the admission of Exhibits -- New Mexico Copper Exhibits</p>	<p>1 in order to give the testimony he gave? 2 MS. BARNCASTLE: No, ma'am, I do not. 3 MS. ORTH: All right. Thank you. 4 Let's break for lunch and return at 1:00. 5 Mr. Butzier. 6 MR. BUTZIER: Madam Hearing Officer, just a 7 reminder, do we also want to ask Ms. Barncastle whether 8 she objects to the three exhibits associated with David 9 Kidd? 10 MS. ORTH: All right. 11 Exhibits 87 through 89, that was resume, 12 PowerPoint and a report, I believe. 13 MS. BARNCASTLE: No objection. 14 MS. ORTH: All right. Thank you very much. 15 We're on break until 1:00. 16 (Proceedings in recess from 11:51 a.m. to 17 1:07 p.m.) 18 MS. ORTH: All right. We are back after the 19 lunch break. 20 When we broke, we were about to begin 21 Mr. de Saillan's cross-examination of Mr. Stein. 22 While I have your attention, please reach for 23 your devices. I heard a lot of ringy-dingies this 24 morning. Just turn it down. I understand you need to 25 know when your phone rings, but the rest of us don't</p>

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<p>1 need to know that.  2 So Mr. de Saillan.  3 MR. DE SAILLAN: Thank you, Madam Hearing  4 Officer.  5 CROSS EXAMINATION  6 BY MR. DE SAILLAN:  7 Q. Good afternoon, Mr. Stein.  8 A. Good afternoon.  9 Q. First of all, I'd like to ask you a little bit  10 about your background.  11 So how many major metal mine sites have you  12 been involved in reclamation of?  13 A. I would say 15, I would put the number at.  14 Q. Okay.  15 And have those been in the Western United  16 States?  17 A. Majority are in the Western United States.  18 Yes.  19 Q. Okay.  20 Any in Nevada?  21 A. Yes. There has been some in Nevada.  22 Q. Which ones?  23 A. Well, peripherally been involved in the  24 Bullfrog Mine. I was not necessarily on the reclamation  25 end of things, but on the planning end of things at the</p>	<p>1 closure planning, reclamation design, very -- it depends  2 on the site, but in general, the closure planning,  3 reclamation planning, cover design, permitting support.  4 Q. Okay.  5 And have you -- have you continued monitoring  6 any of those mines after closure?  7 A. Yes.  8 Q. Which ones?  9 A. I haven't monitored, but I've evaluated the  10 data from sites, and that would include Chino and Tyrone  11 following reclamation, and I've looked at monitoring  12 data for the Bingham Canyon Mine, Utah. That would be  13 following closure. I've also looked at the Questa  14 tailings. And that would be the primary ones.  15 Q. And have all of those mines that you just  16 mentioned -- have they all involved long-term  17 maintenance and monitoring? And when I say long-term, I  18 mean on the order of more than 25 years, upwards of 100  19 years or more?  20 A. Not all of them.  21 Q. Which ones have not?  22 A. Bingham Canyon Mine.  23 Q. And how long was monitoring and maintenance  24 necessary there?  25 A. Now, this is a portion of the mine facility</p>
431	433
<p>1 Long Canyon Mine in Nevada.  2 Q. Okay.  3 A. Those are the two primary ones. Yeah.  4 Q. Okay.  5 And how about are there any in Montana?  6 A. None in Montana.  7 Q. Any others in New Mexico?  8 A. Yes. I've been involved in reclamation  9 planning, closure planning at Questa, McKinley, Chino,  10 Tyrone, Cobre and Hidalgo.  11 Q. Okay.  12 McKinley is a uranium mine?  13 A. It's a coal mine.  14 Q. Okay.  15 Of the -- I think you said 35?  16 A. No. I said 15.  17 Q. Fifteen. I'm sorry.  18 Of the 15 that you've been involved in, how  19 many of them have been hardrock mines?  20 A. The majority of those have been hardrock  21 mines.  22 Q. Okay.  23 And what has been your involvement in the  24 Chino, Tyrone, Cobre, Hidalgo and Questa mines?  25 A. I've been involved in the cover design,</p>	<p>1 that's been reclaimed.  2 Q. Okay.  3 A. They're not under an active monitoring and  4 maintenance program right now. The sites that have been  5 reclaimed are stabilized. It's -- these reclaimed areas  6 are within an active mining area of the -- they're  7 within an active mining area of the mine itself.  8 I think the monitoring, maintenance period  9 was -- for those facilities were approximately five  10 years.  11 Q. And what type of facilities were they?  12 A. Bingham Canyon Mine is a copper, gold,  13 hardrock, silver, molybdenum mine.  14 Q. Okay.  15 But the facilities that --  16 A. Waste rock piles.  17 Q. Waste rock piles?  18 A. Oh, and -- I'm sorry -- and tailing  19 facilities.  20 Q. Okay.  21 Let's move to slide 8, please.  22 Now, here you mention the -- slide 8?  23 Okay. On slide 8, you reference stormwater  24 channels. And you mention a 100-year return interval  25 event.</p>

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1 You're basically talking about a 100-year  
 2 storm event, right?  
 3 A. Yes.  
 4 Q. And isn't -- isn't that changing as a result  
 5 of climate change? Isn't what -- isn't what would be  
 6 considered a 100-year storm event or what has previously  
 7 been considered a 100-year storm event changing as a  
 8 result of climate change?  
 9 MR. BUTZIER: Madam Hearing Officer, I will  
 10 object that that's -- that's an ambiguous question.  
 11 It's not clear what -- what specifically he's talking  
 12 about is changing. Is it a 100-year storm event to some  
 13 other years storm event or -- and is it scientists? Is  
 14 it -- you know, it's basically there's no context  
 15 provided for the question.  
 16 MS. ORTH: All right.  
 17 And, Mr. de Saillan, you may be thinking of a  
 18 reference by which the size of those events is  
 19 established. If you would just clarify.  
 20 MR. DE SAILLAN: Sure.  
 21 Q. Isn't the severity of storm event that is  
 22 considered -- that is normally considered to be a  
 23 100-year storm event changing as a result of climate  
 24 change?  
 25 MR. BUTZIER: Same objection.

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1 MS. ORTH: Can we back up just a little bit?  
 2 That is to say how he would understand the severity of a  
 3 100-year storm event to begin with?  
 4 MR. DE SAILLAN: Sure.  
 5 Q. I mean, who sets the standard for a 100-year  
 6 storm event?  
 7 A. Well, there's procedures, there's standard  
 8 scientific procedures in evaluating 100-years/24-hour  
 9 storm event, and we use a 100-year period to evaluate  
 10 what that storm event is. And I believe for ours it was  
 11 NOAA Atlas, where we use the precipitation event  
 12 associated with that.  
 13 Now, keep in mind that's over a 100-year  
 14 period what that record is so you're looking at a long  
 15 period of time to evaluate what that storm event is.  
 16 Q. All right.  
 17 So aren't those standards changing as a result  
 18 of climate change?  
 19 MR. BUTZIER: Same objection.  
 20 MR. STEIN: So -- yeah.  
 21 MR. BUTZIER: Madam Hearing Officer --  
 22 MR. STEIN: I'm not sure where you're coming  
 23 from on that.  
 24 MS. ORTH: So you referred to the NOAA Atlas  
 25 for the standards, right? For --

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1 MR. STEIN: For the storm event.  
 2 MS. ORTH: For the storm event.  
 3 MR. STEIN: Yeah.  
 4 MS. ORTH: So is that changing?  
 5 I mean, I felt like he put it in context that  
 6 time.  
 7 MR. STEIN: I haven't seen an update.  
 8 MR. DE SAILLAN: Okay. Thank you.  
 9 Q. Did you consider the possibility that in the  
 10 future as this -- this closure -- the closure of this  
 11 mine progresses, that you may have to change your  
 12 estimation of what a 100-year storm event is?  
 13 A. We didn't look at climate change, but what I  
 14 will say is that we have an additional one foot of  
 15 freeboard designed into the channels which would handle  
 16 additional input into the channels beyond the  
 17 100-year/24-hour storm event.  
 18 Q. Would you agree with me that over the next 100  
 19 years it's likely that we will receive more than one  
 20 100-year storm event?  
 21 A. I would say there's a probability. Yes.  
 22 Q. Okay. Thank you.  
 23 Now let's move on to slide 11.  
 24 You mentioned the -- the Grayback Arroyo  
 25 diversion structure.

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1 Could you describe that structure for me,  
 2 please?  
 3 MR. STEIN: Let me see the slide that  
 4 present --  
 5 MS. EMMER: Which one?  
 6 MR. STEIN: That's what I'm looking for, the  
 7 Grayback one that shows the Grayback.  
 8 I'll just describe it. I don't really have a  
 9 slide that shows --  
 10 MR. DE SAILLAN: That's fine.  
 11 MR. STEIN: -- a depiction.  
 12 But anyway, the Grayback diversion is a  
 13 diversion that was built into Grayback. Grayback used  
 14 to flow through to the mine site. And so it gets  
 15 diverted on the west side of the mine permit area, and  
 16 it runs along the southern perimeter of the mine permit  
 17 area.  
 18 I believe that -- I'm not 100 percent sure on  
 19 this, but Grayback Arroyo used to run on the southern --  
 20 so from west to east. From the west side, it would run  
 21 through the permit area toward -- in the vicinity of the  
 22 current open pit. So there's a diversion that runs  
 23 to -- more to the south. So it's a constructed  
 24 diversion that's in place now.  
 25 MR. DE SAILLAN: Okay.

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<p>1 Q. And how was that diversion structure built?</p> <p>2 A. I think it was -- it's -- it was built with</p> <p>3 local fill materials. So there's a -- there's a berm in</p> <p>4 place in the -- to divert the flow. So there's an</p> <p>5 earthen bermed area along the west side of the Existing</p> <p>6 Waste Rock Stockpile 1. And then it runs along the</p> <p>7 south side. I think it ties back into its natural</p> <p>8 channel.</p> <p>9 Q. Okay.</p> <p>10 So the berm and whatever aspects to the</p> <p>11 diversion structure there are, is that a permanent</p> <p>12 diversion?</p> <p>13 A. It's -- in our Reclamation Plan, it is</p> <p>14 included as a permanent diversion. Yes.</p> <p>15 Q. Okay.</p> <p>16 Now, you -- I believe you testified or one of</p> <p>17 your slides says that you plan to maintain the Grayback</p> <p>18 Arroyo diversion for the closure period.</p> <p>19 What do you mean by the closure period?</p> <p>20 A. Well, the Reclamation Plan, what I think --</p> <p>21 what I was getting at there is we do not plan to disturb</p> <p>22 the existing Grayback Arroyo diversion structure as part</p> <p>23 of the Reclamation Plan. It's going to be maintained.</p> <p>24 And there's no -- as part of any -- what I was</p> <p>25 trying to tie that into is the reclamation of the</p>	<p>1 attached to that.</p> <p>2 MS. ORTH: Right.</p> <p>3 MR. DE SAILLAN: Fair enough.</p> <p>4 MS. ORTH: Would you rephrase that?</p> <p>5 MR. DE SAILLAN: Okay.</p> <p>6 Q. What would the Closure Plan provide for -- or</p> <p>7 does the Closure Plan provide for the failure of that</p> <p>8 structure?</p> <p>9 A. Well, I'll tie it into the draft Discharge</p> <p>10 Permit. There's a Contingency Plan section in the draft</p> <p>11 DP document that specifically covers excessive erosion</p> <p>12 associated with any types of conveyance structures.</p> <p>13 Q. Okay.</p> <p>14 What happens -- does the -- does the Closure</p> <p>15 Plan address failure of the diversion structure after</p> <p>16 the mine has stopped operating and the Contingency Plan</p> <p>17 is no longer in effect?</p> <p>18 MR. BUTZIER: Madam Hearing Officer, as I</p> <p>19 understand the question, he's asking for speculation.</p> <p>20 MS. ORTH: I didn't hear it that way. He</p> <p>21 asked if the Closure Plan provided for potential</p> <p>22 failure.</p> <p>23 MR. BUTZIER: Okay. Great. Okay.</p> <p>24 MR. STEIN: I guess my response would be I --</p> <p>25 the Contingency Plan should be in place at closure. So</p>
439	441
<p>1 components along Grayback Arroyo, that's the Existing</p> <p>2 Waste Rock Stockpiles 1 and 4, the outcrops that face</p> <p>3 Grayback Arroyo, they're not going to encroach upon the</p> <p>4 Grayback Arroyo channel.</p> <p>5 Q. So when you say it's going to be maintained,</p> <p>6 do you mean it's just going to be left alone in place as</p> <p>7 opposed to you're going to take care of it?</p> <p>8 A. It's left alone in place. There are sections</p> <p>9 of Grayback Arroyo along the plant area that I</p> <p>10 mentioned. There's two land bridges where there's --</p> <p>11 that those two land bridges will be removed so that you</p> <p>12 have open channel flow --</p> <p>13 Q. Right.</p> <p>14 A. -- through those areas.</p> <p>15 Q. Right. I'm focusing specifically on the</p> <p>16 diversion.</p> <p>17 A. The diversion is -- as far as maintained, it's</p> <p>18 left in place as is --</p> <p>19 Q. Okay.</p> <p>20 A. -- under the current plan.</p> <p>21 Q. Okay.</p> <p>22 Well, suppose the structure were to fail.</p> <p>23 MR. BUTZIER: Madam Hearing Officer, I'm not</p> <p>24 sure that was a question. So far he's asked for a</p> <p>25 supposition, and I don't think there was a question</p>	<p>1 if there's a failure -- and if -- hypothetically if</p> <p>2 there was a failure, that that -- or excessive erosion</p> <p>3 on that diversion structure, the Contingency Plan would</p> <p>4 be in place at that point in time, and that would kick</p> <p>5 in.</p> <p>6 MR. DE SAILLAN: Okay.</p> <p>7 Q. But suppose that the mine is no longer</p> <p>8 operating, it's closed, it's gone out of business, the</p> <p>9 copper has all been mined out, and we're talking, you</p> <p>10 know, more than 25 years down the road, and the</p> <p>11 diversion structure fails, the Contingency Plan is no</p> <p>12 longer in operation.</p> <p>13 Does your Closure Plan address that failure?</p> <p>14 A. I'll answer that, but then I'll comment on</p> <p>15 what my opinion is on the failure of that dam.</p> <p>16 Q. That's fine.</p> <p>17 A. I mean of the diversion structure.</p> <p>18 We do not specifically address failure of that</p> <p>19 diversion structure.</p> <p>20 But what I will say is that there has been a</p> <p>21 diversion analysis done by M3 Engineering, and as part</p> <p>22 of that analysis, they looked at flows within Grayback</p> <p>23 Arroyo under a 500-year storm, and it showed that that</p> <p>24 structure is sound at 500 years. So -- under the</p> <p>25 500-year storm event.</p>

442	<p>1 So we are anticipating that, and it is not</p> <p>2 currently included in the -- in the Reclamation Plan.</p> <p>3 Q. Okay. Well, let me just ask you one more</p> <p>4 question on this issue.</p> <p>5 Suppose that the diversion structure were to</p> <p>6 fail.</p> <p>7 Would the water from Grayback Arroyo then flow</p> <p>8 into the -- into the pit?</p> <p>9 A. Well, again I don't anticipate that. And I</p> <p>10 don't believe it would -- well, again that's kind of an</p> <p>11 open-ended question. It depends on what kind of</p> <p>12 failure, where the failure is. So I -- I mean, unless</p> <p>13 you -- I mean, there's different types of failures that</p> <p>14 can occur on that.</p> <p>15 Q. Okay. Let's say that the berm is breached.</p> <p>16 A. Again it depends on where the berm's breached.</p> <p>17 Q. Wouldn't it -- wouldn't it most likely flow</p> <p>18 back into its original channel?</p> <p>19 A. Not necessarily.</p> <p>20 Q. Okay.</p> <p>21 Let's move on to slide number 12.</p> <p>22 Now, I think you testified that as part of the</p> <p>23 closure here the nonacid-generating material would be</p> <p>24 encapsulated in the acid-generating material?</p> <p>25 A. Around -- around the acid-generating material.</p>	444	<p>1 Let's move on to slide 16.</p> <p>2 In that slide, I think you give a range for --</p> <p>3 range for some slopes.</p> <p>4 Do you see what I'm referring to?</p> <p>5 A. Um-hum.</p> <p>6 Q. And I'm wondering has that -- has that been</p> <p>7 determined yet, which -- where in the range the slopes</p> <p>8 are going to be graded?</p> <p>9 A. It depends on the location. It's all tied</p> <p>10 into the Operational Plan of the tailing impoundment.</p> <p>11 So it's -- it's not if or -- if or that -- this or that</p> <p>12 type of analysis. There's -- there are going to be --</p> <p>13 it's already in the design. There's sections of the</p> <p>14 tailing facility that will have 3-to-1 slopes, and then</p> <p>15 there's sections -- due to the operational design,</p> <p>16 there's slopes that will be 3-and-a-half-to-1.</p> <p>17 Q. Okay.</p> <p>18 And has that been determined yet?</p> <p>19 A. Yeah. It's in our reclamation designs as part</p> <p>20 of the MORP document.</p> <p>21 Q. Okay.</p> <p>22 Slide 19.</p> <p>23 And I think you estimate there that the</p> <p>24 drawdown time will be -- after 16 years that the</p> <p>25 drainage will be 16 gallons per -- excuse me -- five</p>
443	<p>1 So there's a 10-foot -- as part of the Mine Handling</p> <p>2 Plan, there's a 10-foot-thick zone underneath. So prior</p> <p>3 to the placement of potentially acid-generating</p> <p>4 material, there's a 10-foot minimum thickness of</p> <p>5 nonpotentially acid-generating material placed at the</p> <p>6 base, then the potentially acid-generating material</p> <p>7 would be placed on top of that, and then another minimum</p> <p>8 10-foot layer would be placed over and on the sides of</p> <p>9 that.</p> <p>10 Think of it as a -- a lens of potentially</p> <p>11 acid-generating material that's surrounded by a minimum</p> <p>12 10-foot layer of nonpotentially acid-generating</p> <p>13 material.</p> <p>14 Q. Okay.</p> <p>15 But just to clarify, this would still be</p> <p>16 porous material, right?</p> <p>17 A. Yes.</p> <p>18 Q. So the encapsulation would not prevent water</p> <p>19 from seeping into the acid-generating material or</p> <p>20 draining out of the acid-generating material.</p> <p>21 A. It's not going to prevent it, but it could</p> <p>22 have some benefits to being there with additional</p> <p>23 buffering capacity and whatnot. But that's not my area</p> <p>24 of expertise. That's a geochemistry.</p> <p>25 Q. Okay.</p>	445	<p>1 gallons per minute after 16 years; is that correct?</p> <p>2 A. No. Well, yes. That is. After 16 years,</p> <p>3 we'll reach a fairly steady draindown rate of what we're</p> <p>4 estimating is approximately five gallons a minute. Yes.</p> <p>5 Q. Okay.</p> <p>6 And what is the basis for that conclusion?</p> <p>7 A. We looked at a few things. We have -- in the</p> <p>8 Water Management Plan portion of the MORP, we looked at</p> <p>9 measured draindown rates in some lined facilities that</p> <p>10 we -- that our company works on. I evaluated those.</p> <p>11 And then we also looked at kind of a conceptual tailing</p> <p>12 draindown curve developed by the Nevada Department of</p> <p>13 Wildlife Protection.</p> <p>14 Q. So you didn't do any independent calculation?</p> <p>15 A. Well, we did a calculation based on -- we did</p> <p>16 an estimate based on observed tailing during drowndrains</p> <p>17 at these reclaimed tailing impoundments, lined tailing</p> <p>18 impoundments. And then we looked at the conceptual</p> <p>19 draindown curve.</p> <p>20 Q. Okay.</p> <p>21 Did you -- did you consider how that number,</p> <p>22 that five gallons per day, might be affected by</p> <p>23 fluctuations in precipitation?</p> <p>24 A. It's for -- well, the way I would answer that</p> <p>25 is that these -- the measured ones -- draindown curves</p>

<p style="text-align: right;">446</p> <p>1 incorporate fluctuations in precipitation. So that's  2 built into the existing measured tailing draindown  3 curves that are in the analysis.  4       And then I will also say that with our  5 reclamation design the cover system and the conveyance  6 channels are designed to limit drainage through the  7 cover.  8       So fluctuations and precipitation are --  9 are -- are dampened by the reclamation cover system, the  10 revegetation and the construction of the conveyance  11 channels that directs surface water off from  12 precipitation events.  13       Q. Okay.  14       So would that cover, say, long-term wet  15 periods?  16       A. The cover is designed in accordance with the  17 Copper Rule, which is -- you know, we have the three  18 foot of earthen cover, and then it will be -- it will  19 meet the water-loading capacity requirements of the --  20 of the Copper Rule, which is designed to store  21 percent -- a certain percentage of winter precip as well  22 as a certain percentage of summer precip.  23       Q. Okay.  24       A. With the assumption -- and the way those are  25 established is that there's -- so a portion of water</p>	<p style="text-align: right;">448</p> <p>1 during that period of time. There may be periods -- dry  2 periods, there may be extreme precipitation periods.  3       I -- so I think the variability is handled in  4 that, like from a -- but yeah. So anyway, that's --  5 yeah.  6       Q. Okay.  7       On your last bullet there, you talk about  8 the -- well, you talk about the tailing storage  9 facilities reaching a point where the evaporation pond  10 is no longer required, and then you say this point in  11 time will be determined in collaboration with the  12 agencies?  13       So that -- that time has not yet been  14 determined?  15       A. Our -- my professional opinion is that it's at  16 that 20-year period. If observed flows -- if there are  17 still observed flows at that point in time, then it  18 would be negotiated with the agencies at that point as  19 far as what the additional operational requirements  20 would be.  21       Q. So your plan would need to be revised at some  22 point in the future?  23       A. It would -- again that's -- that's  24 speculative, I believe, but the -- my professional  25 opinion is it's 20 years, but we don't want to say it's</p>
<p style="text-align: right;">447</p> <p>1 that enters the cover -- a good portion of it is going  2 to evaporate and transpire from the vegetation. There  3 may be a residual amount that's left in place that is  4 not extracted from those two mechanisms.  5       So the cover systems are designed to store  6 that additional precipitation during periods where  7 either we have limited evaporation or the  8 evapotranspiration are smaller as well as periods where  9 we have maybe higher transpiration and evaporation but  10 also higher precipitation, which would be the summer  11 monsoon months.  12       Q. Okay.  13       Now, I was -- my last question I was referring  14 to longer-term trends such as drought periods -- well,  15 the opposite of drought periods, a relatively wet period  16 where you have a lot of precipitation.  17       A. Can you repeat the question, then?  18       Q. Yeah, sure.  19       Was your -- was your analysis -- did it take  20 into consideration long-term wet periods, multi-year wet  21 periods?  22       A. What I would say is going back to the -- the  23 measured draindown curves, that I present in the Water  24 Management Plan, are -- cover a prolonged period of  25 time, where there's variability in the precipitation</p>	<p style="text-align: right;">449</p> <p>1 just going to be shut off no matter what.  2       So there's -- in the Copper Rule, there's  3 postclosure, there's postclosure requirements. So if  4 there's -- if we do observe flows, certainly it's --  5 we're not just going to -- it just wouldn't be -- the  6 tailing evaporation pond wouldn't just be closed at that  7 point in time. We would work with the agencies and  8 determine the best path forward.  9       Q. All right.  10       Does the -- does the plan include tasks to  11 address hazardous materials that might result from --  12 from leaks or spills of process solutions or chemicals  13 or tailings or fuels?  14       A. From the reclamation?  15       Q. From the mine facility, any location at the  16 mine facility?  17       MR. BUTZIER: That sort of turns into a  18 compound question when you talk about tailings, fuels  19 and various other things at any point in the mine site.  20       MS. ORTH: You might have to break it down.  21       MR. DE SAILLAN: Okay. That's fine.  22       Q. So let me ask you if the plan includes tasks  23 to address hazardous materials that might result from  24 leaks or spills of process solutions at the mine?  25       A. Now, on the -- you're talking about under --</p>

<p style="text-align: right;">450</p> <p>1 because I'm specifically speaking on the Reclamation and 2 Closure Plan. 3 Are you talking on the operational end of 4 things or -- 5 Q. No, no, no. I'm sorry. 6 A. -- on the reclamation and closure? 7 Q. I'm sorry. I failed to clarify that. I am 8 talking about -- 9 A. Okay. 10 Q. -- for purposes of closure. 11 A. Okay. 12 So we address as part of, say, the plant 13 closure, when we talk about disturbed areas, if there's 14 impacted soils from a spill or, you know, long-term 15 operation in that area, that gets taken care of as part 16 of the Reclamation Plan. 17 Disturbed areas are -- you -- for disturbed 18 areas, impacted soils would be covered and revegetated, 19 or the material would be removed as -- like in pipelines 20 there's -- we have the residual solutions are going to 21 be removed and then placed on top of the tailing prior 22 to reclamation. 23 Q. Okay. 24 When you say disturbed areas, does that 25 mean --</p>	<p style="text-align: right;">452</p> <p>1 Cheryl, we were talking at the same time 2 there. 3 Did you get all of that? 4 THE REPORTER: I might have. 5 MR. STEIN: You're pretty good, then. 6 MR. DE SAILLAN: Okay. 7 Q. Does the Closure Plan include maintenance of 8 access roads to and from the site and within the site 9 for the period of closure? 10 A. It might -- I -- we have reclamation of 11 components of the access roads that are required. So 12 they're built -- so they'll be revegetated -- covered 13 and revegetated. Sections of -- if the roads are wide 14 or if they're not going to be used for access. But the 15 access roads, I am not sure how they're handled in 16 the -- I can't speak to that. 17 Q. Okay. 18 Now, the Closure Plan does not provide for 19 water treatment, does it? 20 A. Well, evaporation is a -- is one component of 21 water treatment, in my mind. 22 Q. Might be a component, but I don't think 23 it's -- well -- 24 A. You could consider evaporation water 25 treatment. Yes.</p>
<p style="text-align: right;">451</p> <p>1 A. A disturbed area is an area that is either the 2 surface is disturbed or there may be an impact to low-pH 3 soils in a certain isolated area that would be 4 reclaimed. 5 Q. Okay. 6 So suppose you have the residues of a previous 7 spill. 8 Is that something that's incorporated in what 9 you're referring to as disturbed areas? 10 A. Yeah. Yeah. Those would be covered and 11 revegetated, those areas, or that material would be 12 removed -- 13 Q. Okay. 14 A. -- and disposed of accordingly. 15 Q. And that's covered in the Closure Plan? 16 A. Yes. We have -- we have acreage reserved for 17 disturbed areas in the Closure Plan. Yes. 18 Q. So it's not specifically covered, it's more 19 generally covered -- 20 A. Yeah, because -- 21 Q. -- in reclamation of disturbed areas? 22 A. -- you can't say where those would occur or if 23 they would occur, but we have built in that those would 24 be taken care of if they did occur. 25 Q. Okay. Thank you.</p>	<p style="text-align: right;">453</p> <p>1 Q. How does your -- how does the plan address 2 long-term monitoring and maintenance for things like 3 erosion and revegetation, stormwater control 4 maintenance? 5 A. Again that's handled -- the -- so for 6 revegetation, there's generally a 12-year period where 7 that's evaluated until you get final. And this is -- 8 we're getting kind of out of the purview with NMED, but 9 more the MMD requirements at least for the revegetation. 10 So on the vegetation component, there's basically a 11 12-year period there. 12 The erosion and -- and cover maintenance will 13 be handled during the closure period as part of the 14 reclamation itself and the reseeding and then the 15 monitoring period per -- there's generally an erosion 16 and vegetation monitoring period in the -- following 17 reclamation of the units. 18 And that's generally something that's included 19 in the -- in my experience, it's included in the MMD 20 permit requirements for that. 21 Q. Well, okay. 22 The -- and that period ends after 25 years? 23 A. I can't speak to that. I -- I wasn't 24 involved -- I haven't really -- I'm not involved in 25 the -- or I guess I haven't been intimately involved in</p>

454	<p>1 the Monitoring Plan portion of the -- our program here</p> <p>2 was more on the Reclamation and Closure Plan.</p> <p>3 Q. Okay.</p> <p>4 So who is in charge of long-term maintenance</p> <p>5 and monitoring?</p> <p>6 A. I'm not aware of who is.</p> <p>7 Q. Okay.</p> <p>8 So you made a distinction just now about the</p> <p>9 jurisdiction of the Mining and Minerals Division of the</p> <p>10 Energy, Minerals and Natural Resources Department and</p> <p>11 the Environment Department.</p> <p>12 And is it your understanding that there's one</p> <p>13 plan, a Closure Plan/Closeout Plan that covers the</p> <p>14 requirements for both Energy, Minerals and Natural</p> <p>15 Resources and Environment Departments?</p> <p>16 A. That's correct.</p> <p>17 Q. Okay. Thank you.</p> <p>18 Does the plan address the potential for pit</p> <p>19 wall failures, sloughing of the pit walls?</p> <p>20 A. We don't consider that.</p> <p>21 Q. Okay.</p> <p>22 Have you performed failure modes effects</p> <p>23 analysis with respect to the Reclamation and Closure</p> <p>24 Plan and its ability to protect water resources?</p> <p>25 MR. BUTZIER: Could I have the question</p>	456	<p>1 MS. ORTH: All right.</p> <p>2 So, Mr. de Saillan, I understand the thrust of</p> <p>3 your question. You're asking him to assume some failure</p> <p>4 there.</p> <p>5 Can you -- but I heard at least two potential</p> <p>6 types of failure.</p> <p>7 Could you break down the question a little?</p> <p>8 MR. DE SAILLAN: All right.</p> <p>9 Q. Suppose we assume long-term geomorphic changes</p> <p>10 will occur, potentially compromising proposed mitigation</p> <p>11 measures, such as the thickness and function of the</p> <p>12 cover.</p> <p>13 Would your answer still be the same?</p> <p>14 A. My answer would be I would not anticipate that</p> <p>15 we would have any types of geomorphic events that would</p> <p>16 compromise the reclamation cover or the conveyance</p> <p>17 structures.</p> <p>18 Q. Okay. Thank you.</p> <p>19 I have no further questions.</p> <p>20 MR. STEIN: Thanks.</p> <p>21 MS. ORTH: Thank you, Mr. de Saillan.</p> <p>22 Ms. Barncastle.</p> <p>23 MS. BARNCASTLE: Thank you.</p> <p>24</p> <p>25</p>
455	<p>1 repeated, please? I didn't quite hear it.</p> <p>2 MR. DE SAILLAN: Okay.</p> <p>3 Q. Are you familiar -- let me rephrase it a</p> <p>4 little bit, then.</p> <p>5 Are you familiar with failure modes effects</p> <p>6 analysis?</p> <p>7 A. No.</p> <p>8 Q. Do you believe that a walkaway reclamation at</p> <p>9 a major metals mine site is feasible?</p> <p>10 A. Yes.</p> <p>11 Q. Suppose we assume long-term geomorphic changes</p> <p>12 will occur due to nature potentially compromising the</p> <p>13 proposed mitigation measures, such as the thickness and</p> <p>14 function of the cover or the stormwater diversion</p> <p>15 features.</p> <p>16 Is your response the same?</p> <p>17 A. I guess you'd have to be specific on what</p> <p>18 you're --</p> <p>19 Q. Well, generally.</p> <p>20 A. In what way?</p> <p>21 Q. I'm not specifying what way. Any way.</p> <p>22 MR. BUTZIER: Madam Hearing Officer, I think</p> <p>23 the witness has indicated he has difficulty</p> <p>24 understanding the question, and I believe it is</p> <p>25 ambiguous as generally posed by Mr. de Saillan.</p>	457	<p>1 CROSS EXAMINATION</p> <p>2 BY MS. BARNCASTLE:</p> <p>3 Q. I'm going to start where I left off yesterday</p> <p>4 with -- I think it was witness Finch, Steve Finch.</p> <p>5 I asked of him is there going to be scraping</p> <p>6 of the alluvium below the existing waste rock</p> <p>7 stockpiles. That was in relation to his slide number 36</p> <p>8 that shows there's alluvium below Waste Rock Stockpile</p> <p>9 Number 3.</p> <p>10 A. Yes. So we did a supplemental soils</p> <p>11 investigation, and that's included in the record. So we</p> <p>12 did a series of, I believe, five test pits in the --</p> <p>13 within the footprint of Waste Rock Stockpiles 2 and 3 to</p> <p>14 evaluate the potential for colluvial materials to be</p> <p>15 within the footprint that could be beneficial for</p> <p>16 reclamation cover material.</p> <p>17 And as part of that -- so we did the five test</p> <p>18 pits, and, yes, we are -- we are going to remove a</p> <p>19 portion of that colluvial material that we believe is</p> <p>20 suitable for cover material.</p> <p>21 Q. So you're going to remove the waste rock, dig</p> <p>22 down underneath it --</p> <p>23 A. No.</p> <p>24 You're talking about new Waste -- Existing</p> <p>25 Waste Rock Pile --</p>



458	<p>1 Q. Yes.</p> <p>2 A. -- Stockpile 3?</p> <p>3 No. There's no -- we're not removing any</p> <p>4 material underneath.</p> <p>5 Q. Okay. So there's not going to be scraping of</p> <p>6 that alluvial material.</p> <p>7 A. No. We -- I'm sorry. I thought you were</p> <p>8 talking about the new planned Waste Rock Stockpile 3.</p> <p>9 So the Existing Waste Rock Stockpile 3, no, there's --</p> <p>10 the material underneath there is not going to be</p> <p>11 removed.</p> <p>12 Q. All right.</p> <p>13 I also asked of Mr. Finch whether he could</p> <p>14 provide me with the exact properties of the</p> <p>15 store-and-release cover, and he said that you would do</p> <p>16 that for me.</p> <p>17 A. As part of the investigation, we looked at</p> <p>18 soil textures, we looked at -- we did some chemical</p> <p>19 analyses on those two. And based on our evaluation of</p> <p>20 that material, we're looking at -- I guess under the</p> <p>21 USDA, we're looking at loams, sandy loams, sandy clay</p> <p>22 loams material, and we looked at the particle size</p> <p>23 distribution of that material.</p> <p>24 And from that evaluation, we looked at</p> <p>25 relationships with soil moisture retention based on soil</p>	460	<p>1 ensure that only 2 percent deep percolation through the</p> <p>2 36-inch cover is achieved?</p> <p>3 MR. BUTZIER: I'll object to the question.</p> <p>4 I'm not sure what is referred to in the current</p> <p>5 situation.</p> <p>6 Is that the natural ground or --</p> <p>7 MS. ORTH: Would you clarify.</p> <p>8 MS. BARNCASTLE: What is currently out there.</p> <p>9 MR. BUTZIER: Yeah. Okay. Thank you.</p> <p>10 MR. STEIN: I will say there are areas where</p> <p>11 the colluvial or alluvial cover over the bedrock is</p> <p>12 thinner than the three feet that we're proposing. So</p> <p>13 we -- the three-foot cover is greater than what's</p> <p>14 observed in certain areas of the mine.</p> <p>15 Under the Copper Rule required under our</p> <p>16 calculations, looking at the winter and summer precip</p> <p>17 and the requirements under the Copper Rule, we're</p> <p>18 looking at a requirement to store a minimum of</p> <p>19 20.9 inches within that three-foot cover.</p> <p>20 So an additional component of the cover</p> <p>21 systems is the revegetation of the cover systems where</p> <p>22 you get additional transpiration and evaporation -- or</p> <p>23 transpiration from the vegetation, evaporation from the</p> <p>24 stored moisture within the cover system.</p> <p>25 So I don't -- I mean, in a specific -- I mean,</p>
459	<p>1 textures to evaluate the water holding capacity of that</p> <p>2 material, the estimated water holding capacity.</p> <p>3 And we determined as part of that soil</p> <p>4 investigation that that material that we deemed</p> <p>5 suitable, that would -- that we're including in as</p> <p>6 reclamation cover material, would be suitable, in our</p> <p>7 opinion, at this point in time as reclamation cover</p> <p>8 material.</p> <p>9 Now, I want to expand on that. As part of the</p> <p>10 condition in DP -- in the draft Discharge Permit,</p> <p>11 there's a requirement to further test the reclamation</p> <p>12 cover material to ensure that it meets requirements of</p> <p>13 the Copper Rule.</p> <p>14 But at this point in time, the information</p> <p>15 that we have, we believe the materials in the -- in the</p> <p>16 volumes of materials that we say are readily available</p> <p>17 for reclamation cover material, that that particular</p> <p>18 volume will be suitable for reclamation cover material</p> <p>19 at the mine.</p> <p>20 Q. So you will not have to go somewhere else and</p> <p>21 find additional cover material.</p> <p>22 A. Correct.</p> <p>23 Q. For the areas with reclaimed store-and-release</p> <p>24 cover, how much does the evapotranspiration need to be</p> <p>25 increased as compared with the current situation to</p>	461	<p>1 I'd have to calculate that out. I can't give you a</p> <p>2 specific number right now on what you're, I think,</p> <p>3 specifically asking for.</p> <p>4 Q. (BY MS. BARNCASTLE) Have you done those</p> <p>5 calculations?</p> <p>6 I'm sorry. I didn't let you finish.</p> <p>7 Go ahead.</p> <p>8 A. We have not done specific calculations. That</p> <p>9 was done by Shomaker &amp; Associates under -- as far as</p> <p>10 their modeling evaluation.</p> <p>11 But we have looked at the -- like I said, we</p> <p>12 looked at the texture, particle size distribution data,</p> <p>13 evaluate the water holding capacity, and then we're</p> <p>14 going to further evaluate the material characteristics</p> <p>15 where we'll actually be evaluating the further -- the</p> <p>16 suitability of that reclamation cover material as part</p> <p>17 of the test plot program.</p> <p>18 Q. So did I understand you correctly to say that</p> <p>19 Shomaker &amp; Associates has done the calculations that I'm</p> <p>20 asking for?</p> <p>21 A. Shomaker &amp; Associates did the modeling, the</p> <p>22 drainage modeling for the stockpiles. But I have looked</p> <p>23 at their estimates for a reclaimed cover, a reclaimed</p> <p>24 facility, and 2 percent -- based on my experience at</p> <p>25 other mine sites and closure sites, 2 percent of mean</p>

462	<p>1 annual precipitation is a reasonable number, in my 2 opinion. 3 Q. And do you agree that you can achieve that 4 2 percent maximum deep percolation? 5 A. Yes. 6 Q. And that's with the planned cover that will be 7 out there, not with the potentially revised cover? 8 A. That's with the planned cover, yes. Correct. 9 Q. Bear with me on this one. 10 Throughout your presentation, you referred to 11 ripping. 12 Please explain to me what that is. 13 A. So the ripping is basically loosening up the 14 soil before you seed. So you're going to be 15 regrading -- because over time this -- the -- over -- 16 after placement and equipment running over even freshly 17 placed cover, the -- it's common that as part of their 18 revegetation process is -- is that we would rip to 19 loosen the soil before we seed. 20 Q. So that's just a heavy machine that would go 21 through and -- 22 A. It's like -- 23 Q. -- dig up -- 24 A. -- yeah, a plow, a disc-type operation. Yeah. 25 Q. Got you.</p>	464	<p>1 along the perimeter of the stockpile and runs into a 2 lined stormwater impoundment, HDPE-lined impoundment. 3 That gets put back into the process water circuit. 4 MS. BARNCASTLE: Can we go to slide 10, 5 please. 6 Q. So this is the one I'm talking about, that 7 it's the third one, and I believe that's Existing 4, and 8 there is a blue line -- that one right there. 9 A. That's a surface water conveyance channel. 10 Surface water conveyance channel. So after this slope 11 is reclaimed, so it's covered and revegetated and 12 regraded, and then also the top -- so this -- so this is 13 designed so once the top is reclaimed, flow -- in this 14 region here, surface water flow off the reclaimed 15 surface, so this is clean surface water, gets conveyed 16 back into Grayback Arroyo. 17 It's not a seepage collection structure. 18 Q. Okay. 19 And that's both during operation and after 20 closure that that water will go back into Grayback. 21 A. This would be -- this -- this would be once 22 this slope is reclaimed, because we don't want -- this 23 is just specifically to handle clean surface water 24 run-off, this channel. 25 I can't recall the sequence on when this</p>
463	<p>1 Existing Waste Rock Stockpile Number 4 has 2 drainage that's collected at the toe downslope. 3 Will that water be pumped into the pit? 4 A. Well, Existing Waste Rock Stockpile 4 does not 5 have a toe collection system. It has a conveyance 6 channel at the base for stormwater -- clean stormwater 7 run-off. There's no -- there's no toe collection at 8 Existing Waste Rock Stockpile 4. 9 Q. Okay. Maybe it's the planned one, then, I 10 need to refer to, then. 11 A. The -- under our operational period for 12 planned -- are you -- I'm not sure what you're exactly 13 referring to. Are you talk -- I guess I'm not -- 14 Q. Maybe I didn't follow you either. 15 A. Yeah. I'm sorry. I probably wasn't clear. 16 Q. One of them -- 17 MS. ORTH: Wait. One at a time. 18 Q. (BY MS. BARNCASTLE) One of them has the 19 ability to collect water downslope, and we're wondering 20 where that water will be taken, where it will go. 21 A. Okay. So I think you're referring to Waste 22 Rock Stockpile 3. There's a drainage or a toe 23 collection channel that's built into the Operational 24 Plan for that facility. And that's beyond the 25 constructed stockpile just beyond the toe, and it goes</p>	465	<p>1 structure is built, if it's -- if it's handling any 2 flows, which it shouldn't be handling any flow. So it 3 would be constructed following the reclamation of the 4 slope here. So it's handling just the clean run-off 5 from the slope, and then this disturbed area right in 6 here gets reclaimed, also. 7 And the channel -- after the cover is placed 8 and revegetated, the channel gets built in to convey 9 surface water -- clean surface water run-off from the 10 slope and this disturbed area here, and it would flow 11 back in Grayback. 12 No seepage would -- there's no seepage -- this 13 isn't designed -- or there's really -- there's no 14 seepage in this area anyway. So the -- under the 15 reclamation, it's specifically handled -- designed to 16 handle clean surface water run-off. It's not a toe 17 collection system. 18 Q. Okay. 19 And so I'd like the record to reflect that 20 we're on slide 10, and it's the Existing Waste Rock 21 Storage Number 4. 22 And can you describe which -- I don't know 23 that I can describe which facility you're talking about 24 that's going to lead back into Grayback, but it's the 25 middle blue line, I guess, on the slide?</p>

466	<p>1 A. Yeah. I can give you a channel number on 2 that, if I can read it. 3 I think it's TC4. But it's in the MORP 4 design -- 5 Q. TC4? 6 A. TC4 I believe is the channel. Yeah. 7 Q. Okay. 8 And so that is not going to be collecting 9 contaminated water, that will be constructed only after 10 reclamation. 11 A. After that slope's reclaimed. Yes. 12 Q. Okay. 13 And then that water gets returned back to 14 Grayback Arroyo. 15 A. Correct. 16 Q. And it's not anticipated that any contaminated 17 water, any mine-impacted water could in any way find its 18 way to that discharge. 19 A. Correct. 20 Q. Mr. de Saillan was asking you scenarios about 21 Grayback Arroyo breaching and whether water might reach 22 the pit, and I don't know if we ever got to an answer, 23 but I'll try again. 24 Is there any possible scenario under which 25 Grayback Arroyo could breach and water would flow</p>	468	<p>1 encapsulating the acid-generating material with 2 nonacid-generating material, you didn't really cover for 3 us how we -- how you would determine what needs to be 4 encapsulated versus what will not be encapsulated. 5 Can you discuss that for us, please. 6 A. I can discuss in general terms, but, I mean, 7 that's probably more of a Jeff Smith, Mine Operations 8 Plan. 9 But in any mine operation, there's ore control 10 measures that are in place, material handling, because 11 they want to -- as part of the ore control, you want to 12 make sure you're -- you're mining the material that you 13 want to mine and extract the metals and the -- the 14 minerals that you want to get from that material. 15 And then so you're always characterizing the 16 material you're removing from the pit. And part of 17 that -- you could be looking at different parameters, 18 but as part of the ore control measures, whatever is 19 mined from that, it's designated in whatever testing is 20 done by -- there's ore control managers. There's 21 geologists that are looking at the material that's mined 22 from the pit to make sure that the materials segregate 23 appropriately as part of the mine operations. 24 So they -- there's testing done to determine 25 whether the material is potentially acid-generating, the</p>
467	<p>1 directly into the pit? 2 A. There's no reasonable scenario. Like I 3 mentioned before, M3 did a diversion analysis, and they 4 did various storm inter -- storm intensities and 5 intervals. They looked at the 100-year, 20 -- 200-year 6 and as well as 500-year storm event, flows from a 7 500-year storm event, and there was no indication even 8 under the 500-year storm event that there would be any 9 breaching of the existing Grayback channel. 10 So I -- I'm -- I do not expect that. No. 11 Q. So your answer was there's no reasonable 12 timeline that would happen, but what would an 13 unreasonable event look like? 14 MR. BUTZIER: Objection to the form of the 15 question. 16 MR. STEIN: I guess my answer would be I do 17 not -- I do not anticipate or expect that, in my 18 professional opinion. 19 MS. BARNCASTLE: Okay. 20 Q. So you changed your answer to it couldn't 21 happen. 22 MR. BUTZIER: Objection. 23 MS. ORTH: I think he gave you his answer. I 24 wouldn't characterize it further. 25 Q. (BY MS. BARNCASTLE) When you talked about</p>	469	<p>1 transitional materials, or whether that they're the 2 nonpotentially acid-generating material, or the ore that 3 they -- you know, that they want to process. 4 So that's done continuously throughout the 5 mine operations. 6 Q. Okay. 7 So as far as you understand, there will be 8 continuous sampling to help determine what -- 9 A. There's continuous monitoring of the material 10 that's mined from the pit, yes, and determine where that 11 material goes as far as which waste rock stockpile it 12 goes to and where it goes to. 13 MR. BUTZIER: Be sure you let her finish her 14 question before you answer. 15 MR. STEIN: Oh, okay. Yeah. 16 MS. BARNCASTLE: And I'll try to make sure -- 17 MR. STEIN: Sorry. 18 MS. BARNCASTLE: -- I let you finish your 19 answer before I start talking. I apologize. 20 Let me see here. 21 MR. BUTZIER: Cheryl would appreciate that. 22 Q. (BY MS. BARNCASTLE) So you referred several 23 times to clean surface water or stormwater collection 24 ponds installed during operations that would be 25 returning clean water to the environment.</p>

470	<p>1 Am I confused? How would there be clean</p> <p>2 surface water in that area during operation?</p> <p>3 A. I don't recall saying that.</p> <p>4 Q. So I'm confused.</p> <p>5 A. Or I misspoke, but I don't recall saying that.</p> <p>6 Q. Okay.</p> <p>7 And each of those collection ponds will be</p> <p>8 removed during closure.</p> <p>9 A. Correct. They'll be reclaimed.</p> <p>10 Q. So what will happen to the water that would</p> <p>11 otherwise make it to them when those ponds are removed?</p> <p>12 A. Well, so the ponds will be backfilled with --</p> <p>13 with reclamation cover material, and they get regraded.</p> <p>14 So -- and revegetated -- well, regraded to drain away</p> <p>15 from the footprint of the former ponds.</p> <p>16 Stormwater, once the -- so if there's an</p> <p>17 adjacent facility -- right now it -- they're designed to</p> <p>18 collect any run-off from an uncovered facility at the</p> <p>19 mine, waste rock facility, or a portion of the mine.</p> <p>20 So once reclamation occurs, the -- whatever</p> <p>21 the facility is is going to get covered, and it's going</p> <p>22 to get revegetated. And then we construct the surface</p> <p>23 water conveyance channels. So they're no longer needed,</p> <p>24 because the clean surface water at that point, after</p> <p>25 covers are in place and revegetated, gets diverted or</p>	472	<p>1 So, I mean, there could be limited soil</p> <p>2 moisture beneath the channels. Yes.</p> <p>3 Q. So there is some level of mixing that would</p> <p>4 have to occur to convey that water out, because some</p> <p>5 water is going to percolate down before the channel will</p> <p>6 act as a channel, right?</p> <p>7 A. No, not necessarily.</p> <p>8 Q. So it's your testimony that there will not be</p> <p>9 any mixing of mine-impacted water and the clean water.</p> <p>10 A. There -- there's a potential for limited</p> <p>11 drainage or infiltration beneath the conveyance</p> <p>12 channels.</p> <p>13 Q. I'd like to go to slide 24, please.</p> <p>14 Now, I think I understand the answer to this,</p> <p>15 but why are we only revegetating the yellow portions and</p> <p>16 not the whole area?</p> <p>17 A. Well, the way that the pit's constructed is</p> <p>18 that there's -- there's high walls and then a low bench</p> <p>19 and then high walls. So the areas that we show here are</p> <p>20 accessible portions of the pit that we can safely access</p> <p>21 for reclamation purposes, or for cover and revegetation.</p> <p>22 And those are around the pit perimeter and along the</p> <p>23 haul road, down to the base of the pit, and then there's</p> <p>24 a bench.</p> <p>25 So these are -- it's more of a safety issue</p>
471	<p>1 conveyed off the facilities and back into Grayback</p> <p>2 Arroyo or into the open pit.</p> <p>3 So it's only at that point in time, once the</p> <p>4 waste rock facilities, plant area are covered, are</p> <p>5 those -- those -- those stormwater impoundments aren't</p> <p>6 required anymore at that point in time.</p> <p>7 Q. Are the clean surface water channels going to</p> <p>8 be lined to keep that water from mixing with</p> <p>9 mine-impacted water?</p> <p>10 A. They're -- the conveyance channels are</p> <p>11 basically constructed -- there's cover -- reclamation</p> <p>12 cover material under the channels themselves. So you've</p> <p>13 got the cover, reclamation cover, soil cover, underneath</p> <p>14 those, and then you've got the conveyance channels built</p> <p>15 into the reclamation cover itself.</p> <p>16 But as far as HDPE-lined channels, no.</p> <p>17 They're not lined.</p> <p>18 Q. Is there potential for mixing the clean</p> <p>19 surface water with mine-impacted water then?</p> <p>20 A. Well, the channel is designed to convey water</p> <p>21 out. So there's no ponding -- where you would have a</p> <p>22 potential for -- or a concern with mixing would be if</p> <p>23 you allowed ponding within a conveyance channel.</p> <p>24 They're designed to remove surface water --</p> <p>25 expeditiously remove surface water from the facilities.</p>	473	<p>1 to -- as far as working within high wall areas. And</p> <p>2 that's the primary reason why you're just seeing what</p> <p>3 you're seeing there. They're accessible areas.</p> <p>4 Q. Okay. Like I said, I thought I understood the</p> <p>5 answer, I just wanted to make sure.</p> <p>6 Slide 27, please.</p> <p>7 In this slide, you refer to ripping surface</p> <p>8 impoundment HDPE liners and folding over prior to</p> <p>9 backfilling.</p> <p>10 I'm not sure I understand what you mean.</p> <p>11 So what do you mean by folding over prior to</p> <p>12 backfilling?</p> <p>13 A. So our plan is to -- so we're going to remove</p> <p>14 the sediment from the ponds, any sediment that's built</p> <p>15 up in there. And then the liners -- typically what we</p> <p>16 do is we -- there's an HDPE liner. We go in, and we rip</p> <p>17 that liner, because right now it's just collected. It</p> <p>18 contains water. So it will allow for -- it won't allow</p> <p>19 for any accumulation of water within the -- you just</p> <p>20 don't want the liner -- stay in place.</p> <p>21 So we -- once it's ripped sufficiently, we</p> <p>22 fold it over, and then you still have your depression</p> <p>23 associated with the surface impoundment, and then that</p> <p>24 whole area gets backfilled and graded to drain</p> <p>25 positively. So it's covered over the liner after it's</p>

<p style="text-align: right;">474</p> <p>1 ripped --</p> <p>2 Q. So the --</p> <p>3 A. -- and folded into the middle of where the</p> <p>4 pond is.</p> <p>5 Q. So the liner stays there.</p> <p>6 A. Yes.</p> <p>7 Q. And it previously held mine-impacted water.</p> <p>8 A. Yes. But like I said, the sediment material</p> <p>9 would -- prior to ripping, it's removed from the liner</p> <p>10 materials. But yes. It -- depending on the location</p> <p>11 of -- it could have. Yes.</p> <p>12 Q. What is done with that sediment that's removed</p> <p>13 that is potentially contaminated?</p> <p>14 A. It gets -- under our plan, it gets put on top</p> <p>15 of the tailing facility prior to reclamation of the top</p> <p>16 surface of the tailing facility.</p> <p>17 Q. Will there continue to be storage of</p> <p>18 mine-impacted water after closure?</p> <p>19 A. In the surface impoundments?</p> <p>20 Q. Um-hum. Yes.</p> <p>21 A. No. Not -- no.</p> <p>22 Q. Anywhere in the -- on the site?</p> <p>23 A. There's storage of -- you're talking about</p> <p>24 impacted water?</p> <p>25 Q. Yes.</p>	<p style="text-align: right;">476</p> <p>1 Where will that water go?</p> <p>2 A. So any -- I think that pertains to the</p> <p>3 pipelines. So that flushed water again gets put back on</p> <p>4 the tailing and gets incorporated into that active</p> <p>5 evaporation program on the tailing impoundments, part of</p> <p>6 the Water Management Plan.</p> <p>7 Q. During Mr. de Saillan's cross-examination, you</p> <p>8 referred to draindown curves.</p> <p>9 Where are those?</p> <p>10 A. Those are an attachment to the -- to the MORP</p> <p>11 itself. Those are included in the MORP document as an</p> <p>12 attachment to the MORP. There's a water -- it's part of</p> <p>13 the Water Management Plan.</p> <p>14 Q. Is that draindown of the tailings or water</p> <p>15 flowing through the cover?</p> <p>16 A. It's -- it's -- well, it would -- it's</p> <p>17 draindown water. Yes. There's a small -- well, we</p> <p>18 still have the 2 percent mean annual precip that's</p> <p>19 estimated. So that's also part of that -- would be</p> <p>20 incorporated in the draindown water.</p> <p>21 MS. BARNCASTLE: If I can have just a moment</p> <p>22 to check my notes.</p> <p>23 MS. ORTH: Yes.</p> <p>24 Q. (BY MS. BARNCASTLE) So you referred quite a</p> <p>25 bit to reclamation going above and beyond what's</p>
<p style="text-align: right;">475</p> <p>1 A. Well, there's going to be the drain -- tailing</p> <p>2 draindown water, which that's a -- whether it's impacted</p> <p>3 or not, I can't tell you, but it is a tailing draindown</p> <p>4 water, gets -- it's within the tailing Water Management</p> <p>5 Plan. So it gets -- it recirculates through the -- and</p> <p>6 into the tailing evaporation pond, which is a</p> <p>7 double-lined evaporation pond.</p> <p>8 Q. And then there would be some water associated</p> <p>9 with the waste rock, also, right?</p> <p>10 Some contaminated water would still exist</p> <p>11 because of the waste rock areas.</p> <p>12 A. I'm not sure where you're coming from on that.</p> <p>13 Q. If all the mine-impacted water facilities will</p> <p>14 be closed and removed, how do we ensure that no offsite</p> <p>15 discharges of the mine-impacted water after closure</p> <p>16 occur?</p> <p>17 A. Well, I think the -- the monitoring system</p> <p>18 that Mr. Finch described will be monitoring the water</p> <p>19 quality and water levels within the groundwater as well</p> <p>20 as the surface water following closure of a particular</p> <p>21 facility. So he -- he'd be better to describe that</p> <p>22 Monitoring Plan. I think he described it yesterday,</p> <p>23 but --</p> <p>24 Q. You also referenced flushing of various</p> <p>25 infrastructure.</p>	<p style="text-align: right;">477</p> <p>1 required of -- in the Copper Rule.</p> <p>2 What is the benefit to New Mexico Copper of</p> <p>3 going above and beyond what's required?</p> <p>4 A. The benefit -- well, there -- the benefit is</p> <p>5 I -- for the Reclamation Plan, it -- the going above and</p> <p>6 beyond is making sure that we're taking care of these</p> <p>7 legacy sites first. So we want to do that as a good</p> <p>8 corporate citizen.</p> <p>9 And the other benefit is that reclamation</p> <p>10 within the open pit surface drainage area is a component</p> <p>11 of the Open Pit Reclamation Plan where we're bringing in</p> <p>12 clean surface water into the open pit as part of the</p> <p>13 Reclamation Plan for the rapid fill and maintaining that</p> <p>14 level within the pit.</p> <p>15 Q. So yesterday we heard a little bit about</p> <p>16 reclamation of the existing groundwater contamination,</p> <p>17 but we didn't hear anything in this plan today.</p> <p>18 Does your plan consider reclamation of the</p> <p>19 groundwater contamination at all?</p> <p>20 A. That's not a component of our plan.</p> <p>21 MS. BARNCASTLE: I don't believe I have</p> <p>22 anything further.</p> <p>23 Thank you.</p> <p>24 MS. ORTH: All right. Thank you,</p> <p>25 Ms. Barncastle.</p>

478	<p>1 Is there anyone else who has a question of</p> <p>2 Mr. Stein about his testimony?</p> <p>3 Ms. Brittan.</p> <p>4 EXAMINATION</p> <p>5 BY MS. BRITTAN:</p> <p>6 Q. Hi.</p> <p>7 A. Hi.</p> <p>8 Q. I just have a couple little questions.</p> <p>9 So the terracing or benches, as you call them,</p> <p>10 so those will actually remain a feature of the</p> <p>11 landscape, won't they? They'll just be covered with</p> <p>12 vegetation?</p> <p>13 A. Correct, yes.</p> <p>14 Q. Okay.</p> <p>15 Oh. The tailing storage facility, what kind</p> <p>16 of vapors will be given off from that evaporation</p> <p>17 process, open tailings?</p> <p>18 A. The way those evaporation systems are</p> <p>19 designed -- the way we have them designed is that</p> <p>20 they're primarily contained within the -- that general</p> <p>21 area, the 15-acre site for the evaporation program.</p> <p>22 But as far as the -- we've not really done an</p> <p>23 analysis of what the components of the evaporated water</p> <p>24 would be as far as the -- I mean, we know what the</p> <p>25 expected water chemistry is, but we haven't -- we're not</p>	480	<p>1 the -- the seed mix in the MORP. So the plan seed mix.</p> <p>2 And that -- we've used that seed mix or a similar seed</p> <p>3 mix at other reclamation study -- or by reclamation</p> <p>4 sites, particularly in Chino and Tyrone, and they've</p> <p>5 been very successful there. They include both warm and</p> <p>6 cool seeds and grasses, forbs and shrubs, the seed mix</p> <p>7 does.</p> <p>8 But they are primarily native species. Yes.</p> <p>9 Q. You say primarily native.</p> <p>10 A. Well, I --</p> <p>11 Q. Have you done a botanical for the immediate</p> <p>12 area to know which species are or are not --</p> <p>13 A. Yes. Part of --</p> <p>14 MS. ORTH: Hold on. Hold on. You have to</p> <p>15 speak one at a time.</p> <p>16 Please finish your question, Dr. Blair.</p> <p>17 Q. (BY MS. BLAIR) Have you done a botanical</p> <p>18 flora of the immediate area so you know exactly which</p> <p>19 species should and should not be there that are native?</p> <p>20 A. I would have to consult with the vegetation</p> <p>21 specialist in our office on that.</p> <p>22 Q. It's become something of an issue on many</p> <p>23 reclamation sites that although they may use a species</p> <p>24 that has been documented in an area they're becoming</p> <p>25 aware that, in fact, there are issues with local genetic</p>
479	<p>1 anticipating they're going to -- we haven't evaluated</p> <p>2 that.</p> <p>3 Q. Okay.</p> <p>4 So fumes or anything like that, you haven't</p> <p>5 checked into that?</p> <p>6 A. Well, I don't anticipate you're going to --</p> <p>7 you would be able to detect anything outside of the mine</p> <p>8 permit area, as far as vapors or fumes or anything.</p> <p>9 Q. Okay. Thank --</p> <p>10 A. But I'm not an air quality expert. I --</p> <p>11 Q. Okay. Thank you.</p> <p>12 A. Yes.</p> <p>13 MS. ORTH: Thank you, Ms. Brittan.</p> <p>14 Are there any other questions of Mr. Stein</p> <p>15 based on his testimony?</p> <p>16 Please come up.</p> <p>17 We need your name first.</p> <p>18 MS. BLAIR: I'm Dr. Kathleen Blair.</p> <p>19 EXAMINATION</p> <p>20 BY MS. BLAIR:</p> <p>21 Q. When you speak about vegetating component</p> <p>22 restoration, the vegetative community, are you talking</p> <p>23 about using only immediately local species? Native</p> <p>24 species.</p> <p>25 A. They -- yes. They're native species. We have</p>	481	<p>1 adapted subspecies or even races or populations that has</p> <p>2 impacted survivorship in the future.</p> <p>3 That requires you actually select seeds and</p> <p>4 harvest seeds from the immediate area before the</p> <p>5 reclamation takes place, before the process takes place.</p> <p>6 Has any of that been considered?</p> <p>7 A. Again I'd have to consult with our vegetation</p> <p>8 specialist in our office on that.</p> <p>9 Q. Have you considered the projected changes in</p> <p>10 weather and climate systems over the next 25 years that</p> <p>11 may preclude certain species being suitable at the time</p> <p>12 you actually apply them?</p> <p>13 A. Again I'd have to defer to a reclamation -- or</p> <p>14 the vegetation specialist in our office on that.</p> <p>15 Q. Have you -- do you use primarily the New</p> <p>16 Mexico plant labs in order to determine a number of</p> <p>17 these facets, or are they simply commercial</p> <p>18 recommendations?</p> <p>19 A. No. I think the plant list we've developed</p> <p>20 over time based on reclamation of other facilities in</p> <p>21 the area, and it's been worked out in consultation with</p> <p>22 the Mining and Minerals Division as part of their review</p> <p>23 of the success of the reclamation over time and the</p> <p>24 revegetation at these mine sites.</p> <p>25 And -- but any further specifics on that I'd</p>

482	<p>1 have to refer to our vegetation specialist in our                  2 office.                  3 Q. And are they then in communications with                  4 various university-based botanical experts that can --                  5 A. Yes, they are.                  6 Q. Okay. Thank you.                  7 A. Yeah.                  8 MS. ORTH: Thank you, Dr. Blair.                  9 Are there other questions?                  10 Ma'am.                  11 Give us your name first.                  12 MS. YARMAL: Hi.                  13 My name is Cindy Yarmal. And I have Animas                  14 Creek Honey and Herb Farm. It's downstream from the                  15 proposed mine.                  16 EXAMINATION                  17 BY MS. YARMAL:                  18 Q. And I'm just wondering.                  19 Did you use the evaporation treatment that you                  20 talked about with the preexisting tailing pond that was                  21 on the property?                  22 A. I can't speak to that, but I do not believe an                  23 evaporation system was in the previous -- was used                  24 during the previous operations.                  25 Q. So I'm going to -- I'm also curious.</p>	484	<p>1 We have an organic farm.                  2 MS. ORTH: All right. Thank you.                  3 Are there other questions of Mr. Stein based                  4 on his testimony?                  5 Ms. Browne.                  6 MS. BROWNE: Thank you.                  7 Candace Browne.                  8 EXAMINATION                  9 BY MS. BROWNE:                  10 Q. The reclamation will happen after mining                  11 stops, right?                  12 A. There's components that will happen                  13 immediately -- or soon after the mine starts operation,                  14 also.                  15 Q. Okay.                  16 A. The other components that are reclaimed                  17 afterwards, they're part of the mine operation. So it's                  18 difficult or really not feasible to reclaim them,                  19 because they're being used as part of the mine                  20 operations.                  21 Q. Okay.                  22 If the mine stops on a temporary basis, for                  23 example, if the copper price drops, will any portion of                  24 this reclamation process be implemented? And if so,                  25 what portion?</p>
483	<p>1 The pond that was there or is there, what is                  2 being done with that?                  3 Because you talk about all the things that                  4 you're going to do after, you know, reclamation of the                  5 property afterwards.                  6 But what about right now? What is being done                  7 with the problems that are already preexisting on the                  8 property?                  9 A. I have to defer that to probably Jeff Smith                  10 here on that. Our plan is for reclamation and closure.                  11 My component of my testimony is specifically on what                  12 happens after mining operations and reclamation and                  13 closure.                  14 Q. I guess my concern is because we're talking                  15 about reclamation, you're saying what's going to happen                  16 after the, quote, new mine goes in.                  17 What about what's already there? What about                  18 what has already been there?                  19 MS. ORTH: So, Ms. Yarmal, we've heard from                  20 several other witnesses, including witnesses who                  21 described the reclamation that will occur either before                  22 or concurrent with new operations, and those witnesses                  23 have already testified mostly yesterday.                  24 MS. YARMAL: Okay. Thank you.                  25 It's just a major concern. I'm downstream.</p>	485	<p>1 A. Well, there's a -- as part of the permitting                  2 process, not necessarily in this, there's -- there's a                  3 bonding -- process for bonding which includes bonding                  4 for closure, whatever the estimate is for reclamation.                  5 So those monies are set aside for -- if                  6 there's an unplanned closure at a certain point in time,                  7 those are set aside to handle the reclamation in                  8 accordance with the plan. So that would kick in the                  9 Reclamation Plan as I described it. Whatever components                  10 of the mine operations have been constructed at that                  11 point would be reclaimed.                  12 Q. Even if that's just for a temporary period?                  13 A. No. That doesn't -- no. Yeah. So --                  14 MR. BUTZIER: Wait until she finishes.                  15 MR. STEIN: Oh, sorry.                  16 MR. BUTZIER: Were you finished with your                  17 question, ma'am?                  18 MS. ORTH: Yes. She was.                  19 Q. (BY MS. BROWNE) I'm not totally clear about                  20 your answer. Let me ask the original question again.                  21 If the mine stops -- if mining stops on a                  22 temporary basis because of for some reason -- and I'm                  23 going to use the example if the copper price drops too                  24 low and they decide to close the mine, or stop mining                  25 for some period of time, they don't know how long it</p>

486	<p>1 will be, will they -- will some of the reclamation                  2 processes be implemented? And if so, which ones and for                  3 what reason?                  4 A. Well, again that -- any of the legacy sites                  5 there -- well, several legacy sites are taken care of up                  6 front.                  7 Now, on the temporary -- there's specific                  8 regulations that handle if there's a temporary slowdown                  9 or shutdown of the mine, and I guess I'm not prepared to                  10 present that at this point, but -- so but there's                  11 specific regulations written to handle that type                  12 situation that you're talking about.                  13 Q. And what I think I heard you say is that right                  14 now you don't have a clear answer for that, or you                  15 weren't able to speak about that?                  16 A. I'm not able to speak about that, but I would                  17 refer you to the regulations that --                  18 Q. There's something set up?                  19 A. -- that detail that. Yes.                  20 Q. There's something set up?                  21 A. Yes.                  22 Q. Okay. Thank you.                  23 MS. ORTH: Thank you, Ms. Browne.                  24 Are there other questions of Mr. Stein based                  25 on his testimony?</p>	488	<p>1 Q. And the Copper Rule takes into effect global                  2 warming or climate change or the severe effects of                  3 those?                  4 A. Well, it incorporates a long period of                  5 record -- climate record, which is a 100-year period,                  6 and that's -- which includes prolonged periods of                  7 drought as well as prolonged periods -- wet periods. So                  8 it handles variability as part of that 100-year record.                  9 Q. The severity of the storms we've seen over the                  10 last 10 years doesn't equate with any of the 350-year                  11 record that you can find in this area of the country,                  12 such as the Spanish have been here for 500 years.                  13 So we're talking in the next 10 years, when                  14 the severity of the storms are expected to double,                  15 triple, quadruple, nobody even knows. And so, I guess,                  16 being downstream I'm a little more worried about the                  17 capacities of your treatment plants, your evaporation                  18 systems.                  19 MS. ORTH: All right.                  20 Is there a question, then, Mr. Kent?                  21 MR. KENT: Question. A suggestion, I guess,                  22 that a 500-year event is probably not a good baseline                  23 going forward.                  24 MS. ORTH: All right. Thank you.                  25 Are there other questions of Mr. Stein based</p>
487	<p>1 Sir.                  2 Give us your name first.                  3 MR. KENT: Dallas Kent. I'm co-owner of the                  4 Animas Creek Honey and Herb Farm.                  5 EXAMINATION                  6 BY MR. KENT:                  7 Q. In 2013, we had a 500-year event. 2014 was                  8 very close to the same. Some part due to the upper end                  9 of the watersheds being burned off. Houston had                  10 2,000-year events in two years.                  11 The reason is because warmer atmosphere,                  12 whether you -- no matter what you think it's caused by,                  13 will hold literally trillions of acre-feet of water,                  14 more than it did before.                  15 So why are you basing your flows and your                  16 gallon-per-minute acre-feet of pond capacity on 500-year                  17 event?                  18 A. Well, the -- when I refer to the 500-year                  19 event, that was an analysis of the flows within Grayback                  20 Arroyo associated with that event.                  21 Q. During 2013.                  22 A. Well, that's just a theoretical 500-year storm                  23 based on -- yeah, that analysis. So the other                  24 conveyance structures are designed in accordance with                  25 the Copper Rule, the reclamation design components.</p>	489	<p>1 on his testimony? Other questions?                  2 No?                  3 Any -- do you have follow-up, Mr. Butzier?                  4 MR. BUTZIER: Just a couple items, Madam                  5 Hearing Officer.                  6 REDIRECT EXAMINATION                  7 BY MR. BUTZIER:                  8 Q. Several times, Mr. Stein, you referred to the                  9 MORP.                  10 And can you say what that is?                  11 A. Well, the MORP is the -- it's the Mine                  12 Operation and Reclamation Plan, and as part of that                  13 MORP -- a component of that MORP is the Reclamation and                  14 Closure Plan which I presented today.                  15 Q. And you also mentioned that it includes                  16 draindown curves as an attachment, and you also talked                  17 about seed mix being present in that?                  18 A. Correct. It's part of the Reclamation Plan.                  19 Q. And is that what is described as the Mining                  20 Operation and Reclamation Plan, or MORP, which is the                  21 revised version July, 2017, identified as document 298                  22 in the administrative record at Bates number 15458 to                  23 15690?                  24 A. Yes, it is.                  25 Q. I'd like to pull up a slide from your</p>



490	<p>1 presentation.</p> <p>2 Is that the -- the Waste Rock Stockpile 2 and</p> <p>3 3, future Waste Rock Stockpile 2 and 3 -- is that the</p> <p>4 stockpile that Ms. Barncastle was referring to that</p> <p>5 includes an area that will be scraped and another area</p> <p>6 of existing disturbance that will not be scraped?</p> <p>7 A. I believe Ms. Barncastle was -- this is</p> <p>8 Existing Waste Rock Stockpile 3 here. That's what she</p> <p>9 was referring to. So we -- and as far as the removal of</p> <p>10 the alluvial or colluvial materials underneath this</p> <p>11 stockpile, it will not -- we don't have any plan there.</p> <p>12 Our focus is to -- prior to development of</p> <p>13 this new stockpile here is to remove suitable</p> <p>14 reclamation cover material prior to the construction of</p> <p>15 the new waste rock stockpile.</p> <p>16 Q. So I had understood her to be asking about the</p> <p>17 area of overlap, where the blue shading covers</p> <p>18 previously disturbed materials.</p> <p>19 Did I misunderstand that?</p> <p>20 I did misunderstand that?</p> <p>21 MS. BARNCASTLE: Yeah. I was referring to</p> <p>22 slide 36 from JSAI's presentation yesterday where</p> <p>23 there's Waste Rock Stockpile 2 and 3 that are existing,</p> <p>24 where there would be scraping of alluvial -- well, I</p> <p>25 guess there's an alluvial fan, and then some of it's</p>	492	<p>1 So the intent is that they will continue to</p> <p>2 collect any potential impacted water from an uncovered</p> <p>3 facility up until the point until we start the regrading</p> <p>4 and covering and reclamation of that particular facility</p> <p>5 that could potentially contribute surface water to the</p> <p>6 impoundment. It's within the drainage area of that</p> <p>7 impoundment itself.</p> <p>8 Q. So is it an oversimplification to say that</p> <p>9 essentially those ponds will not be reclaimed until</p> <p>10 they're -- it's unnecessary to continue to use them to</p> <p>11 capture mine-impacted water?</p> <p>12 A. No. That's not an oversimplification.</p> <p>13 Q. So it's accurate.</p> <p>14 A. It is accurate.</p> <p>15 MR. BUTZIER: Madam Hearing Officer, I have no</p> <p>16 further questions.</p> <p>17 MS. ORTH: All right. Thank you.</p> <p>18 And you've already moved your exhibits, I</p> <p>19 believe, right? It was like 90 to 104 or something?</p> <p>20 MR. BUTZIER: I'm not sure that I did.</p> <p>21 MS. ORTH: Okay.</p> <p>22 MR. STEIN: I think you might have done it up</p> <p>23 front.</p> <p>24 MS. ORTH: I think so.</p> <p>25 MR. BUTZIER: Okay.</p>
491	<p>1 outside of Waste Rock Stockpile 3, some of it is under</p> <p>2 Waste Rock Stockpile 3, and the testimony was that that</p> <p>3 alluvium would be scraped, and my question was would you</p> <p>4 be removing the waste rock stockpile to scrape under or</p> <p>5 just scraping what's accessible outside of it.</p> <p>6 MR. BUTZIER: Okay. Rather than further</p> <p>7 confuse the record, I think I will just leave that</p> <p>8 alone, Madam Hearing Officer.</p> <p>9 Q. Mr. Stein, there was some questioning from</p> <p>10 Ms. Barncastle relating to reclamation of some of the</p> <p>11 stored -- the impoundments onsite.</p> <p>12 Do you recall that?</p> <p>13 A. Yes.</p> <p>14 Q. And there was some questioning about what</p> <p>15 happens after that -- after those are reclaimed.</p> <p>16 My question is at what point in time in the</p> <p>17 reclamation and closure process do those get reclaimed?</p> <p>18 What has occurred up to that point?</p> <p>19 A. The impoundments, if they are to precede</p> <p>20 stormwater flow from an uncovered facility -- those</p> <p>21 get -- those are left in place to collect the</p> <p>22 impacted -- potential impacted stormwater, up to the</p> <p>23 point to where we start the regrading, covering and</p> <p>24 reclamation of whatever the adjacent or the contributing</p> <p>25 facility is during operations to that impoundment.</p>	493	<p>1 Have -- if they've been admitted, then I -- I</p> <p>2 apologize.</p> <p>3 I did do that?</p> <p>4 MS. ORTH: Yes. 90 to 104. Thank you.</p> <p>5 MR. BUTZIER: Okay. Thank you.</p> <p>6 It's getting late.</p> <p>7 MS. ORTH: We will excuse Mr. Stein, and let's</p> <p>8 take a break until 2:50.</p> <p>9 (Proceedings in recess from 2:43 p.m. to</p> <p>10 2:57 p.m.)</p> <p>11 MS. ORTH: All right. We move now from the</p> <p>12 presentation by New Mexico Copper Corporation to a</p> <p>13 presentation by the Ground Water Quality Bureau of the</p> <p>14 New Mexico Environment Department.</p> <p>15 Mr. Knight, I remember you made an opening</p> <p>16 statement at the beginning of the hearing. So I trust</p> <p>17 you'll just be leaping into the presentation of your</p> <p>18 witnesses.</p> <p>19 MR. KNIGHT: Thank you, Madam Hearing Officer.</p> <p>20 I would like to present my witnesses -- I'd</p> <p>21 like to have them give their direct testimony</p> <p>22 individually, and then, as was discussed previously, I'd</p> <p>23 like to have them stand for cross-examination as a</p> <p>24 panel.</p> <p>25 And I guess I wanted to ask the other</p>

494	<p>1 attorneys if there was any objection to having each one</p> <p>2 of them give their direct testimony and then save all</p> <p>3 the cross-examination questions until all three of them</p> <p>4 have given their direct testimony, if that's all right</p> <p>5 with you --</p> <p>6 MS. ORTH: Okay.</p> <p>7 MR. KNIGHT: -- or if that's all right with</p> <p>8 the other attorneys, I guess more to the point.</p> <p>9 MS. ORTH: I think we discussed that.</p> <p>10 Mr. de Saillan, do you have any objection?</p> <p>11 MR. DE SAILLAN: Madam Hearing Officer, I have</p> <p>12 no objection to that approach, with the caveat that I</p> <p>13 also raised at the scheduling conference, that is I will</p> <p>14 be directing my questions to individual witnesses.</p> <p>15 MS. ORTH: That's fine.</p> <p>16 Let's see. I don't see Ms. Barncastle.</p> <p>17 MR. BUTZIER: No objections.</p> <p>18 MS. ORTH: All right. Thank you very much.</p> <p>19 Please proceed, Mr. Knight.</p> <p>20 MR. KNIGHT: Thank you.</p> <p>21 First I would like to call Mr. Vollbrecht as</p> <p>22 my first witness.</p> <p>23 MS. ORTH: Let's swear them all in.</p> <p>24</p> <p>25</p>
495	<p>1 KURT VOLLBRECHT, BRADLEY REID and JOSEPH MARCOLINE</p> <p>2 having been first duly sworn or affirmed, were</p> <p>3 examined and testified as follows:</p> <p>4 DIRECT EXAMINATION OF KURT VOLLBRECHT</p> <p>5 BY MR. KNIGHT:</p> <p>6 Q. Good afternoon, Mr. Vollbrecht.</p> <p>7 Could you begin by just stating your full name</p> <p>8 for the record.</p> <p>9 A. Kurt Vollbrecht.</p> <p>10 Q. Mr. Vollbrecht, where are you employed?</p> <p>11 A. The Mining Environmental Compliance Section of</p> <p>12 the New Mexico Environment Department.</p> <p>13 Q. And how long have you worked for NMED?</p> <p>14 A. Twenty years.</p> <p>15 Q. And what is your current job title there?</p> <p>16 A. I'm the manager of the Mining Environmental</p> <p>17 Compliance Section.</p> <p>18 Q. What are your job duties in that position?</p> <p>19 A. I manage the program that is responsible for</p> <p>20 all permitting, spill response, abatement and public</p> <p>21 participation activities associated with mining</p> <p>22 facilities in New Mexico in accordance with the New</p> <p>23 Mexico Water Quality Act and the ground and surface</p> <p>24 water protection regulations.</p> <p>25 I also directly and indirectly supervise 12</p>
496	<p>1 staff.</p> <p>2 Q. Please describe your educational and</p> <p>3 professionals qualifications.</p> <p>4 A. I hold a bachelor of science degree in geology</p> <p>5 from California University -- California State</p> <p>6 University Hayward and a master's in geology from New</p> <p>7 Mexico Institute of Mining and Technology.</p> <p>8 During my 20 years with NMED, I have provided</p> <p>9 regulatory oversight ensuring compliance with the</p> <p>10 commission's regulations at a variety of facilities,</p> <p>11 including those for domestic and industrial wastewater</p> <p>12 discharges and abatement activities, and for the last 13</p> <p>13 years, exclusively -- exclusively for those associated</p> <p>14 with mine sites.</p> <p>15 Q. A copy of your resume has been provided as</p> <p>16 Exhibit 5; is that correct?</p> <p>17 A. Yes.</p> <p>18 Q. Have you submitted written direct testimony in</p> <p>19 this proceeding?</p> <p>20 A. Yes, I have.</p> <p>21 Q. And your full written direct testimony appears</p> <p>22 as Exhibit 2; is that right?</p> <p>23 A. That is correct.</p> <p>24 Q. Do you have any changes that you would like to</p> <p>25 make to that written testimony now?</p>
497	<p>1 A. I do not.</p> <p>2 Q. Do you adopt that written testimony as your</p> <p>3 testimony today?</p> <p>4 A. Yes, I do.</p> <p>5 Q. Could you please discuss the regulatory</p> <p>6 framework for draft Discharge Permit 1840?</p> <p>7 A. Yes. Pursuant to the New Mexico Water Quality</p> <p>8 Act, the Copper Flat Mine is subject to Part 3 of 20.6.2</p> <p>9 NMAC, which are the general groundwater permitting</p> <p>10 requirements, and 20.6.7 NMAC, which is the Copper Mine</p> <p>11 Rule which includes prescriptive requirements for</p> <p>12 protection of water quality of copper mines. DP-1840</p> <p>13 was drafted pursuant to these regulations.</p> <p>14 Q. Could you give a brief history of the</p> <p>15 discharge permitting process for this facility?</p> <p>16 A. Yes. New Mexico Copper Corporation submitted</p> <p>17 an initial Discharge Permit application in 2011.</p> <p>18 At that time, there was also done a</p> <p>19 cooperative agency process, which included New Mexico</p> <p>20 Copper Corporation was involved in that, the New Mexico</p> <p>21 Environment Department, the Bureau of Land Management,</p> <p>22 the Mining and Minerals Division, the Office of the</p> <p>23 State Engineer, as well, and this was a mechanism to</p> <p>24 ensure that the various regulatory requirements that the</p> <p>25 mine would be subject to would be met in a cohesive and</p>

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<p>1 comprehensive manner.</p> <p>2 Over the past seven-and-a-half years, this</p> <p>3 resulted in an iterative process that has resulted in</p> <p>4 changes to the mine plan over time.</p> <p>5 In 2015, New Mexico Copper Corporation</p> <p>6 submitted another Discharge Permit application which was</p> <p>7 intended to reflect the requirements of the Copper Mine</p> <p>8 Rule which came into being in 2013 as well as the</p> <p>9 changes to the mine plan that had occurred over that</p> <p>10 time.</p> <p>11 Review of the 2015 application proceeded based</p> <p>12 on the requirements of the Copper Mine Rule and was</p> <p>13 subject to the Copper Rule timelines for review.</p> <p>14 As a result of several requests for additional</p> <p>15 information, a revised permit application was submitted</p> <p>16 in 2017.</p> <p>17 I should also state that at various times</p> <p>18 during this period there were a Stage 1 Abatement Plan</p> <p>19 submitted that included various proposals and associated</p> <p>20 summaries of monitoring that had happened during that</p> <p>21 time frame.</p> <p>22 Q. Could you summarize the status of the</p> <p>23 administrative record in this matter?</p> <p>24 A. Yes. On July 10th, 2018, NMED filed the index</p> <p>25 to the administrative record with the Hearing Officer.</p>	<p>1 made that a hearing was warranted.</p> <p>2 Department issued notice of the hearing in</p> <p>3 August of 2015 -- that is incorrect -- in August of 2018</p> <p>4 in both the Albuquerque Journal and the local newspaper</p> <p>5 here, The Herald.</p> <p>6 In addition, NMED E-mailed the hearing notice</p> <p>7 to everyone who had provided E-mail comments on two</p> <p>8 separate occasions. We sent the public notice to the</p> <p>9 facility's specific mailing list the department</p> <p>10 maintains. We posted notice on the department web site</p> <p>11 and posted the notice in about a half a dozen locations</p> <p>12 in the affected communities, in both English and</p> <p>13 Spanish.</p> <p>14 This process exceeded or meets -- meets or</p> <p>15 exceeds all of the regulatory requirements of</p> <p>16 20.6.2.3108 NMAC.</p> <p>17 Q. What does draft DP-1840 state with respect to</p> <p>18 the surface water of the state determination for the</p> <p>19 Copper Flat pit water body following closure?</p> <p>20 A. Condition C115G of draft DP-1840 states that</p> <p>21 surface water quality standards do not apply to the open</p> <p>22 pit water mine at closure. The basis for this condition</p> <p>23 is the Surface Water Quality Bureau decision that the</p> <p>24 open pit water body that will exist following closure of</p> <p>25 the Copper Flat Mine does not meet the definition of a</p>
499	501
<p>1 And then the following day, July 11th, 2018, NMED posted</p> <p>2 the DP-1840 record on the department web site.</p> <p>3 Subsequent updates to the administrative record were</p> <p>4 conducted on September 13th, 2018, and also submitted on</p> <p>5 the day before this hearing started.</p> <p>6 Q. Mr. Vollbrecht, please describe the public</p> <p>7 process associated with DP-1840.</p> <p>8 A. In 2011 with the initial application, what's</p> <p>9 called a PN-1, Public Notice 1, was issued by the</p> <p>10 department as well as New Mexico Copper. The PN-1 is</p> <p>11 really a notification from the department and the</p> <p>12 applicant that an application has been submitted.</p> <p>13 Then in 2016, January of 2016, a PN-1 was</p> <p>14 issued for the revised permit application.</p> <p>15 The PN-2, the Public Notice 2, which is the</p> <p>16 notification that a draft permit has been prepared, was</p> <p>17 issued on February 2nd, 2018, for a 30-day time frame,</p> <p>18 which is what is required by regulation under 30 days.</p> <p>19 Received -- we received several requests to</p> <p>20 extend that time frame, and so it was extended to a</p> <p>21 total of 90 days, and the public comment period closed</p> <p>22 on May 5th, 2018.</p> <p>23 The department received substantial public</p> <p>24 comment on the proposed draft permit, including a number</p> <p>25 of requests for hearings, and that determination was</p>	<p>1 surface water of the state.</p> <p>2 Q. Can you discuss the steps taken that led to</p> <p>3 this decision by NMED?</p> <p>4 A. The water quality of the open pit will be very</p> <p>5 good following rapid refill -- and we saw a fair amount</p> <p>6 of testimony on that -- and will meet all standards for</p> <p>7 groundwater, livestock watering and wildlife habitat.</p> <p>8 Geochemical modeling conducted by New Mexico</p> <p>9 Copper Corporation predicted that over time the water</p> <p>10 quality will degrade due to evapoconcentration and</p> <p>11 inputs of groundwater from the surrounding mineralized</p> <p>12 rock into the hydrologic sink, and in 25 years after</p> <p>13 rapid fill, lake water quality may exceed surface water</p> <p>14 wildlife standards for one constituent.</p> <p>15 Before the New Mexico Mining and Minerals</p> <p>16 Division can issue a permit for a mine under the Mining</p> <p>17 Act, NMED must provide an environmental determination</p> <p>18 that indicates that all applicable environmental</p> <p>19 standards will be met. This includes surface water</p> <p>20 standards.</p> <p>21 Because of the requirements to provide this</p> <p>22 determination and the predicted water quality at 25</p> <p>23 years after closure, New Mexico Copper Corporation and</p> <p>24 the Surface Water Quality Bureau met on several</p> <p>25 occasions to discuss the applicability of surface water</p>

502	<p>1 quality standards to the open pit water body.</p> <p>2 The definition of surface water of the state</p> <p>3 has three exclusions. These include that, one, the</p> <p>4 water body in question is a manmade body of water not</p> <p>5 originally created in a surface water of the state; two,</p> <p>6 a surface water body is a private water that does not</p> <p>7 combine with other surface and subsurface waters; or,</p> <p>8 three, the surface water body is a water treatment</p> <p>9 system or a component of a water treatment system.</p> <p>10 In August of 2016, New Mexico Copper</p> <p>11 Corporation sent a letter to the Surface Water Quality</p> <p>12 Bureau summarizing the previous meetings and unique</p> <p>13 circumstances with respect to the setting and location</p> <p>14 of the current and future open pit water body.</p> <p>15 The letter requested concurrence from NMED</p> <p>16 that if New Mexico Copper Corporation could demonstrate</p> <p>17 that it met the private water criteria in the definition</p> <p>18 of surface water of the state, that the open pit water</p> <p>19 body would not be subject to surface water quality</p> <p>20 standards.</p> <p>21 In a letter dated October 16th, 2016, New</p> <p>22 Mexico Environment Department Surface Water Quality</p> <p>23 Bureau relied -- replied to New Mexico Copper</p> <p>24 Corporation, stating that because the open pit water</p> <p>25 body was an evaporative sink and no other surface waters</p>	504	<p>1 The Copper Rule acknowledges that impacts to</p> <p>2 groundwater are likely to occur from open pit copper</p> <p>3 mining. New Mexico Supreme Court acknowledged that the</p> <p>4 most appropriate mechanism to mitigate these potential</p> <p>5 impacts is through containment resulting from</p> <p>6 evaporation of the open pit water body.</p> <p>7 In summary, Surface Water Quality Bureau has</p> <p>8 determined that surface water quality standards at</p> <p>9 20.6.4 do not apply to the pit lake. Pursuant to the</p> <p>10 Mining Act, New Mexico Copper Corporation is required to</p> <p>11 achieve preexisting conditions following closure.</p> <p>12 Modeling indicates the future pit lake will have better</p> <p>13 water quality than the existing pit lake, which</p> <p>14 testimony has been provided previously with respect to</p> <p>15 that.</p> <p>16 Q. Thank you, Mr. Vollbrecht.</p> <p>17 Could you briefly describe the status of the</p> <p>18 financial assurance cost estimate for this facility?</p> <p>19 A. Yes. Ultimately three agencies, the Bureau of</p> <p>20 Land Management, the New Mexico Environment Department</p> <p>21 and the Mining and Minerals Division, must hold</p> <p>22 financial assurance for closure of the Copper Flat Mine</p> <p>23 through a Joint Powers Agreement between NMED and MMD</p> <p>24 and a Memorandum of Understanding that NMED holds with</p> <p>25 BLM, a mechanism exists for joint financial assurance to</p>
503	<p>1 flowed into the open pit, it therefore did not combine</p> <p>2 with other surface or subsurface waters.</p> <p>3 The letter further acknowledged that New</p> <p>4 Mexico Copper Corporation had received jurisdictional</p> <p>5 determination from the United States Army Corps of</p> <p>6 Engineers that the open pit water body was not a water</p> <p>7 of the US.</p> <p>8 The October of 2016 Surface Water Quality</p> <p>9 Bureau letter stated that if New Mexico Copper</p> <p>10 Corporation could demonstrate the future pit lake would</p> <p>11 be wholly on private land, surface water quality</p> <p>12 standards would not apply.</p> <p>13 The phrase "does not combine with other</p> <p>14 surface and subsurface waters" within the definition of</p> <p>15 surface water of the state is viewed from a narrow lens</p> <p>16 in this instance. Because Grayback Arroyo has been</p> <p>17 diverted around the pit and no other surface water flows</p> <p>18 into or out of the open pit and evaporation from the pit</p> <p>19 lake water body results in a hydrologic sink, there is</p> <p>20 no potential that the open pit water body could</p> <p>21 contaminate any other groundwater or surface water.</p> <p>22 This is in alignment with the Copper Rule</p> <p>23 which effectively grants a variance by rule from</p> <p>24 groundwater standards within the area of open pit</p> <p>25 hydrologic containment.</p>	505	<p>1 be held by all three agencies.</p> <p>2 The New Mexico Mining Act includes financial</p> <p>3 assurance regulations. Therefore the Mining and</p> <p>4 Minerals Division takes the lead role as agency for</p> <p>5 jointly held financial assurance. And this is typical</p> <p>6 at other sites where all three agencies are involved.</p> <p>7 NMED review and approval of the proposed cost</p> <p>8 estimate is necessary to ensure that the requirements of</p> <p>9 the Water Quality Act are met.</p> <p>10 In addition to ensuring there is financial</p> <p>11 assurance to cover costs associated for the prescriptive</p> <p>12 surface reclamation requirements of the Copper Rule,</p> <p>13 there must be financial assurance provided for long-term</p> <p>14 monitoring and maintenance of the site postclosure and</p> <p>15 any short-term and long-term water management that may</p> <p>16 be necessary. This includes consideration of tailing</p> <p>17 draindown water management, both active and passive,</p> <p>18 groundwater quality monitoring and monitoring to ensure</p> <p>19 open pit capture is maintained.</p> <p>20 There also needs to be adequate financial</p> <p>21 assurance in place to cover costs associated with the</p> <p>22 Abatement Plan in the event the facility never does</p> <p>23 operate. This would include source control through</p> <p>24 reclamation of the existing surface disturbance and</p> <p>25 long-term groundwater monitoring.</p>

506	<p>1 The New Mexico Environment Department intends</p> <p>2 to require financial assurance for a period of 100 years</p> <p>3 to ensure adequate financial assurance is in place for</p> <p>4 long-term monitoring and maintenance. This is</p> <p>5 consistent with the financial assurance requirements for</p> <p>6 the Chino and Tyrone mines where long-term water</p> <p>7 treatment is required.</p> <p>8 The financial assurance cost estimate will be</p> <p>9 subject to review every five years at permit renewal.</p> <p>10 No disturbance associated with mining will be allowed</p> <p>11 until the cost estimate is approved by all three</p> <p>12 agencies and financial assurance is in place.</p> <p>13 Q. Thank you.</p> <p>14 Is process -- is a process for review and</p> <p>15 approval of the financial assurance underway?</p> <p>16 A. Yes, it is. The New Mexico -- or a request</p> <p>17 for comment on the cost estimate was sent to New Mexico</p> <p>18 Environment Department from the Mining and Minerals</p> <p>19 Division pursuant to the Mining Act requirements in</p> <p>20 August of this year. There have been several meetings</p> <p>21 between MMD, NMED, BLM and New Mexico Copper Corporation</p> <p>22 to discuss the cost estimate.</p> <p>23 The first round of comments is due to the</p> <p>24 Mining and Minerals Division on October 15th. MMD can't</p> <p>25 issue the Mining Act permit until the financial</p>	508	<p>1 DIRECT EXAMINATION OF BRADLEY REID</p> <p>2 BY MR. KNIGHT:</p> <p>3 Q. Good afternoon, Mr. Reid.</p> <p>4 A. Good afternoon.</p> <p>5 Q. Could you please state your full name and your</p> <p>6 job title.</p> <p>7 A. My name is Bradley Reid, and my job title as</p> <p>8 designated by the State of New Mexico is</p> <p>9 geoscientist-advanced.</p> <p>10 Q. And could you tell us where you are employed?</p> <p>11 A. I work for the Mining Environmental Compliance</p> <p>12 Section, which is typically referred to as MECS, of the</p> <p>13 New Mexico Environment Department.</p> <p>14 Q. And what are your main responsibilities with</p> <p>15 MECS?</p> <p>16 A. I'm a permit lead with primary focus on copper</p> <p>17 mine facilities, including the Copper Flat Mine and the</p> <p>18 Chino Mine near Silver City.</p> <p>19 My duties in MECS include drafting groundwater</p> <p>20 discharge permits, conducting inspection at mine</p> <p>21 facilities, public participation and ensuring that</p> <p>22 compliance, spill response and groundwater abatement at</p> <p>23 mining facilities in New Mexico is conducted in</p> <p>24 accordance with the Water Quality Control Commission</p> <p>25 regulations and the Water Quality Act.</p>
507	<p>1 assurance issues are resolved and all three agencies</p> <p>2 approve the cost estimate. We fully expect a hearing on</p> <p>3 the Mining Act permit that will include the approved</p> <p>4 cost estimate and financial assurance, and NMED will</p> <p>5 participate in that hearing.</p> <p>6 Q. Thank you.</p> <p>7 And finally, in your opinion, has the</p> <p>8 applicant met the requirements of the Water Quality</p> <p>9 Control Commission regulations both at 20.6.2 NMAC and</p> <p>10 the Copper Rule at 20.6.7?</p> <p>11 A. Yes. The applicant has met the applicable</p> <p>12 requirements, including the general permitting</p> <p>13 requirements and those prescriptive Copper Rule</p> <p>14 requirements that are necessary to ensure protection of</p> <p>15 water quality.</p> <p>16 Q. Thank you, Mr. Vollbrecht.</p> <p>17 I have no further questions for this witness.</p> <p>18 And I know -- Ms. Barncastle, I had discussed</p> <p>19 before you returned that we're going to have direct</p> <p>20 examination of all three witnesses and then have cross</p> <p>21 as a panel.</p> <p>22 So I'm going to proceed with -- I'm going to</p> <p>23 call my next witness, Mr. Reid.</p> <p>24</p> <p>25</p>	509	<p>1 Q. How long have you worked for the department</p> <p>2 and MECS specifically?</p> <p>3 A. I've worked for NMED for over 15-and-a-half</p> <p>4 years, and I have worked for MECS since December</p> <p>5 of 2012.</p> <p>6 Q. Please briefly describe your educational</p> <p>7 background.</p> <p>8 A. I hold a bachelor of science degree in geology</p> <p>9 with special honors from the University of Texas at</p> <p>10 Austin and a master of science degree in geology also</p> <p>11 from the University of Texas at Austin. My primary and</p> <p>12 secondary education took place in Albuquerque, where I</p> <p>13 was raised.</p> <p>14 Q. Did you provide a resume along with your</p> <p>15 prefiled written testimony?</p> <p>16 A. Yes. My resume is marked as NMED Exhibit 6.</p> <p>17 Q. And you did file written testimony in this</p> <p>18 matter?</p> <p>19 A. Yes. It is NMED Exhibit 3.</p> <p>20 Q. And do you adopt that written testimony here</p> <p>21 today?</p> <p>22 A. Yes.</p> <p>23 Q. Please let's start, if you could, just provide</p> <p>24 an overview of your testimony.</p> <p>25 A. My testimony provides a general overview of</p>

<p style="text-align: right;">510</p> <p>1 the Copper Flat Mine, describes the draft Discharge  2 Permit, DP-1840, discusses changes to the draft DP in  3 response to comments, and finally, it describes how the  4 draft DP-1840 and its authorized mine units meet the  5 requirements of the Copper Mine Rule.  6 Q. Okay. Please describe what the draft  7 Discharge Permit and application for DP-1840 are based  8 on.  9 A. The draft Discharge Permit is based on the  10 discharge plan. The discharge plan for DP-1840 includes  11 application materials submitted by the applicant, New  12 Mexico Copper Corporation, to NMED dated December 11th,  13 2015, and Revision 1 of the Discharge Permit application  14 dated August, 2017 -- this is known as the revised  15 application -- and the materials contained in the  16 DP-1840 administrative record prior to issuance of the  17 draft Discharge Permit.  18 Before deeming the draft -- the Discharge  19 Permit application technically complete, NMED issued  20 three letters requesting additional information from the  21 applicant in addition to four other comment letters  22 required -- related to the technical review of the  23 application and documents that are part of the discharge  24 plan.  25 The three letters requesting additional</p>	<p style="text-align: right;">512</p> <p>1 facility description and overview of site operations, a  2 summary of the permitting history, information related  3 to the location and groundwater and process water  4 characteristics.  5 The next two sections, B103 and B104, define  6 the mine units authorized by the discharge and  7 management of water contaminants and authorize  8 discharges and discharge volume limits pursuant to  9 system design and operational requirements set forth in  10 DP-1840 and the Discharge Plan.  11 Part C is titled Facility Specific  12 Requirements and contains facility-specific design,  13 construction, location, site-wide water management,  14 monitoring, contingency, postclosure, abatement and  15 financial assurance requirements for Copper Flat Mine.  16 Part D contains general requirements pursuant  17 to Part 20.6.2 NMAC and Part 20.6.7 NMAC. These  18 requirements are not specific to Copper Flat Mine and  19 are general permit requirements.  20 Q. Thank you.  21 During the public comment period, the  22 department received comments on the initial draft of  23 DP-1840.  24 Please describe changes the department has  25 included in the draft -- in the most recent draft in</p>
<p style="text-align: right;">511</p> <p>1 information contained a total of 73 items requiring  2 response from the applicant and approval from NMED in  3 order for the application to meet the technical  4 completeness requirements of the Copper Mine Rule.  5 Q. Please discuss how draft -- how the draft  6 Discharge Permit is structured.  7 A. DP-1840 was drafted using a standardized  8 permitting template developed through permitting other  9 copper mine facilities in the state. The permit is  10 divided into four parts, Parts A through D.  11 Part A is titled General Information and  12 provides a statement of purpose, a brief outline of the  13 discharge authorizations and defines others applicable  14 regulations, permit duration and terms of issuance. The  15 last part of Part A, A103D, lists additional  16 requirements added to the Discharge Permit by NMED that  17 are not included in the Copper Mine Rule.  18 As required by subsection I of 20.6.7.10 NMAC,  19 NMED provided written explanation of the reasons for the  20 additional permit requirements in the cover letter  21 accompanying the draft Discharge Permit dated  22 February 2nd, 2018.  23 Part B is titled Facility Specific  24 Information. The first three sections of Part B, B100  25 through B102, provide the history of the site, a</p>	<p style="text-align: right;">513</p> <p>1 response to these comments.  2 A. As a result of careful consideration of  3 comments received, NMED is proposing changes to be  4 incorporated into the final version of DP-1840. The  5 edits and basis for the changes are shown in revised  6 draft DP-1840, marked as NMED Exhibit I.  7 Overall the proposed edits strengthen and  8 clarify DP-1840 and impose additional requirements on  9 the applicant. The edits also represent a commitment by  10 NMED for continuous improvement in the permitting  11 process. NMED refines each Copper Mine Rule Discharge  12 Permit developed to ensure each permit is clear, concise  13 and in alignment with the rule.  14 Q. Please provide a summary highlighting some of  15 the specific changes to the draft DP-1840 that resulted  16 from comments on the initial draft.  17 A. Sure. In response to a concern raised by a  18 member of the public, NMED has added requirement C104C  19 to clarify the requirement that the application --  20 applicant submit a Construction Quality  21 Assurance/Construction Quality Control Plan, known as a  22 CQA/CQC Plan, a minimum of 90 days prior to construction  23 of any impoundment that requires a liner system at  24 Copper Flat Mine.  25 A CQA/CQC Plan as set forth by subsection C of</p>

514	<p>1 20.6.7.16 NMAC ensures that construction of liner  2 systems meet all design criteria plans and  3 specifications. The existing requirements C100 and  4 D102A address this requirement, but the addition of  5 C104C adds clarity to the permit.</p> <p>6 NMED added requirement C105C.2 to require that  7 the applicant submit documentation to NMED of compliance  8 with the Office of State Engineer Dam Safety Bureau  9 permitting requirements prior to initiation of  10 construction of any portion of the tailing storage  11 facility.</p> <p>12 NMED has been in communication with the Dam  13 Safety Bureau and understands that New Mexico Copper is  14 currently in compliance with Office of State Engineer  15 regulations for the existing tailing storage facility.</p> <p>16 NMED added requirement C108A and related  17 permit requirements to require that the applicant  18 combine three separate water management plans required  19 by the Copper Mine Rule into one comprehensive site-wide  20 Water Management Plan that includes the Stormwater  21 Management Plan, the Mine Operation Water Management  22 Plan and the Interim Emergency Water Management Plan.</p> <p>23 It has been determined through other copper  24 mine permitting efforts that a unified site-wide Water  25 Management Plan with annual updates provides more</p>	516	<p>1 Have there been any additional changes to the  2 draft permit since the department provided DP-1840 in  3 red-line/strike-out to the other parties on August 10th  4 of this year?</p> <p>5 A. NMED has made a few minor edits and  6 typographical corrections since the August 10, 2018,  7 draft. The edits are as follows.</p> <p>8 In section C109, the word "existing" has been  9 removed from C109A, and the order of C109A and C109B  10 have been reversed. Please note that on the version  11 submitted with the NOI on August 23rd, I failed to  12 delete the word "existing" and switch the order of A and  13 B. The final version of the draft permit added to the  14 administrative record, found at Bates numbers 18734  15 through 18775, does reflect this change.</p> <p>16 In requirement C113H, a quotation mark was  17 added in front of the word "shall."</p> <p>18 And although we would have been pleased to see  19 an 80-millimeter-thick synthetic liner installed at the  20 tailing storage facility, we have dutifully made a  21 correction in the requirement B103D.2 for a  22 typographical error listing the tailing storage facility  23 liner thickness as 80-millimeter. It was corrected to  24 read 80-mil.</p> <p>25 In requirement B103F.4, Stormwater</p>
515	<p>1 clarity and reduces potential redundancy which may occur  2 with three separate plans.</p> <p>3 Upon further examination of the monitoring  4 well network proposed by the applicant and in  5 consideration of comments received on draft DP-1840,  6 NMED has added requirement C113A to require that the  7 amendment install two more monitoring wells at Copper  8 Flat Mine in addition to those already required to be  9 installed under draft DP-1840.</p> <p>10 These two wells will provide additional  11 groundwater information for the tailing storage facility  12 and Waste Rock Stockpiles 2 and 3 and strengthen the  13 DP-1840 Groundwater Monitoring Plan.</p> <p>14 NMED received comments from the applicant  15 requesting elimination of two additional monitoring  16 wells NMED is requiring to be located around the open  17 pit as specified in requirement C116C. These wells are  18 necessary to fulfill the requirements of subparagraph  19 (4) of 20.6.7.28B NMAC, which states a permittee shall  20 install a sufficient number of monitoring wells around  21 the perimeter of an open pit to monitor groundwater  22 quality and the hydrologic gradient around the pit.</p> <p>23 In addition, both these wells will provide  24 critical groundwater information for abatement purposes.  25 Q. Thank you.</p>	517	<p>1 Impoundments A through C were all defined in parentheses  2 as SWA, SWB and SWC.</p> <p>3 And in requirement B104A, a typographical  4 error of the discharge volume was corrected to change  5 the discharge volume from 25,246,000 to 25,264,000  6 gallons per day.</p> <p>7 Q. All right.</p> <p>8 And those were the changes made between the --  9 basically between the filing of our notice of intent and  10 when the final version of the draft permit was added to  11 the record on the day before this hearing, but are there  12 any additional edits that you would like to add to the  13 Discharge Permit at this time?</p> <p>14 A. Yes. Condition C113M in the monitoring and  15 reporting section of the Discharge Permit is intended to  16 require that the applicant report volumes and locations  17 of acid-generating waste rock placed within a waste rock  18 stockpile.</p> <p>19 We recently noticed that this condition as it  20 exists requires volumes in locations of not potentially  21 acid-generating material placed, which we reference as  22 NPAG, and that is a typo. NMED needs to change this  23 condition for the final Discharge Permit to require  24 reporting of volumes and locations of potentially  25 acid-generating material, or PAG, material placed</p>

<p style="text-align: right;">518</p> <p>1 instead of NPAG.  2 Q. Thank you, Mr. Reid.  3 And, Madam Hearing Officer, we will submit a  4 final final version of the draft Discharge Permit at the  5 conclusion of this hearing which will reflect this one  6 additional change.  7 MS. ORTH: All right. Thank you.  8 Q. (BY MR. KNIGHT) Mr. Reid, what is the guiding  9 doctrine -- what do you understand to be the guiding  10 doctrine of the Copper Rule?  11 A. Subsection K of 74-6-4 of the Water Quality  12 Act states that the commission shall specify in  13 regulations the measures to be taken to prevent water  14 pollution and to monitor water quality.  15 Q. And how does subsection K relate to the Copper  16 Rule and a permit drafted under that rule?  17 A. A copper mine permit drafted pursuant to the  18 Copper Mine Rule specifies the measures to be taken to  19 prevent water pollution at a copper mine facility.  20 DP-1840 references applicable Copper Mine Rule  21 regulations that specify design criteria, location,  22 purpose and operation of mine units at the facility,  23 which if executed as required under the rule will  24 fulfill the requirements of the Water Quality Act and  25 prevent water pollution.</p>	<p style="text-align: right;">520</p> <p>1 60-mil high density polyethylene, or HDPE, or equivalent  2 material to prevent water pollution for this particular  3 mine unit.  4 Impoundments intended for long-term storage of  5 process water, such as the process water reservoir and  6 the underdrain collection pond, are required by the  7 Copper Mine Rule to be designed with an engineered,  8 double-lined, 60-mil HDPE or equivalent material liner  9 system with an integrated leak collection system to  10 prevent water pollution for this particular mine unit.  11 I would also like to point out that the  12 applicant has designed the process water reservoir,  13 which is one of the most critical impoundments for  14 operations, with an overflow weir that conveys solutions  15 directly into the HDPE-lined tailings trench/pipeline  16 corridor which discharges to the tailing storage  17 facility. This design element offers additional water  18 protection measures in the event of an extreme upset  19 condition.  20 Q. Thank you.  21 Now please discuss how the draft Discharge  22 Permit meets Copper Mine Rule requirements for the  23 tailing storage facility.  24 A. The Copper Mine Rule allows for a tailing  25 storage facility to be an unlined mine unit coupled with</p>
<p style="text-align: right;">519</p> <p>1 Q. Mr. Reid, does the draft Discharge Permit,  2 DP-1840, meet the requirements of the Copper Mine Rule,  3 and does it adequately specify the measures to be taken  4 to prevent water pollution at the mine site?  5 A. Yes. The mine units proposed for construction  6 and operation in DP-1840 meet Copper Mine Rule  7 requirements.  8 Q. Thank you.  9 Now let's discuss how the draft Discharge  10 Permit meets Copper Mine Rule requirements for some of  11 the specific mine units at the Copper Flat Mine.  12 Let's start with impoundments.  13 A. Impoundment design is dictated by location of  14 the impoundment and the designated purpose the  15 impoundment will serve. Impoundments that store process  16 water or leach solutions for long-term storage require  17 additional engineering controls compared to impoundments  18 intended to store solutions for less than 30 days.  19 C104 of DP-1840 specifies requirements for the  20 design criteria, location, purpose and operation of the  21 impoundments proposed for use at Copper Flat Mine. For  22 example, all three stormwater impoundments are intended  23 to store impacted stormwater for less than 30 days.  24 As such, the Copper Flat rule requires that  25 they be designed with an engineered, single-lined,</p>	<p style="text-align: right;">521</p> <p>1 an aquifer evaluation required to determine the  2 potential for impacts and subsequent requirements for a  3 groundwater intersystem -- groundwater interceptor  4 system as necessary.  5 In the case of Copper Flat, the applicant has  6 proposed instead to line the tailing storage facility  7 with an 80-mil HDPE liner system. NMED finds that this  8 approach is satisfactory to prevent water pollution and  9 exceeds Copper Mine Rule requirements for this  10 particular mine unit.  11 The aquifer evaluation the applicant conducted  12 for the tailing storage facility focused on potential  13 water quality effects resulting from leaks in the  14 tailing storage facility liner system. NMED has  15 reviewed the aquifer evaluation and agrees that the  16 tailing storage facility liner system will prevent an  17 exceedance of the groundwater standards set forth in  18 Section 20.6.2.3103 NMAC.  19 Lastly, I'd like to clarify that an important  20 design -- engineering design feature of the applicant's  21 proposed tailing storage facility is that all impacted  22 stormwater generated from the tailing storage facility  23 dam face will be captured and contained on HDPE-lined  24 and bermed channels which are integrated into the  25 tailing storage facility liner system.</p>



522	<p>1 Q. Thank you.</p> <p>2 Please discuss how the draft Discharge Permit</p> <p>3 meets Copper Mine Rule requirements for the waste rock</p> <p>4 stockpiles.</p> <p>5 A. Engineering design requirements for waste rock</p> <p>6 systems vary depending on whether the stockpiles are</p> <p>7 constructed inside or outside the open pit surface</p> <p>8 drainage area. The applicant is proposing to construct</p> <p>9 three new waste rock stockpiles, one inside the open pit</p> <p>10 surface drainage area and two outside the open pit</p> <p>11 surface drainage area.</p> <p>12 The Copper Mine Rule requires that an</p> <p>13 applicant conduct an aquifer evaluation for stockpiles</p> <p>14 located outside the open pit surface drainage area to</p> <p>15 determine the need for an interceptor system.</p> <p>16 The aquifer evaluations for Waste Rock</p> <p>17 Stockpile 2 and 3 concluded that discharges from these</p> <p>18 waste rock stockpiles are not expected to result in an</p> <p>19 exceedance of groundwater standards. An interceptor</p> <p>20 system is not required at this time.</p> <p>21 Considering the placement of the stockpiles on</p> <p>22 low permeability andesite bedrock, the demonstrated</p> <p>23 geochemistry of the waste rock, the integrated solution</p> <p>24 capture systems and the strong Monitoring Plan, NMED</p> <p>25 does not anticipate that contaminants generated from</p>	524	<p>1 Q. Thank you.</p> <p>2 Next, if you would, please discuss how the</p> <p>3 draft Discharge Permit meets Copper Mine Rule</p> <p>4 requirements for stormwater management and seepage</p> <p>5 collection for the Waste Rock Stockpiles 2 and 3.</p> <p>6 A. In accordance with Section 20.6.7.21 NMAC,</p> <p>7 DP-1840 specifies that berms and open channel conveyance</p> <p>8 structures be constructed around waste rock stockpiles</p> <p>9 to prevent surface water run-on and to control run-off</p> <p>10 and/or flowing seeps from the proposed stockpiles.</p> <p>11 Channels must be constructed in a manner to maximize</p> <p>12 positive flow while minimizing the potential for ponding</p> <p>13 and erosion.</p> <p>14 Collected solutions will be conveyed to the</p> <p>15 impacted stormwater impoundments. Any alluvial</p> <p>16 materials encountered along stockpile toes will be</p> <p>17 removed, and conveyance channels will be constructed</p> <p>18 into the low permeability bedrock to maximize collection</p> <p>19 of seepage and impacted stormwater generated from the</p> <p>20 stockpiles.</p> <p>21 In addition, all alluvial or colluvial</p> <p>22 materials will be removed from the footprint of Waste</p> <p>23 Rock Stockpiles 2 and 3 prior to placement of waste</p> <p>24 rock.</p> <p>25 Q. And now please discuss how the draft Discharge</p>
523	<p>1 Waste Rock Stockpiles 2 and 3 will impact groundwater</p> <p>2 above the standard set forth in Section 20.6.2.3103</p> <p>3 NMAC.</p> <p>4 Dr. Marcoline will discuss this further in his</p> <p>5 testimony.</p> <p>6 In addition, New Mexico Copper Corporation has</p> <p>7 also proposed a robust Material Handling Plan that</p> <p>8 places the potentially acid-generating waste rock</p> <p>9 material between layers of waste rock that is not</p> <p>10 acid-generating. And that has been discussed in</p> <p>11 previous testimony.</p> <p>12 In the event that groundwater monitoring</p> <p>13 indicates that groundwater standards could be exceeded,</p> <p>14 there are provisions in DP-1840 which could result in</p> <p>15 NMED requiring installation of an interceptor system for</p> <p>16 implementation of other source control measures.</p> <p>17 Waste Rock Stockpile 1 will be constructed</p> <p>18 inside the projected open pit surface drainage area on</p> <p>19 low permeability andesite and quartz monzonite. Waste</p> <p>20 rock with a higher potential to develop acid rock</p> <p>21 drainage will be placed within the authorized footprint</p> <p>22 of this waste rock stockpile. Any potential impacts to</p> <p>23 groundwater from stockpiles located inside the open pit</p> <p>24 surface drainage area will be contained by the area of</p> <p>25 open pit hydrologic containment.</p>	525	<p>1 Permit meets Copper Mine Rule requirements for secondary</p> <p>2 containment for pipelines located outside of the open</p> <p>3 pit surface drainage area.</p> <p>4 A. Section C106 of DP-1840 references</p> <p>5 Section 20.6.7.23 NMAC of the Copper Mine Rule, which</p> <p>6 specifies that all new pipelines located outside the</p> <p>7 open pit surface drainage area shall incorporate a</p> <p>8 mechanism of secondary containment to control leaks and</p> <p>9 spills.</p> <p>10 To this end, tailing storage facility</p> <p>11 supernatant process water will be returned to the</p> <p>12 process water reservoir for reuse through a pipeline</p> <p>13 situated within the HDPE-lined tailings trench corridor.</p> <p>14 The return process water pipeline from the tailings</p> <p>15 storage facility underdrain collection pond will be</p> <p>16 placed within the tailing storage facility toe berm and</p> <p>17 on top of a synthetic liner during all build-out phases</p> <p>18 of the tailing storage facility.</p> <p>19 The tailing pipeline will also be located</p> <p>20 within the lined tailing trench corridor until discharge</p> <p>21 at the tailing storage facility.</p> <p>22 Q. Next let's discuss the water quality</p> <p>23 Monitoring Plan in the permit.</p> <p>24 Does the Monitoring Plan proposed for</p> <p>25 implementation in DP-1840 meet the requirements of the</p>

526	<p>1 Copper Rule?</p> <p>2 A. Yes.</p> <p>3 Q. Please provide details on how the Monitoring</p> <p>4 Plan was reviewed and approved by the department.</p> <p>5 A. The applicant prepared a water quality</p> <p>6 Monitoring Plan that identified certain existing</p> <p>7 monitoring wells at the site to be used in combination</p> <p>8 with proposed new monitoring wells. In addition, the</p> <p>9 plan includes surface water and process water sampling</p> <p>10 to monitor water quality at Copper Flat Mine.</p> <p>11 As a result of the technical review process,</p> <p>12 NMED required eight additional monitoring well locations</p> <p>13 be added to the monitoring well network and relocation</p> <p>14 of some of the monitoring wells to account for</p> <p>15 site-specific conditions, including preexisting</p> <p>16 topography.</p> <p>17 As an example, NMED requested that the</p> <p>18 applicant move one of the proposed monitoring wells at</p> <p>19 the toe of Waste Rock Stockpile 3 to the base of an</p> <p>20 existing drainage channel that will be buried by waste</p> <p>21 rock during operations.</p> <p>22 DP-1840 has contingency requirements in place</p> <p>23 that would be triggered in the event that impacts to</p> <p>24 groundwater are detected or anticipated. Implementation</p> <p>25 of contingency requirements could require a corrective</p>	528	<p>1 a potential to generate contaminants be reclaimed at the</p> <p>2 end of mine life with 36 inches of approved reclamation</p> <p>3 cover material.</p> <p>4 The applicant has committed to reclaiming</p> <p>5 Existing Waste Rock Stockpile 1, Existing Waste Rock</p> <p>6 Stockpile 2B and the outcrops of Existing Waste Rock</p> <p>7 Stockpile 4 facing Grayback Arroyo during the</p> <p>8 preproduction period of the mining operation. Condition</p> <p>9 C115H requires reclamation of Existing Waste Rock</p> <p>10 Stockpile 1 and Existing Waste Rock Stockpile 2B occur</p> <p>11 no later than three years from the effective date of</p> <p>12 DP-1840.</p> <p>13 It is important to make the point that</p> <p>14 issuance of this permit requires reclamation of existing</p> <p>15 onsite disturbances regardless of whether the Copper</p> <p>16 Flat Mine ever operates. This will result in enhanced</p> <p>17 environmental protection by providing abatement-related</p> <p>18 source control.</p> <p>19 Q. Thank you, Mr. Reid.</p> <p>20 Last question, please discuss how the draft</p> <p>21 Discharge Permit addresses the ongoing abatement at this</p> <p>22 mine site.</p> <p>23 A. Section C116 of DP-1840 addresses the</p> <p>24 Abatement Plan for Copper Flat Mine. Abatement</p> <p>25 activities to be implemented upon issuance of DP-1840</p>
527	<p>1 action plan, additional monitoring wells and interceptor</p> <p>2 systems.</p> <p>3 Q. Thank you.</p> <p>4 Now please discuss how the draft Discharge</p> <p>5 Permit meets Copper Mine Rule requirements for closure.</p> <p>6 A. Section C115 specifies -- specifies</p> <p>7 requirements for closure at Copper Flat Mine. The</p> <p>8 applicant prepared a closure/closeout plan referenced in</p> <p>9 DP-1840 to address closure requirements of the Copper</p> <p>10 Mine Rule. The Closure Plan as submitted and</p> <p>11 conditioned through DP-1840 meet applicable requirements</p> <p>12 of Sections 20.6.7.33 and 34 NMAC.</p> <p>13 The proposed waste rock stockpile design meets</p> <p>14 the planning for closure requirements of subsection A of</p> <p>15 20.6.7.18 NMAC. Paragraph (3) of Section 20.6.7.33C</p> <p>16 NMAC requires reclaimed stockpiles at a 3-to-1 slope at</p> <p>17 closure.</p> <p>18 To facilitate this and minimize the amount of</p> <p>19 pushdown necessary to achieve the 3-to-1 slope at</p> <p>20 closure, each lift within the stockpile will have a</p> <p>21 maximum height of 75 feet and be placed with a 120-foot</p> <p>22 setback between lifts.</p> <p>23 The Closure Plan as conditioned through</p> <p>24 DP-1840 specifies that all waste rock stockpiles, the</p> <p>25 tailing storage facility and other mine units that have</p>	529	<p>1 include installation of additional monitoring wells, the</p> <p>2 submittal of a work plan to address any ongoing impacts</p> <p>3 to Grayback Arroyo and the collection of additional</p> <p>4 ground and surface water quality data.</p> <p>5 I believe it is important to state again the</p> <p>6 issuance of that Discharge Permit will require</p> <p>7 implementation of abatement activities and ensures</p> <p>8 abatement occurs in a timely fashion regardless of any</p> <p>9 timeline for operation of Copper Flat Mine.</p> <p>10 Thank you.</p> <p>11 Q. Thank you, Mr. Reid, for your testimony.</p> <p>12 And I would like now to call my third and</p> <p>13 final witness, Mr. Marcoline.</p> <p>14 DIRECT EXAMINATION OF JOSEPH MARCOLINE</p> <p>15 BY MR. KNIGHT:</p> <p>16 Q. Good afternoon, Dr. Marcoline. Excuse me.</p> <p>17 A. Good afternoon.</p> <p>18 Q. Could you state your full name for the record.</p> <p>19 A. My name is Joseph Marcoline.</p> <p>20 Q. Dr. Marcoline, where are you employed, and for</p> <p>21 how long have you been there?</p> <p>22 A. I'm employed with the Mining Environmental</p> <p>23 Compliance Section of the New Mexico Environment</p> <p>24 Department. I've been there for just under 16 years.</p> <p>25 Q. And what is your job title?</p>

530	<p>1 A. My job title is the oversight manager for the 2 Chevron Questa Mine Superfund site. 3 Q. And what are your job duties in that position? 4 A. In that position, I oversee the design and 5 implementation of the -- pretty much all aspects of the 6 Chevron Questa Mine Superfund site, and that's in 7 accordance with both New Mexico Water Quality Act and 8 CERCLA. 9 I also provide technical assistance to NMED 10 staff on issues pertaining specifically to unsaturated 11 flow hydrology, to cover systems, waste characterization 12 and performance criteria, performance monitoring. 13 Q. Thank you. 14 Please describe your educational and 15 professional qualifications. 16 A. I earned a bachelor's degree in geology and 17 math from Hamilton College, in Upstate New York, master 18 of science degree in geology and geochemistry from New 19 Mexico Tech, New Mexico Institute of Mining and 20 Technology, and a PhD in hydrogeology from The 21 University of British Columbia. 22 I've also, as I mentioned before, worked with 23 Environment for approximately 16 years. The first six 24 of those years was with -- predominantly working on 25 mining -- or permitting and reclamation of hardrock mine</p>	532	<p>1 Committee that assembled the draft of the technical 2 portion of the Copper Rule, the copper mine 3 requirements. My largest contributions were in 4 development of the waste characterization section -- I 5 wrote the portion we saw on the slides in one of the 6 talks yesterday -- the cover system and the performance 7 monitoring sections of the Copper Rule. 8 That being said, I am not -- I'm definitely 9 not as familiar with the Copper Rule in its entirety as 10 Mr. Reid and Mr. Vollbrecht are. 11 Q. Does your written testimony discuss your 12 involvement and development of the Copper Flat Mine 13 draft Discharge Permit to date? 14 A. Yes, it does. My written testimony provides a 15 summary of my technical review of several reports 16 submitted by New Mexico Copper for this hearing. 17 Specifically I was asked to review the Hydrologic 18 Consequences Model -- or the Hydrologic Consequences 19 report, the Geochemical Characterization Report, the 20 Stage 1 Abatement report, both -- I reviewed both the 21 2012 and the 2014 groundwater modeling reports. 22 Q. Can you summarize your involvement with the 23 department's preparation for this hearing? 24 A. Yes. In addition to the technical reports I 25 just listed, I also reviewed the notice of intents and</p>
531	<p>1 sites in New Mexico. For the last 10 years with the 2 department, I've worked on, again, development of the 3 Remedial Investigation, the Feasibility Study, the 4 Record of Decision, two Administrative Orders on Consent 5 and worked on the Partial Consent Degree for the Chevron 6 Questa Mine. 7 And now we're working on the implementation of 8 the remedy at Chevron Questa Mine site. 9 Q. And a copy of your resume has been provided as 10 Exhibit 7; is that right? 11 A. Yes. 12 Q. Have you submitted written direct testimony in 13 this proceeding? 14 A. Yes, I have. It's Exhibit 4. 15 Q. And do you have any changes to your written 16 testimony you'd like to make at this time? 17 A. There were a few -- there were misspelling and 18 a few typos that I have corrected. 19 Q. Okay. 20 And do you adopt that written testimony here 21 today? 22 A. Yes, with those corrections. 23 Q. What was your involvement with the development 24 of the Copper Rule? 25 A. I participated on the Technical Advisory</p>	533	<p>1 the other submittals, technical memorandums submitted by 2 the other parties for the hearing. 3 My reviews on those submittals focused 4 specifically and were pretty much limited to issues 5 pertaining to water balance and on the geohydrology and 6 characterization of the contaminant transport through 7 different mine units and into groundwater. 8 Q. Dr. Marcoline, can you summarize how the New 9 Mexico Copper Corporation has attempted to demonstrate 10 compliance with the aquifer evaluation requirements of 11 the Copper Rule, specifically with regard to the tailing 12 storage facility? 13 A. Yes, I can. To summarize it, it's basically a 14 three-step process. 15 The New Mexico Copper Corporation first 16 predicted concentrations of the dissolved constituents 17 in the process porewater and the tailing water. This 18 was based on both static and kinetic testing program of 19 historic tailing from older operations in combination 20 with laboratory samples of tailing porewater collected 21 during this historic operation. 22 This was used essentially as a chemistry of 23 the water that would be leaking through or potentially 24 leaking through the liner system. 25 The second, New Mexico Copper Corporation</p>

<p style="text-align: right;">534</p> <p>1 estimated the volume of water that would be likely -- or  2 potentially likely to leak through the tailing facility  3 if minor defects occur. New Mexico Copper Corporation  4 extended the equations of Giroud, et al., 1997 -- we've  5 heard -- I've seen several of the parties have  6 referenced some of that same literature -- to quantify  7 leakage rates through the synthetic liner system which  8 is underlain by tailings subgrade. Each of them have a  9 different hydraulic conductivity.</p> <p>10 The calculations assume that approximately  11 1.5 feet of tailing material or tail water is ponded on  12 top of that liner system from day one of the discharge  13 to the facility.</p> <p>14 The third portion of that was -- first we look  15 at the chemistry of the water, then we look at the  16 amount of water going through the system. The third  17 part uses both volume and chemistry to put those inputs  18 into a geochemical mixing model to evaluate the  19 resultant groundwater quality beneath the facility.</p> <p>20 The water quality of the tailing discharge was  21 predicted to meet water quality standards for all  22 constituents except for TDS and sulfate prior to mixing  23 with groundwater. Pat Longmire, PhD, a geochemist with  24 the department, evaluated the mixing models and  25 concurred that water quality standards should not be</p>	<p style="text-align: right;">536</p> <p>1 Q. Can you summarize your review methods and  2 conclusions with respect to the aquifer evaluation and  3 potential for impacts to groundwater quality from the  4 tailing storage facility and waste rock stockpiles?  5 A. Yes, I can. For the tailing facility, I  6 evaluated modeling performed and equations used by New  7 Mexico Copper to estimate leakage of tailing porewater  8 through the synthetic liner at the base of the lining  9 facility.</p> <p>10 The method applied to estimate leachate from  11 the facility was based on peer-reviewed literature  12 studies and published data. The method, in my opinion,  13 was -- is mathematically rigorous and I believe yielded  14 reasonable results. Considering that the estimated  15 volume of water that would be discharged beneath -- to  16 groundwater beneath the tailing facility is fairly small  17 and the quality of that water is fairly good, New  18 Mexico's aquifer evaluation, in my opinion, was  19 appropriate -- or is appropriate.</p> <p>20 In addition, the permit requires a pretty  21 comprehensive QA/QC Plan to ensure that the liner system  22 is properly constructed. A monitoring network will be  23 in place to monitor for impacts resulting from leakage,  24 and then as well as contingency plans are required under  25 the Copper Rule.</p>
<p style="text-align: right;">535</p> <p>1 exceeded.</p> <p>2 Q. Thank you.</p> <p>3 Can you summarize how the New Mexico Copper  4 Corporation has attempted to demonstrate compliance with  5 the aquifer evaluation requirements of the Copper Rule  6 with regard to the waste rock facilities?  7 A. Yes. As with the tailing facility and  8 similar, New Mexico Copper Corporation first predicted  9 concentrations of dissolved constituents in the  10 porewater within the waste rock. This was based on  11 static and kinetic testing program of the waste rock  12 again from the historic operation as well as from some  13 of the boreholes. This was used as the chemistry of the  14 water percolating through the waste rock pile.</p> <p>15 The second step, New Mexico Copper used a dual  16 porosity, unsaturated flow model to predict quantity  17 of -- or the net percolation of meteoric water through  18 the waste rock based on site-specific climate data.</p> <p>19 The third step, the volume of water predicted  20 to move through the waste rock during operations in  21 conjunction with predicted chemistry were used to  22 evaluate the potential impact on the groundwater quality  23 beneath the waste rock and that water quality standards  24 would be -- and the determination was that water quality  25 standards would not be exceeded.</p>	<p style="text-align: right;">537</p> <p>1 The process for the waste rock piles is a  2 little bit different, at least for the waste rock piles  3 outside of the open pit surface drainage area. The  4 waste rock piles -- I performed a pretty detailed  5 evaluation of New Mexico Copper Corporation water  6 balance modeling which estimated the quantity of  7 percolation through the waste rock piles.</p> <p>8 My evaluation included a detailed review of  9 all the input parameters and conducted numerous runs of  10 the New Mexico Copper Corporation numeric model.</p> <p>11 In the process, I developed a series of  12 batched model runs using New Mexico Copper Corporation's  13 model as a base, and then I conducted comprehensive  14 sensitivity analysis of the New Mexico Copper  15 Corporation modeling results to the physical properties  16 of the waste material.</p> <p>17 In addition to the physical properties in the  18 waste material, I also conducted sensitivity analysis  19 to -- to the -- sorry -- to the van Genuchten parameters  20 and also to precipitation and evaporation inputs.</p> <p>21 Following the sensitivity analysis, I compared  22 the predicted results to observations made at other  23 hardrock mine sites in similar climates.</p> <p>24 And again based on the fair quality of the  25 predicted seepage, the predicted flux of water through</p>

<p style="text-align: right;">538</p> <p>1 the waste rock and the flux of these waters through 50  2 to 100 feet of unsaturated material beneath the waste  3 rock, New Mexico Copper Corporation's aquifer  4 evaluation, in my opinion, is appropriate.  5 Q. Thank you.  6 Does the New Mexico Copper Corporation aquifer  7 evaluation as it relates to the waste rock pile require  8 that the andesite beneath the waste rock -- does it  9 require the andesite beneath the waste rock to be  10 impermeable in order to be protective of groundwater?  11 A. No, it doesn't. In fact, the andesite is not  12 impermeable, and it actually hosts a water table at  13 depth. However, the low permeability of the andesite  14 does help in several ways, however the main aquifer  15 evaluation, in my opinion, is based on the limited flux  16 and the -- and the chemistry of the water beneath the  17 waste rock pile.  18 Q. Did you review the predictions related to  19 development of an area of open pit hydrologic  20 containment at the Copper Flat Mine following closure?  21 A. Yes, I did. Based on the review of  22 groundwater conditions, precipitation data, final  23 surface area and the depth to water in the pit, I am in  24 agreement and believe it's a very defensible conclusion  25 that it will be an open -- that the postmining open pit</p>	<p style="text-align: right;">540</p> <p>1 installed prior to any discharge, at least those two  2 additional wells.  3 Q. In your written testimony, you stated that the  4 monitor well network around the tailing storage facility  5 and waste rock stockpiles provide an appropriate initial  6 basis for monitoring of the proposed facilities.  7 What was the basis of your review?  8 A. My review of the monitoring network around  9 both the proposed waste rock facility and the tailing  10 facility was based on two things. It was based on the  11 underlying geology. I looked at the geomorphology of  12 the surface -- or -- excuse me -- the surface topography  13 and my understanding of both -- understanding of both  14 current and the postmining potentiometric surface, or  15 the hydrology.  16 As an example, the geology at the copper mine  17 is moderately complex. It does have several different  18 sedimentary units. It's got multiple volcanic units  19 with both brecciation and fracturing and faults. We  20 looked at well locations in relation to, say, buried  21 drainages, to geologic contacts and as well as the  22 locations downgradient of projected groundwater flow  23 directions.  24 While I believe that monitoring wells that are  25 required by the permit provide an appropriate basis for</p>
<p style="text-align: right;">539</p> <p>1 will result in an evaporatively driven hydrologic sink  2 end of mining.  3 Q. Dr. Marcoline, did you review the adequacy of  4 the monitoring well network with respect to monitoring  5 the area of open pit hydrologic containment?  6 A. Yes I did. With the inclusion of additional  7 wells required by the permit that Brad spoke about, the  8 monitoring wells around the open pit are appropriately  9 spaced and we believe provide verification of the water  10 table gradient surrounding the pit.  11 Q. Would a fracture system near the pit result in  12 pore quality water potentially leaving the open pit  13 area?  14 A. No. It's the gradient of the water table that  15 controls the direction of groundwater flow. A high  16 conductivity or fracture zones adjacent to the pit could  17 potentially change the size and shape of the open pit  18 capture zone but would not result in groundwater flowing  19 away from the pit.  20 I will note, too, that if following  21 installation of the proposed wells, you know, there is  22 any kind of question or lack of confidence in the  23 characterization of the potentiometric surface, we would  24 require additional wells for verification. And it is my  25 understanding that these additional wells will be</p>	<p style="text-align: right;">541</p> <p>1 additional monitoring of these proposed facilities, as  2 the mine develops, NMED may require additional  3 monitoring wells as appropriate. And that's why the  4 permit has conditions for this.  5 Q. We heard some testimony earlier from the  6 applicant that one of their witnesses believes that the  7 additional monitoring wells north of Waste Rock  8 Stockpile Number 3 and southwest of the tailing storage  9 facility were, in his opinion, unnecessary.  10 In your opinion, what is the justification for  11 these additional monitoring wells that the department is  12 requiring?  13 A. The two wells in question essentially were --  14 are filling gaps in the monitoring well network and are  15 located in potential that there is a change in the  16 potentiometric surface, in the direction of groundwater  17 flow.  18 Q. Thank you, Dr. Marcoline.  19 And that's all my questions for these  20 witnesses, and we are now available for  21 cross-examination or questions from anyone else.  22 MS. ORTH: And were you going to expressly  23 move some exhibits?  24 MR. KNIGHT: I was going to expressly move  25 some exhibits. In fact, I had that written right here</p>

542	<p>1 at the end of Dr. Marcoline's testimony so that I</p> <p>2 wouldn't forget to do that.</p> <p>3 I would like to move admission of Department</p> <p>4 Exhibits 1 through 7.</p> <p>5 MS. ORTH: Any objections?</p> <p>6 MR. BUTZIER: No objection.</p> <p>7 MS. BARNCASTLE: No objection.</p> <p>8 MS. ORTH: All right.</p> <p>9 MR. DE SAILLAN: No objection.</p> <p>10 MS. ORTH: Thank you very much.</p> <p>11 Exhibits 1 through 7 are admitted.</p> <p>12 (Exhibit NMED 1 through 7 admitted into</p> <p>13 evidence.)</p> <p>14 MS. ORTH: Mr. Butzier, do you have questions</p> <p>15 of the NMED panel?</p> <p>16 MR. BUTZIER: I do not.</p> <p>17 MS. ORTH: Mr. de Saillan.</p> <p>18 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>19 Officer.</p> <p>20 I will go ahead and cross-examine the</p> <p>21 witnesses in the order of their direct testimony,</p> <p>22 starting with Mr. Vollbrecht. And I will again direct</p> <p>23 my questions specifically -- unless otherwise specified,</p> <p>24 specifically to the witnesses.</p> <p>25</p>	544	<p>1 value calculation is done where costs are escalated out</p> <p>2 into the future, and then there's a discount rate that</p> <p>3 brings that back based on the value of that money.</p> <p>4 What we do for sites that require long-term</p> <p>5 water treatment, such as the Chino Mine and Tyrone Mine,</p> <p>6 is require that financial assurance cost estimate to be</p> <p>7 for a period of 100 years. That is a sufficiently long</p> <p>8 enough time period that it ensures there is adequate</p> <p>9 money for long-term -- long-term care of the facility.</p> <p>10 And so in the case of Copper Flat, we won't</p> <p>11 have long-term water treatment, but we would require</p> <p>12 long-term monitoring, long-term maintenance and any care</p> <p>13 that needs to be taken.</p> <p>14 MR. DE SAILLAN: Okay. So the financial</p> <p>15 assurance would reflect monitoring and maintenance of</p> <p>16 the facility for 100 years?</p> <p>17 MR. VOLLBRECHT: That is correct.</p> <p>18 MR. DE SAILLAN: Okay.</p> <p>19 And has New Mexico Copper Corporation agreed</p> <p>20 to that?</p> <p>21 MR. VOLLBRECHT: I've informed them of that</p> <p>22 during the last meeting we had amongst the agencies at</p> <p>23 New Mexico Copper. So they are aware of that. Yes.</p> <p>24 MR. DE SAILLAN: Okay. They're aware of it.</p> <p>25 Have they agreed to it?</p>
543	<p>1 CROSS EXAMINATION</p> <p>2 BY MR. DE SAILLAN:</p> <p>3 MR. DE SAILLAN: So good afternoon,</p> <p>4 Mr. Vollbrecht.</p> <p>5 MR. VOLLBRECHT: Good afternoon.</p> <p>6 MR. DE SAILLAN: I'm going to ask you a few</p> <p>7 questions to begin with about financial assurance.</p> <p>8 I suppose I should have a microphone.</p> <p>9 MS. ORTH: Yes.</p> <p>10 MR. DE SAILLAN: I project pretty well.</p> <p>11 MR. KNIGHT: You can have mine unless I</p> <p>12 object.</p> <p>13 MR. DE SAILLAN: Thank you.</p> <p>14 So I'm going to begin by asking you a few</p> <p>15 questions about financial assurance.</p> <p>16 Now, I thought I heard you mention in your</p> <p>17 direct testimony that the Environment Department would</p> <p>18 be requiring financial assurance for 100 years; is that</p> <p>19 correct?</p> <p>20 MR. VOLLBRECHT: Yes, that is correct.</p> <p>21 MR. DE SAILLAN: Could you explain that in a</p> <p>22 little bit more detail?</p> <p>23 MR. VOLLBRECHT: There's -- associated with</p> <p>24 financial assurance you typically determine the amount</p> <p>25 of time for that financial assurance, and a net present</p>	545	<p>1 MR. VOLLBRECHT: I haven't heard back from</p> <p>2 them, but it is our intent to require that.</p> <p>3 MR. DE SAILLAN: Okay.</p> <p>4 It's -- that is not currently reflected in the</p> <p>5 financial assurance proposal that's been submitted to</p> <p>6 the state, is it?</p> <p>7 MR. VOLLBRECHT: That is correct.</p> <p>8 MR. DE SAILLAN: Okay.</p> <p>9 And Mr. Knight refers to a revised permit that</p> <p>10 would be subsequent to the August 10th, 2018, permit.</p> <p>11 Would the 100-year requirement be reflected in</p> <p>12 that permit?</p> <p>13 MR. VOLLBRECHT: Mr. de Saillan, we had not</p> <p>14 intended to do that. We could consider that. We're --</p> <p>15 we're still early in the financial assurance review</p> <p>16 process at this -- at this time. We will be providing</p> <p>17 written comments on October 15th back to the Mining and</p> <p>18 Minerals Division which would include this requirement</p> <p>19 from the state -- or from the Environment Department.</p> <p>20 It's certainly something we could consider.</p> <p>21 MR. DE SAILLAN: Okay.</p> <p>22 How often is financial assurance renewed?</p> <p>23 MR. VOLLBRECHT: The financial assurance is</p> <p>24 subject to renewal every five years upon permit renewal,</p> <p>25 which is required pursuant to the Water Quality Control</p>

546	<p>1 Commission regulations.                  2 MR. DE SAILLAN: Okay.                  3 And has it been the practice of the                  4 Environment Department at other mine sites where                  5 long-term financial assurance is required to continue to                  6 require 100 years of financial assurance when the permit                  7 is renewed each five years?                  8 MR. VOLLBRECHT: Yes.                  9 MR. DE SAILLAN: And you expect that will be                  10 the practice with New Mexico Copper Corporation?                  11 MR. VOLLBRECHT: I do.                  12 MR. DE SAILLAN: I nevertheless want to go                  13 through some of the -- some of the financial assurance                  14 proposal just to -- just to establish the Environment                  15 Department's position on certain issues.                  16 So first of all, what is the total estimated                  17 cost for closure on which the financial assurance                  18 proposal is based?                  19 MR. VOLLBRECHT: I can't state exactly what                  20 the number was. I believe it was 55 million,                  21 approximately, I saw on a slide yesterday.                  22 MR. DE SAILLAN: I think that's right, and I                  23 think that's close enough for our purposes.                  24 Do you think that this overall amount is an                  25 underestimate?</p>	548	<p>1 Department and the Mining and Minerals Division have                  2 created a guidance document on contingencies with                  3 perhaps a component of the indirect costs, and we will                  4 be reviewing that, certainly.                  5 MR. DE SAILLAN: Okay.                  6 And I'll ask you again. The cost estimate                  7 includes 2,657,000 for -- excuse me. Next one.                  8 Strike that last one.                  9 Okay. Mr. Vollbrecht, if the cost estimate is                  10 too low, who would bear the cost of closure of the                  11 Copper Flat Mine once the mine is shut down and stopped                  12 operating?                  13 MR. VOLLBRECHT: Is it safe to assume you're                  14 talking about the final approved cost estimate as                  15 opposed to that that's been submitted as proposed?                  16 MR. DE SAILLAN: Absolutely. That is what I                  17 meant. Thank you for that clarification.                  18 MR. VOLLBRECHT: Certainly.                  19 If it did turn out that the cost estimate was                  20 too low, the State of New Mexico would be the one,                  21 assuming the company that was responsible was no longer                  22 financially viable.                  23 MR. DE SAILLAN: Okay.                  24 And that means ultimately the taxpayers; is                  25 that correct?</p>
547	<p>1 MR. VOLLBRECHT: That's a difficult thing for                  2 me to answer, Mr. de Saillan. I can say I do have -- we                  3 have a staff person assigned to the review and comment                  4 on that who is very familiar with cost estimates and                  5 will be providing comments on that. It would be more                  6 appropriate for me to probably make that -- respond to                  7 that after October 15th depending on the comments.                  8 I -- there is not agreement on that number. I                  9 can tell you that.                  10 MR. DE SAILLAN: Okay.                  11 Is that staff person here today?                  12 MR. VOLLBRECHT: No.                  13 MR. DE SAILLAN: Okay.                  14 Okay. There is an estimated Engineering,                  15 Design and Construction Plan cost which is \$1,771,000.                  16 Do you agree that that estimate is too low?                  17 MR. VOLLBRECHT: I cannot comment directly on                  18 that.                  19 MR. DE SAILLAN: Okay.                  20 The plan also includes a \$2,657,000 estimate                  21 for contingency costs.                  22 Do you agree that those are too low?                  23 MR. VOLLBRECHT: Likewise I can't comment                  24 directly on that number.                  25 I can say that the New Mexico Environment</p>	549	<p>1 MR. VOLLBRECHT: That is correct.                  2 MR. DE SAILLAN: Now, is it your understanding                  3 that a discount rate will be applied to the cost                  4 estimate for closure?                  5 MR. VOLLBRECHT: Yes. That is my                  6 understanding.                  7 MR. DE SAILLAN: And that will have the effect                  8 of reducing the -- the amount of financial assurance                  9 that is required to be -- to be posted at this point; is                  10 that correct?                  11 MR. VOLLBRECHT: That is correct. It does                  12 work in conjunction with an escalation rate, as well.                  13 MR. DE SAILLAN: Okay.                  14 And do you know at this point what the                  15 discount rate will be?                  16 MR. VOLLBRECHT: I do not know what the                  17 specific number is.                  18 MR. DE SAILLAN: Do you know what the                  19 escalation rate will be?                  20 MR. VOLLBRECHT: I do not know that number.                  21 That will need to be determined prior to approval, and,                  22 once again, all three agencies will need to be in                  23 agreement prior to approval of that.                  24 MR. DE SAILLAN: Okay.                  25 Will the public have an opportunity to comment</p>

550	<p>1 on the final financial assurance in the context of the</p> <p>2 groundwater Discharge Permit?</p> <p>3 MR. VOLLBRECHT: I can say not directly, but</p> <p>4 indirectly, as I stated, by when the financial assurance</p> <p>5 cost estimate is -- is finally agreed to and an</p> <p>6 instrument is put in place, that will be done, finalized</p> <p>7 pursuant to the Mining Act permit, and there will be</p> <p>8 opportunity for a hearing on the Mining Act permit, and</p> <p>9 we would participate in that hearing.</p> <p>10 MR. DE SAILLAN: Okay.</p> <p>11 Now, looking at the -- the financial assurance</p> <p>12 proposal that has been submitted, is it your</p> <p>13 understanding that the cost estimate assumes that 25</p> <p>14 years after closure New Mexico Copper will be able to</p> <p>15 cease all monitoring and maintenance and water</p> <p>16 management at the mine site?</p> <p>17 MR. VOLLBRECHT: That is my understanding,</p> <p>18 yes, that that was what was proposed.</p> <p>19 MR. DE SAILLAN: Okay.</p> <p>20 And do you think that's a realistic</p> <p>21 assumption?</p> <p>22 MR. VOLLBRECHT: As I stated, we intend to</p> <p>23 require 100 years of postclosure monitoring.</p> <p>24 MR. DE SAILLAN: Okay.</p> <p>25 And similarly is it your understanding that</p>	552	<p>1 MR. VOLLBRECHT: Yes. I stated we would --</p> <p>2 New Mexico Environment Department intends to require 100</p> <p>3 years of postclosure monitoring.</p> <p>4 MR. DE SAILLAN: Okay.</p> <p>5 Is it your understanding that for purposes of</p> <p>6 the closure cost estimate that New Mexico Copper has</p> <p>7 submitted it estimates that the period of time for</p> <p>8 maintenance is seven years after mining operations</p> <p>9 cease?</p> <p>10 MR. VOLLBRECHT: I'm not directly familiar</p> <p>11 with that, but I would assume you are correct.</p> <p>12 MR. DE SAILLAN: Okay.</p> <p>13 Do you agree that the closure cost estimate</p> <p>14 does not include costs for removal of large equipment,</p> <p>15 piping and other infrastructure?</p> <p>16 MR. VOLLBRECHT: Once again I'm not that</p> <p>17 familiar with the details as I'm not the one doing the</p> <p>18 review of that, but --</p> <p>19 MR. DE SAILLAN: Do you agree that the closure</p> <p>20 cost estimate as currently submitted does not include</p> <p>21 costs for mitigation of water contaminated during road</p> <p>22 reclamation?</p> <p>23 MR. VOLLBRECHT: I'm not once again that</p> <p>24 familiar with the details of that.</p> <p>25 MR. DE SAILLAN: And do you agree that the</p>
551	<p>1 for the purposes of the closure cost estimate New Mexico</p> <p>2 Copper Corporation estimates that the period of time</p> <p>3 that will -- that water will continue to drain from the</p> <p>4 tailing storage facility is 25 years after cessation of</p> <p>5 mining operations?</p> <p>6 MR. VOLLBRECHT: It's my understanding that's</p> <p>7 what was provided. Yes.</p> <p>8 MR. DE SAILLAN: Okay.</p> <p>9 And again do you think that period is</p> <p>10 unrealistic?</p> <p>11 MR. VOLLBRECHT: I can't speak to that</p> <p>12 directly other than to say we are currently reviewing</p> <p>13 that.</p> <p>14 MR. DE SAILLAN: Okay.</p> <p>15 And is it your understanding that for -- that</p> <p>16 for purposes of the current submitted closure cost</p> <p>17 estimate New Mexico Copper Corporation has estimated</p> <p>18 that the period of time that groundwater monitoring will</p> <p>19 be necessary is 25 years after cessation of mining</p> <p>20 operations?</p> <p>21 MR. VOLLBRECHT: It is my understanding that</p> <p>22 is what's provided in the estimate.</p> <p>23 MR. DE SAILLAN: Okay.</p> <p>24 And do you -- do you agree that that is an</p> <p>25 unrealistically short period of time?</p>	553	<p>1 closure cost estimate does not include comprehensive</p> <p>2 costs for waste disposal?</p> <p>3 MR. VOLLBRECHT: Same answer.</p> <p>4 MR. DE SAILLAN: Okay.</p> <p>5 MR. VOLLBRECHT: I suppose I would add that</p> <p>6 it's important to include all those things.</p> <p>7 MR. DE SAILLAN: Okay. Thank you.</p> <p>8 Do you agree that active water treatment will</p> <p>9 likely be necessary at the Copper Flat Mine after</p> <p>10 closure?</p> <p>11 MR. VOLLBRECHT: Based on our analysis, we do</p> <p>12 not expect -- well, with the caveat -- we do not expect</p> <p>13 there to be a need for active water treatment, I guess,</p> <p>14 with the caveat of managing the water that's draining</p> <p>15 out of the tailing impoundment, and there's an active</p> <p>16 and passive treatment phase for that which is</p> <p>17 evaporation.</p> <p>18 MR. DE SAILLAN: Do you agree that many of the</p> <p>19 closure parameters that the cost estimate is based on</p> <p>20 are highly uncertain?</p> <p>21 MR. VOLLBRECHT: I -- I can't -- I'm not an</p> <p>22 expert on financial assurance so I can't answer that</p> <p>23 directly.</p> <p>24 MR. DE SAILLAN: Well, this is not so much a</p> <p>25 question that goes directly to financial assurance.</p>



554	<p>1 So things like, for example, the pit lake 2 level, pit lake water quality, the volume of leakage 3 from the tailing impoundments, things like that, would 4 you agree that those are highly uncertain? 5 MR. VOLLBRECHT: I would not say highly 6 uncertain. I think we understand the science behind 7 those -- those estimates fairly well, and I would expect 8 that we're in -- pretty close in the ballpark on where 9 those things will end up. 10 MR. DE SAILLAN: Do you know what the form of 11 financial assurance will be for the Copper Flat Mine? 12 MR. VOLLBRECHT: There has not been a 13 financial assurance instrument posed yet. There are 14 different requirements under the Mining Act as well as 15 under the federal regulations that BLM is required to 16 implement. I could say that the BLM requirements do not 17 allow for a corporate guarantee. 18 MR. DE SAILLAN: Okay. So is it your 19 understanding that the form of the financial assurance 20 will not be a corporate guarantee? 21 MR. VOLLBRECHT: It's my understanding that 22 the Bureau of Land Management would not allow a 23 corporate guarantee as a form of financial assurance. 24 MR. DE SAILLAN: Okay. 25 Now, Mr. Reid mentioned the possibility of the</p>	556	<p>1 MR. DE SAILLAN: Okay. 2 Do you agree that it would be desirable to 3 have further characterization of the andesite bedrock? 4 MR. VOLLBRECHT: I -- it's beyond my expertise 5 to weigh in on the technical merits of that. I think 6 Dr. Marcoline could probably provide a better analysis 7 of that. I think the department's position and the 8 reason we've drafted the permit as we have is that we 9 think that the evaluation that was done is adequate. 10 Doing more work will certainly provide more 11 data and make it more defensible, and so I can't say I 12 would object to that necessarily, but we don't 13 necessarily think it's necessary. 14 MR. DE SAILLAN: Okay. 15 Do you think it would be desirable? 16 MR. VOLLBRECHT: That's a tough question in 17 light of what I had just said. It may give other folks 18 more confidence in the interpretation of the results. 19 And certainly we are servants of the public, and if it 20 will help the public feel more confident, I think that 21 could be a positive outcome. 22 MR. DE SAILLAN: Okay. 23 The ranches have also proposed that 24 additional -- that the Environment Department require 25 additional monitoring wells. And when I say additional</p>
555	<p>1 Environment Department requiring additional -- and I 2 think he was referring to stormwater collection. There 3 was testimony, I think, in Mr. -- or Dr. Marcoline's 4 presentation that the Environment Department might at 5 some point require additional groundwater monitoring 6 wells if you found it was necessary. 7 Are these types of things covered in or will 8 they be covered in the financial assurance? 9 MR. VOLLBRECHT: If they apply for -- after 10 closure. So stormwater management highly certain. With 11 respect to groundwater monitoring, we would evaluate 12 what a postclosure scenario looks like with respect to 13 groundwater monitoring. 14 As you have pointed out, we agree that the 15 permit does come up for renewal every five years and so 16 those things would be reviewed at that time. 17 MR. DE SAILLAN: Okay. The -- the ranches and 18 the Environmental Law Center have proposed that New 19 Mexico Copper Corporation be required to do further 20 characterization of the andesite bedrock which underlies 21 the location of the proposed waste rock storage 22 facilities. 23 Are you familiar with that? 24 MR. VOLLBRECHT: I have seen that proposal. 25 Yes.</p>	557	<p>1 monitoring wells, I mean beyond the two that the 2 Environment Department included in the August 10th 3 proposed Discharge Permit. So the ranches have proposed 4 additional monitoring wells. 5 Do you agree that the additional monitoring 6 wells would be desirable? 7 MR. VOLLBRECHT: I would suggest my answer 8 would be the same to that question as it was to the 9 previous. 10 MR. DE SAILLAN: Okay, Mr. Vollbrecht. I'd 11 like to talk to you a little bit about the -- the pit 12 lake. 13 Now, in your testimony, you discussed the pit 14 lake under the heading of Surface Waters of the State 15 Determination at pages 6 and 7 of your testimony. And 16 there you conclude that the pit lake will not be a 17 surface water of the state. 18 Is that the Environment Department's 19 conclusion? 20 MR. VOLLBRECHT: Yes, it is. 21 MR. DE SAILLAN: And you referenced the 22 surface water quality regulations at 20.4.1 NMAC, which 23 have been adopted by the Water Quality Control 24 Commission; is that right? 25 MR. VOLLBRECHT: I believe it's 20.6.4.</p>

558	<p>1 MS. ORTH: That's what he said.</p> <p>2 MR. DE SAILLAN: Mr. Vollbrecht, I'd like</p> <p>3 to -- I'd like to show you an exhibit that's been</p> <p>4 marked -- or a document that's been marked as Ranches</p> <p>5 Exhibit 42.</p> <p>6 And I'm going to ask Kendra to provide that</p> <p>7 for you and to counsel and the Hearing Officer.</p> <p>8 Now, for the record, these -- this is a copy</p> <p>9 of one page of the surface water quality regulations at</p> <p>10 20.6.4 NMAC.</p> <p>11 Do you recognize those regulations?</p> <p>12 MR. VOLLBRECHT: Yes, I do.</p> <p>13 MR. DE SAILLAN: Okay.</p> <p>14 And are you familiar with those regulations?</p> <p>15 MR. VOLLBRECHT: More than I ever thought I'd</p> <p>16 be.</p> <p>17 MR. DE SAILLAN: Okay.</p> <p>18 And does this include the definition of</p> <p>19 surface water(s) of the state?</p> <p>20 MR. VOLLBRECHT: Yes, it does.</p> <p>21 MR. DE SAILLAN: Okay.</p> <p>22 And that's at 20.6.4.7S.(5) NMAC?</p> <p>23 MR. VOLLBRECHT: That is correct.</p> <p>24 MR. DE SAILLAN: Okay.</p> <p>25 Let's take a look at the definition.</p>	560	<p>1 created in a surface water of the state.</p> <p>2 MR. DE SAILLAN: Do you agree with that</p> <p>3 interpretation?</p> <p>4 MR. VOLLBRECHT: Mr. de Saillan, with all due</p> <p>5 respect, I am not really in a position to agree or</p> <p>6 disagree with the Surface Water Quality Bureau. They've</p> <p>7 made a determination.</p> <p>8 MR. DE SAILLAN: How much thought did the</p> <p>9 Environment Department give to this interpretation?</p> <p>10 MR. VOLLBRECHT: All I can really speak to is</p> <p>11 the record. There were -- I had looked back through</p> <p>12 meeting notes from 2015 and 2016. There were a number</p> <p>13 of meetings between New Mexico Copper and the Surface</p> <p>14 Water Quality Bureau to discuss this issue. I was not</p> <p>15 in those meetings or privy to those discussions.</p> <p>16 MR. DE SAILLAN: Do you know if any other</p> <p>17 interested parties or organizations were involved in</p> <p>18 those discussions?</p> <p>19 MR. VOLLBRECHT: The other various agencies,</p> <p>20 BLM, the Mining and Minerals Division and New Mexico</p> <p>21 Copper, were in those meetings.</p> <p>22 MR. DE SAILLAN: Okay.</p> <p>23 MR. VOLLBRECHT: As I understand.</p> <p>24 MR. DE SAILLAN: Okay.</p> <p>25 Well, let's continue with the definition.</p>
559	<p>1 The first sentence of the definition lists</p> <p>2 what the definition includes, and that's pretty broad;</p> <p>3 is that correct?</p> <p>4 MR. VOLLBRECHT: That is correct, yes.</p> <p>5 MR. DE SAILLAN: And the second sentence then</p> <p>6 lists some more things included in the definition. It</p> <p>7 includes tributaries and manmade wetlands.</p> <p>8 And then let's look at the next item, which is</p> <p>9 manmade bodies of -- manmade bodies of water that were</p> <p>10 originally created in surface waters of the state or</p> <p>11 which resulted in impoundment of surface waters of the</p> <p>12 state.</p> <p>13 Do you see that?</p> <p>14 MR. VOLLBRECHT: I do.</p> <p>15 MR. DE SAILLAN: Now, do you agree that</p> <p>16 Grayback Arroyo is a surface water of the state?</p> <p>17 MR. VOLLBRECHT: I believe it is. Yes.</p> <p>18 MR. DE SAILLAN: Okay.</p> <p>19 And the pit lake will be created in the</p> <p>20 original channel of Grayback Arroyo; is that correct?</p> <p>21 MR. VOLLBRECHT: That is correct, although --</p> <p>22 well, Grayback Arroyo has been diverted around the</p> <p>23 existing pit lake, and the Surface Water Quality Bureau</p> <p>24 determined that because of that prior diversion that</p> <p>25 occurred, that this would not be considered to be</p>	561	<p>1 The next sentence tells us that the definition</p> <p>2 does not include private waters that do not combine with</p> <p>3 other surface or subsurface water; is that correct?</p> <p>4 MR. VOLLBRECHT: That is correct.</p> <p>5 MR. DE SAILLAN: Okay.</p> <p>6 Now, so first of all, let's -- let's talk</p> <p>7 about how the pit lake is going to work.</p> <p>8 It's -- particularly with a pit that is a</p> <p>9 hydrologic sink, doesn't the pit lake have the tendency</p> <p>10 to rise and fall in elevation over time due to seasonal</p> <p>11 variations and longer-term trends?</p> <p>12 MR. VOLLBRECHT: It does. Yes.</p> <p>13 MR. DE SAILLAN: Now, I heard Mr. Finch</p> <p>14 testify on behalf of New Mexico Copper Corporation that</p> <p>15 the elevation of the pit lake will be 4,894 feet above</p> <p>16 sea level.</p> <p>17 Were you present for that testimony?</p> <p>18 MR. VOLLBRECHT: Yes, I was.</p> <p>19 MR. DE SAILLAN: Do you view that as a precise</p> <p>20 number?</p> <p>21 MR. VOLLBRECHT: I think Mr. Finch also</p> <p>22 provided testimony that that could fluctuate one to two</p> <p>23 feet over time. So precise within -- within those</p> <p>24 bounds.</p> <p>25 MR. DE SAILLAN: Do you agree that that's the</p>

562	<p>1 appropriate bounds?</p> <p>2 MR. VOLLBRECHT: I -- we're trending out of my</p> <p>3 area of expertise. I suppose if you got a significantly</p> <p>4 wet year or dry years, it could exceed those. The --</p> <p>5 Mr. Finch also testified that the lake level had dropped</p> <p>6 approximately 10 feet over the last -- I don't know how</p> <p>7 many years, but some number of years.</p> <p>8 MR. DE SAILLAN: He was -- he was referring, I</p> <p>9 believe, to the existing pit lake.</p> <p>10 MR. VOLLBRECHT: That is correct. Yes.</p> <p>11 MR. DE SAILLAN: So given the shape of the</p> <p>12 open pit, if the pit lake level rises, the surface area</p> <p>13 of the pit lake would expand; is that correct?</p> <p>14 MR. VOLLBRECHT: That is correct.</p> <p>15 MR. DE SAILLAN: And so that expansion could</p> <p>16 result in the pit lake moving from being entirely on</p> <p>17 private property to encroaching onto public property; is</p> <p>18 that correct?</p> <p>19 MR. VOLLBRECHT: As I understand, there is</p> <p>20 some BLM property close to the edge of that.</p> <p>21 MR. DE SAILLAN: Now, Section C115G of the</p> <p>22 Discharge Permit, and I'm talking about the August 10th</p> <p>23 version, provides that surface water quality standards</p> <p>24 will not apply to the pit lake water body that will</p> <p>25 exist at closure so long as the pit remains a hydrologic</p>	564	<p>1 MR. VOLLBRECHT: Sure.</p> <p>2 MR. DE SAILLAN: Do you have a sense as to at</p> <p>3 what point the Environment Department would say this is</p> <p>4 no longer on purely private property, but it encroaches</p> <p>5 on public property frequently enough and for a long</p> <p>6 enough duration as to make it no longer subject to the</p> <p>7 exemption?</p> <p>8 MR. VOLLBRECHT: Yeah. I cannot provide a</p> <p>9 direct --</p> <p>10 MR. DE SAILLAN: Okay.</p> <p>11 MR. VOLLBRECHT: -- answer to using those</p> <p>12 criteria.</p> <p>13 MR. DE SAILLAN: Okay.</p> <p>14 Now, is it your understanding that the pit</p> <p>15 lake at the Copper Flat Mine, the proposed pit lake,</p> <p>16 will exceed surface water quality standards?</p> <p>17 MR. VOLLBRECHT: The modeling shows an</p> <p>18 exceedance of a wildlife surface water quality standard</p> <p>19 for selenium at year 25, I believe it is.</p> <p>20 MR. DE SAILLAN: Okay.</p> <p>21 And isn't it likely that the pit lake water</p> <p>22 will deteriorate or have a tendency to deteriorate in</p> <p>23 quality as a consequence of evapoconcentration?</p> <p>24 MR. VOLLBRECHT: That is likely, and that is</p> <p>25 what the modeling shows.</p>
563	<p>1 evaporative sink and the pit lake water remains wholly</p> <p>2 on private land.</p> <p>3 Now, I think that provision was added in the</p> <p>4 August 10th revised draft permit; is that correct?</p> <p>5 MR. VOLLBRECHT: That is correct.</p> <p>6 MR. DE SAILLAN: Okay.</p> <p>7 And as a side, I would mention that we</p> <p>8 appreciate the Environment Department adding that</p> <p>9 provision to the -- to the proposed Discharge Permit.</p> <p>10 But I'm wondering how this provision is going</p> <p>11 to work in practice.</p> <p>12 So let's say that the pit lake is entirely on</p> <p>13 private property for half of the year and encroaches on</p> <p>14 public property for half of the year.</p> <p>15 How would the Environment Department deal with</p> <p>16 that situation?</p> <p>17 MR. VOLLBRECHT: That's an interesting</p> <p>18 question. I think that the department would have to</p> <p>19 review that as a transient feature and speak with the</p> <p>20 BLM about that and determine the appropriate path</p> <p>21 forward.</p> <p>22 MR. DE SAILLAN: Okay.</p> <p>23 Is there -- do you have a sense of -- I mean,</p> <p>24 I can pose a whole lot of different hypotheticals here,</p> <p>25 of course.</p>	565	<p>1 MR. DE SAILLAN: Okay.</p> <p>2 And just for the record, could you explain</p> <p>3 what we mean by evapoconcentration?</p> <p>4 MR. VOLLBRECHT: Sure. The water, H2O,</p> <p>5 evaporates out of the open pit water body, the solvents,</p> <p>6 the various elements and minerals stay, the suspended</p> <p>7 solids, dissolved solids, they stay there, and they</p> <p>8 become more concentrated over time.</p> <p>9 MR. DE SAILLAN: Okay. Thank you.</p> <p>10 Okay. Let's go back to the definition.</p> <p>11 The definition also refers to private waters</p> <p>12 that do not combine with other surface or subsurface</p> <p>13 water; is that correct?</p> <p>14 MR. VOLLBRECHT: That is correct.</p> <p>15 MR. DE SAILLAN: Okay.</p> <p>16 Now, let's look at the pit lake. And again</p> <p>17 I'm talking about the future pit lake as opposed to the</p> <p>18 existing pit lake.</p> <p>19 Is it your understanding that clean</p> <p>20 groundwater will flow into the pit after -- after</p> <p>21 closure of the mine?</p> <p>22 MR. VOLLBRECHT: It's my understanding that</p> <p>23 groundwater will flow into the pit after closure of the</p> <p>24 mine.</p> <p>25 MR. DE SAILLAN: Okay. That's what I meant to</p>

<p style="text-align: right;">566</p> <p>1 ask, if I didn't.</p> <p>2 And some of that water -- some of that</p> <p>3 groundwater will come from off of the -- the mine site;</p> <p>4 is that correct?</p> <p>5 MR. VOLLBRECHT: That is correct.</p> <p>6 MR. DE SAILLAN: And in fact, the pit will</p> <p>7 actually behave as a huge well; is that correct?</p> <p>8 MR. VOLLBRECHT: That is correct.</p> <p>9 MR. DE SAILLAN: So it will draw water into</p> <p>10 it.</p> <p>11 MR. VOLLBRECHT: That is correct.</p> <p>12 MR. DE SAILLAN: And the clean groundwater</p> <p>13 that is drawn into the pit will combine with pit lake</p> <p>14 water; is that correct?</p> <p>15 MR. VOLLBRECHT: That is correct. I mean, the</p> <p>16 pit lake will essentially be that water.</p> <p>17 MR. DE SAILLAN: Okay.</p> <p>18 And when that clean groundwater enters the</p> <p>19 pit, it has the potential to become contaminated with</p> <p>20 water from the mine -- contaminated water from the mine;</p> <p>21 is that correct?</p> <p>22 MR. VOLLBRECHT: That's a -- the pit lake, as</p> <p>23 you describe it, pit acting as a -- as a pump, it pumps</p> <p>24 water from 360 degrees, from all directions around it,</p> <p>25 and so that will be a mix of water that's coming from</p>	<p style="text-align: right;">568</p> <p>1 And if you didn't understand my question, I</p> <p>2 can rephrase it.</p> <p>3 MR. VOLLBRECHT: I think I understand it, but</p> <p>4 I had a hard time following it.</p> <p>5 MR. DE SAILLAN: Okay.</p> <p>6 MR. VOLLBRECHT: Yeah.</p> <p>7 MR. DE SAILLAN: Well, why don't I do it this</p> <p>8 way. We're talking about this part of the definition,</p> <p>9 and maybe you could explain what the Environment</p> <p>10 Department's position is on why that exemption applies.</p> <p>11 MR. VOLLBRECHT: I guess I'd go back to the --</p> <p>12 the 2016 -- the October, 2016 letter from the Surface</p> <p>13 Water Quality Bureau where they stated that because it</p> <p>14 was an evaporative sink they determined that it does not</p> <p>15 combine with other surface or subsurface waters.</p> <p>16 And so I think as you described in your</p> <p>17 question, that it is a one-way street, that is the</p> <p>18 direction the Surface Water Quality looked at when</p> <p>19 making that determination.</p> <p>20 MR. DE SAILLAN: Okay.</p> <p>21 Do you know if the Environment Department has</p> <p>22 always interpreted this exemption in that manner?</p> <p>23 MR. VOLLBRECHT: That's a difficult thing to</p> <p>24 say. The department's been in existence for a long</p> <p>25 time. I can say that it is consistent with the Copper</p>
<p style="text-align: right;">567</p> <p>1 upgradient, offgradient and, like I say, downgradient,</p> <p>2 although the gradient is towards the pit but from all</p> <p>3 directions.</p> <p>4 MR. DE SAILLAN: Right.</p> <p>5 MR. VOLLBRECHT: And so it will come from</p> <p>6 areas that are outside of the mine as well as areas</p> <p>7 inside of the mine.</p> <p>8 MR. DE SAILLAN: Right.</p> <p>9 MR. VOLLBRECHT: That is correct.</p> <p>10 MR. DE SAILLAN: And to the extent that clean</p> <p>11 water from off the mine site enters the pit, it will</p> <p>12 have the potential to become contaminated with</p> <p>13 mine-influenced water.</p> <p>14 MR. VOLLBRECHT: It will mix with that water.</p> <p>15 Yes.</p> <p>16 MR. DE SAILLAN: Okay.</p> <p>17 Now, as I understand it, the Environment</p> <p>18 Department's position on this combining with waters is</p> <p>19 it's essentially a one-way street, that the exemption</p> <p>20 does -- the exemption does not apply if water flows out</p> <p>21 of the pit and combines with groundwater outside the</p> <p>22 pit.</p> <p>23 However, the exemption continues to apply if</p> <p>24 clean water moves into the pit and combines with water</p> <p>25 in the pit; is that correct?</p>	<p style="text-align: right;">569</p> <p>1 Mine Rule, which came to existence in 2013. That</p> <p>2 essentially has a variance by rule for the area of open</p> <p>3 pit hydrologic containment, and so all that water will</p> <p>4 report to the pit.</p> <p>5 MR. DE SAILLAN: Okay.</p> <p>6 Let me ask you, then, do you know Marcy</p> <p>7 Leavitt?</p> <p>8 MR. VOLLBRECHT: I do.</p> <p>9 MR. DE SAILLAN: And Marcy Leavitt was</p> <p>10 formerly employed at the Environment Department; is that</p> <p>11 correct?</p> <p>12 MR. VOLLBRECHT: That is correct.</p> <p>13 MR. DE SAILLAN: And do you know approximately</p> <p>14 when?</p> <p>15 MR. VOLLBRECHT: Marcy Leavitt was bureau</p> <p>16 chief when I started 20 years ago.</p> <p>17 MR. DE SAILLAN: Bureau chief of what bureau?</p> <p>18 MR. VOLLBRECHT: The Ground Water Quality</p> <p>19 Bureau.</p> <p>20 MR. DE SAILLAN: Okay.</p> <p>21 So do you know what other positions she held</p> <p>22 at the Environment Department?</p> <p>23 MR. VOLLBRECHT: She was chief of the Surface</p> <p>24 Water Quality Bureau, she was division director. Prior</p> <p>25 to that, I assume she had technical positions, but I</p>

570	<p>1 don't know.</p> <p>2 MR. DE SAILLAN: Okay.</p> <p>3 And she was the director of which division?</p> <p>4 MR. VOLLBRECHT: The division names have</p> <p>5 changed over time. I could say we're currently called</p> <p>6 the Water Protection Division, which includes</p> <p>7 Groundwater and Surface Water Quality Bureaus. That was</p> <p>8 the division she was director of.</p> <p>9 MR. DE SAILLAN: Okay.</p> <p>10 So the name has been changed, but at the time</p> <p>11 that she was director, it sat over both the Ground Water</p> <p>12 Quality Bureau and the Surface Water Quality Bureau; is</p> <p>13 that correct?</p> <p>14 MR. VOLLBRECHT: That is correct.</p> <p>15 MR. DE SAILLAN: Okay.</p> <p>16 So I want to show you another document that's</p> <p>17 been marked as the Ranches Exhibit 41.</p> <p>18 And for the record, this is a transcript of</p> <p>19 the proceedings In the Matter of the Appeal of the</p> <p>20 Supplemental Discharge Permit for Closure for DP-1341,</p> <p>21 and this is Volume 3, pages 865 through 867 of that</p> <p>22 transcript, and it's dated October 29th, 2003.</p> <p>23 Now, Mr. Vollbrecht, first of all, would you</p> <p>24 give Ms. Leavitt's interpretation of the New Mexico</p> <p>25 water quality regulations a high degree of respect?</p>	572	<p>1 be almost finished.</p> <p>2 MS. ORTH: All right.</p> <p>3 MR. DE SAILLAN: Thank you, Mr. Vollbrecht.</p> <p>4 I have no further questions.</p> <p>5 I think now I'll move on to Mr. Reid.</p> <p>6 MS. ORTH: Mr. de Saillan, just one minute.</p> <p>7 I would like to start a break sometime in the</p> <p>8 next five minutes. So we can either start now, or you</p> <p>9 can go five minutes and then we can start, but we need a</p> <p>10 break before public comment begins at 5:00.</p> <p>11 MR. DE SAILLAN: Okay. Well, why don't we --</p> <p>12 my cross-examination Mr. Reid may go more than five</p> <p>13 minutes. So why don't we go ahead and take a break now.</p> <p>14 MS. ORTH: All right.</p> <p>15 We're going to be on break until 5:00 p.m.,</p> <p>16 and when we return, we're going to have to take a break</p> <p>17 in the cross-examination of the department panel. We</p> <p>18 will be taking public comment starting at 5:00.</p> <p>19 If you have not yet signed in on the sign-in</p> <p>20 sheet, please do so, because that's how I'm going to</p> <p>21 call on people.</p> <p>22 Thank you very much.</p> <p>23 MS. BARNCASTLE: Madam Hearing Examiner.</p> <p>24 MS. ORTH: Yes.</p> <p>25 MS. BARNCASTLE: Before we leave, do we</p>
571	<p>1 MR. VOLLBRECHT: Yes, I would.</p> <p>2 MR. DE SAILLAN: Okay.</p> <p>3 Could you just take a minute to review the</p> <p>4 document that I -- I've just handed you?</p> <p>5 MR. VOLLBRECHT: Okay.</p> <p>6 MR. DE SAILLAN: Now, would you agree with me</p> <p>7 that Ms. Leavitt is saying here that the -- the</p> <p>8 exemption is actually a two-way street, that the mixture</p> <p>9 with other waters works both ways? You could have clean</p> <p>10 water moving in to areas of dirty groundwater and -- and</p> <p>11 vice versa, and in either case the exemption does not</p> <p>12 apply?</p> <p>13 MR. VOLLBRECHT: That is a -- that is correct.</p> <p>14 That is what she stated. She is speaking to the Water</p> <p>15 Quality Act and the definition of water, which is a</p> <p>16 bit -- somewhat different from the definition of surface</p> <p>17 water of the state, although that same phrase is</p> <p>18 contained.</p> <p>19 My understanding of this hearing and this</p> <p>20 testimony, it was relative to groundwater contamination,</p> <p>21 and one thing that certainly has changed since that time</p> <p>22 is the Copper Rule and the interpretation of how that</p> <p>23 applies to the area of open pit hydrologic containment.</p> <p>24 MR. DE SAILLAN: Okay. Thank you.</p> <p>25 Could you just give me a second here. I may</p>	573	<p>1 anticipate that we will start cross-examination after</p> <p>2 public comment tonight, or will we resume tomorrow</p> <p>3 morning?</p> <p>4 MS. ORTH: So typically the public comment</p> <p>5 goes for a while. There are typically a lot of people</p> <p>6 who come on a night when we've designated that. So my</p> <p>7 short answer would be I would expect that we will pick</p> <p>8 up the department's cross-examination tomorrow morning.</p> <p>9 Are there any comments or observations about</p> <p>10 that?</p> <p>11 I mean, I'm willing to stay as long as anyone</p> <p>12 is.</p> <p>13 MS. BARNCASTLE: That would certainly be my</p> <p>14 preference, that we started tomorrow morning so I can go</p> <p>15 home and feed my little one.</p> <p>16 MS. ORTH: All righty.</p> <p>17 Anyone else object?</p> <p>18 MR. KNIGHT: No objection from the department.</p> <p>19 MS. ORTH: All right.</p> <p>20 In that case, thank you, department panel.</p> <p>21 We'll excuse you until the morning.</p> <p>22 And again we're on break until 5:00.</p> <p>23 (Proceedings in recess from 4:46 p.m. to</p> <p>24 5:07 p.m.)</p> <p>25 MS. ORTH: Okay. Thank you.</p>

574	<p>1 We are turning now in this hearing, which is a</p> <p>2 hearing on the proposed Copper Flat Mine.</p> <p>3 Mr. de Saillan.</p> <p>4 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>5 Officer.</p> <p>6 Real quick, just one thing I'd like to request</p> <p>7 of the Environment Department.</p> <p>8 When you submit the latest version of the</p> <p>9 permit, if you could put a date on it so that we can</p> <p>10 distinguish it from the two previous versions of the</p> <p>11 permit, which both have sort of a blank date on, I would</p> <p>12 appreciate it.</p> <p>13 Thank you.</p> <p>14 MR. KNIGHT: We will do that.</p> <p>15 MS. ORTH: All right. Thank you.</p> <p>16 That was a request pertaining to the technical</p> <p>17 part of this case.</p> <p>18 We're turning from the technical part now to</p> <p>19 nontechnical public comment. We will start in just a</p> <p>20 moment and go until everyone who is present has had an</p> <p>21 opportunity to make the comment they would like to make.</p> <p>22 First, I'm going to speak with our</p> <p>23 interpreter, because if you are more comfortable in a</p> <p>24 language other than English, this pertains to you.</p> <p>25 So if you would, please, state your name and</p>	576	<p>1 I would like to point out one other person in</p> <p>2 the room who if you have a question you should approach</p> <p>3 if we're not on break. If we're on a break, you can</p> <p>4 certainly approach me. If we're not on a break, please</p> <p>5 speak with John Baca.</p> <p>6 Mr. Baca is there in the green-gray shirt.</p> <p>7 Thank you.</p> <p>8 So I have the sign-in sheets. I will be</p> <p>9 calling the names of those who signed in and indicated</p> <p>10 that they wish to make public comment.</p> <p>11 If you have not yet signed in, please do so.</p> <p>12 The sign-in sheets are with Mr. Baca.</p> <p>13 You will not be spammed as a result of signing</p> <p>14 in. We use the sign-in sheets only as evidence of</p> <p>15 public participation and for the correct spelling of</p> <p>16 your name in the transcript. We don't use them</p> <p>17 otherwise. They're maintained at the Environment</p> <p>18 Department.</p> <p>19 Just a few rules.</p> <p>20 I will ask you to collect your thoughts and</p> <p>21 merely give verbal comment once. If you think of</p> <p>22 something you want to say after you've already spoken,</p> <p>23 please put it into writing.</p> <p>24 We do accept both verbal and written comment</p> <p>25 all the way up until the time we adjourn, which might be</p>
575	<p>1 certification for the record.</p> <p>2 THE INTERPRETER: Madam Hearing Officer,</p> <p>3 Sandra Olivares Caldwell, certified court interpreter</p> <p>4 for the State of New Mexico.</p> <p>5 MS. ORTH: Do you swear to interpret to the</p> <p>6 best of your ability and knowledge of the English and</p> <p>7 Spanish languages in accordance with the standards and</p> <p>8 ethics of the interpreter profession?</p> <p>9 THE INTERPRETER: I do.</p> <p>10 MS. ORTH: Thank you very much.</p> <p>11 Now, if you would make your statement.</p> <p>12 THE INTERPRETER: Thank you.</p> <p>13 Good evening, ladies and gentlemen.</p> <p>14 If you are here helping someone who is more</p> <p>15 comfortable in another language besides English, please</p> <p>16 let me know. If you yourself feel more comfortable in</p> <p>17 another language besides English, no matter what</p> <p>18 language that is, that's okay. Just let me know you do</p> <p>19 not speak English very well.</p> <p>20 I'll be making an announcement in Spanish.</p> <p>21 (In Spanish.)</p> <p>22 Everybody is good in English?</p> <p>23 No requests for interpreter, Madam Hearing</p> <p>24 Officer, but I will be available if someone wants it.</p> <p>25 MS. ORTH: All right. Thank you very much.</p>	577	<p>1 later this week, might be the week of October 9th.</p> <p>2 We're just going to go until we finish. No comment can</p> <p>3 be accepted after we adjourn, however, but we expect</p> <p>4 that to be a couple of days away at least.</p> <p>5 We will ask you to be sworn in, and we will</p> <p>6 ask you not to make personal attacks on anyone, not the</p> <p>7 company, not the state, not the citizens groups or</p> <p>8 anyone else. No personal attacks.</p> <p>9 And let's see. I think that was it really for</p> <p>10 the rules.</p> <p>11 And I don't put a time limit on you. So I'll</p> <p>12 ask you not to repeat yourself, but I -- you do not need</p> <p>13 to watch the clock while you're speaking.</p> <p>14 Are there any questions about any of that?</p> <p>15 About any of that?</p> <p>16 No?</p> <p>17 All right.</p> <p>18 And, counsel, I know that the rules say that</p> <p>19 you may cross-examine anyone who speaks. Those of you</p> <p>20 who have been in my hearings before know that I</p> <p>21 discourage cross-examination of public commenters. So</p> <p>22 I'm not going to ask you if you have questions of them.</p> <p>23 You're going to have to get my attention if you really</p> <p>24 are going to insist on doing that.</p> <p>25 MR. DE SAILLAN: Madam Hearing Officer, we</p>

578	<p>1 have no intention of cross-examining any of the public 2 speakers.</p> <p>3 MS. ORTH: All right. 4 So I'm going to start here now. 5 Mike Bowen.</p> <p>6 MR. BUTZIER: Madam Hearing Officer. 7 MS. ORTH: Sir.</p> <p>8 MR. BUTZIER: Will you be keeping track of 9 whether public comments stray from public comment into 10 technical testimony and reminding people of that --</p> <p>11 MS. ORTH: Thank you.</p> <p>12 MR. BUTZIER: -- or is that something you're 13 expecting us to point out?</p> <p>14 MS. ORTH: No, no. Thank you very much. I 15 knew I was forgetting one rule, and that was it. So 16 thank you, Mr. Butzier, for reminding me.</p> <p>17 This is nontechnical public comment. So I 18 will ask you not to offer technical testimony. 19 Technical testimony is typically scientific testimony 20 that one would require the education or expertise 21 necessary to offer it. Now, you may have that education 22 and expertise, but if you didn't file a notice of intent 23 to present technical testimony timely, sometime ago, 24 then you're not a technical witness in this hearing. 25 MR. KNIGHT: Madam Hearing Officer, excuse me.</p>
579	<p>1 I just -- while we have a lot of people here, 2 I would like to mention that if the hearing does go into 3 the second week of October, if we do need to resume the 4 hearing on October 9th, that will be at a different 5 location, and I think folks should be aware of that.</p> <p>6 MS. ORTH: Thank you for that, Mr. Knight. 7 So just to clarify, we will be going through 8 Friday of this week as necessary, and if we resume, that 9 is to say if we're not done Friday by about 7 o'clock at 10 night, we will pick up on October 9th, and you will want 11 to look at the Groundwater Bureau web page or contact 12 Mr. Baca to ask where we would be resuming that hearing 13 on October 9th. And we'll do our best to get the word 14 out.</p> <p>15 So if you would please swear Mr. Bowen. 16 MIKE BOWEN 17 having been first duly sworn or affirmed, gave 18 public comment as follows: 19 PUBLIC COMMENT</p> <p>20 MR. BOWEN: Madam Hearing Officer, thank you 21 for the opportunity to comment on such a serious matter. 22 My name is Mike Bowen. I am the executive 23 director of the New Mexico Mining Association. We're 24 located in Santa Fe. 25 The New Mexico Mining Association currently</p>
580	<p>1 has 18 operator members who explore, mine, produce and 2 refine sand and gravel and other aggregates, coal, 3 copper, humate, industrial minerals, molybdenum, potash, 4 precious metals and uranium in New Mexico.</p> <p>5 In addition, the association has over 70 6 associate members who provide consulting construction, 7 engineering, drilling, laboratory, legal, reclamation 8 and other services and equipment, fuel, power, chemicals 9 and other supplies to the New Mexico mining industry.</p> <p>10 The association serves as a spokesman for the 11 industry and is active in representing its members and 12 keeping them informed concerning legislation and 13 regulatory developments.</p> <p>14 It also serves its members on a wide variety 15 of subjects such as taxation, environmental quality, 16 public lands, health and safety and education, primarily 17 through the expertise of its members and member 18 companies.</p> <p>19 According to the latest annual report 20 published by the Energy, Minerals and Natural Resources 21 Department, in 2016 the mining industry in New Mexico 22 reported production values of more than \$1.7 million.</p> <p>23 New Mexico ranks first in the United States in 24 potash production, second in copper production and 11th 25 in coal production. New Mexico was once a leader in the</p>
581	<p>1 production of uranium and still has large uranium 2 resources that may be mined in the future, market 3 conditions permitting.</p> <p>4 Total direct and contract employment by the 5 mining industry in 2016 was just under 5,000, with total 6 payrolls of over 330 million.</p> <p>7 Mining jobs are typically some of the 8 highest-paying and sought-after jobs, particularly in 9 the rural areas of New Mexico. Mining creates many 10 additional jobs in the community as illustrated by the 11 goods and services provided by our associate members and 12 other local goods and services provided to our mine 13 employees.</p> <p>14 Since most mining operations are located in 15 rural areas, these jobs are critical to the local 16 economies where the mines operate.</p> <p>17 Minerals are vital to everyday life. All of 18 our electrical energy is supported by mineral 19 production, including electric power generated from 20 coal, uranium and oil and gas, as well as renewable 21 power generation that requires steel, copper and other 22 metals for wind towers and motors, steel, copper, silver 23 and other metals for photovoltaic cells and solar 24 installations and copper, steel and other metals for 25 transmission lines.</p>

582	<p>1 Potash and other fertilizers are essential to</p> <p>2 produce our food, and our roads and buildings for homes</p> <p>3 and businesses cannot be constructed without aggregates.</p> <p>4 If these essential minerals are not being produced in</p> <p>5 New Mexico, they must be produced somewhere else. New</p> <p>6 Mexico might as well enjoy the economic benefits of</p> <p>7 mineral production as well as the everyday benefits that</p> <p>8 consume the minerals.</p> <p>9 As the legislature said in the Mining Act, the</p> <p>10 exploration, mining and extraction of minerals is vital</p> <p>11 to the welfare of New Mexico.</p> <p>12 I believe this is the first public hearing</p> <p>13 held on a proposed Discharge Permit under the Copper</p> <p>14 Rule. The Copper Rule was adopted by the Water Quality</p> <p>15 Control Commission in December of 2013 pursuant to the</p> <p>16 New Mexico Water Quality Act.</p> <p>17 Since then, the Copper Rule has been</p> <p>18 scrutinized and upheld on appeals to the New Mexico</p> <p>19 Court of Appeals and the Supreme Court, in each case by</p> <p>20 unanimous decision. The Copper Rule implements</p> <p>21 legislation passed in 2009. So the Copper Rule has been</p> <p>22 backed -- excuse me -- by all three branches of New</p> <p>23 Mexico's government.</p> <p>24 The Copper Rule specifies detailed</p> <p>25 requirements for the design, construction, operation,</p>	584	<p>1 As I previously discussed, development of New</p> <p>2 Mexico's mineral resources provides many local and</p> <p>3 statewide economic benefits and employs many local</p> <p>4 residents. Issuance of the Discharge Permit for the</p> <p>5 project will be a great step forward to realizing the</p> <p>6 important benefits this project will provide in terms of</p> <p>7 employment, revenue for local and New Mexico businesses</p> <p>8 and substantial contributions to state and local tax</p> <p>9 revenues to support our schools, roads and other</p> <p>10 government services.</p> <p>11 Many years have been spent and countless</p> <p>12 dollars spent for experienced engineers, scientists and</p> <p>13 other experts to develop the plans for the Copper Flat</p> <p>14 project. These plans must comply with a myriad of</p> <p>15 federal and state laws and regulations imposed on mining</p> <p>16 projects to ensure protection of public health and</p> <p>17 safety and the environment.</p> <p>18 I would urge that the Hearing Officer and the</p> <p>19 department would focus on the requirements set out by</p> <p>20 the Water Quality Control Commission. Other matters</p> <p>21 such as dam safety requirements and water supply issues</p> <p>22 should be left to consideration by the agencies assigned</p> <p>23 by the legislature to consider those issues.</p> <p>24 Approving DP-1840 will be good for the state</p> <p>25 and local communities and will send the right message to</p>
583	<p>1 monitoring and closure of copper mines to protect</p> <p>2 groundwater quality. These requirements are based upon</p> <p>3 experience gained under the Discharge Permits issued</p> <p>4 over nearly 40 years.</p> <p>5 I am impressed by New Mexico Copper Company's</p> <p>6 plans for the Copper Flat project. New Mexico Copper</p> <p>7 has worked tirelessly to satisfy the requirements of</p> <p>8 multiple federal and state agencies, including BLM, the</p> <p>9 US Fish and Wildlife Service, the Environment Department</p> <p>10 and the Mining and Minerals Division.</p> <p>11 While this area is limited to considerations</p> <p>12 of the requirements for a groundwater Discharge Permit,</p> <p>13 the mine plans reflect the need to comply with the</p> <p>14 myriad of environmental protection laws. These plans</p> <p>15 take years to come to fruition at a tremendous cost,</p> <p>16 representing New Mexico Copper's investment in the</p> <p>17 development of New Mexico's mineral resources.</p> <p>18 I am happy to see that the Environment</p> <p>19 Department has issued a draft permit based upon the</p> <p>20 department staff's conclusion that New Mexico Copper's</p> <p>21 mine plans appear to meet or exceed all of the</p> <p>22 requirements of the Copper Rule and the commission's</p> <p>23 regulations. With the permit conditions proposed by the</p> <p>24 department, the Copper Flat project will be operated in</p> <p>25 a manner that protects groundwater quality.</p>	585	<p>1 mining companies that are willing to invest significant</p> <p>2 resources and promising projects such as the Copper Flat</p> <p>3 Mine. For these reasons, on behalf of the New Mexico</p> <p>4 Mining Association, I urge you to approve Discharge</p> <p>5 Permit DP-1840 after considering all relevant testimony</p> <p>6 and comments.</p> <p>7 Thank you for your time.</p> <p>8 MS. ORTH: Thank you very much, Mr. Bowen.</p> <p>9 Would you be willing to put your written</p> <p>10 statement next to the flowers there.</p> <p>11 MR. BOWEN: Yes.</p> <p>12 MS. ORTH: All right. Thank you.</p> <p>13 The next person signing in -- and I apologize</p> <p>14 in advance for mispronouncing anyone's name. I do my</p> <p>15 best.</p> <p>16 Ted Caluwe? Ted Caluwe?</p> <p>17 No?</p> <p>18 All right.</p> <p>19 I also forgot to mention that there will be</p> <p>20 other opportunities to offer public comment. We don't</p> <p>21 have other scheduled times, but if you come during the</p> <p>22 day and let me or the hearing clerk know that you would</p> <p>23 like to offer public comment, we will find a time when</p> <p>24 we have a break in the technical case to accept it.</p> <p>25 So if Mr. Caluwe comes back, we'd be happy to</p>



586	<p>1 take his comment.</p> <p>2 Taylor Streit -- Streit did not indicate</p> <p>3 whether he wanted to offer comment or not. So let me</p> <p>4 ask.</p> <p>5 Would you like to?</p> <p>6 MR. STREIT: Yeah, please.</p> <p>7 MS. ORTH: All right. Come on up.</p> <p>8 MR. STREIT: Sit here?</p> <p>9 MS. ORTH: Yes, please, the table with the</p> <p>10 flowers.</p> <p>11 I will ask for your name first and then that</p> <p>12 you be sworn in.</p> <p>13 MR. STREIT: Taylor Streit.</p> <p>14 MS. ORTH: And that was S-T-R-E-I-T?</p> <p>15 MR. STREIT: That's correct.</p> <p>16 TAYLOR STREIT</p> <p>17 having been first duly sworn or affirmed, gave</p> <p>18 public comment as follows:</p> <p>19 PUBLIC COMMENT</p> <p>20 MR. STREIT: I was kind of asked to be here</p> <p>21 because I had a similar -- a parallel experience with</p> <p>22 the Moly Mine in Questa.</p> <p>23 I was in the outdoor business, in the fishing</p> <p>24 business in the area, still am, for a long time. Now</p> <p>25 I've moved down south -- or 10 miles south. And -- and</p>	588	<p>1 law. The Moly Mine was fined what amounted to pocket</p> <p>2 change. It was fined seemingly daily, or very often,</p> <p>3 but the fines were, I think, insignificant with the</p> <p>4 amount of ore that was coming out of the ground.</p> <p>5 When the operation pulled out, it left a</p> <p>6 mess -- mess. And instead of doing the right thing and</p> <p>7 cleaning up the vast rubble, contaminated dirt and</p> <p>8 water, the mining companies fought the Superfund process</p> <p>9 vehemently.</p> <p>10 And when our Superfund committee was given a</p> <p>11 tour of the reclaimed land, we burst out laughing at a</p> <p>12 reclaimed slope that we were taken to. There were two</p> <p>13 bushes growing out of a pile of small boulders. And we</p> <p>14 thought this was a joke, but the gal who was showing us</p> <p>15 around had such a look on her face, we realized she was</p> <p>16 getting well paid to visualize a green garden.</p> <p>17 The Town of Questa's people had many health</p> <p>18 problems from exposure to heavy metals, also. These</p> <p>19 were ongoing problems, because when the mine pulled out,</p> <p>20 it left the town's water system bedded in tailings, the</p> <p>21 air full of nasty white dust in the spring winds.</p> <p>22 And the people who were formerly miners all of</p> <p>23 a sudden were the unemployed. Many were forced to move</p> <p>24 on from what was their historical homes. And there were</p> <p>25 lots of social and criminal problems over the years. In</p>
587	<p>1 I also write, and I have a book that has some photos in</p> <p>2 it that I'm going to submit.</p> <p>3 And I wrote a little thing here.</p> <p>4 And it is I like living on the frontier. But</p> <p>5 it has its drawbacks, and when there aren't many people</p> <p>6 around, bad things can happen to the environment. Such</p> <p>7 was the case with the Moly Mine on the Red River in</p> <p>8 Northern New Mexico a couple decades ago.</p> <p>9 There was a little opposite -- there was</p> <p>10 little opposition, but myself and a handful of people --</p> <p>11 we were the Concerned Citizens of Questa -- went to a</p> <p>12 lot of meetings like this. But molybdenum prices stayed</p> <p>13 high so our work didn't amount to much.</p> <p>14 But that was a different time, and if a mine</p> <p>15 was proposed near present day Taos, which is by Questa,</p> <p>16 there wouldn't even be a meeting. Who cares what</p> <p>17 happens between Array, Hillsboro and Caballo? These</p> <p>18 tiny towns are somewhat near the extremely remote Aldo</p> <p>19 Leopold Wilderness.</p> <p>20 In the north, in Questa, I saw a relatively</p> <p>21 small mine turn into a huge beast that broke all the</p> <p>22 rules. I watched it devastate the lonely Red River --</p> <p>23 the lower Red River where I made much of my living,</p> <p>24 still do really, and that runs into the Rio Grande.</p> <p>25 Not that the government didn't lay down the</p>	589	<p>1 fact, over a period of 20 years, there were 12 unsolved</p> <p>2 murders in a row.</p> <p>3 I have moved to this lonely place, Southern</p> <p>4 New Mexico, and don't want to see the same things happen</p> <p>5 here. At my tender age, I am more interested in</p> <p>6 catfishing than, quote, hiking and trout fishing. But</p> <p>7 if I get in shape, it's possible, because we have the</p> <p>8 southernmost Rio Grande cutthroat trout fishery in the</p> <p>9 world. And that's our state fish.</p> <p>10 Which is the Animas. It's not much of a</p> <p>11 stream, and it usually dries by the time it gets near</p> <p>12 the proposed mine wells, but it has a population of Rio</p> <p>13 Grande cutthroats above the Ladder on public land. And</p> <p>14 when the mammoth -- period. But when that mammoth well</p> <p>15 starts pumping, we can be sure that it will suck the</p> <p>16 Animas aquifer so powerful -- powerfully that it will</p> <p>17 dry it up even up into the wilderness.</p> <p>18 I forget the technical term for that. I'm</p> <p>19 sure somebody will do it.</p> <p>20 And then there is the downstream element, too.</p> <p>21 There is me and my prized well and two peach trees. In</p> <p>22 a parallel drainage, besides myself there are other</p> <p>23 life-forms, rare Arizona sycamore, catfish, green chile,</p> <p>24 pecans, waterfowl, cows, quail, deer, bighorns, farmers,</p> <p>25 and many touristy Texans.</p>

590	<p>1 I care what happens to all this life. Don't</p> <p>2 you? But this -- but this "you" I speak of is just a</p> <p>3 few of us, and we rely on the New Mexico EID to do the</p> <p>4 right thing and not permit this mine.</p> <p>5 This is my comment, and I'll -- leave it here?</p> <p>6 MS. ORTH: Yes, please.</p> <p>7 MR. STREIT: Yeah.</p> <p>8 And I've also included a couple photos. I</p> <p>9 probably could have done a better job with this.</p> <p>10 They're out of my book, Man vs Fish. And they show the</p> <p>11 Red River premining. It's a very rare photo from when</p> <p>12 it was clear and -- you know, like water, clear. And</p> <p>13 now Red River is almost always a blue-gray color. And</p> <p>14 that blue-gray color is the standard.</p> <p>15 I mean, I've seen it go from what was just</p> <p>16 normally water -- this is pre-19 -- about 1980, and the</p> <p>17 well went -- the mine went underground and did huge</p> <p>18 production about '81, and -- and then at present time,</p> <p>19 it still has this blue-green color.</p> <p>20 At any rate, I've got the photos here. If</p> <p>21 anybody wants to see them, I don't know if I could --</p> <p>22 MS. ORTH: All right. If you'd put them in</p> <p>23 front by the -- next to the flowers.</p> <p>24 MR. STREIT: Yeah.</p> <p>25 But that's about all I have, but the photo</p>	592	<p>1 right down the stream from the Bagdad copper mine. So</p> <p>2 I've got 20 years of experience with some of these</p> <p>3 changes that are potentially being discussed.</p> <p>4 I have professional expertise and personal</p> <p>5 interest in the results of this Discharge Permit.</p> <p>6 Copper and other minerals are found in</p> <p>7 association with it as well as many byproducts of the</p> <p>8 processing process have been found highly toxic in</p> <p>9 multiple studies. As a result, I have four major</p> <p>10 concerns I do not believe that have been adequately</p> <p>11 addressed relative to the Discharge Permit.</p> <p>12 A, federally protected migratory waterfowl and</p> <p>13 New Mexico wildlife species of concern will be attracted</p> <p>14 to extremely large and increasingly toxic water feature,</p> <p>15 as they have been through many such water features in</p> <p>16 multiplying across the west. Water is just too rare a</p> <p>17 thing on this landscape not to attract wildlife, in</p> <p>18 particular migratory waterfowl.</p> <p>19 This has resulted in large deaths. It has</p> <p>20 resulted in selenium contamination of waterfowl and of</p> <p>21 wildlife and very high cost in fines and remediations to</p> <p>22 the mines. I see no provision for preventing this from</p> <p>23 occurring, by finding ways of discouraging migratory</p> <p>24 birds and other waterfowl from -- other wildlife from</p> <p>25 these areas.</p>
591	<p>1 is -- tells more.</p> <p>2 So thank you.</p> <p>3 MS. ORTH: Thank you very much, Mr. Streit.</p> <p>4 MR. STREIT: Thank you.</p> <p>5 MS. ORTH: Kathleen Blair.</p> <p>6 KATHLEEN BLAIR</p> <p>7 having been first duly sworn or affirmed, gave</p> <p>8 public comment as follows:</p> <p>9 PUBLIC COMMENT</p> <p>10 MS. BLAIR: Good evening.</p> <p>11 I'm Kathleen Blair. I am a resident of</p> <p>12 Hillsboro and have owned property there for</p> <p>13 approximately 10 years.</p> <p>14 I have a PhD in zoology with a concentration</p> <p>15 in ecology. Particularly I have specialized in the</p> <p>16 impacts of natural and human-caused changes in natural</p> <p>17 processes to ecosystems. I have taught a wide variety</p> <p>18 of university courses as an assistant professor in</p> <p>19 ecology, environmental biology, botany, wildlife</p> <p>20 biology, wildlife management at Central Missouri State</p> <p>21 and West Texas State -- A&amp;M universities and was adjunct</p> <p>22 at Texas A&amp;M University.</p> <p>23 For the last 20 years, I've been an ecologist</p> <p>24 for the US Fish and Wildlife Service, working on the</p> <p>25 Bill Williams River National Wildlife Refuge, which is</p>	593	<p>1 B, due to the toxicity of copper, which they</p> <p>2 are now starting to regulate at public water supplies as</p> <p>3 badly as it's lead -- they're starting to realize how</p> <p>4 bad it could be -- as well as the ancillary</p> <p>5 contaminants, any discharge from any catchment basin,</p> <p>6 whether it's the pit lake or the evaporation ponds, any</p> <p>7 of the catchment ponds, anything that is holding water</p> <p>8 that has a potential to be contaminated by the mine --</p> <p>9 whether this is accidental human error or whether it is</p> <p>10 a natural event in excess of your current projected</p> <p>11 parameters, it could be severely damaging for people,</p> <p>12 wildlife and plants in the watershed, including both</p> <p>13 surface flows or groundwater downstream of the mine.</p> <p>14 Such impacts could include the rural</p> <p>15 residents, watershed, the businesses, the Town of</p> <p>16 Caballo, Caballo Reservoir, Percha Dam State Park and</p> <p>17 potentially the Lower Rio Grande mainstem if these</p> <p>18 discharges are sufficient.</p> <p>19 This could easily last for decades and</p> <p>20 possibly even in perpetuity, into the -- as it has</p> <p>21 happened elsewhere. In particular, for example, the</p> <p>22 Bill Williams River, Alamo Lake that has been</p> <p>23 contaminated by mercury from the Bagdad Mine. They</p> <p>24 never originally thought it was going to be there. It's</p> <p>25 naturally occurring.</p>

<p style="text-align: right;">594</p> <p>1        However, it is their tailings piles and their 2 exposure of the mercury that has resulted in it becoming 3 into the watershed. Alamo Lake, which is one of the 4 premier bass fisheries in Arizona, now frequently has to 5 forbid people from eating the fish because of the 6 mercury concentration. 7        There's been for various reasons very little 8 research done on what the potential for that mercury 9 contamination on other wildlife may be. 10        So sometimes it's the things you're not really 11 looking for in the planning that actually hit hardest. 12        Copper is necessary in small quantities for 13 healthy plant populations and plant development, but it 14 can be highly toxic at higher concentrations, 15 particularly if it's engaged in water. 16        It is the primary algacide, fungicide and 17 herbicide for all aquatic applications. It kills plants 18 in water. 19        Wind-driven dust from massive tailing piles 20 and other exposure areas of the mine and the dry 21 sediments from the evaporation ponds and other -- the 22 copper tailings pile, the evaporation areas, 23 concentrating sediments that can become windborne, 24 disbursed over the landscape, and when it does rain and 25 comes in contact, it will enter soil and potentially</p>	<p style="text-align: right;">596</p> <p>1 to generate those communities. And as we're learning 2 more and more, there are very specific genetic 3 populations in certain areas that turn out to be quite 4 critical for restorations to be successful. 5        You can't just sit there and grow buckwheat 6 and Bermuda grass all over the hills anymore and make it 7 work. 8        All right. Climate change I also do not 9 believe has been adequately addressed, at least to my 10 satisfaction, for the next 25 years to 100 years. Again 11 it was brought up whether this is a -- how long this 12 mine will actually be in production, if it will be 13 concentric or if it will be episodal. Depending 14 entirely on what the price of copper is, it could wind 15 up being stretched out for a time being. 16        But projections of increasing temperatures in 17 New Mexico for the foreseeable future will result in 18 higher evaporation rates out of many of these exposed 19 areas. This will increase concentration of the 20 contaminants at a rapid rate that -- probably more 21 rapidly than it is being projected at the moment, 22 particularly in those areas when they are combining 23 recycling and reuse, increasing concentrations even more 24 and evaporation. So you could end up with a real nasty 25 situation in a real big hurry.</p>
<p style="text-align: right;">595</p> <p>1 surface waters. 2        Once this rain carries the contaminated dust 3 into the ground, it is -- particularly can be toxic to 4 plants and the mycorrhizal fungi ecology which we are 5 now beginning to discover was really critical to an 6 awful lot of plant and soil development. 7        It's not an accident if you drive through the 8 lands and hillsides around Santa Clara, around Bagdad, 9 around Globe, around Bisbee look like they've been 10 sterilized. They look like the moon. They have been 11 sterilized. Largely not because of direct water 12 contamination, but because of dust, years of dust 13 sediments settling down in these regions and then being 14 carried by rainfall in the soils. 15        And if you don't think -- if you have any 16 illusions on the part of the county on using these 17 tailing piles for infrastructure or roadbeds, I suggest 18 you contact Ottawa County, Oklahoma and find out just 19 how much trouble you can get in and just how fast, when 20 those winds lift tailing sediments and -- into a dust 21 and find out how fast your town can become a ghost town 22 like Picher, Oklahoma. 23        I have concerns with those plant situations, 24 as I mentioned previously, with precisely which plants 25 will be -- will be utilized, which species will be used</p>	<p style="text-align: right;">597</p> <p>1        Higher evaporation rates will also speed the 2 exposure of toxic sediments through their evaporation 3 of -- around the edges of the ponds or the ponds when 4 they dry out. We do get long periods of droughts. Once 5 again resulting in airborne contaminants that can be an 6 issue for the downstream airshed as well as the 7 watershed. 8        Second on climate change, flash flooding 9 potential is projected to be increasing over the time 10 this mine is projected to function. The episodic 11 results, it is the -- we are -- it is projected to have 12 longer periods of drought but more explosive and 13 intensive rainfall when it does occur, which increases 14 the probability of being a flash flood, since the soils 15 will not be as good at holding the water back when it 16 does occur. 17        Furthermore, these sorts of episodic issues 18 with drought will reduce vegetation in the watershed 19 upstream of the area. It will increase the probability 20 of grass and forest fires, all things which will tend to 21 denude a watershed and be much slower in recovery than 22 is -- has been for the last hundred years. And without 23 this vegetation protecting those slopes, again you're 24 contributing to more flash flood severity and frequency. 25        All right. Such patterns have already been</p>

<p style="text-align: right;">598</p> <p>1 documented well over New Mexico, Arizona, much of the  2 desert Southwest as well as other areas that these  3 climate shifts are indeed happening. Such ecosystem  4 processes require decades to regain any sort of  5 stability or the kind of database to make accurate  6 projections.  7 Hurricanes in the Gulf of Mexico, curiously  8 enough, you might think that they're an issue. Tell  9 that to Ruidoso after Hurricane Dolly came off the Gulf  10 and lost a town just about over the entire thing. So  11 the increased intensity of hurricanes that is projected,  12 not frequency necessarily, but increased intensity to  13 the point they're considering upping the scale to five  14 might not be as high as they go anymore.  15 One of those comes off the Gulf of Mexico or  16 the Gulf of California, because certainly you do get  17 rainfall results from hurricanes coming in from either  18 the Pacific or the Gulf of Mexico, again increasing the  19 probability of flash flooding that could overwhelm these  20 contained areas over newly contained areas.  21 Should these contaminated holding areas,  22 whether they're evaporation ponds, whether they're the  23 pit lake itself -- if any of these happen to be  24 overtopped, once again, if they erode, if they fail,  25 even if potentially human error is involved, although</p>	<p style="text-align: right;">600</p> <p>1 Lee Newman?  2 Is Lee Newman here?  3 No?  4 Oh.  5 LEE NEWMAN  6 having been first duly sworn or affirmed, gave  7 public comment as follows:  8 PUBLIC COMMENT  9 MR. NEWMAN: Well, I came tonight to really  10 talk about water chemistry of the tailings pond, my  11 experience with tailing ponds, some technical issues.  12 So I came tonight to talk about water chemistry, soil  13 chemistry, water flows through Animas Creek canyon, with  14 some real numbers.  15 Now I just left my papers on my seat. I'm not  16 going to go into any numbers at all. I'm just going to  17 talk from my experience and my life of working with  18 mining companies.  19 Some of the finest jobs I've ever had have  20 been with mining companies, Atlas Minerals, Moab, Utah,  21 Hecla Mining Company, Hitsler Mining Company (phonetic).  22 At Atlas Minerals, I worked on the tailings  23 ponds on -- I was young -- on keeping them from  24 breaking. We didn't have spillways. And of course,  25 without a spillway, when you have a break the soft</p>
<p style="text-align: right;">599</p> <p>1 that may be less probable than environmental issues --  2 any downstream flow of these contaminated waters will  3 damage property and water resources potentially as far  4 down as the Rio Grande.  5 There are certain examples of both mine  6 retention ponds being overtopped fail due to flooding,  7 failing due to accidental release due to human error.  8 Ask the San Juan up in Northern Arizona just exactly  9 what happens when somebody misses by a few inches with a  10 bulldozer.  11 I see no provision for double emergency  12 retaining structures on any of these. Most of them have  13 a single retaining structure. I don't see an emergency  14 backup on most of these features to protect the  15 downstream watershed from any of these events during the  16 life of these mine evaporation areas and the life of  17 these big puddles.  18 Thank you.  19 MS. ORTH: Thank you, Dr. Blair.  20 Would you be willing to leave your comments --  21 MS. BLAIR: I need to edit. I've been  22 scribbling all over it all day.  23 MS. ORTH: All right.  24 MS. BLAIR: I'll bring it tomorrow.  25 MS. ORTH: Okay. Thank you.</p>	<p style="text-align: right;">601</p> <p>1 material that the dam is made of just is gone. Now, our  2 dam at lookout was -- at Atlas Minerals was right along  3 the river, the Colorado River.  4 When uranium played out in the '70s, boy, it  5 turn from a boomtown to a ghost town. My parents, my  6 friends -- the houses were just let go. Nothing, the  7 town turned to nothing.  8 The town got together with the Department of  9 Interior, with Bureau of Mines and addressed the big  10 tailings pond that we developed over the years, which is  11 about the size of the one we're talking about for the  12 Copper Flat, 600 acres. You realize 600 acres is huge.  13 To answer the lady's question back there from  14 this afternoon -- she asked what would happen if the  15 tailings pond broke at the Copper Flats Mine. Okay.  16 640 acres, one-foot depth -- let's say it dropped one  17 foot. That's not too much. Okay. One foot down  18 Grayback Arroyo off of 640 acres is going to be a  19 2,065,000,000 gallons. Okay. 2,065,000,000 -- do you  20 realize a billion is a thousand millions?  21 The number -- the amount of water in tailings  22 that would pour down Grayback Arroyo -- now, if somebody  23 were recreating or hobby gold mining down there, would  24 it take them out? Yes, it would take them out. Now, do  25 I think that's a big issue? No. That's not what the</p>

<p style="text-align: right;">602</p> <p>1 big issues are.</p> <p>2 The big issues are -- it's our duty to protect</p> <p>3 the water. Now, I have lived and been in the mining</p> <p>4 towns all my life, Cobalt, Idaho; Moab, Utah; Durango.</p> <p>5 I'm just naming the towns that had big tailings piles</p> <p>6 along the rivers. Every single town in the West that</p> <p>7 had big tailings pile along the rivers had to deal with</p> <p>8 them.</p> <p>9 Now, in Moab, they had to take the tailings</p> <p>10 pile inland, mix it with aggregate, with concrete, and</p> <p>11 stabilize it. That's what should happen to the Copper</p> <p>12 Flat tailings pile, too. Right away it should be dealt</p> <p>13 with. It's not maybe. It's a for sure that that</p> <p>14 tailings pile is going to cause trouble in the future.</p> <p>15 There's no maybe about it. It has for every single mine</p> <p>16 in the communities I named, every time.</p> <p>17 We've all seen orange creeks. I don't want</p> <p>18 Animas Creek to turn into an orange creek. Animas Creek</p> <p>19 is world famous. I mean, it's the beloved creek that</p> <p>20 Aldo Leopold and his brother fished in in the early</p> <p>21 1900s and wrote the book -- and wrote the books about</p> <p>22 starting the Forest Service and the first hunting</p> <p>23 licenses. Animas Creek was the beloved Animas Creek.</p> <p>24 It still is to trout fishermen and -- and naturalists.</p> <p>25 So we don't want -- I hope we -- I hope that</p>	<p style="text-align: right;">604</p> <p>1 It's been my observation from measuring sodium</p> <p>2 content in 20 years it is going up. Every time we have</p> <p>3 a drought and the water level goes down in Animas Creek,</p> <p>4 the sodium level goes up. The water is now so that if</p> <p>5 my neighbor, Adam Chavez, waters his hay field my wells</p> <p>6 start pumping air. So we're going to put pressure on</p> <p>7 that.</p> <p>8 So, now, if you say, okay, look, there's</p> <p>9 probably aquifers below that you guys can all drill in,</p> <p>10 and that's what the environmental -- everybody know what</p> <p>11 the Environmental Impact Statement is?</p> <p>12 MS. ORTH: Sir --</p> <p>13 MR. NEWMAN: It's the document that governs</p> <p>14 this mine. It's the document that is paid for by Copper</p> <p>15 Flats Mines. It's the document that describes what is</p> <p>16 going to go into the water. In the -- in the Copper</p> <p>17 Flat Mine Environmental Impact Statement, it says the</p> <p>18 effects from the copper mining will be measurable in</p> <p>19 Animas Creek for a hundred years after mining stops.</p> <p>20 We've got tables and -- that I've copied to</p> <p>21 distribute tonight, but since we're not into technical,</p> <p>22 I won't. But the tables show the drawdown are so</p> <p>23 dramatic on -- on the wells.</p> <p>24 Do I sound a little up -- and, well, yeah.</p> <p>25 Twenty -- it's going to be 25 years of putting this</p>
<p style="text-align: right;">603</p> <p>1 the commission -- I hope that your agencies will protect</p> <p>2 the farms below the dam, below the mine.</p> <p>3 I -- we have a farm, a tree farm. Now, we</p> <p>4 ship 60,000 drought-resistant trees a year off of our</p> <p>5 site in New Mexico. Nobody else in the state does it.</p> <p>6 Nobody else has the expertise to do it. 60,000 trees a</p> <p>7 year.</p> <p>8 The drawdown from the Environmental Impact</p> <p>9 Statement, which I have over on my seat -- the drawdown</p> <p>10 from my farm -- and the Environmental Impact Statement</p> <p>11 says so -- all of my wells will go dry. All of my</p> <p>12 artesian wells will go dry.</p> <p>13 Now, we spent 20 years putting together a</p> <p>14 system of solar collectors, harnessing the artesian</p> <p>15 water to water the fields. We've had awards. We were</p> <p>16 Green Business of the Year, the Governor's Cup award.</p> <p>17 We've been awarded by the Department of Interior. We</p> <p>18 were named Finest Tree Growers of New Mexico in The Best</p> <p>19 of New Mexico.</p> <p>20 We have -- this is going to shut us down.</p> <p>21 This is -- this -- if you draw down the water the way</p> <p>22 you say you're going to do -- now, which brings up one</p> <p>23 of my main issues with tonight that I wanted to address,</p> <p>24 is sodium content of -- of the -- of Animas Creek and</p> <p>25 the aquifers below Animas Creek.</p>	<p style="text-align: right;">605</p> <p>1 together, and then just seeing a mining company come</p> <p>2 and -- first they want to take the water, and then</p> <p>3 they're going to put in a giant tailings dam right above</p> <p>4 us.</p> <p>5 Now, what does history tell us? The tailings</p> <p>6 dam -- every one of them has failed. Name a success.</p> <p>7 Name one tailings dam that's stable and the community's</p> <p>8 happy with.</p> <p>9 MS. ORTH: Mr. Newman --</p> <p>10 MR. NEWMAN: Name one in the west, anybody.</p> <p>11 There isn't.</p> <p>12 So I urge you to do us right for our community</p> <p>13 and not let this mine have the Discharge Permit, and we</p> <p>14 hope the State Engineer doesn't give them our precious</p> <p>15 water and further our problem. You should see the</p> <p>16 drawdown on -- that they're predicting for Caballo</p> <p>17 Reservoir and the river.</p> <p>18 The drawdown in their own environmental --</p> <p>19 nobody talks about that. Nobody talks about the</p> <p>20 Environmental Impact Statement, because once they wrote</p> <p>21 it, it didn't look good. So why do they never talk</p> <p>22 about it? Why is it never brought up? Because it</p> <p>23 doesn't look good. Because if you read it, a reasonable</p> <p>24 person is going to go, oh, wow. Wow. This just isn't</p> <p>25 right.</p>

606	<p>1 So that's what I got to say.</p> <p>2 MS. ORTH: Thank you very much, Mr. Newman.</p> <p>3 Next we have -- please don't applaud.</p> <p>4 Tom Shelley. Tom Shelley.</p> <p>5 TOM SHELLEY</p> <p>6 having been first duly sworn or affirmed, gave</p> <p>7 public comment as follows:</p> <p>8 PUBLIC COMMENT</p> <p>9 MR. SHELLEY: Good evening.</p> <p>10 My name is Tom Shelley. I worked in the</p> <p>11 copper mining industry and as a consultant for over 27</p> <p>12 years. I also own and operate a cattle ranch in Grant</p> <p>13 County.</p> <p>14 I appreciate mining and the tremendous</p> <p>15 economic activity and prosperity that it -- that they</p> <p>16 generate. It's this kind of activity that enables our</p> <p>17 great way of life. I know by experience that ranches</p> <p>18 and farms can co-exist with mines just fine.</p> <p>19 I support the issuance of DP-1840. It will be</p> <p>20 a great milestone to see that a mine can be permitted</p> <p>21 and operated under the extremely stringent environmental</p> <p>22 requirements here in my home state.</p> <p>23 Thank you.</p> <p>24 MS. ORTH: Thank you, Mr. Shelley.</p> <p>25 The next person indicating a desire to offer</p>	608	<p>1 Sierra County and create opportunity for economic</p> <p>2 growth.</p> <p>3 Sierra County sits at the bottom of almost</p> <p>4 every negative list of social and economic woes in the</p> <p>5 entire country. Let's not allow this to continue. Do</p> <p>6 not let the county and municipalities continue to die a</p> <p>7 slow death. Permit Copper Flats Mine to help our county</p> <p>8 revive its economic health.</p> <p>9 Thank you.</p> <p>10 MS. ORTH: Thank you, Mr. Lee.</p> <p>11 Virginia Lee.</p> <p>12 Nope. Please don't applaud.</p> <p>13 VIRGINIA LEE</p> <p>14 having been first duly sworn or affirmed, gave</p> <p>15 public comment as follows:</p> <p>16 PUBLIC COMMENT</p> <p>17 MS. LEE: Madam Hearing Officer, about the</p> <p>18 year 2000, my husband and I tried to look for a place</p> <p>19 where we thought we would retire. We looked on the West</p> <p>20 Coast. We looked on the East Coast. We looked in</p> <p>21 Canada. We settled on here.</p> <p>22 This place has got a lot to offer. It's got a</p> <p>23 lake. It's got a lot of things, a hospital. It's got a</p> <p>24 bowling alley. It's got a theater. It's got a senior</p> <p>25 center. This is -- this is where we decided we are</p>
607	<p>1 public comment is George Lee. I believe that's Lee.</p> <p>2 GEORGE LEE</p> <p>3 having been first duly sworn or affirmed, gave</p> <p>4 public comment as follows:</p> <p>5 PUBLIC COMMENT</p> <p>6 MR. LEE: Good evening.</p> <p>7 My name is George Lee, and I am a resident of</p> <p>8 Sierra County.</p> <p>9 My wife and I have been property owners in</p> <p>10 Sierra County for the past 13 years. We invested our</p> <p>11 life savings into our home and property here, and we</p> <p>12 love our home here. Although we did not intend to do</p> <p>13 more than quietly retire to Sierra County to enjoy the</p> <p>14 scenic wonder and rural experience, life took us in a</p> <p>15 different direction, and we are both now very involved</p> <p>16 in serving our community. We are stakeholders.</p> <p>17 I am not a scientist, but I can read, and I</p> <p>18 can listen. I believe the studies are in and the</p> <p>19 science is clear. The Copper Flats Mine is not</p> <p>20 affecting the environment, nor a threat to the quality</p> <p>21 of life for the citizens of our county.</p> <p>22 What is a threat to Sierra County is poverty,</p> <p>23 poverty fueled by lack of jobs, lack of opportunities</p> <p>24 for our youth and declining population. The Copper</p> <p>25 Flats Mine will help to reverse the economic collapse of</p>	609	<p>1 going to spend the rest of our lives. Therefore, I am</p> <p>2 concerned about anything that happens in this community</p> <p>3 because this is now my community.</p> <p>4 So when I hear about the Copper Flats Mine</p> <p>5 coming in, as a citizen I want to know the pros and the</p> <p>6 cons. So I thought about the cons.</p> <p>7 All right. It's definitely going to be</p> <p>8 environment impact somehow. And I'm very concerned when</p> <p>9 I hear the farmers and the ranchers below saying that</p> <p>10 they're concerned how it's going to impact them. They</p> <p>11 are my neighbors.</p> <p>12 I'm worried about the air. I'm worried about</p> <p>13 the ground. I'm worried about the water. I'm worried</p> <p>14 about after they close what is left, what do we have to</p> <p>15 deal with, what are we leaving for the generations</p> <p>16 behind us.</p> <p>17 So those are the cons I'm thinking of.</p> <p>18 Then the pros, I think about the pros.</p> <p>19 There are a lot of jobs coming in. It will be</p> <p>20 the biggest employer in the county. That will bring GRT</p> <p>21 in. Do you know what our county can do with more GRT?</p> <p>22 How many more programs can we start? What is it out</p> <p>23 there that we can look at that we're not doing now?</p> <p>24 Maybe we could start a crisis intervention center or</p> <p>25 maybe some place for -- I don't know, homeless. There's</p>

610	<p>1 just so many things that we can do that we can't now                  2 because we don't have the funding to.                  3 And also the pros, when this copper mine                  4 opens, it will bring a lot of jobs. That will bring in                  5 their families. That will bring in a lot of people.                  6 We'll need new homes. They'll -- we'll need more                  7 teachers. We'll need a better hospital system. Their                  8 families will need jobs, and maybe their families will                  9 need qualified teachers and work in the hospitals.                  10 And I can see the population growing, the                  11 county expanding, and then new businesses might start.                  12 More shopping, things that we need that we don't have                  13 now. Maybe we can have an Uber company start or two or                  14 three. When I look at what the county can do with the                  15 money, to me the pros are -- are really great.                  16 And then I think, well, have they taken care                  17 of the cons? Every few months we hear an update about                  18 the mine, they're working on this, they're working on                  19 that. There are just an awful lot of regulations that                  20 they have to go through. And they have planned for                  21 this. Every obstacle, I believe, they've overcome.                  22 They have -- they have met everything that's been                  23 required to protect the environment and to clean it up                  24 after they're done and try and restore it as much as                  25 they can.</p>	612	<p>1 here, for my occupation.                  2 But what I wanted to come up here and do is                  3 just say thank you. I wanted to say thank you to the                  4 investors at the mine and those working for it. Thank                  5 you for the opportunity. Thank you for the believing                  6 that this could be a mutual beneficial endeavor for my                  7 community and for you. Thank you for getting out there                  8 and having the tenacity to do something.                  9 And, you know, this community is dying. And                  10 if we don't do something, it's going to literally die                  11 off. And this is that huge opportunity for us to say                  12 that, you know, we're going to take the bull by the                  13 horns and try to do something different. And so thank                  14 you, you guys coming and stepping in, giving us that                  15 opportunity.                  16 I work here in Truth or Consequences. I live                  17 at Caballo so I'm not far from the mine. And I realize                  18 there's going to be change, but I realize the change is                  19 also going to be extremely positive.                  20 I mean, yeah, we got to move some earth, we                  21 got to do something to make a mine. But if we're going                  22 to employ a huge amount of the locals here, if we're                  23 going to employ people that can come in from the state,                  24 we're going to be bringing in money, we're going to be                  25 changing this atmosphere.</p>
611	<p>1 And then I also think it's not completely fair                  2 to judge the past mining operations that have left                  3 barren lands on what's happening now, because                  4 regulations have changed, and they are now complying                  5 with what is -- what is required today. And they are                  6 not going to leave it like they've left it in the past.                  7 I just don't think that that's allowable.                  8 And so they jump through all of their hoops,                  9 and I think they've done everything that they need to do                  10 to get this permit. And so as a citizen of Sierra                  11 County, I urge you to allow this permitting and allow                  12 our county to grow.                  13 Thank you.                  14 MS. ORTH: Thank you, Ms. Lee.                  15 Earl Bridges.                  16 EARL BRIDGES                  17 having been first duly sworn or affirmed, gave                  18 public comment as follows:                  19 PUBLIC COMMENT                  20 MR. BRIDGES: I just wanted to come up here                  21 and -- I'm Earl Bridges. I'm a supervisor at New Mexico                  22 Gas Company.                  23 And I'm only a resident here as of three                  24 years. I've grown up around Elephant Butte, and I just                  25 kind of love this area in general, which is what drew me</p>	613	<p>1 This community is, like I said, dying off.                  2 The atmosphere is one of regression. And I for one                  3 would love to see this atmosphere change to a can do                  4 attitude and ambition, and I think that this mine could                  5 really change this town in general. And I just wanted                  6 to thank you guys for bringing that effort.                  7 Thank you.                  8 MS. ORTH: Thank you, Mr. Bridges.                  9 Nolan Winkler.                  10 NOLAN WINKLER                  11 having been first duly sworn or affirmed, gave                  12 public comment as follows:                  13 PUBLIC COMMENT                  14 MS. WINKLER: You'll be happy to know I was                  15 told three minutes.                  16 I'm Nolan Winkler. I'm an artist living in                  17 Hillsboro for 25 years and presently the vice-president                  18 of the Hillsboro Mutual Domestic Water Consumers                  19 Association. That should scare everybody.                  20 I've heard a lot since I've been here about                  21 the New Mexico copper law, et cetera, but first, I would                  22 like to read part of New Mexico's Constitution that I                  23 feel is important to granting this Discharge Permit.                  24 Article 20 -- it's very short. Article 22,                  25 Section 21 of the Constitution of the State of New</p>

<p style="text-align: right;">614</p> <p>1 Mexico says "The protection of the state's beautiful and                  2 healthful environment is hereby declared to be of                  3 fundamental importance to the public interest, health,                  4 safety, and general welfare. The legislature shall                  5 provide for control of pollution and control of                  6 despoilment of the air, water and other natural                  7 resources of this state, consistent with the use and                  8 development of these resources for the maximum benefit                  9 of the people."                  10 I would ask if leaving at the mine site a 700                  11 vertical feet of steep pit walls after mining protects                  12 the state's beauty or health or safety.                  13 And I just heard tonight from a friend in                  14 Hillsboro that years ago when her -- her and other                  15 friends' children were teenagers they used to go                  16 swimming in the blue lake. Nobody knew where they went.                  17 They found out later it was the mine site. That -- so                  18 that goes to the safety of what the state has done on                  19 that site.                  20 Second, I'm confused about letting this                  21 Discharge Permit go through at this time as the company                  22 that owns the mine has not yet secured enough water to                  23 allow it to function more than one-and-a-half to two                  24 years annually. If they cannot secure more, that means                  25 their 11 years of working time could extend way into the</p>	<p style="text-align: right;">616</p> <p>1 I'm opposed to the mine. My concern is                  2 probably not as well thought out as a lot of people who                  3 have spoken here today. I didn't even think I was going                  4 to talk. But something's on my mind.                  5 As they fill this pit lake, it occurs to me                  6 that probably the salinity of the water that goes down                  7 Animas Creek is going to increase.                  8 What's going to happen to the guy with the                  9 corn field? What's going to happen to Lee with his                  10 nursery? To Cindy with her herb and egg farm? To the                  11 guy with the peacock?                  12 They're going to -- you can't raise crops with                  13 highly salinated water. So that's my real concern.                  14 What's the plan for that? Does the mine have plans to                  15 compensate these people as their crops fail or the other                  16 people that are watering horses?                  17 Again all of this is probably going to end up                  18 in the Rio Grande ultimately, and that's another                  19 concern, is the Mesilla Valley.                  20 So basically that's what I have to say, and I                  21 want the mine to think about what's going to happen to                  22 these people. What is going to happen? Because it's                  23 inevitable as they draw down the toe of that pit lake                  24 that the salinity of the water in Animas Creek is going                  25 to go up.</p>
<p style="text-align: right;">615</p> <p>1 future.                  2 My concern on that is trying to learn from                  3 history of like mining, would they even be in business                  4 so many years down the road. I would ask that this                  5 Discharge Permit not even be considered until the mine                  6 has secured enough water to function.                  7 Third, I'm told that the reclamation bond of                  8 \$54 million the mine suggests has not been legally set,                  9 and I again ask that the Discharge Permit not be                  10 considered until a reclamation bond is in place.                  11 I'm wondering if this entire hearing is not                  12 putting the cart before the horse and to whose advantage                  13 is that.                  14 Thank you.                  15 MS. ORTH: Thank you, Ms. Winkler.                  16 MS. WINKLER: Should I leave --                  17 MS. ORTH: If you would leave that there, that                  18 would be great. Thank you.                  19 Is this Arlene Lynch?                  20 ARLENE LYNCH                  21 having been first duly sworn or affirmed, gave                  22 public comment as follows:                  23 PUBLIC COMMENT                  24 MS. LYNCH: My name is Arlene Lynch. I'm a                  25 21-year resident of Hillsboro.</p>	<p style="text-align: right;">617</p> <p>1 Thank you.                  2 MS. ORTH: Thank you, Ms. Lynch.                  3 Ryan Gott.                  4 RYAN GOTT                  5 having been first duly sworn or affirmed, gave                  6 public comment as follows:                  7 PUBLIC COMMENT                  8 MR. GOTT: Good evening.                  9 My name is Ryan Gott. I'm a resident in                  10 Animas Creek.                  11 I recently moved from Durango, Colorado. I --                  12 in 2015, I experienced the Gold King Mine disaster,                  13 where they had an accident and let out 3 billion gallons                  14 of water into the Animas -- contaminated water with                  15 arsenic and copper into the Animas River, turned it --                  16 turned the river orange for about a week.                  17 The City of Farmington, which is downstream,                  18 had to close their water -- their city water for a week,                  19 and it dried out the river for about a couple days once                  20 the river started to clear up again.                  21 I have an acre-and-a-half soil farm that I'm                  22 raising vegetables and selling at the farmers market,                  23 and I'm concerned that my groundwater will -- in the                  24 future will no longer be available because they're going                  25 to pump all the water out, and I'm -- I'm very opposed</p>



618	<p>1 to the mine, and I hope they don't -- they don't proceed 2 and -- with the mine. 3 And that's all I have to say tonight, and -- 4 thank you. 5 MS. ORTH: Thank you, Mr. Gott. 6 Charles Hacke. 7 MR. HACKE: It's not Irish. Hacke. 8 MS. ORTH: Hacke. 9 MR. HACKE: Deutsch. 10 MS. ORTH: Ah. 11 CHARLES M. HACKE 12 having been first duly sworn or affirmed, gave 13 public comment as follows: 14 PUBLIC COMMENT 15 MR. HACKE: My name is Charles Michael Hacke. 16 I'm retired from the Navy. Used to ride 17 bastille by force up north. But during that unpopular 18 war, I got spit on when I came back, but I forgive. 19 That's in the past. That's their problem, not mine. I 20 retired our Navy intel. I know how to use this real 21 good. I have done it. I'm educated. 22 I've got breaches in Denver. And I worked 23 with Father Downey. I helped him -- assisted him with 24 the seismograph that was under the steps of the admin 25 building. When we go to school, they have to complete</p>	620	<p>1 zone that's called Copperhill, Tennessee. There is not 2 one tree that grows on that. And that's from the sulfur 3 dioxide that was emitted from their -- I think that's a 4 roasting process. I don't think it's active anymore. 5 So it's something to consider. And that's 6 back when they had plenty of water, folks. 7 Water is life out here, and it's precious. 8 And believe me, you mess up my coffee water, I'm going 9 to be real grumpy and upset. 10 But there's an opportunity here. Why can't 11 those tailings be recovered and whatever waste products 12 are there -- because I'm sure there's valuable material 13 in that. 14 You know, I know in the Middle East they do 15 evaporation processes to get freshwater, and they have 16 residue left over. Why can't that be done here? I 17 mean, it's something to consider in the future, put a 18 dome over it, let it evaporate, then you have a pan to 19 come in and scoop that up. 20 Is that not useful? I don't know. I'm 21 asking. That's -- I think that's an opportunity. You 22 know, maybe a university or somebody can look at that. 23 I'm not real keen on using a process -- I 24 don't know. How is the water involved in this? Does it 25 involve a reagent of some sort? From what I understand,</p>
619	<p>1 the predicted earthquake to 64. Our equipment was so 2 degraded. That's what the key was. Everybody else had 3 the fancy, sensitive stuff. As soon as that first 4 P-wave came in, all the galvanometers stuck. 5 Well, that's neither here nor there, but the 6 point is Father Downey was instrumental in showing how 7 when they do pumping to have -- to get rid of waste 8 products, that's what was lubricating the fault zones. 9 Okay? All right. 10 Now, after I graduated and went to the Navy 11 and stuff like -- et cetera, et cetera, retired. But 12 I'm also retired from the US Geological Survey Water 13 Sources Division. That doesn't make me an expert. My 14 definition of that expert is ex is a has-been, a pert is 15 I'm good under pressure. Okay. 16 The only comment I have to make tonight, right 17 now I am not convinced it's in our best interest yet. I 18 think you've got some hoops to jump through. But I 19 think there's some opportunities there. I believe that 20 one man's trash is another man's treasure. 21 What is in those tailings, guys? I did some 22 uranium geology on the Murray project. And I don't know 23 what cross -- you're going to use an amine reagent. 24 I tell you what. If you ever see an infrared 25 photograph of North Georgia, you'll see this big dead</p>	621	<p>1 it's a froth -- froth process, where they take all that 2 material off. 3 Well, let me draw your attention to 4 Cartersville, Georgia, barite district there. They use 5 an amine reagent to take the barite off, and then 6 whatever is left over is put in a tailings pond. Do you 7 know those tailings ponds have never dried? You try to 8 step out on one of those, you're going to disappear. 9 So why not recover this stuff? Is that 10 possible? I don't know. But right now I'm not real 11 convinced on the basis it's going to be covered. But I 12 think there's an opportunity there. 13 And based upon -- I've got to do some reading. 14 I don't know anything yet, to be honest. I want to give 15 you guys a fair shake. I'm 73 years old. I'd like to 16 live a little bit longer. But my -- I have prostate 17 cancer from being exposed, I'm sure, to radiation and 18 several other things at my job in the USGS. 19 And in the Navy, God knows what we were 20 exposed to there. And those radars we had could put an 21 I beam on fire a hundred yards. That's how powerful 22 that was. And some -- just the firemen, no telling what 23 we experienced. 24 But it's in remission thanks to the good 25 doctors at St. Louis University. And I'd like to be</p>

622	<p>1 able to live further on. But don't mess up my coffee  2 water, because I'll be looking you guys up. I don't  3 really -- I'm not going to hurt you. I will be grumpy.  4 I just want to be reassured before this thing  5 goes forward. Right now I don't think all my questions  6 have been answered. And I'm saying no. Okay. Unless  7 you think -- and I'm going to be fair about this. You  8 convince me that you've covered all the bases on this  9 stuff.  10 I don't like the idea of an open pit where  11 wildlife can be attracted. Matter of fact, there was  12 one of these tar sand pits when excess water was put  13 out, and they don't reuse that water. There was a bunch  14 of Canadian geese around that, and guess what, they're a  15 bunch of dead geese.  16 It's like they -- they -- what's the term I'm  17 looking for? Swimming pools. They are a nuisance in a  18 sense, especially if they're uncovered.  19 And all I ask is I want to be assured -- well,  20 and I do know that wind can take mine tailings away.  21 History is a teacher. History is prologue to the  22 future. Okay? So when someone says, well, I don't know  23 future, you know, no. I want to be sure that all the Ts  24 have been dotted and the Is crossed. That's all.  25 And I don't think that's asking too much. How</p>	624	<p>1 Jan Haley.  2 JAN HALEY  3 having been first duly sworn or affirmed, gave  4 public comment as follows:  5 PUBLIC COMMENT  6 MS. HALEY: My name is Jan Haley, and I'm a  7 longtime resident of Hillsboro.  8 And my main concern is water. I -- I very  9 much appreciate the economic circumstances of this  10 county. I've lived here long enough to see firsthand  11 what that looks like. And I very much agree that we  12 need jobs and we need something that will stimulate our  13 economy.  14 I believe that -- I guess I believe -- I know  15 I believe -- I believe that water is life and that water  16 is the most important thing that we can have. We cannot  17 live without water. And in my mind, this mining  18 operation is going to affect our water. There is no way  19 it cannot affect our water.  20 According to the proposed plan by NMCC, when  21 the water -- when the mining operation has been  22 completed, the pit lake, which will be a 2,800-foot-wide  23 hole, will be reclaimed by filling the bottom with water  24 to the equilibrium level. The resulting pit lake will  25 be 21 acres in area and 250 feet deep. It will require</p>
623	<p>1 about you -- any you of guys live downstream? I live in  2 Las Cruces. I know I talked to one of your permit  3 people, said, "Well, I live in Albuquerque." Well,  4 you're not living downstream.  5 And I -- I can truly understand the concern of  6 the people whose livelihood -- I would go crazy without  7 a Hatch chile. I mean, it's an important concern. I  8 don't know. Using the groundwater for this, it boggles  9 the mind. I mean, how -- why is that so important? You  10 use that amine reagent, right? Or some kind of reagent  11 to draw it off.  12 So I got to understand your process a little  13 more closely, be assured that this ain't going to be a  14 fiasco, you know, where somehow you go belly up and you  15 walk away, and guess what, us taxpayers got to clean up  16 the mess. That's all. I think that's a fair question.  17 Would you like to live in the valley, in  18 Mesilla, downstream, you and your family, and if God  19 forbid something happened to that holding pond. That's  20 a big pond.  21 I think there's still a lot of things that  22 need to be addressed. Okay? Don't mess up my coffee  23 water. Okay?  24 MS. ORTH: Thank you, Mr. Hacke.  25 All right. Please don't applaud.</p>	625	<p>1 between 2,200 and 2,900 acre-feet to accomplish this.  2 This would require six months of pumping water nine  3 miles uphill and will take about three years to fill the  4 pit lake.  5 This is my understanding. I hope this  6 information is correct.  7 This will be an enormous waste of our already  8 threatened water table, and it seems that this fact  9 alone should halt any discussion of an operation that  10 will both profit a few and threaten the future of our  11 communities and the future of our extensive wildlife  12 population.  13 So my question is why would this project,  14 which, in my mind, threatens our lifestyle and could  15 mean that this area could become uninhabitable for  16 people and animals, be approved for the profit of a few.  17 And I wonder if we have learned any lessons  18 from the past. Without water, good water, there will  19 be -- there is the possibility there will be no human  20 life in the future in that area downstream from this  21 mining operation.  22 And in conclusion, I would like to quote  23 Benjamin Franklin who said when the well is dry, we will  24 know the value of water. That seems true to me.  25 So thank you.</p>

626	<p>1 MS. ORTH: Thank you, Ms. Haley.                  2 Dan Lorimier.                  3 DAN LORIMIER                  4 having been first duly sworn or affirmed, gave                  5 public comment as follows:                  6 PUBLIC COMMENT                  7 MR. LORIMIER: Hello.                  8 My name is Dan Lorimier, and I'm a 40-year                  9 resident of Sierra County, where I live rurally. I've                  10 installed and maintain a water well to supply my home                  11 and my property.                  12 First, I want to thank the department for                  13 holding this public comment session. And thanks also to                  14 the Hearing Officer for formalizing it.                  15 I was involved in the development of the Dairy                  16 Rule and its stipulated agreement with this agency and                  17 New Mexico dairy industry in 2013, '14 and '15. And                  18 from that work, I developed a sense of the importance of                  19 synthetic liners with leak detection and recovery. I                  20 also became familiar with the problems associated with                  21 monitor wells and their after-the-fact pollution                  22 detection nature.                  23 I oppose this groundwater Discharge Permit as                  24 drafted, and here's one reason.                  25 Originally the New Mexico Copper Corporation</p>	628	<p>1 these formidable potential expenses?                  2 With wide agreement that the unlined tailings                  3 pond used in the past is currently causing groundwater                  4 pollution, shouldn't the department require this company                  5 to install interceptor wells to treat the existing                  6 contamination at the outset of their production phase in                  7 addition to more monitoring wells?                  8 Shouldn't this company install these wells in                  9 anticipation of groundwater pollution from their single                  10 lined dump tailings pond that has no leak detection or                  11 under-lagoon pollution recycling capacity?                  12 Again, I oppose this plan and this draft                  13 permit as written. The department might still fold                  14 together their mission to protect and improve our New                  15 Mexican groundwater quality while regulating a New                  16 Mexico industry as sanctified and ultra-legal as copper                  17 mining.                  18 Thank you.                  19 MS. ORTH: Thank you, Mr. Lorimier.                  20 Would you be willing to leave your written                  21 remarks there?                  22 Thank you.                  23 Veronique De Jaegher.                  24                  25</p>
627	<p>1 planned a double liner system with leak recovery between                  2 the two synthetic liners. So they would have installed                  3 a gravel bed, a bottom plastic liner, an underdrain leak                  4 collection system plus leak detection sensors, a top                  5 plastic liner and then the tailings.                  6 The current plan, which is allowed by our new                  7 Copper Rule, calls only for a bed of gravel to hold a                  8 single synthetic liner and the tailings. It would also                  9 have a very mysterious component called an underdrain                  10 collection system installed above the liner.                  11 The department should ask how the planned                  12 system could capture and recycle leaks above the                  13 synthetic liner when its purpose is to recapture leaks                  14 between the two synthetic liners.                  15 What this plan calls for is actually an                  16 above-drain water capture system that pumps water that's                  17 inside the tailings pond to be used for production                  18 purposes. Nothing is there to prevent pollution that                  19 has made its way past or through the liner from entering                  20 the vadose zone and then the groundwater.                  21 Rather than prevent groundwater contamination,                  22 this plan proposes to use existing monitor wells. And                  23 if pollution is detected, the company will install                  24 interceptor wells to pump up and treat the polluted                  25 water. Is their financial assurance sufficient to cover</p>	629	<p>1 VERONIQUE DE JAEGER                  2 having been first duly sworn or affirmed, gave                  3 public comment as follows:                  4 PUBLIC COMMENT                  5 MS. DE JAEGER: My name is Veronique De                  6 Jaegher. I live locally in Kingston.                  7 And I am opposed to the granting of the                  8 Discharge Permit for many reasons.                  9 First and foremost, I'm concerned about the                  10 interceptor system that Dan Lorimier mentioned. It will                  11 be placed around the dam of the tailing ponds, a ring of                  12 wells that pumps groundwater back into the ground if                  13 contamination is detected in the monitoring wells. So                  14 it goes back in them.                  15 Are there enough monitoring wells to detect                  16 all the contamination? If the water is flowing fast,                  17 can't a stream of pollution go between the monitoring                  18 wells undetected at the wells?                  19 The same questions can be asked about the                  20 interceptor wells. How do they know if all the                  21 contamination will be captured? How close do they have                  22 to be to each other? How deep do the wells have to be?                  23 Have they tested or even designed the system?                  24 If not, who will design and build a system if                  25 NMCC is gone, i.e., during reclamation? Does the money</p>

<p style="text-align: right;">630</p> <p>1 NMCC leave with the state for reclamation include funds  2 for an interceptor system that might be needed if after  3 closure the monitoring detects contamination?  4 Another point is NMCC says that it will  5 create -- I heard 270 jobs over 11 years. I know that  6 this issue is not germane to the granting of the  7 Discharge Permit, but the issue is repeatedly brought up  8 by the mine supporters.  9 First, in the contract that binds NMCC with  10 the Jicarilla Apaches for the water, it is specifically  11 stated that the NMCC will give preference in employment  12 to the members of the nation and to maximize utilization  13 of tribal members in all available employment  14 opportunities. So those jobs won't be local employment  15 after all.  16 Second, that employment would be temporary  17 because of the stop-and-go mining due to the fluctuation  18 of the copper price and not enough water.  19 What happens to all those jobs when the mine  20 temporarily closes?  21 Thank you for your attention.  22 MS. ORTH: Thank you, Ms. De Jaegher.  23 If you would leave your written comments --  24 MS. DE JAEGHER: Yes.  25 MS. ORTH: -- the court reporter can refer to</p>	<p style="text-align: right;">632</p> <p>1 could be irreparably damaged.  2 Another thing that has not been mentioned is  3 the beautiful population of Arizona sycamore finds its  4 easternmost population in the Animas Creek. And of  5 course, the Animas does flow into the Rio Grande.  6 Deciding in favor of this permit is wrong. My  7 key reasons.  8 One, the toxicity of the massive amount of  9 waste material and its permanence in our system.  10 Serious questions for me. How can long-term  11 management of the liner be assured? Who truly  12 understands the effects of the underlying geology on the  13 system? Who will monitor this area and the potential  14 for devastating contamination for generations to come?  15 Who monitors it now? Where are those reports? Who will  16 respond when the system failures occur? Who will pay  17 for the long-term care of this project?  18 Second, the monumental use and toxification of  19 precious water. The amounts of water proposed for  20 operational needs are preposterous in a dry environment.  21 I noted that a figure of 2.3 billion gallons of water  22 was requested by NMCC for yearly operations.  23 Unlike municipal water, this water can never  24 directly recharge our groundwater. It cannot. Let's  25 quickly calculate. If an average personal water use is,</p>
<p style="text-align: right;">631</p> <p>1 them.  2 Thank you.  3 Nichole Trushell?  4 NICHOLE TRUSHELL  5 having been first duly sworn or affirmed, gave  6 public comment as follows:  7 PUBLIC COMMENT  8 MS. TRUSHELL: And like Nolan Winkler, I also  9 thought I only had three minutes so you can be sure this  10 is three.  11 Good evening.  12 And I am Nichole Trushell. I live in  13 Kingston. I'm a biologist, and I've lived in the  14 Southwest all of my life.  15 As a resident of Kingston, you might wonder  16 why I am concerned. This project is not located in my  17 backyard. I care because if the Discharge Permit is  18 granted, wheels will be in motion for stunning  19 quantities of unreclaimable water to be used, for toxic  20 chemicals to be released from the soils and for  21 life-supporting waterways to be threatened.  22 Groundwater would likely be impacted, as would  23 Animas Creek, a unique ribbon of life running through  24 our dry landscape. The lives and farms of local people,  25 many of whom have lived in along the Animas for decades,</p>	<p style="text-align: right;">633</p> <p>1 say, 125 gallons of water a day, this amount of water  2 alone would supply a city of 50,000 people for a year.  3 From what I read, third and last point, the  4 economic benefit is very short-term, intermittent and  5 questionable at best. And I note that a foreign company  6 is the greatest beneficiary of this product, not New  7 Mexicans.  8 In closing, allowing this project is a  9 decision with effects long into the future, very  10 negative effects. If any of the decision-making people  11 have precious family or care about water, you must not  12 grant this permit. This excessive waste and toxic  13 legacy will be yours. The true cost to our water and to  14 our environment is too great. No permit is my vote.  15 Thank you.  16 MS. ORTH: Thank you, Ms. Trushell.  17 William Lindenau.  18 WILLIAM LINDENAU  19 having been first duly sworn or affirmed, gave  20 public comment as follows:  21 PUBLIC COMMENT  22 MR. LINDENAU: My name is William Lindenau. I  23 live in Kingston, in Sierra County, in the Percha  24 Watershed, which is one of the watersheds that could be  25 affected by this mine.</p>

634	<p>1 Get my glasses out because I'm going to need</p> <p>2 it to read.</p> <p>3 I'm opposed to the granting of this Discharge</p> <p>4 Permit as has been proposed. It is the duty of the</p> <p>5 Environmental Department to protect the health and</p> <p>6 safety of the people and the environment from the</p> <p>7 contamination by toxic materials in the groundwater.</p> <p>8 Because there is current contamination that has been</p> <p>9 known for 35 years around this mine, greater precaution</p> <p>10 should be taken.</p> <p>11 The 600-acre, 200-foot-deep tailing storage</p> <p>12 facility is inadequately protected and monitoring as</p> <p>13 planned.</p> <p>14 The proposed underdrain system does not</p> <p>15 satisfy the Copper Rule which specifies a tailing</p> <p>16 seepage collection system because it is above the liner</p> <p>17 and does not catch contaminants going past the liner and</p> <p>18 into the groundwater. To do that, NMCC should be</p> <p>19 required to construct an interceptor system to function</p> <p>20 from the beginning of operations with verification that</p> <p>21 NMCC owns enough water rights to operate a sufficient</p> <p>22 system.</p> <p>23 Contaminants from the mine threaten both the</p> <p>24 Percha and Animas watersheds which drain directly into</p> <p>25 Caballo Lake and the Rio Grande River. It is your duty</p>	636	<p>1 important conservationist of the 20th century because</p> <p>2 his ideas are so relevant to the environmental issues of</p> <p>3 our time.</p> <p>4 He's also referred to as the Father of the</p> <p>5 National Wilderness System, wrote the first book on</p> <p>6 wildlife management, established the science of</p> <p>7 ecological restoration and authored The Sand County</p> <p>8 Almanac in 1949, which still inspires many to see the</p> <p>9 natural world as a community to which we belong.</p> <p>10 I have spent the last 10 years researching</p> <p>11 Aldo Leopold writings, and they dovetail very closely</p> <p>12 with what I practice in my own career.</p> <p>13 The one thing that has impressed me so much</p> <p>14 about Aldo Leopold is that he came to the West here in</p> <p>15 1909, and his education and the training that he had he</p> <p>16 soon found to be quite inadequate to what he actually</p> <p>17 experienced as reality out in the field. And he changed</p> <p>18 a lot his thinking.</p> <p>19 The one thing that he had a hard time with,</p> <p>20 which I also understand, is he was reluctant to revisit</p> <p>21 a lot of the wild areas that he's seen in his younger</p> <p>22 days, because he knew that they had changed.</p> <p>23 He was a good part of writing a lot of the</p> <p>24 policy that particularly the US Forest Service, but also</p> <p>25 the BLM, National Park Service, Fish and Wildlife --</p>
635	<p>1 to protect the lives and livelihood of those citizens</p> <p>2 who depend on the quality of these waters.</p> <p>3 Finally, no permit should be granted until an</p> <p>4 adequate surety bond is negotiated and secured. This</p> <p>5 site has had many owners who have departed under</p> <p>6 bankruptcy. All promises of reclamation at the end of</p> <p>7 operations are merely that, promises, without an</p> <p>8 adequate surety bond in place.</p> <p>9 Thank you.</p> <p>10 MS. ORTH: Thank you, Mr. Lindenau. Thank you</p> <p>11 for leaving your comments.</p> <p>12 Steve Morgan.</p> <p>13 STEVE MORGAN</p> <p>14 having been first duly sworn or affirmed, gave</p> <p>15 public comment as follows:</p> <p>16 PUBLIC COMMENT</p> <p>17 MR. MORGAN: My name is Steve Morgan. I'm a</p> <p>18 resident in Kingston.</p> <p>19 I'm also a landscape architect for the past 35</p> <p>20 years, and my -- my main work is in restoration and</p> <p>21 creating habitat.</p> <p>22 As my career is coming to a close, I've taken</p> <p>23 on a new persona. I do living history performances.</p> <p>24 Many folks don't know who Aldo Leopold is. Fortunately,</p> <p>25 around here we do. He's considered by many as the most</p>	637	<p>1 these policies that they follow. I'd like to say a few</p> <p>2 of his words here which I feel are very pertinent.</p> <p>3 "We must quit this thinking about decent land</p> <p>4 use as solely an economic problem. Instead we should</p> <p>5 look at each problem in terms of what is ethically and</p> <p>6 aesthetically right, as well as economically expedient.</p> <p>7 For a thing is right when it tends to preserve the</p> <p>8 integrity, stability and beauty of the biotic</p> <p>9 community."</p> <p>10 And "It is wrong when it tends otherwise."</p> <p>11 "Ethical behavior is doing the right thing</p> <p>12 when no one else is watching even when doing the wrong</p> <p>13 thing is legal."</p> <p>14 And one last thing of his words, and I use</p> <p>15 this line a lot in my talks. "Consider that what you do</p> <p>16 in the outdoors reflects your own set of ethics. It's</p> <p>17 your sense of responsibility to this world you exist</p> <p>18 in."</p> <p>19 Now, I strongly believe that if Aldo was aware</p> <p>20 of this current situation he would have said these</p> <p>21 words, and quite a few more, but also remind those</p> <p>22 involved in making this decision that the total cost of</p> <p>23 this kind of economic destruction is never fully</p> <p>24 calculated. The amount of New Mexico water involved and</p> <p>25 the possibility of catastrophic flooding and the</p>

<p style="text-align: right;">638</p> <p>1 resulting environmental and economic destruction  2 downstream should heavily outweigh the economic benefit  3 to a foreign company.  4 I am opposed to granting this Discharge  5 Permit.  6 Aldo saw many things over his whole career,  7 where things were presented in a certain way, but very  8 often without adequate information.  9 One of the things he was so adamant about  10 establishing the wilderness system was because he felt  11 that the -- we needed a land laboratory which the  12 wilderness would provide because we needed to study. We  13 needed to understand how the natural processes work.  14 And he felt that if we didn't do that, we were designing  15 policy by guesswork, which is folly.  16 And I feel that a lot of what we've been  17 hearing with this mine, there's a lot of history that is  18 being ignored.  19 So I really stress for everybody on these  20 panels to truly look beyond this tiny, really, little  21 bit of economic boom, and look at the long-term effects  22 that this may cause. Our Southwest is a fragile  23 environment. It takes very little to destroy it. And  24 once it is disturbed as a wilderness, it is pretty much  25 gone. You can attempt to restore it, but with our low</p>	<p style="text-align: right;">640</p> <p>1 was the children would come here, graduate from high  2 school and move away. And it has to do with the  3 economics of the community.  4 And speaking from my heart, I will tell you  5 this community really needs this mine. I drive cancer  6 patients. I'm in houses of people and going into places  7 where -- meeting seniors who -- in their 70s and 80s who  8 are dying or need treatment, and there's no way for them  9 to make additional income, or even a lot of times their  10 relatives have moved away. So we see that all the time.  11 And I've set through all day yesterday  12 listening to what everybody had to say. The mine has  13 come to our Rotary Club probably -- I don't know. Since  14 2012, I don't know how many times. And I've set through  15 several briefings.  16 And sometimes -- I guess I'm not as smart as  17 the rest of the people in this room, but, you know, our  18 federal government and our state government create laws,  19 rules and regulations to protect us. And that's what  20 the whole purpose of this process is. But they protect  21 us by creating these things, and then everybody wants to  22 question are they valid, are they good, are they a high  23 enough standard.  24 Well, we elect people to create rules and  25 laws, and I believe that they've met the standards that</p>
<p style="text-align: right;">639</p> <p>1 water use, of what we receive in our climate, it is very  2 hard to do restoration.  3 So I implore you all to look within yourself  4 and really think about the long-term effects of what  5 your decision in possibly granting this Discharge  6 Permit.  7 Thank you.  8 MS. ORTH: Thank you, Mr. Morgan.  9 Please don't applaud.  10 Steve Buckley.  11 STEVE BUCKLEY  12 having been first duly sworn or affirmed, gave  13 public comment as follows:  14 PUBLIC COMMENT  15 MR. BUCKLEY: My name is Steve Buckley.  16 Like the Navy person here, I'm retired. I  17 spent 30 years in the Army. I've lived all over the  18 globe, and I've seen a lot of different poverty issues.  19 And working here in the community the last 10 years, on  20 a daily basis. I first came in in the houses and seen  21 the poverty of the community.  22 And I used to be an instructor at the college  23 here, teaching business and writing business plans and  24 trying to get the young people to develop plans on what  25 they could do with their life. And what we saw mostly</p>	<p style="text-align: right;">641</p> <p>1 were required.  2 As the treasurer of the Rotary Club in T or C,  3 which represents over 40 members in this community,  4 which are community leaders, civic-minded people,  5 volunteers and businessmen, we are for this mine.  6 And I will tell you that I understand and I  7 have strong feelings about what I hear from the  8 opposition, and I respect that, and it makes me really  9 proud to be American and be able to hear everybody come  10 in this room and say exactly what they feel. But you  11 have to make the decision, and that's -- you know,  12 that's why we go through this process.  13 But are the rules that are set forth by the  14 mining organization, the mining laws for the state --  15 are they valid? Are they used -- are they -- are they  16 used standard being one?  17 If they are and that's what we're using, and  18 that's what they're meaning to get permitted, then we  19 ought to give them the permit, because they're meeting  20 the rules. Rules are rules, you know, to me. I guess I  21 was in the Army too long for 30 years. Everything is  22 kind of black and white. Right?  23 But I will tell you from my heart this  24 community is suffering. It is suffering. And they  25 don't wear suits. And they make about \$800 a month. If</p>

642	<p>1 it wasn't for the boxes delivered to their house they                  2 probably wouldn't be eating.                  3 And I'm shaking. And I'm a command sergeant,                  4 major F1 Army, and when we shake, it's because I'm that                  5 upset about it.                  6 And I don't know what you all can do to make                  7 things better for the community. But this is the right                  8 step in the right direction.                  9 I ran the Downtown Management District,                  10 watched businesses open and close for two years, tried                  11 to get more business in the community. It's a struggle.                  12 It's a struggle.                  13 And I thank you for your time.                  14 MS. ORTH: Thank you, Mr. Buckley.                  15 Paul Tooley. Paul Tooley.                  16 No?                  17 Cathy Berger.                  18 CATHY BERGER                  19 having been first duly sworn or affirmed, gave                  20 public comment as follows:                  21 PUBLIC COMMENT                  22 MS. BERGER: My name is Cathy Berger. I live                  23 in Animas Creek.                  24 Thank you, Madam Hearing Officer, for the                  25 opportunity to express my displeasure at the possibility</p>	644	<p>1 They left behind a tailings pond without a liner which                  2 has been leaking contamination into the groundwater for                  3 35 years. Perhaps we have the cart before the horse                  4 here, but I would think that an Environment Department                  5 of the State of New Mexico should perhaps be concerned                  6 that there is presently contamination leaking into the                  7 groundwater from the existing tailings ponds before                  8 considering another permit by the same mine to do the                  9 same thing all over again.                  10 And what about monitoring wells to monitor the                  11 plume of contamination that has already been                  12 contaminated with groundwater for 35 years?                  13 By the New Mexico Environment Department's own                  14 regulations, there should be interceptor wells in place                  15 to pump the contamination of the groundwater back into                  16 the tailings pond. In order to do this, there would                  17 have to be sufficient water available in the interceptor                  18 wells along with the water rights necessary to pump this                  19 water. There are no interceptor wells at present.                  20 This mine has had nine owners in 40 years and                  21 has only been in operation a total of three months in 40                  22 years. During these 40 years, numerous letters of                  23 violation have been sent by the New Mexico Environmental                  24 Department, from my understanding, none of which have                  25 been responded to. There has been no bonds set to</p>
643	<p>1 of the issuance of a Discharge Permit for New Mexico                  2 Copper Corporation.                  3 I've lived on Animas Creek for 20 years. And                  4 I don't know if anyone here who is interested in this                  5 process has driven through Animas Creek. It's quite an                  6 amazing place. There are magnificent ancient sycamore                  7 trees, 350 to 450 years old. So obviously, they predate                  8 any, in my opinion, water right or right to life as any                  9 other being on this planet. I do consider them to be                  10 alive as we are alive.                  11 I wish you would go see what these trees are,                  12 how long they've been there and how they could actually                  13 be at risk from the proposed Discharge Permit. These                  14 are like the redwood trees of the Southwest. If you                  15 make a decision -- any decision without seeing them with                  16 your own eyes, then you're a derelict in your duties to                  17 the people of New Mexico and to the seven generations                  18 that follow ours.                  19 The pit lake and tailings pond that are at                  20 issue here are 10 to 15 miles up-creek from my home.                  21 The water production wells are even closer. I don't                  22 think we need an expert hydrologist to tell us that                  23 water flows downhill. I am assuming groundwater also                  24 flows in a similar manner.                  25 The last operator of this mine left in 1982.</p>	645	<p>1 ensure that reclamation is adequate.                  2 As a private property owner, who will I seek                  3 redress from if the groundwater becomes polluted? Do                  4 you think I will be able to find anyone to answer the                  5 phone?                  6 This is all just one big scam. It's a water                  7 grab, if you ask me. The promise of jobs and money                  8 flowing into Sierra County is minimal compared to the                  9 impact not just on Sierra County, but potentially the                  10 whole Lower Rio Grande Valley. Far more money is                  11 generated in the State of New Mexico from tourism than                  12 from mining.                  13 Let's change our priorities. Our land is more                  14 valuable than your money.                  15 Thank you.                  16 MS. ORTH: Thank you, Ms. Berger.                  17 Please don't applaud.                  18 Martin Mijal.                  19 MARTIN MIJAL                  20 having been first duly sworn or affirmed, gave                  21 public comment as follows:                  22 PUBLIC COMMENT                  23 MR. MIJAL: So I am against the mine. The                  24 mine -- the mine has hired experts to say don't worry,                  25 no tailings, no pollution can escape this manmade</p>

<p style="text-align: right;">646</p> <p>1 construction and remediation. Copper code in New Mexico  2 laws to protect us. The mine is in compliance with  3 this.  4 New Mexico Department of Environment wants the  5 mine to put up a bond for 100 years to maintain and  6 monitor any problems that might occur when the mine is  7 closed.  8 The mine will be in operation -- well, mine  9 will be in operation, leaking massive pollution for  10 maybe 15 years.  11 I'm reading the wrong one. I'm not ready --  12 I'm not organized.  13 What I want to say is the copper code is  14 only -- wants the mine to pay 25 years after it closes  15 for monitoring and maintaining the remediation that they  16 did. So this way the multimillionaires are happy. Our  17 impoverished citizens get wonderful jobs for 15 years of  18 mine operation. And our industry has gold, silver,  19 molybdenum and copper.  20 So this mine will operate for maybe 15 years,  21 making massive piles of pollution. Maybe the mine will  22 pay for all that 100 years of monitoring and  23 maintenance, but this pollution will not go away. This  24 is a Superfund state -- site, that hopefully it will be  25 contained.</p>	<p style="text-align: right;">648</p> <p>1 RON FENN  2 having been first duly sworn or affirmed, gave  3 public comment as follows:  4 PUBLIC COMMENT  5 MR. FENN: Okay. Thank you.  6 I'm a 20-year resident of Truth or  7 Consequences. I retired to this community.  8 What I have seen over that 20 years has been a  9 great deal of dismay, mostly brought by outsiders, in  10 suits, who have come here and promised great economic  11 wealth and improvement to our community. What the  12 people who don't live here don't understand is this is a  13 retirement community. It's not even a tourist  14 community. It's a retirement community. A third of our  15 population are more our retirement-aged individuals.  16 Therefore, they do not make an employment pool  17 for a mine. All of the people who will be employed if  18 this permit and this process goes through will be from  19 outside. And from my understanding, this is not going  20 to be a long-term solution to our -- our community's  21 problem.  22 We currently ignore our greatest resource, our  23 greatest asset, and that is the minds of our people, our  24 retirees. The community constantly wants to ignore the  25 fact that all old people have nothing to offer and do</p>
<p style="text-align: right;">647</p> <p>1 This site won't be cleaned up, won't be  2 carried away, but the pollution will be covered up and  3 considered good enough.  4 So imagine the year 4018. If all wells last  5 2,000 years, all of this is intact. What do we know now  6 that was built 2,000 years ago that's still functioning  7 as designed? Unfortunately, the covered up pollution is  8 probably now uncovered, the pollution is ruining our  9 air, earth and watershed.  10 So thank you.  11 This is illegible.  12 MS. ORTH: That's all right.  13 Thank you, Mr. Mijal.  14 Mike Armijo?  15 MR. ARMIJO: No comment.  16 MS. ORTH: Okay.  17 Carl Teston?  18 Jared Bartoo?  19 J. Robbin Broddy.  20 Ron Fenn.  21  22  23  24  25</p>	<p style="text-align: right;">649</p> <p>1 nothing for the community itself. Oh, the retirees.  2 There are no programs within this community that are  3 designed to improve the lives of our seniors.  4 We prefer to have somebody coming in from  5 outside and dropping a pile of money. And guess what.  6 All the GRT in this community is less than a third of  7 our budget. More than a third of our budget comes from  8 stealing money from our electric utilities and our other  9 utilities to make up a \$2-million-a-year budget deficit.  10 The employment of outsiders in a mine  11 operation is not going to improve this situation.  12 Instead of concentrating on what our reason for being  13 is, which is a beautiful place for people to end their  14 lives, in a comfortable, clean environment, is being  15 ignored for the sake of potential wealth.  16 I sat here 10 years ago when a group of suited  17 individuals from Florida came with great promises of  18 economic benefit for this community. And though the  19 community that filled those benches up there, those  20 seats said to a man "Do not do this," a small group of  21 five individuals said "Okay, we'll do it."  22 And 10 years since that time, 8,000 acres has  23 gone without a single porta potty being built upon it,  24 and so much for the economic value or the promises.  25 This is a kind of community that if you don't</p>



650	<p>1 want to live here, you don't want to enjoy the purity of  2 our air, the limited amount of water that we have and  3 the beautiful atmosphere and the -- and the weather,  4 then you're coming here for the wrong reasons.  5 And unless this country is running out of  6 copper and this is a vital mine for the safety and  7 economy of our United States, as opposed to just another  8 addition to the pot, we are wasting things that we  9 should not, that we will never recover.  10 There was just a very important publication on  11 the Internet today about our dwindling water supply and  12 the fact that perhaps next year we are not going to have  13 water enough for our farmers. Our farmers sustain us  14 with food. Copper does not. Please remember that and  15 think about it.  16 And I will leave this with you.  17 MS. ORTH: Thank you, Mr. Fenn.  18 J. Khalsa.  19 J. KHALSA  20 having been first duly sworn or affirmed, gave  21 public comment as follows:  22 PUBLIC COMMENT  23 MS. KHALSA: I will keep my comments brief  24 because I feel that everything that I would have liked  25 to say tonight has already been said.</p>	652	<p>1 So it just -- everything else has been said.  2 Our land, our water is way more important than  3 short-term profits for a company that won't even offer  4 much to this -- to this area. Yes, we do have needs,  5 but there are many other ways that we can meet those  6 needs without destroying the earth and our environment.  7 And without clean air and clean water, clean land, what  8 else matters?  9 MS. ORTH: Thank you, Ms. Khalsa.  10 Denise Barrera.  11 DENISE BARRERA  12 having been first duly sworn or affirmed, gave  13 public comment as follows:  14 PUBLIC COMMENT  15 MS. BARRERA: Good evening.  16 My name is Denise Barrera.  17 December 1st of last year, 2017, I was  18 employed as the general manager of Sierra Electric.  19 We're headquartered in Elephant Butte, New Mexico.  20 Sierra Electric is a member-owned, rural electric co-op,  21 serving over 3,150 members with 4,192 meters.  22 Excuse me.  23 We serve Sierra County excluding the City of  24 Truth or Consequences, Catron, Socorro and Luna  25 Counties. 99 percent of our meters are in Sierra</p>
651	<p>1 And really it comes down in my mind to why  2 does a foreign corporation get to come in and tell  3 people who have been living in a place and don't want a  4 mine there that they're going to come in and make money  5 for themselves, take it, and they don't live there. The  6 people who are going to make money on this mine don't  7 live there.  8 Yes, there may be less than 300 people who  9 will get jobs there in seven years. That's -- that's  10 nothing. And they're probably not even great-paying  11 jobs. They're probably not jobs that require a lot of  12 training or anything. So they're not going to be  13 huge-paying jobs.  14 And as someone else mentioned, the mine has  15 already promised that the Jicarilla Apache Reservation  16 both get -- get preference on those jobs anyway in order  17 for them to have enough water.  18 The other thing is the jobs will be very  19 temporary jobs, if the mine can't operate all year long.  20 It's really not going to give this -- this county the  21 kind of economic boom that some people think that it  22 will. And in fact, once it's -- once they leave, it --  23 all the adverse repercussions will be left with the  24 people who live here. And the money that they -- that  25 the corporation has made will be gone.</p>	653	<p>1 County. We have about 900 miles of line with a density  2 of 4.65. That is 4.65 meters per one mile.  3 Rural cooperatives have seven cooperative  4 principles that they go by, one being concern for  5 community, which is one of the highest concerns of  6 Sierra Electric, including the economic needs of the  7 members and residents of Sierra County.  8 NMCC mine will enhance and provide a unique  9 opportunity for growth and sustainability to the Sierra  10 County residents, surrounding counties and the State of  11 New Mexico. It will offset the existing weak economic  12 conditions our county is currently facing. It will  13 allow local companies to provide additional employment  14 opportunities and local governments the resources to  15 improve and develop sustainable critical services for  16 its citizens.  17 In 1982, when Quintana Mine came online for a  18 short period of time, our purchases went from  19 18.2 million kilowatt hours in 1981 to 47.5 million.  20 That was an increase of 29 million kilowatt hours, and  21 that was just for the few months that they were in  22 operation.  23 The NMCC copper mine load is a 40-megawatt  24 load, and at a 90 percent load factor would increase our  25 purchases from 65.4 million kilowatt hours that we sold</p>

654	<p>1 in -- last year in 2017 to 263 million kilowatt hours.                  2 We're looking at approximately 197 million kilowatt                  3 hours increase.                  4       What does that mean?                  5       This would benefit the economic and financial                  6 conditions of our members of Sierra Electric by reducing                  7 the burdens of our current ratepayers, which 81 percent                  8 are residential consumers. It would allow us to                  9 maintain and operate our system and infrastructure                  10 without having to increase rates or borrow funds, and it                  11 will also open up opportunities for additional economic                  12 development projects.                  13       The Sierra Electric Board of Trustees adopted                  14 a Board Resolution in February, 2016 supporting NMCC and                  15 its investments and efforts in the development of the                  16 Copper Flat mining project in Sierra County. And I                  17 won't bore everybody with the whereas.                  18       Over two -- over two years later, they                  19 continue to strongly support this unique opportunity for                  20 growth and sustainability to Sierra County and state                  21 economics.                  22       On a more personal note, I have lived here                  23 practically my whole life. I graduated from Hot Springs                  24 High School. I started my career at Sierra Electric. I                  25 left in 1987 for a better job. The last 22 years of my</p>	656	<p>1       If you would leave your written statement,                  2 that would be great.                  3       MS. BARRERA: You want the resolution, too?                  4       MS. ORTH: Yes.                  5       Rebecca Dow. Rebecca Dow?                  6       No?                  7       UNIDENTIFIED SPEAKER: She had to leave.                  8 She'll be back.                  9       MS. ORTH: Okay.                  10       Anyone who was had to leave before I called                  11 their name, again, they are welcome to come back                  12 tomorrow. I believe we'll be in hearing at least                  13 another couple of days.                  14       MS. BROWNE: You're not done?                  15       MS. ORTH: Sorry.                  16       MS. BROWNE: Are you done?                  17       MS. ORTH: I can't hear you, Ms. Browne.                  18       UNIDENTIFIED SPEAKER: Are you done?                  19       MS. ORTH: No. There are three more yeses.                  20       UNIDENTIFIED SPEAKER: Thanks.                  21       MS. ORTH: Steve and Angela Detloff?                  22       UNIDENTIFIED SPEAKER: They've left.                  23       MS. ORTH: Okay.                  24       James Berger.                  25</p>
655	<p>1 36 years in the electric cooperative business, I drove                  2 every day back and forth from Deming to T or C for work.                  3 While working in Deming, I never moved out of Sierra                  4 County.                  5       I have served on numerous boards and                  6 committees, one of which I served 12 years on the local                  7 school board. As a member of the school board, I handed                  8 out hundreds of diplomas to graduating students, knowing                  9 that the majority of these kids were going to leave                  10 Sierra County for better career opportunities.                  11       And those who remained in Sierra County are                  12 faced with higher costs of living and lower wages. My                  13 son and his classmates graduated in 2004. My son is in                  14 Yuma, Arizona. He has fellow classmates in Las Cruces,                  15 Albuquerque, Santa Fe, Dallas, Nashville, and this is                  16 just a few of the classmates.                  17       I could go on for hours about what I feel this                  18 mine could do for our community. But in closing, NMCC                  19 has demonstrated their commitment to Sierra County.                  20 They have already invested millions of dollars in this                  21 project, and I ask that you please approve the                  22 groundwater protection Discharge Permit.                  23       And I thank you for giving us all the                  24 opportunity.                  25       MS. ORTH: Thank you, Ms. Barrera.</p>	657	<p>1       JAMES BERGER                  2       having been first duly sworn or affirmed, gave                  3 public comment as follows:                  4       PUBLIC COMMENT                  5       MR. BERGER: So my name is James Berger. I                  6 live up in Animas Creek. So you probably get an idea of                  7 where my affections are.                  8       I don't have any earth-shattering revelations,                  9 just some practical conclusions about things that are                  10 impacting our everyday life.                  11       I've lived in New Mexico most of my life. My                  12 parents lived here. My grandparents homesteaded here                  13 and were here before New Mexico became a state. And                  14 I've lived all over New Mexico, kind of settled in the                  15 Sierra County area because I was looking for solitude, a                  16 peaceful place to grow food and raise a family. And                  17 this looked like a reasonable place to do that.                  18 Although it is a harsh climate here, but that's one of                  19 the reasons that there's not a lot of people here.                  20       Animas Creek is one of the few areas in New                  21 Mexico -- in Southern New Mexico we have year-round                  22 running water. It's a natural riparian area. It's                  23 beautiful and delicate, and most dependent on the                  24 groundwater. And that is where my real concern is.                  25       My sense about discharge of -- water discharge</p>


<p style="text-align: right;">658</p> <p>1 of -- from a mining operation certainly concerns me  2 since there are millions of gallons involved, and also a  3 lot of material displacement that certainly can impact,  4 which I'm sure has been gone over many times here today.  5 One of the things that is of primary concern  6 to me is the fact that there are so many unknowns. With  7 so many things that are unknown, it seems to be a  8 potential for error and -- in the state. We don't have  9 a good or thorough understanding of aquifers, artesian  10 water and in even rainfall-dependent surface water.  11 There are a good many known facts and  12 statistics, but they all pale in comparison to the  13 unknowns. We can only surmise and postulate about the  14 true nature of what goes on 50 to a thousand feet below  15 the surface.  16 What tailings of any kind, crushed rock, fine  17 sands, slurry, and a host of other types of debris, we  18 can only postulate what they might do when piled in huge  19 amounts and disbursed on our landscape.  20 And then when unconditions -- unexpected  21 conditions arise, we have to wonder what is our backup,  22 what solutions are at hand and on what timetable. These  23 are all serious questions that demand serious answers.  24 Of course, I don't want to see Animas Creek or  25 any other downstream or upstream area potentially</p>	<p style="text-align: right;">660</p> <p>1 the opportunities that are here. Plus I saw what a  2 beautiful place it was and because has lots of expansion  3 possibilities. It has a great deal of possibilities.  4 I'm president of the Chamber of Commerce. I  5 own the Desert View hotel, and I work hard and long.  6 I'm a retiree, but I still work 14, 15 hours a day. I'm  7 71 years old. And I do that for a reason. That reason  8 is moving forward, me and everybody else.  9 I want to say a few things that are -- I think  10 are very important and that a lot of these things people  11 seem to just ignore.  12 I get the impression that a lot of people here  13 think there's never been a mine in New Mexico before.  14 The way they talk, something unusual is going to happen,  15 something's going to happen that they've never seen  16 before.  17 We have -- I think it's over 20 operational  18 mines in Sierra County right now. And there have been  19 hundreds of mines here. Before there was Sierra County,  20 there was New Mexico. Mining was the main trading  21 source of the area by the Spanish and Native Americans  22 inhabitants long before then. In other words, we're  23 talking about over a thousand years.  24 Has that mining destroyed us? No, it hasn't  25 destroyed us. It's the only thing that's brought any</p>
<p style="text-align: right;">659</p> <p>1 impacted by toxic discharges. I don't want to see  2 those -- any of those areas destroyed. And so I have to  3 be in opposition to the mining operation at Copper Flat.  4 And have I -- as I said before, there are just  5 too many unknowns, too much at risk and too few  6 benefits.  7 Thank you.  8 MS. ORTH: Thank you, Mr. Berger.  9 I have two more names. This one is hard to  10 read. It looks like Hans -- Hans Townsend.  11 Please correct me when you come up.  12 And then the last name I have is Mary Cavett,  13 Mary Cavett.  14 Hold on a sec.  15 Please tell me your name.  16 MR. TOWNSEND: H-A-N-S, Hans, Townsend.  17 MS. ORTH: I was right?  18 MR. TOWNSEND: That was right.  19 MS. ORTH: Okay.  20 HANS TOWNSEND  21 having been first duly sworn or affirmed, gave  22 public comment as follows:  23 PUBLIC COMMENT  24 MR. TOWNSEND: I live here in Truth or  25 Consequences. I moved here 11 years ago because I saw</p>	<p style="text-align: right;">661</p> <p>1 prosperity to a lot of people that lived here in those  2 times. Sierra County grew a mine because it was blessed  3 with an abundance of underground resources, resources  4 that many others would be overjoyed to have. We're  5 still here, and the area is still beautiful.  6 I don't understand when people come up here  7 and make comments that are neither factual nor are they  8 sticking to the things that we know. They want to  9 balloon things. Anyway, it's time that our business  10 community at least realizes the enormous value, the  11 positive economic impact of the Copper Flat Mine will  12 have on the community.  13 It's time the advantages and true facts are  14 seriously considered and appreciated by the community,  15 not the baseless fearmongering and exaggerated hogwash  16 continually promulgated by those who don't want things  17 to change, most especially the ones who consider  18 themselves to be leaders. These are the people who  19 should be making sure we move forward, not stagnating,  20 and not letting opportunities to our economy slip away.  21 It's time to come down to earth and realize  22 that all things change. They change for the better, or  23 they change for the worse, but nothing stays the same.  24 The mining industry has also changed. The way  25 things are mined nowadays is nothing like they were a</p>

662	<p>1 hundred years ago. They don't use the same poisons.                  2 It's not done the same way. We've moved forward.                  3 Technology advances. Everybody knows that. So I don't                  4 know why we're ignoring it here.                  5 The technical advances made over recent years                  6 affect just about every aspect of the industry,                  7 especially the ability to operate a successful mine that                  8 is also ecologically responsible in its operations.                  9 The mine will need several hundred employees,                  10 and although local labor will have a chance to be                  11 trained for some of the jobs needed at the mine, most of                  12 the labor will have to move here because we have had                  13 little to offer so most of our young people moved away.                  14 This is not a retirement community. If you                  15 want to say what it really is, it's become a retirement                  16 community because kids have to go somewhere else. It's                  17 not because they don't come here. It's because they                  18 can't live here. They need to go. And I'm sure a lot                  19 of them don't want to go. But there's nothing here.                  20 And there's nothing here because so many people resist                  21 anything that means a little change in their lives.                  22 The mine -- let's say 200 people, workers come                  23 from somewhere else. There's nowhere for them to live                  24 but here. That's a low figure, but if it's 200 workers,                  25 that means 600 new residents as an average figure.</p>	664	<p>1 you're in the wrong place.                  2 The new residents will shop, buy gas and use                  3 services here in Sierra County. They'll use doctors,                  4 they'll use hospitals and our clinics. They'll go to                  5 the cinema, the brewery. And they'll need houses and                  6 apartments.                  7 There are many here who have the common sense                  8 to realize this is an enormous opportunity for the                  9 community. Sorry. I'm really concerned about this. I                  10 can't believe what I hear. It's time to hear from more                  11 of those people about positive support for this                  12 one-time, one-of-a-kind opportunity for Sierra County                  13 instead of nebulous negatives from repetitive naysayers.                  14 Sometimes they take a fact and they look to                  15 bend it out of shape and all reality just to fit their                  16 agenda. I've read every piece of paper I could get from                  17 those people who are writing the negatives. They don't                  18 match up. They don't match up with reality. They don't                  19 even match up with reality 50 years ago.                  20 Does anybody read what the mine has put out or                  21 what anybody else puts out? Don't you take a balance?                  22 Don't you read and compare, go online and look and say                  23 what is the truth? Where do I find the truth? Is                  24 mining still the same as before with using mercury                  25 and -- it's not the same. It's advanced. And we need</p>
663	<p>1 Includes spouses, children. That's a 10 percent                  2 population increase in T or C and about 6 percent for                  3 the county.                  4 And these are not retirees. These are mostly                  5 people of working age, something we need desperately.                  6 That will be 400 who do not work at the mine, and some                  7 will have skills that we really need in the community.                  8 From these 400 family members you can be sure that a                  9 percentage of these will look for work part-time or                  10 otherwise.                  11 This will also help bring other businesses to                  12 our area. We've had lots of businesses look at the                  13 area, but because there's no labor here, they don't                  14 come.                  15 Having a larger labor pool will draw more                  16 business to our area and also improve the growth                  17 opportunities for the businesses already here. Does                  18 anybody think about that? There's only the people that                  19 think about their backyard?                  20 You retire here because you like it, because                  21 it's beautiful, because you like the community. If you                  22 didn't like the community, why did you come? The                  23 community includes kids, includes schools, includes                  24 families. They don't survive. So if you've got your                  25 retirement check, you think that's all that matters,</p>	665	<p>1 it.                  2 These people are not thinking about the                  3 survival of the community. They say these things mostly                  4 for personal reasons, selfish personal reasons, to be an                  5 antihero, and because they think that's a lot of what                  6 the community want to hear. Go read the facts. Read                  7 what the mine will do. Read all the things that they've                  8 put in, the official papers, the papers that have been                  9 checked and tested. Look at reality.                  10 We hear continuous complaining about the state                  11 of the roads, our water and sewer systems, electric.                  12 And my belief is that if we don't do something, we won't                  13 have electric in this town soon.                  14 We have outages over and over again, and the                  15 reason we have outages is because most of the money is                  16 taken out of the electric and put in the city general                  17 fund to keep us alive. But that means they don't spend                  18 money on repairs, they don't spend money on upgrades.                  19 Go to some of those transformers out there.                  20 I'm surprised they're not all blowing up. That has to                  21 come to an end. And one day it will come to an end.                  22 And if we don't do something to move forward, that's                  23 where we will really go backwards.                  24 This is partly because Sierra County is very                  25 poor, one of the poorest in the US, not just New Mexico.</p>

<p style="text-align: right;">666</p> <p>1 That's not going to change unless we help it change.                  2 And this is about the best jobs you're going to get.                  3 MS. ORTH: Thank you, Mr. Townsend.                  4 If you'll leave your written statement so the                  5 court reporter can refer to them.                  6 MR. TOWNSEND: Thank you.                  7 MS. ORTH: Mary Cavett.                  8 MARY CAVETT                  9 having been first duly sworn or affirmed, gave                  10 public comment as follows:                  11 PUBLIC COMMENT                  12 MS. CAVETT: Well, for a moment, I had a                  13 lovely picture from Hans' testimony of all these                  14 Chiricahua Indians coming into our community to work. I                  15 love native people.                  16 Native peoples, though, are the truth keepers                  17 of the land, and they are the ones all over the world                  18 that talk about how we used to have clean water, how all                  19 the countries of the world had clean water, and they                  20 don't, because of -- because of mining and fossil fuel                  21 extraction.                  22 And I would just like to see this community                  23 kept as pristine as it is. We already have seepage from                  24 the last mine at the same spot.                  25 I visited our sister city, Silver City, and I</p>	<p style="text-align: right;">668</p> <p>1 REBECCA DOW                  2 having been first duly sworn or affirmed, gave                  3 public comment as follows:                  4 PUBLIC COMMENT                  5 MS. DOW: Thank you, Madam Chair, and thank                  6 you for being here.                  7 And my name is Rebecca Dow.                  8 And I've listened to the testimony and                  9 thoroughly enjoyed pulling into the parking lot full of                  10 vehicles that are as a result of extractive industry and                  11 natural -- our use of natural resources.                  12 And I've heard the saying before if you can't                  13 grow it, you must extract it, and that is what has                  14 afforded us the privileges that we enjoy, the quality of                  15 life we enjoy in America and around every developed                  16 world.                  17 And I -- I noticed several people when they                  18 were coming up to testify their beautiful native                  19 jewelry, the turquoise, the silver. That was extracted                  20 from the land. And we all appreciate the beauty of that                  21 jewelry.                  22 I also have noticed folks commenting on the                  23 research that they conducted in their home on the                  24 Internet using their computers. All result of                  25 extractive industry.</p>
<p style="text-align: right;">667</p> <p>1 talked to the people in Hurley, and they have just been                  2 issued a notice from the water company not only don't                  3 drink the water, but don't even brush your teeth with                  4 the water.                  5 That could happen here. I don't want to see                  6 it happen. I really want us to keep our water safe and                  7 our air pure.                  8 Thank you.                  9 MS. ORTH: Thank you, Ms. Cavett.                  10 Ma'am.                  11 MS. DOW: I was out when you called my name.                  12 MS. ORTH: Oh, all right.                  13 Come up to the table.                  14 Do you need a break?                  15 No?                  16 THE REPORTER: We're almost done, right?                  17 MS. ORTH: We are.                  18 Thank you.                  19 Tell us your name and be sworn in.                  20 MS. DOW: Thank you so much, madam.                  21 My name is Rebecca Dow.                  22                  23                  24                  25</p>	<p style="text-align: right;">669</p> <p>1 And we've come to this point where we are                  2 trying to balance between being responsible for the                  3 environment and dealing with the adverse poverty that                  4 has plagued this community for far too long.                  5 I have the privilege of working -- being a                  6 state representative for District 38, which is known as                  7 New Mexico's mining district, and to be able to look at                  8 the statistics and look at the data around this                  9 district, and one of the first things that surprised me                  10 was to see that District 38 had an average household                  11 income of over 40,000 a year, which caught my attention                  12 because here in Truth or Consequences the average                  13 household -- household income is around 29,000.                  14 And one of the reasons I ran for office was to                  15 find economic opportunities, because I have spent the                  16 last 19 years of my life providing services for children                  17 in adverse poverty, children with the most adverse                  18 childhood experiences, victims of poverty, victims of                  19 abuse, victims of neglect. And to see the correlation                  20 between poverty and the life experiences of children                  21 drove me to run for office.                  22 And I've been able to knock on doors and visit                  23 this district and learn that our average household                  24 income is a result of the mining district and the mines                  25 that are open in Grant County, which includes my</p>

<p style="text-align: right;">670</p> <p>1 district.</p> <p>2 And to knock on those doors and see the</p> <p>3 beautiful historical buildings that have historical</p> <p>4 significance, and many of the people in this room that</p> <p>5 are testifying against mining industry that are living</p> <p>6 in those homes, some of the most beautiful homes in our</p> <p>7 district, built on the incomes of people who made their</p> <p>8 living in extractive industry.</p> <p>9 So it seems -- it's conflicting to me as a</p> <p>10 state representative to be asked to stop extractive</p> <p>11 industry, but to increase natural -- to increase</p> <p>12 alternative energy, being asked to tap the permanent</p> <p>13 land grant fund for universal access to preschool, to</p> <p>14 fund single-support, single-parent insurance, which</p> <p>15 costs the state millions -- we don't even have a price</p> <p>16 tag, when all of these things that we do have -- many of</p> <p>17 the things that we do have come from the permanent land</p> <p>18 grant fund, which is a majority of extractive industry.</p> <p>19 We are a mineral-rich state. And to have an</p> <p>20 organization that has come and put in millions of</p> <p>21 dollars to try to be the first mine to open in over 25</p> <p>22 years, and to go through this process and to get to the</p> <p>23 point where they -- from listening to the testimony and</p> <p>24 the E-mails that I've been reading, that they've given</p> <p>25 the best effort that's happened so far to meet the</p>	<p style="text-align: right;">672</p> <p>1 described to me, coming to school on Monday in the same</p> <p>2 clothes they left on on Friday, is very ugly.</p> <p>3 And it comes at a high price to our children,</p> <p>4 to their innocence. They're not safe, they're not</p> <p>5 protected. They have no food security. They need help.</p> <p>6 And here's an opportunity, a real opportunity. And</p> <p>7 every person in here who testified against mining is</p> <p>8 using extractive industry in their day-to-day lives.</p> <p>9 So I just ask for you if they've met the</p> <p>10 standard to issue the permit.</p> <p>11 MS. ORTH: Okay. Thank you, Ms. Dow.</p> <p>12 We've come to the end of the names on the</p> <p>13 sign-in sheets.</p> <p>14 Ms. Browne, are you going to be with us</p> <p>15 tomorrow?</p> <p>16 MS. BROWNE: On day one on page 4, I signed</p> <p>17 up. I'd rather not wait until tomorrow.</p> <p>18 MS. ORTH: You would. Okay.</p> <p>19 Please go to the table.</p> <p>20 MS. BROWNE: You have it?</p> <p>21 MS. ORTH: I don't have day one. I have day</p> <p>22 two.</p> <p>23 MS. BROWNE: This is day two.</p> <p>24 MS. ORTH: Yes.</p> <p>25 So we're going to hear from Ms. Browne.</p>
<p style="text-align: right;">671</p> <p>1 requirements to receive their Discharge Permit, that if</p> <p>2 it does meet the state's requirement it should be</p> <p>3 permitted.</p> <p>4 I mean, there's other hurdles to cross, but at</p> <p>5 this point, this is the conversation that we're asking</p> <p>6 for. We're asking the state if you agree that they've</p> <p>7 met those regulations and they've met the standards,</p> <p>8 that they should be permitted.</p> <p>9 The cost of copper is only going to go up as</p> <p>10 we demand and require alternative energy. This is a</p> <p>11 resource we have in our district that can address not</p> <p>12 only what many people in my district demand, alternative</p> <p>13 energy, but to address the poverty that plagues this</p> <p>14 community.</p> <p>15 And I've heard people talk about the hole in</p> <p>16 the mountain or the areas being mined and what it looks</p> <p>17 like afterwards. And I've heard people testify today</p> <p>18 about poverty.</p> <p>19 The correlation of poverty and the fact that</p> <p>20 more women in this district are on antidepressants than</p> <p>21 not, the fact that more children are born to teen</p> <p>22 mothers than not, the fact that the result of that is</p> <p>23 multigenerational poverty and children experiencing</p> <p>24 domestic violence, falling asleep on park benches at the</p> <p>25 age of four, the experiences that children have</p>	<p style="text-align: right;">673</p> <p>1 CANDACE BROWNE</p> <p>2 having been first duly sworn or affirmed, gave</p> <p>3 public comment as follows:</p> <p>4 PUBLIC COMMENT</p> <p>5 MS. BROWNE: So my name is Candace Browne, and</p> <p>6 I've lived in Sierra County for the last 21 years.</p> <p>7 And I want to thank the State of New Mexico</p> <p>8 for allowing us to have this public hearing, because</p> <p>9 they didn't have to do it. And I really appreciate it.</p> <p>10 I -- I have just been overwhelmed by listening</p> <p>11 to people talk about -- about how they feel about this.</p> <p>12 I have felt my heart open, and I have felt my heart</p> <p>13 close, and I know what it's like to make a decision</p> <p>14 based on your heart being open and a decision based on</p> <p>15 using your mind.</p> <p>16 When I first came to Sierra County,</p> <p>17 practically the first day I was here, they happened to</p> <p>18 have the first meeting about the concern about the mine,</p> <p>19 and it was people on Animas Creek. And when I heard</p> <p>20 about the mine -- and I've been here. I've seen Animas</p> <p>21 Creek, and I've seen the sycamore trees.</p> <p>22 And I said -- I came from back east. I knew</p> <p>23 nothing about mining. I knew nothing about concerns</p> <p>24 about water. And my heart said they can't do it. If</p> <p>25 they do, they'll kill the trees. And the trees are</p>

674	<p>1 really important to us for many reasons.</p> <p>2       So that was my heart opening up 21 years ago,</p> <p>3 and I've been involved in concerns about this mine ever</p> <p>4 since then. So I've been doing things to try to stop</p> <p>5 the mine for 21 years.</p> <p>6       And I didn't have a computer until this mine</p> <p>7 came on board, and so I really didn't know a whole lot</p> <p>8 about mining, water rights, how they look things up, how</p> <p>9 to look up other issues. But since then, I have spent</p> <p>10 countless hours, and I have tons of data.</p> <p>11       And I wanted to ask people, but most of them</p> <p>12 are gone, and say, you know, how many of you have read</p> <p>13 and -- you know, let me see the hands of the people who</p> <p>14 have read. But that's my mind, and that's not really</p> <p>15 what I want to do.</p> <p>16       So I'm just going to start reading some of the</p> <p>17 things that I wrote down before I heard all these</p> <p>18 wonderful things being said by people.</p> <p>19       I am indeed seriously and very sincerely</p> <p>20 concerned about the overwhelming possibility of</p> <p>21 environmental pollution if this copper mine is allowed</p> <p>22 to open.</p> <p>23       I am opposed to you granting this permit for</p> <p>24 the discharge of the wastewater unless -- and I think</p> <p>25 you're the one who gets to make the decision?</p>	676	<p>1 added to the public record of the hearing.</p> <p>2       My -- my comments in my notebook are basically</p> <p>3 focused on that heavy duty plastic liner called the HDPE</p> <p>4 geomembrane liner which will be laid out on the ground</p> <p>5 of the -- we don't know exactly how many anymore, but</p> <p>6 I've heard a lot of figures, but at least 547-acre</p> <p>7 tailing storage facility, which is commonly called the</p> <p>8 tailings pond. And it's designated to hold 100 million</p> <p>9 tons of rock and generate acid mine drainage.</p> <p>10       Well, I really want us to be proud of our New</p> <p>11 Mexico Environmental Department, and I also wanted to</p> <p>12 make it really easy for whoever needs to look at my</p> <p>13 notebook that they wouldn't have any trouble finding it.</p> <p>14       And also, as many people have spoken up with</p> <p>15 their hearts open, that whoever it is that makes this</p> <p>16 decision really is protecting and guarding our New</p> <p>17 Mexico air, our New Mexico earth, our New Mexico</p> <p>18 wildlife and our New Mexico plants. So I wanted to</p> <p>19 bring some really simple symbols to help whoever looks</p> <p>20 at the notebook to -- to remember that.</p> <p>21       And since when I wrote these, it was the New</p> <p>22 Mexico Environmental Department that I thought I was</p> <p>23 going to be speaking to, then I thought I was going to</p> <p>24 be speaking to you, and then I -- now I don't know who</p> <p>25 I'm speaking to, but all of you get to be -- I am</p>
675	<p>1       You're not. Okay. I don't know who does make</p> <p>2 the decision anymore. I thought it was the New Mexico</p> <p>3 Environmental Department, then I found out it wasn't.</p> <p>4 Anyway.</p> <p>5       But whoever it is, I want them to be</p> <p>6 120 percent sure that this mining company, THEMAC, who</p> <p>7 is financed out of Australia, who calls themselves the</p> <p>8 New Mexico Copper Company, that was set up in Canada,</p> <p>9 that they have proven with detailed documentation in all</p> <p>10 areas and beyond a doubt that they intend to protect our</p> <p>11 Sierra County environment from any waste water</p> <p>12 contamination or including anything else that might</p> <p>13 contaminate our environment, and I want this -- this</p> <p>14 detailed documentation to include anything following</p> <p>15 closure.</p> <p>16       And I want them to prove beyond a possible</p> <p>17 doubt that they will take every possible precaution to</p> <p>18 protect our fragile desert environment, which is already</p> <p>19 stressed to the max right now with serious drought</p> <p>20 conditions.</p> <p>21       I've brought to this public hearing some of my</p> <p>22 research, which I began in 2011, and I've been doing it</p> <p>23 continuously until last night. Some of my research is</p> <p>24 included inside a notebook that I will hand in following</p> <p>25 my comments, and I ask that this written comment be</p>	677	<p>1 designating all of you our guardian bears. The bear is</p> <p>2 a great guardian.</p> <p>3       So anyway, I have the book. So here you go.</p> <p>4 So you won't have to wonder what it is you're</p> <p>5 protecting. There you go. White bear. Whoever you</p> <p>6 are, you're the white bear. Okay? And these are my</p> <p>7 comments.</p> <p>8       So I want -- I want to thank you for hearing</p> <p>9 these comments, and I want to ask for your -- to think</p> <p>10 about in a sincere and knowledgeable way and to put all</p> <p>11 your attention on the details of this permit, and please</p> <p>12 make it carefully with -- and feel that you're fully</p> <p>13 informed.</p> <p>14       I also wanted to make a couple of other</p> <p>15 comments. If -- they talk about -- people have talked</p> <p>16 about the mine bringing in jobs, and they've already</p> <p>17 said a lot of things about that.</p> <p>18       But the thing is that if the water is used, we</p> <p>19 have very little water left. The reservoir is down.</p> <p>20 The last I heard it was at 4 percent. When I moved here</p> <p>21 20 years ago, it was full. And it's the farmers not</p> <p>22 only south of us, you know, on the Rio Grande, but it</p> <p>23 goes -- has to go all the way down to Mexico. And there</p> <p>24 are people everywhere who need this water.</p> <p>25       If we don't have it, if it's poisoned, or if</p>

<p style="text-align: right;">678</p> <p>1 we poison billions and billions and billions of gallons  2 of water with this mine, those people won't have it.  3 Those are jobs that will be lost. Those are people that  4 won't have a way to make a living. So what's the  5 trade-off? And that water won't come back for a hundred  6 years? All of you who know what that answer is?  7 So when we think about jobs, we have to think  8 about that.  9 Also, people have talked -- people have talked  10 about other mines in this state. And because I got  11 interested in mining, I learned about the uranium mines  12 up in the Navajo area, and I'm reading a book right now  13 called Yellow Dirt, Yellow Cake. I don't even remember  14 the name of it.  15 But the Navajos have a disease now called  16 Navajo neuropathy because of the uranium mining, and  17 they -- and people tried to stop that mine. They tried  18 to stop it from happening. But they couldn't because  19 people turned their backs. People were told they'd be  20 fired. That is genetic for the Navajo people.  21 So there may be -- there may be something good  22 about mining somewhere, but there are places where it's  23 not okay, and there are times when it needs to be  24 stopped and not allowed.  25 Thank you very much.</p>	<p style="text-align: right;">680</p> <p>1 Tongate, cabinet secretary of the Environment  2 Department.  3 (Proceedings adjourned at 7:50 p.m.)  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25</p>
<p style="text-align: right;">679</p> <p>1 MS. ORTH: Thank you, Ms. Browne.  2 So that's the end of our public comment for  3 this evening --  4 THE REPORTER: Ms. Browne, will you leave your  5 papers.  6 MS. ORTH: Oh.  7 Ms. Browne.  8 MS. BROWNE: Oh, I'm sorry.  9 MS. ORTH: Would you leave your written  10 comments.  11 MS. BROWNE: What about it?  12 MS. ORTH: If those are not what's reproduced  13 in that green folder, if you'd leave them, the court  14 reporter can refer to them, your written comments.  15 MS. BROWNE: Oh, this little bit?  16 MS. ORTH: Yes.  17 MS. BROWNE: Okay. Good luck trying to figure  18 these out.  19 MS. ORTH: So I will invite public comment on  20 every subsequent day of the hearing. So if you know  21 someone who wants to comment, please encourage them to  22 come back.  23 We are adjourned for the night, and we'll  24 reconvene tomorrow morning at 9 o'clock.  25 And the decision-maker in this matter is Butch</p>	<p style="text-align: right;">681</p> <p>1 STATE OF NEW MEXICO )  2 ) ss.  3 COUNTY OF BERNALILLO )  4  5  6 I, CHERYL ARREGUIN, the officer before whom the  7 foregoing proceeding was taken, do hereby certify that  8 the witnesses whose testimony appears in the foregoing  9 transcript were duly sworn or affirmed; that I  10 personally recorded the testimony by machine shorthand;  11 that said transcript is a true record of the testimony  12 given by said witnesses; that I am neither attorney nor  13 counsel for, nor related to or employed by any of the  14 parties to the action in which this proceeding is taken,  15 and that I am not a relative or employee of any attorney  16 or counsel employed by the parties hereto or financially  17 interested in the action.  18  19   20 NOTARY PUBLIC  21 CCR License Number: 21  22 Expires: 12/31/2018  23 My Commission Expires: 12/12/19  24  25</p>



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<p>1 STATE OF NEW MEXICO                  2 BEFORE THE SECRETARY OF ENVIRONMENT                  3 No. GWB 18-06(P)                  4                  5 IN THE MATTER OF THE APPLICATION                  OF NEW MEXICO COPPER CORPORATION FOR                  6 A GROUNDWATER DISCHARGE PERMIT FOR                  THE COPPER FLAT MINE, DP-1840                  7                  8                  9                  10                  11                  12                  13 TRANSCRIPT OF PROCEEDINGS                  14                  15 Volume 3                  16                  17 BE IT REMEMBERED that on the 26th day of                  18 September, 2018, this matter came on for hearing before                  19 FELICIA ORTH, Hearing Officer, at the Ralph Edwards                  20 Auditorium in Truth or Consequences, New Mexico, at the                  21 hour of 9:05 a.m.                  22                  23                  24                  25</p>	<p>1 A P P E A R A N C E S (Continued)                  2 For the Elephant Butte Irrigation District:                  3 SAMANTHA R. BARNCASTLE                  BARNCASTLE LAW FIRM                  4 Attorneys at Law                  Post Office Box 1556                  5 Las Cruces, New Mexico 88004                  (575) 636-2377                  6 samantha@h2o-legal.com                  7                  8                  9                  10                  11                  12                  13                  14                  15                  16                  17                  18                  19                  20                  21                  22                  23                  24                  25</p>
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<p>1 A P P E A R A N C E S                  2 The Hearing Officer:                  3 FELICIA ORTH                  Hearing Officer                  4 20 Barranca Road                  Los Alamos, New Mexico 87544                  5 felicia.l.orth@gmail.com                  6 For the New Mexico Environment Department:                  7 ANDREW P. KNIGHT                  Assistant General Counsel                  8 New Mexico Environment Department                  Office of General Counsel                  9 121 Tijeras Avenue, Northeast                  Suite 1000                  10 Albuquerque, New Mexico 87502                  (505) 222-9540                  11 andrew.knight@state.nm.us                  12 For New Mexico Copper Corporation:                  13 STUART R. BUTZIER                  MODRALL, SPERLING, ROEHL, HARRIS &amp; SISK, PA                  14 Attorneys at Law                  500 Fourth Street, Northwest                  15 Suite 1000                  Albuquerque, New Mexico 87102                  (505) 848-1832                  16 sbutzier@modrall.com                  17                  18 For the Turner Ranch Properties, LP, and Hillsboro                  Pitchfork Ranch, LLC:                  19                  CHARLES de SAILLAN                  20 NEW MEXICO ENVIRONMENTAL LAW CENTER                  1405 Luisa Street                  21 Suite 5                  Santa Fe, New Mexico 87505-4074                  (505) 989-9022                  22 cdesaillan@nmelc.org                  23                  24                  25</p>	<p>1 I N D E X                  2 PAGE                  3 KURT VOLLBRECHT, BRADLEY REID and                  JOSEPH MARCOLINE                  4                  5 Cross Examination (Continued) by 690                  Mr. de Saillan                  6                  7 Cross Examination by Ms. Barncastle 725                  8 Examination by Mr. Mijal 741                  9 Examination by Ms. Blair 751                  10 Examination by Ms. Browne 755                  11 Cross Examination by Mr. Butzier 759                  12 Further Cross Examination by 770                  Ms. Barncastle                  13                  14 ROBERT BYRD                  15 Public Comment 773                  16 STEPHEN DOBROTT                  17 Direct Examination by Mr. de Saillan 779                  18 Cross Examination by Mr. Butzier 822                  19 Redirect Examination by Mr. de Saillan 861                  20 EDNA TRAGER                  21 Public Comment 808                  22 DON STEINNERD                  23 Public Comment 813                  24 JIM LOMMEN                  25 Public Comment 814</p>

686	<p style="text-align: center;">I N D E X (Continued)</p> <p style="text-align: center;">PAGE</p> <p>1 VERN JONES</p> <p>2     Public Comment                     815</p> <p>3 LARRY BROOKS</p> <p>4     Public Comment                     816</p> <p>5 ROBERT CUNNINGHAM</p> <p>6     Direct Examination by Mr. de Saillan   863</p> <p>7     Cross Examination by Mr. Butzier   884</p> <p>8     Redirect Examination by Mr. de Saillan 895</p> <p>9 JAMES R. KUIPERS</p> <p>10    Direct Examination by Mr. de Saillan 898</p> <p>11    Voir Dire Examination by Mr. Butzier 912</p> <p>12    Direct Examination (Resumed) by   922</p> <p>13    Mr. de Saillan</p> <p>14    Direct Examination (Continued) by   999</p> <p>15    Mr. de Saillan</p> <p>16 ANDREW MALONEY</p> <p>17    Public Comment                     989</p> <p>18 MIKE SKIDMORE</p> <p>19    Public Comment                     991</p> <p>20 JACK DIAMOND</p> <p>21    Public Comment                     994</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	688	<p style="text-align: center;">E X H I B I T S (Continued)</p> <p style="text-align: center;">ADMITTED</p> <p>1 TURNER RANCH PROPERTIES, LP, and HILLSBORO</p> <p>2 PITCHFORK RANCH, LLC (Continued):</p> <p>3     Ranches Exhibit 40. Excerpt from JSAI   725</p> <p>4     Amendment to the Stage 1 Abatement</p> <p>5     Plan Proposal for the Copper</p> <p>6     Flat Mine, October 14, 2011</p> <p>7     Ranches Exhibit 42. Excerpt from 20.6.4   725</p> <p>8     NMAC (Surface water(s) of the state)</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
687	<p style="text-align: center;">E X H I B I T S</p> <p style="text-align: center;">ADMITTED</p> <p>1 TURNER RANCH PROPERTIES, LP, and HILLSBORO</p> <p>2 PITCHFORK RANCH, LLC:</p> <p>3     Ranches Exhibit 3. Resume of Stephen Dobrott   806</p> <p>4     Ranches Exhibit 4. Various Ladder Ranch   806</p> <p>5     maps, photographs and species inventories</p> <p>6     Ranches Exhibit 5. Resume of Robert   884</p> <p>7     Cunningham</p> <p>8     Ranches Exhibit 6. Various photographs and   884</p> <p>9     maps of the Hillsboro Pitchfork Ranch</p> <p>10    Ranches Exhibit 7. US Department of the   884</p> <p>11    Interior, Bureau of Land Management,</p> <p>12    Copper Flat Copper Mine Draft</p> <p>13    Environmental Impact Statement, Volume 1,</p> <p>14    November 2015</p> <p>15    Ranches Exhibit 39. Excerpts from JSAI   725</p> <p>16    Results from First Year of Stage 1</p> <p>17    Abatement Investigation at the Copper</p> <p>18    Flat Mine Site, Near Hillsboro, New</p> <p>19    Mexico, May 2014</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	689	<p>1 MS. ORTH: Good morning.</p> <p>2 My name is Felicia Orth, Hearing Officer</p> <p>3 appointed to conduct a hearing in the application of New</p> <p>4 Mexico Copper Corporation for a groundwater discharge</p> <p>5 permit for the Copper Flat Mine, which is DP-1840,</p> <p>6 docketed by the hearing clerk as GWB-18-06(P). This is</p> <p>7 day 3 of that hearing.</p> <p>8 We broke into the technical case last night to</p> <p>9 undertake -- to take public comment last night. As I</p> <p>10 said, folks who were not there last night may still give</p> <p>11 public comment.</p> <p>12 I don't see anyone in the room not -- is there</p> <p>13 anyone here not affiliated with a party who would like</p> <p>14 to -- well, Mr. Mijal, hi -- who would like to offer --</p> <p>15 make an indication that they want to offer public</p> <p>16 comment at some point?</p> <p>17 John, the hearing clerk, will indicate to</p> <p>18 folks signing in from here on out that -- if they</p> <p>19 indicate that they want to make public comment, he will</p> <p>20 tell them that we will make sure to take them on the</p> <p>21 next break, in connection with the next break.</p> <p>22 So are there any preliminary matters, anything</p> <p>23 we have to address before we resume the</p> <p>24 cross-examination of the Department panel by</p> <p>25 Mr. de Saillan?</p>

690	<p>1 No?</p> <p>2 All right. Thank you.</p> <p>3 Mr. de Saillan.</p> <p>4 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>5 Officer.</p> <p>6 KURT VOLLBRECHT, BRADLEY REID and JOSEPH MARCOLINE</p> <p>7 having been previously duly sworn or affirmed,</p> <p>8 were examined and testified further as follows:</p> <p>9 CROSS EXAMINATION (Continued)</p> <p>10 BY MR. DE SAILLAN:</p> <p>11 MR. DE SAILLAN: I think the next witness I'll</p> <p>12 be talking to is Mr. Reid.</p> <p>13 Good morning, Mr. Reid.</p> <p>14 MR. REID: Good morning.</p> <p>15 MR. DE SAILLAN: I actually don't have very</p> <p>16 many questions for you. I had some plans at one point</p> <p>17 of giving you some more detailed comments on the draft</p> <p>18 Discharge Permit through some friendly cross-examination</p> <p>19 questions, but we didn't quite have the time to do that.</p> <p>20 So I'm going to ask you about a few other things related</p> <p>21 to -- mostly to the Discharge Permit.</p> <p>22 MR. REID: Okay.</p> <p>23 MR. DE SAILLAN: The first thing I want to ask</p> <p>24 you about is the -- the cover that is to be placed on</p> <p>25 top of the waste rock piles.</p>	692	<p>1 MR. REID: Not that I'm aware of.</p> <p>2 MR. DE SAILLAN: Okay.</p> <p>3 And how much material is going to be needed?</p> <p>4 MR. REID: I don't know the answer to that off</p> <p>5 the top of my head.</p> <p>6 MR. DE SAILLAN: Do you know an approximate</p> <p>7 number?</p> <p>8 MR. REID: You know, 36 inches over the -- you</p> <p>9 know, the mine units that have potential to discharge</p> <p>10 water contaminants. So --</p> <p>11 MR. DE SAILLAN: Right.</p> <p>12 So we're talking the waste rock piles?</p> <p>13 MR. REID: The tailing storage facility,</p> <p>14 anywhere at the process facility area where there's</p> <p>15 impacted materials that have the potential to generate</p> <p>16 water contaminants, the historic waste rock stockpiles</p> <p>17 and the -- you know, where the impoundments that will be</p> <p>18 closed out will need cover, as well.</p> <p>19 MR. DE SAILLAN: Okay.</p> <p>20 So that's quite a bit of material.</p> <p>21 Is there enough available at the sources that</p> <p>22 you referenced a minute ago?</p> <p>23 MR. REID: I believe they have identified that</p> <p>24 there is enough cover material available.</p> <p>25 MR. DE SAILLAN: Okay.</p>
691	<p>1 My understanding is that that would be a</p> <p>2 three-foot cover?</p> <p>3 MR. REID: That is correct.</p> <p>4 MR. DE SAILLAN: And do you know what material</p> <p>5 New Mexico Copper will be using for that cover?</p> <p>6 MR. REID: Yes. They did a soil survey early</p> <p>7 on in the Discharge Permit process, and they identified</p> <p>8 reclamation cover material down near the tailing storage</p> <p>9 facility, the storage -- tailing storage facility. They</p> <p>10 will also be salvaging alluvial and colluvial material</p> <p>11 from beneath Waste Rock Stockpile 3.</p> <p>12 Those are the primary sources that I'm aware</p> <p>13 of.</p> <p>14 MR. DE SAILLAN: Okay.</p> <p>15 And will that be combined or used separately?</p> <p>16 MR. REID: The two sources?</p> <p>17 MR. DE SAILLAN: Right.</p> <p>18 MR. REID: Well, they have -- there will be</p> <p>19 three growth media stockpiles, and I would imagine that</p> <p>20 they would place the material that they collect closest</p> <p>21 to some of the growth media stockpiles that are</p> <p>22 identified at that Discharge Permit application.</p> <p>23 MR. DE SAILLAN: Okay.</p> <p>24 And will there be amendment made to the -- to</p> <p>25 that material?</p>	693	<p>1 Now, you testified earlier, and I'm going to</p> <p>2 paraphrase a little bit, that the Copper Mine Rule sets</p> <p>3 certain standards for copper mine facilities that the</p> <p>4 Environment Department is essentially bound to follow.</p> <p>5 Do you recall that testimony?</p> <p>6 MR. REID: Yes.</p> <p>7 MR. DE SAILLAN: Okay.</p> <p>8 Now, the Copper Mine Rule also allows the</p> <p>9 Environment Department to place additional requirements</p> <p>10 in the permit that go beyond the requirements of the</p> <p>11 Copper Mine Rule; isn't that true?</p> <p>12 MR. REID: That is correct.</p> <p>13 MR. DE SAILLAN: And all the Environment has</p> <p>14 to -- Environment Department has to do really is to give</p> <p>15 an explanation of the reasons for those additional</p> <p>16 requirements; is that correct?</p> <p>17 MR. REID: That is correct.</p> <p>18 MR. DE SAILLAN: Okay.</p> <p>19 And that -- just for the record, that's in</p> <p>20 20.6.7.10.1 NMAC.</p> <p>21 Is that your understanding? Is that what</p> <p>22 you're referring to?</p> <p>23 MR. REID: Yes, subsection I of 20.6.7.1 NMAC.</p> <p>24 MR. DE SAILLAN: Yes. Thank you. I misread</p> <p>25 my -- my writing here.</p>

694	<p>1 Okay. And I want to ask you a few questions</p> <p>2 about abatement.</p> <p>3 There is a provision in the permit that</p> <p>4 essentially incorporates the ongoing abatement process</p> <p>5 into the permit; is that correct?</p> <p>6 MR. REID: That is correct.</p> <p>7 MR. DE SAILLAN: Okay.</p> <p>8 And as I understand it, and the testimony</p> <p>9 from -- from yesterday or the day before was that New</p> <p>10 Mexico Copper has submitted a Stage 1 Abatement Plan to</p> <p>11 the Environment Department.</p> <p>12 Do you agree with that?</p> <p>13 MR. REID: I would agree. Yes.</p> <p>14 MR. DE SAILLAN: And when was that submitted?</p> <p>15 MR. REID: The Stage 1 Abatement Plan was</p> <p>16 submitted originally, I believe, in 2011, and then there</p> <p>17 was an amendment submitted to the Stage 1 Abatement Plan</p> <p>18 submitted later that year, maybe October, 2011. There</p> <p>19 was a status report submitted in 2013, and then there</p> <p>20 was a results from the first year of Stage 1</p> <p>21 investigation submitted in 2014.</p> <p>22 MR. DE SAILLAN: Okay.</p> <p>23 So has there -- which -- of those different</p> <p>24 documents, which one is the final Stage 1 Abatement</p> <p>25 Plan?</p>	696	<p>1 you see now as the -- the final Stage 1 Abatement Plan?</p> <p>2 Is it all of the above?</p> <p>3 MR. VOLLBRECHT: I would suggest it is all of</p> <p>4 the above as well as we're requiring some additional</p> <p>5 wells as a component of this permit.</p> <p>6 One thing to bear in mind that's probably not</p> <p>7 clear from the record is that we kind of ran into</p> <p>8 some -- I guess I could say conflicting requirements</p> <p>9 when we were embarked on the NEPA process with BLM and</p> <p>10 whether or not BLM would allow additional wells prior to</p> <p>11 them finishing the NEPA process.</p> <p>12 And so we've been working with that federal</p> <p>13 agency with respect to timelines. The NEPA process is</p> <p>14 pretty close to being complete. They couldn't allow</p> <p>15 things to happen out there that could be construed as</p> <p>16 components of the Mine Plan because it would have to go</p> <p>17 through its own separate NEPA process or be included in</p> <p>18 the NEPA process for mining.</p> <p>19 And so it -- it wasn't quite as</p> <p>20 straightforward as we would have liked it to have been.</p> <p>21 MR. DE SAILLAN: Okay.</p> <p>22 MR. VOLLBRECHT: So I would say Stage 1 is</p> <p>23 still ongoing.</p> <p>24 MR. DE SAILLAN: Okay.</p> <p>25 So has New Mexico Copper submitted a final</p>
695	<p>1 MR. REID: We -- we haven't approved, you</p> <p>2 know, the Stage 1 Abatement Plan at this point. They --</p> <p>3 well, no. We did -- we have approved the Stage 1</p> <p>4 Abatement Plan. I guess it would be the amendment to</p> <p>5 the Stage 1 Abatement Plan that was submitted in October</p> <p>6 of 2011. That would be the one that was approved.</p> <p>7 MR. VOLLBRECHT: Mr. de Saillan, if it's okay,</p> <p>8 could I --</p> <p>9 MR. DE SAILLAN: Yes. If you want to</p> <p>10 elaborate, Mr. Vollbrecht, that would be fine. Thank</p> <p>11 you.</p> <p>12 MR. VOLLBRECHT: I'd love to, yes. Thank you.</p> <p>13 That -- I mean, the Abatement Plan that was</p> <p>14 originally submitted, that's a proposal to do a site</p> <p>15 investigation, and as is typical of other facilities,</p> <p>16 once you start to gather information, that plan can</p> <p>17 change, it can be added onto.</p> <p>18 And I would suggest that everything that</p> <p>19 they've submitted is a component of the Stage 1. The</p> <p>20 Stage 1, the intent of that is to determine the nature</p> <p>21 and the extent of the -- of the impact. And so as you</p> <p>22 learn things, you may put in new wells, and the plan</p> <p>23 would evolve over time.</p> <p>24 MR. DE SAILLAN: Okay.</p> <p>25 So that -- what would have been -- or what do</p>	697	<p>1 site investigation report to the Environment Department?</p> <p>2 MR. REID: They've submitted results from the</p> <p>3 first year of sampling and, as Kurt mentioned, that in</p> <p>4 the permit, you know, we are actually requiring more</p> <p>5 sampling, another year of sampling from the Stage 1</p> <p>6 abatement wells. So at this point, there is no final</p> <p>7 Stage 1 Abatement report that we have -- that has been</p> <p>8 submitted or approved by NMED.</p> <p>9 MR. DE SAILLAN: Okay.</p> <p>10 When you say a final Stage 1 Abatement report,</p> <p>11 are you referring to what the regulations refer to as</p> <p>12 the final site investigation report?</p> <p>13 MR. REID: Yes.</p> <p>14 MR. DE SAILLAN: Okay.</p> <p>15 So this has been a fairly lengthy abatement</p> <p>16 process.</p> <p>17 MR. REID: It has.</p> <p>18 MR. DE SAILLAN: So at this point, do you know</p> <p>19 what the company plans to do for final abatement?</p> <p>20 MR. REID: I believe in the results from the</p> <p>21 first year of investigation they did -- there are</p> <p>22 recommendations in there, you know, some of which</p> <p>23 involve source control.</p> <p>24 I can think of an example at the tailing</p> <p>25 storage facility, the plume that exists beneath the</p>

698	<p>1 historic tailing storage facility, if it were to be 2 covered with a synthetic liner, that would provide 3 source control for the plume. 4 MR. DE SAILLAN: Okay. 5 But that has not been approved yet. 6 MR. REID: It has not. 7 MR. DE SAILLAN: Okay. 8 Okay. I have no further questions for 9 Mr. Reid. 10 Thank you, Mr. Reid. 11 I will next proceed with Dr. Marcoline. 12 Give me just a second here. 13 Good morning, Dr. Marcoline. 14 MR. MARCOLINE: Good morning. 15 MR. DE SAILLAN: Now, first -- get the mic 16 here. 17 First, I want to ask you about the water 18 balance calculations that you referenced in your written 19 testimony. 20 MR. MARCOLINE: Okay. 21 MR. DE SAILLAN: Now, there was no citation in 22 your written testimony. 23 So could you tell us what -- what you were 24 referring to there? 25 MR. MARCOLINE: In the direct testimony, the</p>	700	<p>1 through the waste rock. That's where I spent most of my 2 time. 3 MR. DE SAILLAN: Okay. 4 So is there -- you talked about the 5 predominant things. 6 Are there some secondary things that you 7 looked at that are relevant? 8 MR. MARCOLINE: I also did look into the 9 literature a little bit more. I looked into the -- some 10 of the leakage from the liner numbers. 11 MR. DE SAILLAN: What was that last point? 12 MR. MARCOLINE: The literature and the 13 calculations for leakage of water -- or potential 14 leakage of water through the liner -- synthetic liner 15 system. 16 MR. DE SAILLAN: And where was that, that last 17 item? 18 MR. MARCOLINE: The New Mexico Copper 19 presented that in Appendix B of -- I believe of the 20 Hydrologic Consequences report. 21 MR. DE SAILLAN: Okay. 22 Now, you also -- in your written testimony, 23 you reference a New Mexico Copper Corporation evaluation 24 of liner leakage, and it -- you assume a 25 0.5-gallon-per-minute leakage rate; is that correct?</p>
699	<p>1 water balance calculations that I was referring to 2 primarily dealt with the water moving through the waste 3 rock stockpiles as well as the open pit capture. 4 MR. DE SAILLAN: Okay. 5 And where can that be found? 6 MR. MARCOLINE: The -- I believe that 7 information is from the -- some of it's in the Stage 1 8 Abatement document, some of it's in the Hydrologic 9 Consequences report and the 2014 and 2012 modeling 10 reports. 11 MR. DE SAILLAN: Okay. 12 Anything else? 13 MR. MARCOLINE: Those are -- I think those are 14 the dominant ones that I looked at, predominant ones. 15 MR. DE SAILLAN: Okay. 16 But it sounds like you're suggesting that 17 there were some other things that you looked at? 18 MR. MARCOLINE: I looked into them in more 19 depth, if that's what you're asking. Yes. 20 MR. DE SAILLAN: Okay. 21 And I guess what I'm trying to get at is what 22 are the other things that you looked at? 23 MR. MARCOLINE: Specifically what I looked at 24 in more depth was the -- was the modeling and the water 25 balance calculations, potential for water to move</p>	701	<p>1 MR. MARCOLINE: No. I think that was a 2 calculated number, not an assumption. 3 MR. DE SAILLAN: Okay. 4 And do you agree that the leakage rates could 5 easily be substantially more than .5 gallons per minute? 6 MR. MARCOLINE: You know, I think that's 7 completely speculative. I think there's a lot of 8 interesting information. Those numbers were based on 9 averages from peer-reviewed literature studies. I think 10 there's case study for larger leaks and there's case 11 study for smaller leaks. 12 MR. DE SAILLAN: Okay. 13 Now, you -- have you reviewed any of the 14 references that say that leakage rates can be 15 significantly reduced through quality control and 16 testing? 17 MR. MARCOLINE: Yes, sir. 18 MR. DE SAILLAN: And can you name any of those 19 sources? 20 MR. MARCOLINE: Yeah, I can. I guess we 21 could -- we could start with, you know, some -- there's 22 some dominant references that keep coming up, and 23 actually they came up in New Mexico Copper's work, they 24 came up, I believe, in some of your expert's direct 25 testimony that was submitted.</p>



<p style="text-align: right;">702</p> <p>1 So the predominant references that have been 2 least referenced in this hearing are found basically 3 from either Giroud or -- and Bonaparte, back -- old -- 4 25-year-old studies, '87, '89. These folks -- at least 5 Giroud is still around, too.</p> <p>6 So there's also some additional references 7 that were looked at, like Abigail Beck. She -- she's 8 not a -- questionably, I think she's considered an 9 academic now, but she's been probably one of the leaders 10 in liner tech and testing and especially with new 11 technologies and models.</p> <p>12 So if you look at some of these older, '89 13 studies which allow these base -- these things have been 14 based on -- they're pretty old. They're fairly old. 15 There's been some EPA studies that I've looked at, 16 physical case studies around the entire country on liner 17 leakage.</p> <p>18 But if you look at -- even in -- in recent as 19 editorials and publications like, say, Geosynthetica, 20 from this year, there was comments from Giroud himself 21 who basically said with new types of liner testing, 22 potentially like arc testing or something like that, 23 same references that are referenced about liner holes 24 are saying that liner defects could almost be eliminated 25 with proper testing.</p>	<p style="text-align: right;">704</p> <p>1 site, but I'm not the liner expert. I will say that. 2 MR. DE SAILLAN: Okay. 3 Next you discuss the groundwater monitoring 4 system. 5 And I was wondering if New Mexico Copper 6 Corporation provided any description of the hydrogeology 7 near the monitoring wells to justify their location. 8 MR. MARCOLINE: That I'm aware of, I did not 9 see the justification -- no. I would say not that I'm 10 aware of. No. 11 MR. DE SAILLAN: Okay. 12 Now, you say that the proposed monitoring well 13 system provides an appropriate initial basis for 14 monitoring, and you seem to suggest the possibility of 15 additional wells; is that correct? 16 MR. MARCOLINE: I can see how you -- how you 17 interpret that way. The -- I would think I have to step 18 back a little bit. 19 You know, until we actually understand the 20 system better, I think, you know, we go off of the best 21 information that we have. 22 And that's where I mentioned in my written -- 23 or my spoken testimony yesterday that we look at the 24 geomorphology, we look at what we think the projected 25 head and the flow directions are going to be, contacts,</p>
<p style="text-align: right;">703</p> <p>1 MR. DE SAILLAN: Okay. 2 How much practical experience does the Ground 3 Water Quality Bureau have with liners at mine sites? 4 MR. MARCOLINE: Not a whole lot, I'm sure. 5 The -- you know, a lot of the PLS systems and things 6 like -- and those type of collection systems at the 7 larger mines are lined systems. The bureau themselves 8 have -- the bureau itself has numerous lined facilities 9 throughout the state. 10 But again, you know, the technology has been 11 changing with liner industries. Some of the earlier PVC 12 liners, we've seen major failures in places like Santa 13 Rosa where you maybe have a pinhole leak, but your 14 geology is very different. You have Karstic environment 15 where your fluids start dissolving the underlying 16 material, and then you have big blowouts. 17 But those are not the type of failures we've 18 been seeing at these large mine sites. 19 MR. DE SAILLAN: Do you think it would be a 20 good idea to use for the tailings facility instead of an 21 80-mil liner a 100-mil liner or a 120-mil liner? 22 MR. MARCOLINE: Or an 80-millimeter liner? 23 You know, I don't really have an answer to 24 that. It's -- I don't know. I don't know. Again, I 25 did review the literature and the calculations on this</p>	<p style="text-align: right;">705</p> <p>1 geologic contacts, and that's basically what -- you 2 know, we have the core rods -- core rods, and that's 3 essentially how -- what we've used as identified if 4 initial basis is appropriate. 5 Really until those wells are in and 6 everything's being monitored, we may not know if we need 7 more or not. 8 MR. DE SAILLAN: Okay. 9 Would you agree that additional wells would be 10 desirable? 11 MR. MARCOLINE: I'm always someone who likes 12 to see more data. So is it necessary is a different 13 question. Desirable? Yeah. I'd love to have it be a 14 Cape Cod aquifer, over 200-some wells, but it's not 15 practical, practicable. 16 MR. DE SAILLAN: Okay. 17 I don't think we're talking about that many 18 wells, but would you like to see a few more wells out 19 there? 20 MR. MARCOLINE: I think at this -- at this 21 stage the number of wells out there with the additional 22 ones that Brad has put in the permit is appropriate. 23 MR. DE SAILLAN: Okay. 24 Okay. Next I have a few questions about the 25 andesite bedrock that you referenced.</p>

<p style="text-align: right;">706</p> <p>1 First of all, where on the mine site is the 2 andesite bedrock located?</p> <p>3 MR. MARCOLINE: The andesite bedrock is a 4 pretty large volcanic unit basically. The andesite 5 bedrock that I was focused on predominantly was in and 6 around the Animas, the east side of -- west -- east side 7 of Animas Creek where the waste rock stockpiles -- the 8 new ones will go.</p> <p>9 The quartz monzonite and the brecciated zones 10 are actually within -- kind of encompassed within the 11 andesite, as well. So the andesite is bigger. So some 12 of the -- some of the borehole testing of andesite was 13 actually up on the -- on the west/northwest side of the 14 pit, I believe, as well.</p> <p>15 So it's a pretty big, intrusive unit.</p> <p>16 MR. DE SAILLAN: Okay.</p> <p>17 What is the area that underlies the Number 2 18 and Number 3 waste rock piles?</p> <p>19 MR. MARCOLINE: I don't have that number off 20 the top of my head.</p> <p>21 MR. DE SAILLAN: Do you have an approximation?</p> <p>22 MR. MARCOLINE: I don't. I've walked it, but 23 I don't know the area.</p> <p>24 MR. DE SAILLAN: Perhaps Mr. Reid could help 25 us with that.</p>	<p style="text-align: right;">708</p> <p>1 MR. MARCOLINE: Okay.</p> <p>2 MR. DE SAILLAN: And I think those were done 3 on andesite and some quartz monzonite at one time 4 period? And I'm trying to get at your understanding of 5 how those pressure tests were done.</p> <p>6 MR. MARCOLINE: Some of the -- some of the 7 testing was fairly simple, like a slug -- a slug test 8 basically, slug test rebound. You're basically 9 measuring -- you're either displacing water or pulling 10 water and measuring rebound. There are also some pump 11 tests that were done.</p> <p>12 Those two -- or those wells -- exact wells I 13 don't know. The lower one was a pump test. The other 14 two were -- I believe were simple slug tests. I could 15 be wrong.</p> <p>16 MR. DE SAILLAN: So I'm sorry. You said that 17 two of the wells were pump tests and one of them was a 18 slug test?</p> <p>19 MR. MARCOLINE: I believe so, yes.</p> <p>20 MR. DE SAILLAN: Okay.</p> <p>21 And the one that was a slug test, that was 22 done in conjunction with a number of other tests that 23 were performed on monzonite?</p> <p>24 MR. MARCOLINE: I'm not sure.</p> <p>25 MR. DE SAILLAN: Okay.</p>
<p style="text-align: right;">707</p> <p>1 MR. REID: Yeah. Let's see. 2 Yeah. Waste Rock Stockpile 2 will be 3 approximately 49 acres, and Waste Rock Stockpile 3 will 4 be 122 acres upon full build-out.</p> <p>5 MR. DE SAILLAN: Okay.</p> <p>6 So if I have your numbers in my head 7 correctly, it's about 170 acres?</p> <p>8 MR. REID: That's correct.</p> <p>9 MR. DE SAILLAN: Okay.</p> <p>10 Now, Mr. Marc -- or, Dr. Marcoline, you 11 testified about a number of pressure tests that New 12 Mexico Copper Corporation conducted on some of the 13 andesite; is that correct?</p> <p>14 MR. MARCOLINE: Yes, I did.</p> <p>15 MR. DE SAILLAN: Okay.</p> <p>16 And could you explain your understanding of 17 how these pressure tests were performed?</p> <p>18 MR. MARCOLINE: I think there were several 19 different types of tests that were performed. Some of 20 those were older, and they were deep borehole tests. I 21 believe that was a 90 -- actually, I don't know the well 22 numbers, but they were older tests, deep borehole tests 23 on the andesite.</p> <p>24 MR. DE SAILLAN: Okay. I'm talking 25 specifically about the pressure tests.</p>	<p style="text-align: right;">709</p> <p>1 I think in your testimony you took issue with 2 the testimony of -- or the comments of one of our 3 experts who indicated that the hydraulic conductivity of 4 several of the tests was lower than what has been -- the 5 andesite has been characterized as.</p> <p>6 MR. MARCOLINE: Um-hum.</p> <p>7 MR. DE SAILLAN: And you pointed out that 8 those tests were performed in quartz monzonite? Do 9 you --</p> <p>10 MR. MARCOLINE: I do recall it was my -- my 11 recollection was it was Table 5-2, something, where 12 the -- the samples that were -- that had a lower 13 hydraulic conductivity -- or a lower hydraulic 14 conductivity than that 10 to the minus-6 were in the 15 quartz monzonite, were not in the andesite sample.</p> <p>16 MR. DE SAILLAN: Okay.</p> <p>17 And was that slug -- were those slug tests?</p> <p>18 MR. MARCOLINE: I'm not sure. I'd have to go 19 back to the -- that information was in the Stage 1 20 Abatement. I'm not sure.</p> <p>21 MR. DE SAILLAN: Right. Okay.</p> <p>22 Okay. In reaching that conclusion, you relied 23 on the Stage 1 Abatement Plan report?</p> <p>24 MR. MARCOLINE: I believe for the -- the 25 numbers in the -- on the Table 5-2, the Stage 1</p>

710	<p>1 Abatement report had a description of the testing for 2 each of those wells. 3 MR. DE SAILLAN: Okay. 4 Well, let's take a look at that report. 5 And I have a document that Kendra is going to 6 pass around that's been marked as the Ranches Exhibit 7 Number 39. 8 That should be a three-page document. 9 Okay. Now, the first page there is a title 10 page from the Stage 1 Abatement report from May, 2014, 11 and that's Bates number 09579. 12 The second page is Table 2 from that report, 13 and that's Bates number 09592. 14 And the third page is a well completion 15 diagram from Appendix A of the same report, and that's 16 Bates number 09655. 17 And this is the report that you're referring 18 to; is that right? 19 MR. MARCOLINE: Yes. That is correct. 20 MR. DE SAILLAN: Okay. 21 Now, two of the wells -- let's take a look at 22 Table 2 there, which is on the second page. 23 The two wells that you reference -- or two of 24 the wells that you reference are on lines 1 through 4 of 25 Table 2; is that right?</p>	712	<p>1 does show the screened intervals, as well. Yes. 2 MR. DE SAILLAN: Okay. 3 Now let's look over on Table 2, the column 4 marked geologic unit. 5 It looks as though 22A and B is indeed 6 completed in andesite, but it also looks like 23A and B 7 is completed in the quartz monzonite, doesn't it? 8 MR. MARCOLINE: That's correct. 9 MR. DE SAILLAN: And now let's look at the 10 last page, which is the well completion diagram for Well 11 23A and B. 12 And according to this diagram, most of the 13 well is completed in quartz monzonite; is that correct? 14 MR. MARCOLINE: I don't have that last page. 15 I have one -- GWB96-23. Okay. 16 Is that the correct one? 17 But not 22. 18 (Discussion off the record.) 19 MR. MARCOLINE: Okay. You're looking at 20 GWB -- or GWQ96-23. 21 MR. DE SAILLAN: Yes. 22 MR. MARCOLINE: Okay. 23 MR. DE SAILLAN: And so does it appear that 24 that well is completed in quartz monzonite? 25 MR. MARCOLINE: It sure does, yes.</p>
711	<p>1 MR. MARCOLINE: I believe it's the second -- 2 yeah. And then -- but also I believe there's the 3 GWQ-5R. 4 Is that correct? 5 MR. DE SAILLAN: Right. Let's focus on those 6 first two ones for now. Okay? 7 MR. MARCOLINE: Okay. Yep. 8 MR. DE SAILLAN: Okay. 9 So those are labeled GWQ96-22A and 22B and 10 GWQ96-23A and 23B; is that correct? 11 MR. MARCOLINE: That is correct. 12 MR. DE SAILLAN: Okay. 13 And just for the record, could you explain 14 what the designations A and B refer to in these 15 monitoring well numbers? 16 MR. MARCOLINE: I'm not sure. They 17 typically -- typically the A and B is an alluvial and a 18 bedrock, but I'm -- in Copper Flat, I'm not exactly 19 sure. 20 MR. DE SAILLAN: Okay. 21 But do they indicate the multiple screens 22 within the well? 23 MR. MARCOLINE: The -- there is a -- it does 24 show the screened interval for A is the shallower -- or 25 it says the total depth is shallower than the B. So it</p>	713	<p>1 MR. DE SAILLAN: And in particular, the well 2 screens are in the quartz monzonite units? 3 MR. MARCOLINE: Yes, it does. It looks that 4 way. 5 MR. DE SAILLAN: Okay. 6 Now let's look back at Table 2. 7 And I would ask you that the well screens 8 in -- actually you could look in either place, I guess. 9 The well screens appear to be pretty deep in 10 the monzonite, don't they? 11 MR. MARCOLINE: Yes. 12 Is this -- is this A, or is this B? 13 I don't see -- 14 MR. DE SAILLAN: Well, both of them really. 15 MR. MARCOLINE: Okay. I see them. 16 Repeat your question. I apologize. 17 MR. DE SAILLAN: So that the well screens, 18 both of them appear to be pretty deep, right? 19 MR. MARCOLINE: They're both in the andesite. 20 Yes. The second one in the -- the nested well B is a 21 deeper one. 22 MR. DE SAILLAN: Right. 23 MR. MARCOLINE: The well screen in the nested 24 well B appears to be deeper, somewhere around 150- 25 250-, 100-foot screen, it looks like. Big screen.</p>

714	<p>1 MR. DE SAILLAN: Okay.</p> <p>2 MR. MARCOLINE: And it looks fairly deep.</p> <p>3 The other one is a -- relatively shallow. The</p> <p>4 alluvial well is fairly shallow. Looks like it's</p> <p>5 between 50 and 100.</p> <p>6 MR. DE SAILLAN: Between 50 and 100?</p> <p>7 MR. MARCOLINE: That's what it looks like to</p> <p>8 me.</p> <p>9 (Discussion off the record.)</p> <p>10 MR. DE SAILLAN: All right. Let's look at the</p> <p>11 table.</p> <p>12 What does the table say about the depth of the</p> <p>13 well screens?</p> <p>14 MR. MARCOLINE: The table is -- the table</p> <p>15 looks correct. It looks like what I just read. It</p> <p>16 says -- the table says that the alluvial aquifer is</p> <p>17 screened between 50 and 100 and it's in a quartz</p> <p>18 monzonite. That appears to be correct.</p> <p>19 MR. DE SAILLAN: Okay.</p> <p>20 MR. MARCOLINE: The basal well, or the bedrock</p> <p>21 well, whatever B stands for, is screened between 150 and</p> <p>22 250, which I believe is approximately what I said, in</p> <p>23 the quartz monzonite, as well, if you look in the</p> <p>24 geologic unit.</p> <p>25 MR. DE SAILLAN: Okay.</p>	716	<p>1 of well is that?</p> <p>2 MR. MARCOLINE: It says it's a supply well.</p> <p>3 MR. DE SAILLAN: Okay.</p> <p>4 And what geologic unit is it completed in?</p> <p>5 MR. MARCOLINE: It's in -- it says it's in</p> <p>6 andesite.</p> <p>7 MR. DE SAILLAN: Okay.</p> <p>8 Next let's look at Well GWQ-6(N), which is</p> <p>9 about six lines down in the table.</p> <p>10 Do you see that?</p> <p>11 MR. MARCOLINE: Yes.</p> <p>12 MR. DE SAILLAN: And what type of well is</p> <p>13 that?</p> <p>14 MR. MARCOLINE: That is also a supply well,</p> <p>15 completed in the andesite.</p> <p>16 MR. DE SAILLAN: Okay.</p> <p>17 And then let's look down near the bottom of</p> <p>18 the table, there's a well that's labeled as the Pague</p> <p>19 well, or the Pague well, or the Pague well. I'm not</p> <p>20 sure how to pronounce that. P-A-G-U-E?</p> <p>21 MR. MARCOLINE: Correct.</p> <p>22 MR. DE SAILLAN: And what type of well is</p> <p>23 that?</p> <p>24 MR. MARCOLINE: It's a supply well -- or --</p> <p>25 it's a supply well.</p>
715	<p>1 And what is the depth to the water table?</p> <p>2 MR. MARCOLINE: In this picture -- or in this</p> <p>3 diagram, it looks like it's around 41.37 feet whenever</p> <p>4 this was conducted, 1996.</p> <p>5 MR. DE SAILLAN: Okay.</p> <p>6 Now, let's take a look at another report.</p> <p>7 So I'm going to ask Kendra to pass around a</p> <p>8 document that's marked as Ranches Exhibit 40.</p> <p>9 Now, this is from a document that's entitled</p> <p>10 Amendment to the Stage 1 Abatement Plan -- excuse me --</p> <p>11 Abatement Plan Proposal for the Copper Flat Mine. It's</p> <p>12 dated October 14th, 2011.</p> <p>13 The first page is the title page, which is</p> <p>14 Bates number 02192.</p> <p>15 The second page is Table 2 from that report,</p> <p>16 which is Bates number 02201.</p> <p>17 The print on that table is pretty microscopic.</p> <p>18 I apologize for that.</p> <p>19 But I want to take a look at a few of the</p> <p>20 wells on that table.</p> <p>21 So the first one is well GWQ-4, which is four</p> <p>22 lines down.</p> <p>23 Do you see that?</p> <p>24 MR. MARCOLINE: Yes, sir.</p> <p>25 MR. DE SAILLAN: And first of all, what type</p>	717	<p>1 MR. DE SAILLAN: And what geologic unit is it</p> <p>2 completed in?</p> <p>3 MR. MARCOLINE: It says it's in andesite.</p> <p>4 MR. DE SAILLAN: Okay.</p> <p>5 And the next well I want you to look at is the</p> <p>6 Dolores well, which I think is right below the previous</p> <p>7 one.</p> <p>8 And what type of well is that?</p> <p>9 MR. MARCOLINE: It's also a supply well within</p> <p>10 the andesite.</p> <p>11 MR. DE SAILLAN: Okay.</p> <p>12 And the next well is the Paxton Well.</p> <p>13 What type of well is that?</p> <p>14 MR. MARCOLINE: It is a supply well in the</p> <p>15 andesite.</p> <p>16 MR. DE SAILLAN: And the next well is labeled</p> <p>17 LRG-4156 well.</p> <p>18 What type of well is that?</p> <p>19 MR. MARCOLINE: A supply well.</p> <p>20 MR. DE SAILLAN: And what geologic unit is it</p> <p>21 completed in?</p> <p>22 MR. MARCOLINE: This table says andesite.</p> <p>23 MR. DE SAILLAN: And at the bottom of the</p> <p>24 table is LRG-4159 well.</p> <p>25 And what type of well is that?</p>

718	<p>1 MR. MARCOLINE: It is also a supply well,                  2 completed in the andesite.                  3 MR. DE SAILLAN: Okay.                  4 Now, in your testimony, you say that it is                  5 reasonable to assume that the bulk hydraulic                  6 conductivity of the andesite is between 10 to the                  7 minus-7 and 10 to the minus-11 centimeters per second.                  8 If that were the case, would you expect to                  9 have all these supply wells completed in the andesite?                  10 MR. MARCOLINE: If that's true, then no, I                  11 would not. I -- but I haven't looked at these wells. I                  12 don't know -- some of these are very old, the '40s,                  13 '30s, and I don't -- haven't looked at the geologic                  14 logs. I haven't looked at any testing data on them.                  15 So I -- but based on the assumption that they                  16 were logged correctly, then yes. I would agree.                  17 MR. DE SAILLAN: Okay.                  18 Dr. Marcoline, given our conversation the last                  19 few minutes on the andesite and the hydraulic                  20 conductivity of the andesite, do you stand by your                  21 conclusion expressed in your testimony that it is                  22 reasonable to assume that the hydraulic conductivity of                  23 the andesite is on the order of 10 to the minus-7 to 10                  24 to the minus-11 centimeters per second?                  25 MR. MARCOLINE: Based on the wells that I</p>	720	<p>1 decision of -- or my -- not my decision, but my                  2 evaluation of water moving to the groundwater beneath                  3 the waste rock pile was not conceptually based on the                  4 conductivity of the andesite.                  5 While I think it would be good to know that                  6 or -- it would be good to know that and more details on                  7 anything, at some point it becomes -- it becomes                  8 academic, and I think -- I think at this point we have                  9 enough information on that.                  10 This information -- this does raise question                  11 of this Monitor Well 23B, which actually -- which                  12 actually was tested. The other wells we brought up,                  13 again, I don't know anything about them. They're older.                  14 They're supply wells.                  15 I work -- I've worked on hundreds of drill                  16 rigs, drilling operations, and, you know, typically --                  17 let's just say I've seen a very large variety of -- in                  18 terms of quantity -- quality of well logging, and                  19 especially depending on the drill method and if they're                  20 using mud and if it's chipped or how it comes up,                  21 it's -- you know, I've seen a large variety and quality                  22 of logs, especially older logs. So --                  23 MR. DE SAILLAN: Okay.                  24 What about fractures in the andesite? There                  25 are fractures in the andesite, correct?</p>
719	<p>1 looked at, I would -- I would still stand by that.                  2 96-23, I would say yes, I would -- warrants a second                  3 look.                  4 Do you have the log for 22?                  5 MR. REID: Yeah.                  6 MR. MARCOLINE: Hold on.                  7 The other well that I have referenced is                  8 clearly in the andesite, as well. It warrants looking                  9 at.                  10 MR. DE SAILLAN: Okay.                  11 So would you agree that it would be a good                  12 thing for New Mexico Copper Corporation to do further                  13 characterization of the andesite?                  14 MR. MARCOLINE: Like I mentioned earlier, I'm                  15 not opposed ever to actually having real good data. So                  16 I wouldn't be opposed to it. I'm not positive that it's                  17 necessary at this point, as I stated in my direct -- in                  18 my written testimony yesterday.                  19 MR. DE SAILLAN: Okay.                  20 But do you at least have a question as to                  21 whether it might be necessary based on our conversation                  22 today?                  23 MR. MARCOLINE: I guess I could repeat what I                  24 just said. Based on our conversation today and on what                  25 I said yesterday, the -- I stated that the -- my</p>	721	<p>1 MR. MARCOLINE: Correct.                  2 MR. DE SAILLAN: Now, essentially, as I                  3 understand it, you're basing your testimony on two data                  4 points, the well that's Number 22, that we agree is in                  5 the andesite, and the other -- the other well where the                  6 slug test was performed.                  7 Now, if neither of those borings crossed a                  8 fracture in the andesite, would you have a complete                  9 picture of the hydraulic conductivity of that andesite                  10 unit?                  11 MR. MARCOLINE: No. But I would -- I would                  12 correct your statement a little bit, that my -- you                  13 know, the only portion of my testimony which I would                  14 agree to that is that one statement about the feeling                  15 confident about the hydraulic conductivity of the                  16 andesite based on those wells.                  17 So the other portions of my testimony I -- was                  18 explicitly saying that the hydraulic conductivity of the                  19 andesite, in my opinion, was not the dominant factor.                  20 Does that make sense?                  21 MR. DE SAILLAN: I don't think I quite                  22 understood your answer --                  23 MR. MARCOLINE: I was essentially making a                  24 clarification to your question, but --                  25 MR. DE SAILLAN: My question referred to the</p>

722	<p>1 possibility of fractures in the bedrock, and -- let me 2 start over.</p> <p>3 You are using at this point essentially two 4 data points for your conclusion that the -- that it's 5 reasonable to assume that the hydraulic conductivity of 6 the andesite is 10 to the minus-7 to 10 to the 7 minus-11 centimeters per second.</p> <p>8 Given that, if neither of those data points 9 went through a fault, would you have a complete picture 10 of the hydraulic conductivity of the andesite?</p> <p>11 MR. MARCOLINE: I understand your question 12 now. I think that was phrased better.</p> <p>13 I agree. I agree, you know, but -- I agree 14 with that statement for sure. We're also looking at a 15 scale -- you know, we look at a scale system. We have 16 two -- at this point, that's what we had, is two points, 17 and based on those two points, I think it is a 18 reasonable conclusion.</p> <p>19 The chance that a 100-foot screen interval or 20 close to a 100-foot screen interval does not intersect 21 fractures, it's anybody's guess. It's probably very 22 likely that the difference in the two values from the 23 two tests other than method could very well be because 24 one of them intersected shallower fractures than the 25 other. But it is possible.</p>	724	<p>1 MR. BUTZIER: I do object to that, because 2 that is a -- like a two or three pages from a very 3 lengthy document, and I just don't think we should admit 4 it into the record without seeing more context for that 5 document.</p> <p>6 MR. DE SAILLAN: I can provide you with the 7 rest of the document if you don't have it, Mr. Butzier.</p> <p>8 MR. BUTZIER: I would appreciate that, and I 9 would still have an objection to admitting those two or 10 three pages into this record.</p> <p>11 MR. DE SAILLAN: And what would be the grounds 12 for the objection?</p> <p>13 MR. BUTZIER: Because I haven't yet seen what 14 you have just offered to show me. I'm happy to look at 15 it, and maybe I would withdraw my objection later, but 16 right now I still have an objection.</p> <p>17 MR. DE SAILLAN: Okay.</p> <p>18 MS. ORTH: All right.</p> <p>19 Mr. Knight?</p> <p>20 MR. KNIGHT: No objections.</p> <p>21 MS. ORTH: All right.</p> <p>22 So the other exhibits are admitted, 39, 40, 41 23 and -- sorry -- 42 -- I'm out of order now. 24 39, 40 and 42. 25 41 is the Marcy Leavitt testimony, and we'll</p>
723	<p>1 MR. DE SAILLAN: Okay.</p> <p>2 Did you do any kind of statistical analysis on 3 whether those two data points, or even three data points 4 as you initially believed, would give you a reasonable 5 level of confidence that you had representative samples 6 of -- I believe earlier the testimony was 170 acres of 7 andesite that underlines the proposed waste rock piles?</p> <p>8 MR. MARCOLINE: Considering that the andesite 9 was not -- the hydraulic conductivity of the andesite 10 was not a driving factor in my analysis, I was 11 comfortable with that.</p> <p>12 MR. DE SAILLAN: Okay.</p> <p>13 Dr. Marcoline, thank you.</p> <p>14 I have no further questions at this point.</p> <p>15 And, Madam Hearing Officer, I would like to 16 move for the admission of the Ranches Exhibits 39, 40, 17 41 and 42, which are the four exhibits that I used in 18 the cross-examination of the Environment Department 19 witnesses.</p> <p>20 MS. ORTH: All right.</p> <p>21 Are there objections?</p> <p>22 MS. BARNCASTLE: No objection.</p> <p>23 MR. BUTZIER: Was Exhibit 42 the one that was 24 the Marcy Leavitt excerpt?</p> <p>25 MR. DE SAILLAN: Yes, it was.</p>	725	<p>1 wait pending Mr. de Saillan's production of the rest of 2 that, and I'll invite your objection when you've seen 3 that.</p> <p>4 (Exhibits Ranches Exhibits 39, 40 and 42 5 admitted into evidence.)</p> <p>6 MR. BUTZIER: So, Madam Hearing Officer, that 7 was 41 that I objected to?</p> <p>8 MS. ORTH: Yes.</p> <p>9 MR. BUTZIER: Thank you.</p> <p>10 MR. DE SAILLAN: I think that might have been 11 my mistake. My apologies, Mr. Butzier.</p> <p>12 MR. BUTZIER: No problem.</p> <p>13 MS. ORTH: Okay.</p> <p>14 And you're finished, Mr. De Saillan?</p> <p>15 MR. DE SAILLAN: I'm finished with the 16 Environment Department witnesses. Yes, Madam Hearing 17 Officer.</p> <p>18 MS. ORTH: All right. Thank you.</p> <p>19 Ms. Barncastle, do you have questions of the 20 department witnesses?</p> <p>21 MS. BARNCASTLE: Yes, I do. Thank you.</p> <p>22 CROSS EXAMINATION</p> <p>23 BY MS. BARNCASTLE:</p> <p>24 MS. BARNCASTLE: I will start this morning 25 with Mr. Reid.</p>

726	<p>1 Good morning.</p> <p>2 There's been testimony about the removal of</p> <p>3 alluvial material from the Waste Rock Stockpile Number 3</p> <p>4 and 2. It was slide 36 from the Finch presentation.</p> <p>5 Do you recall that?</p> <p>6 MR. REID: Yes.</p> <p>7 MS. BARNCASTLE: Do you have that slide in</p> <p>8 front of you?</p> <p>9 MR. REID: Not directly, but I -- it was from</p> <p>10 Mr. Finch's that showed a geologic map of the waste rock</p> <p>11 stockpile superimposed?</p> <p>12 MS. BARNCASTLE: Yes.</p> <p>13 Madam Hearing Officer, may I approach the</p> <p>14 witness?</p> <p>15 MS. ORTH: Yes.</p> <p>16 MS. BARNCASTLE: So I'm going to show the</p> <p>17 witness slide 36 from the Finch presentation.</p> <p>18 Do you have that?</p> <p>19 MR. REID: Yes. I'm familiar with it. Yes.</p> <p>20 MS. BARNCASTLE: Okay. There's been some</p> <p>21 confusion about whether or not the alluvial material</p> <p>22 will be removed.</p> <p>23 Do you have any information that may enlighten</p> <p>24 us?</p> <p>25 MR. REID: Yeah.</p>	728	<p>1 The alluvial material will not be removed beneath the</p> <p>2 Existing Waste Rock Stockpile 3. New Mexico Copper has</p> <p>3 proposed to remove alluvial material beneath the</p> <p>4 proposed Waste Rock Stockpile 3, and any stormwater</p> <p>5 conveyance channels will be excavated down into the</p> <p>6 bedrock.</p> <p>7 So any alluvial materials that are encountered</p> <p>8 beneath the toe of the proposed waste rock stockpile</p> <p>9 will be removed, and stormwater channels will be</p> <p>10 excavated in the bedrock.</p> <p>11 MS. BARNCASTLE: Thank you. That's</p> <p>12 significantly more helpful.</p> <p>13 Mr. Reid, you also testified that should</p> <p>14 groundwater contamination occur, installation of an</p> <p>15 interceptor system would be required; is that correct?</p> <p>16 MR. REID: I believe I didn't say that</p> <p>17 explicitly. I think I stated that if groundwater</p> <p>18 contamination were to occur, that NMED could require a</p> <p>19 corrective action which could include an interceptor</p> <p>20 system. Yes.</p> <p>21 MS. BARNCASTLE: What other types of</p> <p>22 corrective actions might NMED require?</p> <p>23 MR. REID: Installation of additional</p> <p>24 monitoring wells. We could require a geochemistry study</p> <p>25 to try to better define the nature and extent of the</p>
727	<p>1 Which alluvial material are you talking about?</p> <p>2 Can you be more descriptive, please?</p> <p>3 MS. BARNCASTLE: Well, there's the alluvial</p> <p>4 material on that slide.</p> <p>5 Do you need it in front of you again?</p> <p>6 MR. REID: Yes.</p> <p>7 MS. BARNCASTLE: It's designated in yellow.</p> <p>8 Uh-oh.</p> <p>9 MR. REID: The yellow flowers?</p> <p>10 MS. BARNCASTLE: The yellow flowers, yeah.</p> <p>11 See right under Waste Rock Stockpile Number 3,</p> <p>12 there's alluvial material designated in yellow? Do you</p> <p>13 see that?</p> <p>14 MR. REID: I do, yes.</p> <p>15 MS. BARNCASTLE: There has been some testimony</p> <p>16 that the alluvial material will be removed.</p> <p>17 But my understanding is some of that alluvial</p> <p>18 material is under an existing waste rock stockpile; is</p> <p>19 that correct?</p> <p>20 MR. REID: Yeah. I believe Waste Rock</p> <p>21 Stockpile -- Existing Waste Rock Stockpile 3 is over on</p> <p>22 the western portion of proposed Waste Rock Stockpile 3,</p> <p>23 and they will be -- I think it's actually this part</p> <p>24 that's represented by daf.</p> <p>25 So the part -- so to answer your question, no.</p>	729	<p>1 groundwater conditions in question.</p> <p>2 MS. BARNCASTLE: Is it possible that NMED</p> <p>3 would not require any remediation?</p> <p>4 MR. REID: If groundwater were in the</p> <p>5 monitoring wells, groundwater results show they're above</p> <p>6 standards, the New Mexico Copper would be required to</p> <p>7 do -- implement source control measures which could</p> <p>8 include an interceptor system or abatement measures.</p> <p>9 MS. BARNCASTLE: And what would an interceptor</p> <p>10 system look like?</p> <p>11 MR. REID: Well, typically interceptor systems</p> <p>12 are emplaced in wells, and they are pumping systems.</p> <p>13 There's other types of interceptor systems that could be</p> <p>14 installed, depending on kind of site-specific</p> <p>15 conditions, including cutoff wells or seepage collection</p> <p>16 trenches.</p> <p>17 MS. BARNCASTLE: So it's possible that there</p> <p>18 could be a pump-and-treat system? Is that what you</p> <p>19 referred to initially with the --</p> <p>20 MR. REID: Yeah. A pumping system that would</p> <p>21 intercept the contaminated groundwater, and that would</p> <p>22 likely be -- return to the process water reuse circuit.</p> <p>23 So I would say it would not be -- it would be part of</p> <p>24 the process water circuit.</p> <p>25 MS. BARNCASTLE: I'd like to direct you to</p>

730	<p>1 Section C105C.2 of the draft permit as amended in August  2 and presented yesterday in your testimony. That would  3 be as amended in August of 2018.  4 MR. REID: Is this about the tailing storage  5 facility?  6 MS. BARNCASTLE: Yes.  7 Do you have that handy?  8 MR. REID: I do.  9 MS. BARNCASTLE: What does it mean to -- that  10 the permittee shall, quote, submit to NMED documentation  11 of compliance with the Dam Safety Bureau of the Office  12 of the State Engineer?  13 MR. REID: Well, as was testified -- as we  14 heard in previous testimony the past -- yesterday, New  15 Mexico Copper will be required to get a dam safety  16 permit for the tailing storage facility. So the New  17 Mexico Copper will be required to submit compliance with  18 Dam Safety Bureau regulations and including an approved  19 dam permit.  20 MS. BARNCASTLE: So the actual permit is  21 required.  22 MR. REID: Yeah. They will need to have a dam  23 permit before any activities occur at the tailing  24 storage facility.  25 MS. BARNCASTLE: And NMED is requiring that</p>	732	<p>1 I'll move on to Mr. Vollbrecht.  2 You just stated that you work with OSE -- and  3 I'm so sorry about the colloquial use of the term "you"  4 again -- that the department works with OSE regularly.  5 You mentioned in your direct testimony that the agency  6 took a cooperative agency approach to this application,  7 and you included Mining and Minerals Division, BLM and  8 other agencies.  9 What were those other agencies?  10 MR. VOLLBRECHT: The Mining and Minerals  11 Division, the Office of the State Engineer, the Bureau  12 of Land Management. I believe Game and Fish attended  13 some of those meetings. It would be difficult for me to  14 go through at various times. It's been a  15 seven-plus-year process, and there have been a variety  16 of different participants in those -- in those meetings.  17 MS. BARNCASTLE: At what point were those  18 other agencies involved?  19 MR. VOLLBRECHT: I could say from the get-go  20 the New Mexico Environment Department entered into a  21 cooperative agencies agreement with BLM and M -- the  22 Bureau of Land Management also had those agreements with  23 a number of other agencies. I can't fully comment on  24 the extent of those and who were all involved.  25 MS. BARNCASTLE: From the get-go being defined</p>
731	<p>1 permit be provided to NMED before construction can  2 occur, the final permit issued by OSE Dam Safety Bureau.  3 Sure, Mr. Vollbrecht.  4 MR. VOLLBRECHT: I -- Ms. Barncastle, I think  5 demonstration that they have that permit could take  6 probably a number of different forms. An approval  7 letter from the State Engineer would suffice, and  8 anything that -- that was provided by New Mexico Copper  9 we would also confer with the Office of the State  10 Engineer.  11 We talk with them on a regular basis at sites  12 that we have a joint interest in, and so we would  13 certainly -- not only would be required to receive that  14 documentation, but we would also follow up with the  15 State Engineer to make sure that all the requirements  16 had been met.  17 MS. BARNCASTLE: In fairness, my concern is  18 that I wouldn't want to see documentation of compliance  19 in the form of "We're going through the process and  20 that's sufficient." I would like to see a final permit  21 issued. And that's what I'm trying to make sure that  22 the department will require.  23 MR. VOLLBRECHT: Understood. That is what we  24 will require.  25 MS. BARNCASTLE: Thank you.</p>	733	<p>1 as from the time the application was submitted or from  2 sometime before that?  3 MR. VOLLBRECHT: The original application to  4 the department for the Discharge Permit was submitted in  5 2011, and the cooperating agency process started around  6 that same time, in 2011.  7 MS. BARNCASTLE: What was OSE, the Office of  8 the State Engineer's, contribution to the cooperative  9 agency approach?  10 MR. VOLLBRECHT: They typically had someone  11 attend meetings. We had monthly meetings for some  12 number of years. It wasn't always monthly. I think at  13 times when things were slowing down they would become  14 less frequent.  15 But, you know, my recollection from in the  16 early days I did attend those meetings, there were 20  17 people in the room, a variety of regulators, different  18 agency representatives, New Mexico Copper  19 representatives, as well as the contractors on location  20 doing the NEPA work.  21 MS. BARNCASTLE: Who from OSE attended those  22 meetings? Do you recall?  23 MR. VOLLBRECHT: Yeah. Kevin Myers was the --  24 from my recollection, the primary person attending  25 those.</p>



734	<p>1 MS. BARNCASTLE: Was he an attorney?</p> <p>2 Hydrologist? Something else?</p> <p>3 MR. VOLLBRECHT: Mr. Myers is a hydrologist.</p> <p>4 He used to work for the department. He worked for the</p> <p>5 State Engineer for a number of years. He's actually now</p> <p>6 with the Mining and Minerals Division.</p> <p>7 MS. BARNCASTLE: Okay.</p> <p>8 Did the Office of the State Engineer provide</p> <p>9 written comments regarding the permit, the draft permit?</p> <p>10 MR. VOLLBRECHT: I do not believe so. They</p> <p>11 did receive a copy, but we did not receive written</p> <p>12 comments from them.</p> <p>13 We have had conversations with staff from the</p> <p>14 Dam Safety Bureau. I've spoken with Chuck Thompson, who</p> <p>15 is the chief of that bureau. We've also had</p> <p>16 conversations with the technical staff person who has</p> <p>17 done the review of various documents.</p> <p>18 MS. BARNCASTLE: Was the Office of the State</p> <p>19 Engineer involved in the meetings regarding surface</p> <p>20 water determination?</p> <p>21 MR. VOLLBRECHT: I cannot say to that. I'd</p> <p>22 have to look back through the record and look at who</p> <p>23 attended those meetings. They wouldn't necessarily have</p> <p>24 an interest in that.</p> <p>25 MS. BARNCASTLE: Why is that?</p>	736	<p>1 MR. VOLLBRECHT: That is correct.</p> <p>2 MS. BARNCASTLE: You also testified that you</p> <p>3 received several -- you being agency, and I apologize</p> <p>4 again -- the agency received several requests for</p> <p>5 extensions of the public comment period?</p> <p>6 MR. VOLLBRECHT: That is correct.</p> <p>7 MS. BARNCASTLE: How many requests for</p> <p>8 extensions were received?</p> <p>9 MR. VOLLBRECHT: I can't recall the exact</p> <p>10 number. There were a few, several.</p> <p>11 MS. BARNCASTLE: And was the comment period</p> <p>12 extended?</p> <p>13 MR. VOLLBRECHT: Yes, it was.</p> <p>14 MS. BARNCASTLE: What was the extension? How</p> <p>15 many days was it extended by?</p> <p>16 MR. VOLLBRECHT: It was -- the original was --</p> <p>17 public comment period was 30 days, and the extension was</p> <p>18 for an additional 60 days, for 90 days total.</p> <p>19 MS. BARNCASTLE: Were there any additional</p> <p>20 requests for extension toward the end of the 60-day</p> <p>21 period?</p> <p>22 MR. VOLLBRECHT: I believe there were.</p> <p>23 MS. BARNCASTLE: And why were those not</p> <p>24 granted?</p> <p>25 MR. VOLLBRECHT: That was an upper-level</p>
735	<p>1 MR. VOLLBRECHT: The pit lake is not a dam,</p> <p>2 and the determination on that would not be something</p> <p>3 that would be associated with water rights.</p> <p>4 MS. BARNCASTLE: It's not considered a new</p> <p>5 appropriation of water?</p> <p>6 MR. VOLLBRECHT: That would be, but that's not</p> <p>7 relevant to the discussion of whether or not it is a</p> <p>8 surface water of the state.</p> <p>9 MS. BARNCASTLE: Did the Office of the State</p> <p>10 Engineer at any point in time provide comments to the</p> <p>11 department, written or otherwise, that helped the</p> <p>12 department shape this permit?</p> <p>13 MR. VOLLBRECHT: I do not believe so.</p> <p>14 MS. BARNCASTLE: Let's talk a little bit about</p> <p>15 the public's participation now.</p> <p>16 Your testimony yesterday was that PN-1 was</p> <p>17 issued in 2011; is that correct?</p> <p>18 MR. VOLLBRECHT: That is correct, with the --</p> <p>19 with the first application that was provided.</p> <p>20 MS. BARNCASTLE: And then another PN-1 issued</p> <p>21 in January of 2016?</p> <p>22 MR. VOLLBRECHT: I believe that is correct.</p> <p>23 Yes.</p> <p>24 MS. BARNCASTLE: And then PN-2 was finally</p> <p>25 issued on February 2nd of 2018.</p>	737	<p>1 management decision, I could say.</p> <p>2 But in general, the requests for extension</p> <p>3 were directed at, I believe, concerns about folks saying</p> <p>4 we need more time to review the record to decide whether</p> <p>5 or not we would have a hearing, and the department had</p> <p>6 determined right away that -- that we were going to have</p> <p>7 a hearing on this matter. There was significant public</p> <p>8 interest going back years even. There was never a</p> <p>9 question as to whether or not we would have a hearing.</p> <p>10 And so --</p> <p>11 MS. BARNCASTLE: And you're aware -- are you</p> <p>12 personally aware that the Elephant Butte Irrigation</p> <p>13 District sent an Inspection of Public Records Act</p> <p>14 request to the department?</p> <p>15 MR. VOLLBRECHT: I am familiar with that.</p> <p>16 Yes.</p> <p>17 MS. BARNCASTLE: Are you aware of when that</p> <p>18 Inspection of Public Records Act request was responded</p> <p>19 to?</p> <p>20 MR. VOLLBRECHT: I do not have those dates at</p> <p>21 my fingertips.</p> <p>22 MS. BARNCASTLE: Would you agree that it was</p> <p>23 sometime after the public comment period closed, that</p> <p>24 the documents were finally provided to the EBID?</p> <p>25 MR. VOLLBRECHT: I could say maybe two things.</p>

738	<p>1 Number one is whether or not the department</p> <p>2 filed a response to IPRA's appropriately, in a timely</p> <p>3 manner is certainly not the subject of this -- this</p> <p>4 particular matter. But we did meet all the</p> <p>5 particular -- all the requirements of the Inspection of</p> <p>6 Public Records Act.</p> <p>7 MS. BARNCASTLE: Would you agree that failing</p> <p>8 to respond to a Inspection of Public Records Act request</p> <p>9 prior to the public comment period would impact a</p> <p>10 party's ability to fully and completely comment?</p> <p>11 MR. VOLLBRECHT: I would once again say we</p> <p>12 responded to all Inspection of Public Record Acts in a</p> <p>13 timely manner and in accordance with the law. The</p> <p>14 record in this case became rather voluminous, perhaps</p> <p>15 more so than was necessary, but we included everything</p> <p>16 in the record as appropriate.</p> <p>17 MS. BARNCASTLE: Is the public participation</p> <p>18 the same for all discharge permits no matter what their</p> <p>19 size is?</p> <p>20 MR. VOLLBRECHT: The rules require a minimum</p> <p>21 of a 30-day public comment period.</p> <p>22 MS. BARNCASTLE: So for an application that's</p> <p>23 100 pages long, it is treated the same as an application</p> <p>24 and record that is 18,000 pages?</p> <p>25 MR. VOLLBRECHT: The department typically</p>	740	<p>1 available to any parties who requested to review the</p> <p>2 record.</p> <p>3 MS. BARNCASTLE: And the Elephant Butte</p> <p>4 Irrigation District requested review of the record on</p> <p>5 February 14th; is that correct?</p> <p>6 MR. VOLLBRECHT: I'll take your word for it.</p> <p>7 I don't have that in front of me.</p> <p>8 MS. BARNCASTLE: The public -- I actually just</p> <p>9 lost a mic.</p> <p>10 So I'll end right there.</p> <p>11 MS. ORTH: We have another one we can bring</p> <p>12 you.</p> <p>13 MS. BARNCASTLE: It's most likely a sign from</p> <p>14 above. I'll take it.</p> <p>15 MS. ORTH: All right.</p> <p>16 MS. BARNCASTLE: I'll go ahead and just end</p> <p>17 right there.</p> <p>18 MS. ORTH: All righty.</p> <p>19 Let's see. I've already asked you.</p> <p>20 Mr. Butzier, I'm sorry. Did you have</p> <p>21 something further?</p> <p>22 MR. BUTZIER: Madam Hearing Officer, I have</p> <p>23 some follow-up questions relating to the questioning of</p> <p>24 these witnesses by others.</p> <p>25 MS. ORTH: Okay. Just give me one moment.</p>
739	<p>1 issues public notice for 30 days, as required by the</p> <p>2 rules, and when we do get requests for extensions, we</p> <p>3 consider those on a case-by-case basis. And in this</p> <p>4 case, we did extend the public comment period to 90</p> <p>5 days.</p> <p>6 MS. BARNCASTLE: In your opinion, was 90 days</p> <p>7 sufficient for the public to adequately contribute given</p> <p>8 that the department had over seven years?</p> <p>9 MR. VOLLBRECHT: That public comment period is</p> <p>10 really to -- for the department to determine whether or</p> <p>11 not a public meeting or a public hearing should be held.</p> <p>12 A full review of the record is something that would be</p> <p>13 more in alignment with a proceeding such as today.</p> <p>14 And so in the department, as I stated</p> <p>15 previously, it was quite clear we were going to have a</p> <p>16 hearing on this matter, and that based on, you know, the</p> <p>17 time frame for the hearing, which is now -- where are</p> <p>18 we? September? Back to February, it's been seven</p> <p>19 months. And you're right. The record is very</p> <p>20 extensive.</p> <p>21 MS. BARNCASTLE: So it's been seven months</p> <p>22 since the PN-2 was issued, but it hasn't been seven</p> <p>23 months since the record was made available to the</p> <p>24 public; is that correct?</p> <p>25 MR. VOLLBRECHT: The record has been made</p>	741	<p>1 First, let me ask if there's anyone else in</p> <p>2 the room who has questions of the panel from the</p> <p>3 Groundwater Bureau.</p> <p>4 Mr. Mijal.</p> <p>5 MR. MIJAL: I should go now?</p> <p>6 MS. BARNCASTLE: Madam Hearing Officer, this</p> <p>7 microphone has a low battery and is not going to</p> <p>8 continue to participate today.</p> <p>9 MS. ORTH: All righty.</p> <p>10 So I'll ask Mr. Baca to figure that out,</p> <p>11 either with the assistance of Peter.</p> <p>12 MR. MIJAL: Thanks for the opportunity.</p> <p>13 MS. ORTH: Please go ahead.</p> <p>14 EXAMINATION</p> <p>15 BY MR. MIJAL:</p> <p>16 MR. MIJAL: Thanks for serving the people of</p> <p>17 New Mexico.</p> <p>18 I have three questions, I have two pages,</p> <p>19 and -- first, I have two paragraphs and then the</p> <p>20 question.</p> <p>21 Mr. Vollbrecht, I'm glad you are changing the</p> <p>22 copper code from 25 years past the mine's closure to</p> <p>23 where a bond is set up for 100 years. This way the</p> <p>24 funds are there to monitor and maintain the pollution on</p> <p>25 the closed mine site. Starting the year 2118, taxpayers</p>

742	<p>1 of New Mexico will have to pay for the monitoring and 2 maintenance of the mine's pollution.</p> <p>3 So paragraph two, I appreciate how hard it is 4 to come up with the amount of money needed for this 100 5 years of future work. We can think of 100 years ago and 6 the rate of inflation, but also the changes in 7 technology from 1918.</p> <p>8 Here's the question. I wonder if you could 9 get the bond funded in the mine's gold ounces. The 10 THEMAC web site says they will get 430,000 ounces of 11 gold. Why not have the bond from the mine be given as 12 10 percent of this? New Mexico will have 43 ounces -- 13 43,000 ounces of gold which will fluctuate in price 14 because of inflation over the 100 years. This might be 15 the best long-term way to fund the bond. Question.</p> <p>16 MR. VOLLBRECHT: That's an interesting 17 question. Thank you.</p> <p>18 The -- I guess I'd say a couple of things of 19 clarification.</p> <p>20 The 100-year period actually doesn't start 21 today or doesn't start the day the permit's issued. 22 That will start at the end of mine reclamation. So that 23 may be anywhere from 20 to 30 years from now. And then 24 100 years out into the future is what the financial 25 assurance will be required for.</p>	744	<p>1 contained on site so there will be no run-off pollution.</p> <p>2 Therefore they comply with this part of the 3 code. There will be no run-off pollution. They 4 acknowledge that they will cover the pollution up and 5 there will be no problem after 100 years, which as you 6 just told me will be beyond 2118. There will be no 7 danger to the New Mexico air, earth or watershed.</p> <p>8 Paragraph two. My understanding of their data 9 is that at the end of the 15 years of mine operation 10 this will be the equivalent of a toxic Superfund site. 11 The difference is that the mine will pay for mitigation. 12 As you know, toxic waste is not cleaned up to some 13 magical garbage dump but covered up.</p> <p>14 So this toxic pollution is still there. It's 15 just under three feet of dirt with monsoon diversions 16 and evaporation to get rid of the toxic water. So most 17 of the solids will dry to a toxic powder, and we are 18 assured they won't blow away all over our beautiful 19 state.</p> <p>20 Paragraph three. The mine plans on using 21 1930s technology, which is strip-mining open pit to get 22 the metals. Then they'll contaminate massive amounts of 23 potable water with the bubble process to separate the 24 valued metals. Their site is in an arid, 25 environmentally fragile area with low water for the</p>
743	<p>1 And I think as was pointed out in questions 2 to -- yesterday, we would not -- that 100-year period 3 keeps rolling. I guess that five-year permit rolls into 4 the future until we reach a point where we feel it is no 5 longer necessary, if we reach that point.</p> <p>6 As with respect to the type of financial 7 assurance instrument, typically those come in the form 8 of cash bonds or trusts, those types of things, kind of 9 insurance instruments through a bank or some other 10 financial institute. It would be difficult for the 11 state to manage a pile of gold over the long term.</p> <p>12 I'd say it's certainly an interesting idea, 13 though.</p> <p>14 MR. MIJAL: Yeah. The reason I suggest it is 15 that besides our environment being fragile, our economic 16 system is, and traditionally gold has been more stable.</p> <p>17 So question number two is really three 18 paragraphs.</p> <p>19 So paragraph one. The mine hired engineers to 20 comply with the copper code's need for data. These 21 experts assure us that the 1983 mine's pollution is 22 inert and increasing the scale of the mine by a massive 23 amount will pose no problem. The experts say that the 24 mine will create a huge amount of pollution, and all the 25 pollution that operating the mine will cause will be</p>	745	<p>1 existing uses.</p> <p>2 Currently the water is used for 3 agriculture/ranching, which provides lots of jobs and 4 food. Plus the water is partly owned by the ranchers 5 and farmers in Texas and Mexico which also provides jobs 6 and food.</p> <p>7 Here's the question. So finally my question. 8 I would like the copper code to have another change 9 besides the bonding for 100 years post mine closure. 10 This new change would be that if the mine's management 11 can only use 1930s primitive technology in this 12 sensitive site the mine be put on hold until they can 13 use better technology.</p> <p>14 One example is to use the tunnel boring 15 machine to access the ore body. The engineers would 16 calculate an efficient pathway to the ore body, and only 17 a minimum of overburden would be produced for the waste 18 rock stockpile, thus less volume of pollution.</p> <p>19 Once the ore body is reached, use a nonwater 20 way to separate the ore. Paradoxically this nonwater 21 process can be more efficient at getting more desired 22 metals out of the ore. This could include having the 23 tailings cleaned of poisons which to certain uses are 24 needed in their manufacturing processes. Thus the 25 tailings are not soaked with precious potable water, and</p>

<p style="text-align: right;">746</p> <p>1 the mine has more benefits for the people who need 2 metals and chemicals. 3 Also, the tailings are less toxic and without 4 the bubble water take up less volume. There is less for 5 the Superfund toxic waste to cover up for 100 years. 6 The open pit is a vector of pollution, as 7 well, and this proposal could mean that the existing pit 8 could be filled in with the waste rock stockpile from 9 the toe. 10 So here is the question. Restate the 11 question. Could the copper code also be changed so that 12 modern, 2018 mining technology be used so that metals 13 would be extracted without using scarce water, and also 14 this would be generating substantially less toxic waste? 15 And if this mine is not available, maybe just put the 16 mine on hold until it is available. You know, 17 technology is just massively increasing. 18 So my question. 19 MR. VOLLBRECHT: I can re -- try and restate 20 that. The question is are they using the most 21 appropriate methods for mining and processing the ore? 22 Okay. 23 MR. MIJAL: The question is based -- I don't 24 know if those are even available right now. Therefore 25 they should be put on hold until there are methods which</p>	<p style="text-align: right;">748</p> <p>1 I'll probably leave it at that. 2 MR. MIJAL: Well, you do have a lot of power. 3 So it's a possibility. I -- they have to meet a 4 criteria that maybe the technology is not going to be 5 here for five years. 6 So third question is the THEMAC web site says 7 30,000 pounds a day of mine powdered metals, gold, 8 silver, molybdenum, copper, will be trucked to the 9 railroad station Rincon -- Rincon, New Mexico. These 10 metals will go then by rail to the Mexican port of 11 Guaymas. The web site doesn't say where the metals will 12 then sail to. 13 Maybe to the mine owners in Australia. Maybe 14 have the metals further processed in China where the 15 labor is cheaper and the environmental protection 16 pollution laws are not -- laws are not as strict. Then 17 these gold ounces can be shipped to the New Mexico 18 Treasury as the bond as is proposed above. 19 My question is why not amend the copper code 20 to be more than protecting the physical environment? We 21 could amend the copper code to have these jobs in New 22 Mexico, not in Australia or China. This is also in 23 accord with the NMCC's ideal of providing jobs to the 24 Jicarilla Nation and the impoverished, unemployed people 25 here in Sierra County.</p>
<p style="text-align: right;">747</p> <p>1 don't use potable water and don't use as much pollution, 2 use minimal overburden, minimal tailings. And at this 3 point, the technology may not exist, but as you know, 4 it's almost like a straight line of technology. In five 5 years, they may actually get more money by doing it with 6 technology that may not exist. 7 MR. VOLLBRECHT: Yeah. Mr. Mijal, I -- you've 8 kind of strayed from my area of expertise with respect 9 to the mining engineering and how materials are 10 processed. 11 They are using kind of tried and true methods, 12 certainly, and there have been improvements over time in 13 that. They did do a feasibility study to evaluate 14 different processing techniques, especially with respect 15 to the tailing impoundment, and it was determined that 16 some of those other methods were not feasible. And it 17 is in the economic feasibility study they couldn't 18 operate the mine at a loss. 19 But once again, we're not -- my job is to 20 ensure that they do -- if they do mine, that they mine 21 in accordance with the regulations as they exist today, 22 which are required to ensure protection of water 23 quality. There are a lot of other moving parts as well 24 as other permits that they need to acquire before they 25 can mine.</p>	<p style="text-align: right;">749</p> <p>1 So that -- yeah. To amend the codes so that 2 we have jobs. We can process the metal, not just ship 3 it to Guaymas. 4 MR. VOLLBRECHT: As I understand it, in 5 Guaymas there is a -- there is a smelter, which is where 6 that concentrate gets processed. There is no smelter in 7 New Mexico. There used to be a smelter in Hurley that 8 serviced the copper mines there. There was another 9 smelter in Hidalgo. Those have been closed. 10 I would expect that the process to permit a 11 smelter in New Mexico would be at least as controversial 12 an idea as this process, if not more. We would need a 13 similar round of permits. 14 They're taking advantage of an existing 15 facility in another place. 16 MR. MIJAL: Well, a summary is, number one, 17 change the copper code so the time the mine pays for is 18 100 years of monitoring and maintenance, which you are 19 doing. 20 Two, since the mine's bond has to fund 100 21 years of the future which has many unknown variables, 22 the bond could be done in 43 ounces of gold which goes 23 to New Mexico Treasury. 24 Three, the copper code is changed to state 25 that when a New Mexico mine is in a fragile, arid</p>

750	<p>1 environment, then 1930s primitive, polluting techniques                  2 are not allowed. If the technology is not yet                  3 available, the mine must wait until the inventors                  4 develop it.                  5 Four, New Mexico Copper Corporation is                  6 admirable in giving jobs to the Jicarilla Nation and                  7 local impoverished people in Sierra County. Their web                  8 site implies that there are more jobs from New Mexico's                  9 wealth that could be done by these above people. You                  10 just told me that you don't want to put a smelter in New                  11 Mexico, which I guess is your power.                  12 MR. VOLLBRECHT: That's not my choice. If                  13 someone came to me and proposed to build a smelter, I                  14 would show them the rules and require them to follow                  15 that process with respect to protection of water quality                  16 for construction and operation of the smelter.                  17 MS. ORTH: Mr. Mijal, do you have other                  18 questions?                  19 MR. MIJAL: Well, just a closing statement.                  20 The New Mexico Department of Environment is                  21 charged with protecting New Mexico's beautiful lands.                  22 The above changes to the copper code help protect our                  23 state in a more comprehensive way of protecting our                  24 lands by lessening pollution from 1930s technology.                  25 Thank you.</p>	752	<p>1 go into the pit, there's the feature that was described                  2 over the last couple of days as the open pit surface                  3 drainage area.                  4 That includes the area where surface water                  5 run-off would flow into the pit, and that will all come                  6 from reclaimed areas. And so that would be technically                  7 for the most part clean stormwater that would flow into                  8 that pit.                  9 MS. BLAIR: And the water that is being                  10 utilized during the mine, the processing water, the                  11 contaminated water, will it go to the pit? If not,                  12 where does it go?                  13 MR. VOLLBRECHT: Once the mine is up and                  14 running, water -- it becomes somewhat of a closed loop,                  15 and any water that gets lost would be lost through                  16 evaporation and then would be replenished from either                  17 pumping of the pit or pumping of the supply wells.                  18 At closure, the water that's in the process,                  19 it would all go into probably the final resting spot,                  20 that's going to be the tailing impoundment, where it                  21 would evaporate off. And as part of their Closure Plan,                  22 they have active evaporation for some period of time                  23 until it's reduced to a low enough volume that it can be                  24 passively evaporated.                  25 MS. BLAIR: Right.</p>
751	<p>1 MS. ORTH: All right. Thank you.                  2 When I ask folks if they have questions, I'm                  3 hoping that they can focus on questions and not sort of                  4 additional public comments.                  5 Are there other questions of the panel from                  6 the Groundwater Bureau?                  7 Ms. Blair. Dr. Blair.                  8 EXAMINATION                  9 BY MS. BLAIR:                  10 MS. BLAIR: I'm just trying to kind of get                  11 this clear in my head.                  12 At the closing of the mine, the open pit                  13 will -- which has been pumped to keep it dry because it                  14 is in contact with the groundwater, it will -- the pump                  15 will be removed, it will be allowed to fill, other                  16 waters from the site will be diverted into it as well in                  17 order to bring its level up? Or is it simply going to                  18 be a passive fill?                  19 MR. VOLLBRECHT: The rapid fill that's been                  20 discussed --                  21 MS. BLAIR: Yes.                  22 MR. VOLLBRECHT: -- it's my understanding that                  23 the supply wells, which are some number of miles to the                  24 east of the facility, will be used to do the rapid fill                  25 of the pit lake, which with respect to waters that will</p>	753	<p>1 And the evaporation process, of course,                  2 removes water and some volatiles but leaves all sediment                  3 and all contaminants behind. So that will be dealt with                  4 on that tailings pile.                  5 MR. VOLLBRECHT: That is correct.                  6 MS. BLAIR: All the -- presumably at some                  7 point, the pit will achieve some sort of hydrostatic                  8 stability with whatever is coming in as opposed to                  9 what's evaporating out, since the evaporation will --                  10 just like with a straw in a Coke, the evaporation will                  11 create a drawing in in order to maintain whatever that                  12 hydrostatic stability is.                  13 So the pit will continue to draw off of                  14 groundwater in order to maintain whatever is in it. And                  15 whatever comes into the groundwater or what is already                  16 in the pit in the way of contaminants again as the water                  17 leaves.                  18 So over time, we would look at that pit water                  19 degenerating in quality?                  20 MR. VOLLBRECHT: That is correct. And I                  21 testified to that yesterday.                  22 MS. BLAIR: Right. I was just wanting to make                  23 sure that that was happening.                  24 And that's in perpetuity.                  25 MR. VOLLBRECHT: That's correct.</p>

<p style="text-align: right;">754</p> <p>1 MS. BLAIR: And it's an enormous, 200-acre  2 lake that's not covered or in any way protected from  3 waterfowl or anything else coming in to utilize it and  4 then engage with that gradually worsening, more  5 contaminated water in perpetuity.  6 MR. VOLLBRECHT: The geochemical modeling done  7 with respect to the pit lake showed that, as you  8 indicated, the water quality does degrade over time.  9 It's not -- it's not how -- how can I say it -- it's not  10 extremely poor quality water. It's not -- because of  11 the nature of this ore body, it's not a situation that  12 we see at some of the other pit lakes where you have  13 very low pH water that's really heavily laden with  14 metals.  15 At some point in the future, the modeling  16 indicates that there could be some exceedances of  17 standards of one metal standard that was shown to be  18 exceeded in the geochemical modeling.  19 MS. BLAIR: That's selenium.  20 MR. VOLLBRECHT: My -- sorry.  21 MS. BLAIR: Sorry.  22 MR. VOLLBRECHT: My suggestion -- that is  23 correct, it's selenium -- would be that in the event  24 that were to happen, that we would address that at that  25 time.</p>	<p style="text-align: right;">756</p> <p>1 MR. VOLLBRECHT: Yes. That plan is intended  2 to ensure that the liner system is installed correctly  3 and that it is free of defects, and then it is properly  4 tested to ensure that it is free of defects so that once  5 it goes into production we do not have leaks and  6 discharges to groundwater, minimized to the best of our  7 capabilities.  8 MS. BROWNE: Can you explain any more about  9 what you will require from New Mexico Copper Corporation  10 in their plan?  11 MR. REID: I can try that. Yeah.  12 The Copper Rule has a detailed description of  13 what is required in the plan, and it's referenced in  14 Section 20.6.7.17C.(1)(b). And it -- there's 10 -- 10  15 different components to that plan.  16 Would you like me to go through them or -- you  17 know, there's an inspection protocol.  18 There's a -- they need to identify people  19 responsible for overseeing the CQA/CQC program, and that  20 person shall be a licensed New Mexico professional  21 engineer experienced in liner system construction and  22 installation.  23 There needs to be identification of field and  24 laboratory testing equipment the facility has proposed  25 to be used, calibration methods.</p>
<p style="text-align: right;">755</p> <p>1 MS. BLAIR: And the selenium is a very major  2 significance to waterfowl in particular.  3 MR. VOLLBRECHT: Understood. Yes.  4 MS. BLAIR: So that could become an issue.  5 MR. VOLLBRECHT: I -- I think there could  6 be --  7 MS. BLAIR: So at a certain level, it's a sort  8 of perpetual pollution machine that will just gradually  9 skid downhill.  10 MR. VOLLBRECHT: The modeling indicates that  11 the water quality will degrade over time.  12 MS. BLAIR: Okay. Thank you.  13 MS. ORTH: All right.  14 Ms. Browne.  15 And let me just remind folks speak one at a  16 time, if you would.  17 MS. BROWNE: Candace Browne.  18 EXAMINATION  19 BY MS. BROWNE:  20 MS. BROWNE: In your testimony yesterday, you  21 said that you were going to be requiring a Construction  22 Quality Assurance Plan, correct?  23 MR. VOLLBRECHT: That is correct. Yes.  24 MS. BROWNE: Could you explain why that's  25 important? And what is it for?</p>	<p style="text-align: right;">757</p> <p>1 Now I'm just reading.  2 The next part is the procedures for observing  3 and testing the liner, subgrade liner bedding and other  4 liner system construction material.  5 Part 5 is a protocol for verification of any  6 manufacture's quality control testing and procedures.  7 Part 6 is the procedures for reviewing  8 inspection test results and laboratory field sampling  9 test results.  10 Part 7 is the actions to be taken to replace  11 or repair liner material, subgrade liner bedding or  12 other liner system construction materials should  13 deficiencies be identified.  14 Part 8, procedures for seaming synthetic  15 liners.  16 Part 9, reporting procedures for all  17 inspections of test data.  18 And part 10 is the submission of a CQA/CQC  19 report.  20 So that's what we'd be looking for in a  21 CQA/CQC plan that would be submitted 90 days prior to  22 installation of any liner system required.  23 MS. BROWNE: I might have missed it.  24 Is there something in there about the resin  25 that they -- will be used and choosing the correct resin</p>

758	<p>1 for the appropriate use for the place? Is that in  2 there? Did I miss that?  3 MR. VOLLBRECHT: Ms. Browne, it doesn't get  4 quite into that kind of specificity. There's -- I'm not  5 entirely sure what you mean by the resin. The -- the  6 materials that will be used, we would make sure that  7 they are appropriate for the -- for the application.  8 MS. BROWNE: Is that in your -- is that in the  9 permitting documentation?  10 MR. VOLLBRECHT: That -- the rule and the  11 permit conditions don't get into that kind of  12 specificity. That would -- that specificity would be in  13 the plan itself. And the plan would be very detailed  14 and, you know, a very voluminous document.  15 MS. BROWNE: Okay. Thank you.  16 MS. ORTH: Thank you, Ms. Browne.  17 Other questions of the Ground Water Quality  18 Bureau panel?  19 Okay.  20 Oh. I'm sorry. Dr. Blair, I'm sorry. Folks  21 can just go once.  22 Mr. Butzier.  23 MR. BUTZIER: Thank you, Madam Hearing  24 Officer.  25</p>	760	<p>1 groundwater flow direction at Little Rock is into  2 Tyrone. It falls within the umbrella of the Tyrone  3 Mine. Something specific to Little Rock could go away  4 at some point in time, but the larger, long-term  5 monitoring care associated with the Tyrone Mine would  6 eventually encompass that.  7 MR. BUTZIER: And would you agree with me that  8 each mine site is -- has unique characteristics in terms  9 of things like drawdown periods and that monitoring is  10 something that is appropriately evaluated based upon the  11 science for a given property?  12 MR. VOLLBRECHT: Certainly, yes.  13 MR. BUTZIER: And when you indicated to  14 Mr. de Saillan that it would be your expectation that at  15 each five-year renewal you would continue to require 100  16 years of monitoring, that wasn't any kind of  17 predetermination by the agency, you would look -- at the  18 time of the closure and the completion of the  19 reclamation work, you would evaluate the data and  20 science that you have at that time and make a judgment  21 as to what would be appropriate; is that correct?  22 MR. VOLLBRECHT: That is correct, yes.  23 MR. BUTZIER: And the same would be true at  24 each five-year period?  25 MR. VOLLBRECHT: That is correct. Yes.</p>
759	<p>1 CROSS EXAMINATION  2 BY MR. BUTZIER:  3 MR. BUTZIER: Mr. Vollbrecht, I have a  4 follow-up question relating to some questions that  5 Mr. de Saillan asked of you relating to the 100 years of  6 monitoring.  7 Am I -- am I understanding that NMED has  8 concluded that 100 years of monitoring is appropriate at  9 copper sites?  10 MR. VOLLBRECHT: Yes. That would be a fair  11 statement.  12 MR. BUTZIER: And what's the -- what's the  13 monitoring period for the Little Rock Mine, Freeport's  14 Little Rock Mine, postclosure?  15 MR. VOLLBRECHT: I can't pull that off the top  16 of my head, but it's associated with the Tyrone Mine,  17 which effectively at the Tyrone Mine there will be  18 pumping and treating groundwater in perpetuity. So the  19 Little Rock Mine is a component of the Tyrone Mine, and  20 so it would fall under those same requirements.  21 MR. BUTZIER: And would it surprise you if  22 it -- if the monitoring period for Little Rock is 30  23 years?  24 MR. VOLLBRECHT: The Little Rock is a peculiar  25 case. As I said, it's a satellite mine to Tyrone. The</p>	761	<p>1 MR. BUTZIER: Okay. Thank you.  2 Ms. Barncastle asked you about some of the  3 timing of inspection requests and when those were  4 responded to in relation to extensions of time and the  5 like.  6 Do you recall that?  7 MR. VOLLBRECHT: Could you repeat that? I'm  8 sorry.  9 MR. BUTZIER: Do you recall the questioning  10 from Ms. Barncastle relating to extensions of time for  11 the comment period and inspection of public records  12 requests and when those were responded to?  13 MR. VOLLBRECHT: Yes.  14 MR. BUTZIER: Does NMED post on its web site  15 materials from a particular project at any point?  16 MR. VOLLBRECHT: Well, we do in the case of  17 when we have a hearing request. We have a lot of sites  18 that fall under our purview, over 700, and so we don't  19 post them all. We couldn't post them all without some  20 kind of a legislative appropriation to digitize our  21 records.  22 MR. BUTZIER: Do you know whether information  23 on the Copper Flat was posted on NMED's web site?  24 MR. VOLLBRECHT: It was. I believe it was  25 posted on July 10th or July 9th.</p>

762	<p>1 MR. BUTZIER: Okay.</p> <p>2 And item number 410 in the index to the</p> <p>3 administrative record refers to EBID comments regarding</p> <p>4 the Copper Flat Mine on May 3rd, 2018.</p> <p>5 That was within the extended comment period,</p> <p>6 correct?</p> <p>7 MR. VOLLBRECHT: Yes. That is correct.</p> <p>8 MR. BUTZIER: Okay.</p> <p>9 Mr. Reid, I'd like to return to the topic of</p> <p>10 the scraping of alluvium or colluvium materials in</p> <p>11 relation to the Waste Rock Stockpile Number 3.</p> <p>12 MR. REID: Sure.</p> <p>13 MR. BUTZIER: Do you recall the line of</p> <p>14 questioning from Ms. Barncastle on that topic?</p> <p>15 MR. REID: I do.</p> <p>16 MR. BUTZIER: Is it your understanding that --</p> <p>17 looking back to the John Shomaker &amp; Associates slide 36,</p> <p>18 that the materials you identified as daf on that</p> <p>19 slide -- is it your understanding that that's alluvium</p> <p>20 material?</p> <p>21 MR. REID: No, it's not. That -- no.</p> <p>22 MR. BUTZIER: And in fact, the slide itself</p> <p>23 refers to it as artificial fill, correct?</p> <p>24 MR. REID: That is correct.</p> <p>25 MR. BUTZIER: And that's the area that the --</p>	764	<p>1 that's identified in yellow is what they've agreed to</p> <p>2 scrape.</p> <p>3 MR. BUTZIER: Thank you.</p> <p>4 Dr. Marcoline, I'd like to clear up some of</p> <p>5 the questioning from Mr. de Saillan relating to the</p> <p>6 andesite.</p> <p>7 And in particular, can I draw your attention</p> <p>8 to your page 5 of Exhibit 4 that contains your direct</p> <p>9 testimony.</p> <p>10 MR. MARCOLINE: Sure. I don't have that in</p> <p>11 front of me, but I can remember it.</p> <p>12 MR. BUTZIER: Okay. Well, I can probably walk</p> <p>13 you through it.</p> <p>14 I think the -- there's a statement in there</p> <p>15 that the -- where you're talking about a commenter and</p> <p>16 you indicate the commenter is in error about the</p> <p>17 hydraulic conductivity of the andesite. In that Table</p> <p>18 5.2 -- wells in Table 5.2 that exceed 10 to the</p> <p>19 minus-5 centimeters per second are not completed in the</p> <p>20 andesite bedrock, rather in the quartz monzonite.</p> <p>21 Do you recall that testimony?</p> <p>22 MR. MARCOLINE: Yes, I do.</p> <p>23 MR. BUTZIER: And what we're referring to in</p> <p>24 terms of Table 5.2 and then in the next sentence Table</p> <p>25 6.1, those are tables not from the Stage 1 Abatement</p>
763	<p>1 Ms. Barncastle is wondering why it's not being scraped</p> <p>2 off, correct?</p> <p>3 MR. REID: Correct.</p> <p>4 MR. BUTZIER: Now --</p> <p>5 MS. BARNCASTLE: Objection, Your Honor. That</p> <p>6 mischaracterizes completely what my question was.</p> <p>7 I referred to the area in yellow, not the area</p> <p>8 in gray marked daf. The area in yellow is marked Qaf,</p> <p>9 and it's -- and also Qamh. Both of them are alluvial</p> <p>10 fan and alluvium.</p> <p>11 MR. BUTZIER: Okay. Well, I'll withdraw that</p> <p>12 question.</p> <p>13 Thanks for that clarification.</p> <p>14 MS. ORTH: Thank you.</p> <p>15 MR. BUTZIER: So can you pull that slide 36</p> <p>16 up, please, Mr. Reid?</p> <p>17 MR. REID: I have something similar up. Yeah.</p> <p>18 MR. BUTZIER: So on my map, the yellow area</p> <p>19 that Ms. Barncastle just described is correctly viewed</p> <p>20 as alluvium, correct?</p> <p>21 MR. REID: That is correct.</p> <p>22 MR. BUTZIER: And that's the material that New</p> <p>23 Mexico Copper Corporation has agreed to scrape off down</p> <p>24 to bedrock, correct?</p> <p>25 MR. REID: That is correct. All the material</p>	765	<p>1 materials, but rather from the model of groundwater flow</p> <p>2 in the Animas Uplift and Palomas Basin, correct?</p> <p>3 MR. MARCOLINE: That is correct.</p> <p>4 MR. BUTZIER: Okay.</p> <p>5 And so you'd certainly want to go back and</p> <p>6 review that again before you question your conclusion in</p> <p>7 this regard.</p> <p>8 MR. MARCOLINE: Certainly.</p> <p>9 MR. BUTZIER: Also, the exhibit Mr. de Saillan</p> <p>10 addressed that's Ranches Exhibit 39, which has a table</p> <p>11 that he drew your attention to, and he specifically</p> <p>12 focused on the first four -- I guess I would say</p> <p>13 completions, because there are actually two wells</p> <p>14 completed at two separate intervals each, correct?</p> <p>15 MR. MARCOLINE: That is correct.</p> <p>16 MR. BUTZIER: And the first two of those items</p> <p>17 are the two completions in Wells GWQ96-22A and 22B.</p> <p>18 So it's one well, two completions, correct?</p> <p>19 MR. MARCOLINE: That is correct.</p> <p>20 MR. BUTZIER: And when you indicate in your</p> <p>21 testimony that well testing data presented in the Stage</p> <p>22 1 Abatement Plan indicate the two wells in the andesite,</p> <p>23 and then you list 96 -- GWQ96-22 and GWQ96-23 tested at</p> <p>24 6 times 10 to the 9 -- negative-9 centimeters per second</p> <p>25 and 9.5 times 10 to the minus-7 centimeters per second</p>



766	<p>1 respectively -- do you recall that sentence, or can you 2 find it?</p> <p>3 MR. MARCOLINE: Yes, I do.</p> <p>4 MR. BUTZIER: Is it possible that your 5 testimony just was a misstatement to refer to the Well 6 GWQ96-23 and that, in fact, what you were intending to 7 refer to were the two interviews -- or two intervals in 8 the completion of Well GWQ96-22?</p> <p>9 MR. MARCOLINE: That -- that is possible. I'd 10 have to go back and look at it.</p> <p>11 MR. BUTZIER: Okay. Thank you.</p> <p>12 And you made a number of references to 13 literature in terms of leak analyses related to liners, 14 correct?</p> <p>15 MR. MARCOLINE: That is correct.</p> <p>16 MR. BUTZIER: And you've referred several 17 times to -- excuse me -- I'm not sure how you pronounce 18 it, or I'm not even sure how it's correctly pronounced, 19 but Giroud and Bonaparte; is that correct?</p> <p>20 MR. MARCOLINE: That is correct.</p> <p>21 MR. BUTZIER: And that's the -- that's the 22 reference material that was used by both John Shomaker &amp; 23 Associates and SRK in considering the potential for 24 leakage from the lining at the tailings facility; is 25 that correct?</p>	768	<p>1 the -- of your defect, you look at your hydraulic 2 conductivity of your upper material, your tailing, you 3 look at the hydraulic conductivity of your material 4 below the tailing -- well, the liner, and that's where 5 you divide by your perm -- or basically divide by, I 6 think, essentially the head in the liner or head in the 7 tailing above the liner plus the head in -- or minus the 8 head in the liner below the liner. I'm sorry. The head 9 in the material below the liner.</p> <p>10 So essentially it's Darcy's law looking at -- 11 but it's taking account the different hydraulic 12 conductivities in material.</p> <p>13 MR. BUTZIER: Thank you.</p> <p>14 And based upon what your testimony was just 15 now on that point, is it fair to say that the 16 assumptions as to the potential leak rate from the liner 17 in this case that was taken into account by New Mexico 18 Copper's consultants was reasonable and was taking into 19 account sophisticated, more recent information than the 20 earlier Giroud and Bonaparte materials?</p> <p>21 MR. MARCOLINE: That is correct.</p> <p>22 I will say I did qualify that in that the 23 QA/QC plan is essential because the same authors have 24 shown that with newer testing than was around 25 years 25 ago, newer testing than was around in 2010 even is</p>
767	<p>1 MR. MARCOLINE: Not exactly.</p> <p>2 MR. BUTZIER: Okay.</p> <p>3 MR. MARCOLINE: That's -- that reference that 4 was there, the 1989 reference, was -- excuse me. Pardon 5 me. That 1989 reference was in the SRK work. It was 6 also, I believe, in New Mexico Environmental Law 7 Center's direct testimony that was submitted -- or in 8 the NOI, I should say.</p> <p>9 The -- there was -- there has also been 10 reference to other work by the same authors, by Giroud 11 himself in 1987 and Bonaparte himself in 1989.</p> <p>12 There was also -- and it's pretty likely to 13 assume that these authors are publishing pretty 14 similar -- and I did look at all three of those 15 documents. It's pretty similar. Those equations 16 were -- it's basically Darcy's law, looking at a simple 17 radius and assuming X number of defects over an acre.</p> <p>18 New Mexico Copper did something different. 19 They took that -- the Bonaparte, I believe, '89 20 reference and modified it with a more recent 2010, I 21 believe, reference by Coffey, which essentially is a 22 little more sophisticated approach. It's still 23 basically Darcy's law analytical solution. Fairly 24 simple.</p> <p>25 Basically, you know, you look at the radius of</p>	769	<p>1 showing that these can be significantly decreased. The 2 same authors also discussed that most of these barriers 3 are not seams, but mostly defects, puncture defects.</p> <p>4 MR. BUTZIER: And as I understand 5 Mr. Vollbrecht's testimony, that QA/QC work is going to 6 be done at this facility.</p> <p>7 MR. MARCOLINE: I believe so. Yes.</p> <p>8 MR. BUTZIER: Okay. I have no further 9 questions.</p> <p>10 MS. ORTH: All right. Thank you.</p> <p>11 Mr. Knight, do you have any redirect?</p> <p>12 MR. KNIGHT: Madam Hearing Officer, I do not.</p> <p>13 MS. ORTH: All right. Thank you.</p> <p>14 So we will excuse the bureau --</p> <p>15 MS. BARNCASTLE: Madam Hearing Officer.</p> <p>16 MS. ORTH: Oh.</p> <p>17 MS. BARNCASTLE: I do have two follow-up 18 questions --</p> <p>19 MS. ORTH: Okay.</p> <p>20 MS. BARNCASTLE: -- following Mr. Butzier.</p> <p>21 MS. ORTH: Go ahead.</p> <p>22 MS. BARNCASTLE: Thank you.</p> <p>23</p> <p>24</p> <p>25</p>

770	<p>1 FURTHER RECROSS EXAMINATION</p> <p>2 BY MS. BARNCASTLE:</p> <p>3 MS. BARNCASTLE: Mr. Reid, I'd like to go back</p> <p>4 to the scraping of the alluvium.</p> <p>5 My understanding is that Waste Rock Stockpile</p> <p>6 3 is an existing waste rock stockpile; is that correct?</p> <p>7 MR. REID: There's two Waste Rock Stockpile</p> <p>8 3s. There's an Existing Waste Rock Stockpile 3, and</p> <p>9 there's a proposed Waste Rock Stockpile 3.</p> <p>10 MS. BARNCASTLE: And my understanding is that</p> <p>11 the existing one is the one that sits on the alluvium</p> <p>12 that will be scraped; is that correct?</p> <p>13 MR. VOLLBRECHT: Let me try and clarify this.</p> <p>14 It might be best to look at that figure that shows gray</p> <p>15 material which is that waste rock stockpile in question</p> <p>16 and yellow material which is alluvium.</p> <p>17 MS. BARNCASTLE: The slide 36 from the JSAI?</p> <p>18 MR. VOLLBRECHT: I'll trust that you're</p> <p>19 correct on that.</p> <p>20 The yellow material will be scraped. The gray</p> <p>21 material will not be scraped. And I think where the</p> <p>22 confusion is coming in is that the gray material does</p> <p>23 overlap onto some old alluvium. The old alluvium that</p> <p>24 is underneath the gray material will not be scraped.</p> <p>25 MS. BARNCASTLE: And so there is -- there are</p>	772	<p>1 Thank you very much, gentlemen.</p> <p>2 And let's take a 15-minute break.</p> <p>3 (Proceedings in recess from 10:54 a.m. to</p> <p>4 11:12 a.m.)</p> <p>5 MS. ORTH: We are back after our morning</p> <p>6 break, and we do have a gentleman who has asked to make</p> <p>7 public comment. So we'll do that before we go back to</p> <p>8 the technical case.</p> <p>9 We do have an interpreter with us throughout</p> <p>10 the entire hearing. She's been here all morning. We</p> <p>11 now have more people in the room than we did when we</p> <p>12 began this morning so we'll have a statement from the</p> <p>13 interpreter.</p> <p>14 Ma'am.</p> <p>15 THE INTERPRETER: Good morning.</p> <p>16 If you would like interpreter services into</p> <p>17 Spanish, please let me know. I'll be making an</p> <p>18 abbreviated announcement as we have several people here</p> <p>19 who were here previously.</p> <p>20 (In Spanish.)</p> <p>21 Everybody is still good in English?</p> <p>22 No requests.</p> <p>23 MS. ORTH: Thank you very much.</p> <p>24 Sir, we'll ask you for your name and then to</p> <p>25 be sworn in.</p>
771	<p>1 lines for Waste Rock Stockpile 3 that overlap onto the</p> <p>2 yellow material.</p> <p>3 And my question is is the waste rock stockpile</p> <p>4 that's existing going to be removed so that the alluvium</p> <p>5 can be scraped from underneath it?</p> <p>6 MR. VOLLBRECHT: No. The material that's</p> <p>7 currently exposed as alluvium will be removed. The</p> <p>8 alluvium that is sitting beneath the existing waste rock</p> <p>9 stockpile will not be removed.</p> <p>10 MS. BARNCASTLE: That is finally what I was</p> <p>11 after. Okay. I finally have the answer. Thank you.</p> <p>12 The last follow-up question I have is,</p> <p>13 Mr. Vollbrecht, you just testified that the</p> <p>14 administrative record for this proceeding, Copper Flat's</p> <p>15 proceeding, was put on the NMED web site on July 10th,</p> <p>16 but you did not say a year.</p> <p>17 What year was that?</p> <p>18 MR. VOLLBRECHT: That was 2018.</p> <p>19 MS. BARNCASTLE: Thank you.</p> <p>20 Nothing further.</p> <p>21 MS. ORTH: All right.</p> <p>22 Mr. Knight?</p> <p>23 MR. KNIGHT: Nothing further.</p> <p>24 MS. ORTH: Okay. Great.</p> <p>25 So we will excuse the bureau panel.</p>	773	<p>1 MR. BYRD: Thank you.</p> <p>2 My name is Robert Byrd. I'm from Las Cruces.</p> <p>3 MS. ORTH: How do you spell that?</p> <p>4 MR. BYRD: B-Y-R-D.</p> <p>5 ROBERT BYRD</p> <p>6 having been first duly sworn or affirmed, gave</p> <p>7 public comment as follows:</p> <p>8 PUBLIC COMMENT</p> <p>9 MS. ORTH: Go ahead.</p> <p>10 MR. BYRD: Thank you. I appreciate this</p> <p>11 opportunity to address this group.</p> <p>12 I'm a retired engineer living in Las Cruces.</p> <p>13 My family is from the old Hot Springs area, which is</p> <p>14 now, of course, T or C. My father worked in mining in</p> <p>15 New Mexico at Magdalena and later Grants before moving</p> <p>16 out of state. Actually my great grandfather was the guy</p> <p>17 that built Elephant Butte Dam back about 100 years ago.</p> <p>18 I would like to commend New Mexico Copper for</p> <p>19 their planned mine at Copper Flat. New Mexico has</p> <p>20 mineral resources that can and should be developed in a</p> <p>21 sustainable fashion that are entirely compatible with</p> <p>22 other important economic activities, farming, tourism,</p> <p>23 manufacturing as well as high-tech.</p> <p>24 The technical plan that New Mexico Copper has</p> <p>25 presented details how much water it will use and how it</p>

<p style="text-align: right;">774</p> <p>1 will be managed. This isn't rocket science. This isn't  2 exotic, untried or especially expensive technology, but  3 it is modern and represents the state-of-the-art in an  4 industry that deals with the same concerns all over the  5 world.</p> <p>6 I made some quick comparisons with the water  7 that will be used at Copper Flat, which is equivalent to  8 about the same amount of water consumed by a large pecan  9 farm covering two sections of farmland. But the social  10 benefit return on the water use in mining vastly dwarfs  11 that in pecan farming, in terms of good-paying jobs,  12 local business rejuvenation, tax revenues and potential  13 follow-on support industries.</p> <p>14 And I'd just like to reiterate that I strongly  15 support Mr. Smith and his company, and I hope that this  16 region will soon see the benefit of this type of  17 operation.</p> <p>18 Thank you very much.</p> <p>19 MS. ORTH: Okay. Thank you, Mr. Byrd.</p> <p>20 If you're willing to leave your written  21 statement with the court reporter, she can refer to it.</p> <p>22 Before we get back to the technical case, is  23 there anyone else here who has not yet made public  24 comment who would like to offer public comment at this  25 time?</p>	<p style="text-align: right;">776</p> <p>1 also a rational one and a reasonable one. It is based  2 on the facts, and it is borne out by experience.</p> <p>3 As our witnesses will testify, there is a  4 significant likelihood that the mining operations will  5 result in water contamination in excess of New Mexico  6 water quality standards to the detriment of the  7 environment. There is a significant likelihood that  8 mining operations will reduce the flow of water around  9 the mine, again to the detriment of the environment, and  10 the mining operations will pose an undue risk to  11 property.</p> <p>12 Despite the presentations that you heard the  13 other day from representatives of New Mexico Copper  14 Corporation, this application for a groundwater  15 Discharge Permit is seriously flawed in several ways.</p> <p>16 The andesite bedrock underlying the proposed  17 waste rock piles has not been well characterized.</p> <p>18 A very real possibility of substantial leaks  19 from the tailings and other mine facilities has not been  20 fully evaluated.</p> <p>21 The proposed groundwater monitoring system,  22 even with the addition of the two wells that the  23 Environment Department has proposed -- and we appreciate  24 the Environment Department doing so -- is nevertheless  25 inadequate. It's insufficient to detect potential major</p>
<p style="text-align: right;">775</p> <p>1 I see no hands.</p> <p>2 I believe we're moving to your case,  3 Mr. de Saillan.</p> <p>4 MR. DE SAILLAN: Thank you, Madam Hearing  5 Officer.</p> <p>6 Good morning.</p> <p>7 I'll proceed with an opening statement.</p> <p>8 Again I'm Charles de Saillan with the New  9 Mexico Environmental Law Center, and I'm representing  10 the Turner Ranch Properties which owns the Ladder Ranch,  11 and I'm also representing the Hillsboro Pitchfork Ranch.</p> <p>12 Madam Hearing Officer, as you will see, the  13 Ladder Ranch borders the Copper Flat Mine permit  14 boundary immediately to the north and to the east, and  15 the Hillsboro Pitchfork Ranch borders the Copper Flat  16 Mine immediately to the west.</p> <p>17 These ranches oppose the issuance of the  18 groundwater Discharge Permit for the Copper Flat Mine at  19 least in its current form. And they oppose the mine  20 permit not because they are unfriendly neighbors, but  21 because they fear the consequences that the mining  22 operations will have on the water resources on their  23 property. They fear the consequences that copper mining  24 will have on their businesses and on their way of life.</p> <p>25 This may be an emotional response, but it is</p>	<p style="text-align: right;">777</p> <p>1 plumes of groundwater contamination.</p> <p>2 The proposed approach for dealing with the pit  3 lake that will form after the closure of the mine is  4 ill-conceived, fraught with uncertainty and immersed in  5 unresolved legal issues.</p> <p>6 The proposed financial assurance is woefully  7 inadequate to cover the likely costs of closing the mine  8 once the mining company has gone out of business and  9 mining operations have ceased.</p> <p>10 The proposed financial assurance is based on  11 best-case predictions that are unlikely to come true.  12 It is based on the assumption that after 25 years the  13 company will be able to walk away from the mine and all  14 will be fine.</p> <p>15 Unfortunately, if these predictions do not  16 turn out to be correct, the state and ultimately the  17 taxpayers will be stuck with the cleanup bill. And the  18 ranches will be largely without recourse.</p> <p>19 So today, Madam Hearing Officer, we will begin  20 with the testimony of Stephen Dobrott, who is the former  21 manager of the Ladder Ranch. He will describe the  22 unique ecosystem of the Ladder Ranch and its abundant  23 wildlife. He will focus particularly on Cave and Las  24 Animas Creeks and particularly on the avant -- the avant  25 pasture.</p>

778	<p>1 He will describe the businesses of the Ladder</p> <p>2 Ranch, its bison ranching, its hunting expeditions and</p> <p>3 it's ecotourism. He will explain that clean water is</p> <p>4 essential to the ecosystem and to the businesses.</p> <p>5 Next Robert Cunningham will testify. He is a</p> <p>6 part owner and manager of the Hillsboro Pitchfork Ranch.</p> <p>7 And he will particularly focus on Grayback Canyon. He</p> <p>8 will also describe his cattle ranching business and his</p> <p>9 hunting business at the ranch. And he will explain the</p> <p>10 importance of water to his businesses.</p> <p>11 Next James Kuipers, a mining engineer, will</p> <p>12 testify. Mr. Kuipers is known to most of the people in</p> <p>13 this room. He has been involved in hardrock mining</p> <p>14 since he was in his teens.</p> <p>15 He will begin with a brief history of the</p> <p>16 Copper Flat Mine. He will explain the potential for</p> <p>17 mining-influenced water that the -- that could be</p> <p>18 generated at the mine. He will also discuss the</p> <p>19 likelihood of seepage from the liner system at the</p> <p>20 tailing storage facility and leaks and spills from the</p> <p>21 other mine facilities.</p> <p>22 He will also discuss the inadequacy of the</p> <p>23 proposed financial assurance.</p> <p>24 Finally, Dr. Tom Myers, a hydrologist, will</p> <p>25 testify. He will also testify about the likelihood for</p>	780	<p>1 Mr. Dobrott, I'd like to discuss your</p> <p>2 qualifications, starting with your education and then</p> <p>3 moving on to your professional experience.</p> <p>4 First, could you describe your postsecondary</p> <p>5 education, please.</p> <p>6 A. I have a bachelor of science degree from the</p> <p>7 University of Arizona, majoring in wildlife biology.</p> <p>8 I have also received specialized training from</p> <p>9 US Fish and Wildlife Service in refuge management,</p> <p>10 wildlife management, endangered species restoration and</p> <p>11 habitat management. I also received fire suppression</p> <p>12 training and prescribed fire management training. I</p> <p>13 also was trained in rangeland evaluation and monitoring.</p> <p>14 Q. Now, could you describe your work experience</p> <p>15 since college?</p> <p>16 A. I worked for The Victorio Company as a range</p> <p>17 and wildlife specialist on the Gray Ranch in Southwest</p> <p>18 New Mexico.</p> <p>19 Q. And how long were you at this job?</p> <p>20 A. Five years.</p> <p>21 Q. And what were your responsibilities there?</p> <p>22 A. I inventoried range and wildlife resources. I</p> <p>23 also inventoried all stock water resources. I developed</p> <p>24 range management plans and recommended stocking</p> <p>25 capacities based on range evaluations that I conducted</p>
779	<p>1 leaks and spills from the mine facilities. He will</p> <p>2 explain the inadequacy of the proposed groundwater</p> <p>3 monitoring system at the -- at the mine site. And he</p> <p>4 will also explain that the pit lake that will form after</p> <p>5 closure of the mine will likely encroach on public</p> <p>6 property and also that the pit lake will combine with --</p> <p>7 with other waters.</p> <p>8 Thank you, Madam Hearing Officer.</p> <p>9 I now call my first witness, Mr. Stephen</p> <p>10 Dobrott.</p> <p>11 MS. ORTH: Let's swear him.</p> <p>12 STEPHEN DOBROTT</p> <p>13 having been first duly sworn or affirmed, was</p> <p>14 examined and testified as follows:</p> <p>15 DIRECT EXAMINATION</p> <p>16 BY MR. DE SAILLAN:</p> <p>17 Q. Could you state your name and current</p> <p>18 occupation, please.</p> <p>19 A. Yes.</p> <p>20 Good morning, Madam Hearing Officer, members</p> <p>21 of the public.</p> <p>22 My name is Stephen J. Dobrott. I am currently</p> <p>23 the ambassador for Ted Turner Expeditions, a New Mexico</p> <p>24 ecotourism business.</p> <p>25 Q. Okay.</p>	781	<p>1 on 325,000 acres.</p> <p>2 I developed and managed 15 hunting programs</p> <p>3 based on game surveys that I conducted. I planned and</p> <p>4 supervised various range management programs, including</p> <p>5 prescribed burning for rangeland improvement.</p> <p>6 Q. Okay.</p> <p>7 And your next job after that?</p> <p>8 A. I worked for the Gray Land and Cattle Company</p> <p>9 as a game manager and commercial hunt program</p> <p>10 coordinator.</p> <p>11 Q. Is that the same Gray Ranch?</p> <p>12 A. Yes, under different ownership.</p> <p>13 Q. And how long were you there?</p> <p>14 A. Three more years.</p> <p>15 Q. What were your responsibilities at that job?</p> <p>16 A. I was responsible for promoting and</p> <p>17 supervising the big game hunting programs. I worked</p> <p>18 closely with the New Mexico Game and Fish Department in</p> <p>19 planning and implementing game surveys and research on</p> <p>20 rare and state endangered species.</p> <p>21 Q. And where did you work next?</p> <p>22 A. The United States Fish and Wildlife Service.</p> <p>23 Q. How long were you there?</p> <p>24 A. Six years.</p> <p>25 Q. And what were your responsibilities at Fish</p>

<p style="text-align: right;">782</p> <p>1 and Wildlife?</p> <p>2 A. As a refuge biologist, I was responsible for</p> <p>3 the recovery of the endangered Masked Bobwhite on the</p> <p>4 Buenos Aires National Wildlife Refuge in Arizona. I</p> <p>5 participated in the development of the Refuge Master</p> <p>6 Plan and start-up of the new refuge. I planned and</p> <p>7 implemented the reintroduction of pronghorn to the</p> <p>8 refuge.</p> <p>9 I was responsible for all of the biological</p> <p>10 surveys on the refuge. I also planned and conducted</p> <p>11 biological surveys in Sonora, Mexico, related to the</p> <p>12 recovery of the endangered Masked Bobwhite.</p> <p>13 Q. And what did you do next?</p> <p>14 A. The Ladder Ranch.</p> <p>15 Q. All right.</p> <p>16 And what was your position at the Ladder</p> <p>17 Ranch?</p> <p>18 A. I was manager of a 150,000-acre ranch managed</p> <p>19 for bison and wildlife with special emphasis on</p> <p>20 imperiled species.</p> <p>21 Q. How long did you work as manager of the Ladder</p> <p>22 Ranch?</p> <p>23 A. Twenty-four years.</p> <p>24 Q. What were your responsibilities as manager of</p> <p>25 the Ladder Ranch?</p>	<p style="text-align: right;">784</p> <p>1 A. Since March, 2017.</p> <p>2 Q. Okay.</p> <p>3 Now, Mr. Dobrott, Kendra is going to hand you</p> <p>4 a document that's been marked as the Ranches Exhibit</p> <p>5 Number 3 and ask you if you would identify that, please.</p> <p>6 A. Yes. This is a copy of my resume.</p> <p>7 Q. And is that accurate?</p> <p>8 A. Yes, sir.</p> <p>9 Q. And current and up to date?</p> <p>10 A. Yes, sir.</p> <p>11 Q. Okay.</p> <p>12 Madam Hearing Officer, at this point, I would</p> <p>13 like to qualify Mr. Dobrott as an expert in biology,</p> <p>14 ecology and ranching.</p> <p>15 MS. ORTH: Objections?</p> <p>16 MS. BARNCASTLE: No objection.</p> <p>17 MR. BUTZIER: No objection.</p> <p>18 MR. KNIGHT: No objection.</p> <p>19 MS. ORTH: All right. He's so recognized.</p> <p>20 MR. DE SAILLAN: Thank you.</p> <p>21 Q. Now, Mr. Dobrott, I'd like you to address the</p> <p>22 interests of the Ladder Ranch in this proceeding.</p> <p>23 First, if you could tell me what is the</p> <p>24 mission of the Ladder Ranch?</p> <p>25 A. The management of the Ladder Ranch is based on</p>
<p style="text-align: right;">783</p> <p>1 A. Under the direction of the general manager, I</p> <p>2 was responsible for all aspects of managing the ranch,</p> <p>3 including hiring employees, annual budgeting and</p> <p>4 administrative duties, coordinating native species</p> <p>5 recovery programs, hunting and fishing programs and</p> <p>6 raising bison for market.</p> <p>7 I also coordinated ecotours with other ranch</p> <p>8 operations.</p> <p>9 Q. And then where did you work next?</p> <p>10 A. I am the ambassador for Ted Turner</p> <p>11 Expeditions.</p> <p>12 Q. So that's your current position?</p> <p>13 A. Correct.</p> <p>14 Q. What does it mean to be ambassador for Ted</p> <p>15 Turner Expeditions?</p> <p>16 A. I promote and participate in the ecotourism</p> <p>17 business on Turner properties in New Mexico. My job is</p> <p>18 to connect people with nature by introducing them to</p> <p>19 some of the finest and best managed ranch properties in</p> <p>20 the Southwest. I guide tours on the Ladder and</p> <p>21 Armendaris Ranches. I also assist with the tour</p> <p>22 development -- with tour development and the training of</p> <p>23 guides.</p> <p>24 Q. And how long have you been ambassador for Ted</p> <p>25 Turner Expeditions?</p>	<p style="text-align: right;">785</p> <p>1 its mission to manage and enhance Turner lands in an</p> <p>2 economically sustainable and environmentally sensitive</p> <p>3 manner while emphasizing the conservation of native</p> <p>4 species and habitats.</p> <p>5 Q. Okay.</p> <p>6 And let me refer you now to a number of</p> <p>7 documents that are collectively marked as the Ranches</p> <p>8 Exhibit 4. And it contains several maps.</p> <p>9 Could you identify these maps, please?</p> <p>10 A. These are all maps of the Ladder Ranch.</p> <p>11 Q. Okay.</p> <p>12 And did you compile the maps?</p> <p>13 A. Yes, I did, with the help of our company</p> <p>14 technician.</p> <p>15 Q. Okay.</p> <p>16 And are they accurate, to the best of your</p> <p>17 knowledge?</p> <p>18 A. To the best of my knowledge, except for one --</p> <p>19 one exception.</p> <p>20 Q. Okay.</p> <p>21 Could you explain what that exception is?</p> <p>22 A. First of all, I'd like to orient everybody as</p> <p>23 to where we are on this map.</p> <p>24 The location of the Copper Flat Mine is right</p> <p>25 here, and you can see the boundary of the Ladder Ranch</p>

<p style="text-align: right;">786</p> <p>1 right here.</p> <p>2       There is a well right here called the Feedlot</p> <p>3 Well, and -- if I can hold my hand straight here. The</p> <p>4 full -- this, I believe, was an error in printing, but</p> <p>5 the well itself is about a quarter mile to the southeast</p> <p>6 of the location on this map. The storage for that well</p> <p>7 is right here.</p> <p>8       Q. And when you say right here --</p> <p>9       A. Well, it's about another -- it's about a half</p> <p>10 mile from the identified location of the Feedlot Well on</p> <p>11 this map.</p> <p>12       Q. Okay.</p> <p>13       So, Mr. Dobrott, does the Ladder Ranch border</p> <p>14 the mine permit boundary?</p> <p>15       A. Yes, it does.</p> <p>16       Q. And approximately how long is that boundary</p> <p>17 along which the -- to the -- how long is that boundary</p> <p>18 along which the Ladder Ranch borders the Copper Flat</p> <p>19 Mine permit boundary?</p> <p>20       A. Well, approximately eight miles, including a</p> <p>21 portion of the mine well field.</p> <p>22       Q. Okay.</p> <p>23       Now, could you take a minute to describe for</p> <p>24 us the Ladder Ranch?</p> <p>25       A. Certainly. What makes the Ladder Ranch</p>	<p style="text-align: right;">788</p> <p>1 and it shows the Ladder Ranch area in gray and some</p> <p>2 surrounding land in green; is that correct?</p> <p>3       A. That's correct.</p> <p>4       Q. Thank you.</p> <p>5       Please proceed.</p> <p>6       A. Okay. Its proximity to the Black Range, in</p> <p>7 this area of the map, on the western edge of the -- of</p> <p>8 the ranch, and the Black Range watersheds and elevations</p> <p>9 from 10,000 feet down to 4,500 feet provide a suite of</p> <p>10 biological life zones unmatched on any one property in</p> <p>11 New Mexico. Thus the biological diversity on the ranch</p> <p>12 is remarkable and highly regarded by biologists and</p> <p>13 ecologists alike.</p> <p>14       Q. Okay. Mr. Dobrott, I'd like to focus now on a</p> <p>15 particular portion of the ranch, the southeast portion,</p> <p>16 and in particular there's a rectangle that sort of juts</p> <p>17 down to the south on the southeast end of the ranch.</p> <p>18       Could you describe that area?</p> <p>19       A. Certainly. This area is named the Avant</p> <p>20 Pasture, is the entrance to the Ladder Ranch off of</p> <p>21 Highway 152. The area includes approximately 5,250</p> <p>22 acres of productive Chihuahuan Desert grassland. It has</p> <p>23 native rangeland grasses and vegetation typical of this</p> <p>24 region.</p> <p>25       Q. Okay. I'd now like to ask you some questions</p>
<p style="text-align: right;">787</p> <p>1 sustainable from a business perspective is the diversity</p> <p>2 and quality of rangelands, wildlife and water resources</p> <p>3 that occur there.</p> <p>4       The ranch consists of 150,000 acres of private</p> <p>5 land, 100,600 acres of National Forest and wilderness</p> <p>6 lands, 20,079 acres of state lands and 11,480 acres of</p> <p>7 BLM lands, totalling 289,159 acres, or 451.81 square</p> <p>8 miles.</p> <p>9       So on this particular map, I'd like to point</p> <p>10 out Hillsboro is right about here, which is -- as you</p> <p>11 can see, it's a little bit out of focus. But this --</p> <p>12       Q. Mr. Dobrott, if you could -- excuse me. Could</p> <p>13 you identify which map you're referring to just for the</p> <p>14 record?</p> <p>15       A. I'm not sure if there's a number on it, but</p> <p>16 this is slide number 4, and this particular map is a map</p> <p>17 that encompasses the whole ranch, whereas the one</p> <p>18 previous was one that shows the southern one-third of</p> <p>19 the ranch, but this map shows the entire boundary of the</p> <p>20 Ladder Ranch, including the forest allotments relative</p> <p>21 to the Copper Flat Mine located right about here.</p> <p>22       Q. Okay.</p> <p>23       And again so it's clear in the record, the map</p> <p>24 that you're referring to says in little white rectangle</p> <p>25 Ladder Ranch, New Mexico in the upper left-hand corner,</p>	<p style="text-align: right;">789</p> <p>1 about the surface water resources at the Ladder Ranch.</p> <p>2       Could you describe for us some of the major</p> <p>3 natural surface water features at the ranch?</p> <p>4       A. The ranch is incised by five semi-perennial</p> <p>5 creek systems. From north to south, it is the Cuchillo</p> <p>6 Creek, shown here, the Palomas Creek, Seco Creek, Cave</p> <p>7 Creek and Las Animas Creek, that all drain into the Rio</p> <p>8 Grande Basin.</p> <p>9       Each contributes greatly to the biodiversity</p> <p>10 and richness -- the biological richness and productivity</p> <p>11 of the ranch. Of the five creeks, Las Animas is the</p> <p>12 most notable for its biodiversity and importance to the</p> <p>13 ranch.</p> <p>14       Las Animas and Cave Creek systems -- the Las</p> <p>15 Animas and Cave Creek system is crucial and is the</p> <p>16 lifeblood of the ranch. Its surface and groundwater</p> <p>17 supply pristine, dependable water for central ranch</p> <p>18 operations, including administrative facilities,</p> <p>19 employee, guest housing, livestock, farm irrigation,</p> <p>20 wildlife and imperiled species programs, all within four</p> <p>21 miles distance of the Copper Flat Mine.</p> <p>22       Notably, Las Animas Creek has been nominated</p> <p>23 as one of New Mexico's scenic waterways, and its</p> <p>24 environmental importance has been documented in</p> <p>25 scientific publications and the book River of Spirits, A</p>

790	<p>1 Natural History of New Mexico's Las Animas Creek, which                  2 I coauthored.                  3 This remarkable riparian corridor has also                  4 been designated as an important bird area, or IBA, by                  5 the Audubon Society. One of the creeks' most unique                  6 features are the ancient Arizona sycamore trees that                  7 occur only on this creek within the entire Rio Grande                  8 Basin.                  9 Q. Okay.                  10 Mr. Dobrott, referring back to the Ranches                  11 Exhibit 3, there are four photographs that appear to                  12 depict a stream.                  13 Could you identify those photographs?                  14 A. These photographs are all of Las Animas Creek.                  15 Q. And did you take those photographs?                  16 A. Yes, except for one, taken by Matilde                  17 Holzwarth for the book River of Spirits, which was my                  18 opening slide.                  19 Q. Okay.                  20 A. And it's this slide right here.                  21 Q. Okay.                  22 And could you describe that for the record                  23 just so that it can be distinguished from the other                  24 photographs?                  25 MS. ORTH: 17.</p>
791	<p>1 MR. DOBROTT: It is slide number 17, and it                  2 depicts a quiet portion of Las Animas Creek, above                  3 Headquarters, I believe.                  4 MR. DE SAILLAN: Okay. That's -- I think that                  5 will suffice.                  6 Q. Now, as to the photographs that you took,                  7 they're a fair and accurate representation of what you                  8 observed at the time?                  9 A. Yes, sir.                  10 Q. And how would you describe the quality of the                  11 water in -- first of all, in Cave Creek?                  12 A. Excellent and pristine.                  13 Q. And what about the quality of the water in Las                  14 Animas Creek?                  15 A. Also excellent and pristine.                  16 Q. Okay.                  17 And Cave Creek -- is it correct that Cave                  18 Creek is a tributary to Las Animas Creek from the south?                  19 A. Yes, sir.                  20 Q. Okay.                  21 And are these creeks used by ranch livestock                  22 for drinking?                  23 A. Yes, by bison.                  24 Q. And have you personally observed bison                  25 drinking from these creeks?</p>
792	<p>1 A. Yes, many times.                  2 Q. And are the creeks used by wildlife for                  3 drinking?                  4 A. Yes, sir.                  5 Q. And have you personally observed wildlife                  6 drinking from the creeks?                  7 A. Yes. Numerous kinds of wildlife depend on the                  8 availability of good quality surface water in these                  9 creeks.                  10 Q. And are the creeks also used by birds for                  11 feeding and drinking?                  12 A. Yes, they are.                  13 Q. And have you personally observed birds feeding                  14 at these creeks?                  15 A. Yes. These creeks provide streamside, or                  16 riparian, vegetation and food used by waterfowl and                  17 migrating, breeding bird populations unique to the                  18 Southwest. These riparian corridors connect migrating                  19 birds along the Rio Grande with the upper reaches of the                  20 Black Range. Food cover and good quality water along                  21 these creeks are used by many bird species, including                  22 the Yellow-billed Cuckoo, currently listed as a                  23 federally threatened species.                  24 Q. Okay.                  25 And do the creeks support fish populations?</p>
793	<p>1 A. Yes, they do.                  2 Q. Could you --                  3 A. Okay. These creeks currently support four                  4 native species of fish. They are the Rio Grande chub,                  5 the Rio Grande sucker, the Rio Grande cutthroat trout                  6 and the longfin dace. These species depend on pristine                  7 water for reproduction and the production of                  8 macroinvertebrate food sources made possible by these                  9 pristine waters.                  10 Q. Okay.                  11 And are there springs and seeps on the Ladder                  12 Ranch?                  13 A. Yes, there are.                  14 Q. Could you describe them, please?                  15 A. Within the area nearest to the Copper Flat                  16 Mine are Animas -- Animas Warm Spring, the Manager House                  17 Spring, Garden Tank Spring, Myers Animas Spring, along                  18 with several unnamed springs and seeps along Las Animas                  19 Creek.                  20 Q. Do some of the springs feed into Cave Creek or                  21 Las Animas Creek?                  22 A. Yes. The most -- mostly Las Animas Creek                  23 Spring and Cave Creek contribute to the water flow in                  24 Las Animas Creek.                  25 Q. And could you describe the water quality of</p>

<p style="text-align: right;">794</p> <p>1 these springs?  2 A. Excellent and pristine.  3 Q. And are the springs used by ranch livestock  4 for drinking?  5 A. Yes, they are.  6 Q. And that's based upon your personal  7 observation?  8 A. Yes, sir.  9 Q. And have you observed wildlife drinking from  10 the springs?  11 A. Yes, sir.  12 Would you like me to point out where these  13 springs are on this map?  14 Q. Sure.  15 A. Okay. For -- Animas Creek is running right  16 through this -- the map from southeast to northwest.  17 Ranch Headquarters is located in this location,  18 approximately three miles north of the Copper Flat Mine.  19 The springs that I mentioned are within the  20 four -- four-mile stretch here along Las Animas Creek.  21 And the Warm Spring is -- well, probably our most  22 important spring, the Warm Spring is just above Ladder  23 Headquarters.  24 Q. And is that marked on the map there?  25 A. It's not marked on -- with the large</p>	<p style="text-align: right;">796</p> <p>1 Q. One-quarter mile to the southeast from where  2 the map indicates that it's located?  3 A. Correct.  4 Q. Okay.  5 And that's in the Avant Pasture?  6 A. Correct.  7 Q. And what is this well used for?  8 A. Along with the Evans Well, it is used to  9 supply drinkers for quail and stock tanks used by bison  10 and large game for drinking. It also provides water to  11 two important conservation facilities, the endangered  12 Bolson tortoise facility, where young tortoises are  13 raised, and the Feedlot steel rim water storage that is  14 used for maintaining threatened Chiricahua leopard  15 frogs.  16 Q. And have you observed bison drinking from  17 these tanks?  18 A. I have.  19 Q. And have you observed game drinking from the  20 tanks?  21 A. Yes, mule deer, pronghorn and elk.  22 Q. And what about quail, have you observed quail  23 using the drinkers?  24 A. Yes, sir.  25 Q. What is the quality of the water from the</p>
<p style="text-align: right;">795</p> <p>1 lettering, but on the original topo map, it's very hard  2 to see, it's right in this area right here.  3 Q. And when you say this area right here --  4 A. Well, it would be approximately one mile  5 northwest of Ladder Headquarters --  6 Q. Okay.  7 A. -- along the Animas Creek.  8 Q. I'd now like to discuss groundwater resources.  9 Could you describe some of the groundwater  10 resources at the Ladder Ranch, please?  11 A. Certainly. Within the area closest to the  12 Copper Flat Mine are five livestock wells, four  13 irrigation wells and three domestic wells. These are  14 west to east Myers Well, John Cross Well, Wanda Well,  15 Evans Well and Feedlot Well. The irrigation wells  16 are -- from east to west are Shipping Pens Well, Higgins  17 Well and Orchard Well. The domestic wells are three  18 wells at Headquarters. And I only have slides of two.  19 Q. Okay.  20 Now, I'd like to look in particular at the  21 Feedlot Well.  22 Could you indicate where that well is located?  23 A. This is where it's located on this particular  24 map, but as I indicated, the actual location is about  25 one-quarter mile to the southeast on this map.</p>	<p style="text-align: right;">797</p> <p>1 Feedlot Well?  2 A. Excellent.  3 Q. Now, Mr. Dobrott, have you noticed fractures  4 in the rocks near the southern boundary of the ranch?  5 A. Yes, I have. Relative to the mine location on  6 this map is Animas Gulch, which is just across the  7 boundary line to the north, which drains into Tank  8 Canyon, the next canyon north, which drains into Las  9 Animas Canyon.  10 Along this range there are exposed fractures  11 of -- in the Santa Fe Group filled with carbonates and  12 silicates, indicating past channels of groundwater.  13 These fractures tend to run north and south from the  14 mine area and appear to continue north into Las Animas  15 Canyon.  16 Q. Okay. Now I'd like for us to focus on the  17 plant and wildlife at the Ladder Ranch, which you have  18 already mentioned.  19 First, let's look at the document that's been  20 marked as Ranches Exhibit Number 4, which Kendra is  21 going to hand you in a second. Okay.  22 A. I think I have it.  23 Q. Okay.  24 A. Yes. The first is a list of mammal species  25 that have been identified at the Ladder Ranch. The</p>



798	<p>1 second is a list of bird species identified at the</p> <p>2 Ladder Ranch. The third is a list of plant species that</p> <p>3 have been identified at the Ladder Ranch.</p> <p>4 Q. And did you put these lists together?</p> <p>5 A. Yes. However, they are based on observations</p> <p>6 and studies of other mammalogists, ornithologists and</p> <p>7 botanists that provided these information lists after</p> <p>8 their studies.</p> <p>9 Q. Okay.</p> <p>10 And then going back to Exhibit 4, that</p> <p>11 document also contains several photographs of wildlife.</p> <p>12 Did you take those photographs?</p> <p>13 A. Yes, sir.</p> <p>14 Q. And were the photographs taken on the Ladder</p> <p>15 Ranch?</p> <p>16 A. Yes, they were.</p> <p>17 Q. And are they a fair representation of what you</p> <p>18 observed?</p> <p>19 A. Yes, sir.</p> <p>20 Q. Now, could you describe the wildlife at the</p> <p>21 Ladder Ranch in a little bit more detail?</p> <p>22 A. Wildlife abounds on the Ladder Ranch. Healthy</p> <p>23 populations of elk, mule deer, Coues Whitetail deer,</p> <p>24 pronghorn, javelina, black bear, mountain lion, turkey</p> <p>25 and three species of quail occur there. That's the</p>	800	<p>1 Is the ranch currently implementing any</p> <p>2 programs to protect wildlife or to preserve wildlife</p> <p>3 habitat?</p> <p>4 A. Yes, sir, in accordance with its mission</p> <p>5 statement and the owner's desire to save everything.</p> <p>6 Q. Could you describe those programs?</p> <p>7 A. The nonprofit Turner Endangered Species Fund</p> <p>8 partners with United States Fish and Wildlife Service</p> <p>9 and New Mexico Game and Fish Department in imperiled</p> <p>10 species restoration projects like the federally listed</p> <p>11 Chiricahua leopard frog, the Mexican gray wolf, the</p> <p>12 Bolson tortoise and the Yellow-billed Cuckoo. Its</p> <p>13 mission is to conserve and restore imperiled species</p> <p>14 with an emphasis on promoting wild, working landscapes.</p> <p>15 Additionally, the Turner Biodiversity Division</p> <p>16 works closely to restore less imperiled species like the</p> <p>17 Rio Grande cutthroat trout and other native fish --</p> <p>18 other fish native to the Las Animas Creek system.</p> <p>19 Q. And do these programs depend on pristine water</p> <p>20 from the springs, creeks and groundwater wells at the</p> <p>21 Ladder Ranch?</p> <p>22 A. Absolutely. The propagation of threatened</p> <p>23 Chiricahua leopard frog depends on pristine groundwater</p> <p>24 for the frog propagation facility at Headquarters and</p> <p>25 multiple water storage facilities deemed suitable for</p>
799	<p>1 Gambel's, scaled quail and Mearns' quail.</p> <p>2 Q. And you're referring to your slides here?</p> <p>3 A. Yes, sir.</p> <p>4 Fifty-seven species of mammals and over 250</p> <p>5 species of birds have been recorded on the ranch. Each</p> <p>6 suite of species is considered a biological treasure and</p> <p>7 an economic asset to the ranch. Bison are managed as</p> <p>8 livestock and coexist with other wildlife species</p> <p>9 ranch-wide.</p> <p>10 Achieving a balance between conservation and</p> <p>11 sustainable business has been the goal for 25 years.</p> <p>12 Q. Okay.</p> <p>13 Mr. Dobrott, can wildlife also be found in the</p> <p>14 Avant Pasture?</p> <p>15 A. Yes, sir. Elk, mule deer, pronghorn,</p> <p>16 javelina, mountain lion, turkey and quail inhabit the</p> <p>17 area seasonally. Black bear also pass through the</p> <p>18 pasture.</p> <p>19 Q. All right.</p> <p>20 And does all this wildlife and plant life</p> <p>21 depend on pristine water from the springs and creeks</p> <p>22 that flow in the Ladder Ranch?</p> <p>23 A. Absolutely.</p> <p>24 Q. Okay. Then the next -- next I'd like to ask</p> <p>25 you about habitat conservation programs.</p>	801	<p>1 holding endangered frogs like the one that is supplied</p> <p>2 by the water from the Feedlot Well.</p> <p>3 Pristine water quality is also important to</p> <p>4 this species in the wild on Cave Creek and Las Animas</p> <p>5 Creeks. The captive endangered Bolson tortoise depends</p> <p>6 on pristine groundwater within the tortoise facility.</p> <p>7 The captive endangered Mexican gray wolf depends on</p> <p>8 pristine spring water within the US Fish and Wildlife</p> <p>9 Service/Ladder Ranch Wolf Management Facility. The</p> <p>10 threatened Yellow-billed Cuckoo depends on pristine</p> <p>11 surface water in Las Animas Creek.</p> <p>12 Q. Okay.</p> <p>13 And you mentioned that the Bolson tortoise</p> <p>14 facility uses water from the Feedlot Well.</p> <p>15 Is that the well that we discussed earlier</p> <p>16 that's in the Avant Pasture?</p> <p>17 A. Yes, sir.</p> <p>18 Q. Okay.</p> <p>19 Next, Mr. Dobrott, I'd like to ask you a</p> <p>20 little bit more about the businesses of the Ladder</p> <p>21 Ranch.</p> <p>22 Now, is the ranch operated as a business</p> <p>23 enterprise?</p> <p>24 A. Yes, it is.</p> <p>25 Q. And could you please describe those -- the</p>

802	<p>1 business enterprises of the ranch?</p> <p>2 A. Since 1992, the Ladder Ranch has been raising</p> <p>3 bison -- been raising and selling bison meat</p> <p>4 commercially in markets and restaurants. The ranch also</p> <p>5 conducts big game hunts for mule deer and elk through</p> <p>6 Turner Ranch Outfitting.</p> <p>7 The ranch also is a popular destination for</p> <p>8 guests of Ted Turner Expeditions, an -- an ecotourism</p> <p>9 enterprise based in Truth or Consequences. Guests who</p> <p>10 visit the ranch for the day will stay at our sister</p> <p>11 property, the Sierra Grande Lodge, an 18-room historic</p> <p>12 hotel in Truth or Consequences. Each enterprise depends</p> <p>13 on healthy, well managed environments to operate</p> <p>14 successfully and to accomplish their objectives in</p> <p>15 concert with each other.</p> <p>16 It is important to note that all these</p> <p>17 businesses contribute to the economy of Sierra County</p> <p>18 through taxes and purchases of goods and services. The</p> <p>19 Ladder Ranch has been doing this on a sustainable basis</p> <p>20 for 25 years.</p> <p>21 Q. Okay.</p> <p>22 And the big -- the big game hunts, do they</p> <p>23 utilize the Avant Pasture?</p> <p>24 A. Yes. We often pursue game in the Avant</p> <p>25 Pasture.</p>	804	<p>1 significantly impact any or all of these programs,</p> <p>2 enterprises and environments within the range of</p> <p>3 potential groundwater contamination emanating from the</p> <p>4 Copper Flat Mine.</p> <p>5 If the assumptions and calculations of the</p> <p>6 mine's experts are wrong and contaminants from the</p> <p>7 Copper Flat migrate towards the Ladder Ranch, it would</p> <p>8 be a disaster and is one of several reasons why the</p> <p>9 Ladder Ranch opposes the mine so strongly.</p> <p>10 These businesses and programs could</p> <p>11 potentially collapse. Without clean water, bison</p> <p>12 ranching on the southern portion of the ranch could be</p> <p>13 seriously compromised and potentially dangerous to our</p> <p>14 bison and human staff. The fish and wildlife would die</p> <p>15 out or move elsewhere.</p> <p>16 Without abundant game within this area, our</p> <p>17 outfitting business would be significantly affected.</p> <p>18 Contaminated water at Headquarters would affect our</p> <p>19 guest accommodations and staff residences. Without a</p> <p>20 healthy, vibrant ecosystem to show our guests, the</p> <p>21 ecotourism business would be significantly affected.</p> <p>22 Q. Now, in closing, is there anything that you</p> <p>23 would like to say to the Environment Department staff</p> <p>24 that are here today and to the Hearing Officer?</p> <p>25 A. Yes. The Ladder Ranch urges the Environment</p>
803	<p>1 Q. And does the ecotourism business use the Avant</p> <p>2 Pasture?</p> <p>3 A. Yes. We take tourists there to observe</p> <p>4 wildlife and to enjoy the quiet, open spaces and scenic</p> <p>5 views.</p> <p>6 Q. Okay.</p> <p>7 Now, these business enterprises that you</p> <p>8 mentioned, do they also depend on pristine water from</p> <p>9 the springs, creeks and groundwater wells on the Ladder</p> <p>10 Ranch for their existence?</p> <p>11 A. Yes, they do, absolutely.</p> <p>12 Q. And how many head of bison occupy the ranch?</p> <p>13 A. The ranch bison herd averages around 1,000</p> <p>14 head.</p> <p>15 Q. And how many people do the businesses -- the</p> <p>16 businesses employ?</p> <p>17 A. The ranch employs between 15 and 20 people</p> <p>18 depending on the season and type of work.</p> <p>19 Q. Now, Mr. Dobrott, in your opinion, what would</p> <p>20 happen to these business enterprises if water quality at</p> <p>21 the Ladder Ranch were significantly compromised, say, by</p> <p>22 contamination from the Copper Flat Mine?</p> <p>23 A. Any change in the quality of water derived</p> <p>24 from ranch stock wells, domestic and irrigation wells,</p> <p>25 springs and impoundments within this area would</p>	805	<p>1 Department to consider the unknown and irreversible</p> <p>2 negative impacts that the Copper Flat Mine could have on</p> <p>3 not just the Ladder Ranch, but its neighbors, ranchers,</p> <p>4 farmers and all downstream water users in the Lower Rio</p> <p>5 Grande if contaminants from the mine enter into the</p> <p>6 groundwater system.</p> <p>7 Our experts contend that there is sufficient</p> <p>8 evidence of hydrological conductivity between the</p> <p>9 aquifers of Copper Flat and Las Animas Creek to raise a</p> <p>10 major concern over possible contaminant drift onto the</p> <p>11 Ladder Ranch and ultimately to Las Animas Creek and to</p> <p>12 the Lower Rio Grande basin.</p> <p>13 Therefore, the potential of this occurrence</p> <p>14 does not justify the issuance of this permit, and to do</p> <p>15 so would be irresponsible and would pose an unacceptable</p> <p>16 risk to those of us who depend on clean, uncontaminated</p> <p>17 water for our citizens, our communities, our ranches,</p> <p>18 our wildlife and environment. The risks are just too</p> <p>19 great to allow.</p> <p>20 Q. Thank you, Mr. Dobrott.</p> <p>21 I have no further questions.</p> <p>22 Madam Hearing Officer, I now would move for</p> <p>23 the admission of Ranches Exhibits Number 3 and 4.</p> <p>24 MS. ORTH: Objections?</p> <p>25 No?</p>

806	<p>1 MR. BUTZIER: I'm just a little confused on 2 Exhibit 4. 3 Is Exhibit 4 the one that starts with this 4 picture or this picture? 5 MR. DE SAILLAN: I can't see very well from 6 here, Mr. Butzier. It should be marked as Exhibit 4 as 7 opposed to Mr. Dobrott's slides, which we are not -- 8 MR. BUTZIER: I see. 9 MR. DE SAILLAN: -- seeking to introduce as an 10 exhibit. Those are just demonstrative. 11 MR. BUTZIER: Thank you. That clears it up. 12 MR. DE SAILLAN: Okay. Thank you. 13 MR. BUTZIER: And I do not have any 14 objections. 15 MS. ORTH: Okay. 16 Anything? 17 MS. BARNCASTLE: No objection. 18 MR. KNIGHT: No objections. 19 MS. ORTH: All right. Thank you. 20 Exhibits 3 and 4 are admitted. 21 (Exhibits Ranches 3 and 4 admitted into 22 evidence.) 23 MS. ORTH: Mr. de Saillan, we can turn to 24 cross-examination, or we can take a lunch break and pick 25 up cross-examination after lunch.</p>	808	<p>1 break. 2 I have some other names here which I will call 3 on when we're done with Ms. Trager. 4 If you would please -- and I understand that's 5 T-R-A-E-G-E-R? 6 MS. TRAGER: No E. T-R-A-G-E-R. 7 MS. ORTH: Okay. Thank you. 8 MS. TRAGER: Yes. 9 MS. ORTH: If you'd be sworn in, please. 10 EDNA TRAGER 11 having been first duly sworn or affirmed, gave 12 public comment as follows: 13 PUBLIC COMMENT 14 MS. TRAGER: Thank you for this opportunity to 15 speak. 16 As I was introduced, I am Edna Trager. I'm a 17 City Councilor with the City of Elephant Butte. 18 Our mayor would also have been here except 19 that she is out of town. So she does send her regrets. 20 Coincidentally, it's been 20 years since our 21 city became a city, and 20 years ago you'll hear people 22 talk about how that was back in the day when the lake 23 here, Elephant Butte Lake, the water was going over the 24 spillway, it was wonderful, the boating industry was 25 fabulous.</p>
807	<p>1 MR. DE SAILLAN: I have no preference at this 2 point. Perhaps we could ask the witness how he's doing. 3 MR. DOBROTT: I'm fine. 4 MS. ORTH: You're fine. 5 MR. DOBROTT: How's the audience doing? 6 MS. ORTH: Let me ask if there would be 7 extensive cross-examination of Mr. Dobrott. 8 Mr. Butzier, I would turn to you first. 9 MR. BUTZIER: I'm not sure about extensive, 10 but I do have a number of questions. 11 MS. ORTH: All right. Let's take a lunch 12 break, then, so that we're not interrupting that. 13 Let's return at 1:15. 14 (Proceedings in recess from 12:01 p.m. to 15 1:19 p.m.) 16 MS. ORTH: Okay. We are back after a lunch 17 break and about to go to the cross-examination of the 18 ranches' witness, Mr. Dobrott. 19 However, before we turn to that 20 cross-examination, we're going to take the opportunity 21 of the lunch break to accept some public comment. 22 Edna Trager -- 23 MS. TRAGER: Yes. 24 MS. ORTH: -- was the first to sign in and to 25 request that she give public comment after the lunch</p>	809	<p>1 I don't know if any of you are on Facebook, 2 but there are pictures going viral of all the -- all the 3 boats and how here it was 20 years ago, here it was a 4 year ago, and here it was a week ago, and they're quite 5 dramatic pictures. 6 Right now there -- if you go out on a -- on a 7 kayak, you can hit a sandbar. Boats are hitting 8 sandbars with their propellers. Fishing is great. 9 There are huge fish getting stuck out there in ponds 10 that are having to be relocated. 11 The reason I bring that up is because this is 12 all about the economic impact on Elephant Butte and 13 Sierra County. That's why I'm mentioning it. So in the 14 past 20 years, the city has grown to the size of about 15 1,500 full-time residents. Over the years on key summer 16 holidays, we host as many as 100,000 visitors. It has 17 represented a lot of revenue. 18 Over those 20 years, we have striven to 19 diversify. We do not want to be not only a lake 20 community, but we have tried to be open to tourism and a 21 retirement community offering a lot of other services. 22 But again back to Facebook, right now with all 23 of these pictures and the lake being down, people are 24 surmising that, you know, the business is going to go 25 away, the people are going to go away. One woman was</p>

<p style="text-align: right;">810</p> <p>1 guessing, boy, what are the home values going to be?  2 How low do you think the prices are going to go? It's  3 almost impossible to guess what the impact is going to  4 be.  5 As I said, we have striven to diversify and  6 bring other business here. We do have a great golf  7 course, but right now the importance of the mine is --  8 just keeps growing in to us. This is a business that is  9 here. It's here right now. They're in our county.  10 We do support the opening of the mine. We see  11 jobs here. We see a future for some of the people that  12 live here, their kids. The idea of having a boat  13 storage and boat mechanics and fishing and that is all  14 of a sudden not looking quite as viable as it did  15 yesterday.  16 People are talking about how this drought just  17 isn't going away. There are a lot of people involved in  18 the lake and tourism industries. EBID, I know, does a  19 great job, and they work hard to manage the water and  20 get the water down to the farmers to the best of their  21 ability, but no one is saying that they're going to keep  22 the water in there for the City of Elephant Butte.  23 So what are we going to do to keep people here  24 working and buying groceries and, you know, keeping kids  25 in the schools and, you know, keeping teachers here and</p>	<p style="text-align: right;">812</p> <p>1 We believe that we need to seize this  2 opportunity for our residents, for our community and for  3 our future. We've looked at things that could be of  4 benefit to us. We did invest in Spaceport. We still  5 think that that's going to benefit this area in the  6 future, but maybe not at the levels that we hoped for,  7 and definitely not as soon as we had hoped.  8 We think that without the Copper Flat Mine  9 project our future sustainability of our communities  10 will be difficult and definitely challenging. The City  11 of Elephant Butte needs and supports the approval of the  12 groundwater protection Discharge Permit for the Copper  13 Flat Mine project and encourages the New Mexico  14 Environment Department to complete their analysis and  15 issue this permit as soon as possible.  16 Thank you.  17 MS. ORTH: Thank you, Ms. Trager.  18 If you would leave your written comments, they  19 will be beneficial to the court reporter.  20 MS. TRAGER: Oh, okay.  21 MS. ORTH: Thank you.  22 MS. TRAGER: There you go.  23 MS. ORTH: Next on the sign-in sheet is Don  24 Steinnerd.  25 Sir.</p>
<p style="text-align: right;">811</p> <p>1 just looking for the overall future of Sierra County.  2 So to maintain our infrastructure, we are  3 looking for industry. And again we talk about economic  4 stimulus, and we look at the political situation and --  5 and the pressures. And again the idea that the mineral  6 deposit is right here. It's not something that's you're  7 going to find someplace else. It's in Sierra County.  8 We've talked to them. We've -- they've been  9 our community. We've listened to them. By all  10 accounts, it seems that they have done everything that's  11 been asked of them.  12 It looks like they're going to provide jobs,  13 you know, truck drivers, accountants, engineers, you  14 know, things that offer, you know, a future for the  15 people that live here, and even if people come here,  16 it's -- it's a good opportunity. It's paychecks. It's  17 family need. It's clothing. It's gasoline. It's GRT  18 to this area.  19 Again by everything that we've seen, it looks  20 like the company has done its part going through the  21 requirements, that they've looked at the environment,  22 that they have said they will post a significant bond to  23 assure that this operation and the infrastructure is  24 protected during the operations and going forward into  25 the future.</p>	<p style="text-align: right;">813</p> <p>1 DON STEINNERD  2 having been first duly sworn or affirmed, gave  3 public comment as follows:  4 PUBLIC COMMENT  5 MR. STEINNERD: Good afternoon.  6 My name is Don Steinnerd. I'm a resident of  7 Socorro, New Mexico.  8 I'm a retired petroleum engineer. I have a  9 degree from the University of Missouri at Rolla as a --  10 in geological engineering, bachelor of science, but I'm  11 not here as an expert by any means on anything. I'm  12 here just to throw my support and say a few comments  13 that I hope the mine gets permitted.  14 In my humble opinion, you had a mine already  15 in the area in the past. This is essentially trying to  16 restart the mine over again. It should be as near a  17 no-brainer as possible to get through the permitting  18 issues, I hope. And I encourage and hope that all of  19 the permitting agencies review and approve this permit  20 as soon as possible so all of the benefits of the mine  21 can start taking place as soon as possible.  22 And I think the negative impacts, if any, are  23 so minute that this will be just a great benefit in  24 general to the community and the state.  25 And again I encourage everything to be</p>

814	<p>1 reviewed and the permits be issued as soon as possible.</p> <p>2 Thank you.</p> <p>3 MS. ORTH: Thank you, Mr. Steinnerd.</p> <p>4 Jim Lommen.</p> <p>5 JIM LOMMEN</p> <p>6 having been first duly sworn or affirmed, gave</p> <p>7 public comment as follows:</p> <p>8 PUBLIC COMMENT</p> <p>9 MR. LOMMEN: My name is Jim Lommen. I'm also</p> <p>10 down from Socorro.</p> <p>11 And the -- we certainly encourage getting the</p> <p>12 mine open, and certainly Sierra County, Socorro County,</p> <p>13 all of us have been looking for any kind of economic</p> <p>14 development that can come to the area. Certainly having</p> <p>15 this mine will be -- will generate a lot of economic</p> <p>16 impact around it, from my experience. And I have had 50</p> <p>17 years in the mining and mineral processing industry.</p> <p>18 So I do encourage getting the permits in line</p> <p>19 and approved.</p> <p>20 MS. ORTH: Thank you, Mr. Lommen.</p> <p>21 Vern Jones.</p> <p>22 MR. JONES: Good day.</p> <p>23</p> <p>24</p> <p>25</p>	816	<p>1 LARRY BROOKS</p> <p>2 having been first duly sworn or affirmed, gave</p> <p>3 public comment as follows:</p> <p>4 PUBLIC COMMENT</p> <p>5 MR. BROOKS: So I'm a native New Mexican. I</p> <p>6 have lived here my entire life, been a lifelong</p> <p>7 resident. I have traveled this state from Cloverdale to</p> <p>8 Des Moines. Some of you may know where that's at. And</p> <p>9 Jal to Farmington and every -- every single state</p> <p>10 highway in between.</p> <p>11 I made a good living, kind of a blue-collar</p> <p>12 living in the paint and coatings industry. And so</p> <p>13 I'm -- I've been by many mines, been by many beautiful</p> <p>14 vistas that we have in our state. And I love this</p> <p>15 state.</p> <p>16 I presently am -- I train contractors, and I</p> <p>17 still work part-time in the roof coating business, even</p> <p>18 though I've got one foot in Kingston, I have a part-time</p> <p>19 residence there, and the other foot down in Las Cruces.</p> <p>20 One of the types of roofing that we work with</p> <p>21 is single-ply roofing. And it's similar to the type of</p> <p>22 liner that I think is being proposed. The single-ply</p> <p>23 roofing material comes in PVC, TPO, EPDM. It may vary a</p> <p>24 little, I mean a little different than the liner that's</p> <p>25 proposed being used. But it goes down very similar --</p>
815	<p>1 VERN JONES</p> <p>2 having been first duly sworn or affirmed, gave</p> <p>3 public comment as follows:</p> <p>4 PUBLIC COMMENT</p> <p>5 MR. JONES: My name is Vern Jones. I'm from</p> <p>6 Los Lunas, New Mexico.</p> <p>7 I'm retired, in engineering department.</p> <p>8 We have a small claim out here, and we work</p> <p>9 out there, and we work with and alongside the Copper</p> <p>10 Flat -- Copper Flats Mining Corporation. They have been</p> <p>11 nothing but very nice to us and everything else. So we</p> <p>12 support them 100 percent.</p> <p>13 I don't think the impact that they will have</p> <p>14 on the environment or anything is going to affect</p> <p>15 anything from there clear down to the Rio Grande, and it</p> <p>16 will dissipate by the time it gets down there.</p> <p>17 And I -- that's it.</p> <p>18 MS. ORTH: Thank you, Mr. Jones.</p> <p>19 MR. JONES: Thank you.</p> <p>20 MS. ORTH: Larry Brooks.</p> <p>21 MR. BROOKS: Thank you, Madam Chair, provide</p> <p>22 comments on this public hearing.</p> <p>23 MS. ORTH: We need to swear you.</p> <p>24 MR. BROOKS: Okay.</p> <p>25 I'm Larry Brooks.</p>	817	<p>1 in fact, on the piece right here, there's even a weld,</p> <p>2 really nicely done, and it's super strong.</p> <p>3 It's the type of roofing material that's used</p> <p>4 on large, large installations, like, for example, a</p> <p>5 Wal-Mart or a large industrial building, sometimes even</p> <p>6 on residential.</p> <p>7 And after a -- a job like the Wal-Mart's done,</p> <p>8 an engineered roofing system is installed, and seams are</p> <p>9 welded, and everything is put together by trained</p> <p>10 professionals. But very frequently at the end of that</p> <p>11 job, after the first rain, that's the real test, you may</p> <p>12 get a few leaks. Either someone inadvertently poked a</p> <p>13 hole in it or maybe one of the seams wasn't exactly as</p> <p>14 it should be. With thousands of feet on a roof of</p> <p>15 seams, there's always the potential for a leak.</p> <p>16 So I train contractors on how to repair seams</p> <p>17 and leaks like that. Like I said, it's similar to the</p> <p>18 type of pond lining material. This one here is actually</p> <p>19 only -- I think this is a 60-mil thickness. I believe</p> <p>20 the one proposed in the mine is 80 -- 80 mils.</p> <p>21 A lot of damage can happen on a roof after a</p> <p>22 rain. You get a slow leak that gets in, and water will</p> <p>23 infiltrate underneath that liner. And hopefully it</p> <p>24 drips through, and then you find where the leak's at and</p> <p>25 then go back and repair that spot and you see --</p>

<p style="text-align: right;">818</p> <p>1 physically see the puncture or the damaged installation 2 seam. 3       So a lot of damage can happen even up to 4 hazardous stuff, like some of the mildew and molds and 5 black mold can get on it. 6       Once you locate that, it can be fixed. But if 7 a liner is used in this tailing pond -- I'm -- I'm 8 concerned with the system of coming in and putting fill 9 over the top of that. Because you have the liner, and 10 then you come in and put the fill on the top. And the 11 potential for tailing rocks, crushed rocks or even 12 equipment -- in fact, I believe that the Truth or 13 Consequences dump was closed because of the damage to 14 their liner. I'm not positive on that, but that's what 15 I was told. 16       So these liners are not uncommon. 17       Once you get a hole in the liner, it can 18 continue to seep and leak. And I understand that the 19 mine has proposed some monitoring wells to take care of 20 some of the seepage, or at least be alerted about the 21 seepage. 22       I actually -- if I may, I'm a little dry. 23       I may say that if we had a single-ply, that is 24 one-ply, liner, and we took and filled that liner with 25 water, just, you know, regular water, and in that water</p>	<p style="text-align: right;">820</p> <p>1 could get down into the water supply, is of great 2 concern to me, that we're taking drinkable water and 3 potentially polluting that water with this tailing pond 4 in its design. 5       I'm not an expert, but I've been -- in mine 6 linings, but I've been around a lot of industrial roofs 7 and I've seen some disasters with one ply, single ply. 8 I'm very concerned about it. 9       I listened yesterday to Representative Dow, 10 and I -- I'm, like I said, a working class kind of a 11 guy. I worked my whole life in and around the 12 construction business, and I understand jobs. I work in 13 the coatings business. In fact, I've even supplied all 14 of the paint and coatings on this building and most of 15 the public buildings here in this town. 16       I like the idea of the jobs. But at what 17 cost? What's the cost to us, the people? What's the 18 cost to the next generation? And not to mention the 19 impacts ecologically on the environment, the wildlife, 20 the vegetation, the sheer beauty of our state. 21       So with that, I'm done with my comments, but 22 I'm getting a little dry. I don't want to drink this 23 water. I would rather use the water that's in the 24 ground as it is. 25       Thank you.</p>
<p style="text-align: right;">819</p> <p>1 is pollution which is represented by this coloring. You 2 can see what it would be. It almost duplicates the 3 appearance of the pond that's in the existing mine site. 4       And if you -- if you would imagine taking some 5 aggregate or rocks and putting on that site, packing it 6 in, however that's done -- I'll try not to make a mess 7 here -- and if you have this single liner that slowly 8 seeps and goes on, you only have one layer of defense. 9 And that layer of defense is this single ply, supposedly 10 protected by all the gravel and the tons and tons of 11 yardage of dirt and soil and crushed rock. 12       And then you put millions of gallons of water 13 on top of that, thus pushing down the weight, the 14 potential for sharp rock and other objects to get down 15 in and penetrate that, to me, is extremely high. 16       You know, if a person would come in and take 17 another -- a double liner and have underneath the first 18 liner, and put that polluted chemical in there, if you 19 do get a puncture from the rocks, then it would spill 20 through, at least have another catchment. 21       At least then we have the double protection, 22 knowing that the water that is being pumped out of the 23 ground, the water that we drink, the good water, and the 24 water that we may have that seeps back in -- this is 25 actually holding -- that is polluted and potentially</p>	<p style="text-align: right;">821</p> <p>1       MS. ORTH: Thank you, Mr. Brooks. 2       I see the name Andrew Maloney here but then a 3 comment that he'd prefer to go this evening. 4       Is that still true? 5       MR. MALONEY: Yes, ma'am. 6       MS. ORTH: Okay. 7       Is there anyone else whose name is not on this 8 sheet of paper who has not already made public comment 9 who would like to offer public comment at this time? 10       No? 11       All right. Thank you. 12       Mr. Dobrott and Mr. Kuipers, if you would 13 return to the table. 14       MR. BROOKS: What do I do with the waste? 15       MS. ORTH: There's a trash can by the coffee 16 table. 17       MR. DOBROTT: Sorry. 18       MS. ORTH: That's all right. 19       Okay. Mr. Butzier, do you have questions of 20 Mr. Dobrott? 21       MR. BUTZIER: Thank you, Madam Hearing 22 Officer. 23 24 25</p>

822	<p>1                   STEPHEN DOBROTT</p> <p>2       having been previously duly sworn or affirmed, was</p> <p>3       examined and testified further as follows:</p> <p>4                   CROSS EXAMINATION</p> <p>5 BY MR. BUTZIER:</p> <p>6       Q.   Good afternoon, Mr. Dobrott.</p> <p>7       A.   Good afternoon.</p> <p>8       Q.   Thank you for your testimony.</p> <p>9           I am curious.</p> <p>10       Are you the person with the Ladder Ranch who</p> <p>11       has the most responsibility for the wells that you</p> <p>12       described in your testimony?</p> <p>13       A.   Not anymore.</p> <p>14       Q.   And who would that person be?</p> <p>15       A.   The new manager of the Ladder Ranch is John</p> <p>16       Hurd.</p> <p>17       Q.   Okay.</p> <p>18           But when you were involved, you -- did you</p> <p>19       have that role?</p> <p>20       A.   Yes.</p> <p>21       Q.   Okay.</p> <p>22           And is the Las Animas -- is Las Animas Creek</p> <p>23       its own water basin, to your understanding?</p> <p>24       A.   Yes.</p> <p>25       Q.   Is that an underground basin according to the</p>	824	<p>1       Q.   And there's -- topographically there's --</p> <p>2       there's a higher elevation ridge, in essence, between</p> <p>3       the Grayback area and Las Animas Creek; isn't that</p> <p>4       correct?</p> <p>5       A.   Correct.</p> <p>6       Q.   Does the Ladder Ranch meter its wells?</p> <p>7       A.   Yes, sir.</p> <p>8       Q.   And is that information that is supplied to</p> <p>9       the Office of the State Engineer?</p> <p>10       A.   Yes, sir. I believe it's quarterly.</p> <p>11       Q.   Is it also sampled for -- you talked a lot</p> <p>12       about how pristine the water is from those wells.</p> <p>13           Is that based upon just general understanding,</p> <p>14       or is there a sampling program on any kind of regularity</p> <p>15       that confirms that fact?</p> <p>16       A.   We don't take regular samplings. Excuse me.</p> <p>17       But our biologists, who are concerned with the</p> <p>18       endangered species such as the Chiricahua leopard frog,</p> <p>19       do take samplings because that's -- there are very fine</p> <p>20       parameters there that exist for the -- for these frogs</p> <p>21       to be able to exist in the stream. So there's mostly pH</p> <p>22       and other -- TDS and that type of thing.</p> <p>23           But from what I understand, they do do -- our</p> <p>24       biologists do regular water analyses in order to make</p> <p>25       sure that whether either taking frogs from or moving</p>
823	<p>1 Office of the State Engineer?</p> <p>2       A.   I believe it is.</p> <p>3       Q.   And do you know is that a fully appropriated</p> <p>4       basin?</p> <p>5       A.   It's an adjudicated basin.</p> <p>6       Q.   It's also an adjudicated basin?</p> <p>7       A.   Yes.</p> <p>8       Q.   So --</p> <p>9       A.   Las Animas basin.</p> <p>10       Q.   And so you -- you as the ranch manager of</p> <p>11       Ladder Ranch are presumably aware or were aware of the</p> <p>12       extent, the quantification of the water rights</p> <p>13       associated with those wells?</p> <p>14       A.   Yes, sir.</p> <p>15       Q.   Okay.</p> <p>16           And are you also familiar with how those wells</p> <p>17       were completed and in what -- to what depth, that type</p> <p>18       of information?</p> <p>19       A.   I'm very familiar with that. Yes.</p> <p>20       Q.   Okay. Thank you.</p> <p>21           And the Las Animas basin -- or the Las Animas</p> <p>22       Creek area is considered to be in a different surface</p> <p>23       watershed area than the Grayback Arroyo basin; is that</p> <p>24       correct? Or area?</p> <p>25       A.   Yes, geographically.</p>	825	<p>1 frogs to that it's suitable.</p> <p>2       Q.   And can I assume from your answer that in some</p> <p>3       of the wells at least there's elevated pH and TDS?</p> <p>4       A.   I do not know that.</p> <p>5       Q.   What made you bring up those two --</p> <p>6       A.   I was mostly -- I thought maybe you were</p> <p>7       talking about -- maybe it was my fault. I was thinking</p> <p>8       more of the creek, of the creek itself, and the springs.</p> <p>9       The wells are still important to our facility at</p> <p>10       Headquarters that we propagate frogs, and so that water</p> <p>11       has also been evaluated --</p> <p>12       Q.   Okay.</p> <p>13       A.   -- its suitability for raising amphibians.</p> <p>14       Q.   Okay.</p> <p>15           And is there considerable amount of</p> <p>16       fluctuation of water in the Las Animas Creek from one</p> <p>17       part of the year to the next?</p> <p>18       A.   There is.</p> <p>19       Q.   And can you describe that? Is there a</p> <p>20       pattern? Is there a time of year when it's more water</p> <p>21       flowing than other times of the year?</p> <p>22       A.   Yes. A lot of it depends on the drought</p> <p>23       conditions that we have. As you know, probably</p> <p>24       65 percent of our rainfall comes within the monsoon</p> <p>25       season, and that is where we have more flashing water</p>

826	<p>1 events. And then if we get a snowpack in the winter, 2 then we have snowmelt and run-off from the snow. 3 We haven't had a whole lot of that lately. In 4 fact, I don't think -- the Animas Creek maybe ran once 5 this summer, and we've had very little run-off from 6 snowpack last year. So that's seasonal. 7 Q. Okay. 8 And you mentioned the proximity to the Black 9 Range in your testimony. 10 Do you recall that? 11 A. Yes, sir. 12 Q. Am I correct that the predominant source, if 13 you will, of water that feeds the Las Animas Creek 14 system is the result of run-off from the Black Range or 15 snowmelt from the Black Range? 16 A. I would say in normal years, yes, it is the 17 predominant source. 18 Q. Okay. 19 A. However, the Warm Spring, the Animas Warm 20 Spring, keeps us going for our -- our irrigation during 21 the dry season, and that's just above Headquarters. 22 Q. Okay. 23 And do the springs also fluctuate like the 24 flows in the stream itself? 25 A. Not necessarily.</p>	828	<p>1 ranch that are constructed in locations to capture 2 rainwater or run-off, but none of them are in a 3 situation where they're pulling in water from creeks or 4 springs. 5 Q. Are they in locations that would otherwise 6 lead to recharging of those springs and creeks? 7 A. No, sir. 8 Q. And how is that? Are they just randomly 9 placed in dry areas on the ranch? 10 A. Yes, sir. 11 Q. Is that to capture mostly just natural 12 precipitation? 13 A. That's correct. 14 Q. And it's for the purpose of feeding livestock 15 and wildlife? 16 A. Correct. 17 Q. And there are 35 of them. 18 A. Roughly. 19 Q. Okay. 20 Could we pull up the slide that has a little 21 24 that's part of your slide presentation? 22 That's it. 23 A. Okay. 24 Q. Looking at this map, I'd like to -- even 25 though it might take a little time, and I apologize, but</p>
827	<p>1 Q. So they're pretty reliable, but that -- you 2 went through a series of pictures of springs. 3 A. Um-hum. 4 Q. Is that water that's pretty reliably -- 5 A. Yes, sir. 6 Q. -- of the same volume that we can see in the 7 pictures? 8 A. Very similar, yes. 9 Q. And that's -- that's not so much affected 10 seasonally? 11 A. No, sir. 12 Q. And do you have an understanding of where the 13 water comes from to feed those springs? 14 A. No, sir. I don't know exactly. 15 Q. Okay. 16 Does the Ladder Ranch have any dams that it 17 uses in connection with either Cave Creek or Las Animas 18 Creek? 19 A. Not directly fed by either one of those two 20 creeks, no. 21 Q. Does it have dams on the Ladder Ranch? 22 A. Oh, yes. 23 Q. And can you describe what -- where those are 24 located? 25 A. Well, there is probably 35 earthen dams on the</p>	829	<p>1 I'd like to go well by well and collect what information 2 you know about it, both in terms of how deep the well 3 is, how deeply it is completed or, you know, at what 4 interval it may be completed. 5 And let's start with the one we talked about 6 the most, which is the Feedlot Well, in the little 7 rectangular area that juts down to the south from the 8 ranch. 9 What can you tell me about how deeply that 10 well has been completed and what you know about what 11 formation it's been completed in? 12 A. I -- if my memory is correct, this well is 13 approximately 100 to 125 feet deep. It has been there 14 since the 1950s. It has serviced in the past a feedlot, 15 thus the name, Feedlot Well. As far as I understand, 16 it's within the Santa Fe Group geologically. It is 17 on -- it is on electric power. 18 Q. And it also has a storage tank to the south -- 19 A. Yes, sir. 20 Q. -- of it? 21 A. There's a 40,000-gallon storage tank just to 22 the south of it. 23 Q. And tell me about what's the -- how often is 24 that storage tank needing to be refilled or used? 25 A. It's on an automatic float where it fills</p>



830	<p>1 whenever it's -- when it gets down to the point where it  2 needs to fill, because we need to keep the water levels  3 up for the frogs that we have in that storage.  4 Q. So there are frogs right in that area?  5 A. Yes, sir. They're in the storage.  6 Q. In the actual --  7 A. We use that particular storage, as other  8 storages that we have on the ranch, for frog refugia, or  9 a place to maintain them while they're in captivity.  10 And these are different genetic sources, frogs from  11 different locations around the Southwest.  12 Q. Okay. I'm going to get to a question about  13 where the --  14 A. Okay.  15 Q. -- threatened and endangered species that you  16 admirably, you know, helped take care of -- I'm going to  17 get to where those come from and when --  18 A. Okay.  19 Q. -- and that kind of thing.  20 But what can you tell me about the quality of  21 the water? Can you tell me any more specifically than  22 you have already about the quality of the water that  23 comes from that Feedlot Well?  24 A. I -- I can't give you anything other than the  25 fact that it's good enough for frogs.</p>	832	<p>1 Q. And do --  2 A. According to storages.  3 Q. And do you know in what volumes?  4 A. No, sir.  5 Q. How often is the Feedlot Well -- how often is  6 water drawn from the Feedlot Well?  7 A. Well, as I said, it's -- it draws it  8 automatically in order to keep the water levels up. So  9 it's -- I can't give you an exact figure.  10 Q. And it's -- in the Feedlot Well, I think you  11 said it was -- it was completed to 150 feet?  12 A. Roughly.  13 Q. Roughly.  14 And is that how -- is that where the well is  15 completed or --  16 A. Yes. It -- most of the stock wells on the  17 ranch are roughly 100 feet, 125 feet.  18 Q. Okay.  19 Is there anything else that the Evans Well is  20 used for?  21 A. No, sir.  22 Q. So its primary purpose today is to  23 supplement --  24 A. Yes.  25 Q. -- the Feedlot Well.</p>
831	<p>1 Q. Okay.  2 Is there anything else but that refuge -- what  3 was the --  4 A. Refugia.  5 Q. -- refugia that is serviced by that Feedlot  6 Well?  7 A. The Feedlot Well is supplemented by the Evans  8 Well.  9 Q. Okay.  10 Then let's move to the Evans Well next.  11 A. Okay.  12 Q. So moving to the west, the next well we come  13 to is the Evans Well.  14 What is it that you mean when you say it's  15 supplemented by that well?  16 A. We do have a pipeline that runs from the Evans  17 Well, that connects to the Feedlot Well, and then in  18 between those two are other storages that we can divert  19 to. So it's a supplemental. We use either/or on that  20 particular pasture.  21 Q. Okay.  22 And how often is water drawn from the Evans  23 Well?  24 A. I would say probably once every couple of  25 weeks.</p>	833	<p>1 A. Yes. And that's for livestock and wildlife.  2 Q. Tell me about beyond the frogs what -- what  3 makes use of water from the Feedlot and Evans Wells.  4 A. There is a facility about two --  5 one-and-a-half miles of the Evans Well and about a mile  6 north of the Feedlot Well where we have -- where we  7 raise Bolson tortoises, which is an endangered species.  8 Q. Okay.  9 A. And those wells supply water to that facility,  10 as well.  11 Q. Okay.  12 And the Bolson tortoises make use of that  13 water how? Just drinking --  14 A. Drinking.  15 Q. Okay.  16 And let's move now further west to the John  17 Cross Well.  18 Is that also in the 100-foot-deep range?  19 A. Yes, sir.  20 Q. Now, in this topography, we're talking about  21 uphill from the Las Animas Creek, obviously --  22 A. Correct.  23 Q. -- but all of the wells we've talked about so  24 far are on the other side of the topographical feature  25 that I described as sort of a hill that divides --</p>

834	<p>1 A. Correct.</p> <p>2 Q. -- the properties? Okay.</p> <p>3 And what is the water from that well used for,</p> <p>4 and how often is it drawn?</p> <p>5 A. That's a livestock and wildlife well. It's on</p> <p>6 a solar power so it operates as much as it needs to.</p> <p>7 Q. Are there drinkers associated with it?</p> <p>8 A. Yes, sir.</p> <p>9 Q. How many?</p> <p>10 A. There's a tire drinker right next to it, and</p> <p>11 then downstream there are quail drinkers.</p> <p>12 Q. Okay.</p> <p>13 A. About every half mile.</p> <p>14 Q. Let's move now farther west to the Myers Well.</p> <p>15 How deep is that one, to your knowledge?</p> <p>16 A. That well is a lot deeper. It's around</p> <p>17 400 feet.</p> <p>18 Q. And does that -- do you know if that taps into</p> <p>19 the regional groundwater table?</p> <p>20 A. I assume it does.</p> <p>21 Q. Do the other ones that we've already talked</p> <p>22 about, to your knowledge, tap into the regional well?</p> <p>23 A. I assume -- I assume that it does.</p> <p>24 Q. What is -- what is the Myers Well used for?</p> <p>25 A. The Myers Well is used for watering bison and</p>
835	<p>1 wildlife.</p> <p>2 Q. And have you -- for either the John Cross Well</p> <p>3 or the Myers Well, can you tell me what you know about</p> <p>4 the quality of the water that is drawn from those wells?</p> <p>5 A. I cannot, other than it's -- it seems to be</p> <p>6 good quality.</p> <p>7 Q. Good quality? Okay.</p> <p>8 A. I don't have any measurements.</p> <p>9 Q. Okay.</p> <p>10 Is there any piping of water from either of</p> <p>11 those two wells, the John Cross Well or the Myers Well,</p> <p>12 to any other location?</p> <p>13 A. Well, yes, sir. The Myers Well boosts water</p> <p>14 up to the Myers Mesa, up to another steel rim storage.</p> <p>15 By the way, the Myers Well has a storage</p> <p>16 there, another 40,000-gallon storage --</p> <p>17 Q. Okay.</p> <p>18 A. -- and a booster pump that pumps up the hill</p> <p>19 to the top of Myers Mesa. And gravity flows back down</p> <p>20 for bison drinkers.</p> <p>21 Q. And is that -- is that on an automatic kind of</p> <p>22 arrangement, or is that periodic?</p> <p>23 A. It's solar -- it's solar, and -- it's managed,</p> <p>24 but it's solar, and it's pretty much automatic.</p> <p>25 Q. Okay.</p>
836	<p>1 Let's talk about the Wanda Well next, moving</p> <p>2 back east and a little bit north.</p> <p>3 How deep is that well?</p> <p>4 A. The Wanda Well is around 100 feet.</p> <p>5 Q. And what is that well used for?</p> <p>6 A. It's used for livestock and wildlife.</p> <p>7 Q. Is it similarly stored in any kind of</p> <p>8 container?</p> <p>9 A. Yes. There is a -- there is a storage</p> <p>10 container nearby, and it is pumped -- the water is</p> <p>11 pumped from the well to the container, and then it's</p> <p>12 gravity-flowed downhill to a series of drinkers for</p> <p>13 quail.</p> <p>14 Q. For quail. That one's primarily a quail well?</p> <p>15 A. (Nods head.)</p> <p>16 Q. Okay.</p> <p>17 And do you know anything about the quality of</p> <p>18 the water drawn from that well?</p> <p>19 A. No, sir, other than we haven't seen any dead</p> <p>20 animals around it.</p> <p>21 Q. Okay. Fair enough.</p> <p>22 Let's go a little to the north and look at the</p> <p>23 Shipping Pens Well.</p> <p>24 Now, that looks to me like it's very close to</p> <p>25 Las Animas Creek; is that correct?</p>
837	<p>1 A. It is. Yes, sir.</p> <p>2 Q. And how deeply is that completed?</p> <p>3 A. I can't say off the top of my head, but most</p> <p>4 of those irrigation wells along through that area are</p> <p>5 around 100 feet.</p> <p>6 Q. Okay.</p> <p>7 A. It's just a little higher static water level.</p> <p>8 Q. Okay.</p> <p>9 A. And the water level does vary with the</p> <p>10 groundwater table.</p> <p>11 Q. And what is that well used for?</p> <p>12 A. That well is an irrigation well.</p> <p>13 Q. And what gets irrigated from that well?</p> <p>14 A. The -- there's farms in that vicinity of that</p> <p>15 well, and the purpose of that well was to pump water</p> <p>16 into those farms for irrigation.</p> <p>17 Q. Okay.</p> <p>18 So those are supported by an agricultural</p> <p>19 water right of some kind?</p> <p>20 A. Yes, sir.</p> <p>21 Q. Okay.</p> <p>22 And what about the Higgins -- well, first of</p> <p>23 all, do you know about the quality of the water from</p> <p>24 that well?</p> <p>25 Maybe I already asked that.</p>

838	<p>1 No?</p> <p>2 A. I can't give you exact parameters.</p> <p>3 Q. Okay.</p> <p>4 And what about the Higgins Well just to the</p> <p>5 north of that?</p> <p>6 A. Same purpose.</p> <p>7 Q. And that's also pretty close, it looks like,</p> <p>8 to the Las Animas Creek streambed?</p> <p>9 A. Yes, sir.</p> <p>10 Q. And then we get to the Ladder Headquarters,</p> <p>11 looking farther north.</p> <p>12 Is that its own well, or is that just the</p> <p>13 Headquarters?</p> <p>14 A. That's just the Headquarters, and there are</p> <p>15 domestic wells. And what is not shown on there is the</p> <p>16 Orchard Well.</p> <p>17 Q. Okay.</p> <p>18 And that's located very close to the</p> <p>19 Headquarters?</p> <p>20 A. Yes.</p> <p>21 Q. Okay.</p> <p>22 Now, tell me about -- you mentioned there's</p> <p>23 a -- I think you said that the Cave Creek is tributary</p> <p>24 to the Las Animas Creek; is that correct?</p> <p>25 A. Correct.</p>
839	<p>1 Q. And it comes down from the Black Range to the</p> <p>2 west --</p> <p>3 A. Correct.</p> <p>4 Q. -- and then feeds into the Las Animas Creek?</p> <p>5 A. Yes, sir.</p> <p>6 Q. Are there other tributaries that feed into the</p> <p>7 Las Animas Creek, to your knowledge?</p> <p>8 A. Not major. There are a lot of minor</p> <p>9 tributaries, such as this area here, Tank Canyon, Wanda</p> <p>10 Canyon.</p> <p>11 Q. What is the topographical elevation in general</p> <p>12 terms of the Cave Creek as compared to, say, the Ladder</p> <p>13 Headquarters?</p> <p>14 A. I know the Ladder Headquarters is</p> <p>15 approximately 5,280 feet, or 5,200 feet. And the</p> <p>16 elevation of -- I can't read it from here -- is -- I</p> <p>17 don't know if I can read it.</p> <p>18 Q. Just looking from the lines on this</p> <p>19 topographic map, it looks like it's quite a bit higher</p> <p>20 in elevation? Is that your understanding?</p> <p>21 A. There we go. Cave Creek -- I'm looking -- I</p> <p>22 don't see -- I don't see an elevation.</p> <p>23 Q. And is Cave Creek sort of down in a -- in its</p> <p>24 own little creek valley below the Myers Mesa that's --</p> <p>25 A. Yes, sir.</p>
840	<p>1 Q. -- that's indicated on this map?</p> <p>2 A. Um-hum.</p> <p>3 Q. Okay.</p> <p>4 So it's kind of between Myers Mesa and Cave</p> <p>5 Creek Mesa.</p> <p>6 A. I'm sorry. Animas Creek is north of Cave</p> <p>7 Creek Mesa.</p> <p>8 Q. No. I was talking about Cave Creek.</p> <p>9 Cave Creek is kind of between -- runs kind of</p> <p>10 between Myers Mesa --</p> <p>11 A. Oh, yes, sir.</p> <p>12 Q. -- to the south and Cave Creek Mesa --</p> <p>13 A. That's correct.</p> <p>14 Q. -- to the north.</p> <p>15 And again it's coming from the Black Range,</p> <p>16 essentially?</p> <p>17 A. That's correct.</p> <p>18 MR. BUTZIER: Can we pull out again on that</p> <p>19 map, Jim? Thanks.</p> <p>20 Okay. Let's turn back to the wells.</p> <p>21 Well, let me ask -- since we're on creeks, let</p> <p>22 me ask about Seco Creek.</p> <p>23 Am I interpreting this map correctly that Seco</p> <p>24 Creek is not tributary to Las Animas Creek, at least as</p> <p>25 far as we can see on the map?</p>
841	<p>1 A. Yes, sir.</p> <p>2 Q. And it's to the north of Las Animas Creek?</p> <p>3 A. Um-hum.</p> <p>4 Q. And Crews Well looks like it might be in close</p> <p>5 proximity to the stream channel; is that correct?</p> <p>6 A. That's correct.</p> <p>7 Q. And what -- is that also about 100 feet or so</p> <p>8 deep?</p> <p>9 A. I believe so.</p> <p>10 Q. And what is that well used for?</p> <p>11 A. That is used -- that well is used for</p> <p>12 livestock and wildlife.</p> <p>13 Q. Is water stored in tanks from that well?</p> <p>14 A. Yes.</p> <p>15 Q. And where are those located, in what volume?</p> <p>16 A. I don't know if it's on this map, but there is</p> <p>17 a pump that pumps water from the Crews Well north</p> <p>18 approximately one mile to another steel rim storage</p> <p>19 facility, and from that storage facility it's</p> <p>20 gravity-flowed out to the east, the eastern part of the</p> <p>21 ranch, which would be this country out here to the -- on</p> <p>22 the north portion of this map.</p> <p>23 Q. And that looks like relatively flat terrain</p> <p>24 kind of?</p> <p>25 A. It is.</p>

842	<p>1 Q. Gently sloping toward the Rio Grande?</p> <p>2 A. Yes, sir.</p> <p>3 Q. And coming back down Seco Creek to Seco Well,</p> <p>4 also appears to be in or close to the stream channel,</p> <p>5 correct?</p> <p>6 A. Correct.</p> <p>7 Q. Is that also about 100 feet deep?</p> <p>8 A. I believe all these wells were drilled about</p> <p>9 the same depth.</p> <p>10 Q. And are the Crews Wells and -- well, is the</p> <p>11 Seco Well also supporting a tank of some kind?</p> <p>12 A. Yes, sir.</p> <p>13 Q. And that's used in connection with livestock?</p> <p>14 A. Yes, sir.</p> <p>15 Q. And wildlife?</p> <p>16 A. Yes, sir.</p> <p>17 Q. Okay.</p> <p>18 What about the Wild Horse Well that's way off</p> <p>19 on the upper right corner of this map?</p> <p>20 A. Wild Horse Well is not being used at this</p> <p>21 time. It's being fed by the Seco Well and pumped</p> <p>22 across, and the pipelines run towards Wild Horse Well.</p> <p>23 Q. Okay.</p> <p>24 And let's jump all the way now over to the</p> <p>25 upper left corner and tell me about Number 2 Well and</p>	844	<p>1 Q. Okay.</p> <p>2 And the farmland that is irrigated with that,</p> <p>3 is it on both sides of the creek or one side or the</p> <p>4 other?</p> <p>5 A. Typically the farmland is on the north side --</p> <p>6 well, north side of the wells; however, the Orchard Well</p> <p>7 is right in the middle of the -- of the farm operation.</p> <p>8 Q. Okay.</p> <p>9 And what's grown in those farms?</p> <p>10 A. Most of the crops are for wildlife, to attract</p> <p>11 wildlife. So it's native grasses or pasture grasses.</p> <p>12 We attract a lot of elk and deer and javelina and</p> <p>13 turkeys. So we try our best to plant foods that</p> <p>14 wildlife would be attracted to.</p> <p>15 Q. Okay.</p> <p>16 A. And that's about it really.</p> <p>17 Q. And I guess I see that I missed three other</p> <p>18 wells on this that I'd like to ask you about.</p> <p>19 Let's turn to the 53 Water Well, which looks</p> <p>20 like it's a little downstream in the Las Animas Creek</p> <p>21 streambed area.</p> <p>22 A. I have no -- no information on that well, and</p> <p>23 this -- this well I'm not even sure it exists, because I</p> <p>24 never could find that, where the information came from</p> <p>25 on that.</p>
843	<p>1 Number 3 Well.</p> <p>2 A. Both wells are again stock wells. Number 3</p> <p>3 Well is -- has a fairly deep well, that's about 400,</p> <p>4 450 feet, and it's pumped by solar.</p> <p>5 Q. Any tanks?</p> <p>6 A. There's a storage there. Most of these</p> <p>7 storages that were put in in the '50s were about 40,000</p> <p>8 gallons.</p> <p>9 Q. Okay.</p> <p>10 A. Number 2 Well, same thing. It has a windmill</p> <p>11 and solar pumping. These are getting water out of the</p> <p>12 ground and a 40,000-gallon storage. And then we boost</p> <p>13 that water upslope to other storage facilities and then</p> <p>14 gravity-flow back.</p> <p>15 Q. To drinkers and that type thing?</p> <p>16 A. Drinkers and for wildlife and livestock.</p> <p>17 Q. So of all these wells that we just talked</p> <p>18 about, it sounds like really only one of them is used</p> <p>19 for purely agricultural reasons; is that correct? Or</p> <p>20 did I misinterpret?</p> <p>21 A. There are three --</p> <p>22 Q. Three. Okay.</p> <p>23 A. -- along Animas Creek that we use for</p> <p>24 agriculture, the Orchard Well, the Higgins Well and the</p> <p>25 Shipping Pens Well.</p>	845	<p>1 And then the 54 Well looks to me off the</p> <p>2 property. So I have no information on that, as well.</p> <p>3 Q. Do you know if that's -- that infrastructure</p> <p>4 belongs to the Ladder Ranch?</p> <p>5 A. The -- this well here is not on the Ladder</p> <p>6 Ranch.</p> <p>7 Q. It's not on the ranch?</p> <p>8 A. It's not on the ranch.</p> <p>9 Q. So it's somebody else --</p> <p>10 A. Some of the neighbors -- some of the neighbors</p> <p>11 ranch.</p> <p>12 Q. Okay.</p> <p>13 And I assume the same would be true of the</p> <p>14 27-27 3 Water Well.</p> <p>15 A. Yes. I have no -- no idea. They're all off</p> <p>16 the ranch.</p> <p>17 Q. Now, am I correct that there are a number of</p> <p>18 residential properties along the lower reaches of Las</p> <p>19 Animas Creek?</p> <p>20 A. Yes, sir.</p> <p>21 Q. About how many people live in that area?</p> <p>22 A. I'm thinking there's probably 100 people.</p> <p>23 Q. And do they all have their -- essentially</p> <p>24 their own well or share wells?</p> <p>25 A. Most -- most people do have their own wells.</p>

846	<p>1 Q. All right.</p> <p>2 Now, you talked about concern about</p> <p>3 contamination possibly making its way somehow to the --</p> <p>4 to the Ladder Ranch.</p> <p>5 I'd like to have you, if you would, tell me</p> <p>6 the areas and the wells that you are most concerned</p> <p>7 could be somehow impacted by the mine.</p> <p>8 A. The Feedlot Well is the well that -- right now</p> <p>9 that we're most concerned about in terms of any</p> <p>10 contamination that could come from the tailings pond.</p> <p>11 The other wells to the north -- any of these wells to</p> <p>12 the north I'm concerned about any -- any possible</p> <p>13 connectivity of the mine pit lake to those wells.</p> <p>14 Q. Okay.</p> <p>15 And you referred to the fact that some of your</p> <p>16 experts or your hydrologists have given you cause for</p> <p>17 concern about what might happen and might come from the</p> <p>18 mine; is that correct?</p> <p>19 A. Yes, sir.</p> <p>20 Q. Can you tell me more about that? What are the</p> <p>21 experts that you're talking to saying could be the</p> <p>22 pathway to -- to reach any of those wells?</p> <p>23 A. Well, they have told me -- and you have to</p> <p>24 understand I've been through this quite a while, and so</p> <p>25 there's a lot of modeling that I have looked at, and</p>	848	<p>1 with, and that's where -- and that's what I am led to</p> <p>2 believe that that is possible.</p> <p>3 Q. And just to be clear, you yourself are not a</p> <p>4 hydrologist, right?</p> <p>5 A. No, sir.</p> <p>6 Q. And do you know whether the Animas fault</p> <p>7 that -- were you -- were you present in the room when</p> <p>8 Steve Finch was testifying?</p> <p>9 A. Yes, sir.</p> <p>10 Q. And do you know whether the Animas fault</p> <p>11 feature that he identified in some of his slides extends</p> <p>12 to the Ladder Ranch?</p> <p>13 A. I do not know exactly.</p> <p>14 Q. Do you know roughly --</p> <p>15 A. I know roughly where.</p> <p>16 Q. -- where it is?</p> <p>17 Can you --</p> <p>18 A. Based on the maps.</p> <p>19 Q. Can you -- on this map, can you use your</p> <p>20 pointer to show where you understand that to be.</p> <p>21 A. Let's see. Roughly in this vicinity here, and</p> <p>22 it could make its way up this way.</p> <p>23 Q. But I think you said you don't know --</p> <p>24 A. I don't know --</p> <p>25 Q. -- how far north?</p>
847	<p>1 from my experience on the ranch, and the information</p> <p>2 that I have read and studied pertaining to this</p> <p>3 particular project, there is in my -- my understanding</p> <p>4 is that there is -- and also from our experts that told</p> <p>5 us, two different hydrologists, that said that there --</p> <p>6 there is -- there could be a connection, there could be</p> <p>7 some connectivity between -- at the -- especially at the</p> <p>8 faults or the fractures.</p> <p>9 And so that's -- that's what the basis is --</p> <p>10 my basis of understanding is from, and also my personal</p> <p>11 experience on the ranch dealing with water for 24 years.</p> <p>12 Q. And can you elaborate on that? What about</p> <p>13 your experience in 24 years has contributed to --</p> <p>14 A. Well --</p> <p>15 Q. -- your concern about this project?</p> <p>16 A. I pretty much know where water runs and where</p> <p>17 it doesn't in terms of surface water. The groundwaters,</p> <p>18 you know, I'm not an expert in that area, but we've had</p> <p>19 to accommodate our livestock through drought periods,</p> <p>20 and I'm pretty well versed on what wells are strong,</p> <p>21 what wells are weak, and how that -- how those wells</p> <p>22 respond to drought conditions.</p> <p>23 And so it's my opinion that -- that there</p> <p>24 could be some connectivity based on the information that</p> <p>25 I have read and the hydrologists that I have consulted</p>	849	<p>1 THE REPORTER: Excuse me.</p> <p>2 MS. ORTH: You have to speak one at a time.</p> <p>3 MR. BUTZIER: Sorry.</p> <p>4 MR. DOBROTT: Sorry.</p> <p>5 THE REPORTER: Please repeat.</p> <p>6 MR. DOBROTT: I don't know how they know, or</p> <p>7 would know.</p> <p>8 MR. BUTZIER: Okay.</p> <p>9 MR. DOBROTT: For the last 24 years, nobody</p> <p>10 has looked on the ranch.</p> <p>11 Q. (BY MR. BUTZIER) Has there -- have there been</p> <p>12 requests coming from consultants for the company to gain</p> <p>13 access to get information on the Ladder Ranch?</p> <p>14 A. There have been.</p> <p>15 Q. And have those been granted by the ranch?</p> <p>16 A. Not always.</p> <p>17 Q. Can you tell me how often and when it was</p> <p>18 granted and when it wasn't?</p> <p>19 A. I think years before we were -- we were</p> <p>20 allowing people from INTERA, I believe, to come --</p> <p>21 Q. Alta Gold?</p> <p>22 A. -- Alta Gold to come in and do some surveys.</p> <p>23 Q. Oh, from INTERA. Okay?</p> <p>24 A. From INTERA.</p> <p>25 Q. Sorry.</p>

850	<p>1 A. INTERA.                  2 And after a while, we stopped doing that.                  3 Q. And why did you stop doing that?                  4 A. I was told to.                  5 Q. Okay.                  6 Now, is there any kind of -- apart from the                  7 concern about contamination finding its way to the                  8 Ladder Ranch from the mine facility, is there any kind                  9 of philosophical problem that your boss or the owner of                  10 the ranch has with mining?                  11 A. Figured you'd ask that.                  12 No --                  13 MR. DE SAILLAN: I'm going to object to that                  14 question --                  15 MR. DOBROTT: Yeah. That's --                  16 MR. DE SAILLAN: -- Madam Hearing Officer.                  17 That goes way outside the scope of his testimony, his                  18 direct testimony.                  19 MR. BUTZIER: I'll withdraw that question.                  20 MS. ORTH: All righty.                  21 Q. (BY MR. BUTZIER) Okay. So you had identified                  22 an area of the Ladder Ranch that I think you indicated                  23 in response to a question from Mr. de Saillan was                  24 immediately adjacent to the property boundary of the                  25 Ladder Ranch.</p>	852	<p>1 A. Yes, absolutely.                  2 Q. Okay.                  3 And are you familiar with the bison in the                  4 Yellowstone area?                  5 A. Yes.                  6 Q. And do you know anything about the quality of                  7 the water that they drink?                  8 A. No, sir.                  9 MS. ORTH: Mr. Dobrott, please wait until he's                  10 done asking his question.                  11 Q. (BY MR. BUTZIER) So now I'd like to turn to                  12 again your admirable efforts to help the threatened and                  13 endangered species.                  14 Are most of those species brought to the                  15 ranch, or are any of them -- I guess that's kind of a                  16 double -- compound question, but can you tell me what                  17 wildlife are indigenous to the ranch that you take care                  18 of in your conservation programs, or that the Ladder                  19 Ranch takes care of?                  20 A. All of the conservation programs on the Ladder                  21 Ranch deal with indigenous or native wildlife.                  22 Q. That started at the Ladder Ranch or that were                  23 brought to the Ladder Ranch?                  24 A. There is -- the Bolson tortoise is a project                  25 that we -- that began in Arizona. It's a -- it's</p>
851	<p>1 Can you show me where the permit boundary for                  2 the Copper Flat Mine is immediately adjacent to the                  3 Ladder Ranch?                  4 A. I believe it's right along this line.                  5 Q. And the Copper Flat Mine is the little sort of                  6 whitish area beneath the --                  7 A. Well, that --                  8 Q. -- Copper Flat Mine?                  9 A. Yes. That's the permit.                  10 Q. So the permit boundary is actually in a very                  11 small -- on this map --                  12 A. Yeah.                  13 Q. -- in a very small, little formation within                  14 that, right?                  15 A. Yes.                  16 Q. So the permit boundary itself is actually                  17 perhaps as much as a couple of miles away from the --                  18 from the southern boundary of the ranch; is that                  19 correct?                  20 A. Correct.                  21 Q. All right. Now, let's talk about the bison.                  22 You've mentioned the frogs need pristine                  23 water.                  24 Is it your understanding that bison require                  25 pristine water to survive?</p>	853	<p>1 actually indigenous to Mexico, but it was                  2 prehistorically in New Mexico, and we -- we -- Turner                  3 Endangered Species Fund got involved in propagating                  4 these tortoises and hopes to return them back into their                  5 prehistoric range in New Mexico.                  6 And so we are involved in a breeding project                  7 right now. So that's the only -- only species that we                  8 deal with that has been brought onto the ranch that has                  9 not been there in historic times. Put it that way.                  10 Q. Okay.                  11 Part of your presentation, you indicated that                  12 the Las Animas Creek goes from the southeast to the                  13 northwest.                  14 Do you remember that testimony?                  15 A. Except for it flows from the northwest to the                  16 southeast.                  17 Q. That was my point of clarification.                  18 It's actually flowing from the northwest to                  19 the southeast, correct?                  20 A. Correct.                  21 Q. Okay.                  22 And so things that happen on the Ladder Ranch                  23 potentially affect the neighbors to the lower reaches of                  24 the Ladder Ranch; is that correct?                  25 A. That's correct.</p>

854	<p>1 Q. Have there been any complaints that the Ladder 2 Ranch has experienced that you're aware of about 3 anything having to do with water management associated 4 with the Ladder Ranch? 5 A. I think in the early days and back in the 6 '90s, there was concern about the Ladder Ranch holding 7 water back for any purpose at all, but then we -- we had 8 a nice tour and showed people that were concerned that 9 there was no reason to be concerned, that all of the 10 impoundments that were -- that are on the Ladder Ranch 11 Headquarters area have been there for several -- for 12 years, and even prior to the adjudication of the Las 13 Animas water basin. 14 Q. And what year was that? I'm sorry. What year 15 was that? 16 A. I believe it was 1964. 17 Q. Okay. 18 Were you -- 19 A. I was not there then. 20 Q. -- there then? Okay. 21 We heard yesterday from a public commenter 22 concerned about salinity of the Las Animas Creek. 23 Have you ever heard any complaints or concerns 24 about salinity of the Las Animas Creek water? 25 A. The only time I've heard that was from the Las</p>	856	<p>1 Can we go to the next one? 2 That one has a little more riparian 3 vegetation. 4 Which well is that? 5 A. That is the John Cross. 6 Q. Is that higher up, that is higher up in 7 elevation? 8 A. It's -- it's -- no. Down canyon from the 9 Myers. 10 Q. Okay. 11 And then let's go to the next picture. 12 Which one is that? 13 A. That is Wanda Well. That's in Wanda Canyon. 14 Q. And that's slide number 27. I guess I should 15 be doing this for the record. 16 All right. And then let's go to the next one. 17 Slide 28 is what well? 18 A. Slide 28 is the Evans Well. 19 Q. Okay. 20 Slide 29? 21 A. Slide 29 is the Feedlot Well. 22 Q. Okay. 23 And -- is that it for the well photos? 24 A. There are irrigation well photos after that. 25 Q. In number 1 where you had sort of a concrete</p>
855	<p>1 Animas nursery, from Lee Newman. 2 Q. Okay. 3 And was that something that you talked with 4 him about? 5 A. No. I haven't. He offered that at the public 6 testimony. 7 Q. Do you have any understanding of why there 8 might be salinity in the lower reaches of the Las Animas 9 Creek? 10 A. No, sir. 11 Q. I'd like to go back to the beginning of 12 Exhibit 4, if we could. Well, at least to the -- to the 13 part of the exhibit -- part of the slideshow that showed 14 the wells. 15 If we could flip through those photos, I'd 16 appreciate it. 17 Now, which infrastructure is this? 18 A. This is Myers Well. 19 Q. And I note -- I can't help but notice it's 20 pretty -- pretty dry terrain around it. 21 Is that -- there's nothing, obviously, that's 22 irrigated in that area, it's the water is used in the 23 tank -- 24 A. No, sir. That's a stock -- stock well. 25 Q. Okay.</p>	857	<p>1 squared -- 2 A. That was a spring. 3 Q. Oh, that was a spring. Okay. 4 A. Um-hum. That's the Manager House Spring. 5 Q. Okay. 6 Can we go back to the map, please. 7 Of the springs that you identified in your 8 testimony earlier, can you use your pointer to show 9 where those are and just -- and mention the name of the 10 spring in connection with slide 24? 11 A. Okay. In slide 24, the Animas Warm Spring is 12 just above Ladder Headquarters, about a mile. 13 The Manager House Spring is right at 14 Headquarters on the north side of the canyon. 15 The Garden Tank Spring is just across the 16 canyon from the Higgins Well. 17 What else do we have. 18 The Myers Animas Spring is in this location. 19 It's almost two-and-a-half miles downstream from the 20 Ladder Headquarters. 21 Q. Okay. 22 A. And then there are several springs that 23 emanate from these canyons that are unnamed, all the way 24 along here. 25 Q. And those canyons rise in elevation to the</p>

858	<p>1 north from Las Animas Creek?</p> <p>2 A. That's correct.</p> <p>3 Q. Now, Mr. Dobrott, are you aware of or have you</p> <p>4 been following what BLM or the Fish and Wildlife Service</p> <p>5 have been doing in connection with the Copper Flat</p> <p>6 project in terms of analyzing threatened and endangered</p> <p>7 species?</p> <p>8 A. In regards to the -- the draft environmental</p> <p>9 assessment?</p> <p>10 Q. Correct.</p> <p>11 A. Yes.</p> <p>12 Q. You've been following that, and you're aware</p> <p>13 of it?</p> <p>14 A. I've been following it and am aware of it.</p> <p>15 Q. And what's your understanding of what sort of</p> <p>16 the analysis of the potential for impacts to some of</p> <p>17 those species is in that -- through that process?</p> <p>18 A. I'm not sure if there's been -- since there's</p> <p>19 not a final draft -- or final EIS out, I don't know what</p> <p>20 the results are, from comments that I know were given by</p> <p>21 the Fish and Wildlife Service, the Game and Fish</p> <p>22 Department. So I really don't know what the BLM's final</p> <p>23 view was on that.</p> <p>24 Q. And would you or the Ladder Ranch expect to</p> <p>25 essentially be comfortable that that was a full process</p>	860	<p>1 A. Um-hum.</p> <p>2 Q. But it has -- to your understanding, it hasn't</p> <p>3 been submitted as part of this process.</p> <p>4 A. Not to my understanding.</p> <p>5 Q. Okay.</p> <p>6 I think the sort of final conclusion or final</p> <p>7 part of your testimony, you had some testimony that was</p> <p>8 sort of in the nature of some of the wildlife and</p> <p>9 conservation programs and maybe perhaps even the</p> <p>10 businesses conducted on the ranch could -- I think your</p> <p>11 term was could be affected if there is contamination</p> <p>12 that comes from the mine to the Ladder Ranch.</p> <p>13 A. Correct.</p> <p>14 Q. And it's not -- there's no assertion that it</p> <p>15 will or that it has, it's just there could be an impact</p> <p>16 if contamination comes to the Ladder Ranch.</p> <p>17 A. That's correct.</p> <p>18 MR. BUTZIER: Okay. That's all the questions</p> <p>19 I have.</p> <p>20 MS. ORTH: All right. Thank you.</p> <p>21 Mr. Knight, do you have questions of</p> <p>22 Mr. Dobrott?</p> <p>23 MR. KNIGHT: I have no questions for this</p> <p>24 witness.</p> <p>25 MS. ORTH: All right. Thank you.</p>
859	<p>1 and was a good analytical process that resulted in</p> <p>2 conclusions that are supportable?</p> <p>3 MR. DE SAILLAN: Objection, Madam Hearing</p> <p>4 Officer. I think that calls for a lot of speculation on</p> <p>5 the witness' part.</p> <p>6 MS. ORTH: Mr. Dobrott, can you answer the</p> <p>7 question without speculating?</p> <p>8 MR. DOBROTT: I believe I can say that our</p> <p>9 team has not been satisfied that BLM has taken into</p> <p>10 consideration the comments that we sent in.</p> <p>11 MR. BUTZIER: Okay.</p> <p>12 Q. And you mentioned earlier in your testimony a</p> <p>13 number of models or a number of modeling work that's</p> <p>14 been done on groundwater? Is that -- am I remembering</p> <p>15 that correctly?</p> <p>16 A. That's correct.</p> <p>17 Q. Is any of that modeling work -- has any of it</p> <p>18 been made a part of the Copper Flat permitting record in</p> <p>19 this case?</p> <p>20 A. I think it has in the past, in the '90s, late</p> <p>21 '90s.</p> <p>22 Q. And so was that in connection when Alta Gold</p> <p>23 was --</p> <p>24 A. Yes, sir.</p> <p>25 Q. -- pursuing this project?</p>	861	<p>1 Ms. Barncastle?</p> <p>2 MS. BARNCASTLE: No cross. Thank you.</p> <p>3 MS. ORTH: Mr. de Saillan, do you have any</p> <p>4 redirect?</p> <p>5 Oh, wait. Sorry.</p> <p>6 Does anyone else in the room have a question</p> <p>7 of Mr. Dobrott based on his testimony?</p> <p>8 All right. Mr. de Saillan.</p> <p>9 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>10 Officer. I just have a couple of questions.</p> <p>11 REDIRECT EXAMINATION</p> <p>12 BY MR. DE SAILLAN:</p> <p>13 Q. Early on in your cross-examination,</p> <p>14 Mr. Butzier asked you about what the Feedlot Well was</p> <p>15 used for, and I don't think you fully answered his</p> <p>16 question.</p> <p>17 You mentioned the -- the endangered frogs, and</p> <p>18 you mentioned the endangered tortoise, but I don't think</p> <p>19 you had a chance to continue, and I think there were</p> <p>20 some other things that you testified about before that</p> <p>21 the Feedlot Well is used for.</p> <p>22 Could you just go over those again, please?</p> <p>23 A. Thank you, sir. Yes. The -- the pipelines</p> <p>24 that emanate from the storage from that well also feed a</p> <p>25 number of wildlife species, the deer, the elk, the</p>



862	<p>1 pronghorns, all the wildlife that occurs in that 2 pasture, and numerous quail feeders that are put out 3 every half mile. 4 It's -- it's not just for frogs and tortoises. 5 It's a wildlife and bison store -- well. 6 Q. Okay. Thank you. 7 And you were explaining to Mr. Butzier at one 8 point the facilities -- the proposed facilities at the 9 Copper Flat Mine that the Ladder Ranch is concerned are 10 going to contribute contamination that may flow to 11 the -- to the Ladder Ranch. And you mentioned the 12 tailing storage impoundment -- or the tailing storage 13 facility, and you also mentioned the open pit. 14 Are there any other facilities that you left 15 out? 16 A. Most likely the waste rock piles and the 17 possibility of the acid drainage from those. 18 Q. Right. Okay. 19 Thank you. 20 That's all the questions I have. 21 MS. ORTH: All right. Thank you. 22 Unless there's some reason not to excuse 23 Mr. Dobrott? 24 Thank you, Mr. Dobrott. 25 Would you like to take a brief break before</p>	864	<p>1 Ranch, owned by our family since 1906. 2 Q. Mr. Cunningham, let's begin by discussing your 3 qualifications. So I'd like to start with your 4 education. 5 Could you please describe your postsecondary 6 education? 7 A. I would be pleased to. 8 I have a bachelor of science in general 9 studies from the University of New Mexico. 10 I might add I began my education in a two-room 11 grade school in Hillsboro, New Mexico, and I completed 12 grades 1 through 6 at that community school. This 13 unique beginning to my education fostered my interest 14 and understanding of the history, cultural diversity, 15 economic basis and ecology of the Hillsboro New Mexico 16 area. 17 Q. And could you describe your work experience 18 since college, please? 19 A. I worked for the United States Forest Service 20 until September the 18th, 2007. 21 Q. And how long did you work for the US Forest 22 Service? 23 A. I worked for the US Forest Service for 34 24 years. 25 Q. And what were your -- what was your position</p>
863	<p>1 your next witness, Mr. de Saillan? 2 MR. DE SAILLAN: Sure. That would be helpful. 3 Thank you, Madam Hearing Officer. 4 MS. ORTH: Let's take 10 minutes. 5 (Proceedings in recess from 2:36 p.m. to 6 2:49 p.m.) 7 MS. ORTH: All right. We're coming back from 8 the break now. 9 Mr. de Saillan, would you call your next 10 witness. 11 MR. DE SAILLAN: Thank you, Madam Hearing 12 Officer. 13 The ranches' next witness is Mr. Robert 14 Cunningham. 15 MS. ORTH: And you'll be using a microphone. 16 MR. DE SAILLAN: I will. 17 ROBERT CUNNINGHAM 18 having been first duly sworn or affirmed, was 19 examined and testified as follows: 20 DIRECT EXAMINATION 21 BY MR. DE SAILLAN: 22 Q. Could you state your name and occupation, 23 please. 24 A. My name is Robert Cunningham. With my sister 25 I am the co-owner and manager of the Hillsboro Pitchfork</p>	865	<p>1 or your job title with the Forest Service? 2 A. My position title upon retirement was 3 supervisory fire management technician. 4 Q. Okay. 5 And what were your responsibilities in that 6 position? 7 A. There were several. Regarding forest 8 management, I had participated in NEPA planning efforts 9 and fuel management activities as a fire management 10 specialist. 11 In fire management, I worked as a line 12 firefighter and as a Helitack crew member, which is a 13 person who is transported to a wildland fire in a 14 helicopter. I worked as a hotshot crew member. And I 15 spent 22 years as a smokejumper, parachuting into 16 wildland fires. 17 In addition, I have aviation management 18 experience. I managed complex aviation operations, to 19 include over 80 large wildland fire incidents in the 20 United States. I have also managed complex aviation 21 operations on all hazard incidents. The most noteworthy 22 are FEMA's response to the 9/11 Twin Towers attack in 23 New York City, Hurricanes Opal, Rita and Katrina -- 24 Katrina, rather, where I spent six weeks in Baton Rouge. 25 In addition, I also had responsibilities in</p>

866	<p>1 wildland fire and incident management training. I                  2 managed an interagency wildland fire Incident Command                  3 System training program in the Northwestern United                  4 States. I was responsible for a staff that developed                  5 and delivered wildland fire ICS training to an                  6 interagency audience.                  7 Q. Okay.                  8 And what other work experience do you have?                  9 A. I grew up on the family ranch, learned to                  10 ride, rope, brand, fix windmills and fences, in general                  11 learned about cattle and to care for the land and                  12 improve the land. When working for the Forest Service,                  13 I returned to the ranch often to assist my father in                  14 running the ranch.                  15 Upon the death of my father in 2003, my sister                  16 and I became the owners and caretakers of our family                  17 ranch and legacy.                  18 Q. And what responsibilities do you have as                  19 manager and caretaker of the Hillsboro Pitchfork Ranch?                  20 A. Business and financial management, care and                  21 improvement of the land, cattle and game management,                  22 hunt guiding, wildlife habitat improvement and                  23 facilities management.                  24 Q. How much time have you spent on the ranch?                  25 A. If I may, sir, may I continue just briefly?</p>	868	<p>1 management, native game and wildlife and ecology.                  2 MS. ORTH: Are there objections?                  3 MR. BUTZIER: No objection.                  4 MS. BARNCASTLE: No objection.                  5 MR. KNIGHT: No objection.                  6 MS. ORTH: He's so recognized.                  7 MR. DE SAILLAN: Thank you.                  8 Q. Now, Mr. Cunningham, I wonder if you could                  9 describe for us the business at the Hillsboro Pitchfork                  10 Ranch.                  11 A. I would be pleased to.                  12 Cattle ranching is a primary activity of the                  13 ranch. The ranch is a cow/calf operation. Currently we                  14 have about 210 head of mother cows. We utilize a                  15 pasture rotation system and supply supplemental feeds as                  16 necessary to maintain good cattle condition. We manage                  17 and improve grazing lands to ensure good range                  18 conditions for today and improved ranch conditions for                  19 future years.                  20 We have partnered with the National Resource                  21 Conservation Service, an agency of the United States                  22 Forest Service, for the previous nine years to implement                  23 improvements to ranchlands for livestock and wildlife                  24 use.                  25 Hunting is another primary activity of the</p>
867	<p>1 Q. Sure.                  2 A. Thank you.                  3 The primary responsibility of any ranching                  4 family is to understand, monitor and foster the ecology                  5 of the land and its care. An understanding of the                  6 native vegetation, to include such grasses as black                  7 grama, side oats, vine mesquite, shrubs such as sumac                  8 and mountain mahogany, and tree species such as the Rio                  9 Grande cottonwood and black walnut is key to the                  10 successful stewardship of the land.                  11 Subsequent ranching economic success comes                  12 from care and improvement of the land.                  13 Q. And how much time have you spent on the ranch?                  14 A. I estimate about 30 years.                  15 Q. Mr. Cunningham, I'd like to show you a                  16 document that's been marked as the Ranches Exhibit                  17 Number 5 and ask if you would identify that.                  18 A. Yes. That is a copy of my resume.                  19 Q. Okay.                  20 And is it accurate?                  21 A. It is.                  22 Q. And is it current and up to date?                  23 A. It is.                  24 MR. DE SAILLAN: Madam Hearing Officer, I'd                  25 like to qualify Mr. Cunningham as an expert in ranch</p>	869	<p>1 ranch. Hunting species include mule deer, elk, dove and                  2 two varieties of quail, Gambel and Mearns. My sister                  3 and I have personally guided hunting trips for some 29                  4 years, providing good -- providing big game hunting                  5 experiences to over a hundred individuals.                  6 Noteworthy is beginning this year we will host                  7 our first Wounded Warrior hunt, where we will donate a                  8 big game hunt to a service member who has suffered                  9 injury while defending our country.                  10 Q. And so you're personally involved in these                  11 businesses?                  12 A. Yes. I do things like negotiate leases,                  13 maintain and upgrade facilities, maintain financial                  14 documents, pay the bills and the taxes. As I stated                  15 earlier, my sister and I are personally involved in the                  16 hunting/guiding aspects of the ranch. Again, as I                  17 stated earlier, we are actively involved in the cattle                  18 ranching aspect of the ranch business.                  19 Q. Okay.                  20 And do these businesses depend on freshwater?                  21 A. Absolutely.                  22 Q. And could you describe the location of the                  23 Hillsboro Pitchfork Ranch in relation to the location of                  24 the proposed Copper Flat Mine?                  25 A. The ranch is to the west of the mine area,</p>

870	<p>1 adjacent to the west property boundary of the proposed                  2 Copper Flat Mine.                  3 Q. Okay.                  4 Does the Hillsboro Pitchfork Ranch border the                  5 mine area for the Copper Flat Mine?                  6 A. Yes, it does.                  7 Q. And as the process for permitting and other                  8 regulatory requirements for the Copper Flat Mine                  9 operation has progressed forward, have you reviewed                  10 documents and maps on the proposed mine?                  11 A. Yes, I have. Primarily documents and maps                  12 from the Draft Environmental Impact Statement prepared                  13 by the Bureau of Land Management dated November, 2015.                  14 Q. Okay.                  15 You have been provided a copy of a document                  16 that's been marked as the Ranches Exhibit Number 7.                  17 Is that the document that you're referring to?                  18 A. Yes, it is.                  19 Q. And have you read the Draft Environmental                  20 Impact Statement?                  21 A. Yes, I have, very thoroughly.                  22 Q. And is there currently -- go ahead.                  23 A. I'm sorry. I apologize about my pauses.                  24 Yes, I have, very thoroughly. As a result, we                  25 have submitted 50 pages, that is five-zero pages, of</p>	872	<p>1 What I wanted to do here is briefly describe                  2 this slide so that everybody understands what we're                  3 looking at here.                  4 This white line indicates the property                  5 boundary of the Hillsboro Pitchfork Ranch, which again                  6 lies upgradient in the Grayback Canyon Arroyo system                  7 from the proposed Copper Flat Mine. And I have                  8 calculated the distance from the center of the existing                  9 pit lake to the property boundary from that corner post                  10 right there.                  11 Of course, here we have the existing pit lake.                  12 And this is from a Google Earth photo I suspect to be                  13 probably, oh, eight or nine months old.                  14 This is the original abraded spring -- stream                  15 channel of the Grayback -- major component of the                  16 Grayback Arroyo system. And prior to the development of                  17 the -- of the initial mine by the now -- now defunct                  18 Quintana Mining operation, the natural spring -- natural                  19 course of Grayback Canyon was down approximately through                  20 here.                  21 There is another couple of other tributaries                  22 in the Grayback Canyon drainage system from the ranch.                  23 One of them you can see partially here, and another one                  24 flows from the north, and it's out of this photo.                  25 During the initial mining operations, this cut was cut</p>
871	<p>1 comments to the BLM regarding the Draft EIS.                  2 Q. Is there -- is there currently a pit lake on                  3 the Copper Flat Mine?                  4 A. Yes, there is. We can see it from our                  5 property.                  6 Q. And have you measured the distance from the                  7 eastern boundary of the Hillsboro Pitchfork Ranch to the                  8 pit lake?                  9 A. Yes, I have. And --                  10 Q. Is that illustrated on one of your slides?                  11 A. Yes, sir, it is.                  12 Q. Okay.                  13 And is that slide 6? What slide number is                  14 that?                  15 A. That would be Exhibit 6 Alpha.                  16 Q. And what is the distance?                  17 A. I calculate the distance to be 680 feet.                  18 If I may at this point, Madam Hearing Officer,                  19 may I spend a moment with this slide?                  20 MS. ORTH: Yes.                  21 I see 1,680 on there.                  22 MR. CUNNINGHAM: Did I mispronunciate that?                  23 Yes, ma'am. That would be 1,680 feet.                  24 MS. ORTH: Okay. Thank you.                  25 MR. CUNNINGHAM: Thank you.</p>	873	<p>1 through this bedrock here, and the natural flow diverted                  2 around the pit.                  3 Q. (BY MR. DE SAILLAN) Does the Hillsboro                  4 Pitchfork Ranch rely on any groundwater sources along                  5 the eastern property boundary of the ranch?                  6 A. Yes. The Pitchfork Ranch owns and operates                  7 two groundwater wells near the eastern property                  8 boundary.                  9 Q. And could you describe those two wells,                  10 please?                  11 A. Yes. This first well is what we locally call                  12 the Rogers Windmill. As you can see, it was operated by                  13 an old -- is operated by an old wooden windmill tower,                  14 again known as the Rogers Well. Based on historic                  15 records, we believe this well was developed around the                  16 year 1900.                  17 Q. So what is the depth of the Rogers Well?                  18 A. The depth of the Rogers Well is 150 feet.                  19 Q. And what is the Rogers Well used for?                  20 A. The Rogers Well provides drinking water to                  21 livestock and wildlife. And as you can see from this                  22 game camera photo, here are some elk cows watering at                  23 the drinking trough associated with that windmill last                  24 November.                  25 Q. Okay.</p>

874	<p>1 And could you describe the second well?</p> <p>2 A. Yes. The second well is the Grayback Well.</p> <p>3 The Grayback Well was originally developed in 1950.</p> <p>4 Q. What is the depth of the Grayback Well?</p> <p>5 A. 200 feet.</p> <p>6 Q. Okay.</p> <p>7 And what is the Grayback Well used for?</p> <p>8 A. The well utilizes a solar pumping system,</p> <p>9 numerous water lines, storage tanks and water drinking</p> <p>10 troughs which have been installed to supply water to</p> <p>11 remote areas of the Grayback drainage. This water</p> <p>12 source is used for drinking water -- excuse me. This</p> <p>13 water source is used for drinking water for the use of</p> <p>14 livestock and wildlife.</p> <p>15 And here we have a photo of a black bear</p> <p>16 that's taking his biannual bath.</p> <p>17 Q. Okay. Mr. Cunningham, I'd like to discuss now</p> <p>18 the proximity of these wells to the Copper Flat Mine.</p> <p>19 Have you measured the distance from the Rogers</p> <p>20 Well to the pit lake?</p> <p>21 A. Yes, I have.</p> <p>22 Q. And how far is it?</p> <p>23 A. The Grayback Well -- would you mind asking</p> <p>24 that question again, sir?</p> <p>25 Q. Yes.</p>	876	<p>1 bounded on the north by the Ladder Ranch and on the east</p> <p>2 by the Copper Flat Mine. The headwaters of the Grayback</p> <p>3 Canyon are primarily on lands owned by the Hillsboro</p> <p>4 Pitchfork Ranch. The drainage area of Grayback Canyon</p> <p>5 owned by the ranch is indicated by the aqua-colored area</p> <p>6 on the slide.</p> <p>7 And so in general, these are ranchlands that</p> <p>8 lie within the Grayback drainage watershed owned by the</p> <p>9 Hillsboro Pitchfork Ranch.</p> <p>10 And if I may talk a little bit more about</p> <p>11 this, as you will see, this is a relatively complex</p> <p>12 polygon. In some places, it looks somewhat angular.</p> <p>13 But I will assure you that I have physically walked this</p> <p>14 property many times and that indeed this polygon is an</p> <p>15 accurate representation.</p> <p>16 As an example, this somewhat rectangular area</p> <p>17 here is actually a draining -- drainage system that</p> <p>18 flows northward into Tank Canyon on the Ladder Ranch and</p> <p>19 subsequently northeasterly to the Animas drainage near</p> <p>20 the Ladder Headquarters.</p> <p>21 These -- these boundaries here on the western</p> <p>22 edge of the polygon flow into a couple of different</p> <p>23 drainages. Right there where the cursor is, there is a</p> <p>24 small saddle, and that's the dividing line of the --</p> <p>25 excuse me -- the drainage system. Again this area here</p>
875	<p>1 My last question was how far is it?</p> <p>2 A. Okay.</p> <p>3 Q. What is the distance from the boundary of the</p> <p>4 Pitchfork -- Hillsboro Pitchfork Ranch property to the</p> <p>5 pit lake?</p> <p>6 A. From the Hillsboro Pitchfork spring --</p> <p>7 Q. Excuse me. Excuse me.</p> <p>8 The distance from the wells that you just</p> <p>9 described to the pit lake.</p> <p>10 A. Very good. Thank you.</p> <p>11 That is approximately 8,070 to 8,084 linear</p> <p>12 feet.</p> <p>13 Q. Okay.</p> <p>14 And which well is that?</p> <p>15 A. This is the Grayback Well.</p> <p>16 Q. Okay.</p> <p>17 And the distance to the Rogers Well?</p> <p>18 A. The distance to the Rogers Windmill is 3,270</p> <p>19 linear feet.</p> <p>20 Q. Okay.</p> <p>21 Now let's talk about Grayback Canyon.</p> <p>22 Where is Grayback Canyon located on the</p> <p>23 Hillsboro Pitchfork Ranch?</p> <p>24 A. Grayback Canyon is located on the eastern</p> <p>25 portion of the Hillsboro Pitchfork Ranch. The canyon is</p>	877	<p>1 flows ultimately into Tank Canyon.</p> <p>2 From here to the south, these areas flow in a</p> <p>3 southerly direction into Warm Springs Canyon and then</p> <p>4 into Cold Springs Canyon and ultimately into North</p> <p>5 Percha Creek, just south of the Percha Box, east of</p> <p>6 Hillsboro, New Mexico.</p> <p>7 The drainage area of the Grayback Canyon lease</p> <p>8 from the BLM by the ranch for grazing purposes is</p> <p>9 indicated on the green-colored area on the slide.</p> <p>10 And again this is somewhat of a complex</p> <p>11 polygon, but again I would like to assure you, Madam</p> <p>12 Hearing Officer, that based on my personal knowledge of</p> <p>13 this property this is a clear and accurate</p> <p>14 representation of the watershed.</p> <p>15 And as you can see, we've got about 1,254</p> <p>16 acres of private land and about 493 acres of leased BLM</p> <p>17 land associated with the ranch that flow into Grayback</p> <p>18 Canyon.</p> <p>19 Now, if I could, I'd like to -- nobody get</p> <p>20 seasick here.</p> <p>21 These areas also flow into the Grayback Canyon</p> <p>22 Arroyo system, adjacent to and/or upgradient from the</p> <p>23 Copper Flat Mine. But since I have no direct knowledge</p> <p>24 of land ownership, I chose not to identify those areas</p> <p>25 on this map.</p>

878	880
<p>1 Q. Okay. Why don't we move on.</p> <p>2 Mr. Cunningham, have you spent much time in</p> <p>3 Grayback Canyon?</p> <p>4 A. Yes. I have ridden horseback, walked on foot,</p> <p>5 ridden in vehicles in the Grayback Canyon area.</p> <p>6 Q. Okay.</p> <p>7 A. I have worked cattle, hunted, guided, improved</p> <p>8 wildlife habitat, built fences, installed solar-powered</p> <p>9 pumping systems, drinking troughs and pipelines in the</p> <p>10 Grayback Canyon area.</p> <p>11 Q. Okay.</p> <p>12 And are there natural sources of water in</p> <p>13 Grayback Canyon?</p> <p>14 A. Yes. There are intermittent streams, springs</p> <p>15 and seeps in the canyon system.</p> <p>16 Q. Okay.</p> <p>17 And do these springs and streams and seeps</p> <p>18 help support the ecosystem of Grayback Canyon?</p> <p>19 A. Yes.</p> <p>20 Q. Could you describe Grayback Canyon in terms of</p> <p>21 its water resources and its plant and animal life -- its</p> <p>22 ecosystem?</p> <p>23 A. The intermittent springs, seeps and streams in</p> <p>24 Grayback Canyon support a varied natural ecosystem</p> <p>25 habitat for wildlife and a forage area for livestock.</p>	<p>1 mule deer habitat improvements have been conducted in</p> <p>2 the Grayback Canyon area.</p> <p>3 The Grayback Canyon upstream of the existing</p> <p>4 mine pit is a primary mule deer hunting area for both</p> <p>5 the ranch and the public who hunt on adjacent Bureau of</p> <p>6 Land Management lands.</p> <p>7 This area's flora and fauna depend on the</p> <p>8 naturally-occurring and the manmade water sources in the</p> <p>9 canyon for freshwater.</p> <p>10 Q. Okay.</p> <p>11 And do you have an understanding of where the</p> <p>12 proposed open pit will be at the Copper Flat Mine in</p> <p>13 relation to the segment of Grayback Canyon that's on the</p> <p>14 Hillsboro Pitchfork Ranch?</p> <p>15 A. The proposed open pit would be immediately to</p> <p>16 the east-northeast of the Grayback Canyon on the ranch.</p> <p>17 Q. And have you estimated that distance?</p> <p>18 A. I have. I would like to return to the slide</p> <p>19 that I showed earlier.</p> <p>20 But to answer your question specifically, sir,</p> <p>21 I calculate the distance to be 1,739 feet. And I had</p> <p>22 thought about potentially putting that in, but having</p> <p>23 never testified in a -- in a setting like this, I wasn't</p> <p>24 sure how much I should alter my initial exhibits.</p> <p>25 But I'm calculating the distance from where</p>
879	881
<p>1 The canyon has particularly good grasses, including side</p> <p>2 oats and black grama. Livestock feed upon these</p> <p>3 grasses.</p> <p>4 It also has an abundance of forbs, Gambel oak</p> <p>5 and thick concentrations of mountain mahogany. Wildlife</p> <p>6 feed on the forbs. Mountain mahogany is the preferred</p> <p>7 and primary food source for mule deer.</p> <p>8 Both wildlife and livestock utilize the area</p> <p>9 year-round due to good forage, thermal cover. And I</p> <p>10 might expand a little bit on thermal cover. Thermal</p> <p>11 cover is basically an opportunity for animals to be</p> <p>12 shaded if it's particularly hot. It's also an area for</p> <p>13 animals to seek shelter if it's particularly cold or</p> <p>14 particularly wet.</p> <p>15 And access to disbursed water from the</p> <p>16 Grayback and Rogers Windmill. Because the deep canyons</p> <p>17 make the area very private and because the canyon has</p> <p>18 good feed and good water, the area has become a premier</p> <p>19 mule deer habitat.</p> <p>20 Representatives of the New Mexico Department</p> <p>21 of Game and Fish refer to this section of the ranch as a</p> <p>22 nursery, as a substantial number of mule deer doe live</p> <p>23 and fawn here. For the last 11 years, the Pitchfork</p> <p>24 Ranch has partnered with the New Mexico Fish and Game in</p> <p>25 a program to improve mule deer habitat. Much of these</p>	<p>1 the cursor is here to that existing pin in the middle of</p> <p>2 the existing pit lake.</p> <p>3 Q. Okay.</p> <p>4 And do you have an understanding of how</p> <p>5 construction of the open pit will likely affect water</p> <p>6 resources in Grayback Canyon?</p> <p>7 A. Yes. The proposed open pit at the Copper Flat</p> <p>8 Mine will be hydrologically immediately downgradient of</p> <p>9 Grayback Canyon area of the Hillsboro Pitchfork Ranch.</p> <p>10 Given the groundwater gradient and given the</p> <p>11 proximity of the Pitchfork Ranch to the proposed open</p> <p>12 pit, groundwater from beneath the Grayback Canyon system</p> <p>13 will be drawn into the pit lake. Our wells may produce</p> <p>14 less water, or they may go dry. We don't know. The</p> <p>15 intermittent streams and seeps in Grayback Canyon will</p> <p>16 most certainly be affected. Their flows will be</p> <p>17 reduced. They may dry up.</p> <p>18 And, Madam Hearing Officer, if I may at this</p> <p>19 point, I'd like to spend a little bit of time describing</p> <p>20 this -- this slide. I developed this slide myself, and</p> <p>21 I'm not a hydrologist, so I'd like to spend a little</p> <p>22 time describing it.</p> <p>23 First of all, I'd like to note the X and Y</p> <p>24 axis are not to scale. So this scale has no</p> <p>25 relationship to this scale.</p>

882	<p>1 What I'm showing here is above mean sea level,                  2 MSL, elevation changes from the bottom of the ranch                  3 wells to the bottom of the proposed pit.                  4 The information as to the elevation of the                  5 bottom of the proposed pit -- and this would be at the                  6 end of construction -- or excavation of -- of ore from                  7 the pit, before the pit is refilled during the rapid                  8 refill process. I found -- I got this figure from the                  9 draft -- draft EIS produced by the Bureau of Land                  10 Management.                  11 So what we have here is above mean sea level                  12 change from the bottom of the ranch wells to the bottom                  13 of the proposed pit.                  14 So we've established the bottom of the                  15 proposed pit at an elevation of 6,587, and the way that                  16 I've derived that is by the elevation provided me -- the                  17 existing ground elevation provided to me in Google Earth                  18 Pro, and then I deducted 780 feet from that base                  19 elevation, where I get this elevation.                  20 I have done a similar calculation for the                  21 Grayback Well, where we spoke earlier the Grayback Well                  22 is 200 feet in depth, and so the elevation -- the actual                  23 ground elevation of the Grayback Well would be                  24 5,718 feet.                  25 And all -- done the same thing for the Rogers</p>	884	<p>1 I have no further questions.                  2 MS. ORTH: Thank you, Mr. De Saillan.                  3 Mr. Butzier?                  4 MR. DE SAILLAN: At this point, I'd like to                  5 move for the admission of the Ranches Exhibits 5, 6 and                  6 7, please.                  7 MS. ORTH: Are there objections?                  8 MS. BARNCASTLE: No objections.                  9 MR. BUTZIER: No objection.                  10 MR. KNIGHT: No objection.                  11 MS. ORTH: Thank you.                  12 5, 6 and 7 are admitted.                  13 (Exhibits Ranches 5, 6 and 7 admitted into                  14 evidence.)                  15 MS. ORTH: And, Mr. Butzier, do you have                  16 questions?                  17 MR. BUTZIER: I have a few.                  18 CROSS EXAMINATION                  19 BY MR. BUTZIER:                  20 Q. Good afternoon, Mr. Cunningham.                  21 I noticed --                  22 Could you pull the slide back up that showed                  23 the elevation change in the blue box that you had --                  24 there. Thank you.                  25 I noticed, and you correctly point out, that</p>
883	<p>1 Well, although the Rogers Well depth is 180 feet.                  2 So I just wanted to spend a minute describing                  3 this slide, but it does show, you know, the potential                  4 groundwater depletion caused by the -- by the pit in                  5 relationship to our family's ranch wells.                  6 Q. Okay. Mr. Cunningham, the effects -- the                  7 potential effects you described a minute ago on water                  8 resources, if they were to occur, how would that affect                  9 the business of the Hillsboro Pitchfork Ranch that you                  10 described earlier?                  11 A. Without a plentiful supply of water, the                  12 ecology of Grayback Canyon will be harmed. Vegetation                  13 will change. Less water will be available for game and                  14 livestock for forage and drinking purposes. We will be                  15 reduced, no doubt, to reduce our cattle numbers.                  16 Wildlife, including game species, will become less                  17 abundant.                  18 The resulting loss of income will result in                  19 less income available to maintain and improve the ranch                  20 and its lands. This will result in less revenue to                  21 local, state and federal government in tax revenue, loss                  22 to local businesses in gross receipt -- revenue receipts                  23 and less or no income to those employees and contractors                  24 we utilize for ranch operations.                  25 MR. DE SAILLAN: Thank you, Mr. Cunningham.</p>	885	<p>1 the X and the Y axis are not to scale in that depiction,                  2 correct?                  3 A. That is correct.                  4 Q. And although it doesn't say it, on Exhibit 6                  5 that we've just admitted to the record, the same is true                  6 for Exhibit 6, correct? The X and Y axis are not                  7 coordinated to scale.                  8 A. I'm sorry, sir. We're currently looking at                  9 Exhibit 6 Foxtrot.                  10 Could you ask that question again?                  11 Q. Well, what Mr. de Saillan just moved into                  12 evidence is a document labeled as Exhibit 6 that looks                  13 very much like what's on the screen.                  14 MR. DE SAILLAN: Stuart, the -- excuse me.                  15 Mr. Butzier, that is essentially the same document, and                  16 we would stipulate to the question that you're asking.                  17 MR. BUTZIER: Okay. Thank you.                  18 Q. And the -- from looking at Exhibit 6D, which                  19 is the distances from the center of the pit to the two                  20 wells you've identified --                  21 A. All right.                  22 Q. -- that reflects in one case 3,270 linear feet                  23 in the case of the Rogers Windmill from the pit and                  24 8,084 linear feet from the Grayback Well to the center                  25 of the existing pit lake, correct?</p>

<p style="text-align: right;">886</p> <p>1 A. Correct.</p> <p>2 Q. And it's not a big point, but all I want to</p> <p>3 point out is if this -- if this Exhibit 6 had the same</p> <p>4 scale on the X axis as is on the Y axis, this would be a</p> <p>5 fairly long document with a less severe change shown by</p> <p>6 the large white line on that document, correct?</p> <p>7 A. I am in agreement with that statement.</p> <p>8 Q. Thank you.</p> <p>9 Now, I'd like to turn back now to slide -- the</p> <p>10 slide that shows the ranchlands and the BLM lands.</p> <p>11 Correct. Thank you.</p> <p>12 I noticed that you've sort of described those</p> <p>13 two shapes that are colored in turquoise and green as</p> <p>14 essentially, as I understand it, watershed areas that go</p> <p>15 from your ranch to the Grayback Arroyo diversion; is</p> <p>16 that correct?</p> <p>17 A. To be sure I'm certain what you said, you said</p> <p>18 the Grayback diversion structure?</p> <p>19 Q. Well, I think you've indicated that those are</p> <p>20 basically part of the watershed, all of which ultimately</p> <p>21 feeds into the Grayback Arroyo.</p> <p>22 A. Correct.</p> <p>23 Q. And on the map -- or on the Google Earth</p> <p>24 depiction, you've indicated that those are two affected</p> <p>25 areas, one of which is private ranchlands and another of</p>	<p style="text-align: right;">888</p> <p>1 one or both of these two areas are the result of shallow</p> <p>2 precipitation-related recharge in the areas that are</p> <p>3 depicted in turquoise and green?</p> <p>4 A. If I may, I want to return here to my</p> <p>5 document.</p> <p>6 The streams, springs and seeps in the</p> <p>7 Grayback -- that I'm aware of in the Grayback Canyon</p> <p>8 Arroyo system do not fall all the time. Commonly after</p> <p>9 a rainstorm. As a consequence, they are intermittent.</p> <p>10 Q. Okay. Thank you.</p> <p>11 And so the primary concern that I understand</p> <p>12 you to be expressing is the impact that the deepening of</p> <p>13 the pit may have on groundwater in this part of your</p> <p>14 ranch; is that correct?</p> <p>15 A. That is correct. And subsequent to the loss</p> <p>16 of groundwater comes the loss of water that is available</p> <p>17 for forage and drinking water purposes for both</p> <p>18 livestock and wildlife.</p> <p>19 Q. And is that -- is that because the Rogers Well</p> <p>20 and the Grayback Well are pumped and provided in the</p> <p>21 kinds of drinkers that were depicted on some of your</p> <p>22 slides?</p> <p>23 A. If I may here --</p> <p>24 May I return to this slide in more detail --</p> <p>25 MS. ORTH: Yes.</p>
<p style="text-align: right;">887</p> <p>1 which is BLM leased lands; is that correct?</p> <p>2 A. Correct.</p> <p>3 Q. What are you referring to when you say</p> <p>4 Affected Ranch Private Land and Affected Ranch Leased</p> <p>5 BLM Lands?</p> <p>6 A. Again I am proposing that the watershed in the</p> <p>7 Grayback Canyon area, upgradient of the proposed Copper</p> <p>8 Flat Mine will to some degree be watered by the</p> <p>9 construction of the pit.</p> <p>10 Q. So in this slide, we're sort of combining two</p> <p>11 concepts, one of which is the additional groundwater</p> <p>12 draw toward the pit that I think you testified to, and</p> <p>13 also the surface watershed; is that correct?</p> <p>14 A. That is correct.</p> <p>15 Q. Now, in terms of the surface watershed,</p> <p>16 leaving aside the groundwater, would you agree with me</p> <p>17 that there could be no effect to the actual watershed in</p> <p>18 terms of precipitation falling on the surface in that</p> <p>19 part of your ranch from the deepening of the open pit?</p> <p>20 A. I would agree that there is no correlation</p> <p>21 between the amount of precipitation that falls in that</p> <p>22 drainage and the depth of the proposed pit.</p> <p>23 Q. Okay. Thank you.</p> <p>24 And would you also agree that the intermittent</p> <p>25 springs and seeps that you've identified occur within</p>	<p style="text-align: right;">889</p> <p>1 MR. CUNNINGHAM: -- Madam Hearing Officer?</p> <p>2 Again nobody get seasick.</p> <p>3 All right. I'm going to try and zoom in a</p> <p>4 little bit here.</p> <p>5 So approximately right here where this white</p> <p>6 cursor is is the location of the Grayback -- Grayback</p> <p>7 Well, 200 feet deep, powered by the solar pumping</p> <p>8 system. And there's a pipeline that moves -- well, I'm</p> <p>9 going to go back to the original here.</p> <p>10 I don't know how to do that. Anyway, we're</p> <p>11 approximately right in here.</p> <p>12 And so there's a pipeline that goes up on a</p> <p>13 ridge here. And again I may not get this quite right,</p> <p>14 due to the availability of these slides. But it's a</p> <p>15 high-pressure pipeline. It's about 320 PSI at the</p> <p>16 wellhead. And it goes up to two 2,500-gallon storage</p> <p>17 tanks that are located on a high ridge in a remote area</p> <p>18 in the northern part of the Grayback drainage water</p> <p>19 system.</p> <p>20 From there, flow to additional pipelines, one</p> <p>21 that comes down a major ridge just to the north of the</p> <p>22 main -- main channel of Grayback Canyon. The other one</p> <p>23 goes north into a ridge somewhere in this area.</p> <p>24 There is little to no naturally-occurring</p> <p>25 water in those areas. And as -- my sister and I</p>

<p style="text-align: right;">890</p> <p>1 recognized an opportunity to improve the utilization of  2 our family lands in that area by building this -- this  3 water -- this water-handling system, and we are able to  4 supply water into remote areas of the range where cattle  5 will not generally forage and --  6 And also subsequently now we have a greater  7 mule deer population. I won't say there weren't any  8 mule deer in that area, but now we have a greater mule  9 deer and most probably elk population, because of access  10 to drinking water in these remote, relatively arid  11 areas.  12 MR. BUTZIER: Thank you.  13 Q. So just so that I'm sure that I understand, so  14 is it the case that the concern you have with impacts to  15 the livestock business and the mule deer habitat is a  16 concern that at some point you may not be able to  17 operate the Grayback Well in order to feed those  18 pipeline systems?  19 A. That is correct. Based on my understanding,  20 my readings of the various documents associated with the  21 proposed development of the mine and the potential  22 dewatering of the Grayback Canyon system, and in  23 addition listening to testimony provided by expert  24 witnesses this week, I feel confident that ultimately  25 we're faced with the prospect of losing some or all of</p>	<p style="text-align: right;">892</p> <p>1 would be a good term -- in the -- in my understanding is  2 in areas that have geology like this, the amount of  3 annual precipitation that you receive on a particular  4 piece of land or indeed the intensity or duration of  5 that rain event or precipitation event will -- can  6 greatly affect the static level of -- of a well, if  7 that's getting anywhere near close what you're asking.  8 Q. It is.  9 And I'll have a follow-up question, which is  10 is it your understanding that the water levels in those  11 wells are primarily the result of water coming down  12 through the annulus of the well to the well from surface  13 precipitation, or is it coming from an aquifer  14 subsurface or some combination of both, if you know?  15 A. I do not know.  16 Q. And I'd have the same question for the Rogers  17 Well. Do you know the answer to that question?  18 A. I do not know in regard to the Rogers Well, as  19 well.  20 Q. And the Rogers Well, I think, was -- you said  21 was drilled in around the '50s; is that right?  22 A. No, sir. Possibly we miscommunicated there.  23 The --  24 Q. I -- I'm sure you've got it, but I probably  25 didn't get it right.</p>
<p style="text-align: right;">891</p> <p>1 our water sources in the Grayback Canyon area as a  2 consequence of the mine development.  3 Q. From the two wells that you've identified.  4 A. Yes, sir. That is correct, the Grayback Well  5 and the Rogers Well.  6 Q. And I think you indicated the Rogers Windmill  7 Well was developed around 1900?  8 A. To the best of my knowledge, that is correct.  9 Q. Do you know where in the -- in the water table  10 that is completed? Is that -- is that completed at the  11 very top of the water table in that area, or is it  12 somewhere farther deeper into the -- into the aquifer?  13 A. I'm not sure if I understand your question,  14 sir, but let me rephrase it to you, see if I've got it  15 right.  16 Are you asking as to the -- the general static  17 water level in the well?  18 Q. Let's -- that's a better way to ask it. Thank  19 you. Yes.  20 A. I would have to look back at my records, but  21 there is some variability in -- in the static water  22 level of any well. Of course, if it's being pumped,  23 certainly, if it's being pumped aggressively, you know,  24 you'll see a reduction in the static water level.  25 The other variability is indeed in -- what</p>	<p style="text-align: right;">893</p> <p>1 A. The Rogers Well, we -- based on historic  2 records, we believe the Rogers Windmill was originally  3 developed around 1900.  4 Q. Okay. I was confusing the two.  5 A. Sure.  6 Q. Thank you for clarifying.  7 So it was the Rogers that was 1900 and the  8 Grayback Well was when? Drilled when?  9 A. The original -- now you're getting me  10 confused.  11 MS. ORTH: Your testimony was that it was  12 developed in 1950.  13 MR. CUNNINGHAM: 1950. Thank you, ma'am.  14 MR. BUTZIER: Okay. Thank you. I got them  15 reversed. I apologize.  16 Q. So in the case of both wells, you don't know  17 the answer to the question I asked about whether those  18 levels are coming from water coming down from -- from  19 the surface versus water coming from some underground  20 source.  21 A. Correct.  22 Q. Okay.  23 Where in relation to the -- what we have on  24 the screen right now, which is Exhibit 6E, is the -- is  25 there a Headquarters of this ranch?</p>



894	<p>1 A. Yes, sir. The Headquarters is approximately 2 one-half mile north -- west-northwest of Hillsboro, New 3 Mexico, in the North Percha drainage system. So it 4 is -- well, quite some ways to the south-southwest, off 5 this -- off this graphic.</p> <p>6 Q. And given the answers that you've already 7 given, you may not know the answer to this question, as 8 well, but is there a possibility that by deepening one 9 or both of these wells, that even if there is an impact 10 to the static level in those wells, they could still 11 remain operational and fulfill the purposes of livestock 12 and mule deer habitat purposes?</p> <p>13 MR. CUNNINGHAM: Madam Hearing Officer, may I 14 ask a question?</p> <p>15 MS. ORTH: Of me? Certainly.</p> <p>16 MR. CUNNINGHAM: Yes, ma'am.</p> <p>17 MS. ORTH: Yeah.</p> <p>18 MR. CUNNINGHAM: Again this is a relatively 19 new venue to me, and so I -- I really think that 20 question may be outside of the -- of the venue of 21 this -- of this hearing, in all due respect.</p> <p>22 MR. BUTZIER: And I appreciate that, and I 23 will go ahead and withdraw that question, and that's all 24 the questions I have.</p> <p>25 MS. ORTH: All right. Thank you, Mr. Butzier.</p>	896	<p>1 from precipitation rather than the groundwater. That's 2 my memory of their conversation.</p> <p>3 MR. DE SAILLAN: I --</p> <p>4 MR. BUTZIER: I would just say, Madam Hearing 5 Officer, that that's the basis of my objection. I don't 6 have a problem with Mr. de Saillan proceeding and having 7 his question answered --</p> <p>8 MS. ORTH: Okay.</p> <p>9 MR. BUTZIER: -- but I do object on the basis 10 that I described.</p> <p>11 MS. ORTH: Okay. So I remember something 12 about that conversation, but go ahead.</p> <p>13 MR. DE SAILLAN: No. I agree, but I'm trying 14 to clarify that point with the witness.</p> <p>15 MS. ORTH: Okay. Go ahead.</p> <p>16 MR. CUNNINGHAM: I have -- I have no knowledge 17 of any permanent spring or seep or stream in the 18 Grayback drainage area system.</p> <p>19 The -- for lack of a better term, the geology 20 of that canyon, in particular its main branch, quite 21 commonly the -- the foundation rock in that area is 22 exposed in the streambed. Upstream of that, commonly 23 there are large -- large deposits of sand, gravel, 24 alluvial materials. And when we have a large 25 precipitation event, the water will flow through those</p>
895	<p>1 Mr. Knight, do you have any questions of 2 Mr. Cunningham?</p> <p>3 MR. KNIGHT: I do not.</p> <p>4 MS. ORTH: Ms. Barncastle.</p> <p>5 MS. BARNCASTLE: No cross.</p> <p>6 MS. ORTH: No?</p> <p>7 Does anyone else have a question of 8 Mr. Cunningham based on his testimony?</p> <p>9 I see no hands.</p> <p>10 Mr. de Saillan, do you have any follow-up?</p> <p>11 MR. DE SAILLAN: Yes.</p> <p>12 I just have one question here, Mr. Cunningham.</p> <p>13 REDIRECT EXAMINATION</p> <p>14 BY MR. DE SAILLAN:</p> <p>15 Q. Just have one question, Mr. Cunningham.</p> <p>16 Mr. Butzier asked you if you were concerned 17 about the water level -- change in water table affecting 18 the wells.</p> <p>19 Are you also concerned about the potential for 20 a change of water level affecting the streams or seeps 21 along the Grayback Canyon?</p> <p>22 MR. BUTZIER: Madam Hearing Officer, I think 23 that question's been asked and answered.</p> <p>24 MS. ORTH: So Mr. Butzier, I thought, 25 established with him that the seeps and springs came</p>	897	<p>1 alluvial materials, meet the -- meet the bedrock and 2 then flow over them for a period of time.</p> <p>3 Now, I cannot address, you know, whether that 4 flow is a combination of -- of surface water or, let's 5 say, groundwater that has -- has -- has flown from the 6 slopes of the canyon and, you know, the connectivity.</p> <p>7 So in all candor, I don't know -- to go to the 8 direct question, I don't know, you know, whether the -- 9 the deepening of the pit would -- would have any direct 10 effect on those streams, seeps, springs. But I can't 11 imagine under any circumstances how it would help.</p> <p>12 MR. DE SAILLAN: Okay. So you're not sure one 13 way or the other.</p> <p>14 MR. CUNNINGHAM: I am not.</p> <p>15 MR. DE SAILLAN: Okay. Thank you.</p> <p>16 I have no further questions.</p> <p>17 MS. ORTH: Anything further before we excuse 18 Mr. Cunningham?</p> <p>19 No?</p> <p>20 Thank you very much, Mr. Cunningham.</p> <p>21 Do you need a break before your next witness, 22 or are we still going?</p> <p>23 MR. DE SAILLAN: Let's ask the witness.</p> <p>24 MR. KUIPERS: Five minutes.</p> <p>25 MS. ORTH: Okay. Short break. Short break.</p>

898	<p>1 (Proceedings in recess from 3:50 p.m. to 2 4:00 p.m.) 3 MS. ORTH: We are back after a break, and 4 we'll hear from the ranches' next witness. 5 Mr. de Saillan? 6 MR. DE SAILLAN: Thank you, Madam Hearing 7 Officer. 8 Is it working? No? 9 JAMES R. KUIPERS 10 having been first duly sworn or affirmed, was 11 examined and testified as follows: 12 DIRECT EXAMINATION 13 BY MR. DE SAILLAN: 14 MR. DE SAILLAN: Before we get started, Madam 15 Hearing Officer, there's a request that I'd like to make 16 here. 17 MS. ORTH: Yes, sir. 18 MR. DE SAILLAN: If in the unlikely event that 19 this hearing continues beyond this week, there is a 20 possibility that Mr. Kuipers might not be able to join 21 us, at least for certain parts of that week. So we 22 would like to put on his rebuttal testimony at the end 23 of his direct testimony, although we would reserve the 24 right to do additional rebuttal testimony if he turns 25 out to be available, if that would be all right.</p>	900	<p>1 Mr. Kuipers has not already covered. 2 MS. ORTH: I see. All right. 3 How about, then, Mr. Butzier, if there's a 4 particular objection you have, in the event we even get 5 to this point, where he's trying to offer additional 6 rebuttal on something he's already covered, that you -- 7 or could have been covered -- excuse me -- that you 8 raise it at that point? 9 MR. BUTZIER: I'm fine with that. 10 MS. ORTH: All right. We're getting a little 11 attenuated there. 12 MR. DE SAILLAN: We are. We're starting to 13 split hairs. 14 MS. ORTH: All right. 15 MR. DE SAILLAN: But I appreciate your 16 indulgence. 17 MS. ORTH: Mr. Knight, any objections? 18 MR. KNIGHT: No objections. 19 MS. ORTH: Ms. Barncastle, we're going to then 20 hear Mr. Kuipers' rebuttal following his direct. 21 MS. BARNCASTLE: I'm good with that. Thank 22 you. 23 MS. ORTH: Thank you very much. 24 Please go ahead. 25 MR. DE SAILLAN: Thank you, Madam Hearing</p>
899	<p>1 MS. ORTH: Okay. 2 Other counsel? 3 We've done it both ways, saving rebuttal for a 4 whole second round or just going ahead and having folks 5 do rebuttal as soon as their direct is finished. 6 Any objections to doing it this way? 7 MR. BUTZIER: Madam Hearing Officer, I have no 8 objection to going ahead with his rebuttal today. I 9 guess I would reserve the ability to object to further 10 rebuttal later if it's on some topic that he's already 11 covered, I guess. 12 MS. ORTH: So I think further rebuttal is 13 properly reserved only if there is more evidence -- 14 MR. BUTZIER: After he gives the -- 15 MS. ORTH: -- offered. 16 MR. BUTZIER: Okay. That's a better way to 17 preserve it. 18 MS. ORTH: Right? 19 MR. DE SAILLAN: Okay. I was trying to 20 reserve a little bit more because we've had relatively 21 little time to prepare for rebuttal here. 22 MS. ORTH: Right. 23 MR. DE SAILLAN: And I guess I would prefer 24 your original approach, Madam Hearing Officer, which is 25 that we will limit any further rebuttal to items that</p>	901	<p>1 Officer. 2 Q. Good afternoon, Mr. Kuipers. 3 Could you please state your name and 4 occupation. 5 A. Yes. My name is James R. Kuipers. R is for 6 Ralph. My occupation is consulting engineer. 7 Q. Okay. 8 And have you prepared a presentation for 9 today's hearing? 10 A. Yes, I have. 11 Q. Could you go ahead and give your presentation, 12 beginning with your qualifications. 13 A. Yes. I want to use this page just to kind of 14 summarize my experience. Madam Hearing Officer has 15 heard me go through my experience several hours, I 16 think, in the past. 17 But I essentially was raised in a mining 18 family, and I -- my mining experience actually began 19 when I was 12 years old, and at the end of a summer 20 after remodeling a cabin, my grandfather decided we 21 should call our dad so that he could go ahead and 22 continue mining through the winter. 23 So I actually spent a couple weeks working as 24 a gopher when I was 12 years old outside of an 25 underground mine. Proceeded to work with my grandfather</p>

<p style="text-align: right;">902</p> <p>1 throughout the 1970s. By the time I was 16, essentially  2 he had taught me to drill muck and blast. Those are  3 terms we commonly use in the mining industry for what we  4 do underground.</p> <p>5 He and I had a bit of a debate about what I  6 was going to do for college. He won that debate, and  7 I'm a mine engineer as a consequence.</p> <p>8 A good example, though, I think of why the  9 support, when I was between my freshman and sophomore  10 years at the university, he felt it was very important  11 if I was going to be a mineral processing engineer for  12 me to actually build and operate a mill.</p> <p>13 And so he had the equipment to build a  14 25-ton-per-day mill, where we did crushing, grinding,  15 flotation separation, which we've been discussing with  16 this project. It involved gravity separation.</p> <p>17 It also involved a tailing storage facility.  18 And I can tell you that was also my first tailing  19 storage facility that overflowed. My grandfather didn't  20 do things quite the way we hope to do them today.</p> <p>21 So I went on to university at Montana School  22 of Mines. It actually changed names midway through the  23 time I was there to Montana Tech. Graduated in 1983  24 with a bachelor's of science degree in mineral process  25 engineering.</p>	<p style="text-align: right;">904</p> <p>1 mines, all the features that are typically associated  2 with a mine.</p> <p>3 And so essentially during the approximately 14  4 years I spent working directly in industry, from 1983 to  5 1996, it was in these type of activities that I've  6 described that I gained the experience, if you will,  7 from an environmental standpoint as well as a mineral  8 processing and mining standpoint.</p> <p>9 In 1996, I decided to take a bit of a turn in  10 my career, after having spent -- well, kind of the first  11 third working with industry, and I felt it was very  12 important -- as I listened to things like this hearing,  13 as I attended them representing industry, I felt the  14 public was not adequately represented. They could use  15 somebody who had the qualifications to speak on their  16 behalf.</p> <p>17 And so I actually decided in 1996 to begin  18 working with the public interest community. And since  19 that time, I've provided assistance to over 80 different  20 public interest organizations.</p> <p>21 Now, when I describe these public interest  22 organizations, they include environmental groups,  23 conservation organizations. It also includes in many  24 cases groups of ranchers or farmers or other folks that  25 may be concerned about impacts from mining.</p>
<p style="text-align: right;">903</p> <p>1 Now, I need to take folks to 1983.  2 Essentially we didn't have environmental engineers yet.  3 There were just a few programs beginning in the United  4 States that involved environmental engineering. And so  5 graduating as a metallurgist, essentially you understand  6 things like aqueous chemistry, analytical chemistry and  7 the various facets that, in fact, environmental  8 engineers have since then been trained to address.</p> <p>9 But it was very common in the 1980s, in  10 particular as environmental regulations began to be put  11 in place, for the metallurgical engineers to actually  12 take those responsibilities.</p> <p>13 So a good example is one of the first jobs I  14 had was with Cumberland Mining Corporation. I was a  15 junior metallurgist with that company, but amongst my  16 responsibilities were the monitoring of the tailing  17 storage facility, which was a clay-lined facility, that  18 leaked.</p> <p>19 And so essentially I've been dealing with  20 tailing storage facilities, various types of liners,  21 various situations since 1983. And during the course of  22 my career as a senior metallurgist, chief metallurgist,  23 mill superintendent and ultimately mine manager, I've  24 always spent time having to deal with tailing storage  25 facilities, waste rock dumps, open pits, underground</p>	<p style="text-align: right;">905</p> <p>1 In addition, I've done a lot of work for  2 tribes and first nations, both in the US as well as in  3 Canada.</p> <p>4 I also do quite a bit of work for local, state  5 and federal governments. Local-wise I was the Anaconda  6 Superfund site director for the Anaconda Deer Lodge  7 County institutional controls program from 2006 to 2012.  8 During that time, I actually expanded my company to  9 approximately 12 employees.</p> <p>10 And during that time, we actually provided the  11 county about a \$1.5-million-a-year service contract to  12 run their Superfund program. And it was intended to  13 protect the remedy.</p> <p>14 Now, this is something we oftentimes forget at  15 reclamation and closure. When we do all these  16 activities, they're not going to last forever. And  17 there may be, in fact -- a good example is different  18 land uses than were originally intended.</p> <p>19 So if we have a postmining land use, for  20 example, for wildlife, but then somebody buys that  21 property and goes into development, in the development  22 of that property they could actually alter various  23 things at a site. So they might take the covers, for  24 example, that were intended to protect acid rock  25 drainage and simply scrape those covers off to build a</p>

906	<p>1 house. Nobody was protecting that remedy.</p> <p>2 Similarly, we have stormwater conveyances. If</p> <p>3 somebody were to block the stormwater conveyance or</p> <p>4 otherwise building a road, that could impact the remedy.</p> <p>5 So one of the things that at least the</p> <p>6 Superfund programs provide is what we call an</p> <p>7 institutional controls program. Of course, a kind of</p> <p>8 substitute for that in reclamation and closure is our</p> <p>9 long-term monitoring and maintenance programs that</p> <p>10 you'll hear us describing at length today.</p> <p>11 I should mention I've also worked for the</p> <p>12 State of New Mexico as part of their damage control</p> <p>13 program on lawsuits, and I've actually represented the</p> <p>14 Environment Department and the Mining and Minerals</p> <p>15 Division in the Manning v. New Mexico case.</p> <p>16 I've worked for USEPA since 2003. I should</p> <p>17 mention I presently do not have a contract with USEPA as</p> <p>18 of January 1st of this last year.</p> <p>19 But I spent essentially 15 years as EPA's</p> <p>20 primary advisor in Region 9 and Region 10, which is</p> <p>21 essentially the West Coast region, California, Nevada,</p> <p>22 Arizona, and then also Alaska, Oregon, Washington and</p> <p>23 Idaho. And my responsibility was to basically assist</p> <p>24 them in all their NEPA reviews, National Environmental</p> <p>25 Policy Act reviews, for environmental impact statements</p>	908	<p>1 and reclamation and closure in general.</p> <p>2 One of the areas I spend a lot of time in is</p> <p>3 financial analysis. I think understanding the financial</p> <p>4 aspects of a mine are very important, and that's a part</p> <p>5 of my testimony today that I'll be going into.</p> <p>6 Things like site characterization, the idea of</p> <p>7 being able to indicate what the geochemistry is, acid</p> <p>8 drainage, the hydrology. We understand today, and I</p> <p>9 don't think we understood this perhaps even just 20</p> <p>10 years ago, how important it is in site characterization</p> <p>11 to recognize the need for adequate information, both</p> <p>12 geochemistry and for water, to combine into our</p> <p>13 characterizations.</p> <p>14 Many of the studies that I've done in looking</p> <p>15 at why we failed to get predictions right came back to</p> <p>16 doing inadequate geochemical and geohydrological</p> <p>17 characterizations. And that's why getting those</p> <p>18 right -- and we've spent a lot of time discussing that</p> <p>19 already -- is very important.</p> <p>20 Also an area that I want to mention is the</p> <p>21 whole idea of monitoring and adaptive management</p> <p>22 planning. This is an area that really is one of the</p> <p>23 newer areas that the mining industry and others who work</p> <p>24 in this type of thing have been looking at as a way to</p> <p>25 address the uncertainty -- the inherent uncertainty in</p>
907	<p>1 for mines.</p> <p>2 During the course of that time, I probably</p> <p>3 assisted them in somewhere in the neighborhood of 50 to</p> <p>4 60 different environmental impact statement reviews,</p> <p>5 both for existing as well as new mines.</p> <p>6 I should also mention I do work for national</p> <p>7 institutions. I've got a list of publications that I've</p> <p>8 provided over the past 15 or more years. Amongst those</p> <p>9 publications or presentations you'll find work on</p> <p>10 geochemistry, tailing studies, financial assurance and</p> <p>11 all the type of things that we're talking about and I'll</p> <p>12 be testifying about today.</p> <p>13 There are areas of specific technical</p> <p>14 expertise that I've developed either through my</p> <p>15 education or -- you know, an engineer really is a</p> <p>16 practical scientist. So a lot of this is about theory.</p> <p>17 But what I've done essentially is spent my</p> <p>18 career working with the people who are experts in the</p> <p>19 field, learning from them, and in particular working</p> <p>20 with them on actual site situations, where we're either</p> <p>21 trying to permit a mine, remediate a mine or otherwise</p> <p>22 address these type of issues.</p> <p>23 As a result of that, I've had the opportunity</p> <p>24 to work with, I believe, some of the world's foremost</p> <p>25 experts on things like geochemistry, tailings facilities</p>	909	<p>1 all these different predictions and things we do.</p> <p>2 We're scientists. We like to think we know</p> <p>3 what the outcome will be. But all these models, tools,</p> <p>4 data inputs, we have to admit there are still things we</p> <p>5 don't know, and it's those things we don't know that we</p> <p>6 can never hope to accurately predict.</p> <p>7 So one other area I'll just mention, I have</p> <p>8 been involved in New Mexico working on behalf of public</p> <p>9 interest organizations in this state since 1998. That's</p> <p>10 included involvement in the Questa, Chino, Tyrone,</p> <p>11 Continental/Cobre and Mt. Taylor Mines.</p> <p>12 I also wanted to mention that I participated</p> <p>13 during the entire Copper Rule period. I was both a</p> <p>14 member of the Technical Advisory Committee, but I also</p> <p>15 was a member of the Citizen Advisory Committee that also</p> <p>16 was involved in those rules. I believe I may have</p> <p>17 missed one session during the time you did that.</p> <p>18 And my participation in the rules was funded</p> <p>19 by the Turner Ranch Properties, who had an interest in</p> <p>20 and are participating in that process.</p> <p>21 Q. Mr. Kuipers, just to elaborate a little bit,</p> <p>22 you mentioned in your testimony the Chino, Tyrone and</p> <p>23 Continental/Cobre Mines in New Mexico.</p> <p>24 Were those also open pit copper mines?</p> <p>25 A. Yes, they are.</p>

910	<p>1 Q. And could you describe in a little bit more</p> <p>2 detail your involvement in those three mines?</p> <p>3 A. Yes. My involvement in those three mines</p> <p>4 dates back to approximately 1999, when I first started</p> <p>5 working for the Gila River Information Project, or GRIP.</p> <p>6 The initial work I did was to review --</p> <p>7 I should mention to folks that what we were</p> <p>8 doing in New Mexico in '98, '99, 2000 was really all the</p> <p>9 mining companies were putting in place their</p> <p>10 closure/closeout plans that were required under the</p> <p>11 Mining Act which had just been essentially promulgated</p> <p>12 in 1996.</p> <p>13 So during that period, all of the 60 mines in</p> <p>14 the state needed to put in place current Reclamation and</p> <p>15 Closure Plans, address all the different things that we</p> <p>16 are today addressing for a new mine.</p> <p>17 I developed a separate Reclamation and Closure</p> <p>18 Plan independent of that of the company -- in this case,</p> <p>19 I think it was Phelps Dodge at the time,</p> <p>20 Freeport-McMoRan today -- as well as participated in</p> <p>21 hearings, various meetings with the company and</p> <p>22 regulators, and ultimately in resolution of those</p> <p>23 matters, although it's still fair to say that we're</p> <p>24 still resolving some things from those hearings even</p> <p>25 today.</p>
911	<p>1 Q. Okay. Thank you.</p> <p>2 Mr. Kuipers, you've been provided with a</p> <p>3 document that's been marked as the Ranches Exhibit</p> <p>4 Number 8.</p> <p>5 I'd like to ask if you could identify that,</p> <p>6 please.</p> <p>7 A. Yes. Ranches Exhibit 8 is my professional</p> <p>8 resume.</p> <p>9 Q. And is it accurate?</p> <p>10 A. Yes, it is.</p> <p>11 Q. And is it current and up to date?</p> <p>12 A. Yes, it is.</p> <p>13 MR. DE SAILLAN: Madam Hearing Officer, I</p> <p>14 would like to qualify Mr. Kuipers as an expert in mining</p> <p>15 engineering, the effects of mining on the environment,</p> <p>16 including water quality, mining remediation, financial</p> <p>17 responsibility for mines and the New Mexico Copper rule.</p> <p>18 MS. ORTH: Okay.</p> <p>19 Objections?</p> <p>20 MR. BUTZIER: Madam Hearing Officer, may I do</p> <p>21 a brief voir dire?</p> <p>22 MS. ORTH: Yes.</p> <p>23</p> <p>24</p> <p>25</p>
912	<p>1 VOIR DIRE EXAMINATION</p> <p>2 BY MR. BUTZIER:</p> <p>3 Q. Good afternoon, Mr. Kuipers.</p> <p>4 A. Good afternoon, Mr. Bustamante.</p> <p>5 Q. Butzier.</p> <p>6 A. Bustier. I'm sorry.</p> <p>7 Q. The T comes before the Z. Butzier.</p> <p>8 Now, I've had the pleasure of meeting you in</p> <p>9 many of the proceedings you've already described, have I</p> <p>10 not?</p> <p>11 A. Yes, you have.</p> <p>12 Q. And I'd like to ask you a few specific</p> <p>13 questions about your qualifications.</p> <p>14 A. Sure.</p> <p>15 Q. You do not have a hydrology degree, do you?</p> <p>16 A. No, I do not.</p> <p>17 Q. You do not have a geology degree, do you?</p> <p>18 A. No, I do not.</p> <p>19 Q. You do not have a hydrogeology degree, as</p> <p>20 well?</p> <p>21 A. No, I do not.</p> <p>22 Q. And you do not have any kind of geochemistry</p> <p>23 degree.</p> <p>24 A. I do not have a degree. I have extensive</p> <p>25 practical experience, and I have published publications</p>
913	<p>1 and coauthored those publications with others who are</p> <p>2 geochemists, and I do consider myself to be qualified in</p> <p>3 geochemistry.</p> <p>4 Q. But you're not a geochemist, correct?</p> <p>5 A. I -- no. But I just have to qualify that,</p> <p>6 that most of the geochemists I know are not geochemists.</p> <p>7 They're civil engineers or other folks like myself who</p> <p>8 have taken that knowledge and applied it to geochemistry</p> <p>9 and have been recognized as experts in the field. And</p> <p>10 the best example is Kim Lapakko with the Minnesota</p> <p>11 Department of Natural Resources, one of the most</p> <p>12 respected geochemists I know of. Kim has a degree in</p> <p>13 civil engineering.</p> <p>14 Q. Mr. Kuipers, I have worked closely with</p> <p>15 geochemists myself, including some ex-great geochemistry</p> <p>16 experts at SRK, but I would not qualify myself as any</p> <p>17 kind of geochemist.</p> <p>18 And I wonder if you could elaborate on why we</p> <p>19 should consider you a geochemist.</p> <p>20 A. Absolutely.</p> <p>21 Are you familiar with metallurgy and the fact</p> <p>22 that most of us metallurgists have extensive knowledge</p> <p>23 in aqueous chemistry?</p> <p>24 Q. I will take your word for that, but I don't</p> <p>25 think that necessarily makes you a geochemist.</p>

<p style="text-align: right;">914</p> <p>1 A. Well, let me explain what aqueous chemistry 2 is, if I may, please. It's essentially geochemistry. 3 What we study in the processing is the dissolution of 4 minerals. And when those minerals dissolve, whether 5 they be in a mineral processing circuit or in a natural 6 environment, they essentially behave exactly the same, 7 because it follows fundamental chemical understandings. 8 And so again a geochemist is one who combines 9 geology and that aqueous chemistry, if you will, and 10 through the work I've done in mining, I believe I've 11 gained a fairly extensive knowledge of both the geology 12 related to geochemistry and the chemistry itself. 13 Again I testified I was not a -- a degree with 14 a geologist. But, Mr. Bustier, I have spent the last 15 35-plus years studying geology almost every day, reading 16 that, applying my knowledge of geology. 17 Q. And I think a bustier is a women's garment -- 18 A. I'm sorry. 19 Q. -- and my name is Butzier. But that's okay. 20 A. I thought so. 21 MS. ORTH: And actually, Mr. Butzier -- and I 22 have, I think, a lot more practice pronouncing your 23 name -- he wasn't offered as an expert in geochemistry. 24 MR. BUTZIER: Okay. I'm just establishing 25 sort of contours of what we're going to consider him to</p>	<p style="text-align: right;">916</p> <p>1 involved in. I've probably been involved in the 2 construction of dozens of mills. 3 Q. Have you ever been in the lead as an engineer 4 in the construction of a tailings facility? 5 A. As the engineer of record, no. As the lead 6 engineer on behalf of the company, yes. 7 Q. Okay. 8 And were you involved in -- as an engineer in 9 the tailings facility that you described you worked with 10 with your father that failed at one point? 11 A. Well, again that was not an engineered 12 facility. It was not even a jurisdictional dam. 13 Q. Okay. Thank you. All right. 14 And you're not an economist, correct? 15 A. I do have expertise in engineering economics. 16 So I do consider myself to be qualified in the area of 17 engineering economics. 18 Q. Have you ever -- have you ever been an 19 engineer in the structural design of a tailings dam? 20 A. Presently I am part of the engineering design 21 review team for Stillwater Mining Company. This is not 22 an outside review team. This is actually an internal 23 review team. As part of the Good Neighbor Agreement 24 with Stillwater Mining Company, I actually work with the 25 company on all phases of engineering design prior to</p>
<p style="text-align: right;">915</p> <p>1 be -- 2 MS. ORTH: Okay. 3 MR. BUTZIER: -- testifying about. 4 MS. ORTH: I can -- I can read what he was 5 offered. 6 MR. BUTZIER: And that's fine. I just also 7 would like to establish certain other things that are 8 somewhat related, because he's done a lot of sort of 9 blurring of lines between various disciplines, and I 10 know that from him from experience, and I just want to 11 try to clarify for the record so that if I make 12 objections to particular parts of his testimony later it 13 will be understood where I'm coming from. 14 MS. ORTH: All right. Go ahead. 15 Q. (BY MR. BUTZIER) Mr. Kuipers, do you 16 recognize a distinction between the disciplines of 17 mineral processing engineering and mining engineering? 18 A. Yes, I do. 19 Q. And your degree is in mineral process 20 engineering, correct? 21 A. Yes. My degree is in mineral processing 22 engineering. My PE is in mining. 23 Q. And I understand that you have been involved 24 in the construction of a 25-ton-per-day mill. 25 A. Yes. That was just one that I've been</p>	<p style="text-align: right;">917</p> <p>1 permit submittal. We actually began that work. 2 So I -- in a sense, I am working as a member 3 of the engineering team not as a structural engineer, 4 but providing my expertise relative to my experience and 5 knowledge. 6 Q. But you've never been the lead engineer in the 7 structural design of a tailings dam, correct? 8 A. Well, again I would -- I think I -- do you 9 mean the engineer of record? 10 Q. Let's start there. Yes. 11 A. Yeah. So let's first make sure we understand 12 what engineer of record is. The engineer of record is 13 typically hired by the company, and they are an outside 14 engineering firm. 15 And so for example, when I was working -- or 16 best example would be right now, the work I'm doing with 17 Stillwater Mining Company, I'm part of the design team, 18 we have three or four other engineers who are working 19 for the company and others, and then Knight Piesold, 20 which is the firm that is actually the design firm, they 21 have a designated engineer of record. 22 So there's multiple responsibilities. In 23 terms of ultimate responsibility, you have both the 24 engineer of record, but also the other engineers who 25 contributed to that effort. But the engineer of record</p>

918	<p>1 would be the, if you will, person in charge, 2 essentially.</p> <p>3 MR. BUTZIER: Madam Hearing Officer, I would 4 like to have the acceptance of this witness as an expert 5 limited to mineral processing engineering as opposed to 6 mining engineering, and I think the effects of mining on 7 environmental issues, to me, is not really a 8 sufficiently delineated discipline to actually admit him 9 as an expert in that category.</p> <p>10 MS. ORTH: All right.</p> <p>11 And how would you describe the distinction, 12 Mr. Butzier, between mining engineering and mineral 13 process?</p> <p>14 MR. BUTZIER: A mineral processing engineer is 15 somebody who is involved in the processing or 16 beneficiation processes associated with turning a 17 mineral that has been mined into a commodity or product 18 or a concentrate.</p> <p>19 A mining engineer is somebody like Mr. Smith 20 who is familiar with all phases of excavation, of 21 mining, tailings facilities, et cetera, et cetera.</p> <p>22 MR. KUIPERS: If I could, Madam Hearing 23 Officer?</p> <p>24 MS. ORTH: Yes. Go Ahead.</p> <p>25 MR. KUIPERS: I would have to say that</p>	920	<p>1 have been involved in the mining side of the operation. 2 So I'm not claiming to be a mining engineer, but again I 3 do have practical knowledge with respect to mining 4 engineering that I believe is valuable.</p> <p>5 MR. DE SAILLAN: Madam Hearing Officer, if I 6 may.</p> <p>7 MS. ORTH: Mr. de Saillan.</p> <p>8 MR. DE SAILLAN: Thank you.</p> <p>9 The standard for qualification of an expert is 10 specialized knowledge which may be of value to the 11 decision-maker, and it can be gained through education, 12 it also can be gained through experience.</p> <p>13 And I think Mr. Kuipers has demonstrated in 14 the last 15 or 20 minutes of his testimony that he has 15 lots of expertise as testifying in mining engineering.</p> <p>16 MS. ORTH: Okay. So I think perhaps with 17 cross-examination, Mr. Butzier, you'll be able to do 18 what you need to do with Mr. Kuipers' testimony.</p> <p>19 MR. BUTZIER: Thank you.</p> <p>20 MS. ORTH: So I do take your point that 21 effects of mining on environment is not a discipline in 22 and of itself, if you will, but I also believe that 23 Mr. Kuipers' education and experience especially 24 provides him with the base of knowledge on which to 25 offer opinions in that area, even if it's not a</p>
919	<p>1 Mr. Butzier -- correct?</p> <p>2 MR. BUTZIER: Correct.</p> <p>3 MR. KUIPERS: Okay.</p> <p>4 MR. BUTZIER: Thank you.</p> <p>5 MR. KUIPERS: You're actually incorrect. The 6 mining engineer does not do tailing storage facility 7 work. And in fact, in most cases at most mine sites, 8 the mineral processing engineer is, in fact, the person 9 in charge of the engineer of record.</p> <p>10 So my entire work as a mineral processing 11 engineer when I've worked at sites, I'm the one 12 responsible for that tailing storage facility, for the 13 safe, proper management of it on behalf of the company.</p> <p>14 MR. BUTZIER: Okay. If that's Mr. Kuipers' 15 understanding of what's within the scope of mineral 16 processing engineer, I still would like to have his 17 expertise accepted as an expert in mineral processing, 18 not mining -- not mining engineering.</p> <p>19 MS. ORTH: All right.</p> <p>20 So, Mr. Kuipers, do you have anything further 21 to say about the distinction that Mr. Butzier is drawing 22 here?</p> <p>23 MR. KUIPERS: No, not distinction. I'd just 24 mention that again in the same way as the mine manager 25 that I have had the role in various other aspects, I</p>	921	<p>1 discipline.</p> <p>2 MR. BUTZIER: Thank you, Madam Hearing 3 Officer.</p> <p>4 MS. ORTH: All right. 5 Anything else?</p> <p>6 MR. DE SAILLAN: Yes, Madam Hearing Officer. 7 If I could, I would point out that expertise 8 in the New Mexico Copper Mine Rule is also not a 9 discipline, and we have qualified Mr. Kuipers in that 10 expertise, and Mr. Butzier qualified several of his 11 experts without objection in that discipline.</p> <p>12 So, you know, expertise doesn't need to be 13 limited to a specific discipline from which somebody can 14 get a degree from a university. The concept is a 15 broader one than that.</p> <p>16 MS. ORTH: Okay. And I agree with you.</p> <p>17 MR. DE SAILLAN: Okay.</p> <p>18 MS. ORTH: Yeah.</p> <p>19 So he'll be recognized in the areas you 20 mentioned, mining engineering, effects of mining on 21 environment, remediation, financial assurance and the 22 Copper Rule, to give the testimony and render the 23 opinions he'll render in each of those areas. 24 25</p>

922	<p>1 DIRECT EXAMINATION (Resumed)</p> <p>2 BY MR. DE SAILLAN:</p> <p>3 Q. Okay. Mr. Kuipers, have you prepared any</p> <p>4 reports for the purposes of this groundwater Discharge</p> <p>5 Permit hearing?</p> <p>6 A. Yes. I prepared written testimony. Or I</p> <p>7 actually prepared a written report some months ago, in</p> <p>8 addition to written testimony.</p> <p>9 Q. Okay.</p> <p>10 And what was the date of that report?</p> <p>11 A. The date of the report was May 1st, 2018.</p> <p>12 Q. Okay.</p> <p>13 And you've been -- you've been provided a</p> <p>14 document that's been marked as Ranches Exhibit 9? Can</p> <p>15 you identify it?</p> <p>16 A. Yes. Ranches Exhibit 9 is titled Copper Flat</p> <p>17 Mine Draft Discharge Permit 1840 Technical Comments,</p> <p>18 prepared by myself.</p> <p>19 Q. Okay. Thank you.</p> <p>20 Can you please then proceed with the technical</p> <p>21 portion of your testimony.</p> <p>22 A. Yes.</p> <p>23 Madam Hearing Officer, there are five things</p> <p>24 essentially that we want to address in my testimony</p> <p>25 today.</p>	924	<p>1 potential for leaks and spills. These are leaks and</p> <p>2 spills from tailings facilities, pipelines, chemicals,</p> <p>3 things of that nature. This type of incident in varying</p> <p>4 degrees happens at all mines, and so it's very important</p> <p>5 that we account for those leaks and spills.</p> <p>6 Similarly in financial assurance, we usually</p> <p>7 want to have something set aside to address those,</p> <p>8 knowing that to some degree they'll happen, even though</p> <p>9 we can't predict exactly what they may be.</p> <p>10 Then the final thing I want to talk about is</p> <p>11 financial assurance for closure. And essentially I</p> <p>12 consider financial assurance to be a way to wrap all</p> <p>13 these different issues that we're talking about into</p> <p>14 really one focused discussion.</p> <p>15 Because what we're really trying to</p> <p>16 demonstrate is if we get this wrong and by some</p> <p>17 chance -- we're not saying it will happen, we don't want</p> <p>18 it to happen, but if by some chance the mining company</p> <p>19 goes bankrupt -- and mining companies do that all the</p> <p>20 time -- we want to make sure that the citizens of the</p> <p>21 State of New Mexico are protected in terms of liability,</p> <p>22 that the environment will be adequately addressed.</p> <p>23 We don't want to be in a situation where if a</p> <p>24 mine were to close we're sitting here 20, almost 30</p> <p>25 years later, 30-plus years later, still not having the</p>
923	<p>1 The first is we want to briefly touch on the</p> <p>2 Copper Flat project history. We feel it has important</p> <p>3 bearing on the risk of this project to potentially</p> <p>4 requiring financial assurance. And it relates to why we</p> <p>5 think getting this right in terms of financial assurance</p> <p>6 is very important. It's very important for any mine,</p> <p>7 but as I'll talk, I think, in this particular case,</p> <p>8 given the mine history, it takes on added importance.</p> <p>9 The second thing we want to talk about is the</p> <p>10 potential for mining-influenced water. And</p> <p>11 mining-influenced water, as I believe Ms. Griffiths</p> <p>12 explained, that's really the term we use today to not</p> <p>13 just limit ourselves to discuss the acid drainage, but</p> <p>14 also to make sure we've addressed saline drainage and</p> <p>15 neutral drainage. Also during that discussion I'll talk</p> <p>16 specifically as to the potential at the Copper Flat</p> <p>17 Mine.</p> <p>18 The third thing we want to talk about today is</p> <p>19 the tailings storage facility liner seepage. As I've</p> <p>20 said, there's a great deal of literature out there and a</p> <p>21 lot you've heard about liner seepage. Then there's the</p> <p>22 actual practical experience that goes with liner</p> <p>23 seepage. And this is a good example of where a theory</p> <p>24 and practice oftentimes don't meet.</p> <p>25 Fourth thing I want to talk about is the</p>	925	<p>1 mine remediated. That's the history of the past. What</p> <p>2 we're all about trying to do today is to make sure that</p> <p>3 can't happen. And in fact, that's the intent of good</p> <p>4 practice when it comes to characterization, mitigation</p> <p>5 and financial assurance in combination.</p> <p>6 So just a bit about the Copper Flat project</p> <p>7 history.</p> <p>8 We've heard quite a bit about the historic</p> <p>9 aspect, et cetera. But really the Copper Flat project</p> <p>10 in the modern context started with Inspiration Copper</p> <p>11 owning the property back in the 1970s.</p> <p>12 I actually worked for Inspiration Copper as a</p> <p>13 strategic acquisitions analyst for the company, and the</p> <p>14 Copper Flat Mine was provided to me as -- on my first</p> <p>15 day of work within that position by the company as an</p> <p>16 example of mines that essentially they had determined</p> <p>17 weren't the kind of mines that major mining companies</p> <p>18 like Anglo American wanted to invest in. And Anglo</p> <p>19 American was the owner of Inspiration Copper.</p> <p>20 Essentially Inspiration leased the mine out to</p> <p>21 other parties to develop because it wasn't a type of</p> <p>22 project they had confidence would make money.</p> <p>23 In 1980, the -- I believe it was Quintana</p> <p>24 Mining proposed the open pit mine. At that time, it was</p> <p>25 very similar to today, with primary crushing, SAG and</p>



<p style="text-align: right;">926</p> <p>1 ball milling, flotation. The main difference was the  2 original proposal in 1980 did not include a lined  3 tailings impoundment. It was unlined.  4 Now, in March, 1982, the Copper Flat Mine went  5 into production. And in the United States, the Copper  6 Flat Mine is well noted as the only major mine that's  7 gone into production and then within three months ceased  8 production. There were a couple different factors.  9 One of the difficulties in mining is you can  10 begin to propose a project in 1980, but you can see it  11 takes several years before you put it into production.  12 Even when you put it into production, you don't know  13 what the price of copper is going to be later.  14 And literally what happened was they had  15 two -- a combination of two things happen at once. The  16 copper price went down, and they were saddled with very  17 large and heavy debt load from having constructed the  18 project, and those two things essentially resulted in a  19 determination within a few months of operation that they  20 were not, in fact, going to be able to make money.  21 The site was originally placed on care and  22 maintenance, but then eventually the company decided to  23 remove the surface facilities and equipment. I think in  24 particular the equipment was sold to pay back some of  25 the debt from the capital loan.</p>	<p style="text-align: right;">928</p> <p>1 I actually went to the property in 2003,  2 following one of the hearings on the Chino or Tyrone  3 mines, and essentially the property had no signs, no  4 security, and I took a mine tour on my own in 2003. And  5 got to look at the pit lake, looked at the site, and  6 again it had every resemblance of an abandoned mine.  7 Now, since then, New Mexico Copper Corporation  8 has arrived. They invested in the project, and they  9 proposed in 2015, and really prior to that as we've  10 heard, again an open pit mine, primary crushing, SAG and  11 ball milling, flotation. The main difference is lined  12 tailings.  13 I think it is important to note that the --  14 during the course of these different activities the  15 amount of material ton -- the amount of material that  16 would be mined and processed has approximately doubled,  17 from about 80 million tons in the 1980s to around 160  18 million tons today.  19 The concern I have -- and again I'm not  20 predicting this mine will go bankrupt. That's not  21 anybody's desire. It's just not what should happen.  22 But the future tends to repeat itself. And this  23 particular mine has some characteristics that I'll touch  24 on later in my rebuttal based upon a slide Mr. Smith  25 provided that I think is real critical to look at in</p>
<p style="text-align: right;">927</p> <p>1 And then in 1987, final reclamation was  2 concluded, and essentially the site was abandoned.  3 After 1987 for some period of time, there  4 really wasn't an active owner. There were various  5 people that held the property. But when you went to the  6 site, there was no ongoing activities related to mining  7 or maintenance or other aspects of the reclamation.  8 In 1994, Alta Gold acquired the property.  9 Alta Gold was primarily involved in gold mining. I'm  10 not ever really quite sure why they decided to get into  11 a copper property.  12 But a couple years after they acquired the  13 property, they proposed again an open pit -- it's not a  14 pen pit, but an open pit mine, primary crushing, SAG and  15 ball milling, flotation. And again in 1996, they  16 proposed an unlined tailings.  17 Not long after they just got started, Alta  18 Gold declared bankruptcy. Now, again Alta Gold didn't  19 go bankrupt because of their investment in Copper Flat.  20 Alta Gold went bankrupt because of some investments in  21 some other projects as well as the gold market going  22 down.  23 But they invested in the project, and  24 essentially the EIS process was discontinued, and again  25 the property was to some extent abandoned.</p>	<p style="text-align: right;">929</p> <p>1 terms of understanding the potential risk of this mine  2 failing at some point.  3 So I want to move on here to mining-influenced  4 water. There are a few slides in here that I'm going to  5 spend a little less time than I originally had intended  6 to because Ms. Griffiths did an excellent job of  7 describing some of these aspects. And in fact, I feel  8 that she really provided us with some good basic  9 background information that I certainly don't need to  10 repeat.  11 You might remember the Ficklin diagrams that  12 were mentioned, and essentially where they showed the  13 different types of drains in terms of acid rock drainage  14 and neutral drainage, but also the metals concentration.  15 And this is really what I call a generalized or  16 simplified Ficklin diagram, not for a specific site, but  17 for mines in general.  18 And many people have heard us for a long time  19 talk about acid rock drainage. And the focus in most  20 discussions, I'd say particularly 20 years ago, even up  21 to current, oftentimes focus on acid rock drainage. And  22 we talk about that as if it's the only potential  23 pollutant that might result from a mine.  24 What's become an understanding -- and this  25 really -- you can see this was 1999, so almost 20 years</p>

930	932
<p>1 ago. There were people like Jeff Plumlee -- who is a 2 good example of a geochemist I've worked closely with. 3 Now -- 4 MR. BUTZIER: Madam Hearing Officer? 5 MS. ORTH: Sir. 6 MR. BUTZIER: Would it be okay, so that I 7 don't have to interrupt his testimony, that I place a 8 continuing objection to testimony on geochemistry 9 issues? 10 MS. ORTH: You can have that objection, 11 certainly. 12 MR. BUTZIER: Thank you. 13 MS. ORTH: Please go ahead, Mr. Kuipers. 14 MR. KUIPERS: So as Ms. Griffiths explained, 15 what we look at in this type of thing is the 16 concentration of metals, and what this does is it 17 combines the concentration of zinc, copper, cadmium, 18 lead, cobalt and nickel into parts per billion. And 19 essentially if you have a billion parts per billion, 20 that's 100 percent, 100,000 parts per billion is 21 10 percent, and et cetera. 22 So down here we have one part per billion. It 23 should say million in this case, now that I look and see 24 how it's -- it's billion. I'm sorry. 25 So what we're doing is basically taking the</p>	<p>1 States that I'm aware of that are treating water. And I 2 actually did this activity more at USEPA, collected that 3 information in a database. 4 And what we discovered that I think was quite 5 telling was that when you look in the United States 6 today at what's being treated for at mine sites, it's 7 actually about 50/50. 8 Yes, there are a lot of mine sites that have 9 acid rock drainage, things like sites in Colorado that 10 we hear about. But if you go, for example, to Nevada, 11 you'll find that it's not a matter of acid rock 12 drainage, but it's rather neutral drainage containing 13 things likes arsenic, selenium, thallium, a number of 14 other things that are more soluble or have less 15 precipitation tendency at a neutral pH. 16 MR. BUTZIER: Madam Hearing Officer, I'd like 17 to also, if I could, place a continuing objection to 18 sort of broad-ranging discussions that are drawn from 19 all sorts of mining operations, all of which are from 20 periods that -- from other places and from periods that 21 do not include compliance with the highly prescriptive 22 Copper Rule. 23 MS. ORTH: And is this a relevance objection? 24 MR. BUTZIER: Yes. 25 MS. ORTH: All right. Thank you. It's on the</p>
931	933
<p>1 combined concentration of the metals and comparing that 2 to pH. Now, acid rock drainage, we talked about that 3 generally being waters that have a pH of less than 6, 4 and you can see that within the range of acid rock 5 drainage you can have metals concentrations that go all 6 the way from almost 10 percent to down to 10 parts per 7 billion. 8 What we also, though, recognize today is that 9 we have what we call neutral drainage or saline 10 drainage. And so even though we may not be dealing with 11 acid rock drainage and reduced pH, we oftentimes are 12 dealing with this, well, circumneutral pH, and in that 13 we still have the ability to have drainage. 14 And importantly, that drainage can have high 15 concentrations of metals, as much as essentially a 16 million parts per billion, which would be one part per 17 million again. 18 So in looking at it -- I should -- that should 19 be one part per 10,000. Let me change that. 20 So when you look at this, the whole point is 21 I've been working with mines and assessing their need 22 for water treatment and actually developing water 23 treatment plans over the last 35 years, and in 24 particular, I've collected a large database of 25 information from all the different mines in the United</p>	<p>1 record. 2 Go ahead, Mr. Kuipers. 3 MR. KUIPERS: So the next slide shows the same 4 kind of diagram, but the focus here is on sulfate. And 5 again what we're really trying to show here is that when 6 we deal with sulfate, sulfate is definitely an issue 7 with acid rock drainage, again with very high 8 concentrations potentially possible, but it's not 9 limited to acid rock drainage. We still have high 10 sulfate with saline drainage and neutral mine drainage. 11 And I think that's important, because one of 12 the things that is different about New Mexico than most 13 states I work in is your groundwater standards address 14 sulfate, and sulfate easily in neutral and saline 15 drainage can exceed 600 milligrams per liter. 16 When you look at what the potential treatment, 17 for example, might be related to the Copper Flat Mine, 18 while there may be some treatment potential for acid 19 rock drainage, I think the real potential has more to do 20 with, for example, saline or neutral mine drainage from 21 the tailing storage facility, potentially even from the 22 waste rock pile, that contains higher concentrations of 23 sulfate. 24 The metals, I think they may or may not be an 25 issue, but I think we can have much more confidence that</p>

<p style="text-align: right;">934</p> <p>1 it's things like TDS and sulfate that we will need to 2 pay attention to at the site.</p> <p>3 We can't ignore at the same time, for example, 4 selenium. You've heard folks talk about selenium 5 evapoconcentrating in the pit lake. Well, that's really 6 a good example of neutral mine drainage. The pit lake 7 may not be acid, but we're still getting neutral mine 8 drainage and it contains selenium at concentrations 9 potentially exceeding standards.</p> <p>10 I just want to mention that when we talk about 11 mining-influenced water it also includes process 12 solutions. This would include leach solutions. It 13 would also include process supernatant, such as the 14 tailings impoundment supernatant water that will be in 15 excess and recycled back to the mill.</p> <p>16 We also include things like waters affected by 17 nitrates from explosives. And we haven't identified 18 that as an issue here, but it's just something to 19 mention that we do have sites where -- I'm working at 20 where the nitrates from explosives have actually turned 21 out to be a significant contaminant.</p> <p>22 Now, this is a flow diagram that I've taken 23 from various other sources and modified for the work 24 that I do and presentations that I make, but essentially 25 the source is -- it's from both the GARD Guide, the</p>	<p style="text-align: right;">936</p> <p>1 presumption is it's fairly ideal outcomes. If we do 2 this, everything will be okay.</p> <p>3 But what we do in modern mine development is 4 we actually go ahead and we determine prediction 5 objectives and develop the site conceptual model.</p> <p>6 So the first thing we want to do with our 7 objectives is what are our prediction objectives? And 8 that can work two different ways. One, if your 9 objective is to prove an already preconceived outcome, 10 such as this mine will not have an issue, you're going 11 to get one result. But if your objective is to find out 12 what might happen without a preconceived notion, then 13 you get another result.</p> <p>14 It's very important going into this process 15 that a preconceived notion not ultimately overwhelm the 16 actual information.</p> <p>17 So what we do is we take, as I've said before, 18 two key things, and I believe Ms. Griffiths similarly 19 showed the same thing. The two key impacts into a 20 prediction are the geochemical characterization as well 21 as the geohydrological characterization. And of course, 22 that -- we've spent quite a bit of time already hearing 23 testimony on those two items -- aspects.</p> <p>24 We then conduct the modeling to determine the 25 concentrations at receptor locations. Now, those</p>
<p style="text-align: right;">935</p> <p>1 Global Acid Rock Drainage Guide, which I think has been 2 referenced before, as well as from the work that I did 3 with Ann Maest in a 2005 basically report on predictions 4 and dealing with uncertainty in predictions.</p> <p>5 I just want to use the next page to make it a 6 little easier for all of us to see.</p> <p>7 The way this starts is we have the Mine Plan. 8 And so every mine when they first -- you know, company 9 when they first look at a project --</p> <p>10 Q. (BY MR. DE SAILLAN) Mr. Kuipers, excuse me. 11 Could you explain the relationship between 12 this slide and the previous slide?</p> <p>13 A. Yes. So the reason I have the second slide is 14 just to enlarge the flow diagram on the right-hand side 15 to make it easier for folks to see as I explain it. So 16 this is slide 10, which is the same flow diagram as the 17 previous slide.</p> <p>18 The flow diagram starts at the top with the 19 mine planning process. And again essentially this -- 20 every company when they have a mine, they begin to 21 develop it based upon exploration information, other 22 predeveloped information, they start with a conceptual 23 plan. This is what the mine should look like, might 24 look like.</p> <p>25 And that conceptual plan, oftentimes the</p>	<p style="text-align: right;">937</p> <p>1 receptor locations could be, say, for example, at the 2 edge of a pile. They might be midway between a pile 3 and, say, for example, a valuable water resource such as 4 a spring or surface water groundwater source, or it 5 might actually be at those sources themselves. And we 6 talk about modeling for various receptor locations.</p> <p>7 Now, what we want to do is ask ourselves what 8 are the concentrations at those receptors. And if we 9 don't allow ourselves the "what if's," what if we get 10 higher flow, higher rainfall, various things, we'll 11 probably come back and say, no, the concentrations of 12 receptors, they're not greater than standards, they're 13 known.</p> <p>14 Well, if that happens, we then go ahead and 15 mine. We conduct the operations, we get to closure, we 16 start monitoring. But concentrations could end up 17 greater than the standards at the mine closure.</p> <p>18 Well, the problem is if that happens, you 19 can't go on implementing the Reclamation and Closure 20 Plan, because if you predicted no problems here, but you 21 have problems here, after the operations, a big -- no 22 problems, as part of your, if you will, testing, but 23 then after the operations, if it turns out that you do 24 have places that exceed standards, you have to go back 25 and redesign the Mine Plan.</p>

<p style="text-align: right;">938</p> <p>1 So what we've come to do more often now is  2 recognize that it's not a bad idea to go ahead and say,  3 well, let's do a sensitivity analysis, let's look at  4 things that might happen, even if we don't think they're  5 necessarily likely to happen, and let's run them through  6 this process, as part of the design process.  7 And what that allows us to do is to take a  8 look at what might happen if the answer is yes, closure,  9 run that back through with additional mitigation,  10 consider redesigning the Mine Plan, and then incorporate  11 that.  12 Now, if you haven't thought about what might  13 happen, trying to come up with this plan after the fact  14 is very difficult. So what this process really tries to  15 emphasize is a risk assessment process, that says if we  16 will go ahead and allow ourselves to consider the  17 possibility of standards being exceeded, then that also  18 would give us a chance to think about whether our Mine  19 Plan still is capable of addressing that situation.  20 And in many cases, what we do is we actually  21 redesign the Mine Plan before we begin to make sure that  22 if this happens we've got an already identified  23 mitigation measure, and ideally we actually have also  24 identified financial assurance necessary to carry out  25 those measures.</p>	<p style="text-align: right;">940</p> <p>1 leaching potential is really what we're talking about.  2 There are both the short-term and the long-term kinetic  3 tests that she discussed.  4 Now, we also need to make sure we understand  5 the pathways. Again I'm not here to testify as a  6 geohydrologist today, but there are many people  7 testifying in that regard and their testimony is very  8 important, because understanding the sources is one  9 thing, the receptors is another, but it's these pathways  10 that are very important and critical, in fact, to  11 understanding what may potentially happen.  12 You can see those pathways can occur from a  13 host of things. Process water draindown, that's  14 essentially the tailings storage facility draindown that  15 we're talking about here. We have draindown from  16 infiltration. This would be from meteoric infiltration  17 and really drainage.  18 We have infiltration that can go through the  19 soil and vadose zone. So we still may have vadose zones  20 that are 10 feet thick or hundreds of feet thick. This  21 describes the infiltration through that zone, that's  22 essentially the dry zone, down to the water table.  23 There's the transport within groundwater,  24 transport from groundwater to surface water, uptake  25 biota, et cetera. So these are all things that it's</p>
<p style="text-align: right;">939</p> <p>1 I was going to replace this one, and I didn't.  2 So the reason I was going to replace this, by the way,  3 is there was some "See Section 5" and "Details in  4 Section 4." This was actually something I used in  5 another publication, and I just simply haven't had time  6 to remove those.  7 So if you will, I would just ask the folks  8 ignore these "Details in Section 3," "Details in  9 Section 4," "See Section 5" and "Details in Section 4,"  10 realize those were simply referring to something else in  11 the work that I borrowed this from.  12 This is a figure that's contained in the  13 report -- the 2005 report I wrote with Dr. Maest.  14 Essentially what we do at the conceptual site  15 model is we want to identify all the different sources  16 at the site. Now, with respect to those sources, you  17 can see we have quite a bit of data requirements, and  18 those include things like physical properties of  19 material, whole rock analysis,  20 geology/lithology/mineralogy -- I happen to think that  21 is a very important aspect of geochemistry that  22 oftentimes gets ignored -- whole rock analysis, acid  23 base accounting and the metal leaching potential.  24 I should mention these are essentially the  25 same tests that were described by Dr. Griffiths. Metal</p>	<p style="text-align: right;">941</p> <p>1 critical to understand how to get from here to here to  2 understand. And again there's all kinds of different  3 information.  4 I would mention in my experience groundwater  5 preferential pathways are very important to understand.  6 We've heard a lot about Darcy's law. Darcy's law  7 basically doesn't account for this. And these are, in  8 fact, the majority of sites that I've worked at where  9 we've ultimately seen pollution travel great distances.  10 And there's an example I'll bring up during my  11 rebuttal having to do with Bingham Canyon Mine that is  12 somewhat infamous or famous for looking at this  13 preferential pathway issue.  14 Now, we'll talk later about mitigation, but  15 this is essentially things like the minor interceptor  16 systems, various other things we would do to try to  17 disrupt the pathway between the sources and the  18 receptors. And so a good example is putting a liner in  19 as a mitigation for that pathway, but understanding that  20 liners again -- they're not a perfect solution.  21 I frequently recommend liners in the projects  22 I work on. A number of projects I worked on, for  23 example, at Stillwater mines, we have three tailings  24 impoundments. They're all lined. In fact, two of them  25 are not only lined, but very identical construction</p>

942	<p>1 technique with an internal drainage system to what's</p> <p>2 being proposed for Copper Flat.</p> <p>3       So liners are very common, but what we've</p> <p>4 discovered is liners don't prevent, they reduce. And in</p> <p>5 many cases, what they accomplish is they make the amount</p> <p>6 of water pollution handleable. Instead of hundreds of</p> <p>7 thousands of gallons, those liners can reduce it to tens</p> <p>8 of gallons. But they don't reduce it typically to a</p> <p>9 point where we no longer have to address them.</p> <p>10       And also, liners it's -- you know, as I'll</p> <p>11 discuss later, there's just so many different things</p> <p>12 that can go on and happen with them.</p> <p>13       So importantly, what we've heard a lot of --</p> <p>14 excuse me -- a lot of testimony from citizens in</p> <p>15 particular about the importance of the receptors here,</p> <p>16 groundwater seeps and springs, surface water, wetlands.</p> <p>17 We talked about the pit lake. We hear people talking</p> <p>18 about aquatic life, wildlife, vegetation, humans.</p> <p>19       Again this is what we've recognized for some</p> <p>20 time now in these conceptual site models that we need to</p> <p>21 identify and ensure we've addressed to be protected.</p> <p>22       Now, just in general, what we see happening at</p> <p>23 mine sites is they'll typically occupy a drainage.</p> <p>24 Within that drainage, we'll locate mine workings, we'll</p> <p>25 have underground mines, open pit mines.</p>	944	<p>1       MR. BUTZIER: A lot of this testimony insofar</p> <p>2 as it does not even relate to the Copper Flat Mine I</p> <p>3 think is more prejudicial than it is probative, and for</p> <p>4 that additional reason, I think it should be not</p> <p>5 allowed.</p> <p>6       MS. ORTH: All right. I'm going to hear it</p> <p>7 regardless. I think he's setting up the context for his</p> <p>8 future testimony.</p> <p>9       Please go ahead, Mr. Kuipers.</p> <p>10       MR. KUIPERS: Thank you.</p> <p>11       This is an important drawing actually with</p> <p>12 respect to the Copper Flat Mine. When we take a look at</p> <p>13 tailings piles being located in the -- in the area of</p> <p>14 essentially watershed, essentially what we have going on</p> <p>15 here is meteoric infiltration from precipitation, be it</p> <p>16 from large storm events, more continuous storm snow</p> <p>17 events, things of that nature.</p> <p>18       Essentially what can happen is the</p> <p>19 infiltration goes through the -- onto the piles, some of</p> <p>20 the water comes off the piles, some of the water goes</p> <p>21 through the pile. This is very much exactly what</p> <p>22 happens for an unlined impoundment in all cases.</p> <p>23       And what can happen, and we've discussed it</p> <p>24 here as a possibility at least, is that infiltration</p> <p>25 from the tailings pile can go into groundwater, and</p>
943	<p>1       You know, a good example would be the Copper</p> <p>2 Flat Mine. Who knows? Maybe the second phase of mining</p> <p>3 would be underground.</p> <p>4       Q. Mr. Kuipers, if I could interrupt you just a</p> <p>5 second.</p> <p>6       As you go through these slides, could you</p> <p>7 identify the slide that you're referring to, either by</p> <p>8 the title or the number of the slide, because you're</p> <p>9 moving pretty quickly, and the record is not going to</p> <p>10 reflect where in the slides you're at.</p> <p>11       A. I apologize for not having done so already. I</p> <p>12 know better.</p> <p>13       So I'm on slide 12 currently.</p> <p>14       The tailings piles, for example, end up</p> <p>15 seeping, end up in many cases with historic mines that</p> <p>16 weren't properly contained, where we end up with</p> <p>17 tailings waste rock actually going into the streams and</p> <p>18 rivers. We have tailings impoundments that are</p> <p>19 oftentimes located very close to sources of water, et</p> <p>20 cetera.</p> <p>21       MR. BUTZIER: Madam Hearing Officer?</p> <p>22       MS. ORTH: Sir.</p> <p>23       MR. BUTZIER: May I add another continuing</p> <p>24 objection?</p> <p>25       MS. ORTH: Yes.</p>	945	<p>1 provided there's conductivity, it can end up in surface</p> <p>2 water. Again recognizing that we have relationships</p> <p>3 between groundwater, alluvial aquifers and surface water</p> <p>4 is very important when we take a look and understand</p> <p>5 this.</p> <p>6       The idea, of course, of putting a liner is to</p> <p>7 limit and try to shut off that infiltration into</p> <p>8 groundwater that occurs. So essentially part of what</p> <p>9 we're trying to do with mitigation is disrupt this</p> <p>10 situation where we can have pollution going below the</p> <p>11 surface, or through here. Also, reclamation is intended</p> <p>12 to address this phenomena of the surface run-off.</p> <p>13       Now, what we're ultimately also very</p> <p>14 interested in doing is protecting --</p> <p>15       Q. Which slide is this?</p> <p>16       A. Slide 14, and this is titled Source and</p> <p>17 Pathway Overview.</p> <p>18       And essentially what I'm trying to show here</p> <p>19 is what happens if this relationship between sources and</p> <p>20 receptors goes so far as to result in pollution to</p> <p>21 surface water. And essentially once we get metals into</p> <p>22 surface water, some of them are going to be dissolved.</p> <p>23       We may also have basically particles of</p> <p>24 minerals that are also there that can adsorb but not --</p> <p>25 are not necessarily dissolved. Some of the particles</p>

946	<p>1 settle out in the bed of the stream. Some of it remains  2 suspended. And then whenever we get storm events and  3 other things, it can scour.</p> <p>4 Now, in extremely polluted systems, we see  5 this phenomena essentially killing aquatic life, because  6 aquatic life is very dependent upon these sediments.</p> <p>7 Again I'm not saying this will happen here,  8 but this is the type of thing that we're concerned about  9 and want to make sure through a robust analysis can't  10 occur, or at least if it can occur, we've addressed what  11 kind of mitigation would be necessary, and we've also  12 addressed having the resources to apply that mitigation.</p> <p>13 Now, in looking at a particular site, we  14 typically take that same information from our conceptual  15 site model diagram and draw it out for the site.</p> <p>16 Q. We're on slide 15 now?</p> <p>17 A. I am sorry, Counsel. I will endeavor to state  18 the slide number.</p> <p>19 This is slide 15, titled Conceptual site  20 model.</p> <p>21 And what we're showing here are the typical  22 various features of a mine site. I should mention this  23 is not specifically intended to represent the Copper  24 Flat Mine. This is a generalized diagram that I use in  25 a lot of different presentations; however, it has a lot</p>	948	<p>1 So again we start with a Mine Plan site  2 conceptual model. I should mention that on the top  3 we're showing the project phase. So again something  4 very important we do today that we didn't do in the  5 past, we look at the entire mine life cycle. There was  6 a failure in the past to consider the life cycle through  7 reclamation and closure.</p> <p>8 So when we design the mine, we want to  9 actually be designing for reclamation and closure.  10 That's a key thing we do today that wasn't done in the  11 past.</p> <p>12 In order to do that, again we have to  13 characterize the geology, mineralogy and lithology. We  14 do sampling analysis. We conduct the various static  15 tests you heard about, the kinetic tests, which are the  16 humidity cell tests. From there, we also need our  17 hydrological characterization.</p> <p>18 We take all that information and do modeling.  19 And, you know, a lot of folks have done a lot of  20 modeling of this project. We typically do a sensitivity  21 analysis. And I'm going to mention later that that's  22 one aspect that I think needs to be performed for this  23 project.</p> <p>24 I'm not saying it hasn't been performed at  25 all, but we have not performed a robust sensitivity</p>
947	<p>1 of similarities to the Copper Flat site.</p> <p>2 We have an open pit, waste rock and tailings.  3 And one of the things I think is very important about  4 this conceptual site model is it recognizes that there  5 is the potential for transport from the waste rock down  6 into the groundwater. Same for the tailings down into  7 the groundwater.</p> <p>8 And I would note that that potential and  9 showing that potential is something we always do  10 regardless of whether it's being lined or not. So that  11 line -- it's recognized as being very important, and  12 even if we have a liner in a conceptual site model --  13 and I'll show you some drawings by others doing the same  14 thing -- we always make that provision for that seepage  15 happen.</p> <p>16 Now, the same model shows what can happen if  17 we get pollutants into groundwater. Those pollutants  18 can end up showing up in springs and seeps that can come  19 out on a hillside with respect to the water table. You  20 also can have transmission directly into surface water.</p> <p>21 The next slide is slide 16, titled  22 Mine-Impacted Water characterization process.</p> <p>23 Now, this again is another way of  24 demonstrating this idea of looping through the process  25 rather than just taking what comes at you.</p>	949	<p>1 analysis for this project. I think it's critical if we  2 want to make sure that we've identified the various  3 mitigation necessary and how to implement those. If  4 necessary, we need to take more time to do more  5 sensitivity analysis.</p> <p>6 And then as the mine goes into operation, we  7 do verification monitoring.</p> <p>8 And you can see all during these tests what  9 we're trying to indicate here is this information needs  10 to keep looping back up in the mine site conceptual  11 model. If we don't do sensitivity analysis, we don't  12 get that particular loop.</p> <p>13 So again just trying to make the point of how  14 we go through a whole iterative process, and we  15 typically don't make assumptions that everything is  16 going to be best case or ideal.</p> <p>17 MR. BUTZIER: Madam Hearing Officer, could I  18 ask for a clarification?</p> <p>19 MS. ORTH: Sir.</p> <p>20 MR. BUTZIER: Mr. Kuipers continually refers  21 to "we" like it's a royal "we." I'm not sure exactly  22 who he's referring to when he says "we."</p> <p>23 MR. KUIPERS: The mining community or  24 industry, the -- for example, the information I'm taking  25 is from the Global Acid Rock Drainage Guide, which was</p>

<p style="text-align: right;">950</p> <p>1 written by the industry and is used extensively by the  2 industry, and I consider myself part of the industry,  3 and the people who have contributed to these documents.  4 MS. ORTH: Okay. Thank you.  5 Slide 17.  6 MR. KUIPERS: Slide 17, titled  7 Mine-Impacted -- Mine-Influenced Water characterization  8 uncertainty.  9 So this is the real gist of why I just went  10 through all these slides, was to try to get folks to  11 understand and make sure the Hearing Officer understood  12 that there's a lot of different inputs, a lot of  13 different things we're doing in here. It's good  14 science. It's great that we've actually developed the  15 means and the ability to utilize these models and do  16 these.  17 But what we can't forget, and this is so  18 critical, there are inherent uncertainties in all water  19 quality bodies. We can't get rid of that. And so the  20 suggestion that we've got predictions that are going to  21 give us exact results? I could make a lot of money, I  22 believe, betting against those predictions. That's not  23 what we want to do. We don't want bad predictions.  24 But it's very important to note these are --  25 these are well-known people in the industry, they're</p>	<p style="text-align: right;">952</p> <p>1 say is the Copper Rule as written and applied does not  2 include risk assessment. And the risk assessment  3 process is, in fact, how -- again we, the industry, when  4 you read the Global Acid Rock Drainage (GARD) Guide,  5 has determined we should address this type of  6 uncertainty.  7 So what I'm trying to make sure we understand  8 is when we talk about these mine-influenced water  9 prediction models, they're best used as a comparative  10 tool and not for determinative predictions. And what I  11 mean is we use them to compare one option versus  12 another.  13 And these tools are very good at telling us  14 whether we get an improvement. But where these tools  15 fail is when we try to say I'm going to end up with  16 exactly 4,897 feet of elevation or I'm going to end up  17 with exactly 990 milligrams per liter concentration,  18 they're almost always wrong.  19 And work that I've done in particular for  20 EISes suggests that as an overall approach these  21 determinative predictions are wrong about greater than  22 80 to 90 percent of the time.  23 There is something to say about the site  24 specifics added to this. I can tell you the sites where  25 we have a lot of the surface water, a lot of</p>
<p style="text-align: right;">951</p> <p>1 respected folks, all of whom have suggested that this  2 uncertainty needs to be considered by regulators as well  3 as policymakers.  4 And I would note that the one concern I have  5 about the Copper Rule, the assumption that -- it's not  6 the one concern, I should say, but it was one of the  7 major concerns, this idea that we can permit by rule  8 when the rule does not contain any requirements for a  9 risk assessment. And without that risk assessment, I  10 don't know that we can really say that we follow the  11 current science.  12 MR. BUTZIER: Madam Hearing Officer, now I'm  13 going to have to make an objection that this is an  14 attempt to relitigate the Copper Rule, which the agency  15 has already indicated is a permit by rule approach and a  16 very prescriptive one at that, and I think Mr. Kuipers  17 participated in that proceeding, and I would object to  18 him reinjecting the same issues into this proceeding.  19 MS. ORTH: All right.  20 So, Mr. Kuipers, I know you understand this  21 isn't a hearing on the Copper Rule, but the application  22 of the Copper Rule.  23 MR. KUIPERS: Yeah.  24 MS. ORTH: So please go ahead.  25 MR. KUIPERS: So I believe what I'm trying to</p>	<p style="text-align: right;">953</p> <p>1 groundwater, that percentage of being wrong actually  2 goes up. It's almost always that those are wrong.  3 We do have a better chance of doing things at  4 a drier site. I want to recognize that. So there are  5 things about the site that help us, but they don't  6 eliminate this concern at all.  7 So a little bit about the Copper Flat  8 mine-impacted water history.  9 Q. (BY MR. DE SAILLAN) We're on slide 18 now?  10 A. Yes. Slide 18, titled Copper Flat  11 Mine-Influenced Water History.  12 We have past intermittent mining activities  13 that have affected water quality, and while we recognize  14 that those activities weren't performed at the same  15 standard as what's being proposed today, one of the  16 things that all of us that worked in this field  17 understand is when you have site-specific information  18 available from historic mining operations or other  19 things, that's very important and valuable data.  20 It gives us a good indicator of what might  21 happen. Again indicator, but not an actual predictor.  22 So we want to talk about the four identified  23 sources, pit lake, the surface water in Grayback Arroyo,  24 groundwater quality in the vicinity of the existing pit  25 and groundwater in the former mineral processing and</p>

954	<p>1 tailing storage facility areas.</p> <p>2 I'm on slide 19, titled Copper Flat</p> <p>3 Mining-Influenced Water History.</p> <p>4 I should mention all of this information came</p> <p>5 from the 2017 EIS, Draft Environmental Impact Statement,</p> <p>6 and it is up here verbatim, the same as the language in</p> <p>7 the Environmental Impact Statement.</p> <p>8 So the EIS -- Draft EIS, I should say,</p> <p>9 indicated that pit lake water quality is subject to</p> <p>10 requirements, et cetera.</p> <p>11 The existing water quality in the pit lake</p> <p>12 exceeded applicable surface water quality standards for</p> <p>13 aluminum, cadmium, copper, lead, manganese, selenium and</p> <p>14 zinc in at least one of the baseline water quality</p> <p>15 samples collected from 2011 through 2012.</p> <p>16 The pit lake water quality also exceeded water</p> <p>17 quality standards for cadmium, copper, manganese and</p> <p>18 selenium during all baseline water sampling events. I</p> <p>19 assume that's from the same period, during 2011 and</p> <p>20 2012.</p> <p>21 The EIS concludes that based on this data the</p> <p>22 existing pit lake does not meet the water quality</p> <p>23 standards for the designated uses of warm water aquatic</p> <p>24 life, livestock watering or wildlife habitat.</p> <p>25 The next slide is slide 20, also titled Copper</p>	956	<p>1 through evaporation, removing water from the lake and</p> <p>2 essentially this evapoconcentration phenomena that we've</p> <p>3 talked about.</p> <p>4 They also noted that periodic dissolution and</p> <p>5 flushing of products from mineral oxidation in the high</p> <p>6 walls surrounding the pit lake also affects water</p> <p>7 quality. So part of what's happening here is as the</p> <p>8 meteoric water keeps falling on the area surrounding the</p> <p>9 pit lake, it also is leaching materials from those pit</p> <p>10 lake -- the pit high walls, walls even though they're</p> <p>11 relatively small in this case, and that continues to be</p> <p>12 an additional source for the pit lake.</p> <p>13 Q. Mr. Kuipers, if I could interrupt you just for</p> <p>14 a minute.</p> <p>15 You're referring here to the existing pit</p> <p>16 lake?</p> <p>17 A. That's correct.</p> <p>18 Q. Thank you for that clarification.</p> <p>19 A. Slide 21, titled Copper Flat Mining-Influenced</p> <p>20 Water History.</p> <p>21 In this slide, we're bringing in the</p> <p>22 information from the 2017 DEIS on Grayback Arroyo.</p> <p>23 What the DEIS says is that the site data from</p> <p>24 SWQ-3 suggests that the surface water in the arroyo is</p> <p>25 affected by not only natural weathering of the Copper</p>
955	<p>1 Flat Mine-Influenced Water History.</p> <p>2 Going on, the pit lake -- according to the</p> <p>3 2017 DEIS, the pit lake water contained high total</p> <p>4 dissolved solids which ranged from 7,770 to 9,680</p> <p>5 milligrams per liter in samples collected during 2010</p> <p>6 and 2011.</p> <p>7 And as we've discussed before, we see</p> <p>8 evapoconcentration occurring in this pit lake with the</p> <p>9 TDS, total dissolved solids, concentration, increasing</p> <p>10 from approximately 3,500 milligrams per liter to 9,500</p> <p>11 milligrams per liter during the period 18 -- 1989 to</p> <p>12 2011.</p> <p>13 So for a period of approximately 22 years,</p> <p>14 what we saw -- and again we would see and have</p> <p>15 evapoconcentration in a smaller pit lake. We actually</p> <p>16 saw a near three times increase over those 22 years.</p> <p>17 And this is the phenomena of evapoconcentration which we</p> <p>18 raised and are very concerned about.</p> <p>19 The EIS goes on to say that the concentrations</p> <p>20 of cadmium, copper, manganese, selenium and sulfate also</p> <p>21 increased over the period of 1989 to 2011. So again</p> <p>22 this wasn't just total dissolved solids, but it was also</p> <p>23 these elements in addition to TDS.</p> <p>24 And again the EIS basically notes that</p> <p>25 increasing trend in TDS is caused by concentration</p>	957	<p>1 Flat ore body, but also previous mining of the ore body.</p> <p>2 Essentially they're saying that the pollution in -- of</p> <p>3 surface water at Grayback Arroyo is both due to natural,</p> <p>4 but also to manmade, or anthropogenic, causes, and those</p> <p>5 anthropogenic causes were the past mining.</p> <p>6 Going on to groundwater quality in the</p> <p>7 vicinity of the existing pit, the EIS says that</p> <p>8 according -- during the 2013 sampling program, water</p> <p>9 quality at GWQ11-24A, which is the shallower of the</p> <p>10 paired monitoring wells, did not meet New Mexico</p> <p>11 groundwater quality standards for pH, TDS, sulfate,</p> <p>12 fluoride, aluminum, cadmium, cobalt, copper and</p> <p>13 manganese.</p> <p>14 It also indicates that groundwater quality at</p> <p>15 the shallower of the two wells, GWQ11-25A, does not meet</p> <p>16 New Mexico water quality standards for pH, TDS, sulfate,</p> <p>17 fluoride, aluminum, cadmium, cobalt, copper, manganese</p> <p>18 and zinc, noting that providing a measurement indicator</p> <p>19 of 10.</p> <p>20 Now, BLM actually has a measurement indicator</p> <p>21 of 1 to 10 for water quality, 10 being the worst. They</p> <p>22 considered this groundwater quality to basically rate a</p> <p>23 10, or the worst water quality in their rating system.</p> <p>24 Notes that the groundwater quality at 11-25B</p> <p>25 exceeds New Mexico water quality standards for TDS,</p>



<p style="text-align: right;">958</p> <p>1 sulfate and fluoride. So I think this -- we have two  2 different intervals being sampled here perhaps. I'm not  3 that familiar with the wells, I have to admit.</p> <p>4 The observed water quality effects at these  5 locations, according to the EIS, may be due to oxidation  6 of sulfide minerals in near-surface rock units -- again  7 these would be the material at the pit walls -- and  8 leaching of previous products of sulfide mineral  9 oxidation with subsequent infiltration to the water  10 table.</p> <p>11 Slide 22, titled Copper Flat Mining-Influenced  12 Water History.</p> <p>13 This slide talks about the groundwater in the  14 former mineral processing and tailing storage facility  15 areas. This is again mainly focused on the tailing  16 storage facility area.</p> <p>17 And what the EIS shows is that groundwater  18 quality at some monitoring wells located downgradient of  19 the former mineral processing area and TSF also show  20 evidence of mining-influenced water.</p> <p>21 Essentially they identify elevated  22 concentrations of sulfate and TDS. I believe that's  23 consistent with some of the testimony we've heard over  24 the last few days. And they note that the metals  25 concentrations meet the groundwater quality standards.</p>	<p style="text-align: right;">960</p> <p>1 made that point enough now, but if I haven't, it's quite  2 notable that the Environmental Impact Statement goes out  3 of its way to identify this issue.</p> <p>4 And I might also note that when they identify  5 this issue I'm amongst the authors' reports that they're  6 referencing when it comes to this, but I'm certainly not  7 the sole author of those reports.</p> <p>8 In order to address those uncertainties, the  9 BLM in the EIS recommends the following.</p> <p>10 First, the rate of mineral oxidation and -- or  11 really they're -- I shouldn't say recommends the  12 following. What they're doing is identifying why these  13 uncertainties exist.</p> <p>14 So first, the rate of mineral oxidation and  15 associated contaminant release from the mineralized  16 rocks in the pit high walls, which controls the  17 chemistry of inflowing water. So trying to predict that  18 rate of mineral oxidation and the associated contaminant  19 release. We have tools to do that. I believe those  20 tools -- Ms. Griffiths' analysis is consistent with  21 those tools. But it is an issue in that it's a  22 difficult prediction to make.</p> <p>23 We have issues with potential seasonal or  24 permanent stratification, for example, at pit lakes and  25 uncertainties associated with the mixing of pit lakes.</p>
<p style="text-align: right;">959</p> <p>1 Again I would not disagree with some of the  2 characterizations we've heard that we would expect the  3 tailings to have less potential for metals  4 concentrations because the flotation process is intended  5 to at least try to remove as much of those metals as  6 possible.</p> <p>7 That doesn't mean there's no potential,  8 though. It is possible that the ongoing discharge of  9 mine-impacted water from the TSF are occurring, but the  10 EIS noted that there is not enough site-specific data --  11 or no site-specific data, according to the EIS,  12 regarding that ongoing seepage of mine-influenced water  13 from the site.</p> <p>14 So I think that's -- I'll let the department  15 address why the BLM came to that conclusion.</p> <p>16 Slide 23, Copper Flat Mining-Influenced Water  17 Predictions.</p> <p>18 Now, in the same Environmental Impact  19 Statement, they also reported on what the future pit  20 lake water quality would be. So this slide is actually  21 referring to the future pit lake, not the existing pit  22 lake.</p> <p>23 So with respect to the future pit lake water  24 quality, they noted uncertainties that are not fully  25 quantifiable due to existing technologies. I hope I've</p>	<p style="text-align: right;">961</p> <p>1 We've seen oftentimes instead of a mixed chemistry  2 throughout, we get stratification, where we may see a  3 lower pH at the bottom, for example, with a higher pH at  4 the top, but then we can simply see a temperature  5 change, and the lake mineralogy will cause it to flip  6 over.</p> <p>7 Again this is common, but it's the type of  8 thing that can happen and creates uncertainty in what it  9 is we're trying to predict.</p> <p>10 The third bullet, the chemistry and inflow  11 rate of groundwater after mining is complete. Again we  12 have estimations, we have models for this project that  13 have attempted to do that, but what the BLM is  14 recognizing here is there are still uncertainties in  15 what it is we essentially predict in this regard.</p> <p>16 The rate of removal of dissolved solids in the  17 pit lake. So as the pit water begins to get more  18 evapoconcentrated, even if it's not necessarily  19 evapoconcentrated, some amount of those pollutants that  20 are in solution begin to form minerals and end up  21 precipitating out. Now, that would actually decrease  22 the concentration, for example, of a given constituent  23 if that were to happen.</p> <p>24 So we -- in a lot of our models, we allow for  25 that, but that can also create an additional</p>

<p style="text-align: right;">962</p> <p>1 uncertainty. Again these models are very sophisticated,  2 they're attempting to mimic the natural processes, but  3 we don't know everything about the natural processes.  4 That's one of the reasons our models aren't necessarily  5 as accurate as we like them to be.</p> <p>6 We also have primary and secondary mineral  7 species that will be present on the pit high walls, and  8 with these, we can have various associated thermodynamic  9 parameters for these minerals. The most example -- best  10 example is basically the minerals going from ferric to  11 ferrous and converting a form of iron in this pit lake  12 to different forms.</p> <p>13 Potential changes in the climate that may  14 occur. We heard talk a lot about the potential for  15 climate change, that these may be due to either natural  16 or anthropogenic factors. What is recognized in the  17 GARD Guide is we need to account for it regardless.</p> <p>18 Slide 24, Copper Flat Mine-Impacted Water  19 Predictions.</p> <p>20 This is also addressing the pit lake water  21 quality, and I believe this is the report that was  22 discussed here this week.</p> <p>23 The SRK report predicts that the pit lake  24 water quality 100 years in the future will be  25 near-neutral pH -- so we're not talking an acid pH,</p>	<p style="text-align: right;">964</p> <p>1 recommended a set of mitigations be developed to provide  2 for postmining compliance with water quality standards.</p> <p>3 So the first thing they did was the proponent  4 shall modify the Mine Plan of Operations to include the  5 appropriate mitigations to protect pit lake water  6 quality. Certainly the proposed rapid refill would be  7 an example of that type of mitigation. Whether it will  8 actually accomplish everything it needs to or not is  9 questioned.</p> <p>10 They also ask that the proponent shall provide  11 a preliminary pit lake water management -- or water  12 quality management plan, and it needs to describe the  13 reclamation, water quality management and monitoring  14 activities that will be conducted to facilitate  15 compliance with applicable water quality standards  16 during the postmining monitoring period.</p> <p>17 Essentially this is the same monitoring that  18 we've been discussing at length already, and one of the  19 key issues is whether that monitoring should continue  20 for 25 years or 100 years or really just simply as long  21 as necessary.</p> <p>22 The BLM also addressed some other mitigation.  23 They suggested the pit lake water chemistry should  24 meet -- or shall meet the water standards during 30  25 years after completion. Not really sure how they're</p>
<p style="text-align: right;">963</p> <p>1 we're talking that circumneutral range we identified --  2 but have high TDS, calcium-sulfate water, similar to the  3 water in the existing pit lake.</p> <p>4 And they also note that it predicts the new  5 pit lake will meet many water quality standards, but  6 would exceed the currently applicable water quality  7 standards for copper, lead, manganese, selenium and zinc  8 if no control measures applied. It's very important to  9 note, I want to clarify this is not using the rapid  10 refill scenario. This is if we actually just let the  11 pit lake fill naturally.</p> <p>12 They note that if the new use -- or use  13 designations or water quality standards do not change in  14 the future the pit lake would not be expected to meet  15 the designated uses of warm water aquatic life or  16 wildlife habitat again if no control measures are  17 applied based on the predictions.</p> <p>18 They also note that the water quality  19 standards that would apply 100 years in the future -- we  20 don't know what that will be. So that's just simply  21 another area of uncertainty.</p> <p>22 Well, the BLM also goes on to note that  23 because both future pit lake water quality and the water  24 quality standards that will apply to the pit lake  25 decades or centuries into the future are uncertain they</p>	<p style="text-align: right;">965</p> <p>1 going to force it to meet those standards, but that was  2 the idea of a plan that would meet it.</p> <p>3 And at least one year prior to closure, the  4 proponent shall update the pit lake water quality  5 management plan and provide this final plan to the BLM  6 for review and approval. That final plan is supposed to  7 indicate how the reclamation activities would be  8 conducted to facilitate compliance with the applicable  9 water quality standards during the post-mining period.</p> <p>10 But note this is one year prior to mine  11 closure. If the company by some bad circumstance went  12 bankrupt, there would not be an opportunity for the  13 agencies to get a revised Mine Plan based upon the  14 knowledge that would be gained during the coming years  15 of mining and revise that plan to ensure we have  16 satisfactory postmining water quality.</p> <p>17 And they also note that the proponent shall  18 provide a cost estimate for implementation of the pit  19 lake Water Quality Management Plan. BLM has made  20 tremendous progress over the last 20 years with respect  21 to bonding. They are, actually, for the financial  22 assurance.</p> <p>23 I cite their guidance and basically follow  24 their guidance extensively. And they've dealt with a  25 lot of pit lakes. For example, in Nevada, I believe</p>

<p style="text-align: right;">966</p> <p>1 there's something in the neighborhood of 20 different  2 pit lakes that are in various stages of formation today,  3 and I think quite a few more even forming in future  4 years.  5       So the BLM isn't -- hasn't just dealt with one  6 or two pit lakes. They've dealt with a lot of pit  7 lakes. And their guidance is very much based upon their  8 experience and knowledge in how to deal with this.  9       So the real question I think we're trying to  10 answer here is what is the appropriate postmining  11 period?  12       Twenty-five, 30 years, it only works if all  13 the water quality standards are met. If the water  14 quality standards aren't met at 25 years, we're going to  15 need to continue. So an assumption that it's just  16 simply going to be 25 or 30 years exposes a tremendous  17 liability if, in fact, that's not the case. And we  18 don't have any actual, you know, data yet. We won't  19 have that data until it's mined.  20       That same approach also doesn't account for  21 spills, leaks, infiltration and eventual pit lake  22 evapoconcentration. I get the idea sometimes the idea  23 is to go ahead and say everything is fine after 20  24 years, leave the site, and then this pit lake is going  25 to sit there and evapoconcentrate.</p>	<p style="text-align: right;">968</p> <p>1 companies' reasoning for not wanting to end up with a  2 prediction that has that scenario, but I'm not sure how  3 we cannot do that and still protect public liability.  4       Slide 25, also -- let's see.  5       I think I might have gone up, didn't I?  6       Okay. Slide 27, titled Copper Flat  7 Mine-Impacted Water Predictions.  8       Just a few other things from the 2017 EIS with  9 respect to surface water and groundwater quality  10 impacts.  11       As we heard --  12       Q. Excuse me, Mr. Kuipers.  13       The EIS you're referring to, is that 2017 or  14 2015?  15       A. I believe it's the 2015 -- you know, could you  16 hand me the EIS again. I may be misquoting the date.  17       I apologize, Madam Hearing Officer. In each  18 case that I've been citing the 2017 Draft Environmental  19 Impact Statement, I should have been citing the 2015  20 Draft Environmental Impact Statement.  21       MS. ORTH: Thank you.  22       MR. KUIPERS: I review a few too many of  23 these.  24       Okay. So from the 2015 Draft Environmental  25 Impact Statement -- we're on slide 27, titled Copper</p>
<p style="text-align: right;">967</p> <p>1       And if nobody is responsible for monitoring,  2 much less dealing with mitigation, we're going to have a  3 problem at some point in the future. And again that's  4 what we're trying to address here. When you really  5 consider the amount of money we're suggesting needs to  6 be put up, it is not exorbitant, but it's reasonable.  7       And it's the type of thing that if we don't do  8 it I think we can -- my prediction would be that there's  9 a greater than 50 percent odds that the public will  10 eventually be liable on this project, even if the  11 company doesn't go bankrupt. Just simply because at  12 some point we're going to let them go, say everything is  13 fine, and then 50, 75, 100 years later, who knows when,  14 discover that wasn't the case.  15       The idea of modern reclamation and closure  16 practice is not to leave liabilities for future  17 generations. It's to recognize these liabilities,  18 account for them, have a plan for financial assurance  19 and try to avoid these legacy issues from the past. So  20 again I respect that there's a lot of legacy mines that  21 we can talk about, but even with new, modern mines, the  22 key is to make sure we've addressed these things.  23       So if the water quality standards are not met  24 as predicted, then the postmining period could be  25 indefinite or perpetual. And I do understand the mining</p>	<p style="text-align: right;">969</p> <p>1 Flat Mining-Influenced Water Predictions.  2       With respect to surface and groundwater  3 quality impacts, the EIS also suggests that in the  4 transition zone there's a high potential to generate ARD  5 or other metals leaching if percolation occurs. And  6 again what we've heard from the company is that they  7 plan on taking this higher-potential ARD material and  8 encapsulating it within the waste rock dump.  9       Good idea, but one of the things we need to  10 note that if by some chance they don't complete the Mine  11 Plan that encapsulation doesn't get done. And presently  12 in the financial assurance proposal that we have,  13 there's nothing in there to complete that encapsulation  14 if the mining company doesn't go all the way to closure.  15       Also in the sulfide zone, we've heard some  16 suggestions that it's not going to be acid-generating or  17 weak acid-generating or other things.  18       I think it's important to note that basically  19 what we're talking about here is material that's going  20 to oxidize slowly, neither acid generation nor release  21 of other deleterious leachate would be expected in the  22 short-term, years to decades; however, that slow  23 oxidation rate could, in fact, end up leading to issues  24 in the long-term.  25       And while I don't mention it here, I certainly</p>

<p style="text-align: right;">970</p> <p>1 don't preclude it. It is one of the things we've seen.  2 I would note that we -- at the Chino and Tyrone sites  3 both, some of those predictions have us not generating  4 deleterious materials for 200 to 300 years in the  5 future. And we've seen that at other sites.  6       So it may take decades, in some cases even  7 centuries for the sulfide waste rock ore to oxidize  8 sufficiently to produce ARD or other deleterious  9 leachates. So we need to not just be looking again five  10 or 25 years in the future. This is something that we  11 really won't know what the ultimate outcome of this mine  12 will be potentially for decades or even centuries in the  13 future.  14       Q. (BY MR. DE SAILLAN) Mr. Kuipers, I'm not sure  15 if I heard you, but did you explain what you mean by  16 ARD?  17       A. Yes. ARD stands for acid rock drainage.  18       Q. Thank you.  19       A. Slide 28. Here I'm going to switch to talking  20 about tailings storage facility liner seepage.  21       Okay. Again I mentioned before the Global  22 Acid Rock Drainage (GARD) Guide. This I'm hesitant to  23 say is the Bible, but in many ways it is, because it's a  24 very comprehensive guide that addresses all kinds of  25 aspects, not just mine-influenced water leaching, but</p>	<p style="text-align: right;">972</p> <p>1 Facility Liner Seepage.  2       Figure 1 cites sources and pathways of  3 ARD/mine-influenced water, acid rock  4 drainage/mine-influenced water, in a slurry tailings  5 storage facility. And again this is taken directly from  6 the GARD Guide. So it's really talking the type of  7 facility that the Copper Flat Mine is proposing to  8 build, which is a wet slurry facility.  9       It's -- as you would note from the plans,  10 they're talking about building the dyke as they go. So  11 this is a good example of starting with a starter dyke,  12 and then as the tailings is raised, they'll raise it by  13 lifts. This particular design shows a downstream  14 tailings design. Actually this could be a combination  15 downstream and centerline, one could suggest.  16       You can see where you have tailings  17 supernatant water, and then we have various layers of  18 sand -- of tailings.  19       Now, one of the things that they always note  20 in the GARD Guide is, for example, we have fine-fraction  21 slimes and coarse-fraction sands.  22       What happens in tailings is if they all were  23 mixed perfectly and homogenous it would be kind of easy  24 with tailings to predict what the permeability might be,  25 but what we end up finding is when tailings get</p>
<p style="text-align: right;">971</p> <p>1 also mitigation of mine-influenced water, mine design,  2 mine-influenced water treatment, and many other aspects.  3       It's a very valuable guide, and I think it's  4 some -- one of the more important things that industry  5 has actually produced in the last 10 years.  6       The GARD Guide provides us some information on  7 tailings, and they mention a couple of different things  8 about tailings.  9       One, that they are a primary source of acid  10 rock drainage and can also be a source of  11 mining-influenced water, neutral and saline drainage.  12       They note that the discharges with tailings  13 facilities includes run-off and seepage for all disposal  14 methods.  15       The run-off and seepage quality are a function  16 of the tailings composition, reactivity and contact  17 time. So time is a very important factor in all this.  18       The seepage rate is a function of the  19 permeability of the underlying natural or engineered  20 materials and the infiltration rates through the  21 tailings. So we need to look at both the infiltration  22 through it, but also what happens with that solution  23 when it gets through those materials.  24       Now, this is a figure from the GARD Guide.  25       This is slide 29, titled Tailings Storage</p>	<p style="text-align: right;">973</p> <p>1 deposited in tailings impoundments -- and I've spent a  2 great deal of my career looking at this phenomena and  3 being responsible for deposition tailings here -- we get  4 segregation of the tailings.  5       And typically in a dam like this, we get  6 coarser fractions of sands towards the area where we're  7 depositing the tailings, and then you get finer  8 materials in the center.  9       What's important to note is the finer  10 materials are going to have a low or lower permeability,  11 but the sands would have a higher permeability. If we  12 assume they're mixed together, then we get something in  13 between.  14       So when we just take one number, for example,  15 for infiltration through tailings or the permeability  16 through tailings, that one number would be trying to  17 represent the middle of this, but not either extreme.  18 Very important, because what we find oftentimes in these  19 seepage predictions is we accounted for an average, but  20 we didn't account for the variability, and with the  21 sands that actually we're allowing a much higher rate of  22 infiltration through the tailings and subsequently  23 through a liner.  24       Now, you might notice that the GARD Guide  25 shows this particular design with a liner, and they also</p>

974	<p>1 include, I would note, a boldfaced seepage indicator.                  2 This isn't a dashed line that says sometimes it's there,                  3 sometimes it's not. It is this small, thin line saying                  4 it's insignificant. It's got the same flow as we talked                  5 about the toe seepage evaporation precipitation.                  6 It's important to note they didn't minimize in                  7 any way, shape or form seepage. We recognize as people                  8 who work with tailings facilities all the time today                  9 that accounting for the seepage in our work is extremely                  10 important, not just with respect to the environment, but                  11 also this can be a factor in a catastrophic failure.                  12 Typically isn't, but again we always account for it.                  13 Just a bit on the storage facility liner                  14 seepage requirements in NMAC -- in the New Mexico Mining                  15 Act -- excuse me. NMAC is the Copper Rule.                  16 Again this is slide 30, titled Tailings                  17 Storage Facility Liner Seepage.                  18 What we're showing here is the general                  19 engineering and survey requirements for new tailings                  20 impoundments in NMAC 20.6.7.22. And what I've done here                  21 is rather than have four slides containing the actual                  22 regulations, I've just gone ahead and tried to more                  23 generically describe what it says to do.                  24 And I think we've heard the Environment                  25 Department similarly go through this in exactly more</p>	976	<p>1 proposed tailings impoundment, seepage collection and                  2 interceptor systems when constructed and operated in                  3 accordance with the plan in this paragraph would cause                  4 groundwater to exceed standards, then the department                  5 shall require additional controls which may include but                  6 are not limited to a liner system.                  7 So this has turned out to be a bit of a                  8 convoluted process in that we describe interceptor                  9 systems as a first aspect. We also mention that they                  10 may be needed here, but then if they -- you know, we may                  11 throw them in here.                  12 Now, what the company did -- and again I                  13 actually believe this is a good decision on their part,                  14 a correct decision, particularly for the recycle of                  15 water and to ensure that they don't lose a lot of water                  16 from this operation, putting a liner system in --                  17 actually we oftentimes do that not for pollution                  18 control -- but to maximize the amount of water we can                  19 recycle. Particularly in dry climates like this we see                  20 that done.                  21 And so simply doing it for that reason I think                  22 was a good idea.                  23 We also would expect that it would reduce                  24 infiltration, but again where we have some concerns with                  25 the aquifer evaluation and the fact that it wasn't as</p>
975	<p>1 detail through the regulations.                  2 But the first step essentially is to address                  3 TSF seepage and make sure it's captured through                  4 construction of headwalls, impoundments, diversion                  5 structures, interceptor systems. So this is kind of a                  6 general assumption that we're going to have TSF seepage,                  7 and it needs to be captured by the various mechanisms.                  8 The second step is to conduct an aquifer                  9 evaluation to determine the potential nature and extent                  10 of impacts on groundwater from the tailings storage                  11 facility. And we've heard that the aquifer evaluation                  12 is performed for the Copper Flat Mine.                  13 A design report is then required for a                  14 proposed interceptor system for containment and capture                  15 of groundwater impacted by the tailings impoundment                  16 based on the aquifer evaluation. Now, of course, if the                  17 aquifer evaluation doesn't say you need the interceptor                  18 system, then you wouldn't design it.                  19 That's why it's very important that this                  20 aquifer evaluation not be based on, if you will, desired                  21 outcomes, but rather be based upon a robust sensitivity                  22 analysis that addresses not just what we would like to                  23 happen, but what we think could happen if our designs                  24 don't go as planned.                  25 Finally, if the department determines that the</p>	977	<p>1 robust as I think it needed to be to look other than at,                  2 if you will, outcomes that would result in a need for                  3 treatment.                  4 So this is slide 31, titled Tailings Storage                  5 Facility Liner Seepage.                  6 One of the things I noted and I was surprised                  7 about -- I'm referring here to the Golder Associates                  8 Feasibility Level Design report, which Mr. Kidd                  9 described and has been developed by Golder for the mine                  10 application -- essentially skips some steps. It doesn't                  11 provide us really an explanation of why we have the                  12 liner design. And it does address seepage from the                  13 underdrain above the liner.                  14 So one of the things we have in this design --                  15 and again this is a good idea -- is above the liner we                  16 have a drainage network that is intended to reduce the                  17 amount of water head on the liner. And what it really                  18 does is it gives us two-dimensional drainage versus                  19 one-dimensional, and it speeds up the rate at which we                  20 can dewater the tailings.                  21 But ultimately it doesn't alleviate all the                  22 pressure, all the potential for leaks or seepage to go                  23 through the liner underneath it.                  24 I'm working with several different                  25 impoundments. Again I mentioned the Stillwater mine.</p>

<p style="text-align: right;">978</p> <p>1 We have an impoundment that does not have an underdrain  2 in it. That impoundment actually operated from 1985 to  3 2001, and we're presently closing out that impoundment  4 because the company no longer uses it for ancillary  5 storage.  6 That impoundment during its history has  7 actually exhibited fairly low seepage, I'd estimate at  8 various times ranging from five to about 20 gallons per  9 minute of seepage that we've seen through that lined  10 tailings impoundment without an underdrain.  11 So one of the ideas on the second tailings  12 impoundment at the Stillwater mine, which we call the  13 Hertzler Impoundment, was to improve that design, put in  14 an underdrain. The underdrain was actually not so much  15 put in to address seepage, but to assure that we could  16 get good consolidation of the tailings.  17 And -- but what we've seen is even though we  18 have the underdrain, this new impoundment -- and I'll  19 discuss it a bit more later -- it actually -- and this  20 was -- began operating in 2001 -- we're seeing  21 steady-state seepage of 20 GPM that we've essentially  22 been dealing with now for over 10 years, and we see  23 periodic seepage that happens, either liner defects,  24 accidents, various other features, that increases that  25 to as much as 50 gallons per minute.</p>	<p style="text-align: right;">980</p> <p>1 addressing seepage through the liner as part of the  2 design report.  3 But I do have to say it was disappointing that  4 that same seepage, because it would need to be addressed  5 in the OSE report, was not addressed in this report  6 explicitly.  7 Part of the problem with that is where we're  8 sitting now is as a result, because of the seepage fact  9 that we're assuming, it's not an issue at all.  10 Essentially we've taken that line that's shown in the  11 GARD Guide and said it's not going to happen at this  12 site.  13 Neither planned nor the resulting financial  14 assurance can be adequate to mitigate liner seepage if  15 it is anything other than best case. I view the 0.5 GPM  16 estimate truly as best case, particularly based upon my  17 experience.  18 MS. ORTH: Sorry, Mr. Kuipers.  19 I don't want to interrupt you, but we need a  20 break soon. So if you'll identify a good breaking  21 point.  22 MR. KUIPERS: Why don't we get through  23 tailings facility and liner seepage, and then that would  24 be a good breaking point.  25 MS. ORTH: Thank you.</p>
<p style="text-align: right;">979</p> <p>1 This is on a 230-acre tailings impoundment,  2 approximately one-third the size of the proposed  3 tailings impoundment at Copper Flat. So --  4 What I can say is EPA addresses this in a  5 number of publications, and it's also been addressed by  6 folks in industry in various publications. But we can  7 estimate seepage inevitably if it does occur. Leakage  8 particularly through a liner, it's one to two, sometimes  9 even three orders of magnitude greater than was  10 estimated theoretically.  11 So we're not saying we should do the  12 theoretical estimates, but experience shows that when we  13 do have seepage it doesn't resemble the theoretical  14 estimates, it's always orders of magnitude higher.  15 So it's standard practice to include -- TSF  16 liner design to include both seepage resulting from  17 permeation, but also from liner defects.  18 We heard how the plan is when the design is  19 increased in engineering effort, essentially -- as  20 Mr. Kidd described it, the present engineering effort is  21 approximately -- I think he described it's 40 to  22 50 percent. When we increase that design effort to the  23 necessary levels, submit it to the Office of State  24 Engineer -- I should say when Mr. -- when the company  25 does, they have suggested that they do plan on</p>	<p style="text-align: right;">981</p> <p>1 MR. KUIPERS: This is slide 32, titled  2 Tailings Storage Facility Liner Seepage.  3 You've heard quite a bit of discussion already  4 today about Giroud and Bonaparte, and every one of us  5 will pronounce Giroud's name differently. In fact, I'll  6 use two different pronunciations two different times.  7 You know, these are the folks that we have  8 been relying upon for a long time to discuss and  9 describe liner seepage. As Dr. Marcoline discussed,  10 they continue their work, and their work is very  11 valuable in the industry.  12 But the main thing is to understand that  13 geosynthetic membranes, which are essentially what we're  14 talking about here, under ideal conditions, they do have  15 very low hydraulic conductivities. In fact, from an  16 ideal standpoint, 2 times 10 to the minus-15 meters per  17 second. That's -- that's an incredibly low  18 permeability, but that's an ideal number.  19 What they also recognize is that the  20 permeation rates estimated can be several orders of  21 magnitude less than the rates resulting from geomembrane  22 defects. As I just said before, that's been my  23 experience, that even though we have leakage rates  24 estimated, that when we do have leaks or seepage, it's  25 almost always orders of magnitude greater.</p>

982	<p>1 If you don't account for that, you're</p> <p>2 basically going to get it wrong, or at least if you</p> <p>3 don't account for that possibility and account for how</p> <p>4 you might mitigate it, then you could end up with a</p> <p>5 situation that becomes quite costly.</p> <p>6 It's very important to realize that when these</p> <p>7 calculations are done there's a number of different</p> <p>8 factors that weigh in.</p> <p>9 So one of them is, of course, the area covered</p> <p>10 by the tailings. So if you have a 100-acre pond versus</p> <p>11 a 500-acre pond, more area means potentially more</p> <p>12 seepage.</p> <p>13 We also want to address the pore pressure</p> <p>14 conditions within the tailings mass. This is where the</p> <p>15 basin underdrain system is very beneficial because it</p> <p>16 helps to relieve that pore pressure. It does not</p> <p>17 eliminate the pore pressure, though.</p> <p>18 The thickness and permeability of the tailings</p> <p>19 stored within the TSF are important. And again I</p> <p>20 mention how the permeability can depend upon the</p> <p>21 materials. And if we have sand fractions separating</p> <p>22 from slime fractions, that sand fraction can actually be</p> <p>23 the overriding permeability material that allows seepage</p> <p>24 to work its way through.</p> <p>25 The permeability of the constructed basin</p>	984	<p>1 But the second impoundment they constructed</p> <p>2 was an HDPE geomembrane liner, and the phenomena that</p> <p>3 happened here that was quite interesting was that the</p> <p>4 liner company got through with all the installation, had</p> <p>5 everything laid out, they left for the evening.</p> <p>6 When they came back the next morning and</p> <p>7 looked out on the tailings impoundment -- and this</p> <p>8 was -- all the liner was completed, they thought it was</p> <p>9 ready to go -- one of the employees noticed that it kind</p> <p>10 of looked like something had run through the tailings</p> <p>11 impoundment and poked a few holes.</p> <p>12 Well, they got to looking, and what had</p> <p>13 happened is the night before a small herd of deer,</p> <p>14 probably 10 or 15 head, had gotten spooked and had run</p> <p>15 through the tailings impoundment. Every single hoof</p> <p>16 print basically represented a defect more significant</p> <p>17 than this.</p> <p>18 Now, they went through that tailings</p> <p>19 impoundment and basically practically relined the whole</p> <p>20 thing as a result of this. But even the relining, et</p> <p>21 cetera, didn't work.</p> <p>22 Today the Golden Sunlight Mine tailings</p> <p>23 impoundment, which is a lined facility, there are</p> <p>24 approximately 23 pumpback wells that have been installed</p> <p>25 to take seepage from that lined facility and circulate</p>
983	<p>1 liner and embankment is important, but it's not the only</p> <p>2 factor here.</p> <p>3 The permeability of the materials underlying</p> <p>4 the basin liner are also important. So that's materials</p> <p>5 that are beneath the liner that would essentially act</p> <p>6 potentially as a secondary liner depending upon their</p> <p>7 character.</p> <p>8 And then, finally, this is driven by the</p> <p>9 hydraulic head within the basin, and that hydraulic head</p> <p>10 we could predict it to be one level, but the best</p> <p>11 example is -- let's say, for example, we get into a wet</p> <p>12 period and we end up filling the impoundment up with</p> <p>13 more water than we expected. That would increase that</p> <p>14 hydraulic head.</p> <p>15 So there are really six different factors that</p> <p>16 play into this that you have to look at. Again it</p> <p>17 depends on the number and size of defects and the</p> <p>18 permeability of the subgrade.</p> <p>19 I oftentimes tell folks about the Golden</p> <p>20 Sunlight Mine tailings impoundment, and I was involved</p> <p>21 in a lot of issues that surrounded lining that</p> <p>22 impoundment. In fact, I worked for the company when</p> <p>23 their first impoundment was lined with clay, which, by</p> <p>24 the way, glad we're not talking clay liners here,</p> <p>25 because I could really talk a lot of seepage.</p>	985	<p>1 it back to protect the Jefferson River. The original</p> <p>2 EIS prediction was that no pump access would be</p> <p>3 required.</p> <p>4 Again I could just go through a litany of</p> <p>5 many, many different sites where this has been the case.</p> <p>6 It's the reason I am, you know, really pushing this from</p> <p>7 an idea of a precautionary approach.</p> <p>8 So we've heard a bit about the equation. And</p> <p>9 I am not going to run through this equation. But again</p> <p>10 Mr. Marcoline did address it, and the short of it is</p> <p>11 that if any of these factors, a the area of the hole, h</p> <p>12 the hydraulic head, hydraulic conductivity and the</p> <p>13 section area -- if any of those increase, Q, or any</p> <p>14 amount of seepage coming from there, will also increase.</p> <p>15 And so they're taking various factors, all are</p> <p>16 not of equal importance, but the whole concept here is</p> <p>17 that if you increase the hydraulic head, Q can increase,</p> <p>18 you increase the area of the hole, a -- or -- excuse</p> <p>19 me -- here a, it increases.</p> <p>20 So a lot of it depends upon these assumptions</p> <p>21 or inputs, and if you take some of these up by just an</p> <p>22 order of magnitude of one or two, such as the hydraulic</p> <p>23 conductivity of the material, you line the membrane, it</p> <p>24 can change the results significantly.</p> <p>25 Just wrapping up the tailings storage facility</p>

986	<p>1 liner seepage discussion. This is slide 35.</p> <p>2 The conclusions or recommendations that I have</p> <p>3 are as follows.</p> <p>4 Neither the permit application materials or</p> <p>5 the draft permit identify or address TSF seepage that</p> <p>6 would be expected to occur from a lined TSF. They have</p> <p>7 provided us a seepage estimate, but I view it as a best</p> <p>8 case, ideal case estimate, and I don't think it provides</p> <p>9 the robust approach that would be necessary.</p> <p>10 I'm not sure you can do this with an estimate.</p> <p>11 This is why we oftentimes do it with what I call</p> <p>12 failures mode and effects analysis, where we assume a</p> <p>13 worst case rather than something is best case.</p> <p>14 The NMED should have identified this</p> <p>15 deficiency in its technical completeness review, but</p> <p>16 they didn't.</p> <p>17 NMED should require NMCC to revise the Copper</p> <p>18 Flat TSF report to recognize and perform a more</p> <p>19 conservative, robust seepage estimate, consistent with</p> <p>20 current industry practice, which would include a</p> <p>21 sensitivity analysis. And so if nothing else, I would</p> <p>22 have expected a sensitivity analysis to be formed around</p> <p>23 that .5 GPM number, but it was not.</p> <p>24 And if warranted, I believe NMED should</p> <p>25 require NMCC to propose additional mitigation measures</p>	988	<p>1 it's reasonable, I think it is not overly expensive, and</p> <p>2 it's the kind of thing that if the company were to do it</p> <p>3 would provide folks a lot of assurance and, in fact,</p> <p>4 might allow us to put this issue to bed.</p> <p>5 I'll stop now.</p> <p>6 MS. ORTH: All righty. Thank you,</p> <p>7 Mr. Kuipers.</p> <p>8 Let's break for 15 minutes.</p> <p>9 (Proceedings in recess from 5:59 p.m. to</p> <p>10 6:17 p.m.)</p> <p>11 MS. ORTH: All right. So we are back after a</p> <p>12 break, and we have four people indicating a desire to</p> <p>13 make public comment. Because we really do want to</p> <p>14 finish up by 7:00 so that folks can get dinner at the</p> <p>15 local restaurants and get on with the rest of their</p> <p>16 evening, Mr. Kuipers has agreed that the public</p> <p>17 commenters can go, and if we still have time before</p> <p>18 7:00, he can cover another topic or not.</p> <p>19 In any event, we will be back in this room at</p> <p>20 9:00 a.m. to finish Mr. Kuipers' testimony regardless.</p> <p>21 So Andrew Maloney signed in earlier today.</p> <p>22 Mr. Maloney.</p> <p>23</p> <p>24</p> <p>25</p>
987	<p>1 such as a groundwater interceptor system. The idea here</p> <p>2 is that if we required a groundwater interceptor system</p> <p>3 as part of the original design, we would include the</p> <p>4 cost of it in financial assurance. We would not</p> <p>5 necessarily need to build it.</p> <p>6 And if at the end of operations after some</p> <p>7 time we knew it would not be necessary, then that money</p> <p>8 could be returned to the mining company. But the</p> <p>9 problem is if the mining company's not there, we don't</p> <p>10 do this, we're not going to have the money.</p> <p>11 So this is a good example, and I'm seeing a</p> <p>12 lot of different cases occurring in the United States.</p> <p>13 The PolyNet NorthMet Mine in Minnesota is a</p> <p>14 good example, where even though they could have argued</p> <p>15 that they didn't require water treatment after 40 years,</p> <p>16 the original Mine Plan did, in fact, suggest that as</p> <p>17 well as their financial assurance.</p> <p>18 The company made a conscious decision to go</p> <p>19 ahead and include the cost of water management treatment</p> <p>20 for that mine and not put that burden on the taxpayer</p> <p>21 and agreed that only if and when it's proven in the</p> <p>22 future it's not required would they seek to not have</p> <p>23 that included in the financial assurance.</p> <p>24 So similarly here, I think including a</p> <p>25 groundwater interceptor system as part of the design,</p>	989	<p>1 ANDREW MALONEY</p> <p>2 having been first duly sworn or affirmed, gave</p> <p>3 public comment as follows:</p> <p>4 PUBLIC COMMENT</p> <p>5 MR. MALONEY: Hi, everyone.</p> <p>6 I'm Andrew Maloney. I represent THEMAC and</p> <p>7 also the major investor, Tulla, Tulla Group.</p> <p>8 Tulla is an Australian family. We have a</p> <p>9 history of investment in mining and mining services.</p> <p>10 In the business we have been involved, we like</p> <p>11 to build a strong relationship with the local community,</p> <p>12 through sponsorships, donations, purchasing goods and</p> <p>13 services. We've done a bit of that today here in -- in</p> <p>14 the community here, but we expect that would increase</p> <p>15 significantly over time.</p> <p>16 I'm personally a big believer in ensuring we</p> <p>17 protect the environment. Where we have an opportunity</p> <p>18 to reduce the impact at the mine, I have encouraged the</p> <p>19 team to consider making these options. I actually</p> <p>20 applaud the conservation work that's being carried out</p> <p>21 by our neighbors. I think it's fantastic that they're</p> <p>22 doing this work.</p> <p>23 The Copper Flat team has worked very, very</p> <p>24 hard over a number of years to develop a plan to meet</p> <p>25 the requirements of the agencies. They have engaged a</p>



990	<p>1 great team of consultants to assist us through this 2 process.</p> <p>3 I see the future of the copper market is very 4 bright. All of the commodities -- out of all the 5 commodities globally, I think copper has the brightest 6 future.</p> <p>7 On the supply side, all the major mines' head 8 grades are reducing to keep up with the mine -- new 9 mines in the area.</p> <p>10 On the demand side, this is where it gets very 11 interesting. In addition to traditional uses such as 12 housing and electrical infrastructure, new industries 13 such as electric vehicles, wind and solar power are 14 predicted to grow significantly, placing more and more 15 demand on copper.</p> <p>16 This mine will be well designed and modern -- 17 a modern operation. I believe it will be -- provide -- 18 it will provide a lot of -- create a lot of opportunity 19 for the local community, operate in an environmentally 20 responsible way, and once rehabilitated this site will 21 be actually better than the current condition it is 22 right now.</p> <p>23 Thank you. Thanks for the opportunity to say 24 some words.</p> <p>25 MS. ORTH: Thank you very much, Mr. Maloney.</p>	992	<p>1 can see is not really a new mine in the sense of 2 something that never existed, because we have a history 3 of mining in our county, and they're not asking to do 4 something brand new, but rather use the existing 5 resources that have been successfully mined in the past.</p> <p>6 I believe THEMAC is doing all that they can to 7 meet or exceed all the safety requirements and 8 environmental codes that -- that they are required to 9 do, and I see no reason to deny them the right to 10 operate on land that they own.</p> <p>11 I would like to state some obvious reasons the 12 mine -- that I feel the mine should be operating.</p> <p>13 First, the economic impact on our local 14 community and indeed the state government in Santa Fe is 15 obvious. Almost 400 full-time, permanent, high-paying 16 jobs will generate much needed income for all. The 17 taxes the mine will pay to the state as well to the 18 local community would be a tremendous asset for us.</p> <p>19 Second, instead of having a dying county with 20 aging residents gradually reducing our population, our 21 children would be able to stay and not have to move away 22 from Sierra County. It would infuse Sierra County with 23 a new vibrant energy and life.</p> <p>24 Third, I'd like to say that there are those 25 who oppose the copper mine I feel are biting the very</p>
991	<p>1 The other names I have indicating a desire to 2 make public comment include Mike -- and is that a 3 Skichmore?</p> <p>4 Please correct me when you come up.</p> <p>5 MIKE SKIDMORE 6 having been first duly sworn or affirmed, gave 7 public comment as follows: 8 PUBLIC COMMENT</p> <p>9 MR. SKIDMORE: Well, thank you for the 10 opportunity to speak today.</p> <p>11 My name is Michael Skidmore. I am the owner 12 of the Butte Propane Company, and I am here today to 13 express my support for the Copper Flat Mine.</p> <p>14 Sierra County is my home. I moved here over 15 35 years ago from Oklahoma. At that time, I had an 16 electrical construction business. And we moved down 17 here because we loved the climate and the community.</p> <p>18 When we moved here, the Copper Flat Mine -- 19 the old Copper Flat Mine was operating, and things were 20 going well. About a year after I moved here, the mine 21 closed, and people moved away, the economy crashed, real 22 estate prices went down, businesses closed. We have not 23 ever completely recovered from that shutdown. Our 24 community has shrunk in size.</p> <p>25 What THEMAC Resources is asking is -- what I</p>	993	<p>1 hand that feeds them. 90 percent of the products in 2 automobiles are from mined metal ores, steel, aluminum, 3 silver, copper, titanium, et cetera.</p> <p>4 Those who advocate for electric cars but 5 oppose copper mining are opposing themselves. One can't 6 have cars without having copper.</p> <p>7 Those who advocate for wind energy but oppose 8 copper mining oppose themselves. Wind turbine needs 9 copper. Where will the copper come from? It comes from 10 the ground. It comes from the mine.</p> <p>11 Those who advocate for solar energy surely 12 must realize solar is impossible without copper.</p> <p>13 Computers, cell phones, televisions, cameras, 14 video equipment, literally every field of technology is 15 dependent on a secure, safe, continuing supply of 16 copper. The demand for copper continues to grow and 17 escalate. In addition to the technical fields' 18 dependency on copper, our nation's power grid, 19 electrical generation stations, power lines, electrical 20 wiring for homes and businesses all need copper.</p> <p>21 Surprisingly, even my propane business uses 22 copper extensively in tubing and for other aspects, 23 regulators and tanks.</p> <p>24 As new technology advances, the need for 25 copper will only increase. It will not decrease.</p>

994	<p>1 When America is forced to import copper from</p> <p>2 other countries to supply the growing demand, not only</p> <p>3 does the cost increase, but our national security is</p> <p>4 threatened. A country could simply shut off our copper</p> <p>5 supply, and America would grind to a halt, and it</p> <p>6 wouldn't take long.</p> <p>7 What good is the valuable resource in the</p> <p>8 ground if we don't use it? It's as though we do not</p> <p>9 have it. Why not use the resource that is local, less</p> <p>10 expensive to mine, provides great-paying jobs, much</p> <p>11 needed tax revenue and advance the technological age in</p> <p>12 which we live?</p> <p>13 Do everyone a favor and open the mine.</p> <p>14 Thank you.</p> <p>15 MS. ORTH: Thank you, Mr. Skidmore.</p> <p>16 If you'll leave your written comments with the</p> <p>17 court reporter, she can refer to them.</p> <p>18 Jack Diamond.</p> <p>19 JACK DIAMOND</p> <p>20 having been first duly sworn or affirmed, gave</p> <p>21 public comment as follows:</p> <p>22 PUBLIC COMMENT</p> <p>23 MR. DIAMOND: My name is Jack Diamond. We</p> <p>24 have a farm up Animas Creek.</p> <p>25 We have two wells that are -- one is about 100</p>	996	<p>1 So that means we would have to go deeper, and</p> <p>2 the problem with going deeper is the electricity would</p> <p>3 then be three-phase and we would be pumping from</p> <p>4 somewhere probably around 400 or 500 feet. I'm not a</p> <p>5 hydrologist, just what I've read.</p> <p>6 So the big issue that I see is who is going to</p> <p>7 pay us? What's going to happen if we cannot water our</p> <p>8 trees? Who is going to be liable for that? Is the</p> <p>9 State Engineer going to let us go deeper? Or do our</p> <p>10 trees just die?</p> <p>11 So I'd like somebody to answer that question</p> <p>12 for me. If not tonight, maybe down the road.</p> <p>13 Our big concern is that this mine -- which I'm</p> <p>14 not against mining. I'm not. I'm not against logging</p> <p>15 or ranching or any multiple use. The problem is they're</p> <p>16 going to be taking a lot of water, and my fear is that</p> <p>17 the farms that we have in Animas -- which we do hire</p> <p>18 people, we do buy products in this county. We try to</p> <p>19 support this county 100 percent.</p> <p>20 But if we can't do anything, the only thing</p> <p>21 left for us to do would be to subdivide our property,</p> <p>22 and we do not want to do that. We've been there a long</p> <p>23 time, and we want to stay there. And our big concern is</p> <p>24 that our only alternative would be to subdivide. And we</p> <p>25 will, but that's not what we want to do. And I don't</p>
995	<p>1 feet, one is about 210. The -- I'm a firm believer in</p> <p>2 multiple use. We also have a cattle ranch where we run</p> <p>3 cattle. We have an outfitting business. So I'm a firm</p> <p>4 believer in multiple use.</p> <p>5 However, I'm very concerned about what's going</p> <p>6 to happen to our wells. As stated, we have a pecan</p> <p>7 farm, and our trees are about five years old and will</p> <p>8 start producing in about another year. Our water is not</p> <p>9 great there.</p> <p>10 The problem is -- excuse me -- we have</p> <p>11 artesian water, and we're not able to go deeper into the</p> <p>12 artesian water simply because of the state regulations</p> <p>13 that we have. So our wells are up above the artesian</p> <p>14 water, except for the two old artesian wells that we</p> <p>15 have.</p> <p>16 My wife's family is -- was -- has been in</p> <p>17 Animas Creek and the Caballo area where they ranched and</p> <p>18 farmed the last Indian raid. So they've been here a</p> <p>19 long time, and that's what they've done all these years.</p> <p>20 So my big concern is what's going to happen to</p> <p>21 our two wells that are 100 and 210, because we can't go</p> <p>22 any deeper, because of the State Engineer will not let</p> <p>23 us get into the artesian water. If we do get into the</p> <p>24 artesian water, we have to cement around to keep the</p> <p>25 artesian water from getting into our wells.</p>	997	<p>1 think that's good for the creek or for anybody that</p> <p>2 lives up there, because it is a pristine place.</p> <p>3 So my comments would be I'm not against</p> <p>4 multiple use, but I'm just afraid of the water drawdown</p> <p>5 that's going to occur in Animas Creek. I think that it</p> <p>6 could be very, very bad for the people that use the</p> <p>7 water there, which we do hire people, and we do try to</p> <p>8 support this community 100 percent.</p> <p>9 The other thing that I would like to say in</p> <p>10 closing is that you talk about the mine only being open</p> <p>11 for 12 years. Okay. I get it. All the jobs, kids need</p> <p>12 jobs, and I get all that. The problem is after 12 years</p> <p>13 what's going to happen then? They're going to have to</p> <p>14 move on anyway.</p> <p>15 If you were telling me this mine was going to</p> <p>16 stay for 30 or 40 years, I would be much more inclined</p> <p>17 to support it. But the problem that I see is if it only</p> <p>18 lasts 12 years, you have somebody out of high school</p> <p>19 that goes to work for the mine, what's he going to do in</p> <p>20 12 years? He's going to have to go find another job.</p> <p>21 So those are the issues that I have. Again</p> <p>22 I'm a believer in multiple use, but this is going to</p> <p>23 take a lot of water, and that's my family's concern.</p> <p>24 Thank you very much.</p> <p>25 MS. ORTH: Thank you, Mr. Diamond.</p>


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<p>1 No one else has indicated a desire to make 2 verbal comment this evening. 3 Is there anyone else out there who would like 4 to do that? 5 This is not your last opportunity. There will 6 be other opportunities tomorrow, and if we go into the 7 next day, the next day as well. 8 No? 9 All right. It's 6:30. 10 Mr. Kuipers, would you like to break for the 11 night or take us to 7:00? 12 MR. KUIPERS: We're willing to go to 7:00 or 13 break, whatever your pleasure is. 14 MS. ORTH: Mr. de Saillan, do you have a 15 preference? 16 MR. DE SAILLAN: I leave it up to my witness, 17 Madam Hearing Officer. 18 MS. ORTH: It's up to you, Mr. Kuipers. 19 MR. KUIPERS: We would like to use the 20 remaining time. 21 MS. ORTH: All right. 22 (Discussion off the record.) 23 24 25</p>	<p>1 associated with water pollution. We have acid mine 2 drainage, metals leaching and releases of toxic metals 3 that have occurred at essentially all of these mines. 4 And one of the most important points of this 5 investigation is this isn't something that happens as an 6 isolated event, but, in fact, all the mines that were 7 looked at had at least one failure, most of the mines 8 experienced multiple failures. And we have some 9 examples of that from New Mexico to share with you. 10 So one of the things the report addresses is 11 the Chino Mine, here in New Mexico. This particular 12 slide contains a lot of information. My intent is not 13 to go through every bullet point, but rather just to 14 point out the nature of what we have seen here. 15 Let me just describe it. This is slide 37, 16 titled Potential for Spills and Leaks. 17 And what the slide does, the top report is the 18 most recent event that occurred at the Chino Mine. That 19 was one involving 1 million gallons of acid mine waters 20 overflowing a containment sump into a stormwater 21 diversion channel. This is not something that would 22 necessarily occur here given a similar situation, but it 23 is a great example of the kind of the magnitude of what 24 can happen at these mines. 25 You see different volumes. For example, in</p>
999	1001
<p>1 JAMES R. KUIPERS 2 having been previously duly sworn or affirmed, was 3 examined and testified further as follows: 4 DIRECT EXAMINATION (Continued) 5 BY MR. DE SAILLAN: 6 MR. KUIPERS: Okay. The topic I want to turn 7 to now is the potential for spills and leaks 8 We have a reference that we're using for this. 9 That's the publication US Copper Porphyry Mines, that 10 was written by Bonnie Gestring with Earthworks and 11 revised in November, 2012. 12 And I might mention with respect to this 13 exhibit, I had occasion on behalf of another client, 14 USEPA, who asked me to actually go through this report, 15 obtain every single reference and verify all the 16 references for this report. And so I just wanted to 17 note for folks that I have done that, and if by some 18 chance anybody has need for any references in the 19 report, I would be more than glad to provide those. 20 MR. BUTZIER: Madam Hearing Officer, I would 21 like to just lodge my set of continuing objections 22 because I think they apply here, as well. 23 MS. ORTH: All right. The record shows that. 24 MR. KUIPERS: Okay. This report shows that 25 copper porphyry mines, copper mines in general, are</p>	<p>1 2000, they had a 480,000-gallon spill of tailings 2 slurry. 3 But then in 1999, there was a -- what I would 4 call a major spill of over 3.25 million gallons of 5 tailings spilled in Whitewater Creek. And as many folks 6 are aware, that ended up requiring some mitigation 7 efforts. 8 You go back to 1996, there was a small-scale 9 spill. 10 1988 I think is very notable in that heavy 11 rains -- and again these are the kind of extreme storm 12 events that we're talking about needing to be accounted 13 for. A heavy rain led to the release of 180 million 14 gallons of acidic wastewater. At the time, I'm sure the 15 system was not designed for those type of rain events. 16 And the result was the type of thing that required quite 17 a bit of mitigation expense so -- 18 So you can see essentially again Chino -- I 19 don't want to go through these in infinite detail, but 20 there's a history essentially from 1988 through at least 21 2007 where spills occurred from pipeline failures. 22 Now, there's also basically failures in water 23 treatment and collection. 24 There was a consent decree that was issued in 25 2011 dealing with these releases. And if you go to the</p>

<p style="text-align: right;">1002</p> <p>1 second bullet, basically found that surface water and  2 associated sediments are exposed to hazardous substances  3 released from the Chino Mine through a variety of  4 pathways, including leaks, spills of process water,  5 tailing spills, run-off and infiltration or percolation  6 from tailings and waste rock piles.</p> <p>7 So all the kind of things that we've been  8 emphasizing that could occur at the Copper Flat Mine, in  9 fact, have occurred at the Chino Mine. And that's one  10 of the reasons we think it's important to not take this  11 analysis lightly, but rather to make sure it's as robust  12 as reasonably possible.</p> <p>13 They also reported groundwater contamination  14 from the Tailings Pond Number 7, and then various other  15 exceedances that occurred from groundwater contamination  16 at various parts of the mine site.</p> <p>17 This is slide 39, also labeled Potential for  18 Spills and Leaks.</p> <p>19 And this slide addresses the Tyrone Mine,  20 which is a sister mine, if you will, to the Chino Mine.  21 There we similarly have a consistent history, if you  22 will, of pipeline failures and other accidental  23 releases.</p> <p>24 And by the way, I want to clarify that I don't  25 view these as being due to negligence, due to poor</p>	<p style="text-align: right;">1004</p> <p>1 Now, a lot of this is due to the leaching  2 that's done at Tyrone, a lot of these are associated  3 with leaching. But in particular, things like  4 chemicals, we're still going to have chemicals being  5 supplied at Copper Flat, and those chemicals need to be  6 addressed from the potential -- standpoint of potential  7 spills.</p> <p>8 And I should mention I'm not aware of any mine  9 sites that ultimately don't have some level of diesel  10 fuel contamination. There are sites today they're  11 building, if you will, asphalt pads to park the  12 equipment on so that if it does leak hydraulic fluids,  13 diesel, various other things, it's contained. But even  14 then I would expect some at least minimal cleanup of  15 contaminated fuel areas, for example, around fueling and  16 other areas would be necessary.</p> <p>17 Now, at Tyrone, we also have, similar to  18 Chino, examples of water collection treatment failures.  19 Same consent decree I mentioned for Chino also addresses  20 Tyrone.</p> <p>21 And they noted with the case at Tyrone, second  22 bullet, that according to the investigation groundwater  23 in both the regional aquifer and the perched groundwater  24 aquifers at the site have been exposed to hazardous  25 substances through a variety of pathways. Very</p>
<p style="text-align: right;">1003</p> <p>1 operation, due to some deficiency in the operations.  2 This is just what happens. And we have to plan for  3 accidents and those type of things to occur because  4 we're human beings, we're not infallible.</p> <p>5 So I know that the mining company did not  6 intend for any of these to happen, they were not  7 planned. The point is they happened nonetheless. And  8 they're the type of thing that we need to account for  9 the potential of happening at Copper Flat, and we can  10 account for that by addressing it in the financial  11 assurance, which I'll talk about tomorrow.</p> <p>12 So again from 2012, we see a diesel spill that  13 occurred, of diesel fuel.</p> <p>14 One of the things I'm going to mention with  15 financial assurance is the need to allow for that type  16 of thing to occur in financial assurance. Oftentimes  17 it's a line item without a great deal of expense, but if  18 we forget that line item, that expense, we have nothing  19 to deal with on the public side. So we'll talk about  20 that more.</p> <p>21 But just as an example -- well, I'll wait for  22 the financial assurance until tomorrow.</p> <p>23 We see also spills for -- of tanker trucks  24 providing reagents, spills of various solutions and  25 other things.</p>	<p style="text-align: right;">1005</p> <p>1 important here, one of the things that they're  2 recognizing is it's not just the -- it's both the  3 regional aquifer as well as perched groundwater aquifers  4 that can potentially be contaminated.</p> <p>5 By the way, this is slide 40.</p> <p>6 The assessment at Tyrone showed 14 different  7 mine areas that have affected water quality, essentially  8 all mine areas.</p> <p>9 And in response to this, Tyrone and Chino have  10 both developed comprehensive closure and closeout plans  11 that include addressing of these spills and hazardous  12 materials.</p> <p>13 One of the key things is -- and we all should  14 recognize this about Chino and Tyrone, most of these  15 mines -- they were similarly not predicted to require  16 water treatment in perpetuity; however, as you note  17 here, in 2012, a groundwater assessment concluded that  18 the seepage through the mine will require water  19 treatment in perpetuity.</p> <p>20 And I think it was essentially recognized even  21 back in 2001 and before that that was a likelihood. But  22 again these mines didn't start out with that  23 presumption.</p> <p>24 There's some other examples at the Tyrone Mine  25 that are worth noting.</p>

<p style="text-align: right;">1006</p> <p>1 We talked about tailings storage facility  2 catastrophic failures. And essentially what happened at  3 the Tyrone Mine Tailings Dam Number 3 in 1980 was  4 classified as a catastrophic failure, spilling  5 2.6 million cubic yards of tailings into the Mangas  6 Valley. That's a lot of tailings.  7 Flowed 8 kilometers downstream and inundated  8 farmland. One of the things that's key to understand is  9 that when these tailings do break, particularly slurry  10 tailings, they can travel quite some distance, and  11 depending upon the gradient and other characteristics,  12 we've seen them travel literally hundreds of kilometers  13 once they meet major rivers.  14 So one of the goals is to understand what  15 could happen in a catastrophic failure, do everything we  16 can to prevent it, but also, as Mr. Kidd recommended, we  17 need to plan for it. And so that's a big part of what  18 we do today.  19 You can see also we have 2.6 million cubic  20 yards, we have also five tons. So you can have small  21 and large type spills. Each of them take a different  22 level of measure.  23 I would mention that our goal absolutely has  24 to be in every case preventing that large spill. We can  25 mitigate to deal with smaller spills, but we absolutely</p>	<p style="text-align: right;">1008</p> <p>1 assure.  2 The impacts could be severe enough to lead to  3 long-term groundwater mitigation.  4 Again we see what happened in the Tyrone and  5 Chino Mine cases where repetitive and multiple leaks and  6 spills ultimately have led us to at least partly  7 contribute to the need for long-term groundwater  8 treatment.  9 And again I still think one of the keys -- I  10 will always think one of the keys to these issues,  11 particularly the uncertainties, unknowns, not in all  12 cases, but to a great extent, we can address these in  13 the financial assurance and provide for the agency to go  14 in and mitigate things if necessary and to provide for  15 protection of public liability.  16 And this is true whether we're talking about a  17 hazardous waste spill or ultimately needing to conduct  18 water management at this site.  19 I'll do this one tomorrow.  20 MS. ORTH: Okay.  21 MR. KUIPERS: So that concludes my direct  22 testimony for today, and I would like to continue  23 tomorrow morning.  24 MS. ORTH: All right. Well, thank you very  25 much, Mr. Kuipers.</p>
<p style="text-align: right;">1007</p> <p>1 have to prevent large spills, particularly where they  2 can cause loss of human life.  3 So just a few things to wrap up with on  4 potential for spills and leaks.  5 We have to recognize there's a high  6 likelihood -- I would actually suggest there's a  7 certainty -- of spills and leaks. The difficulty is in  8 anticipating what size they'll be. I would not suggest  9 we take into account a worst case, but I do think that  10 in the plan for reclamation and closure as well as in  11 the financial assurance there should be something that  12 accounts for this potential.  13 In a reasonable scenario, and we've got lots  14 of examples in other mines with financial assurance  15 where they have included line items that would allow us  16 to address this if necessary.  17 It's important to recognize that these leaks  18 and spills while in many cases they may be just limited  19 to the site itself, there have been instances where  20 they've led to impacts of offsite property. And it's  21 very important. We've heard a lot of concerns about  22 that. I believe that can be addressed.  23 But again these are things that take a robust  24 analysis, a robust engineering effort, and that's  25 something that I think the agencies need to help us</p>	<p style="text-align: right;">1009</p> <p>1 We will see you in this room at 9 o'clock  2 tomorrow morning.  3 (Proceedings adjourned at 6:48 p.m.)  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25</p>

1 STATE OF NEW MEXICO )  
2 ) ss.  
3 COUNTY OF BERNALILLO )  
4

5  
6 I, CHERYL ARREGUIN, the officer before whom the  
7 foregoing proceeding was taken, do hereby certify that  
8 the witnesses whose testimony appears in the foregoing  
9 transcript were duly sworn or affirmed; that I  
10 personally recorded the testimony by machine shorthand;  
11 that said transcript is a true record of the testimony  
12 given by said witnesses; that I am neither attorney nor  
13 counsel for, nor related to or employed by any of the  
14 parties to the action in which this proceeding is taken,  
15 and that I am not a relative or employee of any attorney  
16 or counsel employed by the parties hereto or financially  
17 interested in the action.

18  
19   
20 NOTARY PUBLIC  
21 CCR License Number: 21  
22 Expires: 12/31/2018

23 My Commission Expires: 12/12/19  
24  
25

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1012	<p>1 APPEARANCES</p> <p>2 The Hearing Officer:</p> <p>3 FELICIA ORTH</p> <p>4 Hearing Officer</p> <p>5 20 Barranca Road</p> <p>6 Los Alamos, New Mexico 87544</p> <p>7 felicia.l.orth@gmail.com</p> <p>8 For the New Mexico Environment Department:</p> <p>9 ANDREW P. KNIGHT</p> <p>10 Assistant General Counsel</p> <p>11 New Mexico Environment Department</p> <p>12 Office of General Counsel</p> <p>13 121 Tijeras Avenue, Northeast</p> <p>14 Suite 1000</p> <p>15 Albuquerque, New Mexico 87502</p> <p>16 (505) 222-9540</p> <p>17 andrew.knight@state.nm.us</p> <p>18 For New Mexico Copper Corporation:</p> <p>19 STUART R. BUTZIER</p> <p>20 MODRALL, SPERLING, ROEHL, HARRIS &amp; SISK, PA</p> <p>21 Attorneys at Law</p> <p>22 500 Fourth Street, Northwest</p> <p>23 Suite 1000</p> <p>24 Albuquerque, New Mexico 87102</p> <p>25 (505) 848-1832</p> <p>sbutzier@modrall.com</p> <p>For the Turner Ranch Properties, LP, and Hillsboro</p> <p>Pitchfork Ranch, LLC:</p> <p>CHARLES de SAILLAN</p> <p>NEW MEXICO ENVIRONMENTAL LAW CENTER</p> <p>1405 Luisa Street</p> <p>Suite 5</p> <p>Santa Fe, New Mexico 87505-4074</p> <p>(505) 989-9022</p> <p>cdesaillan@nmelc.org</p>	1014
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1023	<p>1 MS. ORTH: Good morning.</p> <p>2 We are on day four of the hearing in the</p> <p>3 matter of the application for a groundwater Discharge</p> <p>4 Permit for Copper Flat, Discharge Permit 1840, docketed</p> <p>5 by the hearing clerk as GWB 18-06(P).</p> <p>6 When we broke last night, we were not in the</p> <p>7 middle, but in the middle of Mr. Kuipers' testimony.</p> <p>8 Are there any preliminary matters we need to</p> <p>9 address before we go back to Mr. Kuipers?</p> <p>10 I see nothing. Thank you.</p> <p>11 Mr. Kuipers.</p> <p>12 MR. KUIPERS: Yes, Madam Hearing Officer.</p> <p>13 JAMES R. KUIPERS</p> <p>14 having been previously duly sworn or affirmed, was</p> <p>15 examined and testified further as follows:</p> <p>16 DIRECT EXAMINATION (Continued)</p> <p>17 BY MR. DE SAILLAN:</p> <p>18 MR. KUIPERS: I'm starting with slide 43,</p> <p>19 titled Tailings Storage Facility Catastrophic Failure.</p> <p>20 In the last three or four years, we've had</p> <p>21 several catastrophic failures that occurred in the</p> <p>22 tailings storage facility industry, or tailings dam</p> <p>23 failures, if you will, that highlight the need for us to</p> <p>24 be sure we address this.</p> <p>25 And I might preface this by the day the Mount</p>	1025	<p>1 MR. BUTZIER: I may need to turn the speaker</p> <p>2 on. Excuse me.</p> <p>3 MS. ORTH: All right.</p> <p>4 MR. BUTZIER: Sorry about that.</p> <p>5 In addition to the continuing objections that</p> <p>6 I've already stated, I'd like to make an objection to</p> <p>7 discussing Mount Polley and Samarco on the basis that</p> <p>8 there's been no foundation laid to show that there's any</p> <p>9 reasonable similarity between the circumstances at those</p> <p>10 operations and the tailings design at this operation.</p> <p>11 MS. ORTH: All right. Thank you.</p> <p>12 Mr. Kuipers, you can certainly add that sort</p> <p>13 of detail if you'd like. Mr. Butzier's objection is on</p> <p>14 the record.</p> <p>15 MR. KUIPERS: I will be glad to do so. I was</p> <p>16 actually going to do that on the second bullet. So --</p> <p>17 Catastrophic failures of this nature can have</p> <p>18 extreme impacts on surface water quality and lead to</p> <p>19 both short-term and long-term groundwater impacts.</p> <p>20 Now, going back to the Mount Polley tailings</p> <p>21 failure, it's a copper mine, a copper mine in British</p> <p>22 Columbia. Its tailing facility was a different design,</p> <p>23 but all tailings facilities share design aspects that</p> <p>24 led to situations that ultimately resulted in these</p> <p>25 failures. There's not a difference between an unlined</p>
1024	<p>1 Polley dam failure occurred, I was actually working at</p> <p>2 the Questa Mine with a group of five other professional</p> <p>3 engineers. I might mention they were all structural</p> <p>4 engineers and I was the sole nonstructural engineer,</p> <p>5 working on the Questa waste rock facilities design for</p> <p>6 closure.</p> <p>7 And this group of folks who are very well</p> <p>8 known in industry, one of the first comments they made</p> <p>9 when the Mount Polley disaster occurred -- we heard</p> <p>10 about it the day it occurred -- was "This will change</p> <p>11 the face of the industry."</p> <p>12 And why that was important is we essentially</p> <p>13 as engineers or a group of people involved in the</p> <p>14 tailings areas had begun to address tailings failures in</p> <p>15 North America, and it put in place a system of</p> <p>16 engineering that was described by Mr. Kidd, but it</p> <p>17 wasn't completely in place.</p> <p>18 It was very obvious that while we thought we</p> <p>19 had the answer solved, these two disasters in particular</p> <p>20 taught us a lesson, and that is that we can't suggest</p> <p>21 anymore that these kind of things won't happen. We have</p> <p>22 to acknowledge they will.</p> <p>23 Talk about --</p> <p>24 MR. BUTZIER: Madam Hearing Officer?</p> <p>25 MS. ORTH: Sir.</p>	1026	<p>1 facility and a lined facility in terms of that potential</p> <p>2 for failure. It changes things slightly, but they still</p> <p>3 are both equally subject to failure ultimately.</p> <p>4 So in that respect, I think it's very</p> <p>5 important.</p> <p>6 Now, I wanted to mention the Mount Polley is a</p> <p>7 good example of where because the tailings were</p> <p>8 relatively clean, there was an immediate impact on</p> <p>9 surface water quality in terms of sediment, TDS, various</p> <p>10 other things. This was a discharge of tailings into</p> <p>11 surface waters.</p> <p>12 But one of the things that I would expect with</p> <p>13 Mount Polley because the tailings were fairly clean is</p> <p>14 that we probably won't have extreme or significant</p> <p>15 impacts to groundwater. Now, again those tailings</p> <p>16 are -- I would say in my experience exceptionally clean.</p> <p>17 These tailings here certainly have limited sulfides and</p> <p>18 other things, but that's something we need to address.</p> <p>19 The Fundao tailings was an iron mine. And</p> <p>20 again the real principal at the Fundao tailings is</p> <p>21 describing the failure mechanisms so we can understand</p> <p>22 what to do to ensure the public, which expressed a lot</p> <p>23 of concern in these hearings, that we will not allow</p> <p>24 these tailings to fail. And I do believe that's</p> <p>25 possible. It's something I wanted to, you know, express</p>

<p style="text-align: right;">1027</p> <p>1 here.</p> <p>2       So -- excuse me. What's important in</p> <p>3 understand this, why I think it's important in this</p> <p>4 Environment Department hearing is to recognize that</p> <p>5 these failures did not result because of a single</p> <p>6 action. It wasn't something where they had a major</p> <p>7 earthquake or major storm event or one single thing</p> <p>8 caused these failures.</p> <p>9       What it is was basically what we call a</p> <p>10 systematic failure, where due to a sequence of events</p> <p>11 that if we would have been able to disrupt that</p> <p>12 sequence, if you will, ultimately the failure wouldn't</p> <p>13 have occurred, or at least if it had occurred, the</p> <p>14 consequences would have been much different.</p> <p>15       When we look at this, in the same way we're</p> <p>16 connecting hydrology and other considerations with</p> <p>17 groundwater, we also have to connect that with the</p> <p>18 stability analysis. This is the real key, and it's the</p> <p>19 second from the bottom.</p> <p>20       And you might notice that I saw this morning</p> <p>21 that I had not emphasized how high the level of</p> <p>22 interaction, and I meant to do that. The high -- so the</p> <p>23 red type in my presentation today, we advise that there</p> <p>24 be a high level of interaction between the regulators.</p> <p>25       One of the things that I can tell you with</p>	<p style="text-align: right;">1029</p> <p>1 Mr. Kidd's presentation, I want to go further a little</p> <p>2 bit more with addressing what we can do to prevent this.</p> <p>3       So again the main emphasis, if we had a</p> <p>4 catastrophic failure, we can't ignore certainly the</p> <p>5 impacts to surface water, and we also might see impacts</p> <p>6 to groundwater. In the case of tailings, it may simply</p> <p>7 be TDS and sulfate, but that's still a significant</p> <p>8 impact.</p> <p>9       Next slide is slide 44, and what I'm doing</p> <p>10 here is essentially changing the subject to financial</p> <p>11 assurance.</p> <p>12       Now, as I've explained before, financial</p> <p>13 assurance really brings all these facets together,</p> <p>14 because in order to accurately estimate financial</p> <p>15 assurance, you need to have an accurate Reclamation and</p> <p>16 Closure Plan. To have an accurate Reclamation and</p> <p>17 Closure Plan, you need to understand the geochemistry,</p> <p>18 mitigations, the pathways and all these things.</p> <p>19       And so this is in a way -- having worked in</p> <p>20 the financial assurance area for 22 years now, this is</p> <p>21 why I've literally had to take advantage of the</p> <p>22 opportunity to work with many different experts and</p> <p>23 become -- I'm not going to say necessarily the best</p> <p>24 expert, but I do have a reasonable level of expertise to</p> <p>25 be able to apply all these principles ultimately to try</p>
<p style="text-align: right;">1028</p> <p>1 respect to Mount Polley in particular was there was a</p> <p>2 lack of putting together the necessary permits relative</p> <p>3 to allowing the tailings facility to not have to</p> <p>4 maintain an absolute full pool of water. And basically</p> <p>5 different agencies were not speaking to each other, and</p> <p>6 also there were lawsuits and other things that got in</p> <p>7 the way.</p> <p>8       That could happen here. I'm not saying it</p> <p>9 will happen here, but it could happen here if the</p> <p>10 regulators between the Environment Department, which is</p> <p>11 looking at groundwater and surface water, we have the</p> <p>12 Mining and Minerals Division in charge of reclamation</p> <p>13 and closure, and then we have the Office of State</p> <p>14 Engineers.</p> <p>15       Now, Montana has passed recent new regulations</p> <p>16 for dam storage facilities, and those regulations are</p> <p>17 the only other than British Columbia, the only</p> <p>18 jurisdictions that have passed those two regulations.</p> <p>19 But one of the keys that those regulations all recognize</p> <p>20 is let's not have this bifurcated regulatory system, but</p> <p>21 let's actually try to put it all under one house because</p> <p>22 of their relationship.</p> <p>23       So again we're emphasizing here that with</p> <p>24 respect to a catastrophic failure we can't ignore that</p> <p>25 it might happen, but later when I get to commenting on</p>	<p style="text-align: right;">1030</p> <p>1 to get the financial assurance cost estimate right.</p> <p>2       We have what I would call a preliminary</p> <p>3 financial assurance cost estimate from the company. I</p> <p>4 think they certainly haven't termed it as their, you</p> <p>5 know, final offer, by any means. Those of you who know</p> <p>6 financial assurance, it's a negotiated process. It's</p> <p>7 not simply one where we have a tried and true formula,</p> <p>8 we always supply it and it just comes out with a number.</p> <p>9       However, I have worked with industry since</p> <p>10 2002 on developing, if you will, best practice for</p> <p>11 financial assurance cost estimation. I've been involved</p> <p>12 with the Forest Service in their guidance, Bureau of</p> <p>13 Land Management, the development of their guidance for</p> <p>14 3809. And I have also worked with SRK in development of</p> <p>15 the standard reclamation cost estimator model.</p> <p>16       Jeff Parshley, who is the person I would</p> <p>17 credit with having developed the model -- he actually</p> <p>18 was involved in -- in, I think, several meetings of the</p> <p>19 Copper Rules. And one of the things that I would start</p> <p>20 with is complimenting the company for having submitted</p> <p>21 and having SRK use the standard reclamation cost</p> <p>22 estimator methodology for doing this.</p> <p>23       It allows folks like me who do this every day</p> <p>24 to not have to spend my time going back and making sure</p> <p>25 they're using basic fundamental principles that are</p>

<p style="text-align: right;">1031</p> <p>1 accepted by basically everybody on how to do this. And  2 by using that estimator, they've allowed us to focus  3 really on what are the key assumptions that go into  4 this, not how did they calculate the estimate.  5       What I can assure you is in terms of a  6 relatively accurate estimate for equipment costs, for  7 fuel, for the cost of doing revegetation, dirt moving,  8 building stormwater -- those are within a reasonable  9 range. We could argue that they could be 10 percent  10 higher or lower, but I -- I would accept those numbers.  11       So it allows us to focus on the real key  12 issues in any reclamation cost estimate, which are what  13 are the key assumptions that went in and how do they  14 affect the estimate.  15       This is just a breakdown of the estimate by  16 facility type.  17       With respect to direct costs, they provide  18 different costs individually for waste rock dumps,  19 tailings storage facilities, draindown management, and  20 then other costs for things such as buildings, pits.  21 You see the pit rapid fill, about the sixth item from  22 the bottom under Direct Costs. Then you have other  23 things like -- smaller things like roads, yards, wells,  24 et cetera.  25       Towards the bottom, you see that we also have</p>	<p style="text-align: right;">1033</p> <p>1 to have \$500 million or billion dollar end costs, but  2 this is a mine in which the cost estimate could end up  3 for this mine being in the 1 -- \$150 million range, by  4 the time we get done with it, and it accounts for all  5 that might be necessary.  6       I'm not going to say what that final figure is  7 going to be. I will be, I believe, presenting a much  8 more accurate estimate of what I think it will be when  9 we testify to the Mining and Minerals Division. But at  10 this point, we're really basing our comments on a  11 preliminary review.  12       So just want to touch on what I think are the  13 key assumptions that are relevant to long-term  14 protection of groundwater and surface water quality.  15       The first part of the estimate that I would  16 call your attention to is that of draindown management.  17 And you've heard a lot of testimony already this week  18 about how that will continue for a total of 25 years.  19       The first five years are active water  20 management, where they will take the seepage that's  21 coming from the tailings impoundment, pump it back up to  22 the surface and evaporate. That's a standard procedure.  23 It's, in fact, how the majority of the tailings  24 impoundments I've ever been involved with are closed,  25 because the first thing we need to do is simply get rid</p>
<p style="text-align: right;">1032</p> <p>1 line items for monitoring and for reclamation  2 maintenance.  3       More typically in the cost estimates of this  4 type, we do combine monitoring and maintenance because  5 we see the two activities as being somewhat synonymous  6 in that it's the monitoring that tells us we need to go  7 out and do the maintenance.  8       So monitoring when we discuss it in the  9 context of reclamation and closure, it's not just  10 limited to groundwater and surface water monitoring.  11 But a good example would be going on the site after  12 storm events and at least once a year regardless and  13 determining if your stormwater channels were blocked or  14 beginning to sediment in or something other was  15 happening that might prevent them from functioning  16 properly.  17       It's also monitoring your covers. And if your  18 covers start to show rilling and compromise of what  19 they're supposed to do, then you go in and do  20 maintenance on the covers. So they really are something  21 that has to be taken hand-in-hand. That's how it's  22 typically treated. I'll stop at that for now.  23       The other thing -- so they ended up with about  24 \$44 million in direct costs for this mine.  25       This isn't a mine where we're going to expect</p>	<p style="text-align: right;">1034</p> <p>1 of the water and control it.  2       And then they're suggesting that we'll be able  3 to go to an evaporate -- a passive evaporation system  4 after year five and beginning out through 20 more years,  5 for a total of 25 years.  6       Now, again there are a number of locations in  7 the United States where -- and I'd suggest this might be  8 one of them, where ultimately passive water management  9 may, in fact, be appropriate.  10       That really depends upon the amount of water  11 that's coming out of the system, whether you can put in  12 an effective passive water management system, such as a  13 constructed wetlands or -- in Nevada, they've actually  14 invented kind of a wetlands cell, where they take their  15 lined ponds they use during operations and put some  16 vegetation in them, various other things, and drain --  17 excuse me -- draindown goes into them.  18       Sorry for going so fast.  19       And there it evaporates, both through  20 evapotranspiration and otherwise.  21       One thing I would note is in all the cases  22 they're working on in Nevada where they're proposing  23 that, we have replacement costs figured in. We also  24 have things like bird netting costs figured in, the  25 replacement costs, because if you're draining solution</p>

<p style="text-align: right;">1035</p> <p>1 to a contained system, it's going to evapoconcentrate 2 again.</p> <p>3 That's why you can't just simply count on 4 these passive devices. It's not only going to need to 5 work for 20 years, but it may need to work for a lot 6 longer than that.</p> <p>7 So this is where in a typical mine Reclamation 8 and Closure Plan that we might see today in Nevada, 9 Montana, Alaska, a number of other jurisdictions that 10 have advanced their attention they're paying to this, we 11 will see that these activities are projected for 12 anywhere from 100 to even 500 years.</p> <p>13 So the whole idea here is they've provided us 14 with five years of active and for 20 years of passive. 15 Ends up providing the agency if the company goes 16 bankrupt -- again that's the thing we have to always 17 remember in financial assurance, this is a scenario 18 that's predicated on the company going bankrupt.</p> <p>19 We don't expect that to happen here. We don't 20 want that to happen. But it's something that -- you 21 know, that's the whole idea of financial assurance, is 22 so the public won't be liable.</p> <p>23 So they've estimated 4.5 million.</p> <p>24 Now, just to, you know -- some of the comments 25 again. You've heard us talk a lot about inherent</p>	<p style="text-align: right;">1037</p> <p>1 characteristics it might be probable -- might be 2 possible is a better way for me to put it -- that we 3 have very limited seepage from the tailings, from the 4 waste rock, and other things like the pit lake ends up 5 being the projected water quality and height.</p> <p>6 But if it isn't, then we would have no ability 7 without that being accounted for in the financial 8 assurance for the state to actually conduct those 9 activities.</p> <p>10 So again I -- in this case, because of the 11 inherent uncertainty, what I'm recommending is a more 12 precautionary approach be taken. I'm hoping ultimately 13 the company may see that by looking at this longer term. 14 It's not so much an additional cost as it is an ability 15 to assure the public that if they don't continue the 16 operations as planned, if some, you know, unfortunate 17 circumstance happens and the market falls out for 18 copper, that the public isn't liable.</p> <p>19 The pit rapid fill is another important aspect 20 of this closure/closeout plan with respect to 21 groundwater and surface water.</p> <p>22 Q. (BY MR. DE SAILLAN) Mr. Kuipers, you're now 23 on slide 47?</p> <p>24 A. Thank you, Mr. De Saillan. Yes. I'm on slide 25 47, titled Closure/Closeout Plan and Financial</p>
<p style="text-align: right;">1036</p> <p>1 uncertainty and the period for which active and/or even 2 passive water treatment might be necessary.</p> <p>3 The idea in a draindown situation is 4 80 percent of the water will drain down in the first 5 several years, and that would typically be the five 6 years that's projected. But then the draindown 7 typically doesn't go to zero. It continues on. And 8 whether it be two gallons per minute, five gallons per 9 minute or 10, that typically does need to be treated, 10 because it's a -- kind of a concentrated solution.</p> <p>11 Now, if -- even if it doesn't again contain 12 metals. In this case, I would expect it to contain 13 greater than 600 milligram per liter sulfate based upon 14 the information we've seen.</p> <p>15 So it's typical again in situations that I'm 16 seeing where we have this occurring, and again Nevada 17 has a very dry climate. It's actually very favorable 18 for the things we're describing in terms of evaporation. 19 But they nonetheless on those sites where they're 20 counting on this for long-term have required a 21 replacement cost, a bird netting cost, in addition to 22 maintenance costs that occur every year.</p> <p>23 What we're concerned about is -- in a lot of 24 respects, you've seen that we -- again the company's 25 consultants, they have suggested that given the site</p>	<p style="text-align: right;">1038</p> <p>1 Assurance.</p> <p>2 The company, as we've heard, is proposing to 3 use the pit as a hydrologic sink based upon projections 4 that without doing some kind of mitigation the pit lake 5 would not reach a suitable water quality. They have 6 gone ahead and proposed the rapid fill approach.</p> <p>7 And that approach has been proposed at other 8 mine sites, and, in fact, has been conducted at other 9 mine sites for the very reasons they have suggested, 10 that it will, in fact, help us mitigate the effect of 11 the wall rock leaching into the pit water, in very 12 simplistic terms, as Dr. Griffiths explained it much 13 more accurately.</p> <p>14 But when we do this rapid fill, we have to 15 have water to do it. And again if the company's in 16 place, everything goes according to plan, they have the 17 necessary water rights, they can do that. But in a 18 bankruptcy scenario, where they're not here, it's now 19 the state's responsibility to do that, and you're 20 sitting there competing with a bankruptcy judge, who, 21 quite honestly, if they have water rights is going to be 22 interested in selling them, it can be an issue.</p> <p>23 Now, you can go to court and perhaps end up 24 arguing that the water should still belong to the state 25 for mitigation, but that can take years to deal with,</p>

<p style="text-align: right;">1039</p> <p>1 and so you again don't want to find yourself in that 2 situation.</p> <p>3 One of the concerns we have is simply with 4 respect to whether they have the water. They've 5 estimated a cost for the rapid fill of 446,769 based on 6 using existing equipment and based upon having the water 7 rights necessary to go ahead and do this.</p> <p>8 And again, the bankruptcy trustee, if he can 9 sell that equipment, will have an interest in doing so, 10 may or may not end up being something they can remove. 11 But at the very least, we would want to see the water 12 addressed, because I would imagine in any situation 13 where that water is not clearly owned, there's going to 14 be a lot of interest in that water.</p> <p>15 So what they've suggested is that they're 16 going to fill the pit at a rate of 3,000 GPM. I believe 17 they suggested that would go on over six months and be 18 approximately 2,300 acre-feet in that year of rapid 19 fill.</p> <p>20 Again I emphasize existing equipment may not 21 be available, and we don't know right now if NMCC has 22 the necessary water rights to do this. I'll leave it up 23 to others to address that, but I don't believe that's a 24 certainty. And therefore, it's something that I believe 25 the state should address in the financial assurance.</p>	<p style="text-align: right;">1041</p> <p>1 have to make sure that the surface reclamation features 2 are addressed, so things like the covers, stormwater 3 channels and anything else critical to maintaining that 4 cover in place so it protects groundwater quality.</p> <p>5 They're planning on doing the reclamation work 6 in years 15, 16. According to the schedule, they would 7 say years 17, 18, 19 they're contouring at the tailing 8 storage facility.</p> <p>9 So essentially what we're seeing here is the 10 waste rock and other features would begin reclamation 11 initially. While the tailings facility was being 12 initially dewatered and other things, they would begin 13 doing contouring at that facility. And then they're 14 suggesting that it would be passive or minimal 15 reclamation work from years 20 through 40.</p> <p>16 I reclaimed a few mine sites. I've reclaimed 17 the US Hill Mine here in New Mexico for the Picuris 18 Pueblo. The suggestion that we can simply walk up and 19 not do a lot after we do reclamation, that's very risky, 20 particularly where we have such a dry climate subject to 21 these high-frequency storms and high-volume storms. You 22 need to go in and, for example, do maintenance and other 23 activities at the site.</p> <p>24 I know the pueblo for quite a number of years 25 initially did activities, and I think some folks were</p>
<p style="text-align: right;">1040</p> <p>1 The suggestion would be if nothing else, what 2 is the cost of that water in current market rates, and 3 apply that amount to the financial assurance. Now, I 4 don't know how much that would add to this financial 5 assurance. That's something that I think we will try to 6 look at more closely over the -- before we testify in 7 the MMD hearing, but it is likely to be significant.</p> <p>8 The next slide is slide 49, Closure/Closeout 9 Plan and Financial Assurance.</p> <p>10 This slide addresses monitoring. Again we've 11 discussed what they proposed in terms of a monitoring 12 program. And just to kind of summarize it again, this 13 is a table that's taken from the appendix that was 14 provided in the financial assurance cost estimate as 15 support for the monitoring costs.</p> <p>16 So they're showing in this table the year. It 17 begins on the top with years 15, 16, then goes through 18 17, 18, 19, then it goes 20, 22, 23 to 30, 31 to 40. So 19 basically accounts for the 14 years prior to 20 reclamation, and then this shows reclamation beginning 21 in year 15 and reclamation and monitoring continuing 22 through year 40 and then ending.</p> <p>23 With respect to reclamation work on the site, 24 in order to -- again I think it's very important to 25 understand that. In order to protect groundwater, we</p>	<p style="text-align: right;">1042</p> <p>1 out there recently. They haven't done a lot in probably 2 three or four years now. But I would suggest that -- 3 this is a very small mine site. I'm talking about 60 4 acres. Even that site over time they're going to need 5 to ensure that that reclamation continue to be monitored 6 and maintained.</p> <p>7 In the case of Copper Flat, this is a large 8 mine. This is not a small mica mine. They're 9 suggesting that in the financial assurance estimate 10 after year seven there would not need to be any 11 additional reclamation and closure maintenance 12 expenditures.</p> <p>13 So essentially it gives me the impression at 14 least, and I -- this is the type of thing where you need 15 to sit down with the company ideally and have a long 16 conversation about this -- but it gives me the 17 impression at least that they're suggesting after year 18 seven they're going to walk away from the surface of the 19 site, and all that remains is monitoring. Nothing 20 further is at least budgeted in their financial 21 assurance proposal for activities beyond year seven.</p> <p>22 At least as I understand it. And if it's 23 different, I'd appreciate them clarifying that.</p> <p>24 You can see that we have after the reclamation 25 work the number of groundwater wells. Those wells start</p>

<p style="text-align: right;">1043</p> <p>1 with 25, and then go to 24, reduce to 22, and then  2 finally 20, years 31 to 40. But then suddenly there's  3 nothing, nothing in the estimate, nothing in the plan,  4 beyond year 40.</p> <p>5 Now, I would be very surprised, given mine  6 sites I've worked on and the postmonitoring plans we put  7 together, if we simply went from 20 to zero. That  8 suggests somehow all 20 wells indicated total  9 compliance. That would be nice. We're not saying that  10 wouldn't be a great outcome. But the likelihood -- I  11 don't think there's a high likelihood of that.</p> <p>12 We also -- excuse me. We also notice that the  13 groundwater sampling frequency starts quarterly for the  14 first four years, years 15 through 18. Then it goes to  15 biannually years 19 through 22, and then annually years  16 23 to 40.</p> <p>17 Now, the only reason you decrease the  18 frequency is the results are showing no issues. If  19 you're showing potential for impacts, certainly if  20 you're showing exceedances, that frequency would  21 continue at the quarterly frequency. And I know sites  22 where because of what we've had we've actually gone to  23 monthly frequency.</p> <p>24 So this again schedule, it's possible, but  25 it's ideal. Everything that would have to just turn out</p>	<p style="text-align: right;">1045</p> <p>1 monitoring should continue well beyond the period of  2 reclamation so that folks get a real sense of confidence  3 and so regulators can get a sense of confidence that our  4 reclamation has actually worked.</p> <p>5 And the schedule kind of says we do it, it  6 works. Again I -- that's not the way good science works  7 out.</p> <p>8 So what they've done is estimated a cost for  9 this sampling program, and again it's only limited to  10 groundwater and surface water sampling. There's nothing  11 in this plan about monitoring for other features. And  12 I'll discuss that in a minute.</p> <p>13 So again -- going back to slide 49 a second,  14 they -- so the estimated cost for the 25-year period is  15 1.8 million. Now, that estimated cost you might note  16 does assume they're able to just simply phase this down.  17 And under a more typical assumption for financial  18 assurance, we would not make that assumption, but when  19 that happens, that's when the financial assurance is  20 released.</p> <p>21 So the idea is that we actually need financial  22 assurance for if this doesn't happen. And if this  23 scenario occurs, then I will be the first one to make a  24 recommendation to the state that they release the  25 financial assurance. That's the way this is supposed to</p>
<p style="text-align: right;">1044</p> <p>1 right in order for us to agree, I think in order for the  2 agency potentially to agree, to decrease the frequency.</p> <p>3 You'll also notice the number of surface water  4 samples. They have five in terms of years 15 through 18  5 during reclamation, but then it goes to zero after those  6 four years of reclamation.</p> <p>7 Now, again if we do everything right, and we  8 get all the contaminants covered, three foot of cover,  9 everything's functioning perfectly, after -- well, I  10 hesitate to say even after four years, but at some  11 point, we can quit sampling surface water.</p> <p>12 How we normally do that, though, is to allow  13 for, depending on the jurisdiction, anywhere from five  14 to 25 years of continued surface water sampling once  15 standards are being met.</p> <p>16 And I might mention that's the same standard  17 in a lot of jurisdictions for groundwater. Until that  18 groundwater, in fact, has been cleaned for five and some  19 cases 25 years, we still continue monitoring. We don't  20 just kind of assume it's already getting there.</p> <p>21 So I also would note that they're only  22 proposing to sample one spring. One thing I like to see  23 done, it will have to be worked out, is ultimately all  24 the springs and other features should be monitored by  25 the company as the project goes forward. And again that</p>	<p style="text-align: right;">1046</p> <p>1 work.</p> <p>2 So in my experience, there is not a basis for  3 NMCC only requiring monitoring for a 25-year period. We  4 worked hard, and ultimately I believe the folks have  5 accepted the fact that mines like Chino, Tyrone and  6 Questa, and albeit they are significantly larger than  7 this mine, they're not different in this facet.</p> <p>8 The policy has been that we now need to  9 recognize a 100-year monitoring and maintenance period,  10 and the BLM in particular has, I believe, taken a very  11 significant step forward in this regard in requiring 500  12 years. And it -- I need to address why they did that.</p> <p>13 We heard, I believe, some prior testimony that  14 100 years represents enough money for perpetuity.  15 That's not exactly right in that the way we do financial  16 assurance is we have a pot of money ultimately. This is  17 for long-term costs. The state would invest it in a  18 fund. That would collect interest. There would also be  19 inflation going on.</p> <p>20 And we assume that for that 100-year period  21 those numbers remain exactly static, and also that our  22 expenditures -- excuse me -- are exactly the same -- not  23 the same, but they go through that 100 years.</p> <p>24 Now, in fact, if that is the exact discount  25 rate or the interest rate is what we estimate, inflation</p>

<p style="text-align: right;">1047</p> <p>1 is what we estimate for 100 years, right on the nose,  2 and all of our costs are correct, we will have \$0.0 on  3 the 100th -- or the first day of 101th year. Okay. And  4 that's why we're doing financial assurance estimation.  5 What the BLM started to look at is when you  6 look at that in a net present value basis, we're  7 probably getting something in the neighborhood of 90 to  8 93 percent of the total amount that if we had that total  9 amount to invest we might, in fact, be able to make this  10 last significantly longer.  11 So what they did is simply extended it out to  12 500 years instead of 100 years. Typically when you do a  13 net present value estimate, that takes your 100-year  14 estimate and increases it by approximately 7 percent.  15 And 7 percent more to assure the public for  16 500 years instead of 100 years -- but more importantly,  17 I do believe it's an approach that can create a  18 permanent trust fund -- I think that's something that's  19 very important. And again that's protecting future  20 generations, and that's part of why I do what I do.  21 So again I wanted to emphasize, as I said, no  22 costs are included for vegetation monitoring. So we're  23 just assuming apparently the vegetation is all going to  24 grow. I know we -- it costs money to do vegetation  25 monitoring, it needs to be done, because there are</p>	<p style="text-align: right;">1049</p> <p>1 Again the tailing storage facility, there's  2 nothing there for monitoring of the actual surface of  3 the facility, other characteristics such as stability.  4 Until the tailings impoundment is completely drained  5 down, and assumes essentially an unsaturated state for  6 the most part, there still is some possibility of  7 failure.  8 It certainly increases once we begin to close  9 a tailing facility. It increases significantly, I might  10 add. But until we get that done, you will want to  11 continue monitoring -- the OSE will want to continue  12 monitoring that stability.  13 I don't know that the OSE has financial  14 assurance capacity. I certainly am not aware of any  15 financial assurance presently required by the OSE of  16 other tailings facility operators for that critical  17 monitoring of that structure's stability.  18 And there's probably some other monitoring  19 that I've forgot that we oftentimes end up looking at at  20 various mine sites. And I'm going to be describing  21 later some of why that's so important when I speak to  22 some of the other experts' presentations.  23 This is slide 51, also titled Closure/Closeout  24 Plan Financial Assurance.  25 This slide talks about maintenance.</p>
<p style="text-align: right;">1048</p> <p>1 specifications required by the Mining and Minerals  2 Division as well as the Environment Department related  3 to that.  4 Again I described the need to do erosion  5 monitoring. If you don't do erosion monitoring, you  6 don't know you need to do maintenance. And there are  7 standard procedures for going in on an annual basis and  8 actually doing erosion monitoring at mine sites. Those  9 are in place, in fact, at Chino and Tyrone, Questa, and  10 we have accounted for the potential cost of that.  11 Wildlife monitoring. This isn't being  12 addressed literally by anybody, and it's not going to  13 end up being addressed at all if somehow the Environment  14 Department and the Mining and Minerals Division don't  15 assume the responsibility for wildlife.  16 And you saw at Chino and Tyrone that we have  17 wildlife issues there. That's ultimately what drove the  18 settlement describing what happened with those various  19 leaks and spills and other things. So wildlife  20 monitoring I believe is very important.  21 The pit lake, another good example. Where's  22 the monitoring for the level of the pit lake? And how  23 are they going to get down there to monitor that pit  24 lake if the high walls begin to assume unsafe  25 conditions?</p>	<p style="text-align: right;">1050</p> <p>1 Now, this is something that's essentially  2 missing from the Reclamation and Closure Plan. I did  3 not see any description of maintenance of these various  4 features. I guess if the monitoring all says everything  5 is fine or if you don't monitor you don't need  6 maintenance, but that's not again what we do with  7 monitoring, reclamation and closure programs.  8 Maintenance is recognized as critical. What  9 they do have again, as I described it, is a one-time  10 cost for reclamation maintenance in year 20, which is  11 postmining year seven, and that consists of 10 percent  12 of the area requiring reseeding and 6 percent of the  13 area requiring growth media.  14 They may have -- and again I would appreciate  15 the clarification for -- Madam Hearing Officer, at some  16 point by the company, and they may have intended that to  17 represent a fund that the Mining and Minerals Division  18 could bank and continue to do some reclamation  19 maintenance. I just -- the way they put it in the  20 financial assurance, though, it doesn't provide for that  21 knowledge.  22 They estimated a cost of reclamation and  23 maintenance at \$686,000. Again I would note that the  24 policy in New Mexico, the policy with the BLM and, I  25 believe, the policy in general of those states,</p>



<p style="text-align: right;">1051</p> <p>1 jurisdictions and industry where they're choosing to be  2 progressive on this issue -- they are doing these things  3 for at least 100 years and 5 -- up to 500 years.  4 This is slide 52.  5 Again I'm just following up with some comments  6 on maintenance.  7 I just provided the first bullet in terms of  8 stating that the other agencies at other mines in New  9 Mexico have used this approach.  10 Again there is no cost in here for road  11 maintenance. And just even to get to a monitoring site  12 and install -- you know, fire up the pump and things  13 like that, you have to be able to access that by road.  14 So most reclamation cost estimates provide for that  15 maintenance.  16 You get a big stormwater event, something  17 happens, it blows out the road, how are you going to get  18 to that well? Again these don't have -- these aren't  19 big costs, but they're costs that if the agency doesn't  20 have them, it's everybody in the room that pays for  21 them. And the idea is let's see if we can make sure the  22 company pays for it.  23 With respect to stormwater maintenance, I'll  24 talk in a few minutes about Grayback Arroyo. This is  25 key. There are a lot of assumptions being made about</p>	<p style="text-align: right;">1053</p> <p>1 expectation of that.  2 I don't think it would be accepted that if  3 this mine site were abandoned at some point in the  4 future after it operated, that we could 20 years later  5 still be looking at things not having been addressed.  6 That's not the idea here. We want to make sure now that  7 that same kind of thing can't repeat itself.  8 So they've estimated about \$44 million. Again  9 this is a preliminary review on our part. We're looking  10 forward to -- and one of the things I need to be working  11 on is a more detailed estimate. But based upon my  12 preliminary review -- and I might mention that I've  13 probably reviewed 200 to 300 of these similar estimates  14 over the last 10 years. I'm not aware of a financial  15 assurance estimate that's actually been made in the US  16 and most of Canada that I don't have in my files and  17 haven't reviewed.  18 My sense of this, based upon my professional  19 judgment, is we're probably going to end up closer to  20 100 million for this project. It will be somewhere  21 between 44 and that figure, I suspect, for direct costs,  22 and then we'll need to add indirect costs.  23 Part of why --  24 If I could go back to slide 53 for a second.  25 Part of why I think that's important to note</p>
<p style="text-align: right;">1052</p> <p>1 what may or may not happen. Those assumptions in almost  2 all cases I believe would have to be predicated on there  3 being an actual maintenance program in place to ensure  4 that the features that are being depended upon are, in  5 fact, still there 100 years, 500 years, perhaps even  6 longer in the future.  7 Some of these features are very critical to  8 maintaining, for example, the contention that we don't  9 have surface water from offsite flowing into the pit.  10 And I'll talk about that more in a few minutes.  11 There are no costs included for long-term pit  12 lake mitigation or the long-term tailings capture and  13 passive treatment, as I mentioned. We -- those features  14 need to be maintained if they are employed. So -- if,  15 for example, we end up having to do something with the  16 pit lake, there will need to be costs to access that pit  17 lake.  18 So what I've described really are aspects of  19 the direct costs. And, you know, again what's important  20 to understand in financial assurance is that the amount  21 is driven by the assumptions. And so the assumptions on  22 draindown management, water quality, pit lake rapid  23 refill, those are all assumptions that if they don't  24 turn out to be as portrayed, then the agencies would  25 need to do something different. There would be an</p>	<p style="text-align: right;">1054</p> <p>1 is we're not talking about a billion dollars here.  2 We're simply talking about more or less twice the money  3 that's been suggested would provide a level of financial  4 assurance that would remove this consideration of  5 uncertainty, that would allow us to have the things in  6 place if anything about their suggestion is wrong, and  7 that would ensure the public wasn't liable.  8 I just want to touch for a minute on indirect  9 costs. These are essentially costs that we don't  10 account for in the direct cost estimate.  11 Q. You're on slide 54 now?  12 A. Yes. Slide 54. Thank you.  13 In the indirect costs, what we're trying to  14 account for are a number of things that are shown in the  15 first column, Indirect Cost Category. Those include  16 things like mobilization and demobilization,  17 engineering, design and construction plans,  18 contingencies, contractor profit and overhead, liability  19 insurance, performance and payment bonds, agency  20 management/contract administration and agency overhead.  21 Now, I'm not going to go through and describe  22 each one of these categories in detail. It would take  23 considerable time, and there's lots of guidance out  24 there available. For example, the Office of State -- or  25 Office of Surface Mining with -- federal Office of</p>

<p style="text-align: right;">1055</p> <p>1 Surface Mining developed guidance for indirect costs a  2 number of years ago.  3 The BLM as again part of their 3809 guidance  4 developed the indirect costs that you see over in the  5 fourth column in this table. I actually was involved in  6 providing recommendations to the BLM in their  7 development of those costs.  8 We also have costs here showing -- what we've  9 done in the table -- excuse me -- is the first column is  10 Indirect Cost Category.  11 Then the next columns all represent the  12 indirect cost percentage for first New Mexico Copper  13 Corporation Copper Flat. So these are the indirect  14 costs they proposed in their initial financial assurance  15 estimate.  16 Then Mining and Minerals Division guidance for  17 indirect costs. And this is an important guidance that  18 the Mining and Minerals Division has developed. It's a  19 draft guidance, and it considers indirect costs more  20 from a -- I would say New Mexico experience. New Mexico  21 does have some experience with having to deal with some  22 abandoned mines over the years.  23 And then the -- again the BLM costs are in the  24 fourth column -- third column under Indirect Cost.  25 So just briefly, when you look at the</p>	<p style="text-align: right;">1057</p> <p>1 going to need to use to build this did we count.  2 And the reality is that as cost estimators we  3 don't get down to every nut and bolt. We don't have  4 time for that. We don't have a 100 percent design in  5 front of us. So we use contingency to make up for the  6 lack of detail of the estimate. It's not there for the  7 "what ifs" that might happen. Those are the things I'm  8 saying need to be looked at more in a precautionary  9 approach.  10 Contractor profit and overhead, they estimated  11 10 percent, whereas the Mining and Minerals Division  12 guidance is 15, and the BLM's is 10 percent. We need to  13 make sure there are things like liability insurance for  14 that contractor who is going to be working for the  15 state, and the state would require them to have that  16 insurance. We could identify that in their estimate.  17 Similarly, performance and payment bonds.  18 Again if you're a contractor working for the state,  19 you're going to be required to have performance and  20 payment bonds, and those are typically included as  21 indirect costs.  22 Then we have agency management and contract  23 administration. Interestingly, this one was basically  24 consistent with guidance. This cost really addresses  25 what the agency's costs would be if they manage the</p>
<p style="text-align: right;">1056</p> <p>1 mobilization and demobilization, those essentially are  2 oftentimes not part of this cost and buried in the  3 direct costs. That's the case with this estimate as  4 well as BLM. I wouldn't look for that cost to be of  5 controversy.  6 An interesting thing that I noted was that the  7 company in their estimate used a direct cost for  8 engineering, design and construction of 6 percent -- or  9 4 percent -- excuse me -- whereas the guidance from the  10 Mining and Minerals Division as well as the BLM  11 suggested 3.  12 Now, the cover letter from the company said  13 they would -- essentially "We're following the agency's  14 guidance." So I would note that somebody might want to  15 be a little more careful to review the agency's  16 guidance.  17 But then we go to contingency, for example.  18 There we see the company estimated 6 percent. The  19 Mining and Minerals Division guidance suggests  20 15 percent, the BLM suggests 10.  21 Now, just to mention something about  22 contingency, this is not what if the dam fails or what  23 if the tailings liner leaks. This is what we call an  24 engineering cost estimation contingency, and it's based  25 upon how many of the widgets that we ultimately are</p>	<p style="text-align: right;">1058</p> <p>1 Reclamation and Closure Plan.  2 And then there is an agency overhead, really  3 says, well, if Mining and Minerals Division, for  4 example, and Environment Department manage this, well,  5 there's other folks like the state procurement office,  6 other, you know, places that -- the motor pool, various  7 other things that also end up incurring costs. So  8 that's the agency overhead.  9 The important point that I would come home  10 with is their suggestion of indirect costs was  11 26 percent, which is significantly lower than that of  12 the Mining and Minerals Division and also lower than  13 that of the Bureau of Land Management.  14 If the intention is to, in fact, comply with  15 the guidance or requirements of these two -- of the  16 various agencies, then my expectation would have been  17 that at the very least it would have been consistent  18 with the Bureau of Land Management's guidance, and in  19 fact, I believe if they truly were intending to meet the  20 letter of what they said, it would be consistent also  21 with the Mining and Minerals Division.  22 I believe that concludes my direct testimony.  23 Q. Mr. Kuipers, I have a few more questions for  24 you.  25 First of all, while we're still on the</p>

1059	<p>1 financial assurance topic, would you comment -- provide                  2 any additional comments you have on the form of the                  3 financial insurance instrument?                  4 A. Yes. The company did not identify the form of                  5 financial assurance that they will actually use. They                  6 indicated that it would comply with the Mining Act                  7 requirements for that.                  8 We would have a great concern, however, if the                  9 company were to propose a corporate guarantee. We hope                  10 that the company will, in fact, propose a real form of                  11 financial assurance in the form of a surety bond, letter                  12 of credit or other -- some other form that the agency                  13 can, in fact, access and use, that represents actual                  14 dollars.                  15 Q. Thank you.                  16 Then I have just a few more questions about                  17 the adequacy of the Discharge Permit application.                  18 And first of all, I'd like to ask you how many                  19 groundwater Discharge Permit applications in New Mexico                  20 for hardrock mine facilities you've reviewed.                  21 A. I've reviewed the discharge application                  22 permits for the Questa Mine, Chino Mine, Tyrone Mine,                  23 Cobre/Continental Mine and a few other mine sites in the                  24 state. I would note that in each case those are not                  25 single discharge plans, but in many cases, they're</p>	1061	<p>1 so what we've been handed today has a lot of                  2 inadequacies. It has not addressed, in my opinion, the                  3 inherent uncertainties that are present from a project                  4 like this.                  5 And I believe that in some form -- I'll leave                  6 that to others to address exactly how, but in some form                  7 this application needs to be supplemented, and in                  8 particular it needs to be supplemented to address the                  9 uncertainty and risks that we've identified.                  10 Q. Okay.                  11 And then, finally, I have a document that you                  12 should have received that's been marked as Ranches                  13 Exhibit 38.                  14 And can you identify that?                  15 A. Ranches Exhibit 38. Correct.                  16 Q. Can you identify that, please?                  17 A. Yes. It's titled the State of New Mexico,                  18 County of Dona Ana, Third Judicial District Court, State                  19 of New Mexico ex rel. New Mexico State Engineer,                  20 Plaintiff, v. Elephant Butte Irrigation District, et                  21 al., Defendants.                  22 Q. And are you familiar with this proceeding?                  23 A. Yes, I am.                  24 Q. Okay. Thank you, Mr. Kuipers.                  25 I have no further questions on your direct.</p>
1060	<p>1 multiple discharge plans.                  2 So I would estimate, you know, perhaps I've                  3 reviewed 30 or so of the discharge plans issued by the                  4 department over the past years.                  5 Q. Okay.                  6 And what is your opinion of the adequacy of                  7 the permit application that the New Mexico Copper                  8 Corporation has submitted to the Environment Department                  9 for the Copper Flat Mine?                  10 A. Let me predicate my comments with I do respect                  11 the company having employed consultants that are highly                  12 capable. These are folks whose opinions I respect, and                  13 I, you know, don't want to suggest that that's not a                  14 part of this.                  15 But as presented, the plan as well as the                  16 financial assurance associated with it represents an                  17 almost best or ideal outcome. Now, I think it's                  18 important to note that they were driven in some respects                  19 to probably do that knowing that we need to talk about                  20 at some point the Mining Act and the fact that it                  21 doesn't suggest an allowance for this long-term                  22 treatment.                  23 But that's, to me, not relevant today, because                  24 what we're talking about is what will actually need to                  25 be done in terms of groundwater and surface water. And</p>	1062	<p>1 And at this point, I move for admission of                  2 Ranches Exhibits 8 through 13, 15 through 21 and 38. So                  3 we're dropping what was originally Exhibit 14.                  4 MS. ORTH: Are there objections?                  5 MR. BUTZIER: Do you mind if I just take a                  6 moment?                  7 MS. ORTH: Please go ahead.                  8 MR. BUTZIER: Mr. de Saillan, could I take a                  9 look at Exhibit 38?                  10 I'm not sure I have a copy of that.                  11 MR. DE SAILLAN: Sure.                  12 Yeah. Jim, if you could just hand him --                  13 thanks.                  14 MR. BUTZIER: The only exhibit that is in the                  15 ranges Mr. de Saillan indicated that we would object to                  16 is Ranches Exhibit 16, which is a US Copper Porphyry                  17 Mines Report from Earthworks, a well-known anti-mining                  18 organization. I don't think that there was any                  19 foundation laid for that to be entered.                  20 MS. ORTH: All right.                  21 Mr. de Saillan, would you like to address the                  22 foundation for Exhibit 16?                  23 MR. DE SAILLAN: Yes, Madam Hearing Officer.                  24 Q. Mr. Kuipers, are you familiar with that                  25 Earthworks document?</p>

1063	<p>1 A. Yes, I am.</p> <p>2 Q. And was that a document that you used in</p> <p>3 preparation of your testimony?</p> <p>4 A. Yes, I did.</p> <p>5 Q. And are you familiar with the background</p> <p>6 documents that went into the preparation of that report?</p> <p>7 A. Yes, I am. And I, in fact, actually mentioned</p> <p>8 that during my testimony, that because of similar</p> <p>9 concerns to that of Mr. Butzier, the USEPA requested</p> <p>10 that I obtain and verify every single reference in that</p> <p>11 document.</p> <p>12 And again I would be glad to provide folks</p> <p>13 those exact references; however, I can assure you I have</p> <p>14 verified them, and the ones that we testified on are, in</p> <p>15 fact, matter of record in the State of New Mexico.</p> <p>16 So I believe that should provide adequate</p> <p>17 foundation.</p> <p>18 MS. ORTH: Mr. Butzier, do you have voir dire</p> <p>19 on that?</p> <p>20 MR. BUTZIER: I do. Thank you, Madam Hearing</p> <p>21 Officer.</p> <p>22 VOIR DIRE EXAMINATION</p> <p>23 BY MR. BUTZIER:</p> <p>24 Q. Mr. Kuipers, are either of the mines mentioned</p> <p>25 in that report mines to which the Copper Rule in New</p>	1065	<p>1 we could eliminate to zero any spills or leaks or</p> <p>2 particularly accidents.</p> <p>3 Again the Copper Rule doesn't prevent human</p> <p>4 error. The Copper Rule sets forth the best practice,</p> <p>5 but everything is subject to human error, and things can</p> <p>6 happen that we didn't plan on.</p> <p>7 MS. ORTH: All right.</p> <p>8 So, Mr. Butzier, I think your objection goes</p> <p>9 more to weight than admissibility, and he did rely upon</p> <p>10 it for his testimony.</p> <p>11 Ms. Barncastle, do you have objections to the</p> <p>12 exhibits?</p> <p>13 MS. BARNCASTLE: No objections.</p> <p>14 MS. ORTH: Mr. Knight?</p> <p>15 MR. KNIGHT: No objections.</p> <p>16 MS. ORTH: All right.</p> <p>17 So Exhibits -- Ranch Exhibits 8 through 13, 15</p> <p>18 through 21 and 38 are admitted.</p> <p>19 (Exhibits Ranches 8 through 13, 15 through 21</p> <p>20 and 38 admitted into evidence.)</p> <p>21 MS. ORTH: Are you moving now to rebuttal?</p> <p>22 MR. DE SAILLAN: Yes, Madam Hearing Officer.</p> <p>23 And I wasn't sure whether the process you're -- your</p> <p>24 process would be for cross-examination to occur now on</p> <p>25 the direct or for that to wait until after the rebuttal</p>
1064	<p>1 Mexico applied at the time of the operations that are</p> <p>2 addressed in that report?</p> <p>3 A. There are periods of time, for example, for</p> <p>4 the Chino and Tyrone mines in the information I</p> <p>5 presented that have been since the Copper Rule -- no.</p> <p>6 Excuse me. No. That's a good -- actually -- no. I</p> <p>7 revise -- I was not thinking specifically the Copper</p> <p>8 Rule. I was thinking of the -- so from the Copper Rule</p> <p>9 standpoint, I believe you're correct.</p> <p>10 MR. BUTZIER: Okay. So I will just maintain</p> <p>11 my objection on the basis that this report surveys mines</p> <p>12 and activities at mines that have nothing whatsoever to</p> <p>13 do with the regulation of mines under the Copper Rule.</p> <p>14 MR. KUIPERS: If I could respond.</p> <p>15 MS. ORTH: Yes, please.</p> <p>16 MR. KUIPERS: So it's important to note in the</p> <p>17 Copper Rule that what we did was we went out and took</p> <p>18 best practices from the existing jurisdictions that were</p> <p>19 out there. These are the same jurisdictions in which</p> <p>20 accidents occurred, that included New Mexico practices.</p> <p>21 So the Copper Rules are a set of best</p> <p>22 practices that we put together that essentially would</p> <p>23 suggest ways to minimize or limit these spills and</p> <p>24 leaks, but nobody -- excuse me -- nobody that I know in</p> <p>25 the Copper Rule, as I was working with that, suggested</p>	1066	<p>1 has been presented.</p> <p>2 MS. ORTH: So I would think it would be more</p> <p>3 efficient to wait until after rebuttal is presented.</p> <p>4 Does anyone disagree with that?</p> <p>5 MR. BUTZIER: I don't have a strong</p> <p>6 preference. I was thinking we would go ahead and</p> <p>7 cross-examine based upon the direct and then go to</p> <p>8 rebuttal, but I guess it doesn't matter that much.</p> <p>9 MS. ORTH: Okay. I just feel like you would</p> <p>10 be repeating at least some of your cross --</p> <p>11 MR. BUTZIER: Okay.</p> <p>12 MS. ORTH: -- if we did that.</p> <p>13 MR. BUTZIER: Thank you.</p> <p>14 MS. ORTH: All right. Please go ahead.</p> <p>15 MR. DE SAILLAN: Thank you.</p> <p>16 DIRECT EXAMINATION (Resumed)</p> <p>17 BY MR. DE SAILLAN:</p> <p>18 Q. Mr. Kuipers, have you prepared a presentation</p> <p>19 in rebuttal for this proceeding?</p> <p>20 A. Yes. I do have a brief presentation.</p> <p>21 Q. Could you present that, please.</p> <p>22 A. Yes. I'm looking at -- I've got -- it's</p> <p>23 entitled slide 55. I believe we attached it as a</p> <p>24 continuation to my previous testimony.</p> <p>25 I'm really going to just testify mostly</p>

1067	<p>1 what -- from this slide. Occasionally I will flip to</p> <p>2 some other slides with some demonstrative exhibits or</p> <p>3 otherwise.</p> <p>4 The first thing I want to address is the Jeff</p> <p>5 Smith slide 7, talking about the project economics and</p> <p>6 likely worst case.</p> <p>7 And do we -- I'm sorry. I thought I had</p> <p>8 that -- oh, shoot.</p> <p>9 Madam Hearing Officer, I need to call up that</p> <p>10 slide.</p> <p>11 MS. ORTH: All right.</p> <p>12 MR. KUIPERS: It will take me just a couple</p> <p>13 minutes to do that.</p> <p>14 MS. ORTH: Should we take a brief break?</p> <p>15 MR. KUIPERS: That would be my suggestion.</p> <p>16 MS. ORTH: All right. Let's just take five</p> <p>17 minutes.</p> <p>18 (Proceedings in recess from 10:04 a.m. to</p> <p>19 10:10 a.m.)</p> <p>20 MS. ORTH: Okay. We are back after a break.</p> <p>21 Mr. Kuipers.</p> <p>22 MR. DE SAILLAN: Madam Hearing Officer, if I</p> <p>23 could ask one last question regarding the foundation for</p> <p>24 that Earthworks report.</p> <p>25 MS. ORTH: Okay. That's fine. I mean, it's</p>	1069	<p>1 perhaps compromised the previous circumstance with the</p> <p>2 Copper Rule in that case.</p> <p>3 Q. Thank you.</p> <p>4 That's all I have.</p> <p>5 MS. ORTH: Okay.</p> <p>6 Q. (BY MR. DE SAILLAN) If you could proceed with</p> <p>7 your rebuttal testimony, Mr. Kuipers, please.</p> <p>8 A. Yes. So I'm on slide 55, and again this just</p> <p>9 indicates the various subjects I'm going to speak of.</p> <p>10 The first one that I want to address is Jeff</p> <p>11 Smith slide 7, which is the project economics and likely</p> <p>12 worst case.</p> <p>13 I'm flipping forward to my slide 59, which is</p> <p>14 a replication of that slide in Mr. Smith's presentation.</p> <p>15 Just as a bit of foundation as to my ability</p> <p>16 to speak to this type of information, all engineers,</p> <p>17 whether they're mining engineers or processing engineers</p> <p>18 or otherwise, at least in the school I went to, took</p> <p>19 several courses in engineering economics, and those</p> <p>20 courses allowed us to have the ability to essentially</p> <p>21 design, plan and conduct a mining operation, shut it</p> <p>22 down and determine the cost of doing that.</p> <p>23 But in addition, I worked as the project</p> <p>24 manager of several mines, also as a superintendent. In</p> <p>25 all those capacities, I was part of a team of people who</p>
1068	<p>1 admitted.</p> <p>2 MR. DE SAILLAN: Correct.</p> <p>3 MS. ORTH: Okay.</p> <p>4 MR. DE SAILLAN: But I just want to preserve</p> <p>5 our position.</p> <p>6 Q. Now, Mr. Kuipers, you testified a little bit</p> <p>7 about the Copper Mine Rule in response to questions from</p> <p>8 Mr. Butzier.</p> <p>9 Is there anything about the Copper Mine Rule</p> <p>10 that is actually less stringent than the requirements</p> <p>11 that were in place for the Chino and Tyrone mines at the</p> <p>12 time of the various spills that are listed in the</p> <p>13 Earthworks report?</p> <p>14 A. Yes, there are.</p> <p>15 Q. Could you describe that, please?</p> <p>16 A. Well, the main thing is in dealing with the</p> <p>17 open pit capture zone as well as the surface water</p> <p>18 capture area that are described in the Copper Rule.</p> <p>19 First, those are not typically -- and I have</p> <p>20 never seen those terms used prior to this in a process</p> <p>21 of regulation or permitting. There is recognition of</p> <p>22 the overhaul phenomena of a hydraulic capture zone, but</p> <p>23 the Copper Rule very explicitly brought those in in a</p> <p>24 way that in particular would allow a company to do less</p> <p>25 reclamation in certain areas, and so in many ways</p>	1070	<p>1 on a daily basis were looking at the economics and</p> <p>2 adjusting the operations, doing various other things.</p> <p>3 And in the same way that Mr. Smith is -- I would</p> <p>4 recognize is an expert in this matter, I similarly have</p> <p>5 had the same experience in applying this information</p> <p>6 throughout my career.</p> <p>7 But also, when I've worked for Anglo American</p> <p>8 Corporation, which was one of the largest mining</p> <p>9 corporations, I spent two years as a member of their</p> <p>10 senior acquisitions team, working with essentially a</p> <p>11 group of much older professionals, and because I was the</p> <p>12 one who knew how to use spreadsheets, and computers were</p> <p>13 just being developed, I was put in charge of doing all</p> <p>14 the engineering economic -- engineering economic</p> <p>15 analysis with their inputs.</p> <p>16 So this is something that I have a high degree</p> <p>17 of familiarity with. I presently on my computer have, I</p> <p>18 think, three different financial analyses for other</p> <p>19 mines that I'm actually evaluating in much more detail.</p> <p>20 So going to the actual slide itself, what</p> <p>21 Mr. Smith presented was a figure that shows on the</p> <p>22 left-hand side the annual copper production in terms of</p> <p>23 tons and also on the right-hand side the copper</p> <p>24 equivalent grade. And these are both on the Y axis.</p> <p>25 The annual production goes at the bottom from</p>

<p style="text-align: right;">1071</p> <p>1 0 up to 50,000 tons. I believe this is set up per year.  2 And then on the right-hand side in terms of grade, we  3 see it goes from 0 percent up to 0.6 percent. Again  4 this is on the right-hand side, the Y axis. And then  5 the X axis on the bottom describes each one of the 12  6 years of operation, years 1, 2, 3 through 12.  7 Now, just to begin with, one of the reasons we  8 don't see a lot of small copper mines is because of  9 these rather short lifetimes. And when you look at the  10 vast majority of copper that's produced throughout the  11 world, it comes from very large mines, the vast majority  12 of which have been operating in terms of historic mines  13 for 100 years or more.  14 When you take a look at mines like Chino and  15 Tyrone, Butte, where I'm from, the Bingham Canyon pit in  16 Utah, all of those are very large mines, they're  17 historic, and they've been operating for a long period  18 of time.  19 Now, there have been a large number -- I'm not  20 saying large -- some -- yeah. By no means it would be.  21 But in comparison, you might have, you know, 20 large  22 mines, but you also have 20 small mines that have  23 occurred. Those 20 small mines have a history of  24 bankruptcy associated with them. And if not bankruptcy,  25 in the majority of cases, they simply didn't make money.</p>	<p style="text-align: right;">1073</p> <p>1 Q. When you say right here, you're referring to  2 year six?  3 A. Year six, yes.  4 So in year six, midpoint through here, what  5 you see is we basically drop from the scenario where  6 they're mining relative high grade, and then all of a  7 sudden we're at a period from year six through 11 where  8 the grade you can see is varied, or that's actually the  9 production. And then I believe this is still tended to  10 represent the grade.  11 So you can see we're considerably lower,  12 approximately about 60 to 70 percent of what that  13 original grade was.  14 So I have worked for, unfortunately, a number  15 of companies that went bankrupt. My first employer when  16 I got done with college didn't actually -- well,  17 actually it did go bankrupt, come to think of it. They  18 just declared bankruptcy after they paid us all.  19 My second employer went bankrupt while I was  20 managing a mine in the State of Nevada. I actually had  21 to sell the company truck -- or give it to the sheriff  22 so he could sell it to pay the bills that we had left  23 behind in this small town in Nevada.  24 I've also seen big companies go bankrupt.  25 And part of my work in financial assurance,</p>
<p style="text-align: right;">1072</p> <p>1 And so in my opinion, Mr. Smith has a real job  2 ahead of him, because what he's doing and -- you know,  3 again this is what we have to do sometimes in the mining  4 industry, is his job is to take a, in my opinion,  5 marginal deposit and turn it into a profit for the  6 people who own it.  7 Now, the risk here that I want to point out --  8 and this is very important again from a financial  9 assurance standpoint, because financial assurance is  10 there in case the company were to go bankrupt. But what  11 you see here is there's a period of high grade up front  12 where they're saying it will be .46 copper, they'll  13 produce annually about 35,222 tons of copper.  14 The profitability of this project depends upon  15 what happens in this five-year period. If the copper  16 price is high, they can pay back their capital, I  17 believe there's a chance they'll go all the way to year  18 12.  19 But if during this period, similar to what's  20 happened in the past, it costs them a lot of money to  21 get capital -- and by the way, capital is not cheap  22 right now -- and the copper price doesn't rise  23 significantly from where it is today, what we really  24 have to worry about is this inflection point right here.  25 And, you know --</p>	<p style="text-align: right;">1074</p> <p>1 I've analyzed what it is that potentially causes  2 companies to go bankrupt, and we use that information in  3 making sure that we recognize where these inflection  4 points are.  5 Now, also, it's notable that the Office of  6 Surface Mining, and again most other jurisdictions that  7 do financial assurance, recognize that we need to find  8 where we have the reasonable worst case result. Now,  9 reasonable worst case means we're following the plan.  10 It's not that we get -- again this isn't the tailings  11 facility failing or the liner leaking. But we're  12 following the plan and suddenly they go bankrupt.  13 And a key example of that is the encapsulation  14 of the sulfide materials that was described as part of  15 their plan.  16 So if we're basically mining at the surface  17 the transition materials which have been acknowledged as  18 the potentially more reactive materials here, we start  19 to put it in a repository, as been described. And again  20 the idea is to put it inside the waste rock pile.  21 But if the waste rock pile has only been half  22 constructed and the encapsulated materials aren't  23 encapsulated but left exposed, the agency would need to  24 come in and figure out how to cover that with -- let's  25 say, for example, 10 foot of nonreactive material as is</p>

<p style="text-align: right;">1075</p> <p>1 planned by the operator. The financial assurance as it                  2 presently is would not contain the money for that.                  3 Similarly, the pit would not have been                  4 completely dug to the ultimate level. Quite likely the                  5 pit lake would be higher and as a result almost                  6 certainly encroach on public land and not remain                  7 entirely on private land.                  8 Well, if that were to happen, that not only                  9 would trigger the fact that it wasn't completed, but in                  10 fact, I think, would result in an entirely different                  11 water quality standard being applied. And if that were                  12 the case, have we accounted for the water treatment that                  13 might be necessary if that standard is applied.                  14 So in understanding risk and why we need to                  15 make sure we get things right, this is a very, very                  16 important graphic, because again I think counting on                  17 financial assurance here, in the event they go bankrupt                  18 early, we can't -- you know, as much as we want to, we                  19 can't ignore the history of this project. We would find                  20 ourselves, I believe, way short.                  21 And this is a scenario where instead of                  22 suggesting being 100 million short, it could well be                  23 higher than that amount, significantly higher, because                  24 we simply didn't get done with what we thought needed to                  25 get done.</p>	<p style="text-align: right;">1077</p> <p>1 need to be supplied, and we're listing those as                  2 strategic. USGS is listing those as strategic, I should                  3 say.                  4 So they have this very list of minerals.                  5 Neither copper, molybdenum, gold or silver are                  6 recognized as strategic minerals on the USGS list.                  7 And mainly copper -- just to explain,                  8 copper -- US is one of the world's leading producers of                  9 copper. I'm not sure this year whether we're number 2                  10 or number 3. We have tremendous domestic resources of                  11 copper. There are numerous untapped, very, very large,                  12 rich resources of copper still in the US that are known.                  13 For example, I'm aware of a group that is                  14 working on a new deposit in Montana that might be about                  15 the size of the Butte deposit, which is known as the                  16 richest hill on earth. Copper is abundant in US. And I                  17 think it's good that it is, because I think we're going                  18 to need it. But I just want to clarify. It's not a                  19 strategic mineral in terms of that we don't have the                  20 capacity to already produce it in this country.                  21 So the next things that I want to speak to are                  22 the testimony of Steve Finch. To some extent, the                  23 same -- my same comments apply to all the testimony                  24 we've heard.                  25 And that's the -- again I want to be clear</p>
<p style="text-align: right;">1076</p> <p>1 And again this is an analysis that I think                  2 needs to be performed as part of the negotiations                  3 between the state and the company to ultimately consider                  4 what would happen here and determine if that actually                  5 does represent a higher cost case than end of mining and                  6 require the financial assurance to account for at really                  7 either case. That's what we need to take a look at.                  8 Just want to mention Mr. Smith suggested that                  9 copper is a strategic mineral. I certainly wouldn't                  10 argue with him that it's an important mineral. I think                  11 it also is going to be an important metal or mineral as                  12 we address climate change that's caused by us humans                  13 here. It's going to take some technology to approach                  14 this.                  15 However, it's important to note that we have                  16 an actual definition of strategic minerals here in the                  17 United States. That strategic mineral list is published                  18 by the USGS, and under the Trump administration, it was                  19 recently revised.                  20 There are some 35 or so strategic minerals on                  21 that list. The strategic minerals that are on the list                  22 are identified as being based upon supply and demand as                  23 well as domestic production. And so a key factor is if                  24 we really -- if we don't have domestic production to                  25 meet the demand, then we need to consider that those</p>	<p style="text-align: right;">1078</p> <p>1 that I respect the testimony of Mr. Finch. I've known                  2 him and worked with him in the past. But again his job,                  3 I believe, was to some extent predicated on coming up                  4 with a plan that suggested there would simply not be                  5 long-term treatment.                  6 And there has to be recognized that within a                  7 plan like that, because it's based upon a lot of                  8 preferable circumstances, if you will, could call them                  9 ideal or best case, that it really doesn't account for                  10 this uncertainty.                  11 And what we've done in the industry for quite                  12 some time now is recognize that again when we have risk                  13 or when we have uncertainty, the best way to address                  14 that is through risk analysis.                  15 And the biggest thing I think I'd recommend to                  16 the company, to the other parties to this proposal are                  17 that if we could go through and conduct a rigorous                  18 failure modes effects analysis, it would help to not                  19 only make sure we've addressed many of these issues and                  20 provide confidence in that, but just as importantly,                  21 would give us a tool to communicate to the public                  22 accurately and confidently what is going to happen with                  23 this mine.                  24 Now, just to describe the failure modes                  25 effects analysis a second, this is a process that I</p>

<p style="text-align: right;">1079</p> <p>1 don't feel that, you know, it's really been used since 2 the 1940s with respect to airplane accidents. And if 3 you go back and realize the degree to which airplanes 4 used to crash, literally every time you took off you 5 were taking your hands in your life.</p> <p>6       It was through examining these accidents and 7 looking at the failures, coming up with either fixes to 8 the failures or in many cases redundant systems, so that 9 if something failed, you at least thought about how to 10 take care of it.</p> <p>11       And I always relate the experience I had that 12 I was on a plane, flying into Butte, Montana, and as we 13 were getting to approach the runway, apparently the 14 lights came on, and the pilot realized that his reverse 15 thrusters no longer were functioning, weren't going to 16 be available.</p> <p>17       We took on up -- back up into the air, headed 18 for Bozeman, Montana, which has a little bit longer 19 runway, for those of you familiar with the area, and 20 once we got to Bozeman they had us assume the position 21 as if we were going to crash and everything else.</p> <p>22       But what the pilot said that gave me 23 confidence was, "Well, we've looked it up in the book. 24 We've got a procedure. We know what to do. We're just 25 going to Bozeman to make sure if the procedure doesn't</p>	<p style="text-align: right;">1081</p> <p>1 a group of high-level experts if we can.</p> <p>2       I participate in these -- with industry and 3 regulators numerous times a year. In fact, I'll be 4 doing one for the Stillwater mine tailing storage 5 facility at the end of this month.</p> <p>6       And so you get a group of people together, and 7 you sit there and basically go through the, for example, 8 structural failures. We look at environmental failures, 9 not just liner leaks, failures of the cover, for 10 example. We haven't talked a lot about it, but this 11 cover system is supposed to actually get us less than 12 2 percent infiltration. That's a pretty hard task.</p> <p>13       And, you know, I think if we had more time, 14 it's an example of something we would have spent a lot 15 more time analyzing than probably brought forth in our 16 testimony this week. It's the kind of thing that we 17 need to take a look at in a net risk analysis.</p> <p>18       We consider also what we call administrative 19 failures, and a good example of administrative failure 20 is the company goes bankrupt, do we have a plan to 21 address that. There are other failures such as if the 22 regulations were to change, things like that, that we 23 also address.</p> <p>24       So it's very important and I'd say critical in 25 any structure, such as a tailing storage facility, that</p>
<p style="text-align: right;">1080</p> <p>1 work we're well cared for." So -- 2       And again we landed safely.</p> <p>3       This is -- and when we look at this same thing 4 in mining, we're simply trying to do the same thing with 5 these failure modes effects analysis, is instead of 6 assuming based upon our analysis that it can't happen, 7 what we do is say, well, you know what, we can't say it 8 can't. I mean, that's -- we don't know what we don't 9 know.</p> <p>10       But -- so we need to go ahead and allow for 11 that to happen and see if we can address it, if we 12 can -- if that does happen, can we come up with a 13 procedure.</p> <p>14       So, you know, the best example here, if 15 seepage occurs from the tailing storage facility, well, 16 we know -- we know that we can address that with a 17 contaminant system, with a pumpback system. That's how 18 we've done it every mine site that I'm aware of.</p> <p>19       So if we allow for that in the plan, we allow 20 for that in the financial assurance, then if it happens, 21 we can address it. If we don't allow for it, then we 22 may see a crash of some kind.</p> <p>23       So again that's the whole principle here, is 24 to do that. When we do failure modes effects analysis, 25 we typically convene a group of experts. We like to see</p>	<p style="text-align: right;">1082</p> <p>1 you do a failure modes effects analysis. And I would be 2 very surprised if, in fact, Mr. Kidd did not plan on 3 recommending that to his client, if it's not already 4 written in part of the process they plan on.</p> <p>5       But I'd suggest to go beyond the tailings and 6 that we use this very useful process to also evaluate 7 the environmental risks and to address what the 8 likelihoods of those risks would be, in addition to the 9 failure modes, what the consequences of those risks 10 would be. And when we look at those consequences, we 11 need to not just consider one factor, but typically we 12 consider six factors, regulatory, environmental, public 13 acceptance, number of other factors that need to be 14 included in this analysis.</p> <p>15       And again I would just point out that this is 16 an analysis that in my experience for mining companies, 17 situations where we're trying to do this right, it's 18 become a standard in our process. And again this type 19 of risk analysis doesn't have to be exactly this, but 20 until we do a risk analysis, this permit is fraught with 21 uncertainty, this proposal is fraught with uncertainty. 22 And I believe this is perhaps the best way to address 23 it.</p> <p>24       So the next bullet is with respect to the 25 testimony of both Mr. Finch and Dr. Griffiths. Both of</p>



1083	<p>1 them -- as you recall, we talked to them and questioned                  2 them about long-term geomorphic change.                  3 And just let me make sure folks understand                  4 what we're talking about when we use the term                  5 "geomorphic." Essentially it's the idea of how does the                  6 landscape or landform change over geologic time. So                  7 we're not talking years, even decades. This is what                  8 occurs beginning years and decades, but can basically                  9 continue forever.                  10 And what we do in mining, in particular when                  11 we do pits, is we -- we essentially build a cliff, if                  12 you will, and we leave that cliff when we're done. You                  13 know, when you go out mountain climbing, there's some                  14 cliffs that are good to climb because the rock's been                  15 there for a long time, it's well solid. There are other                  16 cliffs that you look at and you say, you know, that's                  17 going to fall down on top of me.                  18 Having tried to go down in a few of these pits                  19 over the years, you don't want to do it, because                  20 ultimately from the time mining ceases, basically going                  21 forward indefinitely, that pit wall is going to start                  22 sloughing off, changing and doing various things.                  23 And in particular on sites where we've seen                  24 pit lakes develop, we've seen fairly large sloughing                  25 occur because as the water rises -- we've dewatered all</p>	1085	<p>1 here, and essentially this started to cap off and                  2 slough.                  3 Well, this actually sloughed quite a bit all                  4 at once. A wave traveled across the Berkeley Pit,                  5 estimated to be about a six-foot wave. And over here is                  6 all the pumping for the pit. This pit gets -- above                  7 there all this water starts flowing down the Columbia                  8 River. Essentially we're at the headwaters of the                  9 Columbia in Butte at the Clark Fork River.                  10 So the remedy is to not let it rise above                  11 here. But what we're seeing now is we get these                  12 sloughs, it creates a danger for the personnel, and so                  13 they actually had to rebuild their pumping system over                  14 here after it got wiped out, and they've had to set it                  15 up so that they are ensuring employees' safety while                  16 they're down there in the event this happens.                  17 So the actual expectation at Butte is we will                  18 end up seeing this slough complete at some point, lose                  19 all the benches.                  20 And what happens is when you look at the                  21 geochemical characterization program and how they                  22 characterize the pit lake water quality as it came up,                  23 the assumption is that we'll have a limited reaction in                  24 the pit wall with waters, that they'll only move in less                  25 than a meter.</p>
1084	<p>1 this material. Now as the water rises, we're actually                  2 putting pore pressure back into rock behind these walls,                  3 and that additional pore pressure as the water rises                  4 actually can cause movement in that wall.                  5 So in recognition of that -- and we actually                  6 have examples of that. I just want to show folks.                  7 This is the somewhat infamous Berkeley Pit.                  8 This is the pit that every once in a while we get a                  9 flock of geese landing on it. We had a flock of about                  10 10,000, and many of which died just a couple of years                  11 ago. Originally there was a flock back in 1993, I                  12 believe it was, that landed on the pit and died. And                  13 actually as a result of that, they have since then                  14 employed all kinds of mitigation measures and other                  15 things.                  16 Then we kind of relax for a few years when we                  17 don't have problems, and suddenly a flock comes in due                  18 to bad weather, and here we are again. So they actually                  19 spend 24 hours a day, they have monitoring surveillance,                  20 flying drones, boats, the whole works, on this.                  21 But what's important here is as this pit lake                  22 rose -- and this was not predicted, but I think today we                  23 would predict it to continue to happen. As this pit                  24 lake rose, it did what I'm talking about in terms of the                  25 water table started to come back, got pressure behind</p>	1086	<p>1 And so the kind of chemistry as you go up the                  2 pit lake is to only account for what's happening in that                  3 first meter or so pit wall. In fact, in this case, I                  4 think it was slightly less than a meter.                  5 But if -- excuse me. If you get sloughing,                  6 like we see here, then not only is that limited distance                  7 reacting, but all that material that could go back tens                  8 or even hundreds of feet has now entered into the water                  9 and becomes part of the water chemistry.                  10 The other thing that happens is if you put                  11 material down in the pit, it can raise the overall water                  12 level, and that could be a permanent raise if looking at                  13 an equilibrium level. And the amount of rise -- that's                  14 a bit of a function of how much goes in, but also how it                  15 alters the water table.                  16 And so you have the potential as these things                  17 happen to safely do that.                  18 I apologize for the poor quality of this slide                  19 here, but this is an actual picture of the Bingham                  20 Canyon slide in Utah. This --                  21 Q. What number is that, Mr. Kuipers?                  22 A. This is slide 58. I'm sorry.                  23 And this is a picture of the slide that                  24 occurred at the Bingham Canyon pit on April 10th, 2013.                  25 Now, this slide was predicted to occur. The</p>

<p style="text-align: right;">1087</p> <p>1 mining company had been monitoring it for some time.  2 They were aware that it could go, but nobody expected it  3 to go when it did. And even more importantly, nobody  4 expected it to be so big.  5 It was nothing short of a miracle that nobody  6 was killed here, because they had an entire truck fleet  7 and other things parked right down here. Clearly the  8 company was not expecting this slide of this nature to  9 occur. It did occur, and again it was huge.  10 Quite interestingly, because the mining  11 company was there and still could -- had valuable  12 resources -- and I look at this as one of the really  13 success stories of modern mining in some respects --  14 they were able within a few months to clear this slide  15 and begin mining again.  16 So these kind of things happen. They happen  17 all the time. In fact, it's a certainty. Gravity isn't  18 going away. Natural degradation of cliffs happens all  19 the time. But these mine pits are highly susceptible to  20 degradation afterwards, and a prediction for either  21 water chemistry or water levels can be drastically  22 altered if this type of event happens in predicting a  23 postmining pit lake.  24 The next comments I want to provide are with  25 respect to David Kidd's testimony.</p>	<p style="text-align: right;">1089</p> <p>1 happen. So again I would expect that we'll do a failure  2 modes effects analysis.  3 Just as important, a few other things that  4 I'll mention just briefly here. So these -- I might  5 mention these are really recommendations in a way,  6 because as we recognize, we kind of have this  7 bifurcation between the Environment Department and OSE.  8 These are things that I believe are important  9 to protect groundwater, but they're really more things  10 that need to be incorporated as the design goes forward  11 with the OSE. And this is really -- to our knowledge  12 with the process from the OSE, this is maybe our  13 opportunity to provide comment, because there is no  14 formal public comment process, to my knowledge, in the  15 OSE permitting.  16 So, you know, again we would make this point.  17 I know I'm working with Stillwater Mining Company and  18 actually in a couple of other sites, as well, as part of  19 the design process to basically bring it up to a  20 70 percent design with all the things I'm -- that we're  21 describing as part of the application package.  22 So at least in the cases where I'm working,  23 where we are dealing with tailing storage facilities,  24 the level of design reviewing at this point in the  25 application package would be consistent with that, with</p>
<p style="text-align: right;">1088</p> <p>1 You know, first, I want to express that I  2 think it's a really good thing that the company got  3 Golder on board. Golder knows what they're doing.  4 Golder is an international consulting firm. I actually  5 worked with Golder, one of their engineers, on their  6 redesign of the Mount Polley tailings.  7 So just speaking briefly of some of my  8 experience working with tailings storage facilities, at  9 the Mount Polley facility I was brought on as the tribal  10 liaison to the independent review panel, but in addition  11 to that capacity, I also represented them as one of  12 three engineers who worked together on the redesign of  13 the facility so that the remaining 50 percent or so of  14 tailings in the facility wouldn't wash out at the next  15 storm event. So I essentially was part of the  16 mitigation design team.  17 In doing all this work, there are certain  18 things we've learned. And I was with a Golder employee  19 as a lead engineer. So again they know what happened at  20 Mount Polley, they're very aware of what happened at the  21 Fundao Dam. And I believe they're committed, and  22 Mr. Kidd will be committed to making the likelihood of a  23 catastrophic tailing storage facility failure not just  24 unlikely, but what I would term as very likely.  25 Even if he does, that doesn't mean it can't</p>	<p style="text-align: right;">1090</p> <p>1 what the OSE is going to require in the future as they  2 proceed.  3 So again I would just point out that -- and I  4 think this process could have benefitted by the company  5 having proceeded with the OSE design already and having  6 submitted that level of design to us. Certainly we'd  7 recommend that that's what we tried to get in the future  8 in such cases.  9 The second bullet, and this is again slide 56,  10 we need to perform an inundation analysis. Because  11 again even though I believe strongly that we can design  12 this to make that failure very unlikely, and that's a  13 pretty -- pretty good place to be, we can't say it won't  14 happen at the risk of, you know, suggesting -- I'm  15 quoting Donald Rumsfeld, we don't know what we don't  16 know. And that's actually what engineers in particular  17 have to recognize.  18 So that's why, as he suggested, and the State  19 Engineer requires, and I believe as engineer of record  20 he would do this anyway, do an inundation analysis.  21 That inundation analysis I expect will be done both for  22 a worst case, for example, storm event, et cetera, but  23 also, very importantly, for what we call a blue sky  24 event. That's basically a day when the earth doesn't  25 quake, storms don't roll, but the tailings just for some</p>

<p style="text-align: right;">1091</p> <p>1 reason go. It's actually part of the guidance that  2 those of us who do this work use.  3 We need to revise the hazard potential  4 classification if warranted. It is important that it be  5 based upon the hazard it represents.  6 I would mention that I have some concerns with  7 the New Mexico OSE's classifications. If you look at  8 the classifications recommended by the Canadian Dam  9 Association -- and that's the reference most of us doing  10 this work use -- it would suggest there actually need to  11 be five classifications instead of three, and has, I  12 think, better specificity between those classifications.  13 So that's certainly something that should be considered  14 by the applicant.  15 And then we need to develop a robust Emergency  16 Action Plan. Mr. Kidd mentioned these plans, and I  17 actually have been participating over the last two years  18 in some of the first actual planned exercises conducted  19 with county and state agency officials in the country.  20 And it's a real interesting process when you take these  21 plans and you sit down with a group of people that in  22 the unlikely event the tailings failed would need to  23 respond.  24 It's a good exercise. It gives you a real  25 sense after you've done it. At least in the cases that</p>	<p style="text-align: right;">1093</p> <p>1 in a sensitivity analysis.  2 We've seen the faults that occur here due to  3 the Rio Grande Rift. We have a sense of the age of  4 those, the impacts of those, but I don't think we can  5 have absolute confidence in that. The approach that we  6 generally use that I've heard that is to either do a one  7 in 10,000 year earthquake or what we call a maximum  8 credible earthquake, or MCE.  9 Essentially the idea of the MCE is to look at  10 the geologic record and establish essentially what was  11 the maximum we have seen and apply that going forward so  12 we're not guessing as to the intervals. Because again  13 what we started to recognize is the science that we're  14 using to estimate these earthquakes, it's not  15 necessarily 100 percent accurate or dependable.  16 So as a precautionary measure, it's something  17 that tailings facilities that I'm working on, the  18 engineers either use this as a design specification, or  19 at the very least they apply the maximum credible  20 earthquake. And really what we're doing is this isn't  21 talking about the seismic magnitude so much as what is  22 the acceleration, what is the ground movement for  23 gravity going to be.  24 So that's what we're trying to estimate here,  25 and then we apply that to our stability calculations.</p>
<p style="text-align: right;">1092</p> <p>1 I've been involved, that these are professional people,  2 they know what to do, and they're going to do the best  3 what they could do to make sure that if it does happen,  4 the least damage, particularly loss of life occurs.  5 And then, finally, we've got to share this  6 information with the public. This isn't something we  7 want to sit here and wrap up as engineers, wrap up as  8 regulators. We listened to persons testimony -- persons  9 testify one after another, their concern about this.  10 They should be concerned about it.  11 But if we do all this right, if we produce  12 this information, we conduct the type of failure modes  13 effects analysis I'm talking about, these also serve as  14 incredibly good information to go then sit down and talk  15 with the public and help them to understand and convey  16 to them why it is we have the confidence we do once we  17 get to that point. But we need to get to that point  18 first.  19 One thing that I mention in my comments on  20 this, in my written comments, was a recommendation for a  21 maximum credible earthquake. I believe Mr. Kidd might  22 have a response to that. But I'm not necessarily  23 suggesting that that be the design basis. The OSE  24 requirements perhaps would be the design basis, but I do  25 believe that at the very least that has to be included</p>	<p style="text-align: right;">1094</p> <p>1 And it's just a way of saying, okay, even though we  2 don't think we'll have a big earthquake, we do see  3 somewhere in the record that we had this big earthquake,  4 let's apply it to the stability, and let's see what  5 happens.  6 And at least in my experience, something that  7 passes a one in 5,000-year event has a good chance of  8 also being able to stand a 1 in 10,000 or MCE. Let's  9 analyze that, and let's let the public know what the  10 results are. Ideally results say, hey, even in a worst  11 case, even in an MCE, the dam will still be stable.  12 That would be the result that I would like to see, that  13 then allows us to say this is a very unlikely  14 probability of tailings failure.  15 Now, we've heard a lot of testimony, I think,  16 about 80-mil liners, seepage and quality  17 assurance/quality control.  18 State of Montana, where I do the majority of  19 my work, we've had experience with this over the years.  20 The state has, similar to the Copper Rule, put together  21 essentially QA/QC program. In fact, I'm quite certain  22 that the State of Montana's guidance was part of what we  23 used in developing the Copper Rule.  24 Those that aren't aware, the Copper Rule  25 really contains the best of the best -- that was the</p>

<p style="text-align: right;">1095</p> <p>1 idea -- of places like Montana, Nevada, Alaska, other  2 places we looked to to help us put this together.  3 The Copper Rule does not specify a thickness  4 of liner. It says that's something the engineer needs  5 to do.  6 I just want to make a suggestion to folks that  7 we need to look at 100- to 120-mil liner as an option.  8 In my experience in working with the manufacturers and  9 the installers, they have suggested that if we can use  10 100-mil in particular, that it allows us to have better  11 confidence both from not having defects, but also, very  12 importantly, allows for better seaming, using heat  13 seaming, other welding methods.  14 Sorry.  15 And it's just something that again is a design  16 feature. If we could build a little more robustness  17 into this, provide some additional assurance that it  18 won't leak, that's always better. And the cost  19 typically is not too much greater. And this is the kind  20 of thing that we really, you know, based on experience,  21 I think -- at least my recommendation would be that they  22 seriously consider a thicker liner.  23 The mention that the New Mexico Office of  24 State Engineer. I agree with Mr. Kidd's  25 characterization.</p>	<p style="text-align: right;">1097</p> <p>1 worked for years as the operator of tailings storage  2 facilities. We didn't have that. The engineer built  3 it. He and I might meet for an afternoon before they  4 left the site. That was it. Next time I talked to the  5 engineer of record literally is when I needed to build  6 an expansion to the tailings impoundment.  7 As a result, I didn't understand what I was  8 supposed to do as an operator to ensure the stability of  9 my tailings storage facility.  10 Now, the reality is there were no failures  11 that was post grandpa, but the idea is that we should  12 have had that information. And again it was a critical  13 aspect of what happened in some regards at the Mount  14 Polley and Fundao failures. So again very important.  15 A final recommendation to the company -- and  16 again this is intended to give confidence to the  17 Environment Department, Mining and Minerals Division and  18 the public. We should create an independent review  19 panel. That's part of the Mount Polley recommendations.  20 It's also part of the Montana legislation to do that.  21 And in doing that -- this is typically an  22 independent review panel of what I would consider  23 world-renowned experts if you can get them, and they  24 would basically review the engineer of record's work and  25 provide him recommendations and inputs as to his design.</p>
<p style="text-align: right;">1096</p> <p>1 I've actually had occasion on behalf of USEPA  2 to in detail evaluate the regulations of all of the  3 states in the United States which have mining tailing  4 storage facilities. And in reviewing that, one of the  5 states that I actually used in the -- in a four-state  6 table -- actually it's not four states. The table is  7 Mount Polley, British Columbia, Montana, and the fourth  8 state is New Mexico.  9 And I use that to show that New Mexico really  10 outside of British Columbia and Montana has in terms of  11 existing regulations close to where it would be today.  12 But as anybody who is familiar with the recommendations  13 of the Mining Association of Canada and the Canadian Dam  14 Association, we're still not quite there.  15 And so it's very important that in addition to  16 the OSE guidance we look at the -- what we call the MACT  17 guidance, Mining Association of Canada guidance, and the  18 CDA, or Canadian Dam Association, guidance. At least in  19 the northern hemisphere, these are the two primary  20 references that are typically used in putting together  21 the mines, the operations and maintenance manuals, he  22 mentioned the TOMS -- I call it the TOMS, tailings  23 operations, maintenance -- excuse me -- tailings  24 operations, maintenance and surveillance program.  25 And that's a key document. I mentioned that I</p>	<p style="text-align: right;">1098</p> <p>1 And this is a very effective process.  2 Stillwater Mining, we actually have a  3 three-person independent review panel, one of whom is  4 Dirk Van Zyl. Dirk Van Zyl was one of the members of  5 the Mount Polley independent and expert review panel. A  6 number of other people who we respect. I worked with  7 that panel.  8 And my recommendation would be if the company  9 were to set up such panel that they consider allowing  10 the public interest community to actually nominate one  11 of those people. And that wouldn't -- I wouldn't  12 recommend be me, quite honestly. What I would look for  13 is to recommend somebody who basically is the highest  14 caliber level we could possibly get.  15 Because again I believe somebody who has been  16 doing this, for example, for 50 years -- I've only been  17 doing it for 35 -- is the best opportunity for all of us  18 to make sure their experience and knowledge helps us  19 ensure that this dam will not catastrophically fail.  20 So the last three comments I have go to the  21 Reclamation and Closure Plan that was presented,  22 essentially the Closure/Closeout Plan that the  23 Environment Department and Mining and Minerals Division  24 need. There were a couple aspects of it that I think we  25 need to address.</p>

1099	<p>1 The first is the current storm event design</p> <p>2 practice relevant to anthropogenic, or manmade, climate</p> <p>3 change.</p> <p>4 When we look at what's happening, it's</p> <p>5 undeniable, at least for those of us that work out on</p> <p>6 these sites, that we are seeing storm events</p> <p>7 consistently above what is being predicted.</p> <p>8 Zortman-Landusky Mine in Montana is probably</p> <p>9 the prime example. Since the mining company went</p> <p>10 bankrupt in 1998, there have been seven storm events</p> <p>11 which exceeded the projected 100-year periodicity.</p> <p>12 You go to mine sites throughout the country,</p> <p>13 and you find this happening, and what we see is damage</p> <p>14 to the infrastructure and other things being done. The</p> <p>15 majority of the design engineers that I've worked with,</p> <p>16 folks with Knight Piesold, Golder in Canada, elsewhere,</p> <p>17 their design recommendations have consistently been, to</p> <p>18 my knowledge, to their clients 200-year storm events</p> <p>19 should be -- should be applied because of the kind of</p> <p>20 climate situation we're in today.</p> <p>21 Now, again that's in the interest of simply</p> <p>22 preserving the capital vestment of the company. That's</p> <p>23 a -- that's a very rational recommendation. That same</p> <p>24 recommendation is an example of what we did with the</p> <p>25 Copper Rule and where a permit by rule can be flawed, is</p>	1101	<p>1 really hope that New Mexico would pick up on this</p> <p>2 soon -- is they have in the interim gone ahead and</p> <p>3 convened workshops of the knowledgeable people in the</p> <p>4 state and brought in people nationally and developed</p> <p>5 interim guidance for extreme storm events and put that</p> <p>6 in place in lieu of NOAA doing their revisions.</p> <p>7 What we've seen at least in the case of</p> <p>8 Montana is a 100-year storm event typically went up by</p> <p>9 about 25 percent, not greatly, but significantly. The</p> <p>10 200-year storm events and 500-year storm events went up</p> <p>11 similarly. But where it's very important actually is in</p> <p>12 terms of what we call the probable maximum flood, or</p> <p>13 probable maximum precipitation, those estimates</p> <p>14 typically doubled.</p> <p>15 And that's what we're learning from these</p> <p>16 extreme storm events, is that there is -- there is very</p> <p>17 significant increases.</p> <p>18 So again current practice, I call it the best</p> <p>19 practice -- certainly I'm not going to suggest everybody</p> <p>20 is doing it, but I'd suggest those that are trying to</p> <p>21 stay ahead of things going wrong are -- is to in their</p> <p>22 designs incorporate greater than just the regulatory</p> <p>23 standard.</p> <p>24 A very important aspect that we heard was with</p> <p>25 respect to Grayback Arroyo dyke breach. Now, we</p>
1100	<p>1 we said in the Copper Rule 100-year. I can tell you we</p> <p>2 argued about that at the time of the Copper Rule. I</p> <p>3 argued for a 200- or 500-year. I can tell you today I</p> <p>4 would argue even more strongly for that.</p> <p>5 And there are jurisdictions that are beginning</p> <p>6 to require that, particularly Canada, but we're</p> <p>7 beginning to see that in the US. And what I have seen</p> <p>8 is many cases where the design engineer has sat down</p> <p>9 with the owner and said, "Yeah, they only require 100.</p> <p>10 We're submitting a design for 200 years." That's the</p> <p>11 Knight Piesold design for the Stillwater mines, and</p> <p>12 they're a lot less of concern than this mine is.</p> <p>13 So again I think it's very important we do</p> <p>14 that.</p> <p>15 And -- yeah. I also wanted to mention that in</p> <p>16 Montana -- and again a number of states have done this,</p> <p>17 that actually put together extreme storm event</p> <p>18 workshops, knowing that it will take the National</p> <p>19 Oceanic -- NOAA, the agency that actually does all this</p> <p>20 work -- it will probably take them another 10, 20 years</p> <p>21 to revise their standards. And particularly with the</p> <p>22 present administration, quite frankly, they may never</p> <p>23 revise those standards even though the evidence is</p> <p>24 preponderous.</p> <p>25 So what many states have done -- and I would</p>	1102	<p>1 heard -- I believe Mr. Stein testified that the Grayback</p> <p>2 Arroyo dyke breach -- he basically said it wasn't</p> <p>3 possible in the event of a storm event, suggested that</p> <p>4 because a 500-year event analysis had been performed, I</p> <p>5 believe in his opinion, he expressed it may not be</p> <p>6 possible.</p> <p>7 Now, a couple of different things on here.</p> <p>8 One, I have called out previously the</p> <p>9 Reclamation and Closure Plan contains no provisions for</p> <p>10 monitoring or maintenance. When you look at the</p> <p>11 Grayback Arroyo dyke breach -- or dyke itself, I should</p> <p>12 say, and you consider how it's shaped around the mine</p> <p>13 site and how the inputs come in from arroyo, from the</p> <p>14 Grayback Arroyo, that bypass is very likely going to</p> <p>15 sand in or sediment up. It also could simply be over</p> <p>16 time a compromise by continually having storm events</p> <p>17 come up against it.</p> <p>18 So this is the kind of thing where, you know,</p> <p>19 it may be able to maintain it indefinitely, but without</p> <p>20 a monitoring and maintenance plan and the dollars to do</p> <p>21 that, because the company is not going to be around</p> <p>22 forever, I believe, in my opinion, that there's not only</p> <p>23 a likelihood, but I believe a high probability that over</p> <p>24 time the Grayback Arroyo dyke will erode or otherwise be</p> <p>25 compromised and will end up with surface water from</p>

<p style="text-align: right;">1103</p> <p>1 outside the mine area going into the open pit.  2 And, you know, again it's something where all  3 of us in -- as engineers know that nature -- it's why it  4 put it there. Well, nature is going to want to put it  5 right back there sometime in the future, particularly if  6 we don't maintain that artificially manmade construct  7 that's intended to take it around.  8 Q. Mr. Kuipers, if I could ask you to elaborate  9 on one point there.  10 The point that you're making is that Mr. Stein  11 was referring to a single 500-year storm event, and are  12 you referring to multiple storm events over a short  13 period of time?  14 A. It could be multiple storm events over a short  15 period of time or a long period of time. And again the  16 principle with the idea of maintenance is all of these  17 storm events, even a 10-year event, causes some erosion,  18 gets us to a point where it's eating away at it.  19 Now, certainly repetitive, larger events or  20 one great big event could do the same thing. You know,  21 we could see something significantly greater than a  22 500-year storm event.  23 I would note that Silver City, New Mexico just  24 about a month ago, day after I left from a meeting  25 there, they had what the city has characterized as a</p>	<p style="text-align: right;">1105</p> <p>1 I -- apparently he's not aware of the CERCLA  2 site action. The Bingham Canyon Mine has been a  3 Superfund site for many, many years now. And it is  4 actually noted throughout the world as the site that  5 demonstrated to many of us how finger flow works.  6 So I described previously how Darcy's law,  7 which assumes homogeneity with the materials and more or  8 less even flow throughout. That's an ideal approach.  9 But what happens is you get what we call preferential  10 pathways. Everything is not totally the same and mixed  11 up perfectly.  12 Well, at Bingham Canyon, they have very large  13 waste rock dumps up against the Oquirrh Mountains.  14 These are huge waste rock dumps. Those same waste rocks  15 dumps, it turns out, have been seeping acid rock  16 drainage since their inception, and ultimately there are  17 groundwater flow paths exceeding more than 10 miles -- I  18 believe some are as far as 16 miles -- from the mine  19 site, down into the Salt Lake Valley.  20 And under the CERCLA action, I believe the  21 most extensive groundwater pump and treat system that  22 I'm aware of anywhere for mining purposes has been  23 installed, and it's operating and is expected to operate  24 indefinitely.  25 So Bingham Canyon, just as the other mines</p>
<p style="text-align: right;">1104</p> <p>1 storm event in excess of 500 years, and it blew out a  2 whole bunch of city infrastructure. It made the  3 headlines because the city had built their  4 infrastructure for much smaller storm events.  5 So yeah. These are what we refer to in the  6 engineering business as critical structures. This is a  7 structure that at the least has to be built, quite  8 honestly, to withstand a 500-year event, but that's for  9 during operations. If it's supposed to sit there and  10 keep water out of this pit indefinitely, then without  11 monitoring and maintenance, I simply don't believe  12 that's possible.  13 So the last rebuttal point I'd like to make is  14 just with respect to the Bingham Canyon Mine.  15 Those of you that aren't familiar with the  16 Bingham Canyon mine, it's a very large, very old,  17 significant mine in Utah, well over a 100-year mining  18 history, one of the, you know, large -- the 10 or so  19 mines here in the US that produce copper. They're  20 almost done producing copper, and they're actually going  21 to go to producing molybdenum underneath the mine soon.  22 But apparently Mr. Stein -- I believe he  23 testified that Bingham Canyon was an example of a mine,  24 to his knowledge, that did not have any groundwater or  25 surface water long-term treatment requirements.</p>	<p style="text-align: right;">1106</p> <p>1 that we're talking about -- they do, in fact, have  2 long-term perpetuity requirements.  3 Thank you.  4 I believe that concludes my rebuttal.  5 Q. Thank you, Mr. Kuipers.  6 Just a couple of follow-up questions here.  7 The two photographs that you included in your  8 presentation, could you tell me what the sources are for  9 those photographs?  10 A. Yes. The first photograph was done by  11 Mr. Fritz Daly. Fritz, for folks who don't -- well, I  12 wouldn't think folks here would know, but if you lived  13 in Montana, you'd know. Fritz was the mayor of  14 Walkerville, Montana, which is a little town above  15 Butte.  16 Fritz has actually been a local activist, if  17 you will, to make sure we get this pit cleaned up and  18 other things. Fritz is a friend of mine, I know him  19 very well, and I have Fritz' permission to use any and  20 all of his photos at any time. So he was the source of  21 this particular photo. And again he's the mayor of  22 Walkerville, Montana.  23 And in -- this photo actually is a file photo  24 from one of the newspapers in Utah, the Deseret News,  25 that I obtained this from.</p>

1107	<p>1 Q. And when you say this photo, you're talking</p> <p>2 about the Kennecott Utah Copper Company Bingham Canyon</p> <p>3 photograph.</p> <p>4 A. Shown on slide 58. Correct.</p> <p>5 Q. Okay.</p> <p>6 And you're familiar with the events that you</p> <p>7 described with reference to these photographs?</p> <p>8 A. Yes. I have a very high degree of familiarity</p> <p>9 with the Berkeley Pit sloughing that occurred as I work</p> <p>10 with a number of organizations and groups on that</p> <p>11 Superfund site. I have since studied the reports that</p> <p>12 have been issued for this particular slide to gain a</p> <p>13 better understanding of the mechanisms of what caused it</p> <p>14 and applied that to my knowledge.</p> <p>15 Q. Okay.</p> <p>16 And again when you say this slide, you're</p> <p>17 referring to the --</p> <p>18 A. Slide 58.</p> <p>19 Q. Right. Okay.</p> <p>20 Madam Hearing Officer, I'd like to move for</p> <p>21 the admission of Ranches Exhibit Number 43.</p> <p>22 MS. ORTH: Objections?</p> <p>23 MR. BUTZIER: No objection.</p> <p>24 MS. BARNCASTLE: No objection.</p> <p>25 MR. KNIGHT: No objection.</p>	1109	<p>1 long-term geomorphic conditions and the possibility of</p> <p>2 sloughing and used these as examples of that, correct?</p> <p>3 A. Correct.</p> <p>4 Q. What can you tell me about the difference of</p> <p>5 the geology between the Berkeley Pit, the Bingham Canyon</p> <p>6 mine and the Copper Flat andesite/monzonite quartzite</p> <p>7 environment?</p> <p>8 A. Sure. And you -- I might recall folks' memory</p> <p>9 to a graphic that I believe was shared during</p> <p>10 Dr. Griffiths' testimony showing some of the</p> <p>11 concentrations of the constituents at these mines.</p> <p>12 As that graphic indicated, the Berkeley Pit is</p> <p>13 very reactive in terms of the geology or geochemistry.</p> <p>14 It's a porphyry copper deposit, high-sulfide deposit.</p> <p>15 And in comparison to the Copper Flat, while Copper Flat</p> <p>16 in reading the literature has perhaps some</p> <p>17 characteristics of copper porphyry, its characteristics</p> <p>18 are really that of a copper breccia mine more so.</p> <p>19 And so, in fact, as has been described, the</p> <p>20 Berkeley Pit is a much more reactive geology, more</p> <p>21 likely to result in geochemical changes. I would also</p> <p>22 grant that it has a higher potential, for example, for</p> <p>23 degradation of pit walls; however, again we see these</p> <p>24 same features to varying degrees at all mine sites, not</p> <p>25 just at this mine site, due to its highly reactive</p>
1108	<p>1 MS. ORTH: All right. Exhibit 43 is admitted.</p> <p>2 (Exhibits Ranches 43 admitted into evidence.)</p> <p>3 MR. DE SAILLAN: Thank you, Mr. Kuipers.</p> <p>4 I have no further questions.</p> <p>5 Thank you, Madam Hearing Officer.</p> <p>6 MS. ORTH: Thank you, Mr. de Saillan and</p> <p>7 Mr. Kuipers.</p> <p>8 Shall we take a short break before</p> <p>9 cross-examination?</p> <p>10 All right. Let's take about 10 minutes.</p> <p>11 (Proceedings in recess from 11:05 a.m. to</p> <p>12 11:18 a.m.)</p> <p>13 MS. ORTH: We are back after a break.</p> <p>14 Mr. Butzier, do you have any questions of</p> <p>15 Mr. Kuipers?</p> <p>16 MR. BUTZIER: I do, Madam Hearing Officer.</p> <p>17 Thank you.</p> <p>18 CROSS EXAMINATION</p> <p>19 BY MR. BUTZIER:</p> <p>20 Q. Could you please pull up the slides that show</p> <p>21 the Berkeley Pit and the Bingham Canyon mine?</p> <p>22 A. Yes. That's slide 57 and slide 58.</p> <p>23 Q. And those are Ranches Exhibit 43, correct?</p> <p>24 A. Correct.</p> <p>25 Q. What can you tell me -- you addressed the</p>	1110	<p>1 geology.</p> <p>2 Speaking of the Bingham Canyon, Bingham Canyon</p> <p>3 is similar to the Butte deposit, a copper porphyry</p> <p>4 deposit, and similar to Butte it has very similar</p> <p>5 geochemical characteristics. I do not believe it is</p> <p>6 quite as reactive as Butte in terms of geology, but it</p> <p>7 is, in fact -- if you will, it has a lot of sulfide</p> <p>8 ores, there's a lot of gouge or clay and a lot of other</p> <p>9 things that go on with this similar to Butte, which is</p> <p>10 part of what makes it susceptible to massive failures</p> <p>11 like this.</p> <p>12 And I would point out that -- again I'm not --</p> <p>13 I apologize for not having taken the time to provide --</p> <p>14 I can provide another 20 slides basically showing the</p> <p>15 degree to which this happens all through these. These</p> <p>16 are more dramatic just mainly because -- I used the more</p> <p>17 dramatic examples because your witnesses suggested that</p> <p>18 this was something that might not happen.</p> <p>19 So again my point would be that I don't expect</p> <p>20 the same massive type degree of failures as we certainly</p> <p>21 would see in Bingham Canyon. I do think in a similar</p> <p>22 context, though, to Butte, particularly as the water</p> <p>23 rises, there's that potential for some sloughing to</p> <p>24 occur. Again sloughing is not a huge massive failure,</p> <p>25 but something that just simply starts to occur with</p>

1111	<p>1 these pits over time.</p> <p>2 Q. So as I understand your answer, you were --</p> <p>3 you were really assuming my question kind of had two</p> <p>4 components to it, one related to the acidic nature of</p> <p>5 the Berkeley Pit water, and the other relating to the</p> <p>6 susceptibility to sloughing of the -- of the walls of</p> <p>7 the pits in those instances; is that correct?</p> <p>8 A. That's correct. I may have tried to answer</p> <p>9 two things instead of one, not understanding --</p> <p>10 Q. You answered more than I asked, but it was</p> <p>11 helpful because I understood your answer to be that the</p> <p>12 Copper Flat pit lake, unlike the Berkeley Pit example</p> <p>13 that is often dredged up as an example of a real problem</p> <p>14 at an operation -- the Copper Flat pit lake is not</p> <p>15 expected to become an acidic lake like we have at the</p> <p>16 Berkeley Pit in Butte, Montana.</p> <p>17 A. I would agree with that characterization.</p> <p>18 Q. All right.</p> <p>19 And are you aware of -- are you aware of</p> <p>20 whether there is -- are you -- do you understand the</p> <p>21 term "argillic alteration zone"?</p> <p>22 A. Yes, I do.</p> <p>23 Q. And can you describe what that is?</p> <p>24 A. Essentially when we talk about an argillic</p> <p>25 alteration zone, what we're referring to is</p>	1113	<p>1 in particular I'm referring to what's renumbered C117,</p> <p>2 Financial Assurance.</p> <p>3 And the paragraph I'm going to read is A. And</p> <p>4 I'd like you to just listen to that paragraph and then</p> <p>5 ask you whether in your view that complies with the</p> <p>6 Copper Rule as it -- as it came out after the process</p> <p>7 that you were involved in.</p> <p>8 The paragraph reads "The permittee shall</p> <p>9 maintain joint financial assurance with NMED and the</p> <p>10 Mining and Minerals Division of the New Mexico Energy,</p> <p>11 Minerals and Natural Resources Department to cover costs</p> <p>12 associated with closure and post-closure activities</p> <p>13 approved under this Discharge Permit."</p> <p>14 In your opinion, is that -- is that consistent</p> <p>15 with the Copper Rule?</p> <p>16 A. I believe it is.</p> <p>17 Q. And I think you've also acknowledged that</p> <p>18 there's a process ongoing to include not only NMED and</p> <p>19 the New Mexico Energy, Minerals and Natural Resources</p> <p>20 Department, but also the Bureau of Land Management; is</p> <p>21 that correct?</p> <p>22 A. Yes. That's my expectation.</p> <p>23 Q. And you understand that to be an ongoing</p> <p>24 process that will likely be farther advanced in time for</p> <p>25 the hearing that is already scheduled involving the</p>
1112	<p>1 solidification of the deposit. Argillites are</p> <p>2 essentially harder, silicified materials that can</p> <p>3 exhibit different characteristics.</p> <p>4 Q. And is that a condition or a situation that</p> <p>5 was present at -- either at the Berkeley Pit walls or</p> <p>6 the Bingham Canyon walls?</p> <p>7 A. As a dominant feature, no. I couldn't speak</p> <p>8 as to whether it might have been small amounts, but</p> <p>9 certainly, you know, that -- to my knowledge, that was</p> <p>10 not part of the areas in particular that these slumps</p> <p>11 that I'm showing occurred in.</p> <p>12 Q. And you're --</p> <p>13 A. So when I --</p> <p>14 Q. I assume you're also aware that that's not a</p> <p>15 part of the conditions that would be expected to be</p> <p>16 present at the Copper Flat pit walls.</p> <p>17 A. Yes. Again my testimony is that a similar</p> <p>18 occurrence, but not the same type of occurrence. I</p> <p>19 would not expect it to be as severe as we're showing on</p> <p>20 these photographs.</p> <p>21 Q. Thank you.</p> <p>22 I'd like to read a provision of DP-1840. I</p> <p>23 think it's from the August version that was attached to</p> <p>24 the statement of intent to present technical testimony</p> <p>25 offered by the New Mexico Environment Department. And</p>	1114	<p>1 Mining and Minerals Division in the latter part of</p> <p>2 October?</p> <p>3 A. I was not aware of that, and I would just</p> <p>4 mention that in similar circumstances there have been</p> <p>5 invitations to the public to attend such meetings so</p> <p>6 that we can provide comment and not have to wait for a</p> <p>7 hearing. Such an invitation has not been extended in</p> <p>8 this case.</p> <p>9 Q. So although your --</p> <p>10 A. To my knowledge.</p> <p>11 Q. Although your presentation regarding financial</p> <p>12 assurance, I'm sure, was very helpful and useful for</p> <p>13 people to hear, it's not something that necessarily</p> <p>14 needs to hold up the issuance of DP-1840 given the</p> <p>15 compliance with the Copper Rule in Section C117A,</p> <p>16 correct?</p> <p>17 A. No. I don't agree. I -- my personal opinion</p> <p>18 is that particularly given the nature of the financial</p> <p>19 assurance estimate, the fact that it has obvious</p> <p>20 deficiencies with respect to, you know, Environment</p> <p>21 Department issues, for example, I would advise the</p> <p>22 Environment Department to not get -- if they intend to</p> <p>23 grant a permit, because that's really the only leverage</p> <p>24 they're going to have, to negotiate and end up getting</p> <p>25 the right amount.</p>



1115	<p>1 And so to do so, I believe would be a mistake</p> <p>2 in giving up their leverage to conduct an effective</p> <p>3 negotiation.</p> <p>4 Q. Now, Mr. Kuipers, was the Copper Rule-making</p> <p>5 process that you participated in one that was mandated</p> <p>6 by a 2009 amendment to the Water Quality Act?</p> <p>7 A. That's my understanding.</p> <p>8 Q. And that change, at least for the copper</p> <p>9 industry, changed the groundwater program from a regime</p> <p>10 where the Water Quality Control Commission could not</p> <p>11 specify methods of preventing pollution to one where the</p> <p>12 Water Quality Control Commission shall specify methods</p> <p>13 of preventing water pollution from mining operations; is</p> <p>14 that correct?</p> <p>15 A. I would -- I would actually have to read that.</p> <p>16 I'm --</p> <p>17 Q. Okay.</p> <p>18 A. I can't say that I'm that familiar with it.</p> <p>19 Q. But you testified that you did participate in</p> <p>20 the stakeholder process, correct?</p> <p>21 A. Yes. And if I might describe something</p> <p>22 relevant to that, but that's very relevant to this</p> <p>23 discussion.</p> <p>24 The original stakeholder process, we put</p> <p>25 together a financial assurance set of regulations for</p>	1117	<p>1 New Mexico, apparently, we now need to wait for the</p> <p>2 Mining and Minerals Division to do their work under</p> <p>3 their regulations for the Environment Department to have</p> <p>4 any confidence whatsoever that this has been addressed.</p> <p>5 Q. I think inherent in your answer is that you're</p> <p>6 acknowledging that there are no financial assurance</p> <p>7 specific requirements that are tied to the Copper Rule</p> <p>8 as a result of the circumstances as you understand them.</p> <p>9 A. That's right. Despite the fact that we</p> <p>10 developed very thorough, very competent financial</p> <p>11 assurance regulations, in fact, the Environment</p> <p>12 Department has no such regulations today.</p> <p>13 Q. And you heard the testimony from one or more</p> <p>14 of the NMED witnesses that the ongoing process to</p> <p>15 negotiate financial assurance for the Copper Flat</p> <p>16 project is one in which essentially the Mining and</p> <p>17 Minerals Division takes the lead, although NMED takes a</p> <p>18 careful look at the financial assurance before signing</p> <p>19 off on it.</p> <p>20 A. I should mention, Mr. Butzier, I'm involved in</p> <p>21 the financial assurance discussions and have been</p> <p>22 involved intimately in the financial assurance</p> <p>23 discussions for the Questa Mine, the Chino Mine, the</p> <p>24 Tyrone Mine, the Continental/Cobre Mine, and I sit in on</p> <p>25 the meetings with the company and the agency, and I'm</p>
1116	<p>1 the Copper Rule. We, in fact, have those financial</p> <p>2 assurance regulations for the Environment Department, in</p> <p>3 my opinion, finalized and ready to go.</p> <p>4 Folks who work with the Environment Department</p> <p>5 are quite aware that they initially did put together a</p> <p>6 draft financial assurance guidance, I believe, clear</p> <p>7 back in the 1990s, at some point, and that had never</p> <p>8 been revised.</p> <p>9 It was our understanding initially starting</p> <p>10 the Copper Rule to avoid this issue that we're talking</p> <p>11 about, of making sure that under the Copper Rule we</p> <p>12 would address financial assurance. We originally had</p> <p>13 proposed and had again developed complete financial</p> <p>14 assurance.</p> <p>15 What happened, bluntly, was the Mining and</p> <p>16 Minerals Division showed up with their attorney and,</p> <p>17 from what I could see, basically informed all of us that</p> <p>18 they were the financial assurance authority and that</p> <p>19 they basically told them, ED, not to develop the</p> <p>20 financial assurance regulations.</p> <p>21 So if the Environment Department had, in fact,</p> <p>22 developed their own regulations, it would make sense to</p> <p>23 go ahead and use those regulations to finalize the</p> <p>24 financial assurance as part of this permitting process.</p> <p>25 But in fact, because of that decision by the State of</p>	1118	<p>1 extremely familiar with MMD's process and the</p> <p>2 negotiations and ED's role in those processes, as well.</p> <p>3 Q. Thank you.</p> <p>4 I'd like to go back to one of your slides that</p> <p>5 was part of your rebuttal that's not a picture but text.</p> <p>6 Let's go to the first of -- it must be 55.</p> <p>7 Okay.</p> <p>8 All right. Can we go back to the last slide</p> <p>9 of your direct presentation. I think that might be the</p> <p>10 one I'm thinking of.</p> <p>11 A. Slide 54?</p> <p>12 Q. Yes. Thank you.</p> <p>13 Now, this slide I think you testified was sort</p> <p>14 of comparing the Copper Flat's financial assurance cost</p> <p>15 estimate with New Mexico Mining and Minerals Division</p> <p>16 guidance and Bureau of Land Management guidance,</p> <p>17 correct?</p> <p>18 A. Yes. Slide 54, what you're -- what it refers</p> <p>19 to is actually indirect cost estimate --</p> <p>20 Q. Okay.</p> <p>21 A. -- more specifically.</p> <p>22 Q. More specifically. Thank you.</p> <p>23 And you pointed out on this slide that the</p> <p>24 total indirect cost percentage in the Copper Flat</p> <p>25 proposal was 26 as compared to 46 percent under the</p>

1119	<p>1 NMED -- MMD guidance and 32 percent under the BLM                  2 guidance, correct?                  3 A. That's correct.                  4 Q. And both the MMD guidance and the BLM guidance                  5 are just that, they're guidance; is that correct?                  6 They're not actual regulations.                  7 A. The -- I believe that's correct in both cases.                  8 Yes.                  9 Q. And were you aware that the Mining and                  10 Minerals Division guidance is only a draft guidance,                  11 it's not even a guidance, it's a draft guidance at this                  12 point?                  13 A. Mr. Butzier, I clearly testified to that                  14 previously, that I recognized, in fact, it was a draft                  15 guidance.                  16 Q. Okay. I apologize if I missed that. I just                  17 wanted to emphasize that.                  18 So as part of the stakeholder process that you                  19 were -- you participated in and in the development of                  20 the Copper Rule, much of what was involved in that was                  21 an intention to draw upon the experiences, both good and                  22 bad, from decades of open pit copper mining activity in                  23 the New Mexico -- in New Mexico as well as other parts,                  24 correct?                  25 A. That's correct. And I just would expand a bit</p>	1121	<p>1 A. Again I think the decision was made that --                  2 again consistent with recommendations that some aspects                  3 belonged in the rule and some were better left to                  4 guidance, as -- and many of these things, I might                  5 mention, more importantly, this is what industry and the                  6 folks in industry who are trying to address these issues                  7 have recommended that industry, in fact, incorporate.                  8 And so my real hope would be that the agencies                  9 would not need to, in fact, put this kind of information                  10 in regulation, but rather a good, responsible,                  11 progressive mine operator would go ahead on their own                  12 and ensure this was already the fact.                  13 Q. Now, in your participation in the Copper                  14 Rule-making and the working groups leading up to the                  15 rulemaking, your participation included many of the same                  16 sort of parade of mishaps, unfortunate mishaps that                  17 you've described in your testimony in this proceeding,                  18 correct?                  19 A. I absolutely don't recall having done that.                  20 If anything, my parade was to bring in other examples of                  21 regulations and policy from other jurisdictions given                  22 the fact that I work in so many jurisdictions, both in                  23 the US as well as Canada.                  24 Q. And your purpose in this proceeding was to                  25 focus on mishaps, and you didn't, for example, make any</p>
1120	<p>1 that it wasn't just copper, but we took into account                  2 regulations that were applicable to gold mines,                  3 molybdenum mines, all kinds of mines, recognizing that                  4 copper and what we do with copper is not explicit to                  5 only copper.                  6 Q. And in much of your presentation over the last                  7 two days, you've talked about some sort of policy                  8 notions like adaptive management principles, performance                  9 of sensitivity analyses, taking into account                  10 uncertainties, taking extra precautions related to those                  11 uncertainties. I'm sure you recall all of that                  12 testimony.                  13 A. Yes, I do.                  14 Q. And as a participant in the Copper                  15 Rule-making, you had the opportunity to advocate for                  16 many of those same kinds of policy-oriented concepts,                  17 correct?                  18 A. I advocated for some policy concepts to be                  19 brought into regulation, but I also recognized and                  20 advocated that many of those same concepts in the same                  21 way as exist in other agencies are better provided as                  22 guidance.                  23 Q. And you would acknowledge that they did not                  24 find their way into the Copper Rule itself, would you                  25 not?</p>	1122	<p>1 effort to acknowledge, for example, the extensive                  2 reclamation awards and recognitions that have been                  3 received, for example, by the Tyrone and the Chino                  4 operations.                  5 A. Certainly, I would acknowledge that they have                  6 received awards, and I would acknowledge that they have                  7 done some very good work.                  8 Q. And are you aware that Mr. Stein of Golder,                  9 who has participated in this proceeding, has been                  10 involved in much of those reclamation efforts that have                  11 resulted in awards at Tyrone and copper?                  12 A. I was --                  13 Q. And Chino. Excuse me.                  14 A. I was not specifically aware of his                  15 involvement as -- at least in the exposure I've had to                  16 the company, he's never been involved in the                  17 discussions.                  18 Q. And going back to the Copper Rule, when the                  19 WQCC -- or the Water Quality Control Commission adopted                  20 that rule after it was proposed by the New Mexico                  21 Environment Department, following the stakeholder                  22 working process, that all was appealed, was it not?                  23 A. Yes. That's my -- yes. It was.                  24 Q. And the rule -- the Copper Rule was upheld by                  25 a unanimous panel of the Court of Appeals as well as the</p>

1123	<p>1 unanimous opinion from our New Mexico Supreme Court,                  2 correct?                  3 A. I've heard that testimony from others. Yes.                  4 Q. And you recall the testimony from the New                  5 Mexico Environment Department characterizing the rule as                  6 a very prescriptive rule, setting forth requirements                  7 just as the legislature mandated in 2009, specifying                  8 methods to protect and prevent water pollution, correct?                  9 A. Yes. And I provided comments relative to that                  10 where I talked about this kind of permit by rule                  11 approach. That's really in general the approach that                  12 you've just described.                  13 Q. Now, I noticed that when you were -- when you                  14 had up on the screen the graph showing 12 years of                  15 expected production by New Mexico -- by New Mexico                  16 Copper Company --                  17 A. Would you like me to pull that up?                  18 Q. I guess, yeah, why don't you pull that up.                  19 Thank you.                  20 In the context of talking about that, I think                  21 you referred to the New Mexico Copper Corporation Copper                  22 Flat project as essentially a small copper mining                  23 project?                  24 A. Yes, I did.                  25 Q. And I think elsewhere in your testimony do you</p>	1125	<p>1 Q. Correct.                  2 A. -- as I recall testifying in that hearing.                  3 So in this case, what we have here at the                  4 Copper Flat Mine is, in fact, a major mine. It's not a                  5 small mine. But when we look in the category of major                  6 mines, it's -- I think I would classify it as a medium                  7 to small within that category, probably more properly                  8 classified as medium-sized.                  9 Q. And I couldn't help but notice that many of                  10 the mines you referred to in the course of talking about                  11 the policies that you're promoting through your                  12 testimony in the last couple of days those are -- those                  13 are very significant major mines that you -- that you                  14 talked about, correct?                  15 A. Yes. And primarily because that's the                  16 experience we have in New Mexico. Unfortunately, we                  17 don't have examples of these medium-sized mines having                  18 operated in New Mexico to provide experience with.                  19 I, however, do have knowledge of quite a                  20 number of other medium-sized copper mines that have been                  21 developed and operated and subsequently closed in the                  22 United States, as I previously described. Many of those                  23 operations have been marginal operations, and there are                  24 many examples of all the things that I've addressed here                  25 similarly occurring at medium-sized mines, as well.</p>
1124	<p>1 recall referring to it as a major -- major mine?                  2 A. Yes. To explain, within the category of major                  3 mines, and it's a fairly well established category, we                  4 have mines that range anywhere from 100 tons a day to                  5 well in excess of 100,000 tons per day.                  6 Within major mines -- it's really only a                  7 division between small miners, which typically are folks                  8 like my grandfather, who might be an individual or                  9 family-owned mine, or may even be a mine with just a                  10 limited number of employees, five to 10. Typically                  11 small mines are classified by the acreage they disturb.                  12 And I believe -- for example, here in New                  13 Mexico, we have some -- I'm not sure it's called small                  14 mines, but there's another term we use for it here, and                  15 I can't remember the term right -- exactly right now,                  16 but --                  17 Q. Minimal impact.                  18 A. Minimal impact. Thank you. I should have                  19 remembered that.                  20 But the minimal impact mines are essentially                  21 similar to what we call small mines in other                  22 jurisdictions, albeit New Mexico allows for quite a                  23 significant more acreage for these mines. For example,                  24 in Montana, it's limited to five acres. I believe the                  25 minimal impact was revised to allow for 60 acres --</p>	1126	<p>1 Q. And where --                  2 A. Certainly not to the same magnitude, I want to                  3 be clear on that, but they still occur.                  4 Q. And where would you put the mica mine that you                  5 referred to that way back when was once a Franklin                  6 Industrial Minerals mine, then it became an Ogelbay                  7 Norton mine and then -- and then other things on the                  8 Picuris Pueblo? Where would you put that on the scope                  9 of size of mines that we're talking about?                  10 A. It wouldn't be classified a major mine. It                  11 might be minimal impact today in New Mexico, but at its                  12 time, it would not be considered a small mine. But in                  13 the realm of major mines, because it was approximately                  14 60 acres, I would -- and I did characterize it as a                  15 small mine in comparison during my testimony.                  16 Q. And you talked about long-term monitoring that                  17 is occurring at that mine; is that correct?                  18 A. Well, there was a plan to do long-term                  19 monitoring and maintenance, some of which got done for                  20 some period of time, and then some of which I would                  21 acknowledge has not been conducted for some time.                  22 Q. And are you aware that the monitoring that was                  23 required at that mine by the New Mexico Environment                  24 Department was five years?                  25 A. Well, since we actually did the Reclamation</p>

<p style="text-align: right;">1127</p> <p>1 and Closure Plan without an approved permit -- and I  2 might explain the rationale for that was I worked with  3 the state for two years on behalf of the pueblo, trying  4 to get the US Hill Mine Reclamation and Closure Plan  5 permit completed so we could perform reclamation.  6 I and my clients had managed to obtain the  7 monies to obtain the mine and perform the reclamation.  8 We had 600,000 in the bank to do the work. After two  9 years of negotiation, I realized it might take several  10 more years. So we decided at our risk, as the owners,  11 if you will, to go ahead and do the reclamation and  12 closure without receiving a permit from either agency.  13 So that may have been their intention, but, in  14 fact, the work was done without a final approved permit.  15 Q. Thank you. I may have misspoken on that. I  16 appreciate the clarification.  17 So the company itself went through a five-year  18 postclosure monitoring period, correct?  19 A. The mine shut down, and the company went  20 bankrupt, and literally the mine had been operating the  21 year before they went bankrupt. So no, they did not.  22 They were not there to do it. It's an example of where  23 there was a transition, and much was lost in the  24 transition.  25 Q. I'd like to turn back now to the very major</p>	<p style="text-align: right;">1129</p> <p>1 A. I didn't catch the question. I'm sorry.  2 Q. Copper Flat is -- there's a contrast between  3 those that were initially permitted before the Copper  4 Rule and Copper Flat.  5 A. That is what we would anticipate. It's -- I  6 think we need to keep in mind that since the Mining Act  7 has been put in place I don't believe we've had a new  8 metal mine permitted in the state. So we really just  9 simply don't have the examples that I would prefer to  10 have used because of the situation here.  11 There certainly -- I could provide numerous  12 examples from other states, though, that were -- provide  13 better similarities.  14 Q. And there are at least two or three other  15 important contrasts between the New Mexico Copper  16 Corporation's Copper Flat Mine and -- let's just stick  17 to the three Freeport-McMoRan mines, Tyrone, Chino and  18 Cobre/Continental. Would you acknowledge that?  19 A. Well, you said there are --  20 Q. There are three -- there are three significant  21 other distinctions.  22 Can you anticipate what I'm talking about, or  23 do you want me to walk through them?  24 A. I'm not going to speculate as to --  25 Q. Okay.</p>
<p style="text-align: right;">1128</p> <p>1 mines that you referred to throughout your testimony,  2 including the Tyrone and the Chino Mine, the Bingham  3 Canyon mine and others.  4 And am I correct that literally all of those  5 operations were initially permitted under something  6 other than the Copper Rule?  7 A. You are absolutely correct. In fact, most of  8 those operations were started before there were even  9 environmental regulations in existence.  10 Q. And most of them were not only started, but  11 fully developed and in the throes of significant  12 production activity.  13 A. Yes.  14 Q. And in contrast to those, which -- which I  15 think you would recognize to the extent there are copper  16 mines in New Mexico fit the category of an existing  17 copper mine under the Copper Rule. Okay? Is that  18 correct?  19 A. Yes.  20 Q. So in contrast to that, Copper Flat's being  21 permitted as a new mining facility under the very  22 prescriptive requirements that apply to new mining  23 facilities under the Copper Rule, correct?  24 A. Is there a question?  25 Q. Am I correct?</p>	<p style="text-align: right;">1130</p> <p>1 A. -- what your three might be, Mr. --  2 Q. Well, one of those -- one of those is that at  3 those operations there's -- there are acid leach  4 processes and leach stockpiles, and that's not going to  5 occur at the Copper Flat Mine, correct?  6 A. I believe that's true for the Chino and Tyrone  7 Mines. I do not recall those at the Continental/Cobre  8 Mine.  9 Q. And New Mexico Copper Corporation proposes to  10 line its tailings facility, and that's a distinction, as  11 well, none of those other operations have lined tailings  12 facilities; is that correct?  13 A. That's correct.  14 Q. And there's -- would you acknowledge that  15 there are much different drawdown considerations that  16 come into play when a facility is lined versus not  17 lined?  18 A. Actually, I've just completed an analysis for  19 that on several tailings impoundments. Well,  20 drawdown -- draindown you mean -- I'm sorry --  21 Q. Draindown. Yes.  22 A. Draindown. Yes.  23 Again if you're unlined, you assume that  24 there's no really capture, if you will, or otherwise,  25 and you allow the seepage to go into the groundwater,</p>

1131	<p>1 and then somewhere downstream you would collect that                  2 seepage along with any groundwater that that seepage had                  3 mixed with.                  4 Q. And then what happens when you collect it                  5 downstream?                  6 A. That water is then typically recycled back to                  7 the milling facility for reuse.                  8 Q. And then ultimately finds its way back to the                  9 tailings facility?                  10 A. Yeah. It goes in a cycle, around and around.                  11 Q. All right.                  12 I'd like to talk and ask you a few questions                  13 relating to your experience at the Golden Sunlight Mine.                  14 Do you recall referring to that in your                  15 testimony?                  16 A. Yes, I do.                  17 Q. And that's a Barrick operation some number of                  18 miles from Butte, Montana, correct?                  19 A. Yeah. Originally owned by Dome Mining, and                  20 then it became Placer Dome Mining, and then, yes,                  21 Barrick is the most recent owner of that mine operation.                  22 Q. And that's a gold mining operation, correct?                  23 A. Gold and silver, correct.                  24 Q. And am I correct that although there's a                  25 carbon and pulp process as part of the processing of the</p>	1133	<p>1 time in various capacities, either in industry or                  2 otherwise, and involved in Golden Sunlight.                  3 So it's a mine I pretty much have continuous                  4 involvement in one way or another, for its mine life                  5 pretty much goes along with mine, professional history                  6 of almost 35 years.                  7 Q. Okay.                  8 Is it your testimony that after the summer                  9 that you worked there, that there has not been any                  10 cyanide heat leaching at that mine?                  11 A. You know, if there was, Mr. Butzier, to my                  12 knowledge, it was not part of the major production. And                  13 again I'm quite certain when I was there in 1982, '83                  14 there weren't -- they might have done some experimental                  15 or small scale that I'm not familiar with. But I would                  16 be quite confident in suggesting that greater than                  17 99 percent of the production that has resulted from the                  18 Golden Sunlight Mine since 1983 came from conventional                  19 carbon and pulp processing.                  20 Q. And at the time that you worked there for a                  21 summer, was there one tailings facility?                  22 A. The first year I was there, in fact, a large                  23 part of what I spent the summer doing was actually                  24 putting slots in the pipe for the tailings underdrain                  25 that was going to lay on top of that clay liner that was</p>
1132	<p>1 ore in that case, there's also a crushing component that                  2 includes cyanide heat leaching in that operation; is                  3 that correct?                  4 A. No, sir. There was historic cyanide heat                  5 leaching. A good friend of mine, Carl Martin, was                  6 actually part of that operation, and I don't recall                  7 exactly, but I believe that operation occurred in the                  8 1970s, the fourth current major mining phase at the                  9 Golden Sunlight Mine. They are a carbon and pulp                  10 processing plant, and their current operations do not                  11 include any heat leaching.                  12 Q. During what period of time were you employed                  13 there?                  14 A. I was employed there 1982, I believe -- it was                  15 '82 or '83. I'm not looking at my resume. But it was                  16 essentially the year before I graduated from the                  17 university.                  18 Q. So it was for less than a year?                  19 A. Actually it was just for a summer.                  20 I have been involved -- I might mention that                  21 my family's mining properties are contiguous to the                  22 mine. My family's mining properties in part were                  23 purchased by the mine. My uncle, who is a rancher, has                  24 the land directly adjacent to the tailings facility.                  25 And I have been employed continuously for quite some</p>	1134	<p>1 part of the original tailings facility design.                  2 Q. Okay.                  3 And I think -- I think your answer is there                  4 was one tailings facility --                  5 A. Yes. There was --                  6 Q. -- when you worked there?                  7 A. Initially there was one tailings facility                  8 lined with clay.                  9 I'll go ahead and explain. That facility was                  10 built on an area where we had what we call frosting, and                  11 in Montana we get periods of cold, could be below zero                  12 for some period of time. We kind of get what you almost                  13 refer to as a -- as a kind of intermittent permafrost.                  14 What happens is the clay soils essentially freeze and                  15 begin to heave, and it compromised the clay liner                  16 severely.                  17 So that yes, they had initially a clay-lined                  18 tailings impoundment that was -- you know, we used to                  19 describe it leaking like a sieve, and that is why they                  20 decided to install the lined impoundment, to my                  21 knowledge.                  22 Q. And I think you testified to a pumpback system                  23 that -- some kind of a pumpback system or collection                  24 system that then put materials back onto the unlined                  25 tailing facility.</p>

1135	<p>1 A. Well, actually the materials don't go back to                  2 the unlined -- the pumpback system that we're talking                  3 about, that pumpback system returns back to the milling                  4 circuit.                  5 Q. Okay.                  6 A. Typically, to my knowledge, that was how it                  7 was set up. And as I described, between the initial                  8 tailings impoundment and the second one, there is a                  9 pumpback system of -- it may be 57 instead of 60, but                  10 it's a large number of wells that have been required to                  11 be installed around both of them to account for the                  12 basically constant seepage.                  13 Q. The -- are you aware that the pumpback system                  14 that you're describing exists at the unlined facility                  15 but does not exist at the lined facility?                  16 A. I would dispute that contention. The records                  17 I have suggest that at least part of that pumpback                  18 system is also in place and is in seepage that                  19 potentially is coming from the lined. There may be some                  20 suggestion that we don't know exactly which one every                  21 gallon is coming from, but I've never heard a contention                  22 that none of that pumpback system is related to Pond                  23 Number 2 at the Golden Sunlight Mine before.                  24 Q. But the pumpback system that's in place at the                  25 Golden Sunlight Mine is a system that was put in place</p>	1137	<p>1 conversation would have any bearing, because what we see                  2 at mine sites that employ either are very similar                  3 characteristics in terms of groundwater seepage capture                  4 and various other matters.                  5 I will suggest that we don't see seepage as                  6 often on heat leach piles.                  7 Q. I'd like to turn now to the draindown                  8 management discussion you had relating to Copper Flat.                  9 And you acknowledged that the draindown period                  10 that's proposed is 25 years from cessation of mining,                  11 correct?                  12 A. Yes. That's the five years of active                  13 management of draindown. I should say the draindown                  14 treatment. That doesn't mean the draindown is limited                  15 to 25 years. Just simply they propose treating the                  16 draindown either with active evaporation or passive                  17 evaporation for a period of 25 years.                  18 Q. And you testified that the five years of                  19 active management was standard procedure in the                  20 industry, correct?                  21 A. Well, the standard procedure is actually to do                  22 a draindown calculation and to base the actual                  23 requirements and process fluid stabilization program,                  24 which is again basically what we're describing here for                  25 the tailings, on those results.</p>
1136	<p>1 in connection with the first tailings dam that's                  2 unlined, and it has not been expanded or further                  3 emplaced after the completion of the lined tailings                  4 facility, the second dam facility at that site; is that                  5 correct?                  6 A. That's not my exact recollection. I do know                  7 the initial pumpback system was installed relative to                  8 the first impoundment; however, again I would need to go                  9 look at the actual files I have -- I have them here on                  10 my computer if I needed to -- to actually verify whether                  11 there was or wasn't for the second.                  12 But I'm -- at least to my recollection, I'm                  13 quite certain that at least some -- and again the                  14 existing pumpback system today is there in order to deal                  15 with solution -- or seepage that's coming from the newer                  16 of the impoundments.                  17 Q. And if I'm correct that at least part of the                  18 process at that mine is sort of a secondary crushing and                  19 cyanide heat leach process, that would be an important                  20 distinction between that facility and the Copper Flat                  21 facility, correct?                  22 A. Well, again I actually suggest that simply the                  23 cyanide leaching versus flotation is a -- is an                  24 important distinction. I'm not sure where I -- heat                  25 leaching versus carbon and pulp relative to this</p>	1138	<p>1 So when you look, for example, after that, you                  2 got results from probably 10 different tailing storage                  3 facilities, I've seen that estimate be anywhere from                  4 three years to -- I think as long as 10 years for that                  5 more active draindown management.                  6 That's typically a function of size as well as                  7 the material characteristics. Finer material, for                  8 example, finer ground might take longer to drain down,                  9 whereas coarser materials drain down more quickly. If                  10 you have an internal drain such as we're talking about                  11 here, that does help us drain down more quickly.                  12 In fact, an analysis that I just reviewed last                  13 week suggested that the drain will increase or decrease                  14 by half the amount of time required to drain down.                  15 Q. So as I understand it, you'd like to change or                  16 at least expand upon your earlier testimony that a                  17 five-year active management period was pretty standard                  18 in the industry.                  19 A. Well, again if I had to kind of average out                  20 everything that I've seen, I'd say five years is an                  21 average what industry sees.                  22 Q. And then the other part of the 25 years is a                  23 passive evaporation period.                  24 Do you recall testifying about that?                  25 A. Yes, I do.</p>

1139	<p>1 Q. I didn't hear you say whether you thought that</p> <p>2 was standard procedure, and I'd be interested to hear</p> <p>3 your thoughts.</p> <p>4 A. I do believe I did say that it, in fact, was.</p> <p>5 Again I described a sequence that's being done as a</p> <p>6 similar sequence to what I'm seeing being done in</p> <p>7 similar climates such as Nevada. And I'm not in any</p> <p>8 way, shape or form suggesting that it's not, in fact,</p> <p>9 what I would recommend.</p> <p>10 The main thing that I am testifying is a</p> <p>11 difference is I just have not had experience, have not</p> <p>12 seen those circumstances where it just -- everything</p> <p>13 came out perfect and it just suddenly ended at year 25.</p> <p>14 Where they have similar features, we always</p> <p>15 see follow-up, long-term monitoring and maintenance,</p> <p>16 recognizing that necessity when we put together these</p> <p>17 type of systems.</p> <p>18 Q. Thank you.</p> <p>19 Now, I would like you to return to the slide</p> <p>20 on your rebuttal of David Kidd, if you would.</p> <p>21 On that first bullet point, you acknowledge</p> <p>22 that the testimony from Mr. Kidd was that the Copper</p> <p>23 Flat, New Mexico Copper Corporation was planning to go</p> <p>24 through the OSE dam safety process, and you acknowledge</p> <p>25 that's separate from this process, correct?</p>	1141	<p>1 if -- depending on the length of the answers.</p> <p>2 MS. ORTH: That's fine.</p> <p>3 MR. KNIGHT: Okay. I just realized that it's</p> <p>4 just about lunchtime.</p> <p>5 Q. Mr. Kuipers, on slide 18 -- if you'd go to</p> <p>6 slide 18.</p> <p>7 A. Yes.</p> <p>8 Q. Let's see. I believe on slide 18 you</p> <p>9 provided --</p> <p>10 Excuse us just for a moment. We're trying to</p> <p>11 make sure we have the right slide here.</p> <p>12 One of your slides you provide a statistic of</p> <p>13 90 percent, where you say 90 percent of predictions are</p> <p>14 incorrect?</p> <p>15 A. Yes. Let me see if I can find that.</p> <p>16 You know, you're going to have to remind me</p> <p>17 what it is, unfortunately. I --</p> <p>18 Q. Okay. You have to go through them a little</p> <p>19 slower.</p> <p>20 A. Yeah. I'm sorry.</p> <p>21 I was talking about uncertainty. I'm sorry.</p> <p>22 That's -- so I need to go back.</p> <p>23 There we go.</p> <p>24 Q. Thank you. Okay. Slide 17, not 18. Thank</p> <p>25 you.</p>
1140	<p>1 A. Yes, I did.</p> <p>2 Q. And you indicate on your bullet point with an</p> <p>3 exclamation mark at the end that you would have</p> <p>4 preferred that that happen prior to this hearing,</p> <p>5 correct?</p> <p>6 A. Absolutely.</p> <p>7 Q. That said, you would not dispute the fact that</p> <p>8 this proceeding can come to its conclusion before that</p> <p>9 process is completed.</p> <p>10 A. You know, that I think would require a legal</p> <p>11 conclusion on my part --</p> <p>12 Q. All right.</p> <p>13 A. -- and I don't think I should do that.</p> <p>14 MR. BUTZIER: Thank you.</p> <p>15 That's all I have, Madam Hearing Officer.</p> <p>16 MS. ORTH: All right. Thank you, Mr. Butzier.</p> <p>17 Mr. Knight, do you have questions of</p> <p>18 Mr. Kuipers?</p> <p>19 MR. KNIGHT: I do. Just a few.</p> <p>20 CROSS EXAMINATION</p> <p>21 BY MR. KNIGHT:</p> <p>22 Q. Good morning, Mr. Kuipers.</p> <p>23 A. Good morning, Mr. Knight.</p> <p>24 MR. KNIGHT: Madam Hearing Officer, if I -- I</p> <p>25 think we can get done probably in the next 15 minutes</p>	1142	<p>1 On slide 17, you provide a statistic of</p> <p>2 90 percent related to predictions ending up</p> <p>3 significantly wrong.</p> <p>4 Where did that statistic come from, and can</p> <p>5 you describe what you mean by a determinative model, and</p> <p>6 might you actually be speaking of a deterministic model?</p> <p>7 A. I forgot -- it would have been better to use</p> <p>8 that word, deterministic, rather than determinative;</p> <p>9 however, I have seen that same phrase used elsewhere.</p> <p>10 So -- but I do understand what Dr. Marcoline may be</p> <p>11 referring to there.</p> <p>12 But just to clarify what I was testifying on,</p> <p>13 this opinion, if you will, results from the 2006 study</p> <p>14 that I did together with Dr. Ann Maest where we</p> <p>15 collected information from environmental impact</p> <p>16 statements and basically compared the predictions made</p> <p>17 in those environmental impact statements to the actual</p> <p>18 water quality results that occurred on those mines</p> <p>19 following those statements.</p> <p>20 Now, folks familiar with environmental impact</p> <p>21 statements and other regulatory processes realize that</p> <p>22 one of the things that they force, in my opinion, the</p> <p>23 company to do is basically come back with a prediction</p> <p>24 that they're going to meet water quality standards. If</p> <p>25 that's not your prediction, you don't get a permit.</p>

<p style="text-align: right;">1143</p> <p>1 It's that simple.  2 That requires a deterministic evaluation of  3 what you think that actual water quality will be. And I  4 can't tell you how many EISes I've reviewed where, for  5 example, the water quality for arsenic, that standard  6 may be three parts per billion and the prediction comes  7 back and says, oh, it will just be 2.  8 That's, unfortunately, what the permitting  9 process forces us to do, is to take these models with  10 highly uncertain aspects and predict an exact number.  11 So what we did is we actually looked at those,  12 if you will, exact predictions in the EISes and said,  13 well, what actually happened at the sites. And what we  14 discovered was that in nearly again all cases there were  15 changes in water quality, in many cases quite  16 significant, but in, you know, again nearly all cases,  17 90 percent or better, where we had exceedances or other  18 nonpredicted water quality impacts that were showing up.  19 Now, if you read the study, it's very  20 important that -- and I did testify to this earlier,  21 that the characteristic we identified for those mines  22 that had this characteristic most predominantly was near  23 surface -- near surface water and/or near groundwater.  24 Okay? Without a preference of either one of those, one  25 might appreciate the likelihood doesn't occur.</p>	<p style="text-align: right;">1145</p> <p>1 got your testimony correct -- you testified that those  2 were not expected to have acid rock drainage for 250 to  3 300 years?  4 A. There were parts of it. I believe more  5 specifically the predictions for the delays were related  6 to the tailing storage facilities. If I didn't make  7 that clear, I take that opportunity to do so now.  8 I believe there were some -- some prediction  9 of delays in the waste rock dumps, but I believe the  10 more specific ones that were predicted to occur decades  11 or even centuries in the future were more typically  12 related to the tailing storage facilities.  13 Q. Okay. Thank you.  14 Let's see. On your slide 30 -- go to slide  15 30.  16 Your subtitle is Steps addressing liner  17 seepage.  18 A. Yes.  19 Q. Is that right?  20 Can you explain how this slide relates to --  21 how this slide relates to addressing liner seepage?  22 A. Well, essentially what again this slide does  23 is take the requirements of the Copper Rule, and  24 essentially I just paraphrased those requirements in  25 these four steps. And those requirements are specific</p>
<p style="text-align: right;">1144</p> <p>1 The Copper Flat mine, while we don't have, if  2 you will, near surface water in terms of streams -- we  3 would typically classify near as being adjacent to or  4 actually going through the site -- we do have what we  5 would have classified as relatively shallow groundwater  6 in the system, groundwater essentially at the surface.  7 So that would qualify this mine as having potentially  8 that same very high probability as with other mines.  9 Now, I've also since 2006, and I have been  10 hoping to replicate the study or somebody else would  11 replicate the study, but continued to look at the same  12 EISes, other mine sites' EISes, look at the water  13 quality data. I remind folks that I essentially almost  14 did this for 15 years continuously for EPA on all the  15 projects in Region 9 and 10.  16 And we continued to see, even with more modern  17 sites, some of the same type of results. I do think  18 using the practices that we're recommending can decrease  19 that likelihood significantly, but again my testimony is  20 that it will not prevent that from happening entirely,  21 based upon my knowledge and experience.  22 Q. Thank you.  23 When speaking about waste rock predictions at  24 the Chino and Tyrone Mines, and you mentioned that based  25 on predictions it is not expected to have -- see if I</p>	<p style="text-align: right;">1146</p> <p>1 to addressing seepage, as noted.  2 Q. I might not agree, but I'll take that as your  3 answer.  4 On slide 32 of your presentation, you suggest  5 that the industry standard practice is the Giroud and  6 Bonaparte, 1989?  7 A. The industry standard as described by Giroud  8 and Bonaparte. Again as I've testified, this is not the  9 only way in which we address liner seepage. We also  10 typically address it as well from a failure mode effects  11 analysis standpoint and allow for other than this simple  12 calculation to guide us.  13 And again as I testified, what is recognized  14 is that when we do have seepage and we base those  15 seepage estimates on this technique in nearly all cases  16 it's at least one, if not two orders of magnitude  17 greater than were estimated by this theoretical  18 technique.  19 And where I said permeation rates less or  20 more, which may be somewhat confusing, what I really  21 would have been better to refer to is seepage rates. So  22 the seepage rates are estimated to be several orders of  23 magnitude higher than the results resulting from the  24 membrane defects.  25 And so I think I may have -- now that I look</p>



<p style="text-align: right;">1147</p> <p>1 at this, that language I have here may be a little  2 confusing. So -- yeah. What I intended to make clear  3 was that when we do estimates such as the .5 gallons per  4 minute that were estimated in this case, using  5 essentially this method, a theoretical equation, that  6 when we have a deserved seepage occurring in mine sites,  7 it has almost always been 1 to 2 orders of magnitude  8 greater in terms of the volume of seepage than was  9 estimated using these equations.  10 Q. Thank you for that clarification.  11 In your rebuttal testimony, you indicated that  12 the Copper Rule requirements leave the determination as  13 to the thickness of a liner system to be placed under a  14 tailing impoundment -- that's left to the judgment of  15 the engineer, and I believe you suggested they should  16 use a -- or your recommendation was for a 100- to  17 120-mil liner; is that right?  18 A. Yes. And there is a phrase about "or  19 equivalent to" in the Copper Rule, which to me says you  20 don't -- you know, it can be different than what's  21 required -- or what's used as the kind of minimum  22 standard in the rule.  23 Q. Now, does the Copper Rule require that a  24 tailing impoundment be lined at all?  25 A. No.</p>	<p style="text-align: right;">1149</p> <p>1 A. Yes. I'm extremely familiar with that  2 requirement in the Mining Act.  3 Q. Are you aware that the department can withhold  4 providing that determination if there is a disagreement  5 over financial assurance?  6 A. I'm aware that they could.  7 MR. KNIGHT: Okay. That's all the questions I  8 have.  9 Thank you.  10 MS. ORTH: Thank you.  11 Ms. Barncastle?  12 MS. BARNCASTLE: I have a brief  13 cross-examination.  14 MS. ORTH: Okay. Please go ahead.  15 MS. BARNCASTLE: I don't have a microphone.  16 Should I have one?  17 MS. ORTH: Yes. It's coming your way.  18 (Discussion off the record.)  19 MS. BARNCASTLE: Thank you.  20 CROSS EXAMINATION  21 BY MS. BARNCASTLE:  22 Q. Mr. Kuipers, my questions are directed to you  23 being an expert on the Copper Rule.  24 Are you aware that the Copper Rule provides  25 that, quote, the secretary shall approve a Discharge</p>
<p style="text-align: right;">1148</p> <p>1 Q. Is it correct that the Copper Rule allows for  2 an unlined tailing storage facility with an interceptor  3 system instead?  4 A. Yes. I believe that actually was the result,  5 if you will, of the ultimate decision by the courts, was  6 to accept the Copper Rule with that as part of it.  7 That, in fact, was, I believe, the major issue that my  8 clients had with the Copper Rule at that point.  9 Q. So would you agree with me that the liner  10 that's being proposed for the Copper Flat Mine tailing  11 storage facility goes beyond the requirements of the  12 Copper Rule?  13 A. I would have to look more carefully, but I  14 would not disagree that it, in terms of the design of  15 the liner system, meets requirements of the Copper Rule.  16 Q. Thank you.  17 You stated in your -- you stated in your  18 testimony -- in your rebuttal testimony that the  19 department is giving up its leverage, as it were, to --  20 over decisions relative to financial assurance. Perhaps  21 that was during the cross-examination.  22 Do you recall Mr. Vollbrecht's testimony that  23 Mining and Minerals Division cannot issue a permit  24 without a determination from NMED that all environmental  25 laws and requirements of those laws have been met?</p>	<p style="text-align: right;">1150</p> <p>1 Permit provided that it poses neither a hazard to public  2 health nor undue risk to property?  3 A. Yes, I am.  4 Q. And that section is New Mexico Administrative  5 Code Section 20.6.7.10 subsection J, as in Julia? Are  6 you aware of that?  7 A. Yes, I am.  8 Q. In your opinion, does that provision -- and  9 I'm addressing my question now to your slide 43, the  10 final bullet point on that slide. No. I'm sorry. The  11 second to the last bullet point on that slide.  12 A. Yes.  13 Q. In your opinion, does that provision  14 facilitate the agency cooperation necessary to ensure  15 that this Discharge Permit is not issued before other  16 agencies have an opportunity to perform their required  17 analysis or otherwise that this permit could be issued  18 with key conditions requiring agency cooperation?  19 A. I'm really sorry. I'm going to have to ask  20 you to repeat that.  21 Q. Okay.  22 In your opinion, does the provision that we  23 just cited facilitate the type of agency cooperation  24 you're talking about here on your slide 43?  25 A. Yes, it does.</p>

<p style="text-align: right;">1151</p> <p>1 Q. Such that -- okay.  2 Such that this Discharge Permit could either  3 not be issued before other agencies have an opportunity  4 to perform their required analyses or that this permit  5 could be issued with key clinicians requiring agency  6 cooperation?  7 A. That's my understanding.  8 Q. And would you agree that one such form of  9 agency cooperation can be found in this discharge draft  10 permit at C105C.2, where NMED is seeking to require  11 compliance with Dam Safety Bureau requirements before  12 initiation of construction of any portion of the tailing  13 storage facility?  14 A. Yes.  15 Q. Are there any more opportunities for agency  16 cooperation such as for water rights permitting or  17 financial assurance?  18 A. With respect to financial assurance, I believe  19 so. I'm not sure with respect to water rights.  20 Q. Can we determine if there is an undue risk to  21 property or a hazard to public health without doing a  22 dam breach analysis for the tailings dam?  23 A. Well, I think in order to really make that  24 judgment, it's not only necessary to do a dam breach  25 analysis, but, as I mentioned, I would actually consider</p>	<p style="text-align: right;">1153</p> <p>1 MS. ORTH: Thank you, Ms. Barncastle.  2 Is there anyone else present who has a  3 question of Mr. Kuipers based on his testimony?  4 All right. Mr. de Saillan, do you have  5 follow-up?  6 MR. DE SAILLAN: Just a few, Madam Hearing  7 Officer.  8 REDIRECT EXAMINATION  9 BY MR. DE SAILLAN:  10 Q. Mr. Kuipers, Mr. Butzier asked you a few  11 questions about the Mining and Minerals Division  12 guidance on financial assurance.  13 Do you recall those questions?  14 A. I do.  15 Q. And he emphasized the fact that the MMD  16 guidance is a draft?  17 A. That's correct.  18 Q. And is it unusual in your experience for an  19 agency to use a draft guidance essentially as a  20 guidance?  21 A. It is not at all unusual. In fact, that  22 happens in almost all cases that I'm familiar with.  23 Q. Okay.  24 And what's the point of using a draft guidance  25 as a guidance?</p>
<p style="text-align: right;">1152</p> <p>1 the failure modes effects analysis to be as critical if  2 not equally critical.  3 And again I think in terms of how we treat  4 this tailings impoundment, lacking that information and  5 inundation analysis -- for example, I would think that  6 if this facility were to fail and it could potentially  7 result in the loss of human life, we might want to go  8 back and look hard at what the design was and other  9 features.  10 So in my opinion, experience, an inundation  11 analysis is a fundamental almost first principle that  12 needs to be performed as part of the conceptual dam  13 siting decision, not as something after we've already  14 studied where we're putting the dam.  15 Q. And in your opinion, is issuance of this  16 Discharge Permit premature where we cannot determine  17 whether compliance with the hazard to public health or  18 undue risk to property provision of the Copper Rule has  19 been achieved?  20 A. Yes. It is absolutely my opinion that that  21 information should have been available, included as this  22 permit at the level required by the OSE, as I previously  23 testified.  24 MS. BARNCASTLE: Thank you.  25 I have no further questions of this witness.</p>	<p style="text-align: right;">1154</p> <p>1 A. Well, the main thing is for some reason  2 through the various bureaucracies and other things, I  3 found that getting from a draft guidance to a final  4 guidance can take periods of years, even decades.  5 You know, best example I can give you is I  6 have rewritten EPA's draft guidance for both  7 mine-impacted water prediction and for tailing storage  8 facility designs. Those first draft guidance was  9 actually done in 2013. The latter was done at the end  10 of 2017. I would not expect to see either one of those  11 as final guidance, perhaps not even ever.  12 But in the meantime, I do know the agency  13 internally does use that to guide what they do.  14 Q. And so effectively the draft guidance serves  15 the same purpose as a final guidance.  16 A. Yes.  17 And, you know, I'd even point out another  18 example. I did the 2005 mine cleanup and financial  19 assurance guide for the USEPA, in 2005. And EPA has  20 actually put that guide out on their web site and made  21 it available to the public even though it's a draft  22 guide because they recognized the value of what's in  23 there and realized that even if there's formal guidance  24 it's something they still wanted to make sure that their  25 regulators were aware of.</p>

1155	<p>1 MR. DE SAILLAN: Thank you.</p> <p>2 I have no further questions.</p> <p>3 MS. ORTH: All right. Thank you.</p> <p>4 Any reason not to excuse Mr. Kuipers?</p> <p>5 No?</p> <p>6 Great. Thank you very much, Mr. Kuipers.</p> <p>7 MR. KUIPERS: Thank you for the opportunity.</p> <p>8 MS. ORTH: And we are on break until 1:30 for</p> <p>9 lunch.</p> <p>10 (Proceedings in recess from 12:20 p.m. to</p> <p>11 1:38 p.m.)</p> <p>12 MS. ORTH: We're back after a lunch break.</p> <p>13 We have one request for public comment before</p> <p>14 we begin our next technical witness.</p> <p>15 Ms. Diamond.</p> <p>16 CRYSTAL DIAMOND</p> <p>17 having been first duly sworn or affirmed, gave</p> <p>18 public comment as follows:</p> <p>19 PUBLIC COMMENT</p> <p>20 MS. DIAMOND: Madam Hearing Officer, I</p> <p>21 appreciate the opportunity to comment.</p> <p>22 My name is Crystal Diamond.</p> <p>23 I'm the director of Sierra Soil &amp; Water</p> <p>24 Conservation District, a division of state government,</p> <p>25 governed by a board of officials elected by all</p>	1157	<p>1 were unknown. The community pushback was extreme. The</p> <p>2 project was abruptly halted when a federal judge ruled</p> <p>3 that the cutthroat trout did not warrant protected</p> <p>4 species designation, a ruling that pleased many within</p> <p>5 Sierra County, specifically respondents along Animas</p> <p>6 Creek who were not pleased at the attempt made by their</p> <p>7 upstream neighbor to poison the water.</p> <p>8 Our orders to promote sustainable conservation</p> <p>9 through multiple-use practices is a mission we take</p> <p>10 seriously. Therefore, we were not quick to support the</p> <p>11 opening of Copper Flat Mine without first being</p> <p>12 confident that our land, water, air and wildlife would</p> <p>13 not be negatively impacted.</p> <p>14 Like the Ladder Ranch proposal, the</p> <p>15 conservation district was equally concerned about the</p> <p>16 impact Copper Flat proposal would have on our natural</p> <p>17 resources, specifically water quality. We have</p> <p>18 carefully reviewed the proposals and studies and called</p> <p>19 numerous meetings with Copper Flat representatives,</p> <p>20 including onsite visits.</p> <p>21 Our concerns and the concerns brought to us by</p> <p>22 the many farmers and ranchers we serve have been</p> <p>23 thoroughly and adequately addressed. We are confident</p> <p>24 that the mine has put in place measures of adequately</p> <p>25 protecting our waters and land.</p>
1156	<p>1 registered voters within the district boundaries, in our</p> <p>2 case Sierra County, Catron County, Socorro County and</p> <p>3 parts of Dona Ana County.</p> <p>4 By state statute, our district is charged with</p> <p>5 furthering the conservation, development, utilization,</p> <p>6 flood prevention and disposal of water and thereby</p> <p>7 preserve and protecting New Mexico's land and water</p> <p>8 resources.</p> <p>9 Earlier in testimony, a representative from</p> <p>10 Turner Properties spoke of protection and conservation</p> <p>11 measures implemented on the Ladder Ranch. The term</p> <p>12 "pristine water" was referenced throughout.</p> <p>13 Ironically, it was our district and community</p> <p>14 landowners that seemed most concerned for water quality</p> <p>15 of Animas Creek when just four years ago the ranch</p> <p>16 proposed the poisoning of our creek waters, including</p> <p>17 rotenone, to kill out all fish inhabitant of our stream</p> <p>18 in an effort to introduce the Rio Grande cutthroat</p> <p>19 trout.</p> <p>20 The poisonous waters would reach Caballo Lake,</p> <p>21 effectively killing fish species the ranch classified as</p> <p>22 undesirable. Additionally, it was not disputed that the</p> <p>23 protected species such as leopard frogs within the</p> <p>24 waters would be killed in the process.</p> <p>25 Impacts to irrigation and livestock waters</p>	1158	<p>1 It appears the effort to stop the opening of</p> <p>2 Copper Flat Mine is not based on genuine concern for the</p> <p>3 environment. The opposition seems spearheaded in an</p> <p>4 attempt to profit from protections generated of an</p> <p>5 ecotourism business that relies on quiet open spaces and</p> <p>6 views.</p> <p>7 Sierra County welcomes this business, just as</p> <p>8 we welcome the business opportunities of another, to use</p> <p>9 the land responsibly and wisely, generating profits for</p> <p>10 themselves while conserving the lands for future land</p> <p>11 stewards.</p> <p>12 This mining project has met what is required</p> <p>13 of them. We urge for the permitting to be granted.</p> <p>14 Together with the overwhelming majority of our citizens,</p> <p>15 Sierra Soil &amp; Water Conservation stands in full support</p> <p>16 of Copper Flat Mine.</p> <p>17 MS. ORTH: Thank you, Ms. Diamond.</p> <p>18 If you'd leave your paper on the table there.</p> <p>19 MS. DIAMOND: Sure. Thank you.</p> <p>20 MS. ORTH: Thank you.</p> <p>21 Mr. de Saillan, we turn to your next technical</p> <p>22 witness.</p> <p>23 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>24 Officer.</p> <p>25 Our next witness is Dr. Tom Myers.</p>

1159	<p>1 And, Madam Hearing Officer, if there are no</p> <p>2 objections, we would also like to present the rebuttal</p> <p>3 testimony of Dr. Myers at the end of his direct</p> <p>4 testimony as we did with Mr. Kuipers.</p> <p>5 MS. ORTH: I continue to think that's a good</p> <p>6 idea.</p> <p>7 MR. BUTZIER: No objection.</p> <p>8 MS. BARNCASTLE: No objection.</p> <p>9 MR. KNIGHT: No objection.</p> <p>10 MS. ORTH: All right. Thank you very much.</p> <p>11 TOM MYERS</p> <p>12 having been first duly sworn or affirmed, was</p> <p>13 examined and testified as follows:</p> <p>14 DIRECT EXAMINATION</p> <p>15 BY MR. DE SAILLAN:</p> <p>16 MR. MYERS: Before I get started, I've got the</p> <p>17 wrong presentation loaded up here. It's -- my rebuttal</p> <p>18 presentation got loaded rather than my regular</p> <p>19 presentation.</p> <p>20 MS. BARNCASTLE: Madam Hearing Officer, I have</p> <p>21 to excuse myself. It's that time again.</p> <p>22 I will not have any objections to qualifying</p> <p>23 this particular witness as an expert.</p> <p>24 MS. ORTH: Thank you, Ms. Barncastle.</p> <p>25 MR. MYERS: Now I think we're ready.</p>	1161	<p>1 school and was employed as a research assistant,</p> <p>2 research associate and occasionally a teaching assistant</p> <p>3 through my graduate level work. The research was in</p> <p>4 support of some of my dissertation work and involved a</p> <p>5 lot of fieldwork and stream morphology and things like</p> <p>6 that throughout the Great Basin.</p> <p>7 Beginning in 1993 and overlapping partly with</p> <p>8 my graduate schoolwork and university work, I began to</p> <p>9 work as a -- as a hydrologic consultant on a part-time</p> <p>10 basis.</p> <p>11 After graduation in 1997, I began to consult a</p> <p>12 lot more, and I have been working as a consultant ever</p> <p>13 since.</p> <p>14 For a period of time between 1999 and about</p> <p>15 2004, I was the executive director of a nongovernmental</p> <p>16 organization known as Great Basin Mine Watch, which was</p> <p>17 a group -- sort of a coalition of ranchers,</p> <p>18 environmental community and Native Americans working</p> <p>19 in -- on reforming mining in the Great Basin.</p> <p>20 As a hydrologic consultant, I have worked on</p> <p>21 quite a few types of projects. I've worked on mining,</p> <p>22 natural gas development, water rights, water supply</p> <p>23 issues.</p> <p>24 Specifically with regard to mining, I have</p> <p>25 done groundwater modeling, contaminant transport</p>
1160	<p>1 Q. (BY MR. DE SAILLAN) Good morning, Dr. Myers.</p> <p>2 A. Good morning.</p> <p>3 Q. Excuse me. Good afternoon, Dr. Myers.</p> <p>4 A. Yes. It is afternoon. Good afternoon.</p> <p>5 Q. Could you state your name and occupation for</p> <p>6 the record, please.</p> <p>7 A. My name is Tom Myers, and I'm a hydrologic</p> <p>8 consultant based in Reno, Nevada.</p> <p>9 Q. Now, let's begin by discussing your</p> <p>10 qualifications.</p> <p>11 Could you describe your postsecondary</p> <p>12 education, please.</p> <p>13 A. Yes. I have a bachelor's degree in civil</p> <p>14 engineering from University of Colorado at Boulder, and</p> <p>15 I have a master's and PhD in hydrology/hydrogeology from</p> <p>16 the University of Nevada at Reno.</p> <p>17 Q. Okay.</p> <p>18 And could you describe your professional</p> <p>19 experience, please.</p> <p>20 A. Sure. After my bachelor's degree, I worked</p> <p>21 for five years for the Bureau of Reclamation, based in</p> <p>22 Boulder City most of the time. In that -- in that job,</p> <p>23 I was a hydraulic engineer, working on planning and</p> <p>24 design occasionally of Bureau of Reclamation projects.</p> <p>25 After that, in 1988, I returned to graduate</p>	1162	<p>1 modeling for a variety of mine sites. I have -- well,</p> <p>2 I've had two groundwater models used in EISes in the</p> <p>3 past. One was a mining project, one was a water rights</p> <p>4 project.</p> <p>5 I have a couple of papers written regarding</p> <p>6 contaminant transport that I've published in journals,</p> <p>7 one on sulfate transport in Minnesota and one on</p> <p>8 selenium transport in Idaho.</p> <p>9 I've done a lot of work as a consultant also</p> <p>10 in -- on monitoring wells and monitoring well designs.</p> <p>11 I should have mentioned a lot of my clients as</p> <p>12 a consultant have been as -- have been conservation</p> <p>13 groups and other Native American groups.</p> <p>14 I've also worked for state government of</p> <p>15 California, and I've worked for several counties,</p> <p>16 including White Pine in Nevada, Pima County in Arizona</p> <p>17 and Routt County in Colorado, doing a variety of things.</p> <p>18 I think that --</p> <p>19 Q. Okay.</p> <p>20 Now, Dr. Myers, you've been provided a</p> <p>21 document that's marked as the Ranches Exhibit 22.</p> <p>22 Could you identify that, please?</p> <p>23 A. That is my curriculum vitae.</p> <p>24 Q. And is it accurate?</p> <p>25 A. Yes, it is.</p>

1163	<p>1 Q. And is it current and up to date?</p> <p>2 A. To the last month or two, yes.</p> <p>3 MR. DE SAILLAN: Madam Hearing Officer, I</p> <p>4 would like to qualify Dr. Myers as an expert in</p> <p>5 hydrology and hydrogeology and in mine remediation.</p> <p>6 MS. ORTH: Objections?</p> <p>7 MR. BUTZIER: No objection.</p> <p>8 MR. KNIGHT: No objection.</p> <p>9 MS. ORTH: He's so recognized.</p> <p>10 MR. DE SAILLAN: Thank you.</p> <p>11 Q. Dr. Myers, have you prepared a presentation</p> <p>12 for today's hearing.</p> <p>13 A. Yes, I have.</p> <p>14 Q. And could you give us an overview of that</p> <p>15 presentation, please.</p> <p>16 A. Certainly. I have about five different major</p> <p>17 topics that I'm going to talk about today.</p> <p>18 The first one has to do with seepage from</p> <p>19 waste rock, including addressing the idea that andesite</p> <p>20 serves as a natural liner beneath the waste rock.</p> <p>21 The second thing I'll very briefly just</p> <p>22 mention on the leaks that -- through liners and seepage</p> <p>23 from unlined ditches.</p> <p>24 Then the third thing I'm going to talk about</p> <p>25 rather extensively is monitoring wells and the necessary</p>	1165	<p>1 A. Yes. That is my review of the draft Discharge</p> <p>2 Permit and application dated May 1st, 2018.</p> <p>3 Q. Okay.</p> <p>4 And then I have another document that you've</p> <p>5 been presented which has been marked as Ranches</p> <p>6 Exhibit 24.</p> <p>7 Can you identify that?</p> <p>8 A. Yes. That is a technical memorandum</p> <p>9 concerning -- that describes the calculations that I'm</p> <p>10 going to present in my testimony, titled Contaminant</p> <p>11 Transport through Groundwater at the Proposed Copper</p> <p>12 Flat Mine.</p> <p>13 Q. And what is the date on that report?</p> <p>14 A. August 24, 2018.</p> <p>15 Q. Thank you.</p> <p>16 Now, let's go ahead with your first topic</p> <p>17 item, which involves the andesite bedrock. Could you</p> <p>18 begin with that, please.</p> <p>19 A. Sure. My first slide, slide number 3, is</p> <p>20 simply an overview of -- of the mine site.</p> <p>21 And I wanted to -- I wanted to do this because</p> <p>22 many of the slides that I present further along in my</p> <p>23 testimony will refer to areas and parts of areas</p> <p>24 within -- within the -- within the mine site.</p> <p>25 I draw your attention to the boundaries, this</p>
1164	<p>1 spacing and placement of those monitoring wells. And in</p> <p>2 doing so, I'm going to present some calculations and the</p> <p>3 estimates of plume development from potential leaks.</p> <p>4 I'm going to estimate the size of plumes in different</p> <p>5 formations, travel time for contaminants, as well as</p> <p>6 then use that information to make some monitoring well</p> <p>7 placement recommendations for this application.</p> <p>8 Then I'm going to talk a little bit about pit</p> <p>9 lake encroachment on public property.</p> <p>10 And also the mixing of public and private</p> <p>11 waters in the poor-quality pit lake waters.</p> <p>12 Q. Okay.</p> <p>13 And before we get into your presentation, have</p> <p>14 you prepared any technical reports with respect to the</p> <p>15 proposed groundwater Discharge Permit for the Copper</p> <p>16 Flat Mine?</p> <p>17 A. Yes. I prepared a review of the application</p> <p>18 that I submitted back in May, I believe it's May 1st, of</p> <p>19 this year, and I've prepared a technical memorandum</p> <p>20 describing the calculations -- the numerical</p> <p>21 calculations that I performed as part of my testimony</p> <p>22 today.</p> <p>23 Q. And you've been provided a document that's</p> <p>24 been marked as Ranches Exhibit 23.</p> <p>25 Could you identify that document, please?</p>	1166	<p>1 white hash line that goes all the way -- all the way</p> <p>2 around the property, and you'll see that white -- that</p> <p>3 line on many of the other maps and figures that I use.</p> <p>4 Q. Excuse me, Dr. Myers.</p> <p>5 That white line that you're referring to, is</p> <p>6 that the property --</p> <p>7 A. No. I'm --</p> <p>8 Q. -- boundary or the permit boundary?</p> <p>9 A. No. I'm sorry. It is the permit boundary.</p> <p>10 Yes.</p> <p>11 Q. Thank you.</p> <p>12 A. It is -- it's the mine permit boundary.</p> <p>13 And the large blue area in the southeast</p> <p>14 corner of -- or southeast area of that permit boundary</p> <p>15 is the tailing storage facility.</p> <p>16 The orange-ish areas are -- are the proposed</p> <p>17 waste rock areas. I'll frequently be referring to the</p> <p>18 waste rock area -- storage area 2 and 3, and that's the</p> <p>19 one that's due north of -- or northwest of the tailing</p> <p>20 facility and that lies in the north of the site.</p> <p>21 I will also -- the proposed pit is the red-ish</p> <p>22 area on the far west of the permit area.</p> <p>23 And I'll also refer to the purple that flows</p> <p>24 as -- this is the diversion for the Grayback Arroyo</p> <p>25 through part of the site.</p>

1167	<p>1 And I will point out that this slide is drawn                  2 from the 2015 Draft Environmental Impact Statement.                  3 My second slide, slide number 4, is titled                  4 Waste rock seepage: Andesite is not a natural liner.                  5 And I just wanted to start off with a couple                  6 of definitions and clarifications, I guess, because I                  7 find myself using some of these things interchangeably.                  8 I just thought it would be worthwhile laying out some                  9 definitions.                  10 First of all, we often -- we refer to                  11 permeability and conductivity, and it's usually used                  12 interchangeably, and it is throughout the application as                  13 well as my presentation. But it is really important to                  14 understand that the difference -- the difference between                  15 permeability.                  16 Permeability is a feature of the material                  17 itself which describes the porosity and the conductivity                  18 of the pores, whereas conductivity takes into account                  19 the property of the fluid that is flowing through the                  20 material, the -- the formation.                  21 Transmissivity, then, is the product of the                  22 conductivity and the thickness of the aquifer.                  23 Primary permeability versus secondary                  24 permeability, that's a fairly important concept in this                  25 application and permit, primary permeability being what</p>	1169	<p>1 minus-6 centimeters per second.                  2 Well, I -- you know, you go to SRK, and they                  3 reference JSAI, 2012, for the same information. That is                  4 a conceptual flow model report. The conceptual flow                  5 model report actually doesn't discuss the andesite                  6 permeability, at least not as a liner. It although                  7 provides a table of pressure tests that does not specify                  8 andesite. In other words, it puts monzonite and                  9 andesite values in one table.                  10 So initially it was difficult to even                  11 separate -- in the initial review of the application                  12 made, it was actually difficult to even determine                  13 whether, you know, the different -- these different                  14 observations.                  15 Ultimately, the -- some of the best                  16 information regarding the permeability was provided in                  17 Shomaker, 2011, which was an appendix to Jones, et al.,                  18 2014, which is a numeric -- which is the report of the                  19 numerical model that was used for the Draft                  20 Environmental Impact Statement. And this referred --                  21 this described the pressure injection test that was done                  22 on well GWQ-5R.                  23 And I'm going to talk very briefly about that,                  24 because an awful lot was -- the table that -- that I                  25 referred to as well as testimony -- as well as the</p>
1168	<p>1 is the permeability of the bulk media of the formation,                  2 whereas secondary permeability is that of the -- of the                  3 fracture zones.                  4 Infiltration is the rate that water enters the                  5 ground surface.                  6 And recharge is the rate that enter -- that                  7 water enters an aquifer, and it's the amount -- it's --                  8 the difference between infiltration and recharge is                  9 often the amount lost during passage through the                  10 unsaturated zone, otherwise known as the vadose zone.                  11 Andesite very simply is extrusive igneous or                  12 volcanic rock. It forms when magma reaches the ground                  13 surface and quickly crystallizes. Many witnesses have                  14 referred to -- or at least some of the witnesses for the                  15 mining company have referred to the volcano in the area                  16 of the -- of the mineral deposit.                  17 And there's approximately 230 acres of waste                  18 rock at the proposed Copper Flat Mine. Most of it is in                  19 the waste rock outside the pit lake capture zone.                  20 Now, first off, slide number 5, titled                  21 Andesite is not a natural liner.                  22 The application referred to andesite as a                  23 natural liner system, and in doing so, it reference --                  24 it provided a reference to SRK, 2013, for the claim that                  25 andesite has a permeability of less than 10 to the</p>	1170	<p>1 state's decision on accepting this as 10 to the minus-6                  2 centimeters per second somewhat set this -- the                  3 permeability of this particular well at zero.                  4 Now, the pressure injection test was -- that                  5 was done was -- is what is called -- what is known as a                  6 standard Lugeon test, which the normal usage of a                  7 standard Lugeon test is actually for estimating the                  8 permeability of a foundation of their dam. It's not                  9 even a common hydrogeologic method, in my research and a                  10 little bit of training I've had with it years and years                  11 ago.                  12 But what it does is -- is it -- you take the                  13 well, a borehole, and you collar off a section of the --                  14 of the borehole so that water cannot enter from above or                  15 below in the borehole, and you pump water under pressure                  16 into that collared-off area and then measure the rate at                  17 which you are -- the pressure and flow rate that you                  18 are -- are injecting -- injecting at.                  19 And simply it determines the conductivity                  20 required to maintain an injection rate of one liter per                  21 minute per meter of open interval. And you determine a                  22 thing called a Lugeon interval, which is equal to 1.3                  23 times 10 to the minus-5 centimeters per second.                  24 Now, for this well, the test was performed                  25 between 64 and 100 feet below ground surface, and that</p>

<p style="text-align: right;">1171</p> <p>1 was below the water table.  2 Now, initially -- I have two figures on the  3 far right here. These come from the Shomaker, 2011,  4 report.  5 The upper figure -- I mean, they look very  6 similar, but the difference is the -- the -- on the Y  7 axis, this is -- the -- I believe that one is the  8 injection rate versus the total head of -- that was  9 being applied to the well.  10 And the one at the bottom is the -- the  11 apparent permeability in Lugeons versus the total head  12 of water being applied.  13 I mean, they're essentially mirror image of  14 each other, as you can see.  15 What this shows at the top is that initially  16 after 200 feet of head there was no water that was being  17 injected, but after it got to 200 feet of head for  18 almost -- for one, two, three -- for five different  19 intervals of injection, it was relatively steady around  20 0.1 gallons per minute. And this is in gallons per  21 minute, not liters per minute. And then after about  22 300 feet, it jumped.  23 What that indicates is that -- I mean, once it  24 began to enter the fractures, it flowed at rates that  25 resulted in about .04 to 0.1 Lugeon units. That is this</p>	<p style="text-align: right;">1173</p> <p>1 second.  2 That pressure test that you're referring to,  3 is that -- just to tie things together, is that the same  4 thing that Dr. Marcoline was referring to as a slug  5 test?  6 A. No, it is not. A slug test is where you allow  7 water to -- I mean, depends on exactly how -- there's a  8 lot of ways of doing a slug test, but in general, you're  9 not applying additional pressure.  10 Q. Are we talking about the same test on the same  11 well even though you're using different terminology?  12 A. No. We're not talking -- a slug test on -- I  13 don't know that a slug test was performed on this  14 particular well.  15 Q. Okay.  16 A. I'll say that with the permeabilities that  17 we've seen there, the slug test would take so long to --  18 it would not be -- it's outside the range at which a  19 slug test is appropriate, I think.  20 Slide number 7, Inappropriateness of the  21 pressure injection tests for estimating surface  22 infiltration.  23 For one, the test was completed at a depth  24 that's not representative of conditions at the ground  25 surface on which the waste rock will be stored. I mean,</p>
<p style="text-align: right;">1172</p> <p>1 lower table here. You can see that that's 0.4. It  2 bounces back and forth in here. And so between .04 and  3 .1 you have a permeability that would be measured from  4 5.2 times 10 to the minus-7 to 1.3 times 10 to the  5 minus-6.  6 Now, that's not saying this is incredibly  7 conductive, but it's a whole lot higher than 0. And  8 that -- that's my point in showing this.  9 And I also will point out that between 200 and  10 300 feet the injection rate was relatively constant.  11 For head varying -- for the head varying from 200 to  12 300 feet, the injection rate was relatively constant,  13 which indicates that water was flowing into the well,  14 into this -- into this section of the well and flowing  15 into the fractures.  16 It -- and it also suggests that the flow rate  17 at that point was relatively laminar until it jumped  18 here, and then it may have gone turbulent at this higher  19 injection rate.  20 So anyhow this observation is more  21 appropriate -- I mean, this estimate here of 1.3 times  22 10 to the minus-6 to 5.2 times 10 to the  23 minus-7 centimeters per second is more appropriate than  24 calling this a 0 value.  25 Q. Dr. Myers, if I could interrupt for just a</p>	<p style="text-align: right;">1174</p> <p>1 we're considering infiltration into the ground at the  2 ground surface or at the level after which colluvium  3 will be scraped off the top of the andesite. It's not  4 a -- that is not representative of andesite -- or I  5 should say andesite between 60 and 100 feet is not  6 necessarily representative of andesite at the surface,  7 due to weathering and other considerations.  8 It's only one sample. I mean, there were a  9 couple of other tests performed, slug tests, but this  10 was only one sample. We can -- or -- excuse me. It's  11 one sample. It's one observation. We cannot understand  12 the variability in permeability if you're considering  13 just one -- one observation.  14 And the standard Lugeon test is usually  15 performed on a shorter section, and I believe in order  16 for this to have -- test to have more validity, it  17 should have been accompanied by geophysical logging  18 of -- to know whether we're dealing with one fracture or  19 half a dozen in that -- in that range. I did not see  20 anything that suggested that geophysical logging was  21 done in that -- along with this test.  22 Slide number 8, titled Low permeability of  23 andesite is not reflected in the observed 1982 mine  24 dewatering.  25 There are several ref -- there are several</p>

<p style="text-align: right;">1175</p> <p>1 references that suggest that the -- that observed mine  2 dewatering in the -- that when the mine operated in 1982  3 showed that this andesite is very low permeability.  4       And I'll point out -- I show the hydrogeologic  5 map from the numerical model report. It shows the  6 bedrock that surrounds the pit. Here in the middle of  7 what's called the Animas Uplift, it's the green area,  8 and you can see the permit boundary here, and the green  9 area encompasses about the western three-fifths of that  10 permit area.  11       The green is bedrock. It is both monzonite --  12 excuse me. It's both andesite, which is the larger  13 area -- I'll draw your attention to the cross-section  14 here, that goes through the middle of the pit area.  15 That cross-section is shown over here on the right, and  16 it shows that the andesite surrounds the monzonite in  17 which the mine would be constructed.  18       So when they were dewatering the original pit,  19 they would have been dewatering an area here that  20 consists of andesite and monzonite, but they -- it's  21 referring to this overall pit area right here in the  22 middle.  23       So there were several different observations  24 of dewatering.  25       One was dewatering rates were from 22 to 50</p>	<p style="text-align: right;">1177</p> <p>1 groundwater flow into this pit lake, through the  2 perimeter and up from the bottom. So that's this  3 overall area here of 290,000 square feet.  4       Then you determine the gradient for flow  5 from -- from all around, and -- and anyone can see that  6 these contours that -- are steeper in some areas than  7 they are in the other.  8       And so as I -- as I've tabulated here, from  9 the east, there's a drop of about five feet in 500 feet,  10 for a slope of .01. From the west, it's about 10 feet  11 in 300 feet, for a .033. North we've got about .025.  12 And from the south, about .0167. For an average  13 gradient of .02125.  14       Now, I've taken Darcy's law, which I've  15 rearranged here in beneath -- beneath the map. I've  16 rearranged and solved it for conductivity. Conductivity  17 is equal to the flow rate divided by the area times the  18 gradient.  19       And if you run -- run this calculation for  20 all -- for four different flow rate scenarios. Let's  21 say I'm not going to argue about which is -- you know,  22 which was an accurate and -- is accurately representing  23 the groundwater inflow to the pit lake. But we've ended  24 up -- I've ended up with K values of from .19 to 1.56,  25 or in centimeters per second 6.6 times 10 to the minus-5</p>
<p style="text-align: right;">1176</p> <p>1 gallons per minute.  2       And another one was that as the pit lake  3 has -- has varied since 1982 it has evaporated from 16  4 to 45 gallons per minute. And that -- those are flow  5 rates that would have had to enter this -- the existing  6 pit there.  7       And then there's also an estimate of six to 10  8 gallons per minute of estimated groundwater inflow.  9       Now, I wanted to use that information to show  10 what an effective permeability or conductivity is for  11 flow into the -- into the existing pit lake, which is --  12 the slide on the right here is also -- is a slide  13 showing existing contours, groundwater contours around  14 the pit.  15       It -- what I've done is I've determined the  16 area for flow to the pit lake. This being the pit lake  17 here, groundwater has to flow through -- come to it from  18 all different directions, as these -- as these arrows  19 indicate. And the lake itself appears to be a --  20 there's a scale bar right here. It's about 500 by  21 500 feet, which I believe would coincide with the five  22 to six acres, that the pit lake is at right now.  23       If you then figure that the perimeter of this  24 pit lake is somewhere around 2,000 feet, and depth for  25 flow to the lake is about 20 feet, so you could have</p>	<p style="text-align: right;">1178</p> <p>1 to 5.5 times 10 to the minus-4.  2       That -- I mean, reasonable people could sit  3 down and would probably come up with different --  4 different numbers for some of this -- some of these  5 things, but none of them are going to be of large enough  6 magnitude to have this consistently below 10 to the  7 minus-6.  8       Since I -- so I would argue that a -- sort of  9 a large-scale representation of andesite conductivity is  10 that it's much higher than 10 to the minus-6.  11       My next slide is slide number 10, and this  12 slide just merely points out -- or it's titled  13 Groundwater model recharge: If the andesite is a natural  14 liner, why would there be any natural recharge?  15       And I will point out this slide over here is a  16 slide of the boundary conditions used in the numerical  17 model for the site. And -- and the colors along this  18 area over here, the green, the brown and the purple, or  19 chartreuse or whatever that color is, represents  20 different recharge rates.  21       Now, the one that applies over the monzonite,  22 andesite area of the mine is .14 inches per year. Now,  23 that is not a very large recharge rate. But I would --  24 if indeed geology has any control over recharge, why  25 wouldn't -- they're showing no recharge at all out here</p>



<p style="text-align: right;">1179</p> <p>1 in this -- where it's Santa Fe Group. And thus I would                  2 argue that if it's truly impermeable there should be no                  3 recharge in this particular area right here at all.                  4 And if indeed this is a relevant number and --                  5 there's more of an opportunity for seepage to enter the                  6 ground beneath a waste rock pile than there is -- than                  7 there is in a -- in natural recharge.                  8 I mean, natural recharge on a site like this                  9 only occurs during the few hours that you have -- that                  10 you have rainfall that exceeds -- you know, that is                  11 substantial enough to actually enter the ground,                  12 overcome the soil moisture and enter the -- enter the                  13 ground, whereas under a waste rock pile it provides a                  14 lot more opportunity for that -- for seepage to enter                  15 the ground.                  16 So slide number 11 states Seepage through                  17 ground surface beneath waste rock is much higher than                  18 natural recharge.                  19 Basically -- and this slide I'm not                  20 necessarily arguing about the -- you know, the modeling                  21 of flow through the waste rock. I'm simply saying that                  22 if -- if flow -- if precipitation enters unreclaimed                  23 waste rock, it will flow down through the waste rock, to                  24 the ground surface.                  25 During an event or over time, it would pond --</p>	<p style="text-align: right;">1181</p> <p>1 Andesite Conductivity.                  2 The NMCC estimate is dependent really on one                  3 pressure injection test performed at depth that is not                  4 representative of the ground surface. And I also                  5 suggested that the results of the test may have been                  6 misinterpreted.                  7 Pit dewatering suggests that an effective                  8 conductivity ranges from about 5.5 times 10 to the                  9 minus-4 to 6.6 times 10 to the minus-5 centimeters per                  10 second.                  11 Groundwater modeling used a recharge rate that                  12 suggests the potential for much higher infiltration rate                  13 based on there being more seepage entering the ground at                  14 the base of the waste rock.                  15 Thus I would conclude by saying that NMCC has                  16 not justified that andesite permeability as affecting                  17 seepage into the ground is less than 10 to the minus-6                  18 centimeters per second.                  19 Q. Okay, Dr. Myers. Do you have any                  20 recommendations as to how to address the issue that                  21 you've identified with the andesite characterization?                  22 A. Yes, I do.                  23 Madam Hearing Officer, I've got several                  24 recommendations here.                  25 One is that the andesite should be better</p>
<p style="text-align: right;">1180</p> <p>1 by pond, I don't mean inches or feet. I mean just a                  2 very small amount. But it would begin to either flow                  3 across the surface or it would enter the ground.                  4 If it flows across the surface, it could -- it                  5 could flow to a zone where there's a higher infiltration                  6 capacity or eventually reports to the edge of the waste                  7 rock where -- where it would be captured in a -- in one                  8 of the -- one of the ditches that surround the --                  9 surround the waste rock.                  10 But overall the average infiltration for a                  11 waste rock area is based on an area average, and it                  12 would be highly affected by the fact that some of                  13 this -- by water that flows underneath the waste rock                  14 would intersect zones that have higher conductivity than                  15 the overall area.                  16 I mean, if it's 10 to the minus -- it may be                  17 10 to the minus-6 in certain areas, but other areas it                  18 may be a lot higher, and that overall -- that average                  19 infiltration is going to be a lot higher than just                  20 simply assuming the one bulk rate.                  21 Now, this slide here I'm actually going to use                  22 on rebuttal so I'm -- it's in the packet that I've                  23 passed out, but I'm going to skip over this slide for                  24 now and use this is on -- in my rebuttal presentation.                  25 So a Summary of Waste Rock Seepage and</p>	<p style="text-align: right;">1182</p> <p>1 characterized before treating it as a natural liner. I                  2 suggest infiltrometer tests or some additional                  3 permeability tests of the andesite at the very near                  4 surface, which is what's -- where it's affected by                  5 the -- or where the seepage through waste rock would                  6 actually encounter the andesite.                  7 I think that either NMCC should withdraw the                  8 application and complete the necessary tests or that                  9 alternatively the NMED should add a condition to the                  10 permit requiring the tests that just as delineated be                  11 performed.                  12 And I would say I'm not recommending the                  13 number of tests that should be performed, but that that                  14 should be determined based upon professional judgment to                  15 minimize the variability, yet you get to collect enough                  16 tests that you have a good confidence in that the                  17 variability is -- and that you understand the                  18 variability in these observations.                  19 The goal should be to collect measurements                  20 until the calculated standard deviation becomes stable.                  21 Q. Okay.                  22 And, Dr. Myers, have you with the assistance                  23 of counsel prepared a proposed permit condition to                  24 require further characterization of the andesite?                  25 A. Yes, I have.</p>

1183	<p>1 Q. And you've been provided with a document</p> <p>2 that's marked as the Ranches Exhibit 30.</p> <p>3 Is that the proposed permit condition?</p> <p>4 A. Yes, it is.</p> <p>5 Q. And would you recommend any changes to this</p> <p>6 proposal at this time?</p> <p>7 A. Yeah. I mean, only that the NMED use their</p> <p>8 experience and use their understanding of the tests to</p> <p>9 determine the number of them that need to be performed</p> <p>10 and --</p> <p>11 Q. The number of tests?</p> <p>12 A. -- and the appropriate ones.</p> <p>13 Yeah. The number -- the number of tests as</p> <p>14 I -- as I referred to in my previous slide.</p> <p>15 MR. BUTZIER: Madam Hearing Officer, would it</p> <p>16 be possible to get a copy of that?</p> <p>17 I don't think it's in my materials.</p> <p>18 MS. ORTH: Exhibit 30?</p> <p>19 MR. DE SAILLAN: Everyone should have it. I</p> <p>20 think we can probably find another copy of it if you</p> <p>21 can't find it, Mr. Butzier.</p> <p>22 MR. BUTZIER: Was it included with the</p> <p>23 statement to present technical testimony?</p> <p>24 MR. DE SAILLAN: Yes, it was.</p> <p>25 MR. BUTZIER: Okay. Well, maybe my notebook's</p>	1185	<p>1 and tears that have been observed to occur in the past.</p> <p>2 And for this, I will refer to the testimony that</p> <p>3 Mr. Kuipers has provided, including reference to some of</p> <p>4 these references that he had -- that he had referenced.</p> <p>5 And I'll simply note that the DP application</p> <p>6 does not estimate the amount of potential leaks, nor</p> <p>7 does it consider their fate if those leaks were to</p> <p>8 occur.</p> <p>9 Now, unlined ditches around the site, around</p> <p>10 the waste rock could also be a source of -- and very</p> <p>11 specifically there -- I mean, this is -- this is during</p> <p>12 operation. So I want -- I want to be clear that during</p> <p>13 operations, before we -- before the mining company has</p> <p>14 reclaimed the waste rock, it is exposed, and -- and</p> <p>15 rainwater could run off of the site -- run off of the</p> <p>16 waste rock.</p> <p>17 And you can see around -- the figure I have</p> <p>18 shown here is sort of a detailed design drawing for</p> <p>19 Waste Rock Storage Pile 2 and Waste Rock Storage Pile 3.</p> <p>20 It shows a stormwater conveyance channel that comes</p> <p>21 around on the east and northeast side of the waste rock</p> <p>22 as well as from the south and southeast side of the</p> <p>23 waste rock, and it will flow to what's labeled here as</p> <p>24 Impacted Stormwater Impoundment C.</p> <p>25 Now, the impoundment I believe is lined, but</p>
1184	<p>1 not complete. I only go up to 25.</p> <p>2 Thank you very much.</p> <p>3 MR. KNIGHT: Exhibit 30.</p> <p>4 MR. BUTZIER: Okay. I have it. Thank you.</p> <p>5 MS. ORTH: Thank you.</p> <p>6 Is there a pending question? I'm sorry.</p> <p>7 MR. DE SAILLAN: No.</p> <p>8 Q. Dr. Myers, if you could proceed with the next</p> <p>9 topic in your prepared testimony.</p> <p>10 A. Yes, I can.</p> <p>11 I've just got a couple of slides here just to</p> <p>12 somewhat echo Mr. Kuipers' testimony actually, referring</p> <p>13 to the likely leaks through the tailings liner, and then</p> <p>14 also I'll mention briefly the potential for</p> <p>15 contamination through unlined stormwater ditches.</p> <p>16 Discharge Permit application</p> <p>17 Section 20.6.7.11J.(2) describes the tailings</p> <p>18 impoundment underdrain and liner system, but it does not</p> <p>19 provide a discussion for the potential of leaks or leak</p> <p>20 rates. The Probable Hydrologic Consequences report</p> <p>21 estimated flow through pinhole leaks.</p> <p>22 And I have no issues with the estimate of flow</p> <p>23 through pinhole leaks, but what -- what I did have an</p> <p>24 issue with is that it did not discuss in any way the</p> <p>25 rate of flow that could -- that could come through leaks</p>	1186	<p>1 the cross-section that is shown here for the stormwater</p> <p>2 conveyance channel does not have a liner.</p> <p>3 And I would point out that there is a</p> <p>4 potential during -- due to relatively -- I mean, if</p> <p>5 there's a significant storm, there -- there could be</p> <p>6 several feet of water, several feet of head in that --</p> <p>7 in those channels, and, frankly, you could have -- you</p> <p>8 could have percolation through the -- through the bottom</p> <p>9 of those channels.</p> <p>10 Q. Okay, Dr. Myers. Could you proceed with the</p> <p>11 next topic of your -- your prepared testimony?</p> <p>12 A. Yes, I can.</p> <p>13 My next topic is -- and I'm on slide 18 now,</p> <p>14 and this is sort of an introductory slide titled</p> <p>15 Interpretive Calculations of Plume Development.</p> <p>16 And I've got four different topics I'm going</p> <p>17 to briefly -- or -- I'm going to discuss, I mean, not</p> <p>18 quite so briefly, in the -- regarding the calculations</p> <p>19 that I did.</p> <p>20 First off, I'm going to consider Santa Fe</p> <p>21 Group and andesite hydrogeology briefly.</p> <p>22 Then I'm going to develop and explain how</p> <p>23 these interpretive calculations were performed.</p> <p>24 Then I will discuss the areal spread of the</p> <p>25 contaminant plume based upon these calculations,</p>

1187	<p>1 longitudinal spread, lateral spread.                  2 And then I will discuss some implications for                  3 monitoring well spacing for DP-1840.                  4 Now, slide 19, also titled Interpretive                  5 calculations of plume development.                  6 The purpose for doing this is to determine the                  7 required number of monitoring wells and spacing based                  8 upon dispersion that could occur from a potential                  9 substantial leak at the site.                  10 This is not based upon predicted                  11 0.5-gallon-per-minute leak rates or something like that,                  12 but this is based upon the fact that, you know,                  13 monitoring wells are used to detect a leak or detect a                  14 problem. And if there -- if there's an -- insufficient                  15 monitoring wells, it is very possible that they will not                  16 detect a major problem. And that's -- that is what I've                  17 tried to assess here.                  18 And then secondly, the purpose -- the second                  19 purpose is to assess whether contaminants from a                  20 substantial leak beneath either facility could reach                  21 offsite resources, specifically groundwater on the                  22 Ladder Ranch.                  23 Slide 20, Interpretive Calculations of plume                  24 development.                  25 Now, the method of doing this is I've</p>	1189	<p>1 An interpretative model is a screening model                  2 and a generic model. Now, I prefer to use the word                  3 "calculations" because this is not a calibrated                  4 groundwater model, this is not a model that is                  5 specifically designed to meet a specific observation at                  6 the site.                  7 It is -- it is a screening model that can help                  8 the modeler develop an initial understanding of the                  9 groundwater system and to test hypotheses about the                  10 system. And the hypotheses tested here include the                  11 potential rate of transport and dispersion for -- for                  12 the development of a plume.                  13 This might be the first cut of an analysis                  14 that could later lead to a more detailed model if                  15 necessary, but you take a look at -- you take a look at                  16 how contaminants could move across an aquifer that has                  17 the properties of the Santa Fe Group.                  18 Slide 22, Interpretative calculations of plume                  19 development, continued.                  20 Generic model -- a generic model can explore                  21 processes in a generic hydrogeologic setting. It helps                  22 to understand the processes apart from some of the                  23 uncertain complexities. Complexities -- and I'm going                  24 to calculate and consider some dispersion that occurs in                  25 a homogeneous aquifer. These complexities would make it</p>
1188	<p>1 completed interpretative transport calculations for a                  2 simulated leak into a hypothetical aquifer which is                  3 representative of the Santa Fe Group, and then I've also                  4 done it for waste rock seepage into the andesite.                  5 I've done this using a standard groundwater                  6 modeling code known as MODFLOW-2000 with a transport                  7 code known as MT3DMS with Groundwater Vistas graphical                  8 unit interface, GUI, or GUI they refer to it as, for the                  9 calculations and for -- and for preparing some graphics                  10 to show later.                  11 The domain size that I'm considering are --                  12 and properties were similar to those at the Copper Flat                  13 site.                  14 I have included a fault to consider whether                  15 the effects that a fault would -- could have on -- on                  16 contaminant transport.                  17 And I've simulated leaks based on there being                  18 a significant tear in the -- in the TSF liner or a                  19 preferential flow zone allowing seepage into the                  20 andesite beneath the waste rock facility.                  21 Now, what are interpretive calculations?                  22 Slide number 21, Interpretive calculations of plume                  23 development.                  24 I'm talking about a reference, a standard                  25 groundwater modeling book, Anderson, et al., 2015.</p>	1190	<p>1 worse than I'm -- than -- generally make it worse than                  2 I -- than I end up simulating here.                  3 I mean, understanding these processes can help                  4 establish appropriate monitoring well spacing.                  5 And it can help to determine the extent that                  6 contaminants could affect nearby property.                  7 Now, a couple of slides to set the -- to set                  8 the setting or the domain that I have considered.                  9 The slide on the left is from the Probable                  10 Hydrologic Consequences report. It shows -- you know,                  11 once again the permit boundary is shown in yellow. And                  12 in the chartreuse color shows the waste rock facility.                  13 And in the -- the yellow-ish-green shows the tailing                  14 storage facility.                  15 The material -- the brownish material on                  16 the -- on the east side of the map is Santa Fe Group.                  17 The green-ish material is mostly -- is bedrock, mostly                  18 andesite which underlies the -- which underlies the                  19 waste rock.                  20 The slide on the right shows the existing --                  21 the contours as they were at the site I believe in 2012                  22 or -- these are observed groundwater contours at the                  23 site. And you can see that the general flow path here,                  24 the general flow direction is from west to east. I                  25 mean, it -- just to the east of the site, which my</p>

<p style="text-align: right;">1191</p> <p>1 cursor is outlining the permit boundary again, the                  2 contours are a little steeper than they are further to                  3 the east.                  4 I also will note that this shows a fairly                  5 significant ridge in the groundwater, or shall I say                  6 it's almost a plateau, about four miles wide here, and                  7 then -- and then it shows a fairly significant gradient                  8 sloping off to the north and sloping off to the south                  9 down here toward Percha Creek, but -- and sloping off to                  10 the north toward Animas Creek.                  11 And I'll also point out on the right -- on the                  12 groundwater contour map on the right that it does                  13 ultimately reach Caballo Reservoir over here, on the far                  14 east.                  15 Q. Caballo Reservoir is where on that map?                  16 A. It's on the far east of the map on the right                  17 side, slide 23.                  18 Q. Thank you.                  19 A. It is approximately 20 -- approximately 12                  20 miles from the permit area, from the permit boundary. I                  21 mean, the permit area is a couple miles across so it's                  22 like 12 to 14 miles down to there.                  23 Now, I'm going to reuse this slide to go over                  24 the geology and how I'm considering it in my -- with my                  25 interpretative calculations.</p>	<p style="text-align: right;">1193</p> <p>1 studies, existing reports. Very specifically I took it                  2 from -- a lot of it from the Jones, et al., 2014, which                  3 is a numerical model report. That's the numerical model                  4 that went into the -- that was used for the Draft                  5 Environmental Impact Statement.                  6 Now, I'll just note that it was not                  7 developed -- that model was not developed as a transport                  8 model, and I don't believe it could be -- would be used                  9 as a transport model because the cell sizes are too                  10 large and the layers are too thick. But it's otherwise                  11 a very fine, very good flow model for the area.                  12 The Santa Fe Group is represented by numerous                  13 formation zones, and I say see Table 6.1, but that is                  14 Table 6.1 in Jones, et al., 2014.                  15 There's about 20 different formations -- or 20                  16 different parameter zones in the model that are used to                  17 describe Santa Fe Group, and in those parameter zones                  18 the conductivity varies from about 0.2 to 20 feet per                  19 day.                  20 The conductivity within the uplift and within                  21 their model layer 2, which is the uppermost active layer                  22 for most of the model domain, is generally less than one                  23 foot per day. I say below the fault. I should say east                  24 of the fault in the Palomas Basin the conductivity                  25 ranges from about .9 to 20 feet per day. The</p>
<p style="text-align: right;">1192</p> <p>1 Here again is the permit boundary. This --                  2 the figure on the left shows the permit boundary and                  3 shows that we have -- there's Santa Fe Group essentially                  4 extending all the way from the bedrock to the Caballo                  5 Reservoir.                  6 It shows a fault at the -- at the east                  7 boundary of the -- the east part of the permit boundary,                  8 and it flow -- and it flows -- and it shows that the --                  9 I mean, it is Santa Fe Group all the way until you reach                  10 some -- some more alluvial material down by the Rio                  11 Grande.                  12 The cross-section on the right, which again is                  13 this -- which again is labeled AA in the plan view,                  14 shows the Animas Uplift. It shows the fault on the --                  15 on the east side of the Animas Uplift. It shows -- it                  16 shows that the Santa Fe Group is -- that there's some                  17 Santa Fe Group within the Animas Uplift, and -- but that                  18 it continues more -- it's more continuous to the east,                  19 down toward the reservoir.                  20 And the other point -- important point here is                  21 that the Upper Santa Fe Group is about 1,000 feet thick.                  22 I mean, it varies, but it's approximately 1,000 feet                  23 thick.                  24 Now, I took almost all of the properties that                  25 I used in this -- in this analysis from existing</p>	<p style="text-align: right;">1194</p> <p>1 conductivity under the TSF is .2 feet per day.                  2 Vertical anisotropy, which is the ratio of                  3 vertical to horizontal conductivity, it was generally                  4 .01.                  5 And then when we consider the andesite, the                  6 andesite layer 2 at the site is .0 -- it's considered                  7 .0002 feet per day.                  8 This slide's titled SFG and TSF simulation,                  9 and it's slide number 26.                  10 This slide shows quite a lot of detail                  11 regarding how I did the simulations. The figure is a                  12 screen capture using the Groundwater Vistas processing                  13 software.                  14 And I just want to point out that many of the                  15 slides -- many of the figures that I use here are screen                  16 captures that -- and they're simple and easy to use, and                  17 most of the slides -- the figures also in my report                  18 that -- that outlay -- lines this particular analysis                  19 are also screen captures from this processing software.                  20 The bottom part is a plan view. The top part                  21 is a cross-sectional view. I will try to show where                  22 that cross-sectional view is on here. It doesn't                  23 always -- it's not always obvious on here -- on the                  24 actual cross-section. But that -- that is what this                  25 show -- the way this -- this -- these figures are laid</p>

<p style="text-align: right;">1195</p> <p>1 out.</p> <p>2 Now, I'll show -- the domain from the tailing</p> <p>3 storage facility to the reservoir, the distance from the</p> <p>4 far left to the far right is 68,000 feet, and the</p> <p>5 north/south distance is 21,000 feet.</p> <p>6 I chose this to be representative of the full</p> <p>7 distance to the reservoir, and I allowed simulations to</p> <p>8 run so I could see if -- if contaminants reached or what</p> <p>9 conceivable time it would take for the water -- for</p> <p>10 anything to get to the reservoir.</p> <p>11 21,000 feet wide was chosen for two reasons.</p> <p>12 It was approximately the width of that groundwater</p> <p>13 plateau that I showed on the -- the groundwater contour</p> <p>14 map a few slides ago, and it's also the width that I</p> <p>15 believe was far enough away -- I did not want</p> <p>16 no-flow-boundaries. The boundaries on the north and</p> <p>17 south are no-flow, meaning the water cannot go across</p> <p>18 them. I did not want that to affect the dispersion</p> <p>19 calculations which were going to be occurring in the</p> <p>20 middle of the domain.</p> <p>21 Q. Dr. Myers, when you say a no-flow boundary,</p> <p>22 that is a modeling term?</p> <p>23 A. That is a modeling term, and what it</p> <p>24 essentially means is that the groundwater flow is going</p> <p>25 parallel to it. There's no flow that goes across --</p>	<p style="text-align: right;">1197</p> <p>1 simulated. And that fault, the ground surface is</p> <p>2 5,200 feet. Between the far west and the fault, the</p> <p>3 surface gradient is .0378.</p> <p>4 Then east of the fault, it goes all the way</p> <p>5 down to the reservoir, where the elevation is</p> <p>6 approximately 4,200 feet -- well, it's exactly</p> <p>7 4,200 feet in the model, and the gradient is .0159.</p> <p>8 The cell size used in this model -- or for</p> <p>9 these calculations were 50 by 50 feet near the source on</p> <p>10 the far west side. Out here they're 100 by 100, and</p> <p>11 then where they overlap they end up being a different --</p> <p>12 some of them are 50 by 100, and -- and right at the</p> <p>13 fault I had a transitional size of 75 by 75.</p> <p>14 There are four layers in this model -- in --</p> <p>15 for these calculations. Each of them is 250 feet thick.</p> <p>16 So I would point out that that is approximately the</p> <p>17 thickness of the Santa Fe Group. And 1,000 feet thick</p> <p>18 is also approximately the -- they layer -- the thickness</p> <p>19 of layer 2 in the numerical model I used before I -- the</p> <p>20 Jones, et al., numerical model.</p> <p>21 The uppermost layer is assumed to be -- or is</p> <p>22 set to be unconfined, which means it doesn't go dry.</p> <p>23 Water level doesn't go below that -- doesn't go below</p> <p>24 the bottom. And then layers 2 through 4 are set to be</p> <p>25 confined.</p>
<p style="text-align: right;">1196</p> <p>1 that goes across that boundary. The -- the groundwater</p> <p>2 flow is set to go -- to be running parallel to it at</p> <p>3 that point.</p> <p>4 Q. Okay.</p> <p>5 And that's for purposes -- again that's for</p> <p>6 purposes of your model, it's not necessarily the real</p> <p>7 world.</p> <p>8 A. Oh, yeah, exactly. That -- it is very common</p> <p>9 in establishing a groundwater modeling domain to</p> <p>10 establish it between two flow -- flow paths that you</p> <p>11 assume that the pumping in your model, or whatever</p> <p>12 you're doing in your model, is not going to change these</p> <p>13 flow paths. Okay. It's common to do that.</p> <p>14 Q. Thank you.</p> <p>15 A. And I was -- I did not want anything that's</p> <p>16 happening in this area here, where I'm analyzing leaks,</p> <p>17 to be affect -- I did not want what happens in them to</p> <p>18 be affected by this -- by these boundaries. So it's set</p> <p>19 far enough away.</p> <p>20 Now, the domain, as I said, is 68,000 feet</p> <p>21 long.</p> <p>22 In the west, the elevation is -- the ground</p> <p>23 surface elevation is 5,400 feet. The green -- the</p> <p>24 vertical green line on the plan -- on the profile view</p> <p>25 is the fault, is the ground -- is the fault that I've</p>	<p style="text-align: right;">1198</p> <p>1 Slide 27 is SFG and TSF simulation.</p> <p>2 And this shows a plan view and a profile view</p> <p>3 on the right side that shows the parameter zones as I</p> <p>4 use them. I have three different hydrogeologic</p> <p>5 parameter zones.</p> <p>6 Well, first off, the far west side and east</p> <p>7 side of the mod -- of the calculations are established</p> <p>8 with constant head boundaries, which establish a head --</p> <p>9 a flow through the -- through the domain. The one on</p> <p>10 the west is set 100 feet below the ground surface. The</p> <p>11 one on the east is set 10 feet below the ground surface,</p> <p>12 which is approximately the reservoir level on the east</p> <p>13 side.</p> <p>14 The conductivity set to provide flow through</p> <p>15 the system was set to provide a flow similar to what was</p> <p>16 observed from the NMCC model. K1, which is the</p> <p>17 orange -- the large orange area east of the fault, is</p> <p>18 one foot per day. K2, which is the yellow, is .4 feet</p> <p>19 per day. The fault itself was set to have a</p> <p>20 conductivity of .01, but with a thickness of 20 feet.</p> <p>21 So that determines a conductance that is --</p> <p>22 you know, it prevents flow. I mean, it definitely solos</p> <p>23 the flow through here. I set that based on a drop in</p> <p>24 contours. I wanted to simulate a drop of about -- of</p> <p>25 about 30 to 40 feet through the fault zone. That was</p>

<p style="text-align: right;">1199</p> <p>1 how this was established.</p> <p>2 And then I also wanted to consider whether a</p> <p>3 fault fracture zone could have an effect on the flows.</p> <p>4 So there actually is a third parameter zone that runs --</p> <p>5 that's right here at the fault. It is to the west of</p> <p>6 the fault, it's one column wide, and it has a</p> <p>7 conductivity of 50 feet per day.</p> <p>8 Now, I want to -- I want to mention that I</p> <p>9 didn't just say 1.4 and just set it and be done. I used</p> <p>10 what's -- I used steady-state simulation to come -- to</p> <p>11 come up with flow -- to come up with groundwater</p> <p>12 contours that -- and to come up with a flow rate that</p> <p>13 was relatively close to what was observed going through</p> <p>14 the NMCC model.</p> <p>15 I ended up with about 275,000 cubic feet per</p> <p>16 day, or 2,300 acre-feet per year, discharging through</p> <p>17 this system to -- and coming out here at the lower end,</p> <p>18 20 -- which is about 20 percent of the simulated</p> <p>19 discharge in -- through -- from the Palomas Basin into</p> <p>20 the reservoir in the NMCC model.</p> <p>21 But I did this through a process where I -- I</p> <p>22 had several goals, and I think it is important I</p> <p>23 describe this a little bit. I had several goals.</p> <p>24 One is that we -- was that there's a 30-</p> <p>25 40-foot drop through the fault.</p>	<p style="text-align: right;">1201</p> <p>1 occur anywhere within that -- within the TSF, I was</p> <p>2 unable to test every possible location. So I tried</p> <p>3 to -- so I established it just based on approximately</p> <p>4 2,400 feet west of the fault so that there wouldn't be</p> <p>5 that much flow before it got to the fault.</p> <p>6 I used a conservative contaminant. I set it</p> <p>7 at 1,000 milligrams per liter. I'm not necessarily</p> <p>8 thinking of any specific -- specific contaminant,</p> <p>9 more -- more than I'm thinking of a tracer.</p> <p>10 The contours that I will discuss could be</p> <p>11 scaled. If you want to consider something that comes</p> <p>12 out at 100 micrograms per liter, you could consider --</p> <p>13 you could scale it, these contours, to -- to consider</p> <p>14 that -- I mean, for that type of a -- of a</p> <p>15 consideration.</p> <p>16 Dispersivity. Longitudinal, horizontal and</p> <p>17 vertical dispersivity was set at 25, 5 and 2.5 feet.</p> <p>18 That's based upon some standard textbook numbers. And I</p> <p>19 did test to variability, and ultimately the thing was</p> <p>20 not very sensitive to these actual values.</p> <p>21 I will also note that I used a porosity of .1</p> <p>22 for the Santa Fe Group and a specific yield of .1 and a</p> <p>23 storage coefficient of .001.</p> <p>24 I have two different type scenarios. There's</p> <p>25 a 100-year scenario for a four-gallon-per-minute leak</p>
<p style="text-align: right;">1200</p> <p>1 Second, that at no point did what was a</p> <p>2 surface flooded.</p> <p>3 And third, that I hit -- that I hit</p> <p>4 approximately this flow rate.</p> <p>5 And that's where I -- how I ended up with</p> <p>6 these two different -- these two different conductivity</p> <p>7 values. Plus I wanted them to be very close to what was</p> <p>8 used in the NMCC model, as well.</p> <p>9 After I -- after I established that and I --</p> <p>10 and a steady-state simulation was the starting</p> <p>11 conditions or the initial conditions for all future</p> <p>12 analysis.</p> <p>13 Simulation of leakage from the site. I did</p> <p>14 two different simulations.</p> <p>15 One is for four gallons per minute, which is</p> <p>16 700 cubic feet per day, over a 50-foot-square model</p> <p>17 cell. It comes out to about 0.3 feet per day.</p> <p>18 20 gallons per minute, 1.54 feet per day,</p> <p>19 which is consistent with the rate expected from a</p> <p>20 substantial leak as estimated in the Kuipers testimony.</p> <p>21 Now, I established the source to be about</p> <p>22 2,400 feet west of the fault. I will show that in a</p> <p>23 couple -- that exact location in a couple of slides.</p> <p>24 But considering that the tailing storage</p> <p>25 facility is about 6,000 feet across and the leak could</p>	<p style="text-align: right;">1202</p> <p>1 just to consider long-term transport properties, and a</p> <p>2 15-year leak followed by a 100-year recovery period.</p> <p>3 That's designed to consider a leak that lasts for much</p> <p>4 of the mine life, then reclamation covers it, stops it,</p> <p>5 just to show what could happen continuing after</p> <p>6 reclamation seals off the leak.</p> <p>7 The first -- this slide, Simulation of</p> <p>8 baseline: 4 gpm grains for 100 years, slide 29.</p> <p>9 This shows the concentrations that I got for a</p> <p>10 simulated leak at this point here. This is about</p> <p>11 2,400 feet from the fault. This is the whole model</p> <p>12 domain, by the way, all the way down to the reservoir.</p> <p>13 The different plan views that I will show will have</p> <p>14 different lengths and consider different areas so</p> <p>15 they're not always -- and in most cases, I have a scale</p> <p>16 bar so that it should be obvious what I am -- I am</p> <p>17 considering.</p> <p>18 What this shows is -- I mean, the mass is --</p> <p>19 the contours as I show them are -- go from 100 to 10 to</p> <p>20 1 to .1 to .01. So this is showing that the mass is</p> <p>21 primarily in an area that's about 500 feet wide and</p> <p>22 about, what, 5,000 feet long from this particular area</p> <p>23 here.</p> <p>24 But dispersion has caused some contaminants</p> <p>25 after 100 years now to reach all the way down and just</p>

<p style="text-align: right;">1203</p> <p>1 begin reaching the reservoir. Now, this is at .0 -- .01  2 contaminants. So it's -- it's not a whole lot of load  3 reaching the reservoir. In fact, it's very little load,  4 but it does show that -- that particles have gotten that  5 far.  6 Now, the one on the right side is showing what  7 happens if I made the fault 0.1 times as conductive.  8 You can see that it did not change the transport all  9 that much. That in other words, the transport was not  10 seriously affected by a lower conductance in the fault.  11 It slowed the transport marginally. It also  12 caused the water to back up a little bit. It came out  13 and flooded on the ground surface.  14 I also added some heterogeneity to the fault  15 to try and charge it, cause it to show flow away from  16 the fault, and it did -- ultimately did not cause a  17 whole lot of transport to go parallel to the fault, but  18 in general that's because I don't have -- I think that's  19 because there's not really much of a gradient going  20 north or south along the fault.  21 So now I'm going to consider the 15-year leak  22 scenarios with 100-year recovery.  23 The first slide I'm showing here is -- what  24 should I do?  25 (Discussion off the record.)</p>	<p style="text-align: right;">1205</p> <p>1 LAURA SCHNEBERGER  2 having been first duly sworn or affirmed, gave  3 public comment as follows:  4 PUBLIC COMMENT  5 MS. SCHNEBERGER: My name is Laura  6 Schneberger. We ranch in the western end of the county,  7 and we have raised three children on an extremely remote  8 ranch.  9 We've watched as our community and our area  10 has struggled to survive with the impact of a  11 well-hunted environmental movement pushing to remove  12 livestock from the land, and we have watched our  13 neighbors go under. And it has been very detrimental to  14 my family and my children. It has cost a lot of money  15 in the long run.  16 You don't think that losing your neighbors  17 will have that high of an impact, but it does. It puts  18 a lot of burden and a lot of cost back on our little  19 operation.  20 I think that a cumulative impact from not  21 being allowed to have this mine open up would be very  22 detrimental to the survival of this little county. We  23 live in an area where it's starting to be -- meth is the  24 biggest economic boost for this community. And I would  25 really love to see my kids have an opportunity to have a</p>
<p style="text-align: right;">1204</p> <p>1 MR. KUIPERS: Madam Hearing Officer, this  2 might be a good time for a break.  3 MS. ORTH: Okay. Let's take a break, 15  4 minutes.  5 (Proceedings in recess from 2:48 p.m. to  6 3:02 p.m.)  7 TERI CATES  8 having been first duly sworn or affirmed, gave  9 public comment as follows:  10 PUBLIC COMMENT  11 MS. CATES: Hi.  12 My name is Teri Cates, and I own TLC Pest  13 Control. I'm a local small business owner here in  14 Sierra County.  15 And I'm here to give my full support towards  16 the mine. We need jobs here, and we need our economics  17 to go up. It's very low. We don't have a lot of jobs.  18 We don't have very few piping jobs at all. And I think  19 the mine is going to greatly benefit us in all aspects  20 of our community.  21 And that's all I have to say.  22 MS. ORTH: Thank you, Ms. Cates.  23 MS. CATES: Thank you.  24 MS. ORTH: Ms. Schneberger.  25</p>	<p style="text-align: right;">1206</p> <p>1 job that this mine might provide.  2 I trust that the environmental -- I guess  3 documents have been done. I see that they're on the web  4 site. I've downloaded them. I've started to read them  5 and gone back to work, and I haven't gotten done what I  6 need to do. I understand that I haven't.  7 But I do want to give you all my full support  8 and hope that one day soon that the kids in this  9 community will have somewhere to go get a job, so they  10 don't have to leave this county to find a job that will  11 take care of their families.  12 Thank you.  13 MS. ORTH: Thank you, Ms. Schneberger.  14 No one else indicated a desire on the sign-in  15 sheet to offer public comment, but if there is anyone  16 else, this is a good time, who has not already spoken.  17 No?  18 All right. In that case, we will return to  19 the technical witness.  20 Thank you, Dr. Myers, for letting us slip that  21 in.  22 MR. MYERS: Oh, absolutely.  23 Ready?  24 MS. ORTH: Yes.  25</p>

1207

1 TOM MYERS  
 2 having been previously duly sworn or affirmed, was  
 3 examined and testified further as follows:  
 4 DIRECT EXAMINATION (Continued)  
 5 BY MR. DE SAILLAN:  
 6 MR. MYERS: Well, before we were so rudely  
 7 interrupted by the projector, I was starting to describe  
 8 the simulations I did of four gallons per minute and 20  
 9 gallons per minute into Santa Fe Group.  
 10 The first slides that I'm showing here are a  
 11 slide of the change in the groundwater level due to  
 12 these leaks. This is after 15 years. And contour  
 13 intervals, as you see, are two footers.  
 14 And I will just point out that the simulation  
 15 that I have run for four gallons per minute ends up with  
 16 approximately a nine-foot groundwater mound forming on  
 17 top of the water table at -- underneath the source. And  
 18 for the 20-gallon-per-minute leak, it's approximately a  
 19 39-foot mound that forms under the tailings facility.  
 20 And I don't think that's an uncommon thing  
 21 when you -- when you have a significant leak beneath a  
 22 tailings facility.  
 23 I've got a series of slides here that show the  
 24 development of concentration contours emanating from  
 25 a -- a source, which is this -- this red -- little red

1208

1 dot here is a 50-foot-square model cell, and that is the  
 2 source.  
 3 This shows for the four -- and the left side  
 4 is the four gallons per minute, the right side is 20  
 5 gallons per minute. And the contaminant contours are as  
 6 I mentioned before, the inner one being 100, then -- and  
 7 then 1, then .1, .01, and sometimes it actually goes out  
 8 to .001 if that's what the software decided to do.  
 9 This shows that after one year the dispersion  
 10 along the flow path. And I'll note that the flow path  
 11 is directed west to east.  
 12 And I'll also show that you -- some of the --  
 13 you'll see some monitoring wells on here. These are  
 14 simulated monitoring wells that I'm going to use later  
 15 to show some hydrographs on.  
 16 But this -- this shows that the -- the plume,  
 17 however you may define the plume, after one year has  
 18 gone, a little over 500 feet for the largest contour,  
 19 and out to about 1,500 feet would be -- would begin to  
 20 detect it.  
 21 For the 20-gallon-per-minute leak, you don't  
 22 see a great deal of difference on the longitude -- in  
 23 the flow path, in the direction along the flow path.  
 24 But you do see more lateral dispersion, which is  
 25 north/south, and that is because dispersion is partly

1209

1 affected by a -- by a concentration gradient, because  
 2 there's more -- I think because 20 gallons per minute  
 3 puts five times the mass of contaminant into the ground,  
 4 it allows it to disperse off of the flow -- off the main  
 5 flow path more quickly.  
 6 Same information after two years.  
 7 And by the way, I will point out that you see  
 8 dispersion actually going upgradient against the flow.  
 9 And that is what -- that's -- typically dispersion does  
 10 that. Dispersion -- part of it is due to the  
 11 concentration of -- of the contaminant. So you have  
 12 some flow in this direction, but for the most part, it  
 13 is going in this direction. It is going in this  
 14 direction, and it becomes --  
 15 Q. (BY MR. DE SAILLAN) When you say -- excuse  
 16 me, Dr. Myers.  
 17 When you say "this direction," could you give  
 18 us a direction?  
 19 A. The -- most of the flow -- I mean most of the  
 20 dispersion is along the flow path to the east, and it  
 21 spreads out because -- more in that direction because  
 22 that is where the -- the groundwater -- the flow is  
 23 naturally going.  
 24 Again I'll note that longitudinally there's  
 25 not a lot of difference between four and 20 gallons per

1210

1 minute, but the lateral -- the lateral transport there's  
 2 a bit more at 20 gallons per minute.  
 3 The next slide shows what happens after 15  
 4 years. You can see that it has expanded further.  
 5 This is down -- this -- there is a monitoring  
 6 well here labeled MW9500. That means 9,500 feet from  
 7 the source. And so you can -- one can use that to  
 8 consider the magnitude. So what we've got at 20 gallons  
 9 per minute is a 100-milligram-per-liter contour,  
 10 covering an area that's almost two miles long and about  
 11 half a mile wide.  
 12 Now, the leak stops at 15 years, and  
 13 everything recovers for 100 years. Well, there's no  
 14 more contaminant around the source, but it does continue  
 15 to flow. And it -- after -- so after 100 and -- 100  
 16 years after the leak is ceased, it is about -- about two  
 17 miles from -- the centroid of the plume is about two  
 18 miles from the reservoir.  
 19 And there's not a lot of difference. This is  
 20 only a 10-milligram-per-liter contour. The one on the  
 21 right side for that 20-gallon-per-minute leak is a  
 22 100-milligram-per-liter contour.  
 23 Now, I've also considered seepage from the  
 24 waste rock -- waste rock seepage in the andesite, and  
 25 there's a couple of assumptions that go into the model



<p style="text-align: right;">1211</p> <p>1 for that -- or go into the calculations for that.  2 This says same domain as for the tailing  3 storage facility. I actually shortened it because  4 there's so little flow through the system that it was  5 not going to go anywheres near the reservoir. So the  6 domain is only 12,000 feet long.  7 I used a conductivity of .01 feet per day.  8 And dispersion coefficients remain the same as  9 for the SFG.  10 The seepage rate and properties of the seepage  11 were the same as for the four-gallon-per-minute TSF  12 leak. I did not try to run 20 gallons per minute into  13 the andesite because it simply wouldn't take it.  14 It ended up with a domain flow rate of about  15 2,500 cubic feet per day, which is like one-hundredth  16 the flow rate that the calculations had going through  17 the Santa Fe Group.  18 So similar concentration diagrams.  19 After one year, you see that most dispersion  20 is directly around -- it's almost circular dispersion.  21 There's very little longitude natural dispersion along  22 the flow path because there's -- because the flow rate  23 is so little. But dispersion has caused -- has caused  24 the contaminant to go maybe 300 feet from the source,  25 both up- and downgradient.</p>	<p style="text-align: right;">1213</p> <p>1 source due to the concentration gradient, but the  2 difference began to disappear downgradient as the plume  3 moves with the flow.  4 Then third, lateral dispersion is much more  5 important for the leak into andesite because the  6 downgradient flow rate is much lower and there is much  7 less flow for dilution.  8 Now, slide number 38 starts to show some  9 concentration hydrographs for monitoring wells that I  10 showed on a couple -- a couple slides ago.  11 These monitoring wells are spaced with --  12 downgradient. These -- this slide is directly along the  13 flow path. So if you can see the legend, it is labeled  14 MW500L1. What that means is monitoring well 500 feet  15 downgradient from the source in model layer 1, and so  16 on. The furthest one is 9,500 feet from the source.  17 And what -- you see kind of what one would  18 expect, that you start to -- that the concentration is  19 first detected at about 60 days at 500 feet. After  20 about -- takes about three years for it to reach its  21 full concentration at 800 milligrams per liter. And  22 then it stays relatively flat, then, for a period -- for  23 about the length of the leak. And then it drops off  24 relatively quickly, as it moves -- as it moves through.  25 Further downgradient the peak is lower, and</p>
<p style="text-align: right;">1212</p> <p>1 After 100 years after the leak -- this is  2 after the leak has ceased and 100 years later, there --  3 there still is a substantial mass, but it's only  4 centered at about 2,500 feet from the site.  5 So this is -- the difference between  6 contaminant movement in the andesite and contaminant  7 movement in the SFG is that it moves a whole lot slower,  8 but that it covers a larger area. It just doesn't  9 dilute as much because there's a -- because there's much  10 less flow to dilute it, as well.  11 And dispersion is almost as important as -- as  12 advection, advection being the movement of the  13 contaminant with the groundwater flow.  14 And that was slide number 30.  15 MS. ORTH: 36?  16 MR. MYERS: Oh, 36. Yeah. Thank you.  17 Now, for a summary of the slides that  18 showed -- showed the development of the plume.  19 First, the length of the plume from west to  20 east did not vary substantially among leak rates because  21 it is controlled by the flow rate in the aquifer. There  22 were some minor differences due to dispersion along the  23 flow path.  24 Second, a higher leak rate into the Santa Fe  25 Group had a much higher lateral dispersion near the</p>	<p style="text-align: right;">1214</p> <p>1 it's more spread out. So at 9,500 feet, the peak is  2 only 200 milligrams per liter, and you don't -- but you  3 don't detect it for about 12 to 13 years. That's  4 something to consider when placing a monitoring well  5 probably.  6 If you look deeper into the aquifer, 250 to  7 500 feet below ground surface, the wells -- the  8 monitoring points closest to the source actually have a  9 lower peak than the ones further from the source, and  10 that is because with distance one ends up with more --  11 ends up with more mass reaching deeper into the aquifer.  12 And I'll -- I'll actually summarize some  13 numbers in a minute or two here that -- for distances  14 and times to detection.  15 If you look at the 20-gallon-per-minute  16 scenario, you see more or less the same thing only  17 higher concentrations. I mean, the time to detection is  18 approximately the same between the  19 four-gallon-per-minute and the 20-gallon-per-minute  20 because again, as I've said, it's the -- it's the flow  21 rate along the flow path that really controls that.  22 And for the higher -- for the  23 20-gallon-per-minute scenario, there was actually  24 detectible tracer in layer number 3.  25 Considering in the waste rock -- considering</p>

<p style="text-align: right;">1215</p> <p>1 the four-gallon-per-minute leak -- or I should say  2 seepage from the waste rock on the andesite, again by  3 distance from the leak, you see at 500 -- 500 feet it's  4 almost -- it's -- it's over a year before it's even  5 really detected, and it peaks at about -- well, it peaks  6 almost what the source concentration is after 15 years,  7 over 950.  8       And at 1,000 feet, 1,500 feet, it -- it more  9 or less shows it moving fairly -- you know, without  10 being diluted that much, but it moves slowly  11 downgradient. I'll point out this -- that at 80  12 years -- it's almost 80 years before it's detected at  13 3,500 feet.  14       In layer 2, you get a much higher  15 concentration. Because of the slower movement, you end  16 up with more contaminant into -- into the deeper layers.  17       Now, a summary with -- of transport with  18 distance from the leaks.  19       For the four-gallon-per-minute leak into the  20 Santa Fe Group, concentration peaks with distance from  21 the source. But contaminants initially appear at the  22 monitoring wells within 1,500 feet within a year, but at  23 3,500, 75 -- or 5,500, 7,500 and 9,500 feet, initial  24 detection occurs at four, seven, nine and 11 years  25 respectively.</p>	<p style="text-align: right;">1217</p> <p>1 slides -- or these hydrographs give an idea of what the  2 dispersion is lateral to the source.  3       And what we -- and what these graphs are, the  4 uppermost one is for -- is a concentration hydrograph on  5 the flow path at 2,000 feet from the source. So this is  6 not a repeat of one of the hydrographs -- or  7 concentration graphs I had on the previous slide because  8 I went -- I went from 1,500 to 3,500 feet.  9       At 2,000 feet, you can see the four-GPM leak  10 peaks out at a little over 500 milligrams per liter.  11 But if you move 100 feet transverse to the flow path, it  12 has -- it's approximately 15 percent lower. It's about  13 460 milligrams per liter. If you move 200 feet away  14 from the flow path, it's down to 300. And if you move  15 all the way down, say 400 feet from the flow path,  16 you're down to 80 milligrams per liter.  17       So if your monitoring well is on the flow  18 path, it really has a chance to pick -- to see  19 something, to capture that -- to capture something, but  20 at 400 feet off, huh-uh, it's going to -- it's such a  21 low amount that even if you see that you may not realize  22 it as a -- as a significant change in what the  23 background concentration would have been.  24       Now, if it's a larger leak, if it's a, you  25 know, 20-gallon-per-minute leak, you know, at</p>
<p style="text-align: right;">1216</p> <p>1       Now, the 20-gallon-per-minute leak into the  2 Santa Fe Group, the time trends are similar to the  3 four-gallon-per-minute leak, but the peaks are higher,  4 and with distance and time the contaminant reaches  5 deeper into the aquifer.  6       Then hydrographs become horizontal as the  7 transport becomes steady-state with the flow.  8       And finally, the four-gallon-per-minute  9 seepage from the waste rock into the andesite, the  10 contaminant moves much slower, there's a much longer  11 time to detection and to peak, and the peak is higher  12 than for the tailing storage facility at short distances  13 due to a lack of dilution. There should -- that should  14 be -- should say "dilution" after "lack" there.  15       Now, I have one more slide that shows these  16 hydrographs, and what this shows is the hydrograph for  17 concentrations transverse to the flow path.  18       So if you consider that the flow path was  19 directly west to east from the source, you go -- and  20 I've already shown how the concentration decreases with  21 distance along that -- along that pathway.  22       What about away from the flow path? Does -- I  23 mean, if your monitoring well is not directly on the  24 flow path, you're certainly not going to see the  25 concentrations that are at the flow path. These</p>	<p style="text-align: right;">1218</p> <p>1 400 feet -- 400 feet is almost 80 percent of the peak.  2       And I'll note here that -- that the peak flow  3 and the -- the monitoring well 100 feet from the flow  4 path is essentially -- it's only about five milligrams  5 per liter difference so they plot on top of each other.  6 So here you get, you know, the larger leak at about 600  7 feet down to half -- down to just a little more than  8 50 percent. Okay. And then it drops off even more,  9 but -- so it's all a function of how far you are from  10 the flow path.  11       Over here on the far right, we show a similar  12 information only for the andesite, and this is for a  13 .500 feet from the source, but then lateral -- or  14 transverse to the flow path you can see that these are  15 very closely -- or the biggest difference for up to  16 about 500 feet from the flow path isn't so much the  17 peak -- the ultimate peak, but it's the time to first  18 detection and the time to when that peak is discovered.  19       So if you're monitoring along the flow path,  20 you may not see it for a couple of years, but eventually  21 you will see it, you know, up -- you'll get the peak at  22 about 15 years.  23       But if your monitoring well is almost -- is  24 40 -- or if your monitoring well is -- let's say this  25 blue one here, 500 feet from the flow path, you'll still</p>

<p style="text-align: right;">1219</p> <p>1 eventually get a very high contaminant concentration,  2 but you won't see it for 40 years.  3 Now, Summary of transport transverse to the  4 leak.  5 For the four-gallon-per-minute leak into the  6 Santa Fe Group, at least three years to detect and five  7 years for its concentration to approach steady-state.  8 There is a substantial lateral decreases begin at about  9 100 feet from the flow path.  10 20-gallons-per-minute leak into the Santa Fe  11 Group peaks are higher near the flow path, but they drop  12 quickly about -- beginning 400 to 500 feet from the flow  13 path. The concentration drops very quickly.  14 The four-gallon-per-minute leak into the  15 andesite is not detectible at 2,000 feet for 40 years,  16 and therefore I've considered 500 feet from the leak  17 detectible concentrations occur in about four years.  18 400 feet from the flow path the concentrations  19 decrease just slightly, with peaks after 16 years  20 remaining high to about 60 years.  21 800 feet from the flow path concentrations  22 exceed 30 percent of the leak -- of the leak. This is  23 that they -- it's 1,000 milligram per liter from the  24 leak, although detection -- you didn't really see it  25 initially for about 15 years.</p>	<p style="text-align: right;">1221</p> <p>1 plumes will pass through undetected. Some of these  2 plumes were 500 to 600, 700 feet wide. If your well was  3 in that, you might have seen them. But if your spacing  4 is 1,000 feet, it's very possible for the contaminant  5 plume to pass through undetected.  6 Monitoring wells will not likely ever detect  7 the full contamination because it's very unlikely that  8 the wells are on the flow path.  9 In andesite, dispersion causes a high  10 concentration lateral to flow path, but only after a  11 long period. Thus the distance from the source for  12 monitoring is critical.  13 And contaminants will continue to flow even  14 after the leak is stopped. I mean, the contaminants are  15 in the ground, and they'll continue to flow, and you'll  16 continue to detect them for a period of time, and  17 therefore monitoring must continue until the leak  18 passes.  19 Q. Dr. Myers, have you with the assistance of  20 counsel prepared a proposed permit condition to address  21 the -- the problem of inadequate monitoring?  22 A. Yes, we have. Yes, I have, but it was based  23 on the recommendations. I think it was based on the  24 recommendations that I had originally come up with for  25 DP-1840, based on the transport calculations.</p>
<p style="text-align: right;">1220</p> <p>1 Overall Summary of these numerical tests.  2 The peak concentration occurs on the flow path  3 from the source, regardless of the media, the formation.  4 The concentration decreases with distance from  5 the source.  6 The concentration at depth increases with  7 distance from the source.  8 The shape of the plume depends on the  9 conductivity and the dispersion.  10 High conductivity has a higher flow rate and  11 therefore a much more elongated plume. There's less  12 dispersion transverse to the flow path, and the plume  13 shape is not dependent greatly on what -- on the exact  14 leak rate, but the total mass of concentration, of  15 course, does vary.  16 The lower conductivity has a lower flow rate  17 and more compact plume. Lateral dispersion is much more  18 important.  19 And lower conductivity -- yeah. Lower  20 conductivity also has less dilution.  21 Now, Dispersion from a leak - the effect on  22 monitoring.  23 Dispersion occurs longitudinally, laterally  24 and vertically.  25 If wells are spaced too widely, contaminant</p>	<p style="text-align: right;">1222</p> <p>1 And that's kind -- that's what this slide  2 number 46 shows.  3 And that is for a tailings impoundment which  4 is over 6,000 feet across. So it's important to  5 remember that the source may have -- may actually have  6 to flow 6,000 feet all the way across the tailings  7 storage facility, along the potential flow path before  8 it even reaches the perimeter.  9 Thus I believe that the recommended spacing  10 based upon my plume calculations should be 500 feet, and  11 if you take the perimeter from the south side to the  12 north side, and I'm sort of scaling -- I'm just scaling  13 the distance, it appears to be about 8,500 feet -- there  14 would be about 18 monitoring wells needed along the  15 perimeter down -- the downgradient perimeter of the  16 tailing storage facility.  17 The waste rock facility is roughly 3,000 feet  18 across, which, you know, considering the slowness --  19 slowness of the transport under the leak -- I mean under  20 the -- in the andesite, I would -- I will recommend  21 monitoring wells based on there being a leak 500 -- or a  22 seepage source 500 feet from the perimeter.  23 Monitoring wells should be spaced at about  24 500 feet. I mean, larger spacing might be okay, except  25 it will take a very long time for it to be detected, and</p>

<p style="text-align: right;">1223</p> <p>1 that's ultimately why I don't recommend a larger spacing  2 for -- at the waste rock.  3 And thus based on the perimeter of about  4 5,000 feet, there should be about -- downgradient of  5 WRSP-2 and 3 there should be about 10 monitoring wells.  6 I will note that I'm not specifically  7 commenting on any specific proposed monitoring well  8 in -- in the plan when I say 10 monitoring wells or 18  9 monitoring wells.  10 I also note that this analysis is based  11 upon -- is not based upon there being fractures. And --  12 and the fractures are observed in either of the  13 formations. That is a cause for an additional  14 monitoring well, not to get rid of one of the  15 proposed -- one of the ones that I recommend.  16 And as with many things in my presentation,  17 there are more details in my May report.  18 Q. Okay.  19 And you should have been provided with a  20 document that's marked as Ranches Exhibit Number 34?  21 Is that the proposed permit condition that you  22 prepared?  23 A. Yes, it is.  24 Q. And would you like to make any changes or  25 revisions to the proposed permit condition at this time?</p>	<p style="text-align: right;">1225</p> <p>1 A. Well, I mean, fracture -- fractures are, you  2 know, secondary permeability, like I mentioned up at the  3 beginning, and often in a zone that has a much higher  4 permeability. And if a -- if the groundwater flow is in  5 any way transverse to a fracture, the fracture could  6 intercept that groundwater flow and cause some or all of  7 it to move along the fracture.  8 And thus it could -- it could move in  9 directions not necessarily predicted using a homogeneous  10 aquifer model calculations as I -- as I used in my  11 interpretative calculations.  12 Q. So potentially there could be a more northern  13 or northeastern component to the -- the flow direction  14 that your calculations depicted?  15 A. Absolutely. There -- I mean, the fault  16 continued -- the fault on the east side of the  17 tailings -- I'm sorry. I forget the name right at this  18 second. But it moves -- you know, it is inferred to  19 move all the way north along -- as far as the Animas  20 Creek and beyond. If it -- if it has a fracture zone,  21 at some point it could definitely transport --  22 Q. And are --  23 A. -- contaminants.  24 Q. And are fracture zones common in fault areas?  25 A. It is very common that faults are both an</p>
<p style="text-align: right;">1224</p> <p>1 A. Yes, sir. There are two things I would like  2 to point out with regard to this.  3 As I just mentioned, I realize that it's  4 better to have a spacing at the waste rock storage  5 facility of 500 feet rather than 800 feet. So I  6 would -- I would change that part of this and add a  7 couple of monitoring wells to what's recommended here.  8 And I would also point out that the spacing is  9 not exact, that I recommend that the -- that the NMED  10 use their experience to -- and to actually establish  11 the -- you know, the locations. You know, if there's a  12 better facility or even an existing well that lands  13 on -- on -- that would be close would be acceptable.  14 So this is an average spacing of 500 feet  15 based upon field observations -- or taking field  16 observations into consideration.  17 Q. Okay.  18 And then you mentioned that the analysis that  19 you have done, the calculations that you have done here  20 don't take into consideration fractures.  21 Could fractures provide a conduit for the  22 movement of contaminants in unpredictable ways?  23 A. They very often do, they -- absolutely.  24 Q. Okay.  25 Could you elaborate on that a little bit?</p>	<p style="text-align: right;">1226</p> <p>1 impede to flow and a conduit for flow, usually an  2 impede transverse to the flow and a conduit one --  3 along the flow. I mean, that is -- if it wasn't for  4 faults moving water, there wouldn't be a lot of water  5 moving around parts of the Great Basin. That's for  6 sure.  7 Q. Okay. Why don't you proceed with the next  8 section of your presentation, Dr. Myers.  9 A. Sure.  10 I have a very brief section here on the  11 effects on Ladder Ranch.  12 And simply contaminants from both waste and  13 tailings source could reach and cross the ranch boundary  14 due to dispersion and due to fractures.  15 We kind of just discussed this a little bit,  16 but I will point out using the layout of the -- of the  17 mine here and the tailing storage facility and the waste  18 rock storage facility, as shown on this map, which I  19 drew from the Draft Environmental Impact Statement, and  20 showed up in my second or third slide.  21 And this is slide number 48, and it shows --  22 it's titled the Effects on Ladder Ranch.  23 And it shows as -- as a base map it shows the  24 map of the Ladder Ranch, it shows the approximate  25 location of the Copper Flat Mine. And I would like to</p>

1227	<p>1 draw your attention to where a couple of these                  2 facilities in the -- on the mine would lie on this map.                  3 If you see this blue line here that goes right                  4 beneath Copper Flat Mine and it goes south and then it                  5 veers back north and then goes south, that is the                  6 Grayback Arroyo. That is the same as this feature right                  7 here on the Draft Environmental Impact Statement.                  8 So the tailing storage facility would tuck                  9 itself -- would be tucked right up in this vicinity --                  10 Q. Excuse me, Dr. Myers.                  11 A. -- right here.                  12 Q. For the record, when you say "this" and                  13 "that," it's not going to be clear.                  14 So if you could go through that last                  15 explanation again and identify features on the two maps                  16 that you're referring to so that we have a clear record.                  17 A. It's -- the tailing storage facility on the                  18 map of the mine site would be directly south of this                  19 northern point in the Grayback Arroyo. It would                  20 straddle two sections. I believe the one on the east                  21 side is section 30. So that would make this one over                  22 here 36 of a different township. And it's just above                  23 the label on the map called Golddust Tank. That's where                  24 the tailing storage facility would be.                  25 The waste rock facility would be to the north</p>	1229	<p>1 stockpile on -- it would -- northeast would head onto                  2 the Ladder Ranch.                  3 And -- and so that -- so just to read what                  4 I've written up here, less than half a mile downgradient                  5 of the north half of the TSF with dispersion more                  6 contaminants will -- could reach the ranch, and any                  7 north-trending fractures will increase the flow to the                  8 ranch.                  9 Q. Okay. Thank you.                  10 Please proceed with the next section of your                  11 testimony, which I believe involves the pit lake.                  12 A. Okay. Now, I've got three short sections to                  13 consider regarding the pit lake.                  14 First of all, the pit lake probably will                  15 encroach on public property.                  16 The pit lake will draw groundwater from                  17 surrounding public and private property.                  18 And the pit lake will have water quality that                  19 exceeds standards.                  20 I'm going to go over this slide which kind of                  21 outlines what I'm going to show on the next three maps.                  22 Q. And that's slide number --                  23 A. This is slide number 50, and it's titled The                  24 pit lake encroaches on public property.                  25 The pit lake will stabilize at elevation</p>
1228	<p>1 of Grayback Arroyo, to the right or to the east of                  2 the -- of the -- the Copper Flat Mine label and to the                  3 south of an old mine labeled Sweetwater.                  4 The Ladder Ranch is just north and northeast                  5 and is almost directly east of some of where this                  6 tailing storage facility would be, and with                  7 dispersion -- dispersion would easily get some                  8 contamination up into -- up into the southernmost                  9 portion of the Ladder Ranch. I am -- I am showing this                  10 area on the Ladder Ranch which I believe is called the                  11 Avant Pasture.                  12 And so the contaminant contamination based on                  13 dispersion calculations I've just done could reach                  14 across this boundary. Clearly if dispersion -- I mean,                  15 the seepage from the waste rock would move only very                  16 slowly in this direction, but if it hits a fracture, it                  17 can move much more rapidly in this direction.                  18 And one other point is I have had several                  19 different slides. The one slide that from the Probable                  20 Hydrologic Consequences report shows actually postmining                  21 groundwater gradient with a gradient going in this -- it                  22 shows a flow arrow going in this direction.                  23 Q. When you say "this direction" --                  24 A. To the northeast from the waste rock storage                  25 facility area, into the -- the waste rock storage</p>	1230	<p>1 4,897. That's after rapid fill which I believe will                  2 take it to 4,894. The 4897 is a long-term, steady-state                  3 lake. The estimated steady-state level is based upon                  4 there being constant recharge and evaporation.                  5 And I'd like to point out that there really is                  6 no such thing as steady-state because recharge                  7 changes -- does not account for seasonal change with                  8 recharge being maximum during the monsoon season. I                  9 realize there's very little snowmelt in this area. And                  10 with evaporation being the least in the winter. So                  11 you've got a seasonal fluctuation.                  12 It also does not account for long-term                  13 fluctuations including there being years with no                  14 recharge or there being very wet years where there's a                  15 lot of recharge.                  16 Fluctuations in precipitation and evaporation                  17 would cause a pit lake to fluctuate around the                  18 steady-state level assuming it is correct.                  19 And now I'm -- the next several slides allow                  20 me to compare the pit lake on a contouring map to                  21 property lines, but I'd like to point out I'm going to                  22 go into a little more detail on -- because it was                  23 discussed a lot in previous testimony, I have a couple                  24 more rebuttal slides regarding seasonal change, as well,                  25 and long-term change.</p>

<p style="text-align: right;">1231</p> <p>1 And so I have at 4,800 -- or 897 feet the pit 2 lake will encroach on public property. 3 Now, this is a map of the pit, and the source 4 is -- this -- it came from an E-mail, I believe it was, 5 written by -- sent by Mr. Smith of NMCC. It's 6 labeled -- it's number -- it's Figure 3. NMCC Future 7 Open Pit With Property Boundary. 8 And what we're seeing here is a contour map of 9 the final open pit configuration. All these lines 10 inside the open pit are contour lines. The purplish 11 color is the open pit, which I believe is intended to be 12 drawn at elevation 4,894 feet. The purple hash lines 13 are an outline of the property lines with lines -- with 14 property on the west and outside of this area being 15 either public land or Hillsboro Pitchfork Ranchland 16 to -- to the southwest, or more or less to the west of 17 this area. 18 I am going to contend, and I will explain why 19 in the next two slides, that this pit lake area is 20 probably drawn incorrectly and that it will ultimately 21 overlap with the property -- with public property 22 boundaries right there on that bench. 23 Now, to do that, I've -- I've blown up the 24 center of that previous map. Okay. Again you can see 25 the contour interval, the contours around -- around it.</p>	<p style="text-align: right;">1233</p> <p>1 right here. 2 But I think it's clear this -- this contour 3 right here, this innermost one is labeled 4,900, which 4 means the next one to the right is 4,875. That means 5 this one right here is 4,900 and -- and this one right 6 here is 4,875, meaning that at some point through here 7 the ground surface drops. 8 Now, I realize on another slide -- this is 9 called a -- it's considered a flat bench, but the way 10 you draw contour lines is that for this to be flat there 11 has to be a closed 4,900-foot interval -- or 4,900-foot 12 contour in here. So it -- this map is not precise to 13 draw this -- precise enough to draw this pit lake. I 14 mean, this pit lake is drawn at the 4,875 level, not the 15 4,894 level. 16 And here is another rendition. This is a 17 slightly larger version of slide 53, shows a slightly 18 larger version of the pit lake map from the Probable 19 Hydrologic Consequences report as well as the 20 cross-section that goes -- that's shown through there. 21 I contend that for the purpose -- that the 22 4,900-foot bench as seen in this cross-section here is 23 drawn incorrectly, because if it were flat, that 24 4,900-foot contour would have to be closed, but it is 25 not closed as you can see here. There -- at some point,</p>
<p style="text-align: right;">1232</p> <p>1 Q. And what slide are you on now? 2 A. I am on slide 52, which is -- which shows two 3 maps, both contour maps of the pit lake, and the one on 4 the left being the one I described on the previous 5 slide, the one on the right being Figure 3-. -- 3.13 6 from the Probable Hydrologic Consequences report. 7 Unfortunately, this contour map that shows the 8 property boundaries does not label the contours. So one 9 could look at this and not really know what elevation 10 any of these points are at. So -- but the contours as 11 shown on this map to my right are very specifically 12 labeled, and you can see that's the exact same -- if you 13 follow down the ramps, you can see it's the exact same 14 map. 15 On the east and southeast side, the contours 16 are a nice -- every 25 feet these are labeled -- these 17 are 25-foot contours. As you go around to the south and 18 the -- and the west, the contours -- they come -- they 19 don't necessarily merge, but they come very close 20 together. So it looks like you've almost got 50-foot 21 contours on this side, but they come very close 22 together. 23 And you'll be able to see that on a 24 cross-section map on the next slide, cross-section being 25 this -- this one that goes across the center of the pit</p>	<p style="text-align: right;">1234</p> <p>1 there is a slope from 4,900 to 4,875. 2 Q. And when you say "it's not closed as you can 3 see here," could you identify a little bit more 4 specifically what you mean by "here"? 5 A. Okay. I am -- my cursor is showing a bench on 6 the west side of -- of the pit, and it's also on the 7 west side of where the drawn -- the pit lake was drawn 8 on the map on the preceding slide. 9 The contour on the -- on the west side of the 10 bench is 4,900. The contour on the east side is 4,875. 11 The way you read a contour map is that -- is that the 12 ground surface slopes from one contour to the other. So 13 if this were -- if this bench on the west side were 14 really flat, the contour lines -- there would have to be 15 a contour interval in here that closes. 16 That is -- that is a -- it's being -- by -- 17 when I say closed contour, it would mean -- I don't want 18 to say circular, but it would -- but it would go 19 around -- be able to trace around it. That is the only 20 way you can have a flat surface. And that -- and to 21 show a flat surface on -- on a contour map. 22 Thus what I am saying is that there's an error 23 in the way the pit lake was drawn and at some point 24 it -- it's going to be on this bench. And the only -- 25 the way to have shown this -- this should have been</p>

1235	<p>1 shown with a two-foot contour map.</p> <p>2 I mean, I -- I can't be certain that the</p> <p>3 map -- that the lake will -- will intersect with the</p> <p>4 property boundary, but these maps don't show it. And</p> <p>5 the property boundary is about a third of the way across</p> <p>6 this bench. And if it's just a simple flat slope across</p> <p>7 there, the pit lake would go across it. If it's -- if</p> <p>8 it's -- if it's perfectly flat, it won't, but they've</p> <p>9 got to draw the map properly.</p> <p>10 And then, finally, the pit lake will draw</p> <p>11 groundwater from the surrounding private land, including</p> <p>12 the Ladder Ranch and the Hillsboro Pitchfork Ranch.</p> <p>13 This map is a contour map with postmining</p> <p>14 groundwater elevation. The arrows show that groundwater</p> <p>15 will flow toward the pit from off the permit area. I</p> <p>16 mean, this arrow here shows that it's coming from the</p> <p>17 southwest. The permit boundary is the yellow line here.</p> <p>18 Clearly there will be flow coming from the southwest,</p> <p>19 including from the Hillsboro Pitchfork Ranch, north</p> <p>20 toward the pit.</p> <p>21 There will be -- there will also be water</p> <p>22 drawn from north of the -- of the permit boundary,</p> <p>23 including from where the Ladder Ranch is, down towards</p> <p>24 into this pit lake, and it will mix with the -- with the</p> <p>25 water that is -- that is in the pit lake.</p>	1237	<p>1 I'd like to just clarify a couple of points.</p> <p>2 If you'd go back to the previous slide, which</p> <p>3 is -- 54, I believe? The one you're on now, is that 54?</p> <p>4 MS. ORTH: It is.</p> <p>5 MR. DE SAILLAN: Thank you.</p> <p>6 MR. MYERS: Yes. That's 54. I'm sorry.</p> <p>7 Q. (BY MR. DE SAILLAN) So you were referring to</p> <p>8 the -- the open pit drawing water in from the west and</p> <p>9 from the southwest and from the northwest.</p> <p>10 The contour lines there have been lowered; is</p> <p>11 that correct?</p> <p>12 A. Have been --</p> <p>13 Q. As a result of the -- as a result of the pit</p> <p>14 lake drawing that water in?</p> <p>15 A. Yes, absolutely. I mean, most maps that are</p> <p>16 provided show drawdown. They don't show -- this is the</p> <p>17 only map I've seen anywhere that actually shows the</p> <p>18 postmining groundwater elevation. And the drawdown map</p> <p>19 you can't necessarily draw flow lines on it, because</p> <p>20 drawdown doesn't necessarily mean you're pulling water</p> <p>21 from one direction.</p> <p>22 This shows exactly where you're pulling water</p> <p>23 from, because it shows what the water table would look</p> <p>24 like. And so for example here, there's a 5,400-foot</p> <p>25 contour just west of the pit prior to mining. That</p>
1236	<p>1 And then, finally, from the -- these two</p> <p>2 figures are from the -- the pit -- the pit lake model.</p> <p>3 These should -- simply I'm just -- I'm just showing</p> <p>4 them -- it's been said many times no one -- no one has</p> <p>5 claimed that the pit lake would be perfect water</p> <p>6 quality.</p> <p>7 This -- this is just showing from the models</p> <p>8 that the future pit lake will have poor water quality</p> <p>9 and that the groundwater that's being pulled into them</p> <p>10 will become -- will reach these concentrations instead</p> <p>11 of the previous cleaner concentrations they had.</p> <p>12 The table below here shows -- compares a</p> <p>13 variety of parameters from cadmium, mercury, lead,</p> <p>14 manganese, zinc, selenium, and it shows the various</p> <p>15 surface water quality standards as published in the</p> <p>16 Draft Environmental Impact Statement.</p> <p>17 And it shows the pit lake at 100 years. These</p> <p>18 are just different -- different ones that will exceed</p> <p>19 the different standards at different points. And that's</p> <p>20 all -- all this is showing.</p> <p>21 And I'll point out that under cadmium that</p> <p>22 should be -- that slash under Warmwater aquatic life --</p> <p>23 that should be 5.38 not 5/38.</p> <p>24 And that concludes my presentation.</p> <p>25 Q. Okay, Dr. Myers.</p>	1238	<p>1 would have been higher. And so it has been lower.</p> <p>2 Q. Okay. Thank you.</p> <p>3 I have no further questions, Dr. Myers.</p> <p>4 Thank you very much.</p> <p>5 Now, Madam Hearing Officer, I'd like to move</p> <p>6 for the admission of the Ranches exhibits 22 through 37.</p> <p>7 MS. ORTH: Okay.</p> <p>8 Objections?</p> <p>9 MR. BUTZIER: No objection.</p> <p>10 MS. BARNCASTLE: No objection.</p> <p>11 MS. ORTH: Okay. Ranches Exhibits 22 through</p> <p>12 37 are admitted.</p> <p>13 (Exhibits Ranches 22 through 37 admitted into</p> <p>14 evidence.)</p> <p>15 MR. DE SAILLAN: Okay. And just to wrap</p> <p>16 things up, we also had Exhibits Number 1 and 2, which</p> <p>17 were sort of more general exhibits.</p> <p>18 The first one is the August 10th, 2018,</p> <p>19 version of the proposed Discharge Permit, a clean copy</p> <p>20 without -- without the revisions shown from the previous</p> <p>21 draft.</p> <p>22 And then Exhibit 2 is our -- the -- the</p> <p>23 ranches' comments on the initial proposed permit.</p> <p>24 And I'd like to also move for the admission of</p> <p>25 those two exhibits.</p>

1239	<p>1 MS. ORTH: Any objections?</p> <p>2 MR. BUTZIER: No objection.</p> <p>3 MS. ORTH: No?</p> <p>4 MR. KNIGHT: No objections.</p> <p>5 MS. BARNCASTLE: No objection.</p> <p>6 MS. ORTH: All right. Thank you.</p> <p>7 Ranch Exhibits 1 and 2 are admitted.</p> <p>8 (Exhibits Ranches 1 through 2 admitted into</p> <p>9 evidence.)</p> <p>10 MR. DE SAILLAN: And then there's one more</p> <p>11 item, and that was the exhibit that was the testimony</p> <p>12 from the Tyrone hearing that Mr. Butzier had at least a</p> <p>13 tentative objection to, and I was wondering if he's had</p> <p>14 a chance to review that document.</p> <p>15 MR. BUTZIER: I have, Madam Hearing Officer.</p> <p>16 I was provided with more context, not full context, but</p> <p>17 more context, and I will withdraw my objection to the</p> <p>18 admission of what was originally proposed.</p> <p>19 MS. ORTH: All right. Thank you.</p> <p>20 I have it here, as well. It says V3</p> <p>21 10/29/2003 at the top of it. All right.</p> <p>22 MR. DE SAILLAN: And that is Exhibit 41,</p> <p>23 Ranches Exhibit 41.</p> <p>24 MS. ORTH: Okay. Thank you.</p> <p>25 Are there other objections?</p>	1241	<p>1 yeah. My first rebuttal starts with Griffiths slide 47</p> <p>2 stated that particle tracking indicates that any seepage</p> <p>3 from the facility would remain in the immediate area for</p> <p>4 several hundred years with no migration or plume</p> <p>5 generation. And the reference was to JSAI, 2012.</p> <p>6 I mean, it's a very important claim, but there</p> <p>7 was no -- the citation, JSAI, '12 -- 2012, is not to</p> <p>8 anything that has a particle tracking calculation done</p> <p>9 in it. JSAI, '12 -- 2012, is the conceptual model</p> <p>10 report.</p> <p>11 And their numerical model had not been -- none</p> <p>12 of the reports showing a numerical model had been done</p> <p>13 until 2013. And at least my review of the model doesn't</p> <p>14 show that there was ever a particle tracking reported in</p> <p>15 those numerical.</p> <p>16 So I -- I -- but it's important to point out</p> <p>17 that there's a difference between particle tracking and</p> <p>18 what I just did in my -- in my testimony, is that</p> <p>19 particle tracking is strictly movement of the advective</p> <p>20 flow. It's simply the movement of groundwater with</p> <p>21 the -- you know, through -- through the groundwater</p> <p>22 flow. It does not include dispersion in any way.</p> <p>23 Second rebuttal refers to Finch slide number</p> <p>24 40 and 41. I'm going to refer specifically to the</p> <p>25 comment that low moisture content and high negative soil</p>
1240	<p>1 No?</p> <p>2 MR. KNIGHT: No objection.</p> <p>3 MS. BARNCASTLE: No objection.</p> <p>4 MS. ORTH: All right.</p> <p>5 Ranch Exhibit 41 is admitted.</p> <p>6 (Exhibit Ranches 41 admitted into evidence.)</p> <p>7 MS. ORTH: Are you moving now to rebuttal?</p> <p>8 MR. DE SAILLAN: Yes, I am.</p> <p>9 MS. ORTH: All right.</p> <p>10 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>11 Officer.</p> <p>12 Q. Dr. Myers, have you provide -- excuse me --</p> <p>13 prepared a presentation in rebuttal --</p> <p>14 A. I have prepared --</p> <p>15 Q. -- for this afternoon?</p> <p>16 A. Yes, I have. I've prepared a fairly brief</p> <p>17 presentation in rebuttal. Yes.</p> <p>18 Q. Could you go ahead and present that, please.</p> <p>19 A. Yes, I will.</p> <p>20 I notice that mine is laid out just a little</p> <p>21 bit different than Mr. Kuipers. He listed everything on</p> <p>22 the first -- on one page that he was going to refer to.</p> <p>23 I bring up the different exhibits and different things</p> <p>24 slide-by-slide as I go through.</p> <p>25 The first -- my first rebuttal -- or first --</p>	1242	<p>1 porewater pressure of the coarse-grained waste rock</p> <p>2 prevents downward migration of surface infiltration,</p> <p>3 more on andesite permeability being less than one times</p> <p>4 10 to the minus-6 centimeters per second, and that</p> <p>5 infiltration through the waste rock storage stockpiles</p> <p>6 is not expected during the operation period, consistent</p> <p>7 with 30 years of observations from the existing waste</p> <p>8 rock storage facility.</p> <p>9 There is -- there is information in the record</p> <p>10 that suggests that seepage occurred through existing</p> <p>11 waste rock out there in less than two years, and I -- I</p> <p>12 will present that in just a second here.</p> <p>13 And then slide 41, vadose zone modeling</p> <p>14 indicates discharge to groundwater will be nil when</p> <p>15 considering. And this -- this is because it goes in</p> <p>16 line with the previous slide. Limited time between</p> <p>17 operations and reclamation for development of conditions</p> <p>18 for net infiltration. That just simply wouldn't be the</p> <p>19 case as shown -- as I'm going to show in a second here</p> <p>20 regarding existing waste rock at the site.</p> <p>21 First, seepage -- slide number -- I see this</p> <p>22 one doesn't have a slide number to it, but labeled</p> <p>23 Seepage through waste rock to ground to groundwater,</p> <p>24 during operations.</p> <p>25 And I'm really only concerned with during</p>



1243	<p>1 operations, because after that I'm assuming that the --</p> <p>2 that that cover would be somewhat -- would be somewhat</p> <p>3 operative. And the graph I'm -- I mean the figure I'm</p> <p>4 using here is from Griffiths slide 41, but I'm only</p> <p>5 partly rebutting part -- what's on this particular</p> <p>6 slide. It's partly demonstrative and partly for</p> <p>7 rebuttal.</p> <p>8 First off, there's no reason that the waste</p> <p>9 rock would be dry. It was said many times the waste</p> <p>10 rock would be dry. And if the -- because the water</p> <p>11 table is at the existing pit lake -- the water table is</p> <p>12 at the existing pit lake, and as they excavate the pit</p> <p>13 lake, the area, it will be dewatered, but it's not going</p> <p>14 to dry as if it's exposed to the desert air. It --</p> <p>15 until it's actually removed and piled.</p> <p>16 When -- during excavation -- I mean during</p> <p>17 dewatering, the air -- the waste -- the rock drains, but</p> <p>18 it would still be at a field capacity. It's not going</p> <p>19 to be bone dry, which is the implication, I believe,</p> <p>20 that the -- that the hearing was given previous -- in</p> <p>21 previous testimony.</p> <p>22 It would still be partially wet, because</p> <p>23 just -- just like draining through -- you know, through</p> <p>24 a column of sand. I mean, it can be saturated, but you</p> <p>25 let it drain, it's still wet, but there's just no water</p>	1245	<p>1 actually using what the -- what the material properties</p> <p>2 will be.</p> <p>3 And that's my next bullet, is no reference or</p> <p>4 simulation of seepage through the vadose zone either,</p> <p>5 which is the zone between the base of the waste rock and</p> <p>6 the groundwater.</p> <p>7 Considering the slide to the right here, there</p> <p>8 was no, you know, assumption of the 30-foot mixing zone.</p> <p>9 We don't know where the basis for that is.</p> <p>10 After closure, seasonal variability would</p> <p>11 apply. And I'm just basing this -- saying there's not</p> <p>12 enough information for the -- for NMED to act on</p> <p>13 this Discharge Permit application.</p> <p>14 This slide here shows that there's -- that</p> <p>15 there has been observed leaching from existing waste</p> <p>16 rock at the site. This is from the 2013 Stage 1 status</p> <p>17 report.</p> <p>18 Q. And what slide is that?</p> <p>19 A. This is -- it's -- the title is Leachate from</p> <p>20 existing waste rock. I don't have a -- I don't have a</p> <p>21 slide number on this. Sorry. We didn't -- it didn't</p> <p>22 get one on.</p> <p>23 I'm going to read the section in the upper</p> <p>24 right which comes from 2013 Stage 1 status report, and</p> <p>25 it's from page 13 of that, and I've listed the Bates</p>
1244	<p>1 dripping through. That's the difference between -- you</p> <p>2 know, that's what happens in dewatering.</p> <p>3 Now, the seepage to -- into the waste rock</p> <p>4 would not have to be wet, unsaturated waste rock. A lot</p> <p>5 of times -- flow into an unsaturated zone has to wet the</p> <p>6 existing rock -- or the existing material that's there.</p> <p>7 That doesn't have to happen here because it should</p> <p>8 already be at least partially wet.</p> <p>9 We heard often that air acts as a barrier, but</p> <p>10 there was no citation or reference to this claim and the</p> <p>11 information needed to actually assess it. I mean, I</p> <p>12 understand what that means. Unsaturated flow often does</p> <p>13 seem to have -- to have a barrier and seems like air</p> <p>14 acts as a barrier.</p> <p>15 But to assess that, you know -- you know, for</p> <p>16 unsaturated flow through the waste rock, you need to</p> <p>17 know the drain size distribution for the waste rock, you</p> <p>18 need to know the soil water characteristics of the waste</p> <p>19 rock, you need to know the unsaturated conductivity</p> <p>20 measurements. And none of that has been provided for</p> <p>21 this -- you know, to actually consider flow through</p> <p>22 waste rock.</p> <p>23 So this is just -- it just doesn't -- it's not</p> <p>24 right to just say air acts as a barrier and there could</p> <p>25 be no infiltration. There's been no calculations</p>	1246	<p>1 numbers here that are relevant for this information,</p> <p>2 too.</p> <p>3 "Results from GWQ-1, GWQ-3, and GWQ-8 provide</p> <p>4 evidence that a sulfate-TDS plume exists in the alluvium</p> <p>5 and Santa Fe Group sediments below the waste rock and</p> <p>6 mill site area along Grayback Arroyo." Reference to</p> <p>7 Table 6 which I don't show.</p> <p>8 "Time-series sulfate concentrations for these</p> <p>9 three wells and historical data from SWQ-1 through -3</p> <p>10 are shown on Figure 7. The source of the sulfate-TDS</p> <p>11 plume is likely leachate from the waste rock and mill</p> <p>12 site area that has commingled with storm-water runoff</p> <p>13 and infiltrated in the alluvium along Grayback Arroyo."</p> <p>14 I believe the statement that it's likely</p> <p>15 leachate is an observation that there's been leakage</p> <p>16 through this waste rock.</p> <p>17 Now, the slide -- the time-series here -- this</p> <p>18 is Figure -- Figure 7 that I referred to -- the -- the</p> <p>19 dots -- these are observations of surface water quality</p> <p>20 at SWQ-1, which is shown on the map on the right side of</p> <p>21 the figure. SWQ-1 is sort of an upgradient or above</p> <p>22 waste rock area. SWQ-2 is midway between the tailings</p> <p>23 impoundment and the pit. And then SWQ-3 is just above</p> <p>24 the tailings impoundment.</p> <p>25 But these are areas -- these are points along</p>

1247	<p>1 the Grayback Arroyo. The lines on the graph that</p> <p>2 show -- show concentrations in the three wells that I</p> <p>3 read before, and show that they have increased with</p> <p>4 time, and these wells are over -- they're either in</p> <p>5 alluvium or Santa Fe Group over here further</p> <p>6 downgradient and along the Grayback Arroyo.</p> <p>7 And the argument that is made by Shomaker &amp;</p> <p>8 Associates in the status report is that it's -- it's</p> <p>9 leachate from waste rock getting into the Grayback</p> <p>10 Arroyo, sinking into the ground and causing the --</p> <p>11 causing this plume, which is shown on this slide here.</p> <p>12 This is -- the next slide, and it's -- it is a</p> <p>13 slide that shows Figure 4. West to east hydrogeologic</p> <p>14 cross-section through the waste rock and mill site area,</p> <p>15 Copper Flat Mine.</p> <p>16 Now -- now I'm going to show that -- I'm -- in</p> <p>17 the next slide, this slide shows a map of groundwater</p> <p>18 monitoring wells around the site, and this is</p> <p>19 andesite -- this -- the location of andesite well</p> <p>20 GWQ96-22A is shown on this map as being west of the pit.</p> <p>21 It -- it's right up just on the far west side of the</p> <p>22 permit boundary. It's upgradient of any influence of --</p> <p>23 of the mine or of the existing mine.</p> <p>24 Now, this is one of the wells that</p> <p>25 Dr. Marcoline used in his testimony for the state in</p>	1249	<p>1 That means that there has to be some way</p> <p>2 for -- groundwater has to be flowing through this</p> <p>3 material, getting into this monitoring well. And this</p> <p>4 is simply evidence that the conduct -- that the</p> <p>5 conductivity is higher than is being presumed for</p> <p>6 andesite.</p> <p>7 Now, I'm going to go back and just refer to</p> <p>8 this one little statement I have over here, also back in</p> <p>9 the testimony from -- from the state and from Marcoline,</p> <p>10 that we -- we had a table that should -- listed a whole</p> <p>11 bunch of monitoring wells that had been shown, and</p> <p>12 there -- there were quite a few of those wells that were</p> <p>13 water supply wells, and quite a few of them were</p> <p>14 developed in andesite.</p> <p>15 And what I wanted to point out simply was that</p> <p>16 that -- it didn't come out in the testimony yesterday,</p> <p>17 because a lot of these wells they didn't show that --</p> <p>18 what the screening interval was, but the one column</p> <p>19 showed that the total depth -- that showed the depth in</p> <p>20 most of them were less than 100 feet.</p> <p>21 So the point is that these water supply wells,</p> <p>22 which were developed in andesite, which I believe we</p> <p>23 would argue is a sign that the andesite is -- is well</p> <p>24 less than -- is less low conductivity than would be --</p> <p>25 than would be expected, you know, or also shallow, which</p>
1248	<p>1 support for the andesite having low permeability.</p> <p>2 That well is shown in this particular slide</p> <p>3 here. It clearly -- on the left side of the -- this</p> <p>4 is -- this is Figure 60 -- or slide 65. I see for some</p> <p>5 reason it's now giving me slide numbers.</p> <p>6 Anyhow, it's -- shows a well log for GWQ96-22,</p> <p>7 shows that it's in totally andesite, and that the well</p> <p>8 is screened from 174 to 244. This is 96-22A which -- A</p> <p>9 and B I think in these wells primarily mean shallow and</p> <p>10 deeper.</p> <p>11 The --</p> <p>12 Q. That refers to the shallower and deeper</p> <p>13 screens?</p> <p>14 A. Yes. I mean A usually is referring to a</p> <p>15 shallower screen, with B referring to a deeper screen.</p> <p>16 Sometimes it's alluvium and bedrock, but I don't think</p> <p>17 that applies at most of the sites around this -- this</p> <p>18 project.</p> <p>19 The hydro -- the graph shown on the right here</p> <p>20 shows that total dissolved solids in blue and sulfate in</p> <p>21 yellow-ish have varied quite substantially at this well</p> <p>22 over time. This is a well with extremely low</p> <p>23 permeability, and it's used as support for extremely low</p> <p>24 permeability, but the hydrograph is showing that we have</p> <p>25 very, very significant changes in concentration.</p>	1250	<p>1 is more representative of near surface -- of near</p> <p>2 surface conditions.</p> <p>3 Now I'm -- now I'm moving down to a slide that</p> <p>4 is labeled Seasonal/annual variability with respect to</p> <p>5 pit lake level.</p> <p>6 And what I'm going to discuss for a minute</p> <p>7 here is the potential sources of variability in the pit</p> <p>8 lake. And I mentioned in my earlier rebuttal slide that</p> <p>9 I would discuss variability -- you know, the variability</p> <p>10 and why would the pit lake vary more than one or two</p> <p>11 feet, which is what the -- testimony by several people,</p> <p>12 but I more specifically remember it being stated by</p> <p>13 Finch -- Dr. Finch yesterday -- or on -- I guess it was</p> <p>14 Monday, that it would be more than -- possibly more than</p> <p>15 a foot or two.</p> <p>16 The only source of variability that has been</p> <p>17 considered is monthly rainfall at the Hillsboro gage,</p> <p>18 and for estimating rainfall and run-off into the pit.</p> <p>19 So did they use the monthly gage to estimate the -- how</p> <p>20 much rain enters -- you know, reaches the surface of the</p> <p>21 pit lake. And I am referring to -- that reaches the</p> <p>22 surface of the pit -- of the pit lake. And I am</p> <p>23 referring to the future -- you know, the future pit lake</p> <p>24 here.</p> <p>25 So -- so this -- that was considered a</p>

<p style="text-align: right;">1251</p> <p>1 variable input.</p> <p>2 And run-off, I believe, if I understand the</p> <p>3 way they did that, they -- they considered that the</p> <p>4 precipitation at Hillsboro 12.6 of that would run off.</p> <p>5 12.6 percent of that, not considering anything about</p> <p>6 antecedent conditions or whether it was a large storm</p> <p>7 and a very large -- you know, more than 12 percent would</p> <p>8 have become run-off.</p> <p>9 They hold recharge throughout the domain</p> <p>10 constant. Part of the argument -- I mean, there's no</p> <p>11 consideration of recharge variability even within the</p> <p>12 pit. I mean, if you have rainfall that falls within --</p> <p>13 that falls within the boundaries of the pit, which are</p> <p>14 shown here on the right -- I mean, you have water that</p> <p>15 runs off.</p> <p>16 Whether it's 12.6 percent or a higher amount,</p> <p>17 the remainder of that rainfall enters the ground and</p> <p>18 either enters the -- enters the groundwater very close</p> <p>19 to the pit lake, and it's reasonable to argue that most</p> <p>20 of that would flow directly into the pit. That would be</p> <p>21 an amount in addition to what is being considered</p> <p>22 throughout the groundwater model domain.</p> <p>23 It's called interflow. You get a little</p> <p>24 groundwater enters -- a little precipitation infiltrates</p> <p>25 into the ground, flows lateral to the ground surface and</p>	<p style="text-align: right;">1253</p> <p>1 sake of argument, I'll say it is correct -- rather than</p> <p>2 plus or minus a foot or two, it's probably more likely</p> <p>3 two to five to eight feet, which still -- which puts it</p> <p>4 way up into public property.</p> <p>5 Now, the next bit of rebuttal I would like to</p> <p>6 make is the consideration of the fault on the east side</p> <p>7 of the tailings storage facility as a barrier, or at</p> <p>8 least as a -- as significant a barrier as has been</p> <p>9 implied through testimony by the -- by the mining</p> <p>10 company.</p> <p>11 I believe this is the only slide in any of the</p> <p>12 documents that shows this very steep groundwater -- I'm</p> <p>13 going to back up.</p> <p>14 The title of this slide is Fault as a barrier?</p> <p>15 And the slide on the left side here is from --</p> <p>16 is Finch slide 15. It -- it's showing -- it shows</p> <p>17 groundwater contours, and it shows a very steep</p> <p>18 groundwater contour just to the east of the permit</p> <p>19 boundary which more or less coincides with the fault</p> <p>20 zone on that side.</p> <p>21 And the implication is that this fault acts</p> <p>22 almost as a dam, slowing the flow through here</p> <p>23 considerably. And this is a -- they -- I believe they</p> <p>24 have -- it's been said this is a 120- to 140-foot drop</p> <p>25 in the groundwater. These are 20-foot contours. So you</p>
<p style="text-align: right;">1252</p> <p>1 into the pit lake.</p> <p>2 So, I mean, basically -- I mean, the other</p> <p>3 thing to keep in mind is that the pit itself will only</p> <p>4 be reclaimed -- the only place there will be reclamation</p> <p>5 is on the -- the ramps. And so you have exposed pit</p> <p>6 walls in perpetuity. So the rainfall will be hitting</p> <p>7 exposed pit walls, and to say that that -- that only</p> <p>8 12.6 percent of that will infiltrate just doesn't --</p> <p>9 that seems like a very low number.</p> <p>10 And -- or only 12.6 of it -- excuse me -- will</p> <p>11 run off. It seems like a very low number. But again,</p> <p>12 as I just said, whatever infiltrates is going to make</p> <p>13 its way to the pit lake quickly anyhow.</p> <p>14 The only other consideration of variability</p> <p>15 was that a 100-year storm or one-year period of no</p> <p>16 run-off would -- had been considered. And I'll simply</p> <p>17 point out that as -- as been testified by Mr. Kuipers</p> <p>18 and others, the 100-year storm in the future may be</p> <p>19 quite a bit larger.</p> <p>20 And I just point out the evaporation was</p> <p>21 considered steady.</p> <p>22 I think my conclusion here is that one to two</p> <p>23 feet if you -- if we made a really good consideration of</p> <p>24 variability on a seasonal and annual basis, even -- if</p> <p>25 steady-state is actually correct -- and I'll -- for the</p>	<p style="text-align: right;">1254</p> <p>1 draw the contours small enough, it can look very steep.</p> <p>2 But I want to point out that this is based on</p> <p>3 only one well, and it -- and there's a lot of -- I would</p> <p>4 like to suggest that maybe it's -- it's not quite --</p> <p>5 it's not interpreted quite properly, as I'll show in the</p> <p>6 next couple of slides.</p> <p>7 But the slide on the right here is the -- is</p> <p>8 the -- I've used several times before, but this shows</p> <p>9 the premining groundwater contour levels, and it does</p> <p>10 not show anything at all like this drop. Now, it</p> <p>11 definitely shows a little bit that the gradient is</p> <p>12 steeper just east of the permit boundary, but it's</p> <p>13 nowhere as near as steep as -- as what's shown on this</p> <p>14 slide here.</p> <p>15 Now, this slide here just very briefly</p> <p>16 shows --</p> <p>17 Q. Which slide is that?</p> <p>18 A. This is -- this is -- my next slide is a clip</p> <p>19 of Finch slide number 20, which shows the geology</p> <p>20 through the tailings storage facility.</p> <p>21 And I'm only really using the slide to show</p> <p>22 where the cross-section goes through the tailing storage</p> <p>23 facility here on the lower southeast portion of the</p> <p>24 permit boundary.</p> <p>25 And that is the -- this slide here shows --</p>

<p style="text-align: right;">1255</p> <p>1 shows the fault -- this slide is labeled Finch slide 21, 2 and it's a cross-section through tailings storage 3 facility. 4       And what I'm showing here -- what it shows is 5 a cross-section that shows andesite with -- with a clay, 6 and it -- it shows andesite, and it shows the Santa Fe 7 Group. The tailing storage facility is primary on 8 this -- primarily on the Santa Fe Group, and it shows in 9 a vertical dashed line through the -- sort of the middle 10 of the cross-section it shows the location of the fault. 11 And it -- it's the low -- it's the dashed line that has 12 the -- that has the vertical up and down arrows on it. 13       And to the left or to the west of that fault 14 zone, it shows an almost triangular area that's labeled 15 as clay. Okay. And that clay -- the -- the tip of 16 that -- of that triangle is at the -- where the -- is at 17 the fault, and on the other side of the fault is -- 18 there is drawn a very extensive layer that's also -- a 19 very extensive area that's also layered -- labeled red 20 clay. And they almost touch. 21       I am going to argue that there's no 22 justification for showing this clay below approximately 23 a point on well log -- on the well log for this 24 particular well that I'm pointing to, a well that is 25 just to the west of the fault. There's no justification</p>	<p style="text-align: right;">1257</p> <p>1 94-21. I see that I have mislabeled -- that should be 2 94-21, not 94-11. And it's from -- it's from the 3 Abatement Plan. 4       And what this shows is -- it shows that 5 approximately 160 feet -- let me -- that -- it shows 6 clay through this uppermost area. I mean, it just -- it 7 shows justifiably clay through this uppermost area, 8 although I'll point out at the near surface it is not -- 9 it is not labeled as clay. 10       But it shows -- but it shows clay ending at 11 approximately 160 feet, and below that you're read -- 12 you're seeing gravel and sand, all the way down. And as 13 I flip back up to the cross-section, that's what this 14 area is here, the lower part and where the GWQ-21A is 15 screened. 16       So my point is simply that there's no 17 justification for showing this as clay at the fault, 18 either on -- below about 160 feet or on the east side of 19 the fault. 20       Now, I acknowledge that I was -- agree that 21 this definitely shows a -- a drop in the water table 22 from -- from here to here, but it -- these are -- the -- 23 these are confined wells. And it's -- it's not 24 unreasonable to see some of that -- you know, to see 25 some change in that distance. It -- it is not proving</p>
<p style="text-align: right;">1256</p> <p>1 for showing clay below that point, nor is there 2 justification for showing it as clay on the east side of 3 the fault. 4       I -- the well diagram shown here is Figure 5 A1 -- A14. It's a well diagram for Monitoring Well 4, 6 MW-4, which is this well right here. It's the 7 furthest -- it's the one shown furthest to the right in 8 the cross-section. 9       And I'll just repeat that the top is sand, 10 then silt-sand, then sand-clay, then silt-sand, then 11 sand and some clay. Sand and clay the way -- the way 12 these well logs are shown, this implies more sand than 13 clay, and they would -- and if it was extremely dense 14 clay, it's unlikely that this would have perforations 15 ranging from 125 to 1,500 feet. 16       I'm not saying that this is highly permeable 17 gravel or something, but to call this impermeable red 18 clay does not follow from this -- from the well log of 19 the only well that they have -- that is -- that is 20 available that shows what is in that clay. 21       And the next slide that -- the next two slides 22 I have are the well log for well GWQ94-21A, which is the 23 well just to the west of the fault. So the next two 24 slides I've actually -- it -- the next two slides show a 25 clip from the well log for GWQ94-21 -- I'm sorry --</p>	<p style="text-align: right;">1258</p> <p>1 that this fault is a huge barrier to flow. 2       And I believe -- 3       Q. Okay. Thank you, Dr. Myers. 4       I have a few more questions, but first, Madam 5 Hearing Officer, the testimony reflected that there was 6 a mislabeled -- well logs on these slides, and I would 7 like to have the opportunity to provide the Hearing 8 Officer and all of the other parties a corrected page 9 for that slide. We'll do that tomorrow. 10       These are demonstrative exhibits, but I still 11 want them to be correct. 12       MS. ORTH: All right. Thank you. 13       Q. (BY MR. DE SAILLAN) And then, Dr. Myers, I 14 just have a couple more questions on rebuttal. 15       You were here yesterday for the testimony of 16 Dr. Marcoline for the Environment Department? 17       A. Yes, I was. 18       Q. Okay. 19       And you -- do you recall his -- him testifying 20 about a well on which a slug test was performed? 21       A. Yes. He was referring to slug test. 22       Q. Okay. 23       And I want to -- I asked you about this a few 24 minutes ago, and I think you misunderstood my question. 25       Now, that was on -- that -- the well that he</p>

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<p>1 was referring to I think was labeled GWQ-5R; is that 2 correct? 3 A. I -- I remember that as being in his 4 testimony. Yes. 5 Q. Okay. 6 And that testing event that he was referring 7 to, is that the same testing event that you were 8 referring to earlier in your testimony when you talked 9 about the pressure test? 10 A. Well, that is the only testing event I'm aware 11 of on that particular well, is the pressure test. I do 12 not -- I'm not aware of there having been a slug test 13 also performed on it. So yes. I have to believe that 14 he was misreferring to the -- the pit pressure test as a 15 slug test. 16 Q. Okay. 17 And earlier you emphasized the distinction 18 between a slug test and a pressure test. 19 A. Yes. 20 Q. And could you explain what that difference is 21 just briefly? 22 A. Well, I mean, simply for the -- it's the 23 amount of pressure that's ultimately applied. I mean, a 24 slug test -- I mean, there's lots of different ways of 25 doing it, but you apply water, and you -- and you</p>	<p>1 Q. Yes. 2 A. Yeah. Yes. We've addressed this already. 3 Q. Okay. Thank you. 4 That -- that's all the questions I have for 5 rebuttal. 6 Thank you, Dr. Myers. 7 Thank you, Madam Hearing Officer. 8 MS. ORTH: Thank you, Mr. de Saillan. 9 Let's take a 15-minute break, and we'll begin 10 with cross-examination. 11 (Proceedings in recess from 4:25 p.m. to 12 4:41 p.m.) 13 MS. ORTH: All right. We are back after a 14 break. 15 If you would please take your conversations 16 out of the room. 17 Thank you. We're coming back from the break 18 now. 19 We will begin with cross-examination of 20 Dr. Myers. 21 Mr. Butzier, do you have questions -- 22 MR. BUTZIER: Yes, ma'am. 23 MS. ORTH: -- of Dr. Myers? 24 MR. BUTZIER: I do, Madam Hearing Officer. 25 MR. DE SAILLAN: Madam Hearing Officer, if I</p>
1260	1262
<p>1 basically watch how fast it drains from the well. I 2 mean, it -- just fill it and -- you know, to a certain 3 level and watch how fast it drains. And you -- and 4 there are formulas that you use to determine the 5 conductivity based on that. 6 At this particular well, they had to apply 7 200 feet of head. A slug test would not have likely 8 shown any because they would not have applied 200 feet 9 of head. 10 Q. Okay. 11 And a pressure test in contrast? 12 A. Well, a pressure test, they -- they have -- 13 they collar off a section of the borehole, and they -- 14 and they -- to prevent water from leaving those collars, 15 or leaving the zone that's collared off, and they apply 16 pressure, and they measure the flow rate that is going 17 into -- that is going into the fracture. I mean, the 18 difference again is just the fact that there's a 19 pressure applied. 20 Q. Okay. Thank you. 21 And then your last slide, I think we really 22 addressed that issue in -- at the end of your direct 23 testimony. 24 A. The slide that's -- that's shown here that I'm 25 not talking about?</p>	<p>1 could just for a second, my understanding is there was a 2 little bit of confusion about what the Exhibit 41 was to 3 be, and I think Mr. Butzier is withdrawing his objection 4 to the short version of that exhibit, and so that's what 5 we introduced. 6 MS. ORTH: Oh. Then I was confused. Maybe no 7 one else was confused, but I was confused. 8 Okay. So Exhibit 41 that's going into the 9 record is the short version, not the full version. 10 MR. BUTZIER: That's correct. 11 MS. ORTH: Aha. Okay. I'll correct my 12 record. 13 MR. DE SAILLAN: Thank you. 14 MS. ORTH: Thank you. 15 Mr. Butzier. 16 MR. BUTZIER: Thank you, Madam Hearing 17 Officer. 18 CROSS EXAMINATION 19 BY MR. BUTZIER: 20 Q. I apologize if my voice waivers. I seem to be 21 coming down with something. 22 Good afternoon, Dr. Myers. 23 A. Good afternoon, Mr. Butzier. 24 Q. I'd like to ask you a question about slide 4 25 of your presentation, the direct presentation.</p>

1263	<p>1 In the second bullet point from the bottom,  2 you -- the bullet point that starts with Andesite,  3 you've indicated that that's an extrusive igneous or  4 volcanic rock, correct?  5 A. Yes.  6 Q. And just in general terms, for my own benefit  7 as a layperson, could you describe what that means and  8 then also how you would expect that to compare to what's  9 being referred to in this proceeding as the Santa Fe  10 Group of materials?  11 A. As -- as a Santa Fe Group?  12 Q. How would extrusive igneous or volcanic rock  13 compare, in your view, to Santa Fe Group material?  14 A. Well, it's -- it is much less -- well, it's  15 more of a crystalline rock. I mean, the Santa Fe Group  16 is more of a -- of a consolidated sedimentary rock, or  17 more of a consolidated alluvium. I mean, they're --  18 they're vastly different, I mean, hydrogeologically  19 speaking.  20 Q. And can you elaborate on that? What does  21 that -- how would that translate in terms of the  22 relative expected hydraulic conductivity of the two --  23 two forms of material?  24 A. One would expect the un- -- one would expect  25 the bedrock to be a couple orders of magnitude lower in</p>	1265	<p>1 second -- where do those fit --  2 A. Right.  3 Q. -- in terms of the findings that were made by  4 Jones and Finch?  5 A. Where --  6 Q. Is it more -- is it a greater hydraulic  7 conductivity figure or same or less or -- where does it  8 fit?  9 A. I'm sorry. Jones and Finch, which report are  10 you referring to?  11 Q. Well, let me just start with the testimony of  12 Steve Finch.  13 I think you were here for the testimony --  14 A. Yeah.  15 Q. -- of Mr. Finch, correct?  16 A. Yes.  17 Q. And just how does that compare to what  18 Mr. Finch was saying in his testimony was the hydraulic  19 conductivity of the andesite?  20 A. Well, I mean, he's saying it's less than 10 to  21 the minus-6, I mean, and -- and using that -- and using  22 that to justify calling the andesite a liner. I'm --  23 I'm not sure if there's some specific quote that I'm not  24 remembering, but -- I mean, most of the testimony has  25 been that the permeability is less.</p>
1264	<p>1 conductivity than you would the Santa Fe Group, and  2 that's kind of what's been found in the modeling that's  3 been done out there.  4 Q. Thank you.  5 Have you ever been to the -- to the proposed  6 copper mine permit area?  7 A. I have been all around it. I've never had a  8 formal tour of the property, but I've been on the Ladder  9 Ranch, and we've driven as close to the boundary as we  10 could.  11 Q. Okay.  12 I'd like to turn next to slide 6, the last  13 bullet point.  14 And here we're talking about the pit area  15 pressure injection test in Q -- in GWQ-5R, correct?  16 A. Correct.  17 Q. You've -- I think the point of your -- your  18 slide here is that the permeability that's -- that you  19 determined for -- from that test was -- was much greater  20 than zero? Is that -- was that -- did I catch that  21 correctly?  22 A. That is the primary conclusion of -- of this  23 slide. That's correct.  24 Q. And where do these figures 5.2 times 10 to the  25 minus-7 and 1.3 times 10 to the minus-6 centimeters per</p>	1266	<p>1 In fact, I think it was -- you know, we've  2 seen a range all the way down to 10 to the minus-11,  3 based upon test -- you know, this is the only test --  4 direct test that was really performed of the andesite.  5 Q. So are you saying that you yourself have not  6 independently attempted to test any of the andesite?  7 A. At the site? No. I've not been out and  8 testing the andesite. No.  9 Q. Okay.  10 And did I hear you correctly to say that the  11 calculations that you performed and presented in a  12 series of slides starting at -- I guess around slide  13 number 29, that there was -- you made no attempt to  14 calibrate any of the data used or assumptions made with  15 anything related to the site itself?  16 A. I attempted to make -- that -- you know, to  17 use conditions, formation parameters that were similar  18 to the site itself, and I -- you know, the gradient of  19 the flow from one point to another.  20 But did I -- I did not attempt to calibrate it  21 in the sense that I had the well observation and I tried  22 to match it. I attempted to match some of the data and  23 some of my understanding of the Jones, et al., 2004.  24 So, I mean, that's kind of almost what an interpretive  25 model is, is a way of trying to -- of trying to</p>

1267	<p>1 understand the site, but it falls short of a fully 2 calibrated model.</p> <p>3 Q. And other than the Jones, 2014 -- well, first 4 let me ask, did you thoroughly review the Jones and 5 Finch, 2014, report that you've referred to a couple 6 times?</p> <p>7 A. I -- it's actually Jones, et al., or 8 something --</p> <p>9 Q. Okay. Thank you.</p> <p>10 A. -- on that particular one.</p> <p>11 I'm sorry. I only -- there is a Jones and 12 Finch report for 2018.</p> <p>13 Q. My apologies --</p> <p>14 A. That's okay.</p> <p>15 Q. -- for confusing the issue.</p> <p>16 A. I have reviewed that report -- rather I 17 reviewed it originally for the EI -- the EIS in 2015, 18 and I reviewed it, and I have -- I'm not actually -- I'm 19 not being critical of that report. I'm using 20 information from that model for the work I've done here.</p> <p>21 Q. And is it your understanding that that report 22 presented information based upon modeling that included 23 calibration with data at the site?</p> <p>24 A. Oh, absolutely. It did have calibration.</p> <p>25 Q. And are you aware that there was -- there is</p>	1269	<p>1 Q. But you would acknowledge that it hasn't moved 2 to the other side of the fault in any distance toward 3 the Caballo Reservoir?</p> <p>4 A. I am -- I'm not sure I have seen evidence to 5 that. There are only those two wells below the fault, 6 and I don't recall if one of them showed sulfate or not. 7 There's -- there is sulfate -- I mean, there are 8 contaminants in that series of wells to the west of the 9 fault. I -- I honestly don't recall if that -- if the 10 one well east of the fault has sulfate or not.</p> <p>11 Q. Did the John Shomaker &amp; Associates groundwater 12 flow model -- are you familiar with what I'm referring 13 to there?</p> <p>14 A. That's Jones, et al., 2014.</p> <p>15 Q. Okay.</p> <p>16 Do you understand that that simulated the 17 historical pit, the pit that's there today?</p> <p>18 A. Yes.</p> <p>19 Q. And in your view, does that model -- I think 20 you've indicated you don't have any criticism of that 21 model.</p> <p>22 Does that model correctly simulate flow to the 23 pit?</p> <p>24 A. Well, you can check my DEIS comments as to 25 criticism of the model, but I did -- because I did have</p>
1268	<p>1 an existing sulfate plume at the site?</p> <p>2 A. Yes. I -- I have testified about it a little 3 bit.</p> <p>4 Q. And are you aware that that sulfate plume, at 5 least one, came from the former unlined tailings 6 facility?</p> <p>7 A. Yes.</p> <p>8 Q. And would you expect that this -- the rate of 9 seepage from that tailings facility back when Quintana 10 constructed that facility and used it for a period of 11 time was likely substantially greater than the rate of 12 any leakage or seepage that could be assumed to be 13 coming from beneath a lined tailing facility?</p> <p>14 A. Yes. I've seen some numbers that suggest that 15 it would have been quite a bit higher than anything I 16 modeled, anything that I had in my calculations.</p> <p>17 Q. Okay.</p> <p>18 And have you -- do you know where today that 19 plume sits at the site?</p> <p>20 A. I believe it -- it is -- there's -- some of 21 it's still there.</p> <p>22 Q. And isn't it the case that it stayed to the 23 west of the Animas fault?</p> <p>24 A. I don't believe that there's any data that 25 supports that.</p>	1270	<p>1 criticism, but I used the model -- I accepted the model 2 for the -- my -- my -- as a basis for my calculations 3 here.</p> <p>4 I'm sorry. Would you repeat your question 5 about that?</p> <p>6 Q. Does that model, the John Shomaker &amp; 7 Associates groundwater flow model, correctly simulate 8 flow to the pit using an assumed conductivity?</p> <p>9 A. I believe you mean the -- the existing pit, 10 correct?</p> <p>11 Q. Correct, yes.</p> <p>12 A. I -- it was part of their calibration, and 13 I -- I don't recall a specific problem with that -- with 14 that aspect of the calibration.</p> <p>15 Q. Okay.</p> <p>16 Now, I'm referring now to slide 9 from your 17 direct testimony.</p> <p>18 A. 9.</p> <p>19 Q. Bear with me. I just have to find one other 20 slide here.</p> <p>21 MS. ORTH: Okay.</p> <p>22 Q. (BY MR. BUTZIER) On slide 9, the part of 23 slide 9 that I'm looking at is your little, shaded box, 24 Dewatering Flow.</p> <p>25 Is the third column of that -- well, explain</p>

<p style="text-align: right;">1271</p> <p>1 to me what the third column shows.  2 A. The third column shows conductivity as  3 calculated using the four different flow rates into the  4 pit, using Darcy's law as shown in -- on the -- you  5 know, on the slide south, below the map.  6 Q. So the column that has a heading K and then in  7 parentheses feet per day and has 0.69, under that 1.56,  8 under that 0.19 and under that 0.31 -- since we're  9 talking about flow into the pit, does that reflect what  10 you understood or somehow came up with as the hydraulic  11 conductivity of the andesite surrounding the pit?  12 A. Well, it -- it is the effect of conductivity  13 of the bedrock that controls flow into the pit, and  14 because a great deal of that bedrock is andesite, it  15 reflects on the andesite -- I don't think they excavated  16 all of the monzonite. So I believe there would be some  17 monzonite included in that, but it -- overall it is the  18 bedrock that is controlling flow into the pit.  19 Q. And can you tell me just generally what --  20 what you understand the hydraulic conductivity of the  21 Santa Fe Group materials to be?  22 A. Well, I --  23 Q. Expressed in the same way that that column  24 expresses --  25 A. Anywhere from .2 to 20. It is -- it is</p>	<p style="text-align: right;">1273</p> <p>1 for the -- for 90 percent of the formation to have one  2 low form -- conductivity.  3 This could all be due to fracture flow into  4 the pit. So the overall average ends up being higher,  5 but a lot of the andesite -- a lot of the bedrock could  6 still be a very low number.  7 Q. I guess I've gotten myself confused, then,  8 because I didn't understand the information in the  9 shaded box on Exhibit 9 -- or on the slide number 9 to  10 be -- to indicate anything that was -- that was actually  11 measured. I understood that that was information that  12 came out of the model that you -- or the calculations  13 you were performing.  14 A. Oh. No. The information in this shaded box  15 doesn't have anything to do with the interpretive  16 calculations that I'm -- that I performed later on.  17 Q. Okay.  18 Then where does this information --  19 A. This is --  20 Q. -- derive from?  21 A. This information derives simply from -- from  22 information presented on this slide. It is -- this is  23 an estimate of conductivity for the bedrock  24 surrounding -- surrounding the pit. It is based upon  25 observed -- an observed cross-sectional area for flow --</p>
<p style="text-align: right;">1272</p> <p>1 basically saying that it's just slight -- slightly  2 lower -- I mean, this column -- and the more important  3 numbers are probably the two at the bottom, the .19 and  4 the .31.  5 The reason that is the case -- I say that is  6 that six and 10 gallons per minute were estimates for  7 groundwater flow. I -- in case there was a higher  8 value, I -- I considered the 50 and the 22, but on the  9 preceding slide, I had specified that that included  10 run-off -- or may include some run-off into the pit.  11 So the .19 and .31 are at the very lower level  12 of the Santa Fe Group K.  13 Q. Okay. So there's an overlap between your  14 understanding of the hydraulic conductivity of andesite  15 and the range of hydraulic conductivity you would expect  16 for the Santa Fe Group.  17 A. There is an overlap between what I've  18 calculated for the bedrock around -- around the pit.  19 And I get that -- and there is a reason I'm -- I'm kind  20 of -- there -- there's a scale factor here.  21 When -- when you consider the conductivity of  22 a formation, you can look at a point, and you can get a  23 very low number, but if you go into the fractures, you  24 get a much different number, and if you combine them,  25 you end up with a higher average. And it's not uncommon</p>	<p style="text-align: right;">1274</p> <p>1 for groundwater flow into the existing pit based upon  2 what I admit is an imprecise measurement of the area.  3 But I came up with 290,000 square feet as well  4 as the gradient for flow into the pit.  5 Then I used Darcy's law as shown over there to  6 calculate -- but that is giving me an average  7 conductivity for the bedrock controlling flow into the  8 pit. And that's -- would be an area of about -- it  9 would be representative of an area that's about, what,  10 1,000 feet square.  11 Q. Okay. So that's an average. Those are  12 averages.  13 A. Those are average. I mean, by -- almost by --  14 that's why I brought up the scale thing, is this is an  15 estimate of conductivity for a bedrock section, you  16 know, 1,000 or 1,500 feet square, as opposed to the --  17 you know, some of these specific tests which only go for  18 a couple of feet.  19 Q. And where does -- on slide 9, where -- you  20 mentioned a little bit ago that some of the values that  21 you show there for conductivity could relate to  22 fractures, I think you said.  23 Where on this slide is anything relating to  24 fractures taken into account?  25 A. Well, there are -- there's not a specific</p>



<p style="text-align: right;">1275</p> <p>1 fracture here. When -- I'm determining a conductivity  2 based upon data that I'm collecting from this slide -- I  3 mean from this map, the data being the observed -- the  4 gradient as observed. I mean, this is an existing --  5 these are existing groundwater elevations, and so  6 therefore the gradient estimate is data.  7       The area estimate -- and so whether there are  8 fracture -- those flow arrows don't represent an exact  9 location that flow is going into the pit. They're --  10 they're representing a general direction of flow toward  11 the pit. It could be from one big fracture, or it could  12 be perfectly homogeneous coming through -- through the  13 bedrock.  14       My estimate would not be any different. If it  15 was one big fracture, though, and the rest of it  16 completely impermeable, the average conductivity would  17 be as shown here.  18       Q. Would you agree with me that the existing pit  19 acts similar to like a very large well and that it  20 serves to provide very valuable data about the hydraulic  21 conductivity of the surrounding material?  22       A. Yes, I would.  23       Q. Okay. I'd like to move to slide number 35,  24 please.  25       This slide, as I understand it, indicates some</p>	<p style="text-align: right;">1277</p> <p>1 under -- for the andesite -- at least for some of the  2 andesite. But I'm not -- you know, what was used there  3 was extremely low. I've used it -- a higher value for  4 the andesite.  5       Just, you know, to consider -- I mean, to  6 consider -- to accept the fact that what -- I mean, that  7 what I had -- I had presented earlier suggested that the  8 permeability of andesite is higher than 10 to the  9 minus-6. I didn't want to use -- I didn't then want to  10 do dispersion calculations for an andesite permeability  11 that I don't believe is -- is correct. I -- but I also  12 didn't want to get extremely high.  13       I mean, that is fairly -- this is a fairly  14 impermeable value that I'm using.  15       And it suggests that the -- you know, and as  16 my calculations show, it suggests that in Animas  17 wouldn't move very fast or very far.  18       Q. So the difference in the two is largely based  19 upon what specific argument you were making from the  20 data?  21       A. The -- the argument with the pit -- you know,  22 with calculation -- calculating the K around the pit was  23 just one more example of how the bedrock conductivity  24 over a relatively large area -- because like I say, it's  25 over maybe 1,000-foot-square area -- is a lot higher</p>
<p style="text-align: right;">1276</p> <p>1 assumptions you made about seepage into andesite from  2 the waste rock dumps; is that correct?  3       A. Um-hum.  4       Q. The second bullet point there identifies a  5 hydraulic conductivity for andesite -- an assumed  6 hydraulic conductivity of andesite that's 0.01 feet per  7 day, and that looks to me quite different from the  8 hydraulic conductivity figures we were just looking at  9 in the shaded box on slide 9.  10       A. Oh, well, absolutely.  11       Q. Can you explain that, please?  12       A. I mean, they're -- they're like two completely  13 different arguments and points of my -- my -- of my  14 testimony.  15       I mean, the -- the first -- that second  16 section regarding andesite was I was making arguments as  17 to whether it should be considered as a natural liner.  18 Here I am -- I was -- this -- this section -- these  19 calculations have nothing to do with the pit. They are  20 assuming flow starting east of the pit. They have --  21 they have nothing to do with the pit at all, and I'm  22 assuming I'm outside the pit -- the pit zone.  23       I'm -- I'm sorry if I didn't say that earlier.  24       But the .01 is slightly more conductive than  25 what was simulated in -- in the Jones, et al., model,</p>	<p style="text-align: right;">1278</p> <p>1 than 10 to the minus-6.  2       Q. Okay. I'd like to turn now to the slide that  3 I think is an unnumbered slide in your rebuttal that has  4 the heading Fault as barrier? And it shows two  5 different slides, one of which is Finch slide 15.  6       A. I'm told they're actually numbered now.  7       Q. Okay. You just passed it. Go back one --  8       A. Oh, oh. The barrier. Okay.  9       Q. Okay.  10       Now, I don't know that you said from what  11 report the slide to the right came from.  12       A. That is actually -- I believe it is -- it's --  13 it's from the Jones -- the numerical model report, the  14 Jones, et al.  15       Q. Okay.  16       A. I used it so many times up above, and I did  17 reference it. I am sorry. I should have put one on  18 here.  19       Q. And I see that the -- I see that the permit  20 boundary in the left slide, which is slide -- Finch  21 slide 15, is the yellow boundary, correct?  22       A. I believe my cursor is on it right there.  23       Q. Okay.  24       And on the slide to the right that's from some  25 other report, could you show me the outline of the</p>

<p style="text-align: right;">1279</p> <p>1 permit boundary on that slide?  2 A. Well, it somewhat coincides with some  3 monitoring wells and one of the contours, but it appears  4 to me to be just about there where -- at the point where  5 the contours change from being blue-ish on the right  6 side to being yellow-ish on the left side, or the west  7 side.  8 Q. I guess the point I'm making is that the  9 permit boundary in the left slide is a much more  10 zoomed-in permit area than in the slide on the right; am  11 I correct?  12 A. I would agree with that.  13 Q. Okay.  14 And I notice that the contour lines that run  15 throughout the permit area on the left are quite --  16 quite a bit more numerous than the contour lines that go  17 through the permit area in the slide on the right.  18 A. That is -- that is because they are in  19 different contour intervals. The one on the right is a  20 50-foot contour interval, the one on the left is a 20-  21 So you have two-and-a-half times as many on the left.  22 Q. That's what I thought was the case.  23 And so when you in your testimony pointed out  24 that there seems to be a greater bunching of lines right  25 along the fault in the left slide as compared to the</p>	<p style="text-align: right;">1281</p> <p>1 Q. Now, in a series of slides starting at 29 and  2 then -- let's also go to slide 32 and 33.  3 I notice that you've got various assumptions  4 made about a possible plume from an assumed leak from  5 the tailings facility, and I -- am I correct the  6 vertical line running through these depictions is the  7 Animas fault?  8 A. Yes, you are. And it is 2,400 feet from the  9 source. Because the location of a leak from a tailing  10 storage facility could be anywhere over a 6,000-foot  11 area, I kind of had -- I mean, I couldn't analyze all  12 possible locations. I -- I made some -- you know, an  13 assumption that it would be about 2,400 feet from the  14 fault.  15 Q. And I notice on these three slides that I just  16 called out, 29, 32 and 33, that as the plume, or  17 whatever you want to call it, passes through the fault  18 there's no indication of any disruption in the flow.  19 Am I interpreting that correctly?  20 A. Well, let me -- I go back to 29, and this one  21 does show that there -- that the fault has an effect. I  22 mean, in part because of the way that this is a  23 perfectly east to west flow path, it doesn't show this  24 big convolution in the -- in -- in the contaminant  25 contours, but you see almost a 20 percent difference in</p>
<p style="text-align: right;">1280</p> <p>1 right slide, that's a false equivalency, isn't it?  2 They're not the same contours?  3 A. They're not the same contours, but I can read  4 the same information off of that. You can see -- here's  5 your scale bar, down here on the lower left, and that's  6 about 1,500. I -- I see a change of about 100 feet from  7 over about -- over about 1,500 feet.  8 Whereas on this side -- slide, I see about  9 120 feet -- that's over half -- that's only over a few  10 hundred feet. This is -- this is the change of over 100  11 feet in a much shorter distance than what I would  12 interpret off of that.  13 Q. Dr. Myers, I'd like to turn now to slide  14 number 29 in your direct testimony.  15 First let me ask you -- I think I understand  16 you to dispute that the Animas fault acts as a barrier,  17 but I -- but I also understood you to indicate that it  18 does inhibit flow across that barrier; is that correct?  19 A. Yeah, absolutely. It -- I established it --  20 its conductance so that there would be a drop of about  21 30 to 40 feet across it. In other words, I didn't  22 want -- because I knew that -- I mean, Jones, et al.,  23 had assumed some drop. I think my primary argument is  24 that 120 feet, this deep, is much more of a barrier than  25 what had been previously assumed.</p>	<p style="text-align: right;">1282</p> <p>1 the -- in the area of -- of the contours and the one on  2 the right.  3 And that is just by changing the conductance,  4 making it one-tenth as -- as conductive. So it is  5 definitely having an effect.  6 And let -- let me also -- if you don't mind,  7 I'll use that slide right there, something I don't think  8 I pointed out.  9 This is the groundwater mounding. You can see  10 that this -- or the ones with the 20-gallon-per-minute  11 into the SFG, you can see that it becomes very  12 elliptical. The -- the fault is slowing the flow. You  13 can see that by the shape of the mounding contours  14 around -- around my source, with the source being there.  15 It becomes elliptical. And so it is having an effect.  16 Q. Okay. So I -- I must have misheard, because  17 when you were describing these kinds of slides earlier,  18 I had understood that the lateral dispersion was greater  19 in -- when it was greater gallons per minute assumed  20 leak, and that the reason for that was because of the  21 volume. I didn't hear you say that --  22 A. Well --  23 Q. -- it was because of the fault.  24 A. Well, the fault has an effect, but I didn't  25 necessarily distinguish between -- distinguish its</p>

<p style="text-align: right;">1283</p> <p>1 effect between 4 GPM and 20 GPM. I mean, the  2 difference -- the reason that the 20 GPM fault has --  3 and you can see -- like you -- let's look at this one  4 here.  5 This is after two years. You see that the --  6 that this is a wider -- this is wider, you know,  7 about -- let's say 500 feet downgradient from the  8 source, there is a wider plume than here. And that is  9 because there was more mass in the plume, and there  10 being more mass means there's more of a concentration  11 gradient, which is one of the things that controls  12 dispersion.  13 Q. Could we go to slide 29 again, please.  14 I'm not sure that this was the slide where you  15 said it, but at some point in your testimony, I  16 understood you to say that in the -- are you calling it  17 interpretive calculations?  18 A. Interpretive calculations.  19 Q. In the interpretive calculations that you  20 made, you weren't able to force those calculations to  21 result in anything going north and south along the fault  22 line because the contours were parallel to the fault  23 line.  24 Did I get that correctly?  25 A. Almost. I don't have -- because of the</p>	<p style="text-align: right;">1285</p> <p>1 underneath it, you could have an increased gradient to  2 the north.  3 And if -- if you'll -- the one slide -- I  4 can't remember the closest point I have for it. If you  5 look at -- this slide right here shows --  6 MR. DE SAILLAN: What slide is that,  7 Dr. Myers?  8 MR. MYERS: This is slide 23. And I'm going  9 to the contour map that -- from Jones, et al., 2014,  10 that shows -- that does show the existing contours.  11 I mean, I have made an assumption of just  12 straight east/west movement, but this actually shows  13 that there is -- it shows that the contours bend and  14 that there is a northeast gradient that -- that would  15 lead -- you know, coming off of this site. And if you  16 add to that gradient by putting a -- you know, a 20-foot  17 or 40-foot mound, you -- there is a potential that --  18 that these existing gradients could drive some flow if a  19 contaminant got to them.  20 MR. BUTZIER: Okay.  21 Q. So is this another example of it just was a  22 function of what you were -- the point you were arguing?  23 A. I -- the calculations were designed more -- to  24 consider dispersion in a homogeneous system as opposed  25 to a fracture flow. I did try to fault -- I wanted the</p>
<p style="text-align: right;">1284</p> <p>1 symmetry in the way I did this, I don't create a  2 gradient along what -- I mean, there is a -- I did  3 simulate a damage zone along this fault. I mean, it --  4 because of the scale of these figures, you can't see it,  5 but there is a -- a 75-foot-wide zone of very high  6 conductivity, 50 feet per day.  7 And the reason for that was to see if  8 something would move along that, but ultimately because  9 I don't have any -- because of the symmetry that I have  10 north/south. I didn't get any gradient showing -- move  11 anything in that direction.  12 Q. So I assume, then, based upon your  13 interpretive calculations that you do not conclude that  14 there would be northward migration along the fault line  15 to the Ladder Ranch?  16 A. Because -- I cannot use the interpretive  17 calculations to prove that there's movement along --  18 along a fracture because the interpretive calculations  19 just didn't consider -- just weren't -- weren't adequate  20 to consider that. There are -- there is evidence that  21 there is gradient potentially in that -- in that  22 direction.  23 For one, the mounding, if not confined by  24 the -- by the boundaries, would cause a gradient. So  25 just the by virtue of there being a mound forming</p>	<p style="text-align: right;">1286</p> <p>1 fault to be there to show that it could slow -- to slow  2 things down, and the one slide shows that it does --  3 that the fault does slow things down.  4 MR. BUTZIER: Thank you, Madam Hearing  5 Officer.  6 That's all the questions that I have.  7 MS. ORTH: All right. Thank you, Mr. Butzier.  8 Mr. Knight, do you have questions of  9 Dr. Myers?  10 MR. KNIGHT: I do.  11 Let me get a microphone here.  12 CROSS EXAMINATION  13 BY MR. KNIGHT:  14 Q. Good afternoon, Dr. Myers.  15 A. Good afternoon, almost evening.  16 Q. Almost.  17 Have you reviewed the draft Discharge Permit  18 in this matter?  19 A. I have reviewed parts of it. Yes. I --  20 specific to some of the issues that I'm referring to.  21 I've not -- I can't recite it word by word, though.  22 Q. Would you agree with me that nor does the  23 Discharge Permit refer to the andesite beneath the waste  24 rock piles as impermeable, nor does it ever refer to it  25 as a natural liner for the waste rock pile?</p>

1287	<p>1 A. No. Well, the permit doesn't -- doesn't 2 describe it as impermeable. I got the -- the term 3 "impermeable" came from the table that showed it as 4 being 0, and that is someone saying that it's 5 impermeable -- impermeable was my word based upon both 6 the table showing it as 0, and I also believe based 7 upon -- I mean, based upon essentially being shown as 0, 8 at least from that one -- at that one site.</p> <p>9 Q. But would you agree with me that the Discharge 10 Permit does not oppose the andesite as a liner of any 11 type, does not use the word "liner" when referring to 12 the andesite beneath the waste rock stockpiles?</p> <p>13 A. It doesn't refer to a liner at all. It 14 doesn't require one, either. So yes. I agree with you.</p> <p>15 Q. Thank you.</p> <p>16 Could we go to slide 17?</p> <p>17 Slide 17 in your testimony -- your testimony 18 here does not contain any quantification of the amount 19 of stormwater that could percolate through the channels 20 carved into bedrock around the waste rock piles.</p> <p>21 And would you agree with me that thus there's 22 really no basis for arguing that these channels could be 23 a significant source of contaminants or that they could 24 have any measurable impact on groundwater?</p> <p>25 A. I think there's too much -- too many unknowns</p>	1289	<p>1 A. I have not on -- on bedrock. No.</p> <p>2 Q. Have you conducted double-ring infiltrometer 3 tests on fractured or nonfractured bedrock?</p> <p>4 A. No.</p> <p>5 Q. Can you suggest an applicable method for 6 testing field permeability of a bedrock unit?</p> <p>7 A. Well, a very shallow slug test might work, or 8 more pressure tests that -- like were done for some of 9 the other monzonite.</p> <p>10 The -- the reference I used for the pressure 11 test earlier, Mr. Knight, was the -- they had done a 12 bunch of it on monzonite and ended up with much higher 13 permeabilities. If they did it -- if they did more of 14 those in andesite, that would be very useful.</p> <p>15 Q. On slide 16, you referenced -- could we go to 16 slide 16?</p> <p>17 On slide 16, you referenced the work of 18 Abigail Beck and Giroud?</p> <p>19 Are you aware of the conclusions that these 20 same authors have made on liner leakage prevention that 21 are modern and physically based?</p> <p>22 A. I -- mostly I'm following the Kuipers 23 testimony. I am not aware of that -- of what you're 24 asking. No.</p> <p>25 Q. You're not aware of more recent publications</p>
1288	<p>1 to -- for me to agree with that. I don't know what 2 would necessarily be -- you just said carved into the -- 3 carved into andesite?</p> <p>4 On the far east side of that, I'm not -- I'm 5 not sure that it would be in andesite.</p> <p>6 Q. I'll move on.</p> <p>7 On slide -- could we go to slide 14?</p> <p>8 On slide 14 --</p> <p>9 MS. BARNCASTLE: It's a sign from above. It 10 happened to me.</p> <p>11 MR. KNIGHT: Well --</p> <p>12 MS. BARNCASTLE: See, told you.</p> <p>13 MR. KNIGHT: Oh, we got something here.</p> <p>14 MS. ORTH: Got it.</p> <p>15 MR. KNIGHT: It's very tenuous.</p> <p>16 Q. Slide 14, you recommend additional 17 characterization of the andesite --</p> <p>18 Madam Hearing Officer, could I make use of 19 your microphone?</p> <p>20 MS. ORTH: Yes. (Discussion off the record.)</p> <p>21 Q. (BY MR. KNIGHT) On slide 14, you recommend 22 additional characterization of the andesite using 23 infiltrometer tests? Have you conducted infiltrometer 24 tests on bedrock or fractured bedrock?</p>	1290	<p>1 by those same authors?</p> <p>2 A. No.</p> <p>3 Q. Stating that with modern methods minor leakage 4 can be greatly reduced below those levels?</p> <p>5 A. That does not surprise me. I have in the past 6 done reviews of liner -- liner leakage, and I do know 7 that due to weathering and other reasons liners still 8 leak, even -- even using GCL liners from the 2000s and 9 beyond. I did not testify to that specifically today.</p> <p>10 So -- but I am aware of the leakage through the liners.</p> <p>11 Q. Could we go to the permit condition you 12 propose in Exhibit 30. I don't know if that corresponds 13 with a slide or not.</p> <p>14 But Exhibit 30 you -- you're proposing -- is 15 it slide 30? No. It's -- this is -- I'm not sure if it 16 was one of your slides.</p> <p>17 But Exhibit 30, you are proposing a new permit 18 condition, C103, and in this permit condition you are 19 suggesting that if the results of the -- of a study of 20 the andesite indicate infiltration greater than 5 times 21 10 to the negative-6 then the permittee would be 22 required to construct a liner system beneath the waste 23 rock pile?</p> <p>24 A. That is -- that is correct.</p> <p>25 Q. And does that -- does this permit condition</p>

<p style="text-align: right;">1291</p> <p>1 take into account any information about the quality of  2 the water that might be emanating from the waste rock  3 piles and the fact that that water is predicted to be  4 fairly good water and not to exceed any standards except  5 for -- with the exception of fluoride, which is  6 naturally elevated in local groundwater?  7       And I guess my question on that is it --  8 are you -- do you think it's a good idea to recommend a  9 liner without any consideration of the chemistry or the  10 quantity of leachate?  11       A. Well, as I've testified other -- in other  12 places, I think there is a substantial -- substantially  13 more leachate than -- than has been estimated.  14       I -- I did not directly consider the  15 geochemistry, but I testified on rebuttal a few minutes  16 ago about leachate from the existing waste rock, which I  17 presume will be similar to future waste rock, and that  18 leachate is causing -- is responsible for one of the  19 plumes beneath the Grayback Arroyo that's subject to the  20 abatement, current -- current abatement.  21       So -- so yeah. I believe that there -- that  22 there is a reason to put a liner under that waste rock,  23 based on potential water quality from it.  24       Q. You state -- can we go to slide 25?  25       You state in the -- on slide 25, you state</p>	<p style="text-align: right;">1293</p> <p>1       Q. Yes.  2       A. It -- dispersion is the movement of  3 contaminants other than -- I mean, in general, it is the  4 movement of contaminants through -- through the -- as  5 affected by the tortuosity of the -- of the pore spaces.  6 It -- it's -- it's affected by several things.  7       It can be affected by the concentration, by  8 concentration gradient in -- in the contaminants.  9       It's also affected by the fact that  10 groundwater -- a molecule of groundwater does not flow  11 in a straight line, unlike the flow paths that -- that  12 we draw on -- on our maps. It -- it flows around, and  13 it -- and it --  14       And then third, it also is affected by the  15 fact that the pore spaces are only a few percent, to up  16 to 10 or 15 percent of the actual cross-sectional area  17 when we talk about Darcy's law.  18       Q. For the record, can you distinguish between  19 mechanical and hydrodynamic dispersion?  20       A. It's almost the same thing. I'm not sure what  21 you -- I'm not sure that there's a difference.  22       Q. Is your definition of dispersion and, for that  23 matter, the modeling that you've presented -- is that  24 based on a Fickian definition of dispersion?  25       A. I don't think so. I can't remember that term,</p>
<p style="text-align: right;">1292</p> <p>1 that the Jones numerical model -- you state that this is  2 not a transport model; is that correct?  3       A. That's correct.  4       Q. But then up here you are using that as a  5 transport model in your later testimony; is that right?  6       A. No. That is not correct. I used  7 hydrogeologic parameters from that model to use in my --  8 in my transport calculations. There are parameters that  9 would be the same in a -- let me back -- allow me to  10 back up.  11       My calculations have a -- include a flow model  12 and then a transport model. The flow model is -- is  13 parameterized using hydrogeologic parameters that I  14 assumed partly on the -- on the basis of Jones, et al.,  15 2014. The transport part of it did not come from -- did  16 not come from that model at all.  17       Q. Thank you.  18       Dr. Myers, you -- you talk a lot about  19 dispersion of contaminants in your testimony and in your  20 technical memo.  21       And in fact, there -- well, there seem to be  22 conflicting statements about dispersion in your  23 testimony, and I'd just ask you to clarify for the  24 record how do you define dispersion.  25       A. How do I define dispersion?</p>	<p style="text-align: right;">1294</p> <p>1 actually.  2       Q. Okay.  3       Can you -- could you briefly discuss the  4 difference -- the difference in groundwater flow versus  5 solute transport, particularly in relation to scale?  6       A. Sure. Oh, I could really go on for a long  7 time about this. I'll try not to.  8       Q. Thank you.  9       A. Groundwater flow is in general -- we generally  10 think of it as a Darcyan flow, something that follows  11 Darcy's law, and that you have a certain flow rate  12 through a cross-section of an aquifer. That  13 cross-section is made up of solids and pore spaces. So  14 the water actually only flows through the pore spaces,  15 and hence the water moves much faster than the estimated  16 Darcyan velocity.  17       I mean, a Darcyan velocity is a -- is the flow  18 divided by the area -- by that total area, but the  19 effect of velocity of groundwater, which is also the --  20 which is -- which is what contaminants go along -- and,  21 you know, which is also the average rate of contaminants  22 moving with the advective flow -- is much faster.  23       Now, when you get to dispersion, you've got --  24 you've got the fact that contaminants also -- that  25 disperse away from the -- from that flow path because of</p>

<p style="text-align: right;">1295</p> <p>1 the tortuosity, is the proper term, of the -- of the 2 connected pores.</p> <p>3 Q. Does -- okay. Specifically does pressure 4 propagate rapidly or slowly in a porous media?</p> <p>5 A. Does pressure?</p> <p>6 Q. Yeah.</p> <p>7 A. Pressure can -- pressure propagates relatively 8 fast.</p> <p>9 Q. Okay.</p> <p>10 Being fast, would you say averaging and 11 Darcy's law can be scaled to be applicable at a large, 12 even regional scale with some confidence?</p> <p>13 A. I'm not sure I understand you.</p> <p>14 Would you say that again, please?</p> <p>15 Q. Yeah.</p> <p>16 Would you say that averaging and Darcy's law 17 can be scaled to be applicable at a large, even regional 18 scale?</p> <p>19 A. Well, it -- well averaging and -- and 20 calculating a conductivity over a regional scale is 21 commonly done using -- using Darcy's -- using the Darcy 22 equation.</p> <p>23 For example, you can -- if you somehow measure 24 the discharge from an aquifer, and you have a known 25 cross-section of that aquifer, it is common to calculate</p>	<p style="text-align: right;">1297</p> <p>1 Given that, what about concentrations of 2 constituents in groundwater? Do they propagate as fast 3 as pressure does in a porous medium?</p> <p>4 A. Absolutely not.</p> <p>5 Q. Okay. Thank you.</p> <p>6 Let's turn to slide 48.</p> <p>7 Slide 48, when you say that contaminants could 8 reach the Ladder Ranch, does that include any of the 9 wells on the Ladder Ranch, and do -- is there any -- 10 have you made any calculations as to the quantity or 11 concentration or resulting possible exceedances at -- 12 and is there -- have you -- is there a time frame for 13 this theoretical event?</p> <p>14 MR. DE SAILLAN: Object to the form of the 15 question.</p> <p>16 MR. MYERS: I also want to know that for some 17 reason part of my slide is missing.</p> <p>18 Is it -- doesn't this slide also have a map of 19 the Ladder Ranch on the left side?</p> <p>20 I'm not sure what happened to my slide.</p> <p>21 MR. KNIGHT: I think we've all seen the map of 22 the Ladder Ranch enough times to have memorized it.</p> <p>23 MS. ORTH: Would you please rephrase your --</p> <p>24 MR. BUTZIER: I think it's a sign from above.</p> <p>25 MR. KNIGHT: I guess I would ask</p>
<p style="text-align: right;">1296</p> <p>1 a conductivity for that entire cross-section. You know, 2 maybe it's a mile wide and you come up with a 3 conductivity of 10. I mean, it's -- that's commonly 4 done. So that gives you a scale of a mine.</p> <p>5 And you've asked me to address scale so I'll 6 just go for one more second here, if that's okay.</p> <p>7 You could put wells along that cross-section, 8 let -- let's say you space them every quarter mile or so 9 and perform a pump test and determine the conductivity. 10 It may be different than the average that you determine 11 for that area because the pump test only applies to a 12 small portion of that cross-sectional area.</p> <p>13 And so the way -- when you're testing, the 14 smaller -- you have a whole scale of tests. Like the 15 pressure tests only applies for directly right around 16 the borehole that you're dealing with. So in other 17 words, you can estimate conductivity for a mile using 18 the method I just described.</p> <p>19 You can estimate conductivity over the area 20 that's influenced by a pump test -- a 72-hour pump test 21 using that method, but it only applies for that area. 22 And then you can estimate pump -- conductivity based 23 upon a borehole, which may only be -- you know, apply 24 for a few feet.</p> <p>25 Q. All right.</p>	<p style="text-align: right;">1298</p> <p>1 Mr. de Saillan to elucidate the nature of his objection. 2 Object to the form, how --</p> <p>3 MR. DE SAILLAN: It was a multiple compound 4 question.</p> <p>5 MR. KNIGHT: Okay.</p> <p>6 MR. DE SAILLAN: There are at least three, 7 maybe four questions --</p> <p>8 MR. KNIGHT: That's --</p> <p>9 MR. DE SAILLAN: -- in that one question.</p> <p>10 MR. KNIGHT: That is fine.</p> <p>11 Q. Let's start -- let's do one at a time.</p> <p>12 So when you say that contaminants could reach 13 the ranch, does that include any of the wells on the 14 ranch?</p> <p>15 A. The one well could -- could be affected by 16 dispersion, but for the most part, it would require a 17 fracture. But it would reach the ranch itself.</p> <p>18 And I would consider that losing the -- you 19 know, the southern half a mile of the property, you 20 know, they -- they may want to put wells in there in the 21 future, too. I think that's an appropriate piece of 22 their property to consider.</p> <p>23 Q. And again is there a particular predicted 24 concentration or -- of any particular constituent that 25 you're modeling here?</p>

<p style="text-align: right;">1299</p> <p>1 A. No.</p> <p>2 Q. And is there any particular time frame that</p> <p>3 you were contemplating for this?</p> <p>4 A. Well, the time frames would -- would have</p> <p>5 been -- I could go into a lot of detail looking at the</p> <p>6 hydrographs and how fast contaminants could flow,</p> <p>7 because if you -- if you -- and then this map is -- for</p> <p>8 some reason, this slide is missing my map.</p> <p>9 But if -- but a leak in the north end of the</p> <p>10 tailings here just -- and if the flow path is directly</p> <p>11 east, dispersion would have it up onto the south</p> <p>12 boundary of -- of the Ladder Ranch.</p> <p>13 And the -- the mine -- the distances that I</p> <p>14 had calculated were on the order of years, not -- not</p> <p>15 decades or -- or centuries to get there. It would be on</p> <p>16 the order of years that it would -- that it would get</p> <p>17 into this Avent -- Avent Pasture, which is the southern</p> <p>18 part of it there.</p> <p>19 And there is -- there is a well called --</p> <p>20 MR. SMITH: Feedlot.</p> <p>21 MR. MYERS: -- the Feedlot Well that is in</p> <p>22 that particular pasture. And, now, it's a little ways</p> <p>23 down, and so that may -- that's probably more on the</p> <p>24 order of decades before it would get to that particular</p> <p>25 well.</p>	<p style="text-align: right;">1301</p> <p>1 And if the conductivity is less than 10 to the</p> <p>2 minus-6 centimeters per second -- well, I haven't run a</p> <p>3 well calculation, but you wouldn't get much water out of</p> <p>4 it. You wouldn't get enough to call it a supply well.</p> <p>5 MR. KNIGHT: Thank you.</p> <p>6 MR. MYERS: Quite honestly.</p> <p>7 Q. (BY MR. KNIGHT) How much faith would you put</p> <p>8 in a well log from a private supply well that was</p> <p>9 drilled in -- sometime during the 1920s or 1930s, where</p> <p>10 there was not even a trained geologist on the drill rig?</p> <p>11 MR. DE SAILLAN: Objection, assumes facts that</p> <p>12 aren't in evidence.</p> <p>13 MS. ORTH: I don't know that you've laid that</p> <p>14 foundation, Mr. Knight.</p> <p>15 Q. (BY MR. KNIGHT) I guess I would just maybe</p> <p>16 more generally ask, how much faith would you put in the</p> <p>17 drilling logs for these particular supply wells drilled</p> <p>18 in the '20s and '30?</p> <p>19 A. Well, it's ironic. I mean, I have a lot more</p> <p>20 experience working with well logs that were done in</p> <p>21 rural parts of Nevada than New Mexico, and I have</p> <p>22 actually found that well logs done in the '40s -- '40s</p> <p>23 and '50s especially, but the earlier ones, that they</p> <p>24 were very conscientious in showing -- so I'm serious.</p> <p>25 I've actually seen -- some of the older well</p>
<p style="text-align: right;">1300</p> <p>1 But if it were to move in this direction and</p> <p>2 the dispersion as I've -- as I have simulated with my</p> <p>3 interpretive calculations would disperse it out into</p> <p>4 that area.</p> <p>5 Q. (BY MR. KNIGHT) Do you have any data on the</p> <p>6 flow rate of the wells completed in the andesite that</p> <p>7 were characterized as supply wells, these wells that</p> <p>8 were completed during the 1920s and 1930s?</p> <p>9 A. No.</p> <p>10 Q. Do you have any way of knowing whether these</p> <p>11 were -- whether these so-called supply wells were good</p> <p>12 supply wells, or whether they were useful supply wells?</p> <p>13 MR. DE SAILLAN: Object to the form of the</p> <p>14 question.</p> <p>15 MS. ORTH: What's your objection?</p> <p>16 MR. DE SAILLAN: I'm not sure what Mr. Knight</p> <p>17 means by good supply wells.</p> <p>18 MS. ORTH: And then he clarified useful,</p> <p>19 useful.</p> <p>20 Would you consider those supply wells useful?</p> <p>21 MR. MYERS: Well, Shomaker Associates</p> <p>22 distinguished them as supply wells. They don't have a</p> <p>23 record for how long they were used, but I don't think</p> <p>24 they would be -- you know, they would have even been</p> <p>25 considered if they didn't produce some water in it.</p>	<p style="text-align: right;">1302</p> <p>1 logs in my experience in another state are actually done</p> <p>2 better than ones that I've seen -- that are then done in</p> <p>3 the '80s and '90s, and you can't even read their</p> <p>4 writing. I mean, they're very meticulous in some of the</p> <p>5 old -- some of the old drillers were meticulous.</p> <p>6 So I'm not sure I can make a conclusion based</p> <p>7 on your question there.</p> <p>8 Q. All right. Thank you.</p> <p>9 Isn't it true that most climate scientists are</p> <p>10 predicting that New Mexico and the Southwest in general</p> <p>11 will become drier rather than wetter in the next 100</p> <p>12 years?</p> <p>13 A. On an annual basis, yes, but not necessarily</p> <p>14 on a storm-by-storm basis.</p> <p>15 Q. And let's see. I have one more question here.</p> <p>16 Your testimony -- actually this goes back to</p> <p>17 the -- to the modeling. Your modeling on a -- showing a</p> <p>18 15-year leak that was then stopped, showing the leak</p> <p>19 continuing to move downgradient. I think Mr. Butzier</p> <p>20 touched on this. Previous testimony indicated the</p> <p>21 existing plume beneath the tailing storage facility has</p> <p>22 not moved after 35 years and is, in fact, shrinking.</p> <p>23 Do you recall testimony from Mr. Finch that</p> <p>24 wells on both sides of the fault east of that plume</p> <p>25 showed no sign of contamination after 35 years?</p>

<p style="text-align: right;">1303</p> <p>1 A. I don't recall him specifically saying that, 2 but I don't believe that one well, MW-4, the second 3 well, is too far south. I would not expect it to show 4 any -- show any. Plus it is screened way too deeply to 5 pick up that plume. 6 The other well -- I'm sorry, I forget its name 7 right now -- is only one sample. I don't recall what's 8 in it, but one -- it's a fair distance below the fault. 9 I don't believe that's enough to prove that it hasn't 10 gone anywhere. 11 But honestly, if it's shrinking, that suggests 12 that it's moving somewhere. 13 Q. Okay. Thank you. 14 That's all the questions I have. 15 MS. ORTH: All right. Thank you. 16 Ms. Barncastle, do you have questions? 17 MS. BARNCASTLE: Yes, I do. 18 (Discussion off the record.) 19 CROSS EXAMINATION 20 BY MS. BARNCASTLE: 21 Q. Okay. I believe we're on slide 48? Yeah. 22 A. We are. 23 Q. There's been a lot of discussion about what 24 alluvium would or would not be scraped or removed. 25 Do you recall that discussion?</p>	<p style="text-align: right;">1305</p> <p>1 I have no further questions of this witness. 2 MS. ORTH: All right. Thank you. 3 Is there anyone else who has a question of 4 Dr. Myers based on his testimony? 5 Mr. de Saillan, do you have any follow-up? 6 MR. DE SAILLAN: I do indeed, Madam Hearing 7 Officer. Thank you. 8 REDIRECT EXAMINATION 9 BY MR. DE SAILLAN: 10 Q. Dr. Myers, at the beginning of the 11 cross-examination, Mr. Butzier asked you some questions 12 about the andesite and asked you to compare the andesite 13 to the Santa Fe Group. 14 Do you remember those questions? 15 A. Yes. 16 Q. And I think you responded that the andesite 17 being an igneous rock would have a -- a K value of a 18 couple of orders of magnitude less than the Santa Fe 19 Group, which was more a sedimentary rock. 20 Do you recall that? 21 A. Yes, I do. 22 Q. And wouldn't that be determined in part based 23 on the amount of fracturing that might exist in the 24 igneous rock? 25 A. Oh, sure. Yeah. Yes, it would. I mean, but</p>
<p style="text-align: right;">1304</p> <p>1 A. Very much so. 2 Q. I think we finally got a clear answer from 3 Mr. Reid yesterday. 4 Are you clear on what his answer was? 5 A. I think he said that it would be scraped where 6 there's going to be new waste rock placed, but if 7 there's little waste rock on it, it would not be 8 scraped. 9 Q. Your understanding, then, is some alluvium 10 will remain? 11 A. Yes. 12 Q. Would the seepage be faster or slower under 13 the waste rock storage facility that sits on the 14 alluvial material that's not proposed to be removed? 15 A. That would -- it would be faster -- it would 16 resemble what's been observed and I've used on -- on 17 rebuttal a while ago. 18 I don't know if there's andesite further 19 beneath that alluvium or not. I don't -- I don't recall 20 specifics of the geology, of the map. But there would 21 definitely be an area and a potential for leakage into 22 that -- into that alluvium and then potentially either 23 to report to -- to the rerouted arroyo or report to 24 groundwater downstream. 25 MS. BARNCASTLE: Thank you.</p>	<p style="text-align: right;">1306</p> <p>1 I would still expect the igneous rock to -- with the 2 exception of a very prominent -- you know, with the 3 exception of a fracture, specific fracture, the overall 4 average conductivity would be a little less than the 5 Santa Fe Group. 6 Q. Okay. 7 But it's still -- if you're -- if you're 8 looking at the fractures, it could be quite a bit -- 9 could have a -- quite a bit of a higher conductivity 10 than if you're looking in an area that doesn't have a 11 fracture. 12 A. Sure. 13 Q. Okay. 14 And then Mr. Butzier asked you some questions 15 about the -- the conductivity that you used in your -- 16 in your conceptual -- or your -- not conceptual model -- 17 MR. BUTZIER: Interpretive calculation. 18 MR. MYERS: Interpretive calculation. 19 MR. DE SAILLAN: Interpretive calculation. 20 Thank you. 21 Q. And is it the case that you selected a 22 conservative K value in preparing your interpretive 23 calculation? 24 A. I -- it was conservative in that I was trying 25 to be representative of -- I was trying to be -- on the</p>



1307	<p>1 Santa Fe Group, I was trying to be true to previous --</p> <p>2 to previous analyses. On the andesite, I was trying to</p> <p>3 be conservative, absolutely.</p> <p>4 Q. Okay. And that's what I was --</p> <p>5 A. Yeah.</p> <p>6 Q. I should have been more specific, but that's</p> <p>7 what I was referring to, was the andesite.</p> <p>8 So does that explain the difference that</p> <p>9 Mr. Butzier was trying to highlight between the K value</p> <p>10 that you used in your calculation versus the K value</p> <p>11 that you were referring to when you were looking at</p> <p>12 the -- at the andesite around the open pit?</p> <p>13 A. Yes. I think so. I mean, around the open</p> <p>14 pit, I was -- it's -- I mean, again with that -- that</p> <p>15 scale factor that I was discussing with Mr. Knight a</p> <p>16 little while ago would come into play.</p> <p>17 Q. Right. Okay.</p> <p>18 Then I think Mr. Knight asked you some</p> <p>19 questions about the proposed permit condition that is</p> <p>20 Exhibit -- Ranches Exhibit 30, that involves testing of</p> <p>21 the andesite.</p> <p>22 Do you recall those questions?</p> <p>23 A. Yes.</p> <p>24 Q. And he particularly asked you some questions</p> <p>25 about infiltrometers.</p>	1309	<p>1 thing everywhere.</p> <p>2 Q. All right. Okay.</p> <p>3 And then Mr. Knight asked you some questions</p> <p>4 about supply wells that were drilled several decades</p> <p>5 ago.</p> <p>6 And you indicated that there wasn't a whole</p> <p>7 lot of data on -- on how these wells were drilled.</p> <p>8 Is that perhaps part of the reason why we --</p> <p>9 you have suggested that additional characterization of</p> <p>10 the andesite is necessary?</p> <p>11 A. Well, I mean, the fact that those were supply</p> <p>12 wells suggested that there had to have been a</p> <p>13 permeability higher than 10 to the minus-6. And so that</p> <p>14 is one of -- one of my multiple pieces of evidence</p> <p>15 suggesting that the andesite has a higher conductivity</p> <p>16 than assumed herein.</p> <p>17 Q. Okay. Very good.</p> <p>18 Then Mr. Knight also asked you a question</p> <p>19 about the predicted precipitation as a result of global</p> <p>20 climate change.</p> <p>21 Is it your understanding that precipitation</p> <p>22 will occur in rainfall events as opposed to snow?</p> <p>23 A. In --</p> <p>24 Q. In the future?</p> <p>25 A. In what location are we talking?</p>
1308	<p>1 Is it your intention in that proposed permit</p> <p>2 condition that infiltrometers would necessarily be used</p> <p>3 or borings would necessarily be used or some combination</p> <p>4 of the two?</p> <p>5 A. I would say some combination of the two.</p> <p>6 Q. Okay.</p> <p>7 And could infiltrometers be useful in</p> <p>8 weathered bedrock at the surface?</p> <p>9 A. Absolutely.</p> <p>10 Q. Okay.</p> <p>11 And would you use infiltrometers to make some</p> <p>12 initial determinations about the -- the conductivity of</p> <p>13 the bedrock that then could be used to inform the</p> <p>14 remainder of your characterization study?</p> <p>15 A. Yes. I'm going to -- an infiltrometer will</p> <p>16 give you an estimate of an infiltration rate. It won't</p> <p>17 necessarily give you a conductivity estimate. The</p> <p>18 infiltrometer -- if you try it and you use it and you</p> <p>19 don't -- and so little water enters the ground that it's</p> <p>20 not measurable, then you're going to have to go and do</p> <p>21 something else, or you're going to use the infiltrometer</p> <p>22 over the more weathered parts of the site.</p> <p>23 I mean, we're talking about 230 acres of waste</p> <p>24 rock. I really don't think it's going to be a</p> <p>25 perfectly -- a perfect -- it's going to be the same</p>	1310	<p>1 Q. In the Southwest, in New Mexico?</p> <p>2 A. Well, it is my understanding that -- that</p> <p>3 that's -- rather that snow is definitely shifting to be</p> <p>4 more rain, and I'm guessing that areas in the</p> <p>5 Southwest -- areas in the Southwest that would have some</p> <p>6 snowpack now are going to have much less and more of it</p> <p>7 will come -- will fall as rain. Yes. So there will be</p> <p>8 larger flood events in -- in wintertime periods.</p> <p>9 MR. DE SAILLAN: That's all the questions I</p> <p>10 have.</p> <p>11 Thank you, Dr. Myers.</p> <p>12 MS. ORTH: All right. Thank you,</p> <p>13 Mr. de Saillan.</p> <p>14 Is there any reason not to excuse Dr. Myers?</p> <p>15 Okay. Thank you, Dr. Myers, for your</p> <p>16 testimony.</p> <p>17 You're excused.</p> <p>18 Counsel can certainly step away from the</p> <p>19 table. I need to take one public comment before we go</p> <p>20 on a break. When we return from the break, it will be</p> <p>21 Elephant Butte's presentation.</p> <p>22 Sir, were you the one who had asked to make</p> <p>23 public comment?</p> <p>24 Back there?</p> <p>25 Did the gentleman -- is the gentleman still</p>

1311	<p>1 here?</p> <p>2 Okay. He may have -- he may have left.</p> <p>3 Let's go on a 10-minute break. Thank you.</p> <p>4 (Proceedings in recess from 5:54 p.m. to</p> <p>5 6:05 p.m.)</p> <p>6 MS. ORTH: Okay. We are back after a break.</p> <p>7 We have approximately an hour left together.</p> <p>8 Ms. Barncastle, did you have an opening</p> <p>9 statement that you'd like to make?</p> <p>10 MS. BARNCASTLE: I do.</p> <p>11 I actually have some preliminary housekeeping</p> <p>12 matters that I'd like to ask for assistance with prior</p> <p>13 to starting my opening statement.</p> <p>14 MS. ORTH: All right.</p> <p>15 MS. BARNCASTLE: And please forgive me, Madam</p> <p>16 Hearing Officer and counsel. I am not near as familiar</p> <p>17 with this type of proceeding as other counsel who are</p> <p>18 present.</p> <p>19 And one thing that threw me off was the</p> <p>20 suggestion of rebuttal cases at some point in the</p> <p>21 future. And I -- I understand that Mr. de Saillan's</p> <p>22 rebuttal case is essentially done at this point, but I'm</p> <p>23 not sure what to expect as far as rebuttal from the</p> <p>24 other parties.</p> <p>25 And quite frankly, my -- my case in chief</p>	1313	<p>1 MS. ORTH: Okay.</p> <p>2 MS. BARNCASTLE: And can we expect that other</p> <p>3 parties will present a separate rebuttal?</p> <p>4 I mean, I understand maybe Mr. Butzier</p> <p>5 might -- may --</p> <p>6 MR. BUTZIER: Yes. We do -- we will have one</p> <p>7 or two probably rebuttal witnesses that hopefully can be</p> <p>8 brief.</p> <p>9 MS. BARNCASTLE: Okay.</p> <p>10 MS. ORTH: Every party has the opportunity --</p> <p>11 and I usually say it in my scheduling order. If I left</p> <p>12 it out of this scheduling order, I'm sorry, but</p> <p>13 typically my scheduling orders say that we'll take the</p> <p>14 direct case in a certain order and then rebuttal and/or</p> <p>15 surrebuttal, although I try to discourage surrebuttal in</p> <p>16 the same order.</p> <p>17 MS. BARNCASTLE: I -- again I apologize. I</p> <p>18 may have been just a tad bit distracted with my personal</p> <p>19 situation over the last few weeks so I -- like I said, I</p> <p>20 was kind of taken off guard by the way things played</p> <p>21 out.</p> <p>22 But --</p> <p>23 MS. ORTH: Okay. I --</p> <p>24 MS. BARNCASTLE: -- I think we are ready to</p> <p>25 proceed regardless.</p>
1312	<p>1 included rebuttal, and so I'm wondering if I should</p> <p>2 change my ways.</p> <p>3 MS. ORTH: So I'm certainly not opposed to</p> <p>4 hearing rebuttal as part of your direct case, or what</p> <p>5 we've been calling direct case, and -- although</p> <p>6 certainly I understood why the direct case, for example,</p> <p>7 from Mr. de Saillan and his rebuttal were presented</p> <p>8 separately, because, of course, his direct case was</p> <p>9 already set out, and the rebuttal was prepared after</p> <p>10 they heard from the other experts.</p> <p>11 I think to the extent you are presenting them</p> <p>12 together, I certainly don't find that objectionable.</p> <p>13 Mr. Butzier.</p> <p>14 MR. BUTZIER: We would have no objection. In</p> <p>15 fact, we would -- we would appreciate going that route,</p> <p>16 because I think that might make our chances of finishing</p> <p>17 this week better.</p> <p>18 MS. ORTH: Okay. Good.</p> <p>19 Mr. Knight.</p> <p>20 MR. KNIGHT: I certainly concur, and, you</p> <p>21 know, I agree they're slightly different circumstances.</p> <p>22 Our testimony was prefiled written testimony so I think</p> <p>23 it's entirely appropriate for them to present rebuttal</p> <p>24 as part of their -- part of their case over the next</p> <p>25 couple days.</p>	1314	<p>1 MS. ORTH: Great.</p> <p>2 MS. BARNCASTLE: And so that -- I'll deal with</p> <p>3 some of my witnesses that will have rebuttal materials</p> <p>4 that we will admit into evidence that weren't provided</p> <p>5 in the statements of intent that was created throughout</p> <p>6 this week as we were listening to testimony, but it will</p> <p>7 be a combination of their direct and rebuttal, and we</p> <p>8 will not do two separate ones -- two separate</p> <p>9 presentations like Mr. de Saillan did.</p> <p>10 MS. ORTH: That's fine.</p> <p>11 MR. BUTZIER: May I ask, would that be for all</p> <p>12 of your witnesses?</p> <p>13 MS. BARNCASTLE: At least one of them has a</p> <p>14 PowerPoint. I don't think the other three do. And so</p> <p>15 the -- just the one with the PowerPoint has been</p> <p>16 revising his -- his PowerPoint throughout this week. He</p> <p>17 actually created it as rebuttal material and essentially</p> <p>18 incorporated his direct testimony in with rebuttal.</p> <p>19 MR. BUTZIER: Okay.</p> <p>20 And you'll let us know if any other witnesses</p> <p>21 are -- are going into direct and rebuttal when they're</p> <p>22 presented?</p> <p>23 MS. BARNCASTLE: Yes.</p> <p>24 MR. BUTZIER: Okay.</p> <p>25 MS. BARNCASTLE: Off the top of my head,</p>

1315	<p>1 though, I'm thinking -- ours is all wrapped up into one.                  2 It's all --                  3 MR. BUTZIER: Yeah.                  4 MS. BARNCASTLE: I mean, we're not going to do                  5 anything separate. That's why, I guess, I'm a little                  6 confused. I --                  7 MR. BUTZIER: I'm fine with that. I just was                  8 wanting to know whether you were -- I couldn't tell if                  9 you were saying --                  10 MS. BARNCASTLE: Essentially --                  11 MR. BUTZIER: -- some of your witnesses would                  12 come back again in rebuttal or --                  13 MS. BARNCASTLE: No.                  14 MR. BUTZIER: Okay.                  15 MS. BARNCASTLE: Essentially we've been                  16 adapting as we go this week.                  17 MR. BUTZIER: And I'm fine with that.                  18 MS. ORTH: Thank you for mentioning that.                  19 Is there anything else?                  20 MS. BARNCASTLE: No, I don't believe so.                  21 MS. ORTH: All right.                  22 MS. BARNCASTLE: Madam Hearing Officer, for my                  23 opening statement, I'd like to start by introducing                  24 everyone to the Elephant Butte Irrigation District.                  25 EBID, as it is called, is a political</p>	1317	<p>1 proposed mine. EBID will have four expert witnesses,                  2 each of whom will discuss various issues with the                  3 proposed project as it relates to issues that NMED                  4 should consider as part of its analysis.                  5 We have focused on the Copper Rule provision                  6 that provides that "The secretary shall approve a                  7 discharge permit provided that it poses neither a hazard                  8 to public health nor undue risk to property." That is                  9 New Mexico Administrative Code Section 20.6.7.10                  10 subsection J, as in Juliet.                  11 EBID's position is that based on the                  12 information available the proposed mine will pose an                  13 undue risk to property and may pose a hazard to public                  14 health, although there is inadequate information                  15 available to properly evaluate the risks to public                  16 health at this time.                  17 The testimony of our witnesses will begin with                  18 Dr. King, who will introduce the Elephant Butte                  19 Irrigation District and its interests in more detail and                  20 will discuss the property rights and jeopardy downstream                  21 of the proposed mine and how the lack of coordination                  22 among agencies has further placed those property rights                  23 in peril.                  24 Following a discussion of property rights EBID                  25 seeks to ensure protection of, our witness, Mr. Fox,</p>
1316	<p>1 subdivision of the State of New Mexico with a primary                  2 responsibility to operate and maintain the New Mexico                  3 portion of the Rio Grande Project. The Rio Grande                  4 Project serves irrigators in the Lower Rio Grande in New                  5 Mexico and Texas and serves approximately 155,000 acres                  6 of farmland within the project boundaries. The Elephant                  7 Butte Irrigation District serves 90,640 acres within New                  8 Mexico, geographic New Mexico.                  9 The Rio Grande Project is served by two major                  10 water storage reservoirs, Elephant Butte and Caballo.                  11 All surface water in the Lower Rio Grande is                  12 appropriated for use by the Rio Grande Project, and this                  13 has been the case since at least 1903, as recognized by                  14 the Lower Rio Grande Adjudication court, and that is in                  15 the Third Judicial District in New Mexico, Dona Ana                  16 County.                  17 The proposed Copper Flat Mine is located                  18 within the Office of the State Engineer -- within what                  19 the Office of the State Engineer considers the Lower Rio                  20 Grande. The Elephant Butte Irrigation District operates                  21 in both Sierra and Dona Ana Counties, and that's in the                  22 area of the Lower Rio Grande.                  23 The Elephant Butte Irrigation District's                  24 interest in protecting the future of water supplies for                  25 its irrigators has been placed in jeopardy by the</p>	1318	<p>1 will provide an overview of water rights administration                  2 in the Lower Rio Grande considering that under state law                  3 water rights are considered property rights, and will                  4 also discuss what water rights New Mexico Copper                  5 Corporation has and what they will need in the context                  6 of the impact of the project.                  7 I'm sorry. And what the copper corporation                  8 will need in context of the impact the project will have                  9 on other water users.                  10 This will not be the same type of discussion                  11 as would take place in an Office of the State Engineer                  12 proceeding, but instead will focus on the idea of risk                  13 to property as contemplated by the Copper Rule. So with                  14 all due respect, EBID disagrees with NMED's statement of                  15 the case and its limited scope. We, in fact, believe                  16 that the Copper Rule as it is written, taking into                  17 account undue risk to property, broadens these                  18 proceedings beyond what Mr. Knight stated in his opening                  19 statement.                  20 Mr. Fox will also discuss the required                  21 coordination between NMED and OSE and specifically the                  22 lack of coordination that has taken place with this                  23 permit action and how that has impacted the Elephant                  24 Butte Irrigation District and its constituents.                  25 Mr. Libbin will follow Mr. Fox with a</p>

<p style="text-align: right;">1319</p> <p>1 discussion of the New Mexico Office of the State  2 Engineer Dam Safety Bureau requirements and issues  3 that -- such as what the Dam Safety Bureau may require  4 as part of its permitting process.  5 Now, I -- I am aware that we've covered a  6 substantial amount of that information already, and  7 Mr. Libbin will endeavor to not duplicate that  8 testimony; however, there are some ins and outs of how  9 the Dam Safety Bureau operates and works that could be  10 very important to a decision in this case, and so  11 Mr. Libbin will lay those issues out.  12 Most importantly, however, Mr. Libbin will  13 again discuss the lack of dam breach analysis, which is  14 key to telling us whether a hazard to public health  15 exists, and while we've already sort of heard some of  16 that testimony, we will hammer that one home through  17 Mr. Libbin.  18 Finally, Dr. Carroll will conclude with a  19 discussion of Probable Hydrologic Consequences,  20 including a rebuttal of much of the direct testimony  21 offered by New Mexico Copper Corporation's witnesses and  22 to a certain extent in response to testimony provided by  23 NMED.  24 Dr. Carroll will discuss issues such as the  25 need for remediation of existing -- the existing</p>	<p style="text-align: right;">1321</p> <p>1 been from a favorable vantage point from New Mexico  2 Copper Corporation or, as you've heard so far in the  3 testimony, from a best case or ideal scenario basis.  4 Such a view in light of what is at stake downstream is  5 responsible. More vigorous evaluation is absolutely  6 necessary.  7 Therefore, issuing the permit now under the  8 current circumstances is premature, and instead we will  9 be asking that additional work be provided, additional  10 backup, additional data be -- I'm sorry -- I lost half  11 of my opening.  12 Essentially what we're asking for is permit  13 conditions to take care of EBID's property rights  14 concerns, additional backup work and data be acquired to  15 ensure that there is not an actual risk to public health  16 and that permit conditions such as those imposed  17 regarding the Dam Safety Bureau be imposed for issues  18 like water rights to ensure that there is adequate  19 coordination among agencies such that entities  20 downstream are not adversely impacted.  21 And with that, I will call my first witness,  22 Dr. King.  23 MR. BUTZIER: Madam Hearing Officer.  24 MS. ORTH: Sir.  25 MR. BUTZIER: May I renew and restate an</p>
<p style="text-align: right;">1320</p> <p>1 contamination plume, that proposed postclosure  2 monitoring is insufficient and that a liner over the  3 waste rock storage piles should be required upon  4 closure.  5 EBID will conclude the issuance of the permit  6 is at best premature at this time given that adequate  7 information is unavailable to determine the risk to  8 public health, a requirement of the Copper Rule, and  9 further that the undue risk to property is clear and  10 cannot be ignored. In other words, the application and  11 corresponding permit are technically incomplete.  12 EBID does not oppose copper mining, however,  13 and does not necessarily even oppose the Copper Flat  14 Mine. EBID opposes the irresponsible permitting of the  15 proposed mine through a process that does not properly  16 consider other equally important economies, specifically  17 for our purposes the farming economy in the Lower Rio  18 Grande.  19 Also, it's improper to ignore other property  20 rights, most importantly the potential to -- potential  21 hazard to public health. Permit conditions can go a  22 long way toward remediating those concerns, however, and  23 that's what EBID seeks to -- seeks through its case in  24 chief.  25 Planning and evaluation of the project has</p>	<p style="text-align: right;">1322</p> <p>1 objection that I have to much of the testimony being  2 offered by the Elephant Butte Irrigation District?  3 MS. ORTH: Yes.  4 MR. BUTZIER: I think it sounds like the --  5 from the statement we just heard, that the -- the basis  6 for getting into water rights issues and Dam Safety  7 Bureau-related issues, which are -- I believe she admits  8 are, generally speaking, under the purview of a  9 different agency from NMED.  10 The language that Ms. Barncastle cited is that  11 "The secretary shall approve a discharge permit provided  12 that it poses neither a hazard to public health nor  13 undue risk to property." That's what I believe she  14 stated is the primary basis for offering this testimony.  15 I think it's important to put that language in  16 context, and I think New Mexico law would -- would  17 require that that language be read in pari materia, so  18 to speak, with other parts of the regulation and the  19 applicable regulations under the state's groundwater  20 program, and also view it in the context of the statute  21 which serves as the basis upon which the Discharge  22 Permit program is established, namely the Water Quality  23 Act, the New Mexico Water Quality Act.  24 And as I know that the Hearing Officer is  25 aware, the purpose of the Water Quality Act is to</p>

1323	<p>1 prevent or abate water contamination. That's recognized                  2 in explicit language in the Water Quality Act. It's                  3 recognized in the Bokum case that often is cited by the                  4 New Mexico Environment Department for that proposition.                  5 Also, I want to point out that I think that                  6 Ms. Barncastle may be more broadly reading the term                  7 "hazard to public health" than is justified. And the                  8 reason I say that is that the term "hazard to public                  9 health" is defined in the general groundwater program                  10 regulations which, of course, must be read in                  11 conjunction with the more specific copper                  12 industry-related Copper Rule.                  13 And I'll just read what that -- what that                  14 definition is. And it appears in 20.6.2.7AA, the                  15 definition of hazard to public health. That provision                  16 says "'hazard to public health' exists when water which                  17 is used or is reasonably expected to be used in the                  18 future as a human drinking water supply exceeds at the                  19 time and place of such use, one or more of the numerical                  20 standards of Subsection A of 20.6.2.3103 NMAC, or the                  21 naturally occurring concentrations, whichever is higher,                  22 or if any toxic pollutant affecting human health is                  23 present in the water; in determining whether a discharge                  24 would cause a hazard to public health to exist, the                  25 secretary shall investigate and consider the</p>	1325	<p>1 the Mining Act rules in Title 19, Chapter 10 NMAC under                  2 the authority of the mining and minerals division."                  3 Now, this provision, this objective statement                  4 in the Copper Rule doesn't explicitly refer to dam                  5 safety rules or water rights. And again it doesn't                  6 define undue risk to property. But I would submit that                  7 undue risk to property, like hazard to public health,                  8 needs to be read in the proper context.                  9 And we're not talking about the possibility of                  10 somebody's house being overrun by -- by a dam break, for                  11 example. We're similarly not talking about depletions                  12 in water supply which are issues that are the subject of                  13 all sorts of proceedings that occur before the Office of                  14 the State Engineer.                  15 And I think that the attempt to try to sort of                  16 merge those issues into this proceeding should not be                  17 allowed, and we would -- if that testimony is allowed,                  18 we'd like to state a continuing objection to its                  19 admission in this proceeding.                  20 MS. ORTH: All right. Thank you, Mr. Butzier,                  21 for being clear in this evidentiary record about your                  22 objection. And we'll certainly grant you a continuing                  23 objection.                  24 But I'd like to hear the Elephant Butte                  25 evidence and have asked only, as I conveyed at one point</p>
1324	<p>1 purification and dilution," et cetera, et cetera.                  2 So my point there, Madam Hearing Officer, is                  3 that's a fairly limited concept of what is meant by the                  4 term "hazard to human health." It's explicitly defined                  5 in the groundwater program regulations, and we think and                  6 submit that as a matter of law the provision that                  7 Ms. Barncastle relies on has to take into account that                  8 definition because it's -- it's the exact same term,                  9 hazard to public health, that is defined.                  10 There is no definition of undue risk to                  11 property. That I will acknowledge. But I think that                  12 given the overall context of the Water Quality Act, the                  13 groundwater discharge permitting program that is -- is                  14 in place in the State of New Mexico to protect against                  15 pollution to groundwater.                  16 And I would also want to draw the Hearing                  17 Officer's attention to the stated purpose of the Copper                  18 Rule, which says, in 20.6.7.6, titled Objective, "The                  19 purpose of 20.6.7 NMAC is to supplement the general                  20 permitting requirements of 20.6.2.3000 through                  21 20.6.2.3114 NMAC to control discharges of water                  22 contaminants specific to copper mine facilities and                  23 their operations to prevent water pollution. Compliance                  24 with these rules does not relieve an applicant or                  25 permittee of a copper mine facility from complying with</p>	1326	<p>1 to Ms. Barncastle, that they be careful about avoiding                  2 duplication and avoiding an excruciating level of detail                  3 when it comes to areas not, if you will, directly                  4 applicable to the groundwater program of the New Mexico                  5 Environment Department.                  6 MS. BARNCASTLE: If I may respond briefly.                  7 Part of what the Elephant Butte Irrigation                  8 District seeks to do here is to clarify what that                  9 provision that I've cited in the Copper Rule means. And                  10 so the litigation that previously took place regarding                  11 the Copper Rule resulted in an opinion that the rule on                  12 its face is valid, but it as implied was left -- that                  13 question was left for a future date.                  14 And that's what we seek to do here, is to                  15 determine if as applied that rule is going to remain                  16 valid, and specifically for Elephant Butte Irrigation                  17 District's interests the issue of the hazard to public                  18 health and undue risk to property.                  19 Now, I will say I appreciate Mr. Butzier's                  20 legal arguments being made at least at this point in                  21 time. I completely disagree in some facets, primarily                  22 the issue of the definition of hazard to public health.                  23 One of the things we will be discussing is the                  24 fact that there is an interconnected nature of ground                  25 and surface water in the Lower Rio Grande and the fact</p>

1327	<p>1 that multiple municipalities rely on the water that</p> <p>2 would potentially become contaminated if the copper mine</p> <p>3 were to have some sort of catastrophic event or</p> <p>4 otherwise, as you'll hear from Dr. Carroll, and as</p> <p>5 you've just heard from some of Mr. de Saillan's</p> <p>6 witnesses, that there is already contamination</p> <p>7 possibilities without a catastrophic event.</p> <p>8 So we will stay focused, but what we seek to</p> <p>9 do is lay the foundation -- evidentiary foundation for</p> <p>10 litigation of whether or not the Copper Rule as applied</p> <p>11 is valid.</p> <p>12 MS. ORTH: Okay. Thank you for that.</p> <p>13 I won't invite, unless you want to insist,</p> <p>14 Mr. de Saillan or Mr. Knight, further argument. I'd</p> <p>15 rather actually hear the evidence and invite all parties</p> <p>16 to put any further legal argument on this question into</p> <p>17 your posthearing submittals.</p> <p>18 MR. DE SAILLAN: Madam Hearing Officer, I do</p> <p>19 have some things to say on this subject, but I will, as</p> <p>20 you suggested, put them in our closing arguments.</p> <p>21 They'll be in writing. So I won't take up any more of</p> <p>22 our time this evening.</p> <p>23 MS. ORTH: All right. Thank you very much.</p> <p>24 MR. BUTZIER: And, Madam Hearing Officer, I'll</p> <p>25 be very brief, but there is one more thing that I want</p>	1329	<p>1 Let's start with your education.</p> <p>2 A. I have a bachelor's degree in civil</p> <p>3 engineering from the University of California at</p> <p>4 Berkeley, I have a master's and a PhD in agricultural</p> <p>5 engineering from Colorado State University, and I have a</p> <p>6 master's in business administration from New Mexico</p> <p>7 State University.</p> <p>8 Q. Please tell us about your work experience that</p> <p>9 would qualify you as an expert in this proceeding.</p> <p>10 A. Okay. Between my bachelor's degree and</p> <p>11 graduate school, I served as a Peace Corps volunteer in</p> <p>12 Malawi, which is Southeastern Africa, where I worked on</p> <p>13 various water resources-related projects, including</p> <p>14 irrigated agriculture, land husbandry and refugee camp</p> <p>15 establishment.</p> <p>16 As a -- I've been a professor at New Mexico</p> <p>17 State University since January of 1990. I am</p> <p>18 responsible for teaching, research and outreach as well</p> <p>19 as a -- heavy administration. I'm a professor and</p> <p>20 assistant department head in the civil engineering</p> <p>21 department there. My research has focused extensively</p> <p>22 on modeling of the surface and groundwater resources of</p> <p>23 the Lower Rio Grande.</p> <p>24 In addition to my time as a professor at New</p> <p>25 Mexico State University, I have served as a consultant</p>
1328	<p>1 to say that perhaps will cut things to the quick a</p> <p>2 little bit, which is that New Mexico Copper would</p> <p>3 stipulate to the fact that a water right in New Mexico</p> <p>4 and under New Mexico law is considered to be an interest</p> <p>5 in real property and a property interest.</p> <p>6 MS. ORTH: All right. I don't know if that</p> <p>7 helps Ms. Barncastle, but in the event that it does,</p> <p>8 some part of the testimony could be cut to the chase,</p> <p>9 perhaps.</p> <p>10 MS. BARNCASTLE: I appreciate the stipulation.</p> <p>11 That's actually state law. So thank you, Mr. Butzier,</p> <p>12 but our testimony is going to go beyond that, actually.</p> <p>13 MS. ORTH: All right. So your first witness</p> <p>14 to the table, please.</p> <p>15 JAMES PHILLIP KING</p> <p>16 having been first duly sworn or affirmed, was</p> <p>17 examined and testified as follows:</p> <p>18 DIRECT EXAMINATION</p> <p>19 BY MS. BARNCASTLE:</p> <p>20 Q. Dr. King, please state your full name for the</p> <p>21 record.</p> <p>22 A. I am James Phillip King.</p> <p>23 Q. And, Dr. King, I'd like you to give us a</p> <p>24 little bit of your background and experience so that I'm</p> <p>25 able to qualify you as an expert this evening.</p>	1330	<p>1 for Elephant Butte Irrigation District since the early</p> <p>2 1990s. In that role, I have engaged in several</p> <p>3 different projects, things from development of flow</p> <p>4 measurement systems to allocation of surface water, to</p> <p>5 development of special policies, to facilitate the</p> <p>6 interaction of EBID with other water use sectors.</p> <p>7 Q. Do you have any professional licenses and</p> <p>8 certifications?</p> <p>9 A. I am a licensed professional engineer in New</p> <p>10 Mexico, License Number 12869, expiring December, 2019.</p> <p>11 Q. Are you currently employed anywhere?</p> <p>12 A. I am a professor and associate department head</p> <p>13 in civil engineering at New Mexico State University.</p> <p>14 Q. And that's in addition to your consulting work</p> <p>15 for EBID?</p> <p>16 A. Yes.</p> <p>17 Q. Do you have any publications that you've been</p> <p>18 involved in, either directly or indirectly, that relate</p> <p>19 to the issues you're going to testify here today?</p> <p>20 A. I have done many publications. Most recently,</p> <p>21 I am third author on a publication that came out this</p> <p>22 month on the relationship between surface water and</p> <p>23 groundwater use by farmers in the Rincon Valley, which</p> <p>24 is the northern valley within the Elephant Butte</p> <p>25 Irrigation District, the relationship between the use of</p>

<p style="text-align: right;">1331</p> <p>1 surface water and groundwater and the aquifer response.  2 I have done many presentations on the water  3 issues and both -- I should back up -- the history, the  4 current practices in water management and the future of  5 water management in the Lower Rio Grande, and again this  6 is integrating surface water and groundwater across time  7 and space within this region.  8 I've done many, many which are probably not  9 well recognized or well represented in my -- in my  10 resume, because they are kind of hard to keep up with,  11 but my next one is tomorrow at 2:30 at the state meeting  12 of the American Society of Civil Engineers in  13 Albuquerque.  14 Q. Are you familiar with the Rio Grande Project?  15 A. Yes, very.  16 Q. Can you tell us a little bit about your  17 familiarity with the organization, operations and  18 accounting procedures for the Rio Grande Project.  19 A. Let me describe the Rio Grande Project first.  20 The Rio Grande Project is a reclamation  21 project that was one of the earlier reclamation projects  22 in the country. It was authorized by Congress in 1905.  23 The Bureau of Reclamation appropriated the  24 waters for the project in 1906 and 1908.  25 Construction on the project was largely</p>	<p style="text-align: right;">1333</p> <p>1 gets their water.  2 The project again came functionally online in  3 1916. In the early years of the project, there was a  4 plentiful water supply. There were various improvements  5 done to it basically from the -- from the late teens  6 into the 1920s and even the early 1930s. A drainage  7 system was added to the -- to the Rio Grande Project to  8 remove the excess water from the irrigation activities  9 and return it to the river for downstream use.  10 The next significant development in the  11 project I would say came around 1938, and a couple of  12 things -- a couple of major things happened in 1938.  13 First of all, the Rio Grande Compact, which is  14 an agreement among Colorado, New Mexico and Texas for  15 the equitable division of water among the three states,  16 waters of the Rio Grande, was agreed to by the three  17 states and then ratified by Congress in 1939.  18 Also in and around 1938, Caballo Dam was built  19 downstream from Elephant Butte -- Elephant Butte Dam.  20 And the functions of Caballo Dam -- remember now this is  21 1938 so the project has already been operating for 22  22 years at this point. The purpose of Caballo Dam was to  23 provide a regulating capacity for releases from Elephant  24 Butte.  25 The original Elephant Butte Dam did not have</p>
<p style="text-align: right;">1332</p> <p>1 completed -- at least on the initial phase of the  2 project was largely completed in 1916 with the  3 completion of Elephant Butte Dam.  4 The Rio Grande Project provides water to -- to  5 serve the needs of 90,640 acres of water-righted land in  6 New Mexico, 69,010 water-righted acres in the State of  7 New Mexico (verbatim) -- those water rights are managed  8 by the El Paso County Water Improvement District Number  9 1, who for brevity we will refer to here as EP1 -- and  10 to provide a delivery of water to the Country of Mexico  11 under an international agreement that was signed by the  12 two countries in 1906.  13 That international delivery of water from the  14 United States to Mexico is a very, very important  15 function of the Rio Grande Project, both in its  16 initial -- the initial concept of the project and also  17 to this day in the administration and allocation of  18 water. The way we think of it is that is an  19 international agreement so that is the top priority on  20 the project.  21 And the two districts and our -- the federal  22 agencies, which would be the US Bureau of Reclamation  23 and the US section of the International Boundary and  24 Water Commission, certainly hold that to be sort of the  25 paramount duty of the project, is to ensure that Mexico</p>	<p style="text-align: right;">1334</p> <p>1 power generation capabilities, but that was added in  2 1938. And since the releases for power generation would  3 not match those for irrigation, Caballo Dam was put in  4 to essentially reregulate power releases then to match  5 the demand for irrigation in the two districts and  6 Mexico.  7 Caballo Dam is also a flood control dam. It  8 captures flood -- floods particularly coming from the  9 west side of the Rio Grande, which would include flows  10 from Animas, Grayback and Percha Creeks that flow in and  11 provide a significant amount of water to Caballo, which  12 is then distributed among the two districts and Mexico  13 as project water.  14 In the period 1951 through 1978, the Rio  15 Grande Project was ripped by a period of recurrent  16 drought. I think of it all as one period of drought  17 with a few fairly wet years interspersed.  18 I think from 1979 through 2002, the Rio Grande  19 Project had a full supply each year every year. In  20 fact, they had a full supply by January 1st of each  21 year, which these days seems pretty exceptional.  22 And in 2003, we returned to persistent drought  23 periods similar to what we saw in 1951 through 1978, and  24 we've been in such generally water-short situations ever  25 since 2003.</p>

<p style="text-align: right;">1335</p> <p>1 The administration of the project -- and  2 you'll pardon me if I run back and forth in time here.  3 There's several inexorably weaved things that run  4 through here, and I'll try to untangle them one at a  5 time.  6 The administration of the project when it was  7 originally built and one of the aspects of the -- the  8 construction of the project was it was financed by the  9 farmers of Elephant Butte Irrigation District and EP1.  10 They essentially put liens on their farms to finance the  11 construction of the project by the federal government,  12 and they subsequently made payments to pay off that debt  13 to the federal government.  14 While they were paying it off, the federal  15 government, particularly the Bureau of Reclamation, ran  16 the project from top to bottom. They -- they controlled  17 the release of water from Elephant Butte Reservoir.  18 Once it went online, they controlled the release of  19 water from Caballo Reservoir.  20 They controlled the diversion of water from  21 the Rio Grande at several points along the river, points  22 that we still use, to put into the irrigation systems,  23 and, in fact, they operated the irrigation systems all  24 the way down to the individual farmer turnouts.  25 So in the early years of the project, that --</p>	<p style="text-align: right;">1337</p> <p>1 balances for the upstream states.  2 At the time of the compact, the Rio Grande  3 Project was run as a single unit by the federal  4 government, and it was this remote and almost forgotten  5 outpost of New Mexico down here, some would say still  6 kind of remote. And so the -- the drafters of the  7 compact placed the delivery point for New Mexico to  8 deliver water to Texas at San Marcial gage, which is at  9 the upper end of the Elephant Butte Reservoir pool.  10 So what that did is it put Elephant Butte Dam,  11 Elephant Butte Irrigation District, EP1 and Mexico all  12 in Texas.  13 In the very wet and wild years of the 1940s,  14 they had very major problems -- oh, let me back up one  15 step.  16 The delivery that New Mexico has -- the  17 delivery obligation New Mexico has with Texas is  18 determined by the flow at Otowi gage, which is a gage in  19 the Rio Grande that is just downstream of the confluence  20 of the Rio Grande and the Rio Chama. So the flow of  21 water past Otowi gage determines how much water New  22 Mexico must deliver to Texas each year. If they deliver  23 more, they get a credit. If they deliver less, they get  24 a debit.  25 But in the 1940s, they had such large flows</p>
<p style="text-align: right;">1336</p> <p>1 they really did run it. The ditch riders, that are very  2 familiar to irrigators in the district now as district  3 employees, were at that time Bureau of Reclamation  4 employees, and so the Bureau of Reclamation ran the show  5 all the way from top to bottom.  6 That is one of the reasons why in 1938, when  7 they were coming up with the division of water among the  8 three states, they very logically made the delivery  9 point from Colorado to New Mexico at the state line.  10 So -- and this is getting into a little bit of compact  11 now, but that's a necessary part of the picture here.  12 The -- the measured flow at a couple of index  13 gages in the upstream part of the Rio Grande in Colorado  14 indicate how much water Colorado is obligated to deliver  15 to the State of New Mexico. And that delivery is made  16 essentially at the state line between Colorado and New  17 Mexico.  18 There's a gage there on the Rio Grande called  19 Lovatos. The upstream index gages tell Colorado how  20 much they were -- they are required to deliver to the  21 Lovatos gage. They take the actual flow at the Lovatos  22 gage. If Colorado delivers more than they were required  23 to, they get a credit. If they are delivered less than  24 they were required, they get a debit. And so there is  25 an annual accounting that has both debit and credit</p>	<p style="text-align: right;">1338</p> <p>1 that they had a great deal of difficulty metering them  2 at the San Marcial gage. In fact, it wasn't just the  3 high flows, it was also the high sediment flows that  4 came in at that time. And so it was extremely difficult  5 for them to determine New Mexico's compliance based on  6 gage flows.  7 So by agreement of the three states, they  8 moved the delivery point from San Marcial gage to  9 Elephant Butte Dam effective in 1948. The delivery  10 point has remained at Elephant Butte Dam ever since.  11 So we find ourselves in the strange situation  12 here being in geographic New Mexico, but in Rio Grande  13 Compact Texas. And this has led to many unusual  14 situations that we find ourselves in, and it is a factor  15 in the issue at hand here with the -- the future  16 impairments of the potential mining activity on the Rio  17 Grande Project and how they will impact the individual  18 beneficiaries of the Rio Grande Project.  19 The two districts paid off their construction  20 loans, which was very unusual. Most of -- most of the  21 reclamation projects in the Western United States had  22 very attractive interest rates, and so they were not all  23 that anxious to pay them off.  24 But particularly due to the drought of the  25 '50s through the '70s, the -- the farmers thought that</p>




1339	1341
<p>1 they could do a better job of managing the resources so  2 they paid off their construction loans and began taking  3 over operations of the irrigation systems in the 1990s.  4 So that the bureau would control the release from  5 Elephant Butte, the release from Caballo and the  6 divergence from the river at the various diversion  7 points.  8 And let me -- to give you a little geography  9 here, the delivery points for the Rio Grande Project  10 that go back to the original design were Percha Dam,  11 which irrigates the entire Rincon Valley.  12 There is Leasburg -- the Percha Dam irrigates  13 entirely in New Mexico.  14 There is Leasburg Dam, which irrigates the  15 Upper Mesilla Valley, which is essentially north of Las  16 Cruces -- a little bit south of Las Cruces.  17 Then the Mesilla Dam which irrigates -- the  18 Mesilla Dam is a little more complicated. It irrigates  19 the Southern Mesilla Valley, which includes acreage --  20 primarily acreage in New Mexico, but also acreage in  21 Texas. So Mesilla Dam is well within New Mexico,  22 geographic New Mexico at least, yet it does make  23 delivery to farmers in Texas.  24 And because the bureau designed the project  25 with very little concern for where the state lines were,</p>	<p>1 districts and Mexico, and were we to go back into a  2 short supply, we would get there sooner than if that  3 groundwater development had not taken place.  4 That initial lawsuit was dismissed in the  5 early 2000s, and, of course, we went back into drought  6 in 2003, back to short -- short supplies.  7 We sort of coasted through the first couple --  8 and -- well, the first three years of that short supply,  9 2003, 2004 and 2005. And in 2005, EBID realized, due to  10 my pointing it out, that, in fact, the performance of  11 the system had changed significantly from the previous  12 drought, that for a given level of release from Caballo  13 Reservoir, we were seeing less water available for  14 diversion from the project.  15 And those are the EBID diversions -- oh, I'm  16 sorry. I didn't -- I didn't finish my run down the  17 river. Let me back up.  18 Below Mesilla Dam, there is the American Dam  19 in Texas, and that delivers water solely to the El Paso  20 Irrigation District. So they get water in the Mesilla  21 Valley from Mesilla Dam and in the El Paso Juarez Valley  22 from the American Dam.  23 Then a couple of miles downstream of that is  24 the International Dam where Mexico takes delivery of  25 their water, Acequia Madre.</p>
1340	1342
<p>1 there is acreage in New Mexico the EBID system cannot  2 deliver water to. They take water delivery from the  3 Texas system, but they are a constituent of EBID.  4 And similarly, there are irrigators in the  5 Mesilla Valley and Texas that El Paso Number 1 cannot  6 reach with their canal system so EBID delivers water to  7 those acres. And this is all done by contract between  8 the two districts and reclamation.  9 In the very wet period of the '80s and '90s, a  10 feud -- a lawsuit started up. It is referred to as a  11 quiet title suit in federal district court. And this  12 was initiated by the Bureau of Reclamation.  13 And to simplify it a great deal for both  14 relevance and time here, the Bureau of Reclamation was  15 asserting essentially that while the districts had paid  16 off the infrastructure of the Rio Grande Project, the  17 water that flowed through it remained the property of  18 the United States. And Elephant Butte Irrigation  19 District agreed with that.  20 At the same time, the El Paso Irrigation  21 District followed -- or filed a cross-claim, stating  22 that groundwater development in New Mexico was depleting  23 the surface water supply of the Rio Grande Project so  24 that it was taking larger releases of Elephant Butte  25 Reservoir water to make full deliveries to the two</p>	<p>1 Previously there was another diversion  2 downstream of International Dam, which was Riverside  3 Dam. That was damaged in the floods of the '80s and  4 '90s, and basically they replumbed their system, the El  5 Paso District did, to take full delivery at American Dam  6 of their lower valley waters.  7 So getting back now to the -- to 2005, looking  8 at the -- the diversions available for a given level of  9 release in Caballo -- or from Caballo, we could see that  10 they had shifted systematically downward. The available  11 water would have decreased relative to what it had been  12 in 1951 through 1978.  13 And that was a major concern to EBID because  14 the most obvious culprit was the groundwater development  15 that took place in New Mexico that was now depleting  16 more water in the New Mexico reach from Caballo Dam down  17 to the state line than had been occurring in 1951  18 through 1978.  19 Q. Dr. King, let me stop you right there. We'll  20 come back to the interconnected nature of the surface  21 and groundwater. I want to clean up a few things.  22 I thought I heard you mention that the El Paso  23 Number 1 district is in New Mexico?  24 A. I'm sorry. I did not mean to say that. El  25 Paso Number 1 is in El Paso County, Texas.</p>

1343	<p>1 Q. Okay.</p> <p>2 And yet EBID, El Paso Number 1 are both</p> <p>3 considered legal Texas under the Rio Grande Compact; is</p> <p>4 that correct?</p> <p>5 A. That is correct.</p> <p>6 Q. When you refer to the bureau in this</p> <p>7 proceeding, you're referring to the Bureau of</p> <p>8 Reclamation; is that right?</p> <p>9 A. Yes. If I -- if I do -- if I say reclamation</p> <p>10 or bureau, I would mean the US Bureau of Reclamation.</p> <p>11 Q. Okay.</p> <p>12 Do you consider yourself to be an expert in</p> <p>13 the field of riparian and irrigation system hydrology,</p> <p>14 water resource management and Rio Grande Project</p> <p>15 organization, operations and accounting?</p> <p>16 A. Yes.</p> <p>17 Q. Have you been qualified as an expert in those</p> <p>18 fields before?</p> <p>19 A. Yes.</p> <p>20 MS. BARNCASTLE: Madam Hearing Officer, I</p> <p>21 would like to tender Dr. King as an expert in those</p> <p>22 three fields, riparian and irrigation system hydrology,</p> <p>23 water resources management and Rio Grande Project</p> <p>24 organization, operations and accounting.</p> <p>25 MS. ORTH: Okay.</p>	1345	<p>1 have about five to 10 minutes before we start going too</p> <p>2 long tonight.</p> <p>3 I'd like you to pick up where you left off</p> <p>4 with the interconnected nature of the surface water and</p> <p>5 groundwater in the Lower Rio Grande system.</p> <p>6 A. Okay.</p> <p>7 The various -- the two irrigation districts</p> <p>8 and -- and Mexico -- I should mention that the delivery</p> <p>9 to Mexico is managed by the federal government through</p> <p>10 the Bureau of Reclamation and the International Boundary</p> <p>11 and Water Commission, and that does occur at the</p> <p>12 International Dam.</p> <p>13 But in 2005, we realized that the groundwater</p> <p>14 development and other factors in the New Mexico portion</p> <p>15 of the Rio Grande Project were affecting the surface</p> <p>16 water supply relative to what it had been in the period</p> <p>17 1951 through 1978, which was the last historical period.</p> <p>18 We didn't worry about it too much in the '80s and '90s</p> <p>19 because we had so much water, there was plenty of water</p> <p>20 to go around, but certainly when we got into those</p> <p>21 drought years, it became evident that there was a</p> <p>22 problem.</p> <p>23 In 2006, Elephant Butte Irrigation District</p> <p>24 proposed an allocation method -- no. I guess I better</p> <p>25 describe the allocation method that was used before</p>
1344	<p>1 Objections?</p> <p>2 MR. BUTZIER: No objection.</p> <p>3 MR. KNIGHT: No objection.</p> <p>4 MR. DE SAILLAN: No objection.</p> <p>5 MS. ORTH: Thank you.</p> <p>6 He's so recognized.</p> <p>7 Q. (BY MS. BARNCASTLE) Dr. King, I'd like you to</p> <p>8 look at what's been marked as EBID Exhibit Number 1.</p> <p>9 Do you have that in front of you?</p> <p>10 A. Yes.</p> <p>11 Q. Do you recognize that document?</p> <p>12 A. I is my resume.</p> <p>13 Q. Did you create that document?</p> <p>14 A. Yes, I did.</p> <p>15 Q. Is it current?</p> <p>16 A. Yes.</p> <p>17 MS. BARNCASTLE: Madam Hearing Officer, I move</p> <p>18 the admission of EBID Exhibit 1 at this time.</p> <p>19 MS. ORTH: Objections?</p> <p>20 MR. BUTZIER: None.</p> <p>21 MS. ORTH: Okay.</p> <p>22 MR. DE SAILLAN: No objection.</p> <p>23 MS. ORTH: Exhibit 1 is admitted.</p> <p>24 (Exhibit EBID 1 admitted into evidence.)</p> <p>25 Q. (BY MS. BARNCASTLE) All right, Dr. King. We</p>	1346	<p>1 that.</p> <p>2 When the -- during the '80s and '90s, when we</p> <p>3 had full supply -- Elephant Butte Irrigation District</p> <p>4 has 57 percent of the US lands in the Rio Grande</p> <p>5 Project. The El Paso District has the other 43 percent.</p> <p>6 And so the surface water diversions were divided between</p> <p>7 the two districts in those proportions. EBID got</p> <p>8 57 percent, El Paso Number 1 got 43 percent.</p> <p>9 Well, the problem is if -- if groundwater</p> <p>10 depletions in New Mexico are causing a shortage in the</p> <p>11 surface water supply of the Rio Grande Project El Paso</p> <p>12 was paying for, that is their -- the -- their allocation</p> <p>13 would be reduced by 43 percent of that shortage relative</p> <p>14 to what it would have been in the period 1951 through</p> <p>15 1978.</p> <p>16 What EBID proposed in 2006 then was to</p> <p>17 allocate water to the two districts by giving El Paso</p> <p>18 Number 1 43 percent of what would have been available in</p> <p>19 the 1951 through 1978 condition to basically keep them</p> <p>20 whole to that baseline, and EBID would take whatever was</p> <p>21 left. If we were seeing less water, then EBID would get</p> <p>22 less water.</p> <p>23 And the intention here was to keep the effect</p> <p>24 of those depletions in New Mexico so it did not affect</p> <p>25 Texas, because there is a long history of litigation in</p>

1347	<p>1 the Supreme Court between upstream states and downstream</p> <p>2 states where the downstream state sues the upstream</p> <p>3 state saying that the groundwater depletions in the</p> <p>4 upstream state were depleting the surface water reaching</p> <p>5 the downstream state.</p> <p>6 And that was exactly the situation we were</p> <p>7 facing here. So in order to avoid that, we</p> <p>8 essentially -- Elephant Butte Irrigation District</p> <p>9 essentially agreed to use surface water allocation that</p> <p>10 they would have gotten under that historical method to</p> <p>11 keep Texas whole, but maintain access to their use of</p> <p>12 groundwater.</p> <p>13 Now, one thing that's important to understand</p> <p>14 is that when EBID entered into that, they knew that they</p> <p>15 were offsetting the impact of their own farmers'</p> <p>16 groundwater pumping on the surface water supply, but</p> <p>17 also the groundwater pumping of everybody else in the</p> <p>18 New Mexico reach of the Rio Grande Project.</p> <p>19 The intention in doing this was to take an</p> <p>20 external problem with Texas and make it an internal</p> <p>21 problem within New Mexico that we then hoped to sort out</p> <p>22 through administration with the State Engineer and the</p> <p>23 agencies within New Mexico.</p> <p>24 Q. Would it be fair to say that the operating</p> <p>25 agreement and litigation surrounding the operating</p>	1349	<p>1 determines EBID's allocation. So if the river more</p> <p>2 efficiently conveys water down to Texas and Mexico, then</p> <p>3 EBID gets more water. If the river is less efficient at</p> <p>4 conveying water down to the Texas and Mexico delivery</p> <p>5 points, EBID gets less water. But it's all keyed off</p> <p>6 what is releasable at Caballo Dam.</p> <p>7 Q. So would it be fair to say that all three,</p> <p>8 EBID, El Paso Irrigation District and Mexico, all rely</p> <p>9 on Caballo?</p> <p>10 A. Absolutely. The release from Caballo is the</p> <p>11 key -- well, the actual or anticipated release from</p> <p>12 Caballo is the primary input in determining both the</p> <p>13 allocation to El Paso Number 1 and to Mexico.</p> <p>14 Q. Now, is the fact that EBID and El Paso Number</p> <p>15 1 are part of legal Texas under the Rio Grande Compact</p> <p>16 the reason that the compact commissioner for the State</p> <p>17 of Texas is so involved in this particular proceeding</p> <p>18 here?</p> <p>19 A. Yes.</p> <p>20 MS. BARNCASTLE: Madam Hearing Officer, I</p> <p>21 think we've reached a logical stopping point at this</p> <p>22 point. Now, I could -- I think it's -- I think it would</p> <p>23 be better if we stop for today.</p> <p>24 MS. ORTH: That's great. Thank you so much</p> <p>25 for identifying a good stopping point.</p>
1348	<p>1 agreement assumed or otherwise it was proven that the</p> <p>2 groundwater and the surface water are interconnected in</p> <p>3 the Lower Rio Grande?</p> <p>4 A. Yes. There is no question. And this is not a</p> <p>5 new concept. It was not new in 2006. In fact, you can</p> <p>6 find -- you can find very eloquent explanations of</p> <p>7 exactly this effect described by hydrologists for the US</p> <p>8 Geologic Survey in the 1950s. And even early studies --</p> <p>9 early conceptual studies in the early 1900s recognized</p> <p>10 that there was this interaction between surface water</p> <p>11 and groundwater.</p> <p>12 Q. Now, what happens to Mexico in this deal</p> <p>13 between EBID and EP Number 1? How is New Mexico taken</p> <p>14 care of?</p> <p>15 A. Well, you can think of New Mexico is upstream</p> <p>16 and El Paso Number 1 and Mexico are downstream. What</p> <p>17 the operating agreement essentially did is flipped them</p> <p>18 so functionally Mexico is first on the river, then EP1,</p> <p>19 then EBID.</p> <p>20 The allocations to both Mexico and El Paso</p> <p>21 Number 1 are based on the amount of project water</p> <p>22 storage in Elephant Butte Reservoir and Caballo</p> <p>23 Reservoirs. And so the -- they're -- the release is</p> <p>24 what determines their allocation.</p> <p>25 The release and the performance of the river</p>	1350	<p>1 We will reconvene at 9:00 a.m. in this room.</p> <p>2 Thank you.</p> <p>3 (Proceedings adjourned at 7:03 p.m.)</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

1 STATE OF NEW MEXICO )  
2 ) ss.  
3 COUNTY OF BERNALILLO )  
4  
5

6 I, CHERYL ARREGUIN, the officer before whom the  
7 foregoing proceeding was taken, do hereby certify that  
8 the witnesses whose testimony appears in the foregoing  
9 transcript were duly sworn or affirmed; that I  
10 personally recorded the testimony by machine shorthand;  
11 that said transcript is a true record of the testimony  
12 given by said witnesses; that I am neither attorney nor  
13 counsel for, nor related to or employed by any of the  
14 parties to the action in which this proceeding is taken,  
15 and that I am not a relative or employee of any attorney  
16 or counsel employed by the parties hereto or financially  
17 interested in the action.

18  
19   
20 NOTARY PUBLIC  
21 CCR License Number: 21  
22 Expires: 12/31/2018

23  
24  
25 My Commission Expires: 12/12/19

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1353	<p>1 APPEARANCES</p> <p>2 The Hearing Officer:</p> <p>3 FELICIA ORTH</p> <p>4 Hearing Officer</p> <p>5 20 Barranca Road</p> <p>6 Los Alamos, New Mexico 87544</p> <p>7 felicia.l.orth@gmail.com</p> <p>8 For the New Mexico Environment Department:</p> <p>9 ANDREW P. KNIGHT</p> <p>10 Assistant General Counsel</p> <p>11 New Mexico Environment Department</p> <p>12 Office of General Counsel</p> <p>13 121 Tijeras Avenue, Northeast</p> <p>14 Suite 1000</p> <p>15 Albuquerque, New Mexico 87502</p> <p>16 (505) 222-9540</p> <p>17 andrew.knight@state.nm.us</p> <p>18 For New Mexico Copper Corporation:</p> <p>19 STUART R. BUTZIER</p> <p>20 MODRALL, SPERLING, ROEHL, HARRIS &amp; SISK, PA</p> <p>21 Attorneys at Law</p> <p>22 500 Fourth Street, Northwest</p> <p>23 Suite 1000</p> <p>24 Albuquerque, New Mexico 87102</p> <p>25 (505) 848-1832</p> <p>sbutzier@modrall.com</p> <p>For the Turner Ranch Properties, LP, and Hillsboro</p> <p>Pitchfork Ranch, LLC:</p> <p>CHARLES de SAILLAN</p> <p>NEW MEXICO ENVIRONMENTAL LAW CENTER</p> <p>1405 Luisa Street</p> <p>Suite 5</p> <p>Santa Fe, New Mexico 87505-4074</p> <p>(505) 989-9022</p> <p>cdesaillan@nmelc.org</p>	1355
	<p>1 A P P E A R A N C E S (Continued)</p> <p>2 For the Elephant Butte Irrigation District:</p> <p>3 SAMANTHA R. BARNCASTLE</p> <p>4 BARNCASTLE LAW FIRM</p> <p>5 Attorneys at Law</p> <p>6 Post Office Box 1556</p> <p>7 Las Cruces, New Mexico 88004</p> <p>8 (575) 636-2377</p> <p>9 samantha@h2o-legal.com</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	
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1360	<p>1 MS. ORTH: Good morning.</p> <p>2 We are on day five of the hearing in matter of</p> <p>3 the application by New Mexico Copper Corporation for a</p> <p>4 Discharge Permit for Copper Flat. Discharge Permit is</p> <p>5 Number DP-1840.</p> <p>6 When we broke last night, we were in the</p> <p>7 middle of the Elephant Butte's witness.</p> <p>8 This morning it appears we have just one</p> <p>9 public commenter.</p> <p>10 Is that Ted Caluwe? Caluwe?</p> <p>11 If you would, sir, come up.</p> <p>12 TED CALUWE</p> <p>13 having been first duly sworn or affirmed, gave</p> <p>14 public comment as follows:</p> <p>15 PUBLIC COMMENT</p> <p>16 MR. CALUWE: My last name is C-A-L-U-W-E.</p> <p>17 Early on in the presentation, I believe it was</p> <p>18 the first day -- Mr. Smith, was it? The first</p> <p>19 presenter?</p> <p>20 Thank you. This is my memory so --</p> <p>21 Said that they had a report prepared -- New</p> <p>22 Mexico Copper Corporation had a report prepared for them</p> <p>23 on reclamation costs.</p> <p>24 Now, if I remember correctly, that report is</p> <p>25 already three years old. We're still looking at many,</p>	1362	<p>1 I would just start by saying that this</p> <p>2 particular witness has to leave for Albuquerque no later</p> <p>3 than 11:00 a.m.</p> <p>4 MS. ORTH: Okay. Thank you.</p> <p>5 And I also forgot to say if you would just let</p> <p>6 us know when a break would be best for you, that's when</p> <p>7 we'll take a break.</p> <p>8 MS. BARNCASTLE: Okay. Thank you.</p> <p>9 So I'd like to continue with Dr. King's</p> <p>10 direct.</p> <p>11 MS. ORTH: Thank you.</p> <p>12 JAMES PHILLIP KING</p> <p>13 having been previously duly sworn or affirmed, was</p> <p>14 examined and testified further as follows:</p> <p>15 DIRECT EXAMINATION</p> <p>16 BY MS. BARNCASTLE:</p> <p>17 Q. All right, Dr. King. I believe you left off</p> <p>18 you were discussing the interconnected nature of the</p> <p>19 surface and groundwater systems in the Lower Rio Grande</p> <p>20 in connection with the operating agreement and</p> <p>21 allocation procedures for the beneficiaries of the Rio</p> <p>22 Grande Project.</p> <p>23 So if you wouldn't mind, why don't you start</p> <p>24 us off this morning with reminding us how do the</p> <p>25 allocation procedures work for the beneficiaries who are</p>
1361	<p>1 many years in the future. They had set aside about 55</p> <p>2 million, as my memory serves me, for reclamation.</p> <p>3 I would like to strongly suggest that if that</p> <p>4 money is ever needed, that they figure in those three</p> <p>5 years plus the future and an inflation rate, because</p> <p>6 in -- let's say 2028 dollars, that money is going to be</p> <p>7 completely inadequate for reclamation.</p> <p>8 Thank you.</p> <p>9 MS. ORTH: All right. Thank you very much,</p> <p>10 sir.</p> <p>11 I don't know that I see anyone else not</p> <p>12 affiliated with a party, but is there anyone else who</p> <p>13 would like to offer public comment at this time?</p> <p>14 No?</p> <p>15 Also, I may have forgotten to put it on the</p> <p>16 record yesterday, but our interpreter continues to spend</p> <p>17 the entire hearing with us. She does check in with</p> <p>18 people as they come into the room if she doesn't</p> <p>19 recognize them, as does the hearing clerk, John Baca.</p> <p>20 But in the event you are aware of someone who would be</p> <p>21 more comfortable in a language other than English,</p> <p>22 please let Sandra know or me or John Baca. Thank you.</p> <p>23 Ms. Barncastle.</p> <p>24 MS. BARNCASTLE: Thank you.</p> <p>25 Good morning, Madam Hearing Officer.</p>	1363	<p>1 beneficiaries and give us a general overview of that</p> <p>2 which we will then tie into your further testimony.</p> <p>3 A. Okay. It occurred to me that I -- it might be</p> <p>4 prudent for me to define a few terms that are very</p> <p>5 common colloquially, but they mean very specific things</p> <p>6 when I'm talking here.</p> <p>7 There are basically three phases -- or three</p> <p>8 steps in Rio Grande Project water management accounting.</p> <p>9 There is release, which is the release of</p> <p>10 water from Caballo Reservoir into the Rio Grande.</p> <p>11 There is diversion, which is the -- the</p> <p>12 various diversion structures I covered last time, taking</p> <p>13 water out of the Rio Grande into the canal system of an</p> <p>14 irrigation district or Mexico.</p> <p>15 And then there is delivery, and delivery is</p> <p>16 the flow of water from the canal system into a farmer's</p> <p>17 field at their headgate and the diversion to Mexico. So</p> <p>18 the diversion to Mexico counts both as a diversion and</p> <p>19 as a delivery. In the United States districts, the</p> <p>20 diversion is from the river, delivery is to the farm, or</p> <p>21 in the case of El Paso, El Paso Water Utilities for</p> <p>22 treatment.</p> <p>23 In project operations, water is allocated to</p> <p>24 the two districts and Mexico.</p> <p>25 The allocation to Mexico is based on the</p>



1364	<p>1 planned release from Caballo Reservoir, and it is tied 2 to the 1951 through 1978 relationship between release 3 and delivery.</p> <p>4 The allocation to the El Paso Irrigation 5 District is tied to the releasable water, or the usable 6 project water, the allocation is, and it is all -- it is 7 based on the relationship between release from Caballo 8 and diversion from the river.</p> <p>9 EBID's allocation then is based on the 10 releasable water from Caballo and the performance of the 11 river in terms of conveying water efficiently.</p> <p>12 Q. And all of this is important because it 13 recognizes that the groundwater and surface water 14 systems are interconnected and we owe a duty to get 15 water to the downstream state and country?</p> <p>16 A. Exactly. And so we entered into an operating 17 agreement in 2008 which codified this allocation method, 18 and that agreement is what we use to allocate water on a 19 month-to-month basis.</p> <p>20 Generally we'll consider the allocation each 21 month during the release season. The release season 22 varies when it starts and when it finishes.</p> <p>23 Coincidentally, the release from Elephant Butte 24 ceased -- I believe it was on Tuesday of this week, and 25 the release from Caballo will cease this weekend.</p>	1366	<p>1 Exhibit Number 6 into evidence at this point in time.</p> <p>2 MS. ORTH: Objections?</p> <p>3 MR. BUTZIER: No objection, although the 4 relevancy objection that I made earlier would apply to 5 this. No objection to having it admitted to this 6 proceeding.</p> <p>7 MS. ORTH: Thank you.</p> <p>8 MR. DE SAILLAN: No objection.</p> <p>9 MR. KNIGHT: No objection.</p> <p>10 MS. ORTH: All right. It's admitted. (Exhibit EBID 6 admitted into evidence.)</p> <p>12 Q. (BY MS. BARNCASTLE) Dr. King, you just 13 referenced litigation that was resolved by that document 14 that's in front of you.</p> <p>15 Is that document currently still the subject 16 of litigation?</p> <p>17 A. Yes.</p> <p>18 Q. And are you aware based on -- well, let's back 19 up.</p> <p>20 You regularly communicate with the El Paso 21 Irrigation District and the Texas compact commissioner 22 regarding allocation procedures and Rio Grande Compact 23 accounting, do you not?</p> <p>24 A. Yes, I do.</p> <p>25 Q. Are you aware based on your communications</p>
1365	<p>1 So we were -- we're right at the end of the 2 season now, but we do consider allocation all the way up 3 to the cessation of release from Caballo.</p> <p>4 Q. I'd like you to take a look at Exhibit Number 5 6, EBID Exhibit 6. I believe you have it in front of 6 you.</p> <p>7 A. Yes.</p> <p>8 Q. Do you recognize that document?</p> <p>9 A. I do.</p> <p>10 Q. What is that document?</p> <p>11 A. This is the operating agreement that was 12 settled -- it settled litigation among EBID, El Paso 13 Number 1 and the United States. This was basically 14 laying the foundation for current project allocation and 15 operations.</p> <p>16 Q. And those are the current allocation and 17 operation procedures you've been discussing?</p> <p>18 A. Yes.</p> <p>19 Q. Are you familiar with the contents of the 20 document?</p> <p>21 A. Yes.</p> <p>22 Q. Did you, in fact, participate in writing parts 23 of the document?</p> <p>24 A. Yes, I did.</p> <p>25 MS. BARNCASTLE: I'd like to offer EBID</p>	1367	<p>1 with those entities of any concerns they may have 2 related to this proceeding?</p> <p>3 A. Yes.</p> <p>4 MR. BUTZIER: I think that calls for hearsay.</p> <p>5 MS. ORTH: Ms. Barncastle?</p> <p>6 MS. BARNCASTLE: I'm going to tie this to 7 documents that are in the administrative record, 8 particularly a letter that came to you this week from 9 the Rio Grande Compact commissioner, and also start to 10 tie it into concerns that EBID has.</p> <p>11 MS. ORTH: All right. Go ahead.</p> <p>12 Q. (BY MS. BARNCASTLE) Dr. King, before you 13 answer, are the concerns that are expressed by the Rio 14 Grande Compact commissioner that we're going to discuss 15 the same concerns that EBID has?</p> <p>16 A. Yes.</p> <p>17 Q. Okay. I'd like you to discuss those concerns.</p> <p>18 A. All right. The Rio Grande Compact 19 commissioner for Texas -- and recall that according to 20 the Rio Grande Compact EBID is in Texas, but the compact 21 commissioner, who is Pat Gordon, issued a letter earlier 22 this week expressing his concerns over the -- the 23 proposed dam and the threat that it poses to the Rio 24 Grande Project.</p> <p>25 I understand that that will be part of the</p>

1368	<p>1 administrative record. It was -- he is an attorney so I</p> <p>2 assume he did things right to have that submitted as</p> <p>3 evidence.</p> <p>4 His concern goes directly to the substance of</p> <p>5 the other lawsuit that is ongoing right now, which is</p> <p>6 Texas versus New Mexico in the Supreme Court.</p> <p>7 Q. When you say Supreme Court, are you referring</p> <p>8 to the Supreme Court of New Mexico?</p> <p>9 A. The Supreme Court of the United States.</p> <p>10 Q. Thank you.</p> <p>11 MR. BUTZIER: Madam Hearing Officer, if</p> <p>12 there's going to be a letter that's going to be admitted</p> <p>13 as part of the administrative record, I think it should</p> <p>14 speak for itself and we don't need to have this witness</p> <p>15 characterize what appears in the letter.</p> <p>16 MS. ORTH: Okay. I believe she's pursuing his</p> <p>17 own feelings or the feelings of Elephant Butte</p> <p>18 Irrigation District now.</p> <p>19 MR. BUTZIER: That wasn't the way I understood</p> <p>20 it, but that's fine if that's the way she proceeds.</p> <p>21 MS. ORTH: All right. That they share those</p> <p>22 concerns in the letter. All right.</p> <p>23 MS. BARNCASTLE: We're still laying some</p> <p>24 foundation. This particular witness will lay foundation</p> <p>25 for not only his own testimony but for our next witness.</p>	1370	<p>1 Q. And those were the 1906 and 1908</p> <p>2 appropriations?</p> <p>3 A. That's correct.</p> <p>4 Q. And significantly in the 1908 appropriation,</p> <p>5 the language "all tributary flow" was included?</p> <p>6 A. That is correct.</p> <p>7 Q. And does the State of Texas consider tributary</p> <p>8 flow to include a portion of the groundwater?</p> <p>9 A. Yes. In the -- what they've said in many of</p> <p>10 their arguments is that the interception of</p> <p>11 hydrologically connected or tributary groundwater is the</p> <p>12 concern.</p> <p>13 Q. All right, Dr. King. I believe we've</p> <p>14 thoroughly, probably too thoroughly for this proceeding,</p> <p>15 discussed the Rio Grande Project operations as a</p> <p>16 foundation for moving on in your testimony, but before</p> <p>17 we move on, is there anything else you feel is necessary</p> <p>18 about operations accounting or project organization that</p> <p>19 we need to cover?</p> <p>20 A. I think I've covered sufficiently that I</p> <p>21 can -- I can express the concern.</p> <p>22 Q. Okay.</p> <p>23 Did you review documents to form your opinions</p> <p>24 for -- that you're about to give regarding the impact of</p> <p>25 the Copper Flats's project on the Rio Grande Project?</p>
1369	<p>1 So that's essentially what we're getting at.</p> <p>2 MS. ORTH: Okay.</p> <p>3 MR. KING: The -- the claim that Texas has</p> <p>4 filed in the -- in the US Supreme Court is claiming that</p> <p>5 while New Mexico is making its required compact</p> <p>6 deliveries to Elephant Butte Reservoir, the compact</p> <p>7 water delivered to Texas is then released from Elephant</p> <p>8 Butte and then Caballo Dam, and before it reaches the</p> <p>9 state line, it is being intercepted by groundwater</p> <p>10 diversions in New Mexico.</p> <p>11 In his letter earlier this week, Commissioner</p> <p>12 Gordon stated that his concern is that New Mexico is</p> <p>13 making delivery of water of a certain quality, then</p> <p>14 releasing it from -- releasing it at Elephant Butte</p> <p>15 Reservoir and placing it at risk of quality</p> <p>16 contamination, as well.</p> <p>17 So it's a very parallel argument for</p> <p>18 impairment of water quality in addition to the prior</p> <p>19 claim of quantity, of impairment and quantity.</p> <p>20 Q. (BY MS. BARNCASTLE) And -- so backing up just</p> <p>21 a little bit, the Rio Grande Project operates based on</p> <p>22 two appropriations of water.</p> <p>23 Is that your understanding?</p> <p>24 A. Yes. I think it was -- it's an appropriation</p> <p>25 action that had two distinct steps in it.</p>	1371	<p>1 A. Yes, I did.</p> <p>2 Q. What were those documents?</p> <p>3 A. It's been a bit of a moving target. I -- let</p> <p>4 me get this turned on here so I can get my dates</p> <p>5 correct.</p> <p>6 We had several -- I guess what I would call</p> <p>7 waves of data that came in. The first was in March of</p> <p>8 this year in response to an IPRA request and a -- let me</p> <p>9 see what I've got in my notes.</p> <p>10 Q. Who was the IPRA request to?</p> <p>11 A. The IPRA request, I believe, was filed with</p> <p>12 the New Mexico Environment Department by EBID.</p> <p>13 Q. Okay.</p> <p>14 A. And we had a -- in mid-February, we issued a</p> <p>15 request and a -- request for an extension. What we</p> <p>16 received in -- on the last day of March, then, was a</p> <p>17 very large bunch of documents that were not indexed or</p> <p>18 particularly organized. So I did spend some time back</p> <p>19 in April trying to sort out what was in there.</p> <p>20 We had a subsequent -- hold on.</p> <p>21 Q. Did EBID subsequently determine that the</p> <p>22 initial IPRA response was incomplete?</p> <p>23 A. Right. In addition to being unorganized, it</p> <p>24 was incomplete. So we requested further information in</p> <p>25 May -- I'm sorry. Our initial -- initially our</p>

1372	<p>1 extension request was granted to May 4th. We had a 2 follow-up request -- request for more information in 3 April, which we, I believe, received in May. 4 And then I have further documents. I'm not 5 sure of the request history. But finally what we got, 6 which was indexed and Bates indexed, came in on 7 July 9th. 8 Q. Was the response received in May organized and 9 indexed? 10 A. No. 11 Q. Okay. 12 A. It may have had an index file in it, but it 13 was still sort of a -- the -- it was not as organized, 14 obviously, as the Bates indexed one. 15 Q. Were you able to make it through all of the 16 documents that were received from NMED regarding this 17 project? 18 A. No. That would be 18,000 pages, I believe is 19 the number being thrown around, and I did not. 20 As a result, I focused on as -- I guess the 21 point that I will be putting forth here is -- is really 22 focused on a sort of a big picture and conceptual take 23 on it. I will be primarily referring to the hydrologic 24 consequences report by Shomaker as -- let's see -- 25 starting with the December, 2017 and then amended May</p>	1374	<p>1 Now, I'm -- to keep it simple and brief, I'm 2 not going to get into haggle about model parameters or 3 model assumptions or anything. The fact is that there 4 is a hydrograph there of the impacts on the Rio Grande 5 Project water supply, and by arguing about those 6 parameters, we could -- we might, you know, argue about 7 where the peak -- when the peak occurs, how high the 8 peak is and things like that. 9 Just the shape of that -- of that impact 10 hydrograph and -- and for what I'm saying is that there 11 is an impact, and that's what we need to go forward 12 with, and that does not seem to be at issue. So I'll 13 keep it as simple as that. 14 Now, my concern is that the way that 15 allocation is done, as I mentioned, both -- or both 16 districts and Mexico have -- their allocation of project 17 water is determined, firstly, by the releasable water 18 releasable from Caballo Reservoir. 19 So depletion of water that would otherwise 20 have reached Caballo Reservoir, this concept of 21 hydrologic capture, where -- again it is not pumping 22 water out of Caballo Reservoir, it is intercepting water 23 that would otherwise have been tributary to Caballo 24 Reservoir -- would reduce the amount of releasable water 25 and therefore reduce the amount of allocation to EBID,</p>
1373	<p>1 of 2018 version. 2 Q. Okay. 3 So in reference to that Probable Hydrologic 4 Consequences report by JSAL, why don't you delve into 5 your discussion of the nature of the impact of this 6 project -- the Copper Flats project on the Rio Grande 7 Project, the impact on the accounting, the concepts of 8 capture and issues raised in Texas versus New Mexico and 9 give us a five-minute, quick summary of -- of your 10 concerns. 11 A. Okay. I'm going to -- again I'm going to make 12 this as simple as I possibly can, because I think it's a 13 fairly simple and straightforward concept. 14 In the model that the -- both the model 15 developed in 2014 and in the 2018 reports from Shomaker, 16 one could argue about the parameters and the itty-bitty 17 details of it, but I believe that there is a consensus 18 among all parties that mining activity will affect the 19 Rio Grande Project water supply, and it will affect that 20 water supply both in Caballo Reservoir and in the river 21 below Caballo. 22 And this is clearly stated in Tables 3.3 and 23 3.4 of the 2018 Shomaker report on hydrologic 24 consequences. This is starting on Bates index page 25 17304.</p>	1375	<p>1 to El Paso Number 1 and to Mexico. 2 And that is of great concern, number one, 3 because Mexico is the subject of international treaty, 4 the 1906 convention on the -- with Mexico; and then, 5 secondly, because it will reduce the available water 6 available for allocation to the two districts for 7 delivery to their constituent farmers to exercise their 8 project water rights. 9 MS. BARNCASTLE: My mic is dead again. 10 (Discussion off the record.) 11 Q. (BY MS. BARNCASTLE) Okay. Where was I? 12 So is it your understanding -- okay. I'll try 13 to be very still. 14 And now I completely forgot where I was. 15 Is it your understanding that -- so let me 16 just make sure I understand. You're not going to 17 quibble with the timing and magnitude of impacts. We're 18 just saying there are impacts on the Rio Grande Project. 19 A. Yes. 20 Q. Okay. 21 A. And if I could add. There is the impact on 22 the reservoir which would impact all three project 23 beneficiaries, the two districts -- the two US districts 24 and Mexico, but there are also significant impacts on 25 the river below Caballo, and that impact would be borne</p>

<p style="text-align: right;">1376</p> <p>1 solely by EBID because that is now below the point of  2 release and affecting the river conveyance efficiency.  3 Q. And based on your participation in the Texas  4 versus New Mexico Supreme Court case, your  5 communications with the Rio Grande Compact commissioner  6 and the Rio Grande Compact commissioner for Texas'  7 letter this week, it's your understanding that Texas  8 shares those same concerns.  9 A. Yes.  10 MS. BARNCASTLE: Now, this is going to delve a  11 little bit off into water rights, but it's to lay the  12 foundation for my next witness. So I understand I'm  13 going to draw an objection.  14 Q. There are offsets -- offset water proposed for  15 the impacts that you've just discussed through the --  16 what's called the Jicarilla lease; is that correct?  17 A. That's correct.  18 Q. Can you explain what that lease is?  19 A. It is an agreement or a contract signed by --  20 let's see -- New Mexico Copper, Jicarilla Apache Nation  21 and the Bureau of Reclamation.  22 Q. And are you familiar with the contents of that  23 document?  24 A. Yes, I am.  25 Q. What does that document propose as the offset</p>	<p style="text-align: right;">1378</p> <p>1 are in legal Texas for compact purposes, and he will be  2 called as one of the State of Texas' witnesses in that  3 case.  4 MS. ORTH: That's fine. Go ahead.  5 MR. KING: As it is stated, definitely not.  6 One of the weaknesses of this and in the -- in the 2018  7 Shomaker report, the description of how the water will  8 be used for offset is that it -- it basically just says  9 here's some water and we're going to use that for  10 offset.  11 It's, unfortunately, not that simple. In  12 order for water to be moved from the diversion point at  13 Azotea Tunnel on Rio Chama all the way down to Caballo  14 Reservoir or the river below Caballo -- it's not  15 clear -- first of all, it would have to go through the  16 accounting of the Rio Grande Compact, because in  17 Elephant Butte Reservoir, when calculating the usable  18 amount of water, we take the physical amount of water in  19 storage, and we subtract out Rio Grande Compact credit  20 water, and we subtract out San Juan-Chama water.  21 Now, I am not sure -- it's not detailed enough  22 that this would be handled as San Juan-Chama water. If  23 so, San Juan-Chama water has never been moved down to  24 Caballo Reservoir. If it is a new flavor of water  25 stored in Elephant Butte Reservoir, I'm not aware of any</p>
<p style="text-align: right;">1377</p> <p>1 for the impacts on the Rio Grande Project?  2 A. It is a lease of water from Jicarilla Apaches,  3 who have a -- in the settlement of their federal water  4 rights claims, the Jicarilla Apaches received 6,500  5 acre-feet of water delivered to the Rio Grande through  6 the San Juan-Chama Project, which takes water from the  7 Chama -- or -- sorry -- from the San Juan River and the  8 Colorado River system through tunnels under the  9 Continental Divide into the Rio Chama, which then is  10 tributary to the Rio Grande.  11 And so there is a proposal to lease Jicarilla  12 Apache water to offset the impacts of the mining  13 activity.  14 Q. In your opinion, is that offset -- the  15 proposed offset sufficient?  16 A. It is certainly not sufficient in terms of  17 development in detail, and I believe there would be  18 necessary some problematic issues with implementing it.  19 Q. Would that offset be sufficient to quiet the  20 State of Texas?  21 MR. BUTZIER: Objection, calls for  22 speculation.  23 MS. BARNCASTLE: Dr. King is an expert  24 involved in the Texas versus New Mexico case. EBID is  25 aligned with the State of Texas in that case because we</p>	<p style="text-align: right;">1379</p> <p>1 accounting mechanisms that have been made for that  2 accounting.  3 And running it through the accounting of the  4 Rio Grande Compact is by no means a trivial matter. Any  5 such changes to the accounting for the compact would  6 require consensus of the three compact commissioners,  7 compact commissioners for Colorado, New Mexico and  8 Texas.  9 That has not always been easy. In fact, since  10 2011, we have -- the compact commission has been keeping  11 two separate sets of books on compact accounting because  12 they disagreed over the handling of some credit water  13 back in 2011. So to this day, we have one set of  14 accounting that's supported by the -- by Colorado and  15 New Mexico and another that's supported by Texas and the  16 United States, and that also is the subject of  17 litigation in another venue.  18 Q. So would it be fair to say that this Jicarilla  19 lease offset or this water supply agreement that would  20 serve as an offset is taking us into uncharted territory  21 in the water rights realm?  22 A. It certainly is. And it's further complicated  23 because if you put water in Caballo Reservoir to offset  24 the effects on the three constituents due to depletions  25 from -- from Caballo Reservoir, that does not take care</p>

<p style="text-align: right;">1380</p> <p>1 of depletions downstream, which would be borne solely by 2 EBID.</p> <p>3 And to -- if you were to then add more water 4 to take care of EBID's concern, that would increase the 5 releasable water from Caballo, which would add 6 allocation to New Mexico and El Paso. And this gets to 7 be a very strange set of accounting. So not only must 8 you square this with the accounting of the Rio Grande 9 Compact, but also with the allocation process of the Rio 10 Grande Project.</p> <p>11 And because of the difference in the impacts, 12 it's -- it is -- it is by no means trivial.</p> <p>13 Q. Would it be fair to summarize your testimony 14 so far as stating that this NMED permitting process has 15 impacts far beyond just groundwater quality 16 contamination issues?</p> <p>17 A. Yes.</p> <p>18 Q. Okay.</p> <p>19 Are there any effects of climate change on 20 what you're discussing now with the offset issue?</p> <p>21 A. Yes. The San Juan-Chama water is again from 22 the Colorado River Basin, and in a full year there's 23 about 100 and -- let's say 110,000 acre-feet transferred 24 from the Colorado River Basin to the -- to the Rio 25 Grande Basin through that project.</p>	<p style="text-align: right;">1382</p> <p>1 Nation and New Mexico Copper Corporation? 2 A. Yes.</p> <p>3 MS. BARNCASTLE: Madam Hearing Officer, I'd 4 like to move the admission of EBID Exhibit Number 7 at 5 this time.</p> <p>6 MS. ORTH: Objections? 7 MR. BUTZIER: Same relevance objection, but I 8 have no problem with it being admitted into the record. 9 MS. ORTH: Thank you. 10 MR. DE SAILLAN: No objection. 11 MR. KNIGHT: Likewise. 12 MS. ORTH: It's admitted. 13 (Exhibit EBID 7 admitted into evidence.) 14 Q. (BY MS. BARNCASTLE) All right, Dr. King, 15 Let's circle back now to the discussion that's taken 16 place over the last week in this proceeding, and that's 17 water quality again. And so we're going to be tapping 18 into your riparian and irrigation system hydrology and 19 water resource management expertise now. 20 We have heard testimony that -- I believe it 21 was from Mr. Myers yesterday that contaminants are 22 migrating and will reach Caballo. 23 Were you here for that testimony? 24 A. Yes, I was. 25 MR. BUTZIER: Madam Hearing Officer, that</p>
<p style="text-align: right;">1381</p> <p>1 And it is contracted to users up north, 2 including the Jicarilla Apaches. Should the Colorado 3 River run short, which it is in the process of doing 4 right now, those diversions into the San Juan-Chama 5 Project are very likely to be reduced, also.</p> <p>6 This is very likely to be a persistent problem 7 with the -- with the project. It will do two things. 8 It will reduce the supply of water from the Rio 9 Grande -- or -- sorry -- from the San Juan-Chama 10 Project, and it will very likely drive up the price of 11 San Juan-Chama Project water, as well.</p> <p>12 This is a -- again a problem because in the 13 agreement the lease -- the price of the lease is \$125 14 per acre-foot, which is extremely low for water in this 15 project. For example, right now in El Paso, El Paso 16 Water Utilities is paying something just over \$300 per 17 acre-foot for Rio Grande Project water for treatment in 18 their plant.</p> <p>19 In the agreement, also, if the Jicarillas find 20 a better deal -- and at \$125, they will find a better 21 deal -- the copper company has first right of refusal, 22 but to plan for offsetting these impacts at \$125 per 23 acre-foot is simply not realistic.</p> <p>24 Q. Did you base your opinions today in part on 25 the water supply agreement between the Jicarilla Apache</p>	<p style="text-align: right;">1383</p> <p>1 mischaracterizes the evidence. 2 MS. ORTH: I'm sorry. Say it again, please, 3 Ms. Barncastle. 4 MS. BARNCASTLE: Contaminants are migrating 5 and will reach Caballo. 6 MS. ORTH: That is a -- perhaps an 7 overstatement of what I heard yesterday. 8 MS. BARNCASTLE: Why don't we ask the 9 witness -- can I ask the witness to just then state what 10 he understood the testimony to be? 11 MS. ORTH: Certainly. 12 Q. (BY MS. BARNCASTLE) Go ahead and state, 13 Dr. King, what you understood Mr. Myers' testimony to 14 be. 15 A. I took it to mean that there is a high 16 likelihood of contamination from the dam -- or from the 17 copper mine reaching Caballo Reservoir, looking at a 18 spread through the groundwater system. 19 Q. And is that consistent with your understanding 20 of the interconnected nature of the surface and 21 groundwater system in this area? 22 A. If -- if there is a contamination plume 23 forming, then yes. 24 Q. And that's contamination that would occur 25 without some sort of catastrophic spill?</p>

<p style="text-align: right;">1384</p> <p>1 A. Right.</p> <p>2 Q. Okay.</p> <p>3 So what would happen -- let's assume a</p> <p>4 catastrophic spill for a second.</p> <p>5 What would happen to a farmer's field in the</p> <p>6 Lower Rio Grande?</p> <p>7 A. That would be very difficult to say. I'm</p> <p>8 not -- if there were a catastrophic spill, we would be</p> <p>9 looking at some sort of emergency action that I -- I'm</p> <p>10 not aware of any plan for such -- such a catastrophic</p> <p>11 event in the Rio Grande Project.</p> <p>12 Q. In other words, if a large amount of</p> <p>13 contaminants were to reach Caballo, there is no</p> <p>14 Emergency Action Plan in place to address that</p> <p>15 contingency?</p> <p>16 A. Not that I'm aware of.</p> <p>17 Q. And it's true that the City of El Paso relies</p> <p>18 on that same water from Caballo?</p> <p>19 A. Yes.</p> <p>20 Q. So it's not just farmers that would be</p> <p>21 affected.</p> <p>22 A. That's correct.</p> <p>23 Q. It's drinking water issues, also.</p> <p>24 A. Yes.</p> <p>25 Q. Okay.</p>	<p style="text-align: right;">1386</p> <p>1 in mind for how we would -- we would deal with a</p> <p>2 large-scale -- large-scale chemical contamination of</p> <p>3 Caballo, because my first reaction would be to shut</p> <p>4 Caballo, which would mean that City of El Paso would</p> <p>5 immediately have to switch from surface water to</p> <p>6 groundwater, which they don't do very -- they don't do</p> <p>7 immediately.</p> <p>8 They have to phase it in because of the</p> <p>9 different chemistry of the surface water and the</p> <p>10 groundwater, and even the different temperature of the</p> <p>11 surface water and the groundwater. They have to phase</p> <p>12 it in slowly so as not to physically shock their</p> <p>13 delivery system.</p> <p>14 The districts would shut down diversions and</p> <p>15 switch to groundwater. That would be a problem for EBID</p> <p>16 farmers who -- it gets complicated, but they would have</p> <p>17 to rely more on groundwater, which is certainly not the</p> <p>18 preferred alternative, surface water is. And El Paso, I</p> <p>19 suspect, would even be worse because they would be using</p> <p>20 much saltier groundwater and municipal effluent, which</p> <p>21 really needs to be blended with a surface water release.</p> <p>22 So that would be the immediate reaction. I</p> <p>23 don't know what you do then, though, to get that cleaned</p> <p>24 up and get Caballo back on line, because if you do</p> <p>25 release that contamination and the current hydrology of</p>
<p style="text-align: right;">1385</p> <p>1 And isn't it true that the City of Las Cruces</p> <p>2 pumps their drinking water from the Lower Rio Grande</p> <p>3 interconnected surface water and groundwater system?</p> <p>4 A. A good bit of our water supply does come from</p> <p>5 it. Yes.</p> <p>6 But if I could get back to your question, it</p> <p>7 really depends on how we responded to the event.</p> <p>8 The only analogy I could draw was a much more</p> <p>9 minor event, but in late 2016, we had a bit of a crisis</p> <p>10 with a release from Caballo when the outlet works at</p> <p>11 Caballo became obstructed with vegetation that</p> <p>12 presumably washed down the Animas and Percha Creeks from</p> <p>13 the fires that had occurred in previous years and</p> <p>14 actually plugged the outlet works so that we could not</p> <p>15 make full release from Caballo Reservoir to meet the</p> <p>16 downstream demand.</p> <p>17 In that case, reclamation pulled together the</p> <p>18 two districts and implemented a plan to coordinate what</p> <p>19 we could release -- well, first of all, we shut Elephant</p> <p>20 Butte down, coordinated the release to draw Caballo down</p> <p>21 to essentially dead storage, and then reclamation</p> <p>22 brought in a clamshell bucket to excavate the debris out</p> <p>23 from the Caballo outlet.</p> <p>24 That did affect our ability to release water,</p> <p>25 but I -- I really do not have an Emergency Action Plan</p>	<p style="text-align: right;">1387</p> <p>1 the system, the river between Caballo and American Dam</p> <p>2 is taking -- depending on the time of year, anywhere</p> <p>3 from -- let's say 200 to 50 -- 50 to 200 cfs of</p> <p>4 infiltration of river water, which would be then taking</p> <p>5 contaminated water directly into our groundwater system</p> <p>6 where it would reside indefinitely.</p> <p>7 And the impact on farmers would really depend</p> <p>8 on the nature and magnitude of the contamination. There</p> <p>9 is always the TDS issue, the total dissolved solids,</p> <p>10 which the biggest advantage to surface water is its</p> <p>11 comparatively low TDS.</p> <p>12 But if you do get trace minerals, trace metals</p> <p>13 or anything like that, the uptake by the crops would</p> <p>14 vary from crop to crop and crop stage even by crop</p> <p>15 stage. So it gets very complicated.</p> <p>16 But I don't know how you get it cleaned up to</p> <p>17 where you would say it's okay to release water from</p> <p>18 Caballo now.</p> <p>19 Q. What would happen to Mexico in the event we</p> <p>20 shut Caballo down here in the United States?</p> <p>21 A. When we shut Caballo down, Mexico shuts down.</p> <p>22 Q. Could that create an international incident?</p> <p>23 A. It could well.</p> <p>24 Q. Could a permit condition to require an</p> <p>25 Emergency Action Plan in the event Caballo was</p>

1388	<p>1 catastrophically contaminated solve this problem?</p> <p>2 A. I would have to see the Emergency Action Plan,</p> <p>3 I'm afraid. I mean, it's -- that would be one way of</p> <p>4 approaching it, but it -- understand that the stakes for</p> <p>5 the downstream players are extremely high, and I would</p> <p>6 not venture to suggest an Emergency Action Plan without</p> <p>7 consultation and collaboration with the other project</p> <p>8 beneficiaries.</p> <p>9 Q. And potentially other state agencies?</p> <p>10 A. Yes.</p> <p>11 Q. Do you believe you have enough information</p> <p>12 to -- to give a complete opinion on all of the impacts</p> <p>13 to -- all of the potential impacts to the Rio Grande</p> <p>14 Project of this new copper mine?</p> <p>15 A. One of the things that working on the Rio</p> <p>16 Grande Project for this long is a strong sense of</p> <p>17 humility. So no. I don't believe I've foreseen all of</p> <p>18 the potential impacts.</p> <p>19 Q. Is there sufficient data on which to rely to</p> <p>20 properly determine impacts at this time, to properly</p> <p>21 determine impacts to the Rio Grande Project?</p> <p>22 A. I think --</p> <p>23 MR. BUTZIER: Madam Hearing Officer.</p> <p>24 MS. ORTH: Sir.</p> <p>25 MR. BUTZIER: I object. That's a completely</p>	1390	<p>1 hydrology and the chemistry of it. You honestly really</p> <p>2 don't know until it happens and you have to live with</p> <p>3 it.</p> <p>4 MS. BARNCASTLE: I have no further questions</p> <p>5 for this witness.</p> <p>6 MS. ORTH: All right. Thank you,</p> <p>7 Ms. Barncastle.</p> <p>8 Mr. Butzier, do you have questions of</p> <p>9 Dr. King?</p> <p>10 MR. BUTZIER: Thank you, Madam Hearing</p> <p>11 Officer. I'll try to be brief.</p> <p>12 CROSS EXAMINATION</p> <p>13 BY MR. BUTZIER:</p> <p>14 Q. Dr. King, if New Mexico Copper were to acquire</p> <p>15 or establish or affirm a sufficient water rights to</p> <p>16 conduct its operations, would you still have any problem</p> <p>17 or concern or objection on the water rights side of</p> <p>18 things?</p> <p>19 A. It depends on the nature of those water</p> <p>20 rights.</p> <p>21 Q. Can you elaborate on that, please?</p> <p>22 A. Certainly. If -- if, for example, the copper</p> <p>23 company were to look to offset the impact of the copper</p> <p>24 mining activity on the river below Caballo, which is now</p> <p>25 affecting EBID and is -- the impact is essentially</p>
1389	<p>1 vague and ambiguous question, and I'm not even clear</p> <p>2 where to begin to start to object to it.</p> <p>3 MS. ORTH: All right. So he said that he</p> <p>4 can't foresee all impacts, and then the follow-up</p> <p>5 question was is there enough data to foresee potential</p> <p>6 impacts.</p> <p>7 Is that --</p> <p>8 MS. BARNCASTLE: Right.</p> <p>9 MR. BUTZIER: And my question is, you know,</p> <p>10 data about what? What assumptions are going into the --</p> <p>11 behind the question?</p> <p>12 It's just a very -- very broad-brush question</p> <p>13 that I think is improper in this proceeding.</p> <p>14 MS. ORTH: All right.</p> <p>15 Dr. King, do you think you can answer the</p> <p>16 question as it's posed, or do you need it narrowed?</p> <p>17 MR. KING: I think I can answer it as posed.</p> <p>18 MS. ORTH: Go ahead.</p> <p>19 MR. KING: It may not be a very satisfying</p> <p>20 answer.</p> <p>21 With any emergency response or Emergency</p> <p>22 Action Plan, there is necessarily a great deal of</p> <p>23 uncertainty no matter how much data you have. For</p> <p>24 example, you don't know, you know, what you assume about</p> <p>25 the nature of the breach or the -- the event, both the</p>	1391	<p>1 confined to New Mexico -- if they were to try to address</p> <p>2 that by acquiring and retiring groundwater rights in the</p> <p>3 Lower Rio Grande, I would have a few problems with that.</p> <p>4 Number one, if they are groundwater rights</p> <p>5 that are not currently being exercised, then that</p> <p>6 depletion on the system is still a depletion on the</p> <p>7 system. If they are groundwater rights that are</p> <p>8 currently depleting project water, then the mine would</p> <p>9 basically continue that depletion of project water.</p> <p>10 If -- so those would be my two concerns with</p> <p>11 the river below Caballo, is that this -- you know,</p> <p>12 you're looking at the Supreme Court issues which EBID is</p> <p>13 somewhat involved in. The groundwater rights that you</p> <p>14 are retiring will almost certainly have a priority date</p> <p>15 much junior to the EBID priority date that we're working</p> <p>16 with right now which is 1903 or before.</p> <p>17 So I don't think that retirement of</p> <p>18 groundwater rights is a valid approach for the impacts</p> <p>19 below the river -- or -- sorry -- below Caballo Dam.</p> <p>20 On the impacts at Caballo Dam, it -- there</p> <p>21 are -- I mean, I would never say never. There are ways</p> <p>22 where one could secure water rights from the Middle Rio</p> <p>23 Grande to move down and offset. The Jicarilla lease is</p> <p>24 one, but it's not nearly firm enough to alleviate my</p> <p>25 concerns over it.</p>

1392	<p>1 So I guess the short answer is no.</p> <p>2 Q. Okay.</p> <p>3 And, Dr. King, the concerns that you've just</p> <p>4 identified with acquiring and retiring rights below the</p> <p>5 dam versus other means of acquiring water rights,</p> <p>6 when -- if and when that occurs, you'll have a forum at</p> <p>7 the Office of the State Engineer or perhaps as part of</p> <p>8 the Interstate Stream Commission compact proceedings to</p> <p>9 fully express and vet the kinds of concerns you're</p> <p>10 raising here today, correct?</p> <p>11 A. Yes.</p> <p>12 Q. Okay.</p> <p>13 When you talked about impacts from a dam</p> <p>14 breach and your concerns about impacts to the Caballo</p> <p>15 Reservoir and what that might mean for farmers, Mexico,</p> <p>16 Texas, New Mexico, EBID, EP1, those are all -- those are</p> <p>17 all basically assuming that there is some impact to</p> <p>18 the -- to the Caballo Reservoir, correct, from something</p> <p>19 that happens at the mine?</p> <p>20 A. Well, yes. There will be the potential for a</p> <p>21 catastrophic event, which would require some sort of an</p> <p>22 Emergency Action Plan, and then there is a concern for</p> <p>23 the chronic -- potential chronic loading of contaminants</p> <p>24 in the reservoir due to just a spreading plume.</p> <p>25 Q. But you're not attempting to testify as an</p>	1394	<p>1 this hearing does not allocate any water whatsoever for</p> <p>2 use at the Copper Flat Mine?</p> <p>3 A. Yes.</p> <p>4 Q. Are you aware that the groundwater Discharge</p> <p>5 Permit that is the subject of this hearing does not give</p> <p>6 New Mexico Copper -- New Mexico Copper Corporation any</p> <p>7 right to -- or any ability to pump any water from their</p> <p>8 production wells?</p> <p>9 A. I believe I can say yes.</p> <p>10 Q. Okay. Thank you.</p> <p>11 That's all the questions I have.</p> <p>12 MS. ORTH: Mr. de Saillan?</p> <p>13 MR. DE SAILLAN: No questions, Madam Hearing</p> <p>14 Officer.</p> <p>15 MS. ORTH: Is there anyone else present who</p> <p>16 has a question of Dr. King based on his testimony?</p> <p>17 I see no hands.</p> <p>18 Ms. Barncastle, do you have redirect?</p> <p>19 MS. BARNCASTLE: No, I do not.</p> <p>20 MS. ORTH: All righty. Ready to excuse</p> <p>21 Dr. King.</p> <p>22 Thank you very much, Dr. King.</p> <p>23 Safe travels to Albuquerque.</p> <p>24 Shall we take five minutes before your next</p> <p>25 witness?</p>
1393	<p>1 expert that there will be impacts to the Caballo</p> <p>2 Reservoir if there is some type of failure of the dam,</p> <p>3 are you?</p> <p>4 A. I am enough of an expert to say that I would</p> <p>5 not say that there will be 100 percent -- 100 percent</p> <p>6 certainly -- certainty, but I would say that there is a</p> <p>7 significant possibility.</p> <p>8 Q. And were you present in these proceedings when</p> <p>9 Mr. Kidd testified about the Dam Safety Bureau process</p> <p>10 at the Office of the State Engineer that is designed to</p> <p>11 ensure the sufficient structural integrity of a tailings</p> <p>12 dam?</p> <p>13 A. I was not.</p> <p>14 Q. Okay.</p> <p>15 No further questions.</p> <p>16 MS. ORTH: All right. Thank you.</p> <p>17 Mr. Knight, do you have questions?</p> <p>18 MR. KNIGHT: I do.</p> <p>19 I need a microphone, though.</p> <p>20 CROSS EXAMINATION</p> <p>21 BY MR. KNIGHT:</p> <p>22 Q. Good morning, Dr. King.</p> <p>23 A. Good morning.</p> <p>24 Q. Dr. King, are you aware that the discharge --</p> <p>25 the groundwater Discharge Permit that is the subject of</p>	1395	<p>1 MS. BARNCASTLE: Actually, I'd like -- I'd</p> <p>2 like -- if he didn't just pull a disappearing act on me,</p> <p>3 I would like to start immediately, but I guess we</p> <p>4 should.</p> <p>5 MS. ORTH: All right. Five minutes.</p> <p>6 MS. BARNCASTLE: Madam Hearing Officer, I will</p> <p>7 need to take a 20-minute break about 10:45.</p> <p>8 MS. ORTH: That's fine.</p> <p>9 (Proceedings in recess from 9:57 a.m. to</p> <p>10 10:03 a.m.)</p> <p>11 MS. ORTH: Okay. Please take your</p> <p>12 conversations out of the room. We are back after a</p> <p>13 short break.</p> <p>14 Ms. Barncastle, please call your next witness.</p> <p>15 MS. BARNCASTLE: Thank you.</p> <p>16 I'd like to call Mr. Erik Fuchs.</p> <p>17 EREK H. FUCHS</p> <p>18 having been first duly sworn or affirmed, was</p> <p>19 examined and testified as follows:</p> <p>20 DIRECT EXAMINATION</p> <p>21 BY MS. BARNCASTLE:</p> <p>22 MR. BUTZIER: Madam Hearing Officer, at the</p> <p>23 risk of annoying everybody, I'd like to again interject</p> <p>24 my continuing objection.</p> <p>25 MS. ORTH: You're not annoying. That's fine.</p>



<p style="text-align: right;">1396</p> <p>1 It's on the record.</p> <p>2 Q. (BY MS. BARNCASTLE) Good morning, Mr. Fuchs.</p> <p>3 Would you please state your full name for the</p> <p>4 record.</p> <p>5 A. EreK Hollis Fuchs.</p> <p>6 Q. You might consider spelling your last name for</p> <p>7 the court reporter.</p> <p>8 A. Good point. That's F-U-C-H-S.</p> <p>9 Q. Thank you, Mr. Fuchs.</p> <p>10 Are you -- oh, this thing. I am not a still</p> <p>11 person, and it wants me to sit still. I'll try again.</p> <p>12 Could you please start out by telling us a</p> <p>13 little about your background and experience?</p> <p>14 A. Sure. I can begin with my formal education.</p> <p>15 I have a bachelor of science degree in range</p> <p>16 and watershed science from New Mexico State University.</p> <p>17 I did some research with that effort concerned with,</p> <p>18 among other things, turbidity in the Gila River, up here</p> <p>19 in the Black Range, pretty close by. I also have a</p> <p>20 master of science degree, likewise from New Mexico State</p> <p>21 University, and that was concerned with range hydrology,</p> <p>22 and my concentration there was sediment transport and</p> <p>23 soil physics.</p> <p>24 I jump ahead, oh, gosh, a good, what, 15, 16</p> <p>25 years or better, and I initiated a PhD that is almost</p>	<p style="text-align: right;">1398</p> <p>1 interpretive work, authored scores of technical</p> <p>2 memoranda specific to water rights applications of both</p> <p>3 surface and groundwater, but principally groundwater.</p> <p>4 Prior to that, I was with Kansas State</p> <p>5 University in Northeastern Kansas, where I was the lead</p> <p>6 researcher for an extension and outreach program</p> <p>7 specific to grazing land water quality considerations.</p> <p>8 So I've been back -- back home, so to speak --</p> <p>9 I didn't think it would happen that way -- but in Las</p> <p>10 Cruces ever since.</p> <p>11 Q. Do you consider yourself an expert in water</p> <p>12 rights administration?</p> <p>13 A. I do. I've been qualified as such on numerous</p> <p>14 different occasions. It's a learned practice indeed,</p> <p>15 exposure to administrative protocols, but certainly a</p> <p>16 lot of rule regulation, working with attorneys. It's</p> <p>17 the kind of thing that, gosh, if a college degree were</p> <p>18 offered in it, I'm not too sure very many people would</p> <p>19 pursue it. But indeed, yes, I do consider myself an</p> <p>20 authority on the subject.</p> <p>21 Q. And when you say you've been qualified in it a</p> <p>22 few times, you mean qualified as an expert in a court</p> <p>23 proceeding?</p> <p>24 A. Yes, ma'am.</p> <p>25 MS. BARNCASTLE: I'd like to tender this</p>
<p style="text-align: right;">1397</p> <p>1 finished in the water science management program,</p> <p>2 likewise at New Mexico State University, where my focus</p> <p>3 is agricultural water resources, but in particular</p> <p>4 groundwater and surface water interactions with</p> <p>5 particular emphasis on the physics associated with those</p> <p>6 interactions.</p> <p>7 My employment is such that currently I am the</p> <p>8 groundwater resources manager for the Elephant Butte</p> <p>9 Irrigation District. I've been in that capacity now</p> <p>10 going on seven years.</p> <p>11 Prior to that, I was the Lower Rio Grande</p> <p>12 Basin supervisor and intermittently the district</p> <p>13 supervisor for the District 4 office of the New Mexico</p> <p>14 Office of the State Engineer located in Las Cruces. I</p> <p>15 was in that capacity from November of '99 until 2011,</p> <p>16 '99.</p> <p>17 Many of my duties with the OSE, I'll</p> <p>18 abbreviate, in addition to personnel supervisory matters</p> <p>19 with scientists and engineers in my charge, was the</p> <p>20 technical facets for water rights administration, in</p> <p>21 particular performing either myself or overseeing</p> <p>22 modeling efforts, MODFLOWS, superposition versions of</p> <p>23 the water flow packages specific to the Lower Rio Grande</p> <p>24 underground water basin.</p> <p>25 A lot of analytical work, a lot of</p>	<p style="text-align: right;">1399</p> <p>1 witness as an expert in water rights administration at</p> <p>2 this time.</p> <p>3 MR. BUTZIER: No objection.</p> <p>4 MR. DE SAILLAN: No objection.</p> <p>5 MR. KNIGHT: No objection.</p> <p>6 MS. ORTH: He's so recognized.</p> <p>7 MS. BARNCASTLE: I would note for the Hearing</p> <p>8 Officer and remind my witness that although he is</p> <p>9 possibly an expert in other areas he should not render</p> <p>10 such opinions today.</p> <p>11 MR. FUCHS: Yes, ma'am.</p> <p>12 MS. BARNCASTLE: All right.</p> <p>13 Q. Well, before we move on, I'd like you to look</p> <p>14 at Exhibit Number 2 -- EBID Exhibit Number 2 in front of</p> <p>15 you.</p> <p>16 A. Yes, ma'am.</p> <p>17 Q. Do you recognize that?</p> <p>18 A. Yes, ma'am.</p> <p>19 Q. What is that document?</p> <p>20 A. This is my current CV and resume.</p> <p>21 Q. Did you write that document yourself?</p> <p>22 A. Yes, ma'am, I did.</p> <p>23 MS. BARNCASTLE: I'd like to offer Exhibit</p> <p>24 Number 2 into evidence at this time.</p> <p>25 MR. BUTZIER: No objection.</p>

<p style="text-align: right;">1400</p> <p>1 MR. DE SAILLAN: No objection.  2 MR. KNIGHT: No objection.  3 MS. ORTH: It's admitted.  4 (Exhibit EBID 2 admitted into evidence.)  5 Q. (BY MS. BARNCASTLE) Okay, Mr. Fuchs. Did you  6 review any documents or records to form the opinions  7 you're about to give today?  8 A. Yes, I did. Among those include many of the  9 documents that Dr. King mentioned earlier. Indeed it  10 was -- it remains a plethora of material that I feel  11 I've gotten through most of, but the documents that I  12 concentrated on in particular included the Jones and  13 Finch work of 2014, certainly also the December, 2017  14 Shomaker report regarding probable hydrologic  15 consequences, and then the refinement of that showed  16 up -- I believe it was May, 2018.  17 But in addition to that, I reviewed other  18 older documentation in my possession specific to OSE  19 material, and that would include a particular letter of  20 understanding between the NMED and the OSE. That was  21 back in 1999. I also looked at the recent Third  22 Judicial District Court subfile order specific to  23 adjudication proceedings, and in this instance that are  24 specific to water rights that are currently owned by New  25 Mexico Copper.</p>	<p style="text-align: right;">1402</p> <p>1 technical considerations.  2 So there are a few things that the State  3 Engineer is required, certainly, to be attentive to in  4 evaluating water rights proposals and related  5 applications.  6 Among those would be, first and foremost, is  7 there unappropriated water available. And to the extent  8 there is or perhaps isn't, then other considerations  9 indeed include public welfare, conservation of water,  10 but the one that typically receives the most attention,  11 at least from a technical perspective, is impairment.  12 Now, impairment is not terribly well defined  13 other than where it exists in specific basin guidelines  14 or criteria. But generally speaking, it is approached  15 in a couple of different fashions, one of which is local  16 impairment, which would include, for example, drying up  17 a neighboring well.  18 Other forms of impairment would include more  19 generalized considerations such as stream completions  20 that would affect a great many others.  21 So those are effectively the backdrop that the  22 State Engineer is required to consider in ultimately  23 formulating decisions on applications.  24 Q. Now, you did say that impairment is where they  25 typically focus, but they also have a duty to focus on</p>
<p style="text-align: right;">1401</p> <p>1 Q. And did you listen to the testimony of  2 Dr. King this morning?  3 A. Yes, I did.  4 Q. Okay.  5 I'm going to ask you the same questions that  6 NMED asked of Dr. King, but before we get there, I'd  7 like you to lay a little bit of foundation for the  8 answers you're going to give to those questions.  9 So can you please give us a general overview  10 of the regulations that are relevant here for your  11 testimony?  12 A. Okay. Well, certainly the State Engineer is  13 guided by, of course, the Constitution, statutes as  14 they're, of course, passed via our legislative body from  15 time to time, but also rules and regulations as they are  16 also promulgated from time to time, but then in  17 particular guidelines and the basic specific criteria.  18 Now, indeed not every square stitch of the  19 state or particular groundwater basin or even stream  20 system, if you will, is the subject of specific water  21 rights administrative criteria; however, once principles  22 and guidelines that seem to have indeed a common  23 understanding are developed, then it becomes as much a  24 case of evaluating proposals, applications or otherwise  25 on a case-by-case basis with reference to pertinent</p>	<p style="text-align: right;">1403</p> <p>1 public welfare; is that correct?  2 A. They do. They do. And that brings to mind a  3 number of considerations that I remember in my tenure as  4 the basin supervisor in the Lower Rio Grande, and that  5 often involved a collaboration, coordination with other  6 entities, be they other state agencies, and at times  7 federal interests and related agencies, and, also,  8 certainly in the Lower Rio Grande, the Elephant Butte  9 Irrigation District.  10 Q. Now, you have in front of you an exhibit  11 marked EBID Exhibit 10.  12 Do you recognize that document?  13 A. Yes, I do.  14 Q. What is it?  15 A. This is the Mesilla Valley Administrative Area  16 Guidelines for Review of Water Right Applications, dated  17 January 5th, 1999. I remember this well because it was  18 hot off the press not long before I started with the  19 OSE.  20 Q. Are those regulations still the governing  21 regulations for water rights applications in the Lower  22 Rio Grande?  23 A. Generally speaking, they are. As other  24 technical tools become available or better data is  25 available, then certainly it is brought into</p>

<p style="text-align: right;">1404</p> <p>1 consideration. But otherwise, the principles that are  2 outlined in the Mesilla guidelines as we're discussing  3 here are generally taken to be applicable elsewhere in  4 the Lower Rio Grande to the extent they're applicable.  5 Now, there are instances where they perhaps  6 are not applicable. One example would be the -- what we  7 call Jornada del Muerto subbasin of the Lower Rio  8 Grande. Hydrologically it is rather different from the  9 Mesilla, but otherwise where stream-connected systems  10 are concerned in the Lower Rio Grande, the Mesilla  11 criteria is considered to be a persistent guideline.  12 Q. Did you rely on the guidelines shown in  13 Exhibit 10 to form your opinions today?  14 A. In part.  15 MS. BARNCASTLE: Madam Hearing Officer, I'd  16 like to move the admission of EBID Exhibit 10 at this  17 time subject, of course, to Mr. Butzier's relevance  18 objection.  19 MR. BUTZIER: No objection subject to that  20 same objection.  21 MS. ORTH: All right.  22 MR. DE SAILLAN: No objection.  23 MR. KNIGHT: No objection.  24 MS. ORTH: It's admitted.  25 (Exhibit EBID 10 admitted into evidence.)</p>	<p style="text-align: right;">1406</p> <p>1 also been testified, EBID and, for that matter, most  2 other water use interests in the water use community in  3 the Lower Rio Grande are, for all intents and purposes,  4 in compact Texas.  5 We are still proud New Mexicans, and we would  6 hope to work together, collaborate in the interest of  7 public welfare and the taxpayer harmony.  8 Q. Now, NMED asked Dr. King if he was aware that  9 the groundwater Discharge Permit does not give New  10 Mexico Copper Corporation any right to pump water from  11 their production wells.  12 Do you have an opinion -- a water rights  13 administration opinion on that question?  14 A. Well, yes, I do. To the extent that the  15 Discharge Permit permits discharge of wastewater in  16 whatever volume, the water originating to produce that  17 wastewater and the subsequent discharge indeed would be  18 an appropriation of water to begin with. And therefore,  19 I do believe that there is a close relationship.  20 Q. And since the New Mexico Copper Corporation is  21 going to be retaining all contaminated water on site,  22 would that be considered a wastewater reuse in your  23 opinion? Or --  24 A. Yes. I believe -- I believe so, to the extent  25 that it is being retained, as I have read and understood</p>
<p style="text-align: right;">1405</p> <p>1 Q. (BY MS. BARNCASTLE) All right. Mr. Fuchs,  2 let's talk a little bit about the NMED's questions and  3 one of Mr. Butzier's questions of Dr. King.  4 Let's start with Mr. Butzier's question, and I  5 hope I don't mischaracterize this, but I believe the  6 question was will EBID have an adequate opportunity to  7 vet these water rights issues before the State Engineer?  8 A. Well, one can only hope. I would offer,  9 however, that a proposal or activity of this nature,  10 particularly of this magnitude and given its geographic  11 situation, would be such that a high degree of  12 collaboration and coordination from an interagency  13 perspective would indeed be expected. Otherwise what we  14 get into -- and I've seen this -- I remember this in my  15 tenure with the OSE -- is a rather fragmented  16 circumstance.  17 And I would further offer that given events,  18 circumstances as they are prevalent today of indeed  19 interstate dimension, if not international, as I believe  20 Dr. King testified regarding litigation before the  21 United States Supreme Court, that indeed includes  22 certainly the State of New Mexico, Texas and our  23 upstream brother in Colorado, that the stakes are  24 really -- really quite high, and that in the context the  25 public welfare of the State of New Mexico, while, as has</p>	<p style="text-align: right;">1407</p> <p>1 the proposal, essentially recycled, if you will, as part  2 of the mining and mill process. Certainly there's an  3 evaporative component of that. But yes, for all intents  4 and purposes, that would be a reuse.  5 Q. I'd like you to look now at what's been marked  6 as EBID Exhibit Number 8.  7 Do you recognize that document?  8 A. Yes. I mentioned this, I believe, earlier,  9 this letter of understanding between the NMED and the  10 OSE.  11 Q. How do you know about the existence of this  12 document?  13 A. Well, again, as I mentioned regarding the  14 Mesilla Valley administrative criteria, or guidelines as  15 it were, this letter of understanding seniorly was  16 produced along about the same time that I joined the  17 OSE, and I remember that it was the subject of an effort  18 to promote interagency collaboration and activities at  19 that time.  20 And in fact, I remember the State Engineer  21 himself -- at that time it was Tom Turney -- had made a  22 trip, and one of the trips -- or stops along the way was  23 District 4, Las Cruces, where he discussed this very  24 letter and encouraged his staff, certainly myself as the  25 basin supervisor, to be rather mindful of it, and that</p>

<p style="text-align: right;">1408</p> <p>1 other such -- or similar types of arrangements, if you  2 will, or understandings might be expected in the future.  3       So -- and for a while, I remember that it was  4 indeed prevalent because I recall getting phone calls,  5 not many, but periodically, from NMED staff. I don't  6 remember their names specifically. It's been many years  7 ago. But I do remember some phone calls and related  8 where proposed discharge permits were concerned.  9       Again there weren't very many, because in the  10 Lower Rio Grande most discharge permits, if my memory  11 serves, were the subject of renewals. So they were  12 existing discharge permits, and therefore the  13 presumption was that, well, then, there must be an  14 existing water right associated with that.  15       But the few times, as I remember, that there  16 were new -- there were proposed new discharge permits, I  17 remember some conversations where the -- the question  18 was, well, what's the story, if you will, on rights to  19 water. So me and my staff from time to time, again not  20 very often, but I do remember a few times where there  21 was some research underway and some communication in  22 keeping with the letter of understanding.  23       Q. As a state government employee, were you  24 trained by the Office of the State Engineer on  25 implementation of this letter of understanding?</p>	<p style="text-align: right;">1410</p> <p>1 proposed mine project be one of the projects that you  2 would have been instructed to collaborate with NMED on  3 as an Office of the State Engineer employee?  4       MR. BUTZIER: Objection, calls for  5 speculation.  6       MS. ORTH: It does, but go ahead if you can  7 answer the question.  8       MR. FUCHS: Yeah. I think I can answer the  9 question.  10       And the answer is yes, indeed, and I could  11 give other examples.  12       Q. (BY MS. BARNCASTLE) Please do.  13       A. Yeah. I mean, one such example included --  14 oh, let's see. It would have been in the early 2000s.  15 Dona Ana County received a sizeable grant from the  16 Environmental Protection Agency to construct and operate  17 two large -- relatively large wastewater treatment  18 plants in what we call our South Valley, in Dona Ana  19 County. In other words, the Southern Mesilla Valley.  20       And the idea there was to take a great many of  21 the colonia settlements, if you will, in related  22 communities in the South Valley that were otherwise  23 discharging raw septic, if you will, via septic tanks,  24 to instead connect them to an actual wastewater  25 treatment system so that that wastewater could then be</p>
<p style="text-align: right;">1409</p> <p>1       A. Not specifically. It was really more general  2 guidance. The idea was that the -- the letter, if you  3 will, and the plain language of it should speak for  4 itself.  5       In other words, the direction I recall we  6 received was that if in doubt or if there is any  7 question in your mind, call them, ask, communicate, and  8 especially do so if something big or new comes up that  9 is, you know, proposing a transfer, if you will, to  10 retire the use of water in one location and change the  11 purpose of that to perhaps something else that would be  12 perhaps of an industrial nature that would then have a  13 discharge component.  14       And if that were the case, that we're getting  15 into water quality, if there's -- we should be mindful  16 of those, and given the intrinsic relationship between  17 quality and quantity, the direction I recall we received  18 was to communicate.  19       And so that would have been about the extent  20 of training, if you will, but we did not, in my  21 recollection, have, for example, a hard and fast  22 protocol. The idea was that use good judgment whenever  23 something comes up that would indeed seem to necessitate  24 collaboration.  25       Q. Would the New Mexico Copper Corporation</p>	<p style="text-align: right;">1411</p> <p>1 properly treated, rather than risking the potential for  2 contamination -- ongoing contamination, nitrates  3 related, of the shallow alluvium in groundwater.  4       And so as that project proceeded, contractors  5 on behalf of Dona Ana County immediately discovered that  6 in order to lay pipeline, if you will, to serve as  7 collection points to receive wastewater, to otherwise  8 take people off septic, that to excavate and lay that  9 pipeline was such that they were regularly encountering  10 the water table, that they would regularly find  11 themselves exposing groundwater.  12       And so as this issue presented itself, what  13 they initially were doing was excavating and then just  14 installing, you know, a hurricane pump or, you know, a  15 sump pump or wastewater pump, whatever was convenient,  16 and then discharging that water wherever, however they  17 might.  18       And so that presented several questions or  19 potential problems, one of which is, well, to the extent  20 that you're exposing groundwater and you're pumping it  21 out of the ground, for whatever purpose, you're  22 appropriating groundwater. So that raises a water  23 rights consideration, which in the Lower Rio Grande is  24 something that always was and indeed should remain of  25 keen concern, because the Lower Rio Grande stream system</p>

<p style="text-align: right;">1412</p> <p>1 is indeed fully, if not overappropriated.  2 So whenever this event presented itself, we  3 had not only a water rights consideration to have a look  4 at, well, gee, how do we handle this, but, also, well,  5 what do we do if this water that's being discharged  6 is -- is there any question about the quality associated  7 with it, and the manner and means by which it's being  8 pumped and discharged?  9 And so my recollection was that there was  10 collaboration at indeed the highest levels. I do  11 remember that elements in Santa Fe were engaged. I  12 believe that the NMED was engaged, both Ground Water and  13 Surface Water Quality Bureaus.  14 I don't remember the specific direction or  15 input that NMED Ground Water or Surface Water may have  16 opined, but indeed the OSE response or reaction was that  17 we can't just waste that water. We certainly need to  18 support the project, because it makes perfect sense, but  19 we need to find a beneficial use of that water, because  20 it would otherwise then be contrary to conservation of  21 water in the state.  22 And arguably a question of public welfare as  23 far as further depletions, if you will, or sending water  24 unnecessarily, if you will, to our friends in Texas.  25 So what we worked out there was a circumstance</p>	<p style="text-align: right;">1414</p> <p>1 project, but that OSE did not provide any comments  2 regarding the project beyond that.  3 Do you recall that testimony?  4 A. I do.  5 Q. Is that the level of agency coordination EBID  6 would like to see here?  7 A. No, it certainly is not. I think that --  8 well, I know that as the groundwater resources manager  9 for Elephant Butte Irrigation District, my  10 recommendation has been and remains that the OSE needs  11 to be engaged at the highest level to sort out any and  12 all permitting issues with respect to water rights in  13 particular, and to explore the degree to which  14 impairment, be it local, stream system or otherwise, is  15 indeed an issue, and then how we could perhaps  16 effectively address that.  17 Q. Mr. Fuchs, did you rely on the contents of  18 Exhibit 8 to form any of your opinions for your  19 testimony today?  20 A. Yes. Yes, I did.  21 MS. BARNCASTLE: Madam Hearing Officer, I'd  22 like to move the admission of EBID Exhibit 8 at this  23 time.  24 MR. BUTZIER: No objection.  25 MR. DE SAILLAN: No objection.</p>
<p style="text-align: right;">1413</p> <p>1 where dewatering was permissible, but only under permit.  2 Okay.  3 And that such a permit would require a plan  4 such that each contractor would then have to coordinate  5 with what we found to be the most workable arrangement,  6 and that were farming interests, where the groundwater  7 that was being dewatered to lower the water table for  8 purposes of laying the pipeline was such that that  9 groundwater could then be applied to actually irrigate.  10 And the idea was that to the extent that that  11 groundwater was being pumped and appropriated to  12 irrigate, that existing groundwater rights owned by  13 existing farming interests would then be relaxed for the  14 time being. In other words, substituted to the extent  15 practicable to use the water that was being dewatered.  16 So that, I think, would probably be one of the  17 foremost examples that comes to mind, and that was a  18 project that ran for at least a full year, as I  19 remember. So it wasn't just a weekend or, you know,  20 week long or a few days kind of thing. So --  21 Q. Now, Mr. Vollbrecht of NMED testified -- and  22 I'm sure Mr. Knight will keep me honest here --  23 Mr. Vollbrecht testified that the Office of the State  24 Engineer did send a person by the name of Mr. Myer to  25 some of the NMED meetings regarding the Copper Flat</p>	<p style="text-align: right;">1415</p> <p>1 MR. KNIGHT: No objection.  2 MS. ORTH: Exhibit 8 is admitted.  3 (Exhibit EBID 8 admitted into evidence.)  4 Q. (BY MS. BARNCASTLE) Okay. So, Mr. Fuchs, you  5 just stated that you'd like to see more coordination to  6 sort out water rights permitting issues in the context  7 of impairment, and I believe also public welfare; is  8 that correct?  9 A. Yes, ma'am.  10 Q. What are those types of water rights issues  11 where NMED and OSE should be coordinating in this  12 situation?  13 A. Well, as I've alluded, if not to try to make  14 reasonably clear, I think that the quality and quantity  15 aspects of this proposed activity are indeed  16 intrinsically linked and related.  17 I think, also, that the discharge component  18 that this proceeding is certainly specific to certainly  19 does relate back to an appropriation of water to begin  20 with and that the nature and magnitude of that  21 appropriation needs to be explored and understood in  22 much, much greater detail than I think it is at this  23 point.  24 One of the reasons that I believe I can offer  25 that perspective is because having reviewed New Mexico</p>

1416	<p>1 Copper's current rights to water as they fairly recently</p> <p>2 have been adjudicated, it's quite clear that at least</p> <p>3 from a freshwater perspective the volumes that have been</p> <p>4 recognized are substantially insufficient for the</p> <p>5 activity as proposed, at least relative to the proposed</p> <p>6 total freshwater production that is contemplated at this</p> <p>7 time.</p> <p>8       There really is no concentration or discussion</p> <p>9 that I have noted that is specific to the dewatering</p> <p>10 associated with the -- the open pit itself over the</p> <p>11 duration and course of the mining activity other than</p> <p>12 that indeed that water would be impounded and safeguards</p> <p>13 are apparently contemplated as to any potential</p> <p>14 contaminants associated with that.</p> <p>15       But I would offer again that that dewatering</p> <p>16 activity in and of itself, if, in fact, were to take,</p> <p>17 you know, what is it, 25 million gallons per day of</p> <p>18 wastewater, potentially, discharged, that's, what, about</p> <p>19 28,000 acre-feet annually.</p> <p>20       I understand that, yes, that in all likelihood</p> <p>21 comprises the bulk of the volume contemplated in the</p> <p>22 Discharge Permit, but again that is an appropriation of</p> <p>23 groundwater by itself, and indeed a portion of that</p> <p>24 necessarily will be evaporated, depleted and removed</p> <p>25 from the system.</p>	1418	<p>1 of this year.</p> <p>2       Q. Are you familiar with those documents?</p> <p>3       A. Yes, somewhat.</p> <p>4       MS. BARNCASTLE: Madam Hearing Officer, I'd</p> <p>5 like to move the admission of Exhibit 9, EBID Exhibit 9.</p> <p>6       And what I will say is that Mr. de Saillan</p> <p>7 actually admitted one of these two documents in his</p> <p>8 direct case. I'm bringing in the second that's also</p> <p>9 relevant and tied to the one that Mr. de Saillan</p> <p>10 admitted into evidence.</p> <p>11       MR. BUTZIER: No objection.</p> <p>12       MR. DE SAILLAN: No objection.</p> <p>13       MR. KNIGHT: No objection.</p> <p>14       MS. ORTH: Both orders in Exhibit 9 are</p> <p>15 admitted.</p> <p>16       (Exhibit EBID 9 admitted into evidence.)</p> <p>17       Q. (BY MS. BARNCASTLE) Mr. Fuchs, are you aware</p> <p>18 of another permit application to appropriate new water</p> <p>19 pending on behalf of New Mexico Copper Corporation?</p> <p>20       A. Yes. There was an application filed by New</p> <p>21 Mexico Copper earlier this year with the Office of the</p> <p>22 State Engineer. The copy that I am in possession of is</p> <p>23 not date stamped specific to the exact day earlier this</p> <p>24 year that it was filed. That reflects a processing</p> <p>25 protocol on behalf of the local district office. Why it</p>
1417	<p>1       So I think that it's really difficult to</p> <p>2 separate out the quality aspects of this, at least in</p> <p>3 the context of discharge, you know, for volume per unit</p> <p>4 time relative to water rights, volume per unit time.</p> <p>5 And so I really think that there needs to be some close</p> <p>6 coordination there.</p> <p>7       Q. Am I understanding you to say that some of the</p> <p>8 activities proposed in the Discharge Permit that NMED</p> <p>9 proposes to issue are de facto appropriations of water?</p> <p>10       A. That is what is contemplated as I have</p> <p>11 reviewed the material at this point.</p> <p>12       Q. Now, the New Mexico Copper Corporation does</p> <p>13 have some water rights; is that correct?</p> <p>14       A. They do. Yes. I believe it was February</p> <p>15 of -- of this year that their -- their claims.</p> <p>16       Q. I'd like you --</p> <p>17       A. Their claims that New Mexico Copper has come</p> <p>18 to own were adjudicated February of this year.</p> <p>19       Q. I'd like you to look now at what's marked as</p> <p>20 EBID Exhibit 9.</p> <p>21       A. Okay.</p> <p>22       Q. Can you identify those documents, please?</p> <p>23       A. Yes. These are the two subfile orders in</p> <p>24 question that reflects New Mexico Copper Corporation's</p> <p>25 groundwater rights as they were adjudicated in February</p>	1419	<p>1 does not reflect a date stamp I do not know.</p> <p>2       That application for a new appropriation of</p> <p>3 groundwater from the existing wells that New Mexico</p> <p>4 Copper owns has not been subject to, or, near as I can</p> <p>5 tell, the OSE has not ordered advertisement as required</p> <p>6 by law regarding that application.</p> <p>7       But otherwise, yes, an application for a new</p> <p>8 appropriation of 5,234 acre-feet of groundwater was</p> <p>9 applied for.</p> <p>10       Q. Now, you've heard testimony that there is no</p> <p>11 dispute that the mine will have a hydrologic impact on</p> <p>12 the Rio Grande Project.</p> <p>13       Do you recall that testimony?</p> <p>14       A. I do. I arrived at a very, very similar</p> <p>15 conclusion of my own. Yes, ma'am.</p> <p>16       Q. But we're not providing that --</p> <p>17       A. Yes, ma'am.</p> <p>18       Q. -- expert opinion today, correct?</p> <p>19       A. Yes, ma'am.</p> <p>20       Q. Okay.</p> <p>21       The issues that will be front and center,</p> <p>22 then, in the OSE application that is currently pending</p> <p>23 will be something similar to the hydrologic impact that</p> <p>24 the Shomaker report suggests exists?</p> <p>25       A. It would have to be, at least to build on</p>

<p style="text-align: right;">1420</p> <p>1 that.</p> <p>2 Q. And, now, does that other permit application</p> <p>3 provide an avenue for NMED and OSE to further coordinate</p> <p>4 on this project?</p> <p>5 A. I would certainly think so.</p> <p>6 Q. But isn't it also advisable that a permit</p> <p>7 condition requiring further agency coordination similar</p> <p>8 to what NMED has suggested in the form of a permit</p> <p>9 condition requiring compliance with Dam Safety Bureau</p> <p>10 regulations could be imposed here to also deal with the</p> <p>11 water rights issues?</p> <p>12 A. Yes. And as a matter of fact, in my written</p> <p>13 testimony, I offered a recommendation specifically</p> <p>14 suggesting that.</p> <p>15 MS. BARNCASTLE: Let me just correct for the</p> <p>16 record. I had my witnesses create written testimony for</p> <p>17 me that I did not submit in the form of written</p> <p>18 testimony, I then incorporated into a statement of</p> <p>19 intent. So that's what Mr. Fuchs is referring to, is</p> <p>20 his written testimony that he prepared that I then</p> <p>21 incorporated into our EBID's statement of intent.</p> <p>22 MS. ORTH: Okay. Thank you.</p> <p>23 MS. BARNCASTLE: I believe that's all the</p> <p>24 questions I have of Mr. Fuchs today.</p> <p>25 MS. ORTH: All right. Thank you.</p>	<p style="text-align: right;">1422</p> <p>1 certainly have not been relinquished, if you will, that</p> <p>2 the stream system and associated interrelated</p> <p>3 groundwaters are fully appropriated.</p> <p>4 Q. And has there been a hydrographic survey done</p> <p>5 of the Lower Rio Grande that's been completed?</p> <p>6 A. Yes. There has been in support of the ongoing</p> <p>7 adjudication. However, I would offer that to</p> <p>8 characterize it as complete would be somewhat</p> <p>9 misleading, and the reason is because it is, for all</p> <p>10 intents and purposes, a bit of a moving target.</p> <p>11 In other words, when the hydrographic survey</p> <p>12 was originally completed and filed with the District</p> <p>13 Court in 2000, it reflected at that time the surveyor's</p> <p>14 best estimate, if you will, of rights to water, surface,</p> <p>15 ground or otherwise, that were the subject of their</p> <p>16 inventory as they had done it through the mid- to late</p> <p>17 '90s.</p> <p>18 However, as adjudication proceedings have been</p> <p>19 since been ongoing, the hydrographic survey has been</p> <p>20 updated, if you will, and adjusted to reflect new and</p> <p>21 otherwise unknown information, in other words, claims</p> <p>22 that have since come forward. To the extent that</p> <p>23 additional claims continue to come forward only</p> <p>24 intensifies, if you will, the otherwise fully</p> <p>25 appropriated, if not again overappropriated circumstance</p>
<p style="text-align: right;">1421</p> <p>1 Mr. Butzier, do you have questions?</p> <p>2 MR. BUTZIER: I do, Madam Hearing Officer.</p> <p>3 Thank you.</p> <p>4 CROSS EXAMINATION</p> <p>5 BY MR. BUTZIER:</p> <p>6 Q. Mr. Fuchs, is the Lower Rio Grande considered</p> <p>7 by the Office of the State Engineer to be a closed</p> <p>8 basin?</p> <p>9 A. Closed would not be the appropriate term.</p> <p>10 Closed is different than fully or overappropriated. If</p> <p>11 it were closed, there would be issuance of no new</p> <p>12 applications or permits for anything including simple</p> <p>13 domestic well applications.</p> <p>14 So technically it is not closed in the context</p> <p>15 of an administrative order from the State Engineer, but</p> <p>16 otherwise there is no unappropriated water available in</p> <p>17 the Lower Rio Grande, and that has been documented and</p> <p>18 well known for quite a few years.</p> <p>19 Q. And what's your basis for your opinion that</p> <p>20 it's been fully or overappropriated?</p> <p>21 A. Well, it is stated quite clearly in the</p> <p>22 Mesilla Valley Administrative Area Guidelines that I</p> <p>23 referenced earlier, dated back in 1999. In fact, the</p> <p>24 development of those guidelines was prompted in no small</p> <p>25 part due to the concern and discussions at the time that</p>	<p style="text-align: right;">1423</p> <p>1 of the Lower Rio Grande stream system.</p> <p>2 Q. Is it the case that the Office of the State</p> <p>3 Engineer continues to process permit applications for</p> <p>4 water rights or applications to appropriate water rights</p> <p>5 in the Lower Rio Grande?</p> <p>6 A. They certainly continue to process</p> <p>7 applications. They are typically and in the</p> <p>8 overwhelming majority of instances to replace older or</p> <p>9 failing existing wells to continue the exercise of</p> <p>10 existing groundwater rights. There are a number of</p> <p>11 instances where new supplemental wells are granted, but</p> <p>12 those again are tied or limited to existing groundwater</p> <p>13 rights of record.</p> <p>14 With respect to new appropriations of</p> <p>15 groundwater, in all of the time that I was the</p> <p>16 supervisor of the Lower Rio Grande, any such application</p> <p>17 would have been and were -- there were several instances</p> <p>18 I remember, that they were rejected and turned back for</p> <p>19 the reason that it was our position at the time that</p> <p>20 there is no unappropriated water available.</p> <p>21 Therefore, unless an application were filed</p> <p>22 that contemplated a transfer, in other words, it's a new</p> <p>23 appropriation, but we're going to transfer in a water</p> <p>24 right from elsewhere, then such an application couldn't</p> <p>25 or wouldn't be considered.</p>

1424	<p>1 Now, the big problem with considering an</p> <p>2 application that contemplates a transfer from elsewhere</p> <p>3 is to what extent does that result in further depletion</p> <p>4 and therefore impairment in the system. Even though for</p> <p>5 accounting purposes, say, for example, on a statewide</p> <p>6 basis or regionwide basis, the numbers may all mass</p> <p>7 balance, it may very well be the depletions have</p> <p>8 effectively increased in the subject area.</p> <p>9 So I think the short answer to your -- to your</p> <p>10 question, Mr. Butzier, is that in my experience an</p> <p>11 application for a new appropriation of a groundwater</p> <p>12 right, and certainly as it would consider any sort of</p> <p>13 surface water right, has not occurred in the Lower Rio</p> <p>14 Grande, at least not in my tenure and subsequent to</p> <p>15 that, other than simple domestic and stock well</p> <p>16 applications that are before -- before or under 72-12-1.</p> <p>17 Q. And isn't it the case that even if OSE were</p> <p>18 not to itself reject an application because of the</p> <p>19 appropriated nature of the Lower Rio Grande, that in any</p> <p>20 event anybody who wanted to protest a new appropriation</p> <p>21 or a permit would have a forum to do so by initiating a</p> <p>22 protest proceeding at the Office of the State Engineer?</p> <p>23 A. Yes, sir. That would be correct. However,</p> <p>24 the application would first need to be advertised and</p> <p>25 keeping with due process. In this instance, regarding</p>	1426	<p>1 So in the interest of water use harmony, for</p> <p>2 lack of a better term, I would advocate for interagency</p> <p>3 collaboration, coordination, such that if a protest</p> <p>4 proceeding is entirely unavoidable, we at least go into</p> <p>5 it understanding some basic boundaries and what the</p> <p>6 framework looks like.</p> <p>7 Q. And in reference to Exhibit 8, which is the</p> <p>8 1999 letter of understanding, would you agree with me</p> <p>9 that that is basically a document that encourages</p> <p>10 coordination but does not necessarily drive a particular</p> <p>11 result of the coordination that's advocated in this</p> <p>12 letter?</p> <p>13 A. I would not disagree with that</p> <p>14 characterization, and the reason is because my</p> <p>15 recollection was that -- and is that this particular</p> <p>16 understanding came about realizing that there are a</p> <p>17 great number of different circumstances that potentially</p> <p>18 could be encountered such that to become too terribly</p> <p>19 specific with it could lead to it being binding and</p> <p>20 other -- and otherwise with no particular effect. In</p> <p>21 other words, its intent perhaps then would not have been</p> <p>22 achieved.</p> <p>23 Q. And in paragraph A.3 of that document, there's</p> <p>24 discussion of the parties agreeing to establish a task</p> <p>25 force to identify specific areas of concern and to</p>
1425	<p>1 the application that I referred to just a bit ago for a</p> <p>2 new appropriation, to my knowledge, no such</p> <p>3 advertisement has been ordered.</p> <p>4 But I would further offer that -- as suggested</p> <p>5 in my earlier testimony, that it would behoove all</p> <p>6 parties involved to engage in a substitute discussion</p> <p>7 about how such an application could even be considered</p> <p>8 to begin with, and in particular how the impairment</p> <p>9 aspects of that could be handled from an interagency</p> <p>10 perspective.</p> <p>11 And I think again that serves public welfare</p> <p>12 in the context of a much more efficient approach to</p> <p>13 things, Mr. Butzier, because, as I'm sure you're very,</p> <p>14 very well aware, protest proceedings typically tend to</p> <p>15 protract, they typically tend to be expensive, not</p> <p>16 unlike the current proceeding that we're engaged in now,</p> <p>17 except that in the case of water rights-related affairs,</p> <p>18 they have a tendency to find themselves in District</p> <p>19 Court pretty quick.</p> <p>20 And one reason is because we have a general</p> <p>21 stream adjudication that's underway, as you're, I'm</p> <p>22 sure, very well aware, hence the expedited inter se</p> <p>23 nature by which New Mexico Copper's groundwater rights</p> <p>24 have been recognized at least to the partial extent they</p> <p>25 have been in the Lower Rio Grande.</p>	1427	<p>1 develop policies, procedures and guidelines and</p> <p>2 subgroups as necessary to facilitate the parties working</p> <p>3 together in the areas identified.</p> <p>4 Do you see where I'm reading?</p> <p>5 A. Yes, sir, I do.</p> <p>6 Q. I'm curious. Has that continued since 1999?</p> <p>7 Have there been policies, procedures, guidelines,</p> <p>8 subgroups formed, that type of thing, under this</p> <p>9 guidance -- or under this letter of understanding?</p> <p>10 A. With specificity, not to my recollection.</p> <p>11 Again my recollection is that the State Engineer himself</p> <p>12 paid a personal visit and provided some instruction as</p> <p>13 to what his wishes were regarding the understanding, but</p> <p>14 as far as otherwise being, as is contemplated in the</p> <p>15 understanding, a task force or officials otherwise</p> <p>16 organized to further carry out the intent of the</p> <p>17 understanding, if that, in fact, ensued, I was not made</p> <p>18 aware of it or asked to be a part of that -- that group.</p> <p>19 Q. Now, in the -- turning to the two Subfile</p> <p>20 Order and Judgments that are offered -- that were</p> <p>21 offered and admitted as Exhibit 9, those are orders and</p> <p>22 judgments arising from the interstate proceeding that</p> <p>23 you described, presided over by Judge Wechsler, correct?</p> <p>24 A. That is correct.</p> <p>25 Q. And EBID participated in that proceeding; is</p>



<p style="text-align: right;">1428</p> <p>1 that correct?</p> <p>2 A. Not actively.</p> <p>3 Q. Okay.</p> <p>4 And that was -- that was a proceeding that</p> <p>5 adjudicated in advance of adjudicating fully the Lower</p> <p>6 Rio Grande water rights, correct?</p> <p>7 A. That would be one way to characterize it,</p> <p>8 which is to say that inter se is intended to -- and this</p> <p>9 is actually wading into legal interpretation that is a</p> <p>10 bit beyond my expertise, and so with that said and with</p> <p>11 that in mind, I think I should tread carefully, in</p> <p>12 wading into legal matters or terminology that is beyond</p> <p>13 my expertise.</p> <p>14 Q. Fair enough.</p> <p>15 And are you aware that adjudicated in that</p> <p>16 inter se proceeding before Judge Wechsler were a</p> <p>17 combination of different types of rights that were</p> <p>18 claimed by New Mexico Copper, including Mendenhall</p> <p>19 rights and other rights, other water rights?</p> <p>20 A. Correct. That's my understanding.</p> <p>21 Q. And I think your testimony is that some of the</p> <p>22 rights were adjudicated to be valid and other rights</p> <p>23 were not recognized in the inter se proceeding as valid,</p> <p>24 correct?</p> <p>25 A. That would be correct.</p>	<p style="text-align: right;">1430</p> <p>1 effects are ultimately to be offset.</p> <p>2 Q. But your concerns are not that the inter se</p> <p>3 proceeding occurred and that the appeal exists. Your</p> <p>4 concerns are more substantive in nature, that -- are</p> <p>5 concerns that can be expressed and pursued as</p> <p>6 appropriate within the context of those other</p> <p>7 proceedings.</p> <p>8 A. I think that's a fair characterization.</p> <p>9 Q. Now, I think you indicated -- if I understood</p> <p>10 it correctly, I think you indicated in answer to a</p> <p>11 question from Ms. Barncastle that DP-1840, the Discharge</p> <p>12 Permit in this case, itself authorizes or constitutes an</p> <p>13 appropriation of groundwater.</p> <p>14 Do you recall that?</p> <p>15 A. I recall having testified that there indeed is</p> <p>16 a clear and present relationship.</p> <p>17 Q. But it's not seriously your opinion as a water</p> <p>18 rights administrator that that document issued by the --</p> <p>19 that might be issued by NMED would itself constitute or</p> <p>20 recognize an appropriation of groundwater, is it?</p> <p>21 A. I believe that such an issuance would</p> <p>22 necessarily have to assume that an appropriation of</p> <p>23 water underlies the permit, because otherwise how could</p> <p>24 there be wastewater generated to serve a Discharge</p> <p>25 Permit. But otherwise the Discharge Permit in and of</p>
<p style="text-align: right;">1429</p> <p>1 Q. And the issues in the inter se -- from the</p> <p>2 inter se proceeding are now pending on appeal, correct?</p> <p>3 A. That is my understanding.</p> <p>4 Q. And you don't have any concern about the</p> <p>5 legality of what New Mexico Copper is pursuing through</p> <p>6 both the inter se proceeding and the appeal that's</p> <p>7 pending?</p> <p>8 MS. BARNCASTLE: Objection. I'd like some</p> <p>9 clarification.</p> <p>10 When he says you, does he mean Mr. Fuchs, or</p> <p>11 does he mean the Elephant Butte Irrigation District?</p> <p>12 MR. BUTZIER: That's a very good</p> <p>13 clarification. I do mean the Elephant Butte Irrigation</p> <p>14 District.</p> <p>15 MS. ORTH: Yes.</p> <p>16 MR. FUCHS: Well, to the extent that we are</p> <p>17 contemplating really rather junior claims to groundwater</p> <p>18 in this instance, and to the extent that the inchoate or</p> <p>19 Mendenhall component of this is to be the subject of</p> <p>20 appeal, then I think I would have to say, as the</p> <p>21 groundwater resources manager for Elephant Butte</p> <p>22 Irrigation District, that indeed the district does have</p> <p>23 great concern, getting back again to my point about the</p> <p>24 fully appropriated nature of the system and, as I</p> <p>25 believe Dr. King testified earlier, how it is that such</p>	<p style="text-align: right;">1431</p> <p>1 itself is not, for example, an application for permit to</p> <p>2 appropriate water.</p> <p>3 Q. Now, I think you alluded to, although maybe</p> <p>4 not by name, the hypothetical possibility of an</p> <p>5 interbasin transfer.</p> <p>6 Did you -- do you recall that?</p> <p>7 A. Yes.</p> <p>8 Q. And I think your testimony was that's not</p> <p>9 likely to be accepted by the Office of the State</p> <p>10 Engineer, correct?</p> <p>11 A. I think that it would be rather complicated</p> <p>12 and that there would be a number of significant</p> <p>13 technical considerations to explore and evaluate. But</p> <p>14 that's not to suggest or say that it is impossible.</p> <p>15 For example, Dr. King in his testimony</p> <p>16 suggested that perhaps native Rio Grande water, such as</p> <p>17 originating from the Middle Rio Grande Conservancy</p> <p>18 District, might be something to have a look at. That</p> <p>19 again is not to suggest that there are not inherent</p> <p>20 complications associated with something like that.</p> <p>21 All I am suggesting, Mr. Butzier, is that I</p> <p>22 think the OSE would have a lot to think about -- or</p> <p>23 necessarily should have a lot to think about, explore,</p> <p>24 contemplate and communicate to the extent such a</p> <p>25 proposal were put forth.</p>

1432	<p>1 Q. And that would all be vetted within the</p> <p>2 context of an application to have an interbasin transfer</p> <p>3 of water rights, correct? And that would occur before</p> <p>4 the OSE?</p> <p>5 A. It could. And if that were the case, indeed</p> <p>6 it would. But that is not to say that it in any way</p> <p>7 precludes an interagency collaboration or even informal</p> <p>8 gathering of folks qualified otherwise interested to</p> <p>9 discuss such possibility.</p> <p>10 Q. Now, it's also the case in a -- in a closed</p> <p>11 basin scenario that somebody could acquire water rights</p> <p>12 or retire water rights from one location and transfer</p> <p>13 the place and purpose of use to another location,</p> <p>14 correct?</p> <p>15 A. That is correct.</p> <p>16 Q. And that also would trigger a process before</p> <p>17 the Office of the State Engineer in which impairment and</p> <p>18 other considerations that you've addressed today would</p> <p>19 be fully vetted, correct?</p> <p>20 A. It should, because again in the context of due</p> <p>21 process and advertisement as required by law, that</p> <p>22 indeed interested parties would be provided the</p> <p>23 opportunity to bring protest if they so chose.</p> <p>24 Q. Okay.</p> <p>25 And I want to talk for -- finally --</p>	1434	<p>1 perspective.</p> <p>2 A. Well, could you repeat that question but from</p> <p>3 a technical perspective?</p> <p>4 Q. My question is --</p> <p>5 A. I don't mean to be short at all, but I just</p> <p>6 want to be clear on the question.</p> <p>7 Q. Sure.</p> <p>8 My question is is it technically the case that</p> <p>9 a depletion or an impact to water supply is the same as</p> <p>10 an impairment for purposes of OSE-related</p> <p>11 considerations?</p> <p>12 MS. BARNCASTLE: I'll object and ask for</p> <p>13 clarification.</p> <p>14 Are we talking about generally or in the Lower</p> <p>15 Rio Grande Basin?</p> <p>16 MR. BUTZIER: Generally.</p> <p>17 MR. FUCHS: Well, not necessarily. You know,</p> <p>18 you would have to characterize the impact, and indeed</p> <p>19 there are impacts that are considered to be de minimus</p> <p>20 but that might otherwise qualify as impairment.</p> <p>21 For example, a strict interpretation of any</p> <p>22 new appropriation of water in a fully or</p> <p>23 overappropriated stream system would necessarily be</p> <p>24 impairment.</p> <p>25 And the reason is because while you're taking</p>
1433	<p>1 Because I know that we wanted to take a break,</p> <p>2 right? That --</p> <p>3 MS. BARNCASTLE: I would say we should</p> <p>4 probably just finish with this witness.</p> <p>5 MR. BUTZIER: Okay. Very good.</p> <p>6 Q. Finally, I want to talk a little bit more</p> <p>7 about impairment. We've talked in this proceeding about</p> <p>8 depletions, we've talked about impacts. I think you</p> <p>9 yourself have talked about impacts projected by some of</p> <p>10 the Probable Hydrologic Consequences or Jones and Finch</p> <p>11 reports from 2014 and amendments thereto.</p> <p>12 And my question is isn't it the case that</p> <p>13 depletion and impact in a water supply sense is not</p> <p>14 necessarily the equivalent or there's not an equivalency</p> <p>15 between that and the legal notion of impairment as that</p> <p>16 issue comes up in OSE proceedings?</p> <p>17 A. Well, to the extent, Mr. Butzier, that you may</p> <p>18 be seeking a legal opinion on that matter, I think I</p> <p>19 would defer to legal counsel. I could, however,</p> <p>20 contemplate that from a technical perspective, but I'm</p> <p>21 not sure that that's what you're asking.</p> <p>22 Q. Let's go ahead and ask it from a technical</p> <p>23 perspective.</p> <p>24 A. Well, why don't you do that, then.</p> <p>25 Q. Okay. Same question from a technical</p>	1435	<p>1 somebody else's water, you necessarily would be, you</p> <p>2 know, having to do that, but there indeed are instances</p> <p>3 where, for example, simple -- they used to be simple,</p> <p>4 they're not so much anymore -- but what I refer to as</p> <p>5 72-12-1, just in reference to the statutory authority</p> <p>6 that permits for such, that domestic and/or livestock</p> <p>7 wells that are routinely and regularly permitted in an</p> <p>8 otherwise fully appropriated system and are not</p> <p>9 considered to be the subject of impairment per se, but</p> <p>10 certainly could and would be the subject of priority</p> <p>11 administration if, in fact a priority call were brought</p> <p>12 about on such a system.</p> <p>13 And if that indeed were the case, well, then,</p> <p>14 these inherently junior simple domestic and/or stock</p> <p>15 wells, if you will, principally domestic, and especially</p> <p>16 those that are intended to serve, say, minor subdivision</p> <p>17 and related types of activities, would be among the</p> <p>18 first, of course, subject to curtailment, but that</p> <p>19 otherwise would be considered and have been</p> <p>20 traditionally considered to be de minimus, at least as</p> <p>21 they were originally intended in more rural settings.</p> <p>22 So I wonder if that might perhaps help with</p> <p>23 your question, Mr. Butzier.</p> <p>24 Q. That does help. Thank you.</p> <p>25 A. Certainly.</p>

1436	<p>1 Q. And isn't it the case that there -- that the</p> <p>2 OSE decisions are replete with examples of protestations</p> <p>3 of somebody's appropriation or permitting of a water</p> <p>4 right where just the -- the impact to the level of</p> <p>5 somebody's well is not found to be an impairment for</p> <p>6 purposes of a protest proceeding before the OSE?</p> <p>7 A. It really depends. I think what you are</p> <p>8 getting at is local impairment, which is to say a --</p> <p>9 borrowing from the example I offered earlier, a proposed</p> <p>10 appropriation or activity results in the lowering, if</p> <p>11 you will, of the water table or the water column</p> <p>12 available to, say, for example, a neighboring well of</p> <p>13 other ownership.</p> <p>14 The question then might be, well, does it</p> <p>15 lower so much that the individual owner of that well and</p> <p>16 associated water right is, in fact, impaired. Maybe,</p> <p>17 maybe not. It would really depend on the circumstances</p> <p>18 at hand.</p> <p>19 Now, if the well essentially dries up or it</p> <p>20 can be reasonably shown or proven via reasonable</p> <p>21 assumptions, whether it be application of an analytical</p> <p>22 method or modeling or otherwise, that, well, yeah, I</p> <p>23 mean, you're going to dry this up, then I think that</p> <p>24 most reasonable people as owners, if you will, of such a</p> <p>25 well and associated groundwater right would tend to</p>	1438	<p>1 correct?</p> <p>2 A. That would be the lead agency appropriate in</p> <p>3 such a matter, but again I would offer that it might</p> <p>4 behoove interested parties to collaborate and explore</p> <p>5 those possibilities well in advance, such that if a</p> <p>6 protest proceeding and further protracted, if you will,</p> <p>7 affairs can be avoided, or perhaps an understanding and</p> <p>8 agreement can be reached at the outset, then that might</p> <p>9 be a very, very good idea.</p> <p>10 We used to encourage that regularly during my</p> <p>11 tenure and charge as the basin supervisor. Didn't</p> <p>12 always work, but --</p> <p>13 Q. Fair enough.</p> <p>14 Now, am I correct that water rights that exist</p> <p>15 within the Lower Rio Grande Basin, unless they have been</p> <p>16 adjudicated pursuant to an inter se proceeding, have not</p> <p>17 yet been quantified? In other words, there's a lot yet</p> <p>18 to be done in the Rio Grande adjudication in order to</p> <p>19 specifically quantify any particular water rights</p> <p>20 holder's rights within that basin?</p> <p>21 MS. BARNCASTLE: I'll object to this question</p> <p>22 on the basis that New Mexico Copper's water rights have</p> <p>23 been fully quantified and those are what the court</p> <p>24 orders reflect.</p> <p>25 MR. BUTZIER: My question wasn't relating to</p>
1437	<p>1 argue, well, yeah, I'm impaired.</p> <p>2 But it gets further complicated because, in my</p> <p>3 experience, if you get into issues of priority and time,</p> <p>4 you know -- for example, say for -- say a proposed</p> <p>5 activity does result in some degree of impairment, of,</p> <p>6 for example, a neighboring well of an ownership, and</p> <p>7 perhaps it can't be argued or shown that, well, yes,</p> <p>8 there is impairment, but there is a substantial lowering</p> <p>9 of the water column otherwise available to that well,</p> <p>10 but it doesn't completely dry up, and they retain some</p> <p>11 degree of recoverable capacity, maybe even enough to</p> <p>12 continue to basically meet the intended purpose of the</p> <p>13 well and water right in question, however, the water</p> <p>14 right and associated means of production of that water</p> <p>15 right, the well in question, is senior to the proposed</p> <p>16 activity, then I think a very good argument would exist,</p> <p>17 certainly also from a technical perspective, that, well,</p> <p>18 then, why should the senior appropriator be impaired in</p> <p>19 any amount, in any way.</p> <p>20 But I think again those are matters that would</p> <p>21 really have to be addressed on a case-by-case basis. It</p> <p>22 would be difficult to provide a blanket catch-all, if</p> <p>23 you will, perspective on that.</p> <p>24 Q. And the proper forum for getting into those</p> <p>25 questions would be the Office of the State Engineer,</p>	1439	<p>1 the court orders. It was more generally talking about</p> <p>2 the Lower Rio Grande, which is some -- is an issue</p> <p>3 that's being raised by EBID itself.</p> <p>4 MS. ORTH: That's how I understood it, as</p> <p>5 well.</p> <p>6 Can you answer the question, Mr. Fuchs?</p> <p>7 MR. FUCHS: I think I can.</p> <p>8 You know, one of the complications associated</p> <p>9 with adjudication proceedings, and one of the reasons</p> <p>10 why stream systems, not just in New Mexico, but</p> <p>11 throughout the West and the Southwest, tend to be loathe</p> <p>12 to pursue them is because you really can't just put on</p> <p>13 hold, if you will, the activities, demands, needs,</p> <p>14 changes, interests or otherwise associated with the</p> <p>15 water use community while you're adjudicating.</p> <p>16 And that's also one of the reasons why, as I</p> <p>17 mentioned earlier, the hydrographic survey in the case</p> <p>18 of the general stream adjudication underway in the Lower</p> <p>19 Rio Grande remains something of a moving target.</p> <p>20 And one of the reasons is because while you</p> <p>21 have adjudication proceedings underway, you also have</p> <p>22 water rights administration and related permitting</p> <p>23 activities underway, such as, for example, a transfer</p> <p>24 type scenario, as you referred to earlier, Mr. Butzier,</p> <p>25 that, well, gee, wouldn't it be convenient if we could</p>

<p style="text-align: right;">1440</p> <p>1 just, you know, push pause and, you know, everybody kind  2 of stop what you're doing, you know, with respect to  3 water use, and let's get this all adjudicated, okay, and  4 get a final decree, and then let's come back to a  5 transfer scenario or replacing a well or drilling a  6 supplemental well, because the water table is lowered or  7 otherwise we need capacity, whatever the case may be,  8 and for whatever the purpose of use it may be.  9 But where I'm going with that, Mr. Butzier, is  10 that the permitting process in and of itself is indeed a  11 quantification activity, and the reason I can say that  12 with some authority is because I did it every day for 12  13 years consecutively even while indeed we had water  14 rights adjudication proceedings underway.  15 So even there a degree of coordination,  16 collaboration and communication within the agency is  17 appropriate, which is to say that the Hydrographic  18 Survey and Adjudication Bureau, if you will, of the OSE  19 and the Water Rights Division and also in many instances  20 the Hydrology Bureau all kind of have to work together  21 to keep the cart moving, so to speak.  22 And in that process, again where a permit is  23 concerned that would reflect an application filed for  24 something, all of those fundamental considerations come  25 into play.</p>	<p style="text-align: right;">1442</p> <p>1 clock, if you will, sort of resets, which is to say,  2 well, okay, it was quantified, adjudicated to begin  3 with, that's wonderful, but if you're changing that,  4 which is to say the place and/or purpose of use in  5 particular, then you subject the right to further  6 scrutiny or a period of uncertainty until you have, in  7 effect, reestablished, if you will, reprove the  8 validity of that right, even though it was adjudicated  9 to begin with.  10 So what I'm trying to get at, Mr. Butzier, is  11 that just because we don't have a final decree yet in  12 the Lower Rio Grande general stream adjudication, and I  13 would offer that we're unlikely to have one for many  14 years to come, is in no way a matter or means by which a  15 prudent administration, prudent communication, prudent  16 collaboration and coordination between and among  17 entities, including certain interagency coordination,  18 shouldn't occur.  19 Q. And the collaboration and cooperation that you  20 described is -- to your knowledge, I assume is not  21 specifically required by any rule and in particular any  22 requirement associated with the discharge permitting  23 program administered by the NMED.  24 MS. BARNCASTLE: I'll object. Mr. Fuchs is  25 not qualified as an expert in anything but water rights</p>
<p style="text-align: right;">1441</p> <p>1 Is the water right valid to begin with? I  2 mean, it's a claim we'll say, merely a declaration.  3 Perhaps it's been adjudicated. Well, that's extremely  4 convenient because then you have a court order that you  5 could work from. If not, then State Engineer and his  6 staff have -- ultimately make a determination.  7 Sometimes that determination is indeed not to  8 the liking of the applicant, and in those instances,  9 well, the applicant has the option to grieve that action  10 by the State Engineer, ask that it be set aside and  11 pursue an administrative hearing, not terribly unlike  12 what we're doing here today.  13 My point being is that in that process there  14 is a quantification that occurs from a legal  15 perspective, and while I am not going to attempt to  16 testify from a legal perspective, I would offer, though,  17 that the way that the permit having reflected due  18 process and the technical review associated with  19 administration in and of itself certainly carries  20 considerable consideration for purposes of adjudication.  21 And in fact, there are instances where you can  22 have an adjudicated right to water that then is subject  23 to an administrative activity and application to change  24 some facet of it.  25 Now, to the extent that occurs, then the</p>	<p style="text-align: right;">1443</p> <p>1 administration, and so his knowledge of the NMED  2 regulations is calling for a legal conclusion that I'm  3 guessing is going to be speculation on his part.  4 MS. ORTH: Okay. I think he can answer as to  5 whether he's aware of a requirement.  6 And if you don't know, obviously, that's a  7 perfectly legitimate answer.  8 MR. FUCHS: What I know is that there really  9 isn't any hard and fast requirement that anybody  10 collaborate, work together and attempt to get along,  11 share information or otherwise.  12 But what I am suggesting, as strongly as I  13 know how, and as I believe the letter of understanding  14 that former State Engineer Tom Turney and former  15 Secretary of Environment Maggiore came to agree on, was  16 that we do need to work together.  17 But is it a statutory requirement? I don't  18 think so. I mean, I don't see a reference to statutory  19 direction to do that. I am simply suggesting that it  20 really would be a good idea to do so and that this is  21 not the first time that such a suggestion has been made  22 between the agencies of the NMED and OSE.  23 Q. (BY MR. BUTZIER) And would you agree with me  24 that since many of the challenges -- water  25 rights-related challenges facing New Mexico Copper are</p>

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1 challenges that are ongoing and will be ongoing into the  
 2 future for some time that -- would you agree with me  
 3 that that kind of collaboration and cooperation that  
 4 you've described is something that could occur hereafter  
 5 and is not dependent upon whether or not a DP-1840  
 6 Discharge Permit is issued?  
 7 A. I think that --  
 8 MS. BARNCASTLE: I'll object also in that it  
 9 calls for a legal conclusion.  
 10 MS. ORTH: All right.  
 11 And again, Mr. Fuchs, I'm not -- I'm aware  
 12 that you're not a lawyer so -- and I think you've done  
 13 a --  
 14 MR. KING: Thank God.  
 15 MS. ORTH: I think you've done a good job so  
 16 far of distinguishing the opinions you're holding as a  
 17 water resource administrator from the opinion you might  
 18 hold as a lawyer.  
 19 So if you can answer the question, please go  
 20 ahead.  
 21 MR. FUCHS: Maybe you should restate it,  
 22 Mr. Butzier.  
 23 MR. BUTZIER: Could we have it reread, Cheryl?  
 24 MS. BARNCASTLE: I might ask -- this has gone  
 25 substantially longer than I expected.

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1 MR. BUTZIER: This is my last question.  
 2 MS. BARNCASTLE: Okay. I need to get out to  
 3 my car soon.  
 4 MS. ORTH: Okay.  
 5 THE REPORTER: "And would you agree with me  
 6 that since many of the challenges -- water  
 7 rights-related challenges facing New Mexico Copper are  
 8 challenges that are ongoing and will be ongoing into the  
 9 future for some time that -- would you agree with me  
 10 that that kind of collaboration and cooperation that  
 11 you've described is something that could occur hereafter  
 12 and is not dependent upon whether or not a DP-1840  
 13 Discharge Permit is issued?"  
 14 MR. FUCHS: That's an eloquent question,  
 15 Mr. Butzier, well said.  
 16 Again I would come back to the recommendation  
 17 that certainly I think it would have been prudent, you  
 18 know, had there been further collaboration, coordination  
 19 with OSE prior to these proceedings. I think it is to  
 20 the credit of the NMED that they have indeed recognized  
 21 and modified the proposed DP-1840 to reflect that, well,  
 22 yes, coordination with the OSE Dam Safety Bureau makes a  
 23 lot of sense here, therefore there is a condition in the  
 24 permit that reflects that.  
 25 I am recommending that a very similar

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1 condition occur but with respect to the Water Rights  
 2 Division of the OSE.  
 3 And to answer Mr. Butzier's question, I cannot  
 4 see any particular reason why the communication,  
 5 coordination, collaboration or otherwise that you're  
 6 referring to could not indeed occur.  
 7 MR. BUTZIER: That's all the questions I have.  
 8 Sorry.  
 9 MS. ORTH: Oh.  
 10 Did you finish your answer?  
 11 MR. FUCHS: I think so.  
 12 MR. BUTZIER: That's all the questions I have.  
 13 Thank you.  
 14 MS. ORTH: All right. Thank you.  
 15 We'll take 20 minutes.  
 16 (Proceedings in recess from 11:19 a.m. to  
 17 11:40 a.m.)  
 18 MS. ORTH: Okay. We are back after a break.  
 19 Mr. Knight, do you have questions --  
 20 MR. KNIGHT: I do.  
 21 MS. ORTH: -- of Mr. Fuchs?  
 22 MR. KNIGHT: I do.  
 23  
 24  
 25

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1 CROSS EXAMINATION  
 2 BY MR. KNIGHT:  
 3 Q. Good morning, Mr. Fuchs.  
 4 A. Yeah. It's Mr. Fuchs, like F-O-X but spelled  
 5 F-U-C-H-S.  
 6 Q. Okay. I believe that's what I said.  
 7 A. Oh, okay. Very good. Thank you.  
 8 Q. Mr. Fuchs, are you aware that there was a  
 9 cooperating agency process for six to seven years before  
 10 today's hearing involving the Environment Department,  
 11 the Office of the State Engineer, Mining and Minerals  
 12 Division and the Bureau of Land Management?  
 13 MS. BARNCASTLE: Objection, foundation.  
 14 MS. ORTH: Is he aware that that occurred?  
 15 MS. BARNCASTLE: Well, I guess the objection  
 16 goes to there's no evidence in the record to suggest  
 17 that the evidence in the record was much more limited  
 18 than that.  
 19 MR. KNIGHT: Mr. Vollbrecht testified to the  
 20 cooperating agency meetings and referenced those in his  
 21 testimony.  
 22 MS. ORTH: Right. That's what I heard.  
 23 MS. BARNCASTLE: Understood. And I'll make  
 24 this a continuing objection, then, because my  
 25 understanding of the testimony was that OSE was only

1448	<p>1 nominally involved.</p> <p>2 MS. ORTH: Okay. Well, he can explore</p> <p>3 Mr. Fuchs' knowledge of that.</p> <p>4 Go ahead, Mr. Knight.</p> <p>5 MR. KNIGHT: Thank you.</p> <p>6 Q. Well, I guess we -- can you go ahead and</p> <p>7 answer the question?</p> <p>8 MS. ORTH: Go ahead.</p> <p>9 MR. FUCHS: Yes. I am aware that there was a</p> <p>10 cooperating agency agreement. I think that was specific</p> <p>11 to the Draft EIS process that was underway, and I did</p> <p>12 see some E-mail correspondence and related exchange in</p> <p>13 the limited material that was made available to me that</p> <p>14 reflected the involvement of the parties that you just</p> <p>15 mentioned.</p> <p>16 Q. (BY MR. KNIGHT) And I take it that you were</p> <p>17 not present or did not participate in any of those</p> <p>18 cooperating agency meetings?</p> <p>19 A. I don't believe the EBID was invited or</p> <p>20 offered to participate as a cooperating agency. So no.</p> <p>21 Q. So you would have -- you have no personal</p> <p>22 knowledge and thus no basis to testify about the extent</p> <p>23 of cooperation or coordination between the Office of the</p> <p>24 State Engineer and the New Mexico Environment Department</p> <p>25 in the six or seven years leading up to today's hearing.</p>	1450	<p>1 You testified earlier that when the Office of</p> <p>2 the State Engineer reviews a water rights permit</p> <p>3 application the office looks at conservation of water,</p> <p>4 public welfare and impairment of other water rights,</p> <p>5 correct?</p> <p>6 A. Those are the principal considerations. In</p> <p>7 addition to that certainly would be whether or not</p> <p>8 there's water available to appropriate to begin with,</p> <p>9 but it largely depends on the application itself.</p> <p>10 Q. Okay.</p> <p>11 But those three things is what this -- the</p> <p>12 Office of the State Engineer would look at for an</p> <p>13 application regardless whether it's a new appropriation</p> <p>14 or an application to change the place or purpose of use</p> <p>15 or to change the place of diversion of the water rights?</p> <p>16 A. Principally, that's correct.</p> <p>17 Q. Okay.</p> <p>18 And when the Office of the State Engineer</p> <p>19 reviews an application, it doesn't normally look at</p> <p>20 effects on ecology, for example, ecosystems or wildlife,</p> <p>21 except perhaps for threatened or endangered species; is</p> <p>22 that correct?</p> <p>23 A. That is correct. In my tenure and experience,</p> <p>24 those were considerations that were not the subject of</p> <p>25 anything that the OSE could or would seek to quantify.</p>
1449	<p>1 A. Other than the E-mail exchange that I saw in</p> <p>2 the record, no, I did not have personal involvement.</p> <p>3 Q. Are you aware that the Office of the State</p> <p>4 Engineer did provide fairly extensive comments to the</p> <p>5 Bureau of Land Management during the NEPA process for</p> <p>6 the Copper Flat Mine?</p> <p>7 A. I think again that refers to the Draft EIS.</p> <p>8 Is that correct? Is that what you're</p> <p>9 referring to?</p> <p>10 Q. I'm referring to the entire NEPA process, but</p> <p>11 yes.</p> <p>12 A. I believe that there was some involvement, the</p> <p>13 extent to which I'm not personally knowledgeable of.</p> <p>14 MR. KNIGHT: That's all the questions I have.</p> <p>15 Thanks.</p> <p>16 MS. ORTH: All right. Thank you.</p> <p>17 Mr. de Saillan.</p> <p>18 MR. DE SAILLAN: Yes. I have just a few</p> <p>19 questions.</p> <p>20 CROSS EXAMINATION</p> <p>21 BY MR. DE SAILLAN:</p> <p>22 Q. Good morning, Mr. Fuchs.</p> <p>23 A. Good morning.</p> <p>24 Q. I just have -- like I said, just a few</p> <p>25 questions.</p>	1451	<p>1 So no.</p> <p>2 Q. Right.</p> <p>3 And then the document that is marked as EBID</p> <p>4 Exhibit 10, which is the Mesilla Valley guidelines,</p> <p>5 doesn't provide for consideration of those issues, does</p> <p>6 it?</p> <p>7 A. No, sir, it does not.</p> <p>8 MR. DE SAILLAN: Okay. Thank you.</p> <p>9 That's all the questions I have.</p> <p>10 MS. ORTH: Thank you.</p> <p>11 Is there anyone else present who has questions</p> <p>12 of Mr. Fuchs based on his testimony?</p> <p>13 No?</p> <p>14 Ms. Barncastle, do you have any follow-up?</p> <p>15 MS. BARNCASTLE: Briefly.</p> <p>16 REDIRECT EXAMINATION</p> <p>17 BY MS. BARNCASTLE:</p> <p>18 Q. Mr. Fuchs, you received several questions from</p> <p>19 Mr. Butzier about whether the public or protestants</p> <p>20 would have an adequate venue through the Office of the</p> <p>21 State Engineer to protest the water rights application.</p> <p>22 Do you recall -- the pending water rights</p> <p>23 application for a new appropriation.</p> <p>24 Do you recall those questions?</p> <p>25 A. I do.</p>

<p style="text-align: right;">1452</p> <p>1 Q. And you said that yes, but the application  2 would first need to be advertised before public  3 participation could be invited; is that correct?  4 A. Yes. That would be correct. For it to be a  5 formal, if you will, and a substituted engagement, yes.  6 Q. Is there a risk that this particular  7 application will not be advertised because it is one for  8 a temporary appropriation?  9 A. I have seen a couple of instances where such  10 has occurred, but the application in question that I  11 recall was the subject of or couched as a lease, and the  12 attempt indeed had been made to postpone essentially  13 indefinitely advertisement, and that did result in some  14 problems.  15 So I think it is fair to be concerned that it  16 may be indefinite as to when or if formal advertisement  17 would be ordered in this case or if it is going to be in  18 the foreseeable future.  19 Q. So it is possible that OSE could decide not to  20 advertise this application to the public.  21 A. That is possible, or perhaps postpone it  22 indefinitely. I would think that to be highly  23 problematic, but, you know, in terms of the State  24 Engineer's discretion or guidance to his -- or  25 instruction, rather, to his staff at this juncture, I --</p>	<p style="text-align: right;">1454</p> <p>1 Q. Now, you were also asked about whether EBID's  2 concerns related to the junior nature of the water  3 rights claimed by New Mexico Copper Corporation could be  4 adequately raised in other forums, to which you answered  5 yes; is that correct?  6 A. Yes.  7 Q. One such other forum would be the Texas versus  8 New Mexico Supreme Court case; is that right?  9 A. Yes. I believe that it would be.  10 Q. And you also received several questions about  11 the letter of understanding and specifically that it  12 does not drive a particular result.  13 Do you recall that question?  14 A. I recall.  15 Q. In your opinion with what's at risk for the  16 State of New Mexico and Texas versus New Mexico Supreme  17 Court case, isn't it advisable to encourage agency  18 coordination within New Mexico at all levels and within  19 all permitting?  20 A. I -- I believe that my testimony thus far has  21 in several instances sought to encourage precisely that.  22 Q. Can you think of a better project than this  23 one in which the type of agency coordination EBID is  24 advocating for would be applicable?  25 A. Oh. Not offhand. This one would be right up</p>
<p style="text-align: right;">1453</p> <p>1 I can't speak to that. So it is possible.  2 Q. Would a temporary appropriation take care of  3 the longer-term offset requirement to alleviate the  4 impacts on the Rio Grande Project?  5 A. Well, it depends on what you mean by  6 temporary. You know, an appropriation -- and it depends  7 also on the magnitude of it, you know --  8 Q. Well, what I'm referring to specifically is  9 the temporary lease application that's currently pending  10 before the Office of the State Engineer in the form of  11 an application that was submitted by New Mexico Copper  12 Corporation.  13 A. Well, that is an application, of course, for a  14 brand new appropriation, and as I understand it, there  15 is contemplated a lease for offset purposes, as Dr. King  16 testified to, that would in effect be a companion  17 effort, if you will. I would think that to also have to  18 be the subject of a formal application, but to my  19 knowledge, no such application has occurred.  20 But in terms of the impact, or if you want to  21 characterize it more specifically as longer-term  22 depletion, to the extent that the appropriation is  23 contemplated for -- I believe it's 12-some-odd years I  24 think is pretty clear that the effects will persist for  25 much, much longer thereafter.</p>	<p style="text-align: right;">1455</p> <p>1 there near the top.  2 MS. BARNCASTLE: Thank you.  3 I have nothing further.  4 MS. ORTH: All right. Thank you.  5 Any reason not to excuse Mr. Fuchs?  6 No?  7 Thank you very much, Mr. Fuchs.  8 MR. FUCHS: Thank you.  9 MS. BARNCASTLE: Madam Hearing Officer, we  10 have about 10 minutes until noon. I believe I can put  11 my next witness on the stand in -- and be done by about  12 12:30.  13 MS. ORTH: I think that's a good plan. I  14 don't think we need to break at noon.  15 MS. BARNCASTLE: Okay. I'd like to call,  16 then, Mr. Zach Libbin.  17 ZACHARY LIBBIN  18 having been first duly sworn or affirmed, was  19 examined and testified as follows:  20 DIRECT EXAMINATION  21 BY MS. BARNCASTLE:  22 MS. BARNCASTLE: I wanted to retrieve my prior  23 witness' exhibits so that we avoid any unnecessary  24 confusion.  25 Q. Mr. Libbin, please state your full name for</p>

1456	<p>1 the record.</p> <p>2 A. Zachary Lowell Libbin.</p> <p>3 Q. Now, Mr. Libbin, I'd like to start with your</p> <p>4 background and experience.</p> <p>5 Please tell us about your education and work</p> <p>6 experience.</p> <p>7 A. I've earned a bachelor's of science and a</p> <p>8 master's of science in civil engineering, a water</p> <p>9 resources emphasis, from New Mexico State University.</p> <p>10 I've been employed by the Elephant Butte</p> <p>11 Irrigation District since 2010. I'm currently the</p> <p>12 district engineer for EBID and supervise the district's</p> <p>13 engineering department.</p> <p>14 During my time at EBID, I've gained experience</p> <p>15 through the operation and maintenance of EBID's 25 flood</p> <p>16 control dams. I'm responsible for the inspection and</p> <p>17 prioritization of maintenance and quality assurance of</p> <p>18 maintenance of EBID's flood control dams. I oversaw the</p> <p>19 development of EBID's first approved Emergency Action</p> <p>20 Plan. I'm engineer of record for several dam breach</p> <p>21 analysis and flood routing reports in the district's</p> <p>22 Operation and Maintenance Manual.</p> <p>23 I've also participated in many of the -- of</p> <p>24 the training opportunities offered by the Association of</p> <p>25 State Dam Safety Officials.</p>	1458	<p>1 Q. Did you create that document?</p> <p>2 A. I did.</p> <p>3 Q. Is it current?</p> <p>4 A. Yes, ma'am.</p> <p>5 MS. BARNCASTLE: I'd like to move the</p> <p>6 admission of EBID Exhibit 3 into evidence at this time.</p> <p>7 MR. BUTZIER: No objection.</p> <p>8 MR. DE SAILLAN: No objection.</p> <p>9 MR. KNIGHT: No objection.</p> <p>10 MS. ORTH: Exhibit 3 is admitted.</p> <p>11 (Exhibit EBID 3 admitted into evidence.)</p> <p>12 MS. BARNCASTLE: I would also like to tender</p> <p>13 Mr. Libbin as an expert in compliance with Office of the</p> <p>14 State Engineer Dam Safety Bureau regulations pertaining</p> <p>15 to dam safety.</p> <p>16 MR. BUTZIER: No objection.</p> <p>17 MR. DE SAILLAN: No objection.</p> <p>18 MR. KNIGHT: No objection.</p> <p>19 MS. ORTH: He's so recognized.</p> <p>20 MS. BARNCASTLE: Thank you.</p> <p>21 Q. Mr. Libbin, I'd like you to look at what's</p> <p>22 been marked as EBID Exhibit 11.</p> <p>23 Do you recognize that document?</p> <p>24 A. I do. It's the Rules and Regulations</p> <p>25 Governing Dam Design, Construction and Dam Safety.</p>
1457	<p>1 Q. Mr. Libbin, are you familiar with the Office</p> <p>2 of the State Engineer's Dam Safety Bureau regulations?</p> <p>3 A. Yes, ma'am. I'm familiar with the OSE dam</p> <p>4 safety regulations and Dam Safety Bureau nonregulatory</p> <p>5 guidance through EBID's desire to comply with dam safety</p> <p>6 requirements and nonregulatory compliance requirements.</p> <p>7 I am also familiar with the OSE Dam Safety Bureau</p> <p>8 regulations through my work developing dam breach</p> <p>9 analysis, flood routing models and EBID's Operation and</p> <p>10 Maintenance Manual.</p> <p>11 I've been doing work with the Dam Safety</p> <p>12 Bureau through the New Mexico Watershed and Dam Owners</p> <p>13 Coalition and the South Central New Mexico Stormwater</p> <p>14 Management Coalition. My work and leadership of these</p> <p>15 coalitions of dam owners has given me the opportunity to</p> <p>16 work cooperatively with many area dam owners to address</p> <p>17 dam risk and compliance issues.</p> <p>18 Q. Mr. Libbin, do you consider yourself an expert</p> <p>19 in the area of compliance with the Office of the State</p> <p>20 Engineer regulations pertaining to dam safety?</p> <p>21 A. I do.</p> <p>22 Q. I'd like you to look now at what's been marked</p> <p>23 as EBID Exhibit Number 3.</p> <p>24 Do you recognize that document?</p> <p>25 A. Yes, ma'am. That's my resume.</p>	1459	<p>1 Q. Are you familiar with the contents of that</p> <p>2 document?</p> <p>3 A. Yes, ma'am, I am.</p> <p>4 MS. BARNCASTLE: Madam Hearing Officer, we</p> <p>5 could go into some detail to lay foundation, but I'm</p> <p>6 going to instead try to move the admission of Exhibit 11</p> <p>7 at this time. We've already had substantial testimony</p> <p>8 regarding the Dam Safety Bureau regulations. I simply</p> <p>9 want to put them in the record at this point.</p> <p>10 MS. ORTH: All right.</p> <p>11 MR. BUTZIER: No objection, and I would note</p> <p>12 that we also already have admitted this through our</p> <p>13 exhibits.</p> <p>14 MS. ORTH: All right. For convenience, it</p> <p>15 might be best to have them reflected as EBID Exhibit 11,</p> <p>16 as well.</p> <p>17 Any objection?</p> <p>18 MR. DE SAILLAN: No objection.</p> <p>19 MR. KNIGHT: No objection.</p> <p>20 MS. ORTH: All right. It's admitted.</p> <p>21 (Exhibit EBID 11 admitted into evidence.)</p> <p>22 MS. BARNCASTLE: Just for clarification, was</p> <p>23 this a separate exhibit that you admitted, or was it</p> <p>24 solely within one of the PowerPoints, Mr. Butzier?</p> <p>25 MR. BUTZIER: I believe it was one of the</p>



1460	<p>1 exhibits offered in connection with Mr. David Kidd. And</p> <p>2 if you give me a minute, I can tell you the exact number</p> <p>3 of the exhibit.</p> <p>4 MS. BARNCASTLE: I must have missed that, but</p> <p>5 certainly I didn't object at the time so no big deal.</p> <p>6 Thank you.</p> <p>7 MR. BUTZIER: Sure.</p> <p>8 Q. (BY MS. BARNCASTLE) Mr. Libbin, would you</p> <p>9 tell us what a jurisdictional dam is.</p> <p>10 A. A jurisdictional dam, as Mr. Kidd explained,</p> <p>11 is a dam that falls under the regulation of the Dam</p> <p>12 Safety Bureau. These dam safety regulations provide</p> <p>13 specific height and capacity requirements and make a dam</p> <p>14 jurisdictional.</p> <p>15 Specifically 19.25.12.7D.(1)(a) of NMAC</p> <p>16 explains that a dam 25 feet or taller which impounds</p> <p>17 more than 15 acre-feet of water or a dam that impounds</p> <p>18 50 acre-feet of water or -- or more and is six feet or</p> <p>19 taller makes a dam fall under the Dam Safety Bureau</p> <p>20 regulations.</p> <p>21 Q. Now, did you review anything in preparation</p> <p>22 for your opinions that you're going to provide today?</p> <p>23 A. I did. I reviewed pertinent parts of the</p> <p>24 Bates index records, including the 2016 Tailing Storage</p> <p>25 Facility Feasibility Study by Golder Associates and the</p>
1461	<p>1 2010 Conceptual Design.</p> <p>2 Q. And based on those documents that you</p> <p>3 reviewed, did you come to the conclusion that this would</p> <p>4 be a jurisdictional dam?</p> <p>5 A. Yes, I did.</p> <p>6 Q. And by this, I mean the New Mexico Copper</p> <p>7 Corporation's tailing storage facility dam?</p> <p>8 A. Based on the feasibility design, yes, ma'am.</p> <p>9 Q. So because this is a jurisdictional dam, this</p> <p>10 means that this dam would be subject to the Office of</p> <p>11 the State Engineer's regulations?</p> <p>12 A. Yes, ma'am.</p> <p>13 Q. Okay.</p> <p>14 And do you agree with Mr. Kidd's presentation</p> <p>15 regarding the potential classification for this dam?</p> <p>16 MR. BUTZIER: Madam Hearing Officer, I'll</p> <p>17 object. I do think we might be missing a foundation for</p> <p>18 that question.</p> <p>19 MS. ORTH: Would you like to lay some</p> <p>20 foundation?</p> <p>21 MS. BARNCASTLE: You know, I'm trying to do</p> <p>22 both a direct and rebuttal while leaving out information</p> <p>23 that Mr. Kidd's already covered. So I guess what I'll</p> <p>24 do is risk the objections and go right straight from the</p> <p>25 top and just lay all the excruciating foundation.</p>
1462	<p>1 Q. Which regulations are most pertinent to this</p> <p>2 project, Mr. Libbin?</p> <p>3 A. 19.25.12.11 of NMAC provides requirements that</p> <p>4 will apply to the design of any dam, including the</p> <p>5 tailings storage facility required by New Mexico</p> <p>6 Corporation Copper Flat.</p> <p>7 Q. And what will the Office of the State Engineer</p> <p>8 Dam Safety Bureau require of this project before a</p> <p>9 permit is granted?</p> <p>10 A. Well, first of all, the Copper Flat will</p> <p>11 require a permit to construct and operate the dam. This</p> <p>12 19.25.12.11 describes requirements for design of a dam.</p> <p>13 It explains that anyone who is intending to construct a</p> <p>14 dam shall submit an application with some supporting</p> <p>15 documentation acceptable to the State Engineer.</p> <p>16 This section primarily addresses the design</p> <p>17 and construction of abatement dams, but it clarifies</p> <p>18 that other types of dams shall conform to sound</p> <p>19 engineering practices, principles and current state of</p> <p>20 practice.</p> <p>21 Quoting, it states the construction shall not</p> <p>22 begin until State Engineer has accepted the supporting</p> <p>23 documentation and approved the application with permit</p> <p>24 conditions. The application and supporting</p> <p>25 documentation shall include the application,</p>
1463	<p>1 documentation of water right, design report that</p> <p>2 includes hazard potential documentation by a dam breach</p> <p>3 and flood routing analysis, hydraulic analysis, spillway</p> <p>4 design, outlet design, geological assessment,</p> <p>5 geotechnical assessment, seepage and interior drainage</p> <p>6 assessment, stability analysis, seismic design analysis,</p> <p>7 dam geometry, erosion protection, structural design,</p> <p>8 construction drawings, construction specifications,</p> <p>9 survey, dam site security plan, an instrumentation plan,</p> <p>10 operation and maintenance manual and emergency action</p> <p>11 plan which also requires a dam breach and flood routing</p> <p>12 analysis.</p> <p>13 Q. And what of that punch list that you just went</p> <p>14 through do we have currently from New Mexico Copper</p> <p>15 Corporation?</p> <p>16 A. I'm going to -- I guess I'm going to say that</p> <p>17 I don't think we have any of that. A feasibility level</p> <p>18 design isn't -- isn't in the state that would be ready</p> <p>19 to submit any of these pieces to the Dam Safety Bureau.</p> <p>20 Q. Should the complete design and all of the</p> <p>21 items on that punch list be considered by NMED?</p> <p>22 MR. BUTZIER: Objection, calls for legal</p> <p>23 conclusion.</p> <p>24 MS. ORTH: Mr. Libbin, can you answer the</p> <p>25 question without drawing a legal conclusion?</p>

1464	<p>1 MR. LIBBIN: I think I can.</p> <p>2 MS. ORTH: Okay. Go ahead.</p> <p>3 MR. LIBBIN: The OSE Dam Safety Bureau is</p> <p>4 specifically concerned with the safety of the dam and</p> <p>5 the risk of life and property downstream related to the</p> <p>6 dam. The Office of the State Engineer and the Dam</p> <p>7 Safety Bureau will have their own requirements specific</p> <p>8 to the dam structure and the safety of the dam.</p> <p>9 Potentially these requirements could make the dam look</p> <p>10 different in the end than what has been reviewed by the</p> <p>11 Environment Department.</p> <p>12 The diversion channels in the Grayback Arroyo</p> <p>13 need to be analyzed for the same design storm as the</p> <p>14 tailings dam to ensure that these channels cannot</p> <p>15 overtop if such an event occurred within the</p> <p>16 contributing area.</p> <p>17 If a storm exceeded the capacity of the</p> <p>18 diversion channels, the Grayback Arroyo run-on could</p> <p>19 contribute to the -- to the dam, in addition to the</p> <p>20 direct precipitation of the event. The capacity of the</p> <p>21 dam could be exceeded. If the capacity of the dam were</p> <p>22 exceeded, it could potentially overflow or breach,</p> <p>23 sending tailings downstream.</p> <p>24 So I don't know what the Dam Safety Bureau</p> <p>25 will require, but it would be prudent to have their</p>	1466	<p>1 and environmental damage that's likely to occur in the</p> <p>2 event of a failure.</p> <p>3 A dam breach analysis includes the potential</p> <p>4 failure modes and includes the -- the flood routing</p> <p>5 where the water will go.</p> <p>6 Q. So in other words, you would assume that the</p> <p>7 dam is full, breach it and then see where the water</p> <p>8 flows from there.</p> <p>9 A. Specifically you determine the worst case</p> <p>10 scenario for -- for that, whether it's piping or</p> <p>11 overtopping or what the worst case conditions would be,</p> <p>12 and then model that.</p> <p>13 Q. Let's move on now to classifications of the</p> <p>14 dam.</p> <p>15 What are the potential classifications for</p> <p>16 this type of jurisdictional dam?</p> <p>17 And I mean the Copper Flat tailing storage</p> <p>18 facility dam.</p> <p>19 A. I will try to avoid overlap of testimony so</p> <p>20 I'll be brief.</p> <p>21 19.25.12.10 of NMAC explains that the hazard</p> <p>22 potential classification is a rating for a dam based on</p> <p>23 the potential consequences of failure. The rating is</p> <p>24 based on loss of life, damage to property and</p> <p>25 environmental damage that is likely to occur in the</p>
1465	<p>1 acknowledgment of the design, in my opinion, prior to</p> <p>2 the permitting of the groundwater discharge.</p> <p>3 Q. (BY MS. BARNCASTLE) Is it possible, for</p> <p>4 example, that Dam Safety Bureau could require</p> <p>5 construction of the dam -- the tailings storage facility</p> <p>6 dam without a liner?</p> <p>7 A. Again I don't know what the Dam Safety Bureau</p> <p>8 will require, but no doubt they'll have extensive</p> <p>9 comments and scrutiny. Again I don't know what they'll</p> <p>10 require, but certainly the dam could potentially end up</p> <p>11 different, even significantly different than the</p> <p>12 feasibility design submitted to the Dam Safety Bureau --</p> <p>13 I mean to the NMED. I apologize. My understanding is</p> <p>14 it has not been submitted to the Dam Safety Bureau.</p> <p>15 Q. So let's talk a little bit about a dam breach</p> <p>16 analysis.</p> <p>17 What is a dam breach analysis?</p> <p>18 A. A dam breach analysis -- and that -- a dam</p> <p>19 breach analysis leads to a flood routing model, which is</p> <p>20 important to show where flooding would go in the event</p> <p>21 of a dam failure.</p> <p>22 The -- the flood routing modeling shows</p> <p>23 where -- shows what geographic area has potentially --</p> <p>24 could potentially be impacted by a -- such a failure,</p> <p>25 including the potential loss of life, damage to property</p>	1467	<p>1 event of a dam failure.</p> <p>2 Low hazard potential dams -- summarizing --</p> <p>3 well, Mr. Kidd explained low hazard potential and</p> <p>4 significant hazard potential.</p> <p>5 The only thing I'll add to what he said about</p> <p>6 significant hazard potential is significant hazard</p> <p>7 potential classifications are -- result in -- are not</p> <p>8 likely to result in probable loss of life, but can cause</p> <p>9 economic loss, environmental damage, disruption of</p> <p>10 lifeline facilities or an impact to other concerns.</p> <p>11 High hazard potential dams are likely -- are</p> <p>12 those dams which failure and misoperation will probably</p> <p>13 cause loss of human life.</p> <p>14 Q. Why is the classification of a dam important?</p> <p>15 A. The classification's important because some of</p> <p>16 the design requirements and parameters change based on</p> <p>17 the classification of a dam, the design storm, spillway</p> <p>18 design and a few other design parameters in more extreme</p> <p>19 or high hazard dams than significant hazard dams.</p> <p>20 For example, a dam designed for high hazard</p> <p>21 potential, the spillway must be designed with a capacity</p> <p>22 for the entire probable maximum flood resulting from a</p> <p>23 probable maximum precipitation without exceeding the</p> <p>24 dam's design freeboard, but for significant hazard dams,</p> <p>25 the spillway is only required to have a capacity of</p>

<p style="text-align: right;">1468</p> <p>1 75 percent of this PMF.  2 Q. All right. Why don't you explain to us what a  3 PMP and PMF are that you just referred to.  4 A. PMP stands for probable maximum precipitation.  5 A PMP is the theoretical maximum depth of precipitation  6 for a given duration and given geographic location.  7 The PMF, the probable maximum flood, is the  8 flood that may be expected from the most severe  9 combination of critical meteorological and hydrologic  10 conditions that are reasonably possible in a particular  11 drainage area.  12 Q. Now, back to my question that started all of  13 this, do you agree with Mr. Kidd's assumption of the  14 classification for this jurisdictional dam?  15 MR. BUTZIER: Madam Hearing Officer, I think  16 Ms. Barncastle may have misinterpreted the nature of my  17 objection to foundation.  18 The objection to foundation -- we haven't  19 heard any kind of testimony to indicate that there has  20 been -- that this witness has undertaken any kind of  21 analysis or has familiarized himself with the  22 particulars of the Copper Flat tailings facility in  23 order to be able to offer an opinion as to Mr. Kidd's  24 assumption about the classification that would be  25 appropriate under the dam safety rules.</p>	<p style="text-align: right;">1470</p> <p>1 this particular jurisdictional dam will be?  2 A. No, ma'am. There's not enough information  3 available. No flood routing model or dam breach  4 analysis has been done, as far as I can tell.  5 Q. And OSE could very likely come in and  6 determine that the dam classification is something other  7 than what has been assumed by New Mexico Copper  8 Corporation; is that correct?  9 A. If that's what their modeling showed.  10 Q. Does the design of a dam affect what is  11 discharged?  12 A. Certainly the -- the design of a dam could --  13 could impact the potential discharge to groundwater or  14 otherwise. For example, the liner that's included  15 within the dam is clearly included to -- to impact  16 that -- to have an impact on that discharge, to reduce  17 that discharge. So the design -- this dam constructed  18 with the tailings could have different discharge based  19 on how it was designed.  20 Q. And that, then -- would that be your  21 understanding of why the NMED has now required the Dam  22 Safety Bureau permit to be in place before any  23 construction occurs at Copper Flats, because things  24 could change and look substantially different?  25 A. I don't know if that's my understanding as to</p>
<p style="text-align: right;">1469</p> <p>1 MS. ORTH: All right. I --  2 MS. BARNCASTLE: Madam Hearing Officer.  3 MS. ORTH: Yes.  4 MS. BARNCASTLE: I respectfully disagree. My  5 witness testified specifically that he did review the  6 feasibility designed by Golder Associates and other  7 documents in the record pertinent to the tailing storage  8 facility design.  9 MS. ORTH: Right. I guess I thought I heard  10 that, as well.  11 MR. BUTZIER: And that we would acknowledge,  12 but I don't think just having reviewed some of  13 somebody's feasibility study is sufficient foundation to  14 say that he's willing to opine about it.  15 Now, if he testifies that he's familiar with  16 the area, the floodplain beneath where the tailings dam  17 is proposed and has done some sort of analysis, then  18 maybe. But I still think I would have the same  19 objection.  20 MS. ORTH: All right. So perhaps --  21 MS. BARNCASTLE: Let me ask a different way.  22 MS. ORTH: All right. Go ahead.  23 Q. (BY MS. BARNCASTLE) Mr. Libbin, do you have  24 enough information based on what was provided in the  25 NMED record to determine what the classification for</p>	<p style="text-align: right;">1471</p> <p>1 why they included that condition. Probably the risk to  2 human health and making sure that was addressed is  3 probably why that would be included.  4 My reasoning for arguing that that should be  5 done in advance of the -- of the permit is for the  6 reason that you -- that you mentioned, that following  7 that review and design -- I won't say negotiations, but  8 the comments by the Dam Safety Bureau, their  9 requirements and their permit conditions, the dam could  10 end up looking different than it does in the feasibility  11 study.  12 Q. So the Elephant Butte Irrigation District is  13 not just asking in this situation for a permit condition  14 similar to what's been included, but that the Dam Safety  15 Bureau permit be required prior to the issuance of the  16 Discharge Permit; is that correct?  17 A. It would be my opinion that that would be  18 prudent, to have that condition -- sorry -- to have the  19 permit in place rather than the condition for later  20 approval for that reason, so that the -- so that we can  21 all see -- the Dam Safety Bureau, the NMED can all see  22 what the dam will look like before the groundwater  23 discharge is permitted.  24 Q. Let's talk about emergency response planning  25 now.</p>

1472	<p>1 Why is the dam breach analysis important?</p> <p>2 A. The dam breach analysis is important mostly to</p> <p>3 show what the consequences of a failure will be.</p> <p>4 Whether that's risk to life or risk to the environment,</p> <p>5 the dam breach analysis will show that.</p> <p>6 The emergency action planning would be the</p> <p>7 next step of that. It would help prepare the community</p> <p>8 for -- and the Office of Emergency Management to be</p> <p>9 prepared for such a failure if it were to occur.</p> <p>10 Q. And since that has not been performed, we</p> <p>11 don't know what a flood event from this -- a breach of</p> <p>12 this dam would look like, right?</p> <p>13 A. That is correct.</p> <p>14 Q. We don't know if it would reach five miles</p> <p>15 down the hill or 14 miles to Caballo Reservoir.</p> <p>16 A. That is correct. I have not seen a flood</p> <p>17 routing study that would show that.</p> <p>18 Q. Dr. King testified this morning that an</p> <p>19 Emergency Action Plan should also be in place in the</p> <p>20 event all -- all of the contamination reached Caballo.</p> <p>21 Would you agree with that opinion?</p> <p>22 A. I'm going to -- I'm going to say that that</p> <p>23 would be maybe an additional Emergency Action Plan. I</p> <p>24 think that the dam breach Emergency Action Plan is</p> <p>25 usually mostly specific to -- the concerns of the Office</p>	1474	<p>1 Mr. Butzier?</p> <p>2 MR. BUTZIER: Thank you, Madam Hearing</p> <p>3 Officer.</p> <p>4 CROSS EXAMINATION</p> <p>5 BY MR. BUTZIER:</p> <p>6 Q. I'm trying to make sure I get your name right.</p> <p>7 Mr. Libbin?</p> <p>8 A. Yes, sir.</p> <p>9 Q. Yes. Thank you.</p> <p>10 The hazard classification process under the</p> <p>11 dam safety rules that you've just outlined and that</p> <p>12 Mr. Kidd outlined, the highest classification is the</p> <p>13 hazard to human -- is it hazard to human health, or</p> <p>14 what's the name of the highest classification?</p> <p>15 A. High hazard.</p> <p>16 Q. High hazard.</p> <p>17 That is a -- I apologize for getting, you</p> <p>18 know, very simplistic and fundamental on this, but just</p> <p>19 because a dam has been classified as a high hazard, that</p> <p>20 bears no relationship to whether -- whether a dam is</p> <p>21 going to have a greater or lesser likelihood of</p> <p>22 breaching once the design for the structure of that dam</p> <p>23 is designed in accordance with the classification</p> <p>24 requirements; is that correct?</p> <p>25 A. No, sir. You are correct that the -- the</p>
1473	<p>1 of Emergency Management, but I'll -- I'll add that</p> <p>2 certainly as part of that it would be a step in that</p> <p>3 process -- of that call-down process that the -- that</p> <p>4 the Rio Grande Project, the folks with Caballo Dam would</p> <p>5 need to be notified in the event of that.</p> <p>6 So those -- those emergency -- I guess I'm</p> <p>7 trying to say that there are probably two different</p> <p>8 Emergency Action Plans, but they would be connected.</p> <p>9 Q. Is it your opinion that the New Mexico</p> <p>10 Environment Department cannot adequately determine the</p> <p>11 hazard to public health downstream or the risk to</p> <p>12 property with just a feasibility-level design for this</p> <p>13 dam?</p> <p>14 A. Yes, ma'am. I don't think that anyone, NMED</p> <p>15 or myself or anybody, can fully analyze the -- the</p> <p>16 hazard downstream to life or property without having a</p> <p>17 complete design with a dam breach analysis and flood</p> <p>18 routing model.</p> <p>19 Q. Is that the basis for your opinion that the</p> <p>20 OSE Dam Safety Bureau permit should be acquired prior to</p> <p>21 issuance of the Discharge Permit?</p> <p>22 A. Yes, ma'am.</p> <p>23 MS. BARNCASTLE: I have nothing further for</p> <p>24 this witness.</p> <p>25 MS. ORTH: Thank you, Ms. Barncastle.</p>	1475	<p>1 hazard classification has no indication on whether it's</p> <p>2 more likely -- less likely to breach, only the impacts</p> <p>3 of the breach downstream.</p> <p>4 Q. And isn't it the case that hypothetically if</p> <p>5 this dam -- if the tailings facility at the Copper Flat</p> <p>6 were to be deemed a high hazard dam, that there would be</p> <p>7 much more rigorous structural, civil engineering-related</p> <p>8 requirements that would apply to the design of that dam,</p> <p>9 specifically to avoid the risk of any kind of breach of</p> <p>10 that dam, correct?</p> <p>11 A. Yes, sir. The analysis that I've seen so far</p> <p>12 is based on the assumption that it's significant hazard.</p> <p>13 Q. Correct.</p> <p>14 And the same would be true as if a dam is</p> <p>15 classified as a significant hazard, the civil</p> <p>16 engineering, structural design components required by</p> <p>17 this rule would all be designed to make sure that</p> <p>18 there's not going to be a breach of that dam, correct?</p> <p>19 A. It would be required to follow the Dam Safety</p> <p>20 Bureau requirements and engineering practice.</p> <p>21 Q. So in both of those examples, if a dam was</p> <p>22 deemed to be a high hazard dam or a significant hazard</p> <p>23 dam under the classification system of the Dam Safety</p> <p>24 Bureau of the Office of the State Engineer, we can</p> <p>25 expect as members of the public who are protected by</p>

1476	<p>1 these dam safety rules that it's not expected that there</p> <p>2 would be at the end of the day a breach of that dam;</p> <p>3 isn't that right?</p> <p>4 A. That is true. It is noteworthy that a dam --</p> <p>5 in any dam the reason that it's subject to these</p> <p>6 rigorous requirements is because it does increase risk.</p> <p>7 Q. And that's a risk that's -- that assumes that</p> <p>8 there's a breach, right?</p> <p>9 A. Yes. The risk that I'm mentioning is</p> <p>10 specifically the consequences of failure times the</p> <p>11 likelihood of failure. So the consequences of failure</p> <p>12 are increased by adding a dam to this location. Good</p> <p>13 engineering practice will reduce the chance that failure</p> <p>14 will happen.</p> <p>15 Q. That's the case regardless of which</p> <p>16 classification the dam fits under, correct?</p> <p>17 A. Yes, sir, or what type of dam.</p> <p>18 Q. And when you as a civil engineer, district</p> <p>19 engineer for EBID design a dam for holding back water,</p> <p>20 you design it according to specification so that there</p> <p>21 won't be a breach of that dam, so that water won't go</p> <p>22 downstream and potentially cause damage to property or</p> <p>23 human health, correct?</p> <p>24 A. Certainly we do our best, but that's --</p> <p>25 there's always the potential for misoperation or other</p>	1478	<p>1 CROSS EXAMINATION</p> <p>2 BY MR. KNIGHT:</p> <p>3 Q. Good afternoon, Mr. Libbin.</p> <p>4 A. Good afternoon.</p> <p>5 Q. You don't have any specific expertise with</p> <p>6 regard to the design of tailing storage facilities; is</p> <p>7 that correct?</p> <p>8 A. I do not.</p> <p>9 MR. KNIGHT: Okay. That's my only question.</p> <p>10 Thank you.</p> <p>11 MS. ORTH: All right.</p> <p>12 Mr. de Saillan, do you have questions of</p> <p>13 Mr. Libbin?</p> <p>14 MR. DE SAILLAN: No questions, Madam Hearing</p> <p>15 Officer.</p> <p>16 MS. ORTH: All right.</p> <p>17 Is there anyone else present who has a</p> <p>18 question of Mr. Libbin based on his testimony?</p> <p>19 Ms. Barncastle, do you have any follow-up?</p> <p>20 MS. BARNCASTLE: No redirect.</p> <p>21 MS. ORTH: All right.</p> <p>22 Thank you very much, Mr. Libbin.</p> <p>23 You're excused.</p> <p>24 And shall we take lunch now?</p> <p>25 MS. BARNCASTLE: Yes.</p>
1477	<p>1 act of God.</p> <p>2 Q. What is there about permitting by the New</p> <p>3 Mexico Environment Department that brings into the --</p> <p>4 into play this issue of hazard to public health or undue</p> <p>5 risk to property if in both instances, whether it's a</p> <p>6 significant hazard dam or a high hazard dam, the goal</p> <p>7 and expectation is that the dam will be constructed</p> <p>8 sufficiently so that it will not breach?</p> <p>9 A. I think that potential -- the potential that I</p> <p>10 just mentioned is the concern. There's always a</p> <p>11 potential for mismanagement or misoperation or act of</p> <p>12 God, a failure. There's always that potential.</p> <p>13 MR. BUTZIER: I don't have any other</p> <p>14 questions.</p> <p>15 MS. ORTH: All right. Thank you.</p> <p>16 Mr. Knight, do you have questions?</p> <p>17 MR. BUTZIER: Madam Hearing Officer -- I'm</p> <p>18 sorry.</p> <p>19 For the record, the exhibit number of NMED --</p> <p>20 or NMCC's exhibit is 89 that is the same as EBID 11.</p> <p>21 MS. ORTH: Thank you for that.</p> <p>22 Mr. Knight's going to borrow your microphone.</p> <p>23</p> <p>24</p> <p>25</p>	1479	<p>1 And I will have my final witness who will go</p> <p>2 on quite a bit longer than my three previous witnesses,</p> <p>3 but he will be directly relevant, Mr. Butzier. So he --</p> <p>4 we will start with him immediately after lunch.</p> <p>5 MS. ORTH: All right. Thanks.</p> <p>6 Let's break until 1:05, 1:10, somewhere in</p> <p>7 there. No. Sorry. What did I just say?</p> <p>8 MR. BUTZIER: 1:45?</p> <p>9 MS. ORTH: 1:45. Thank you.</p> <p>10 MS. BARNCASTLE: That would be much better.</p> <p>11 Thank you.</p> <p>12 (Proceedings in recess from 12:25 p.m. to</p> <p>13 1:47 p.m.)</p> <p>14 MS. ORTH: We did have one request for an</p> <p>15 opportunity to make public comment. So we'll take</p> <p>16 Mr. Bokich.</p> <p>17 Is there anyone else who would like to offer</p> <p>18 public comment?</p> <p>19 This would be close to your last opportunity.</p> <p>20 I'll ask again at the end of the day, but this is close</p> <p>21 to your last opportunity.</p> <p>22 All right. Let's take Mr. Bokich, and then</p> <p>23 we'll return to the technical case.</p> <p>24</p> <p>25</p>

1480	<p>1 JOHN BOKICH</p> <p>2 having been first duly sworn or affirmed, gave</p> <p>3 public comment as follows:</p> <p>4 PUBLIC COMMENT</p> <p>5 MR. BOKICH: Good afternoon.</p> <p>6 My name is John Bokich. I'm president of the</p> <p>7 Board of Trustees for Sierra Electric Cooperative, based</p> <p>8 in Elephant Butte.</p> <p>9 As background information, even though I'm not</p> <p>10 a technical witness, I do have a bachelor and a master</p> <p>11 of science degrees in biological and ecological sciences</p> <p>12 from the University of Texas at El Paso. I'm a</p> <p>13 certified wildlife biologist. I'm a licensed contractor</p> <p>14 in New Mexico. I'm certified a MSHA safety instructor.</p> <p>15 That's Mine Safety and Health Administration. I'm a</p> <p>16 certified auditor with the International Cyanide</p> <p>17 Management Institute.</p> <p>18 I have 36 years of experience as an</p> <p>19 environmental professional in the mining industry.</p> <p>20 During my 36 years, I focused on environment and</p> <p>21 reclamation, and projects under my management received</p> <p>22 eight awards for excellence in reclamation, including</p> <p>23 one in the Province of British Columbia, one in New</p> <p>24 Zealand and six in New Mexico.</p> <p>25 Sierra Electric Co-op was established in 1941.</p>
1481	<p>1 We're now in our 77th year of serving Sierra County. We</p> <p>2 serve all of Sierra County and some slivers of some</p> <p>3 other surrounding counties.</p> <p>4 We've got about 3,000 to 4,000 members, but</p> <p>5 we've had the challenges of a lot of rural electric</p> <p>6 co-ops in that our membership is declining. As Mr.</p> <p>7 Swingle stated in his presentation early in the -- in</p> <p>8 the meeting, we've declined about 19 percent since 2000.</p> <p>9 Why is that? A lot of it's because we don't</p> <p>10 have jobs. We're one of the poorest counties in New</p> <p>11 Mexico with a stagnant and declining economy and little</p> <p>12 industrial load for our co-op.</p> <p>13 Our aging infrastructure with constant need to</p> <p>14 replace and upgrade is a significant financial drain on</p> <p>15 the co-op. We have nearly 900 miles of power lines with</p> <p>16 three lines per pole -- or per mile on average. We've</p> <p>17 got about 3,000 miles of wire in the air. We have</p> <p>18 14,000 wooden power poles with the -- we have</p> <p>19 approximately 3,300 transformers, 600 regulators,</p> <p>20 capacitors and sectionalizing devices. We have two</p> <p>21 substations in Cuchillo and Caballo and a fleet of</p> <p>22 specialized vehicles for maintaining and repairing</p> <p>23 our -- our infrastructure.</p> <p>24 Sierra Electric Co-op is primarily a</p> <p>25 residential base customer service co-op, and that's the</p>
1482	<p>1 toughest kind to make headway with, or keep your head</p> <p>2 above water. There's just not enough load, too much of</p> <p>3 the load comes during peak hours. What we're lacking in</p> <p>4 Sierra County is some industry.</p> <p>5 If we were to be able to get the Copper Flat</p> <p>6 Mine online -- we went back and looked at when it was</p> <p>7 operating in the early 1980s -- it would almost double</p> <p>8 our load from today, significantly increase our revenues</p> <p>9 and allow us to reduce our rates to the rest of our</p> <p>10 membership.</p> <p>11 In addition to that, the capital that would be</p> <p>12 generated during the operation at Copper Flat would give</p> <p>13 us some financial resources to upgrade our</p> <p>14 infrastructure without having to borrow the money, which</p> <p>15 is currently what we have to do.</p> <p>16 When you got a declining population base and</p> <p>17 your infrastructure costs are constant or going up,</p> <p>18 because, like I said, we're in our 77th year, our only</p> <p>19 solution is to raise rates. And people already gripe</p> <p>20 about how -- how high their electric bills are in this</p> <p>21 county. But there is nothing we can do about it unless</p> <p>22 we get some economic stimulus like Copper Flat.</p> <p>23 Copper Flat will run 24/7. You have to --</p> <p>24 when you get those big machines going, they got to keep</p> <p>25 going. And that's a fantastic load for an electric</p>
1483	<p>1 co-op. And it will generate what we need to help our</p> <p>2 membership.</p> <p>3 Sierra County Electric has ongoing</p> <p>4 requirements, as I stated, to upgrade or replace our</p> <p>5 aging infrastructure, and for large capital projects,</p> <p>6 after they are professionally designed, they go to bid,</p> <p>7 and they're constructed by licensed professionals</p> <p>8 specializing in electrical construction.</p> <p>9 Once construction is complete, our own highly</p> <p>10 trained and specialized linemen support crews -- and</p> <p>11 support crews monitor and maintain the system, conduct</p> <p>12 maintenance and new small-scale construction projects.</p> <p>13 New Mexico Copper has done the same thing with</p> <p>14 the design of this mine facility, including the tailing</p> <p>15 storage facility. It's been designed by professionals</p> <p>16 that have extensive experience designing tailings</p> <p>17 storage facilities. These professionals rely on their</p> <p>18 designs and construct their facilities to operate and</p> <p>19 work as designed in order to stay in business. And so</p> <p>20 will New Mexico Copper.</p> <p>21 Sierra Electric Co-op is a working example of</p> <p>22 how when opportunity for good employment is available in</p> <p>23 Sierra County that our local youth and talented</p> <p>24 individuals who may leave from other areas but like</p> <p>25 living in a small town in New Mexico seek out these</p>

<p style="text-align: right;">1484</p> <p>1 jobs.</p> <p>2 They're then offered intensive and</p> <p>3 professional training programs to improve themselves and</p> <p>4 to build careers in Sierra County. This results in</p> <p>5 growth in the county, which is what Sierra County --</p> <p>6 Sierra Electric needs to sustain and improve our service</p> <p>7 to our members.</p> <p>8 New Mexico Copper is going to do the same</p> <p>9 thing. They're going to offer jobs for our youth,</p> <p>10 they're going to train them, they're going to give them</p> <p>11 opportunity for advancement and opportunity --</p> <p>12 opportunity to stay close to their families, if that is</p> <p>13 what they choose to do.</p> <p>14 I've been here all week. We've heard a lot of</p> <p>15 talk and opinion, but not fact, about the effects of</p> <p>16 mining on a community.</p> <p>17 It's too bad that mining is so rare of an</p> <p>18 industry in New Mexico. Mining is a wonderful -- mining</p> <p>19 has a wonderful and unique history. It's much like a</p> <p>20 family. And employees of families feel like members of</p> <p>21 a team. It's not like a normal job. And for us that</p> <p>22 have been lucky enough to work in the mining industry as</p> <p>23 I was for 36 years, we make friendships that last a</p> <p>24 lifetime.</p> <p>25 I'm sure that Mr. Kuipers can relate to this.</p>	<p style="text-align: right;">1486</p> <p>1 eight-hour refresher class to be recertified to work at</p> <p>2 the mine. Again this is paid for by the company.</p> <p>3 Safety training is not the end of your</p> <p>4 exposure to safety at a mine. Every day before you</p> <p>5 start work you will meet with your -- your crew and your</p> <p>6 supervisor and have a safety tailgate meeting to discuss</p> <p>7 the day's work plan, any special hazards or conditions</p> <p>8 that should be avoided or repaired and more time and</p> <p>9 site-specific information to ensure that all employees</p> <p>10 are on the same page.</p> <p>11 In addition, task training takes place and is</p> <p>12 required for anyone in order to operate a piece of</p> <p>13 equipment. You can't just dump on a dozer and say, oh,</p> <p>14 I've been running these for 15 years. You have to prove</p> <p>15 it. You have to operate it in front of a supervisor and</p> <p>16 demonstrate.</p> <p>17 In addition, task training is given to those</p> <p>18 young people or not so young people that want to run a</p> <p>19 different piece of equipment. Maybe he's been driving a</p> <p>20 haul truck, but he wants to run a dozer. So he'll be</p> <p>21 trained how to safely operate that dozer so that he</p> <p>22 keeps it operating in a safe and efficient way.</p> <p>23 In addition, they'll develop checklists to</p> <p>24 inspect the equipment before they use it at the start of</p> <p>25 the shift, and they'll do a checklist at the end of the</p>
<p style="text-align: right;">1485</p> <p>1 Mining is an incredibly complex, technical and</p> <p>2 potentially dangerous industry. Mining has and</p> <p>3 continually upgrades a culture of safety. Like an</p> <p>4 electric cooperative, safety is number one.</p> <p>5 Before you're hired, you will be required to</p> <p>6 take and pass a drug and alcohol test, and drug tests</p> <p>7 will likely be given randomly throughout the year or to</p> <p>8 any individual that has an accident on the mine that</p> <p>9 could have or does result in injury to an employee or to</p> <p>10 equipment.</p> <p>11 This is to protect our workforce from someone</p> <p>12 who might come to work in an impaired state. We believe</p> <p>13 it's very important, and I think virtually every mining</p> <p>14 company does this.</p> <p>15 A new employee will go through 24 hours, three</p> <p>16 full workdays, of specific training by an MSHA-certified</p> <p>17 instructor. All employees work together in these</p> <p>18 training classes. Administration, receptionists,</p> <p>19 accountants, human resources, are in the same safety</p> <p>20 class as the haul truck drivers, bulldozer operators,</p> <p>21 mechanics and mill workers. They're all part of the</p> <p>22 same team.</p> <p>23 You will receive full pay for the training</p> <p>24 that you take for safety or that is required by your</p> <p>25 job. Every 12 months an employee must have an</p>	<p style="text-align: right;">1487</p> <p>1 shift before it goes to the next operator.</p> <p>2 MSHA safety training and the safe culture will</p> <p>3 be practiced and required at the Copper Flat Mine and</p> <p>4 will make you a safer person in all aspects of your</p> <p>5 life. You could take home your safety knowledge and</p> <p>6 culture and integrate it into your family. We all do</p> <p>7 that. We love our wives and our kids, and we want to</p> <p>8 see them be safe.</p> <p>9 And we learn things in the mining industry</p> <p>10 about safety that you won't learn anyplace else. No one</p> <p>11 in your family will ride in a moving vehicle, not even</p> <p>12 50 feet, without attaching their seat belt. You'll be</p> <p>13 provided PPE, personal protective equipment, such as</p> <p>14 hardhat, reflective vests, hearing protection, eye</p> <p>15 protection, et cetera, by the company. You'll probably</p> <p>16 buy your own steel-toed footwear.</p> <p>17 You'll teach your family the importance of</p> <p>18 using PPE around the home, for chores, and you'll likely</p> <p>19 prepare and keep a kit in your vehicle for emergencies.</p> <p>20 You and your family will be prepared.</p> <p>21 If you're hired to work at Copper Flat, you</p> <p>22 will work hard and be compensated well. You'll go to</p> <p>23 work early, and you'll often stay late. It's a team,</p> <p>24 and you all function together and make sure you operate</p> <p>25 the mine in a safe and planned way.</p>

1488	<p>1 A mine team, because mining is a diverse</p> <p>2 industry and has lots of requirements for specialized</p> <p>3 people as well as equipment, will include things like</p> <p>4 the administrative staff, receptionists, accountants,</p> <p>5 human resources, et cetera.</p> <p>6 Operations will require equipment operators,</p> <p>7 mill workers, road and infrastructure maintenance, blast</p> <p>8 hole drillers, blasters, operations support,</p> <p>9 environmental reclamation, drainage control, mine</p> <p>10 geology, surveying, grade control, warehouse, equipment</p> <p>11 maintenance, heavy equipment and mill maintenance.</p> <p>12 And then you have your management, which is</p> <p>13 general manager, department heads, et cetera.</p> <p>14 The mine team is made up of women, men,</p> <p>15 Hispanics, blacks, Native Americans, Asians and any</p> <p>16 other person legally able to work and live in Sierra</p> <p>17 County. Like all other mining companies, New Mexico</p> <p>18 Copper will not discriminate.</p> <p>19 It's interesting to note that as the mining</p> <p>20 industry has developed and we're using bigger and more</p> <p>21 modern equipment all the time, that it's been identified</p> <p>22 that women make the best drivers of haul trucks, better</p> <p>23 than men. Why? Because they take care of the equipment</p> <p>24 better than men. They make it last.</p> <p>25 If you ever go to a large open pit mine or</p>	1490	<p>1 future economy of Sierra County, it can't carry the</p> <p>2 county on its own, and this county's conditions today</p> <p>3 prove that. Tourism jobs tend to be seasonal,</p> <p>4 temporary, have little to no benefits, while the Copper</p> <p>5 Flat Mine will have full-time jobs with benefits,</p> <p>6 training and a future.</p> <p>7 Tourism in Sierra County centers primarily</p> <p>8 around Elephant Butte Reservoir. Our lake level is</p> <p>9 currently at about 3 percent. That's as low as I've</p> <p>10 seen it since we first moved here in '61. A year ago</p> <p>11 the lake level was 12 percent. So that means we drew it</p> <p>12 down 9 percent from spring until now.</p> <p>13 With the inflow and -- if we don't get a water</p> <p>14 snowpack in 2018, 2019, what's going to happen? Are we</p> <p>15 going to start out with the lake at 1 percent next</p> <p>16 spring? Or 0 percent? That's going to shoot what</p> <p>17 little bit of tourist economy this county has right in</p> <p>18 the head.</p> <p>19 With the ever increasing acreage of pecan</p> <p>20 trees being planted in the Mesilla Valley, which is a</p> <p>21 high water use crop, and desert, riparian lands being</p> <p>22 converted to cropland, the issue of water for Texas and</p> <p>23 Mexico, will Elephant Butte ever again be a lake that is</p> <p>24 an engine for tourism in Sierra County?</p> <p>25 I spent 36 years working in the mining</p>
1489	<p>1 even a small open pit mine, you mostly notice trucks</p> <p>2 drive on the left-hand side. That's because they want</p> <p>3 to be able to see the berm and where the wheels are in</p> <p>4 relation to the berm. Every tire costs 20,000 to 25,000</p> <p>5 bucks so you want to make sure you take care of your</p> <p>6 tires. Women do a good job of that.</p> <p>7 I've been a landowner in Sierra County through</p> <p>8 my parents since 1961, when they acquired a lot at Hot</p> <p>9 Springs Landing in Elephant Butte. I was 10 years old</p> <p>10 when we got that lot, spent a lot of family time there,</p> <p>11 have a lot of great memories.</p> <p>12 But my wife and I got married in '73, and</p> <p>13 we've been here as much as we can be on a vacation</p> <p>14 basis, as we lived out of state most of that time</p> <p>15 because I couldn't find a job in Sierra County. And we</p> <p>16 visited when we could. We came back in '05 full-time</p> <p>17 and retired in 2016.</p> <p>18 I've seen a lot of changes in Sierra County</p> <p>19 since 1961, and most of them are not very good. When I</p> <p>20 was here as a kid, T or C was a thriving place. People</p> <p>21 were working, stores were open and diverse. Things were</p> <p>22 happening, good things. And our newspapers weren't full</p> <p>23 of photos of people who had been arrested for drugs,</p> <p>24 murder, robbery and every other kind of vile act.</p> <p>25 While tourism is important, a component of the</p>	1491	<p>1 industry, as I said, in New Mexico, Nevada and overseas.</p> <p>2 One notable observation I had in working at mine sites</p> <p>3 in different parts of the world is that wildlife species</p> <p>4 are not driven away from an area because of a mine.</p> <p>5 In fact, in Nevada, in Northern Nevada, in the</p> <p>6 Independence Mountain range, first rifle shot of deer</p> <p>7 season, the deer, particularly the big bucks, came to</p> <p>8 the mine, because they figured out pretty quick the mine</p> <p>9 had MSHA protecting them. You can't hunt on a mine</p> <p>10 site.</p> <p>11 So we had an area right in the middle of</p> <p>12 several pits that up high we called it the refuge, and</p> <p>13 that's where the big bucks went every year for deer</p> <p>14 season. So we protected the gene pool for the big bucks</p> <p>15 in that area.</p> <p>16 As an environmental professional in mining,</p> <p>17 I've seen and been an active member of mine teams to</p> <p>18 plan and manage the construction, operation,</p> <p>19 environmental management, closure and reclamation of</p> <p>20 several large tailing storage facilities around the</p> <p>21 world, as well as heap leach pads and other mine</p> <p>22 facilities, using the same kinds of techniques and</p> <p>23 materials that are proposed for Copper Flat Mine.</p> <p>24 I also managed an environmental auditing</p> <p>25 program for a gold company and conducted environmental</p>



1492	<p>1 audits and gold mines in the US, many in Canada, Chile,                  2 Brazil, Zimbabwe and Russia. Many of these mines were                  3 aged, and yet the tailings facilities and systems                  4 were -- were designed, built and operated to rigorous                  5 standards and were protective of the environment. I                  6 don't think a single one of them had a liner.                  7 I've never known a project that I was involved                  8 with that was designed, constructed and operated as the                  9 Copper Flat Mine is proposed to be that has failed.                  10 Copper Flat Mine project has been designed by                  11 the most advanced and proven technologies that we have                  12 today, will use the most advanced and proven materials                  13 to protect the environment while providing jobs,                  14 training and opportunity to local youth and working                  15 people and an economic engine for Sierra County.                  16 The design, construction and operation of the                  17 Quintana mine in the late '70s and early '80s was a                  18 totally different area of mining and facility design.                  19 Consideration for the environment and our science has                  20 advanced significantly since that time.                  21 When Quintana constructed the tailing storage                  22 facility, it had only a clay liner, as you know, and                  23 little else to prevent migration of fluids from the                  24 tailings constituents into groundwater. When they left                  25 the mine, they left the tailings in the tailings</p>	1494	<p>1 above human health standards.                  2 In addition, thousands of tons of ammonium                  3 sulfate fertilizer is applied to crops in the Mesilla                  4 Valley every year, which borders the Rio Grande south of                  5 the Copper Flat project.                  6 A paper in the publication Chemical Geology in                  7 2011, which studied sulfate levels in the Mesilla                  8 Valley, concludes that fertilizers containing sulfate                  9 were major contributors to elevate sulfur in                  10 groundwater -- or sulfate in groundwater, down to the                  11 depth of as much as 600 feet.                  12 Also water samples reports -- reported by the                  13 USGS in 1998 for the years '92 to '95 showed elevated                  14 levels of many pesticides and volatile organic compounds                  15 and nutrients which were detected in surface and                  16 groundwaters in the Rio Grande Valley, with a                  17 significant increase of croplands that we've seen since                  18 '95. What are those values today?                  19 I find it hypocritical. There's criticism of                  20 Copper Flat for potentially affecting groundwater with                  21 sulfate and TDS while the -- there's residue of                  22 nitrates, sulfate and other leachates in the groundwater                  23 in Mesilla Valley in much greater quantities.                  24 In addition, there's been criticism of the                  25 design of the TSF and the material to be used, HDPE in</p>
1493	<p>1 facility. As the liner dried up, avenues for the                  2 contamination from those remaining tailings was created                  3 to get into the -- the groundwater.                  4 The result was a relatively small plume of                  5 water that did percolate from the TSF into the                  6 groundwater below and downgradient of the TSF.                  7 I have reviewed data from the monitoring wells                  8 that intersect this plume. While the groundwater                  9 samples from the monitoring wells does have some                  10 elevated values for constituents, primarily TDS and                  11 sulfate, the values are really not very high, as                  12 Dr. Myers pointed out in his presentation yesterday.                  13 And there's no samples that show copper as                  14 being above standards.                  15 In the flotation process of copper milling,                  16 the metals are insoluble, or sulfides, and so they don't                  17 move in water like they would if they were oxidized. So                  18 they stayed in the tailings pond, the metals did, for                  19 the most part. At least I couldn't see any that were                  20 exceeding standards.                  21 In contrast, in a report published by New                  22 Mexico Tech in 2013, samples taken from water discharge                  23 from the T or C Hot Springs District directly into the                  24 Rio Grande River at a rate of about 1 million gallons                  25 per day show some sulfate and TDS concentrations well</p>	1495	<p>1 particular. HDPE is used exclusively to protect                  2 groundwater in the environment -- or extensively. I'm                  3 sorry. Hazardous waste landfills, gold mines containing                  4 solutions with cyanide and many others utilize this                  5 material. There is no other known to man right now.                  6 HDPE is estimated to last 500-plus years, and,                  7 of course, the numbers vary depending on who's doing the                  8 analysis. In its application, where there's a compacted                  9 subbase, an HDPE liner is protected from excess                  10 pressures by the solution drainage system and from UV                  11 light by the tailings itself, it could well last in                  12 perpetuity. We won't know.                  13 Who's to say that the Elephant Butte Dam is                  14 going to last 500 more years? It's 100 years old right                  15 now. And if it is, if it does last 500 years, it's --                  16 is it going to be a lake, or is it going to be a big mud                  17 hole? We know that it's silting in now. What's it                  18 going to be like in 500 years? Nobody knows.                  19 Without the Elephant Butte Dam, from what I                  20 read and historically, agriculture in the Mesilla Valley                  21 will be a remnant of the past.                  22 New Mexico Copper has followed the path of                  23 federal and state regulations required. They have                  24 engaged highly trained, experienced and professional                  25 teams to design a comprehensive project that will</p>

1496	<p>1 protect the environment, generate much needed</p> <p>2 opportunity and economic benefits to Sierra County and</p> <p>3 reclaim the land to a condition better than what it is</p> <p>4 today.</p> <p>5 It's time to approve this project and let</p> <p>6 those in Sierra County that want to work to work, that</p> <p>7 want to see their children stay in Sierra County and</p> <p>8 work, let them stay, and want a county to be</p> <p>9 economically sustainable and receive what this project</p> <p>10 has to offer.</p> <p>11 Thank you very much.</p> <p>12 MS. ORTH: Thank you, Mr. Bokich.</p> <p>13 We'll return to the technical case.</p> <p>14 Ms. Barncastle.</p> <p>15 MS. BARNCASTLE: Thank you.</p> <p>16 Before we move on, I'd like to note for the</p> <p>17 record EBID's objections to the foregoing testimony --</p> <p>18 public comment, rather. To the extent that that public</p> <p>19 comment was lacking in foundation related to claims made</p> <p>20 about farming in the Elephant Butte Irrigation District,</p> <p>21 we object. And further we object to the extent that</p> <p>22 that was offered as technical testimony that was not</p> <p>23 disclosed prior to today in compliance with the rules.</p> <p>24 MS. ORTH: All right. Thank you.</p> <p>25 MS. BARNCASTLE: I need to approach my witness</p>	1498	<p>1 your direct and rebuttal?</p> <p>2 A. Yes.</p> <p>3 Q. Why don't you go ahead and start out with your</p> <p>4 background and experience, please.</p> <p>5 A. Okay.</p> <p>6 My experience -- or my background in terms of</p> <p>7 training includes an undergraduate degree in geological</p> <p>8 sciences from Ohio University. I have a master's degree</p> <p>9 from Ohio University, as well, in aqueous and</p> <p>10 environmental geochemistry. I have a PhD from the</p> <p>11 University of Arizona in hydrology and water resources.</p> <p>12 I have had experience over the years since</p> <p>13 that time. I -- well, most recently, I've been an</p> <p>14 assistant and associate professor at New Mexico State</p> <p>15 University in the plant and environmental sciences</p> <p>16 department. Before that, I was a research scientist at</p> <p>17 the Pacific Northwest National Laboratory. Before that,</p> <p>18 I was a postdoctoral researcher in the University of</p> <p>19 Arizona soil and water environmental sciences</p> <p>20 department.</p> <p>21 Before that, I spent four years as a</p> <p>22 hydrogeologist and geochemist at two firms, Water</p> <p>23 Management Consultants and Hydro Geo Chem. And before</p> <p>24 that, I was a research assistant and teaching assistant</p> <p>25 in grad school.</p>
1497	<p>1 briefly.</p> <p>2 MS. ORTH: Okay.</p> <p>3 MS. BARNCASTLE: All right. It's a race to</p> <p>4 the end.</p> <p>5 THE REPORTER: That doesn't mean talk fast.</p> <p>6 MS. BARNCASTLE: Dr. Carroll, would you please</p> <p>7 state your full name for the record.</p> <p>8 THE REPORTER: Hold on.</p> <p>9 MS. BARNCASTLE: Has he been sworn in, by the</p> <p>10 way?</p> <p>11 THE REPORTER: No, not yet.</p> <p>12 MS. BARNCASTLE: Okay.</p> <p>13 KENNETH C. CARROLL</p> <p>14 having been first duly sworn or affirmed, was</p> <p>15 examined and testified as follows:</p> <p>16 DIRECT EXAMINATION</p> <p>17 BY MS. BARNCASTLE:</p> <p>18 Q. Dr. Carroll, would you please state your full</p> <p>19 name for the record.</p> <p>20 A. Yes. My name is Kenneth Cooper Carroll.</p> <p>21 Q. All right, Dr. Carroll.</p> <p>22 I believe you have prepared a presentation for</p> <p>23 today; is that correct?</p> <p>24 A. Yes, that's correct.</p> <p>25 Q. Is this presentation considered to be both</p>	1499	<p>1 Q. I'd like you to look at what's been marked as</p> <p>2 EBID Exhibit 4.</p> <p>3 Do you recognize that document?</p> <p>4 A. Yes, I do.</p> <p>5 Q. What is that document?</p> <p>6 A. It's my curriculum vitae.</p> <p>7 Q. Did you create that document?</p> <p>8 A. Yes, I did.</p> <p>9 Q. Is it current?</p> <p>10 A. Yes.</p> <p>11 Q. Does it contain all of what you just said and</p> <p>12 then some?</p> <p>13 A. It contains more.</p> <p>14 Q. All right.</p> <p>15 I'd like to tender Dr. Carroll as an expert in</p> <p>16 environmental geochemistry, hydrogeology, mine closure</p> <p>17 and environmental impacts of mining related to</p> <p>18 groundwater.</p> <p>19 MR. BUTZIER: No objection.</p> <p>20 MR. DE SAILLAN: No objection.</p> <p>21 MR. KNIGHT: No objection.</p> <p>22 MS. ORTH: He's so recognized.</p> <p>23 MS. BARNCASTLE: I would also like to offer</p> <p>24 into evidence EBID Exhibit Number 4 at this time.</p> <p>25 MR. BUTZIER: No objection.</p>

1500	<p>1 MR. DE SAILLAN: No objection.</p> <p>2 MR. KNIGHT: No objection.</p> <p>3 MS. ORTH: It's admitted.</p> <p>4 (Exhibit EBID 4 admitted into evidence.)</p> <p>5 Q. (BY MS. BARNCASTLE) Dr. Carroll, did you</p> <p>6 review any documents in preparation for today?</p> <p>7 A. I did. I wasn't able to get through all of</p> <p>8 the documents that are in the court record, but I spent</p> <p>9 a little bit of time.</p> <p>10 I did find a document that I believe is</p> <p>11 relevant to this on -- from the United States</p> <p>12 Environmental Protection Agency on the Gold King Mine.</p> <p>13 And then there was another document related to</p> <p>14 some of the copper mines that have been discussed in the</p> <p>15 testimony this week. It's from the New Mexico Office of</p> <p>16 Natural Resource Trustees from 2012 on Final Groundwater</p> <p>17 Restoration Plan for Chino, Cobre and Tyrone Mines.</p> <p>18 I also reviewed the JSAI, 2013, Status Report</p> <p>19 for Stage 1 Abatement. We've been hearing about that</p> <p>20 report during this week.</p> <p>21 I also reviewed the SRK, 2013, Geochemical</p> <p>22 Characterization Report for the Copper Flat Project,</p> <p>23 Volume 1.</p> <p>24 I reviewed the SRK, 2018, Predictive</p> <p>25 Geochemical Modeling of Pit Lake Water Quality at the</p>	1502	<p>1 refer to, and if I could just offer a suggestion.</p> <p>2 Did you remember what Mr. Knight did with the</p> <p>3 bureau witnesses where he had them adopt what they had</p> <p>4 submitted in the NOI under oath before they spoke?</p> <p>5 That's often -- it's a good idea. It's a belt</p> <p>6 and suspenders kind of thing. It doesn't stop</p> <p>7 Dr. Carroll from whatever he'd like to say.</p> <p>8 MS. BARNCASTLE: Okay.</p> <p>9 Q. Dr. Carroll, are you familiar with the notice</p> <p>10 of intent to present technical testimony that EBID</p> <p>11 prepared and filed in this proceeding?</p> <p>12 A. Yes, I am.</p> <p>13 Q. Did you assist with preparation of your</p> <p>14 section?</p> <p>15 A. Yes, I did.</p> <p>16 Q. Do you adopt that testimony here today?</p> <p>17 A. Yes, I do.</p> <p>18 Q. Dr. Carroll, did you rely on what's been</p> <p>19 marked as EBID Exhibits 16 and 17 to form portions of</p> <p>20 your opinions for today?</p> <p>21 A. Yes, I did.</p> <p>22 Q. Are you sufficiently familiar with the</p> <p>23 information contained in those reports to be able to</p> <p>24 rely on that information?</p> <p>25 A. Yes.</p>
1501	<p>1 Copper Flat Project.</p> <p>2 And I reviewed the JSAI, 2018, Revision 1,</p> <p>3 Probable Hydrologic Consequences of the Copper Flat</p> <p>4 Project.</p> <p>5 I think that's all.</p> <p>6 Q. Dr. Carroll -- hello.</p> <p>7 Dr. Carroll, shown up here on slide 3 is</p> <p>8 something I believe different than what we're talking</p> <p>9 about now.</p> <p>10 Do you want to explain what this slide is?</p> <p>11 A. Yes. This is just kind of a follow-up, an</p> <p>12 inclusion of the CV, and I think since we've already</p> <p>13 admitted that, it's in the record, but it's just a brief</p> <p>14 background of some of the publications that I completed</p> <p>15 that are relevant, I believe, to this case, including</p> <p>16 sulfate plumes in groundwater.</p> <p>17 MS. BARNCASTLE: And for the record, Madam</p> <p>18 Hearing Officer, I will provide copies of this</p> <p>19 presentation to all of the other attorneys and to the</p> <p>20 record, if necessary, if I go ahead and admit it. I</p> <p>21 don't have that ability today because my cell phone hot</p> <p>22 spot was not fast enough to be able to send this</p> <p>23 document via E-mail. So I apologize.</p> <p>24 MS. ORTH: All right.</p> <p>25 And if you would mark it so that it's easy to</p>	1503	<p>1 MS. BARNCASTLE: I'd like to offer into</p> <p>2 evidence Exhibits 16 and 17 at this time, as well.</p> <p>3 MS. ORTH: Okay.</p> <p>4 The first was the Gold Mine -- sorry -- Gold</p> <p>5 King --</p> <p>6 MR. CARROLL: Gold King, yes.</p> <p>7 MS. ORTH: -- mine report.</p> <p>8 And was the other from the ONRT?</p> <p>9 MR. CARROLL: Yes.</p> <p>10 MS. ORTH: Okay. For some reason, that's not</p> <p>11 in my packet.</p> <p>12 But are there objections?</p> <p>13 MR. BUTZIER: Madam Hearing Officer,</p> <p>14 Exhibit 17 is not in what I received either, but I have</p> <p>15 no objection to either document.</p> <p>16 MS. ORTH: Would you provide that to me and</p> <p>17 Mr. Butzier and perhaps the other counsel, as well?</p> <p>18 I didn't get it.</p> <p>19 MS. BARNCASTLE: Did other counsel not get</p> <p>20 that?</p> <p>21 MR. KNIGHT: I have it. Yeah. Exhibit 17</p> <p>22 is -- was included with the materials I received.</p> <p>23 MR. DE SAILLAN: I did not receive it.</p> <p>24 MS. ORTH: Okay. So just to me, to</p> <p>25 Mr. de Saillan and Mr. Butzier, but it doesn't sound as</p>

1504	<p>1 though there are objections.</p> <p>2 MR. KNIGHT: No objections.</p> <p>3 MS. ORTH: All right.</p> <p>4 So Exhibits 16 and 17 are admitted.</p> <p>5 (Exhibits EBID 16 and 17 admitted into</p> <p>6 evidence.)</p> <p>7 MS. BARNCASTLE: Thank you.</p> <p>8 And at this point, I think it's safe to note</p> <p>9 that I am going to withdraw a few exhibits that I will</p> <p>10 not be seeking to admit.</p> <p>11 EBID Exhibit 5 is the draft permit that was</p> <p>12 released by NMED on August 10th. That was admitted</p> <p>13 through Mr. de Saillan's case in chief. I won't</p> <p>14 duplicate that.</p> <p>15 And then my mistake in including Exhibits 12,</p> <p>16 13, 14, 15, and then 18, 19, 20 and 21, those are</p> <p>17 already part of the record. I listed them as exhibits</p> <p>18 because my experts relied upon them, but we will not be</p> <p>19 seeking to admit them separately.</p> <p>20 MS. ORTH: Thank you for that clarification.</p> <p>21 Q. (BY MS. BARNCASTLE) All right, Dr. Carroll.</p> <p>22 At this point in time, I think rather than a question</p> <p>23 and answer, I'm going to just let you take it away and</p> <p>24 proceed with the format that we saw of several of the</p> <p>25 other witnesses in proceeding with your PowerPoint, and</p>	1506	<p>1 of increasing contamination discharged to groundwater,</p> <p>2 inward migration of contaminants that are already in</p> <p>3 groundwater.</p> <p>4 So the proposed condition would be to provide</p> <p>5 underlying liners and also overlying covers, and I</p> <p>6 would -- I would ask that they both be considered</p> <p>7 low-permeability materials, because that's not really</p> <p>8 been discussed for the covers this week in detail. And</p> <p>9 that would be for any of the mine waste materials or</p> <p>10 facilities that are outside of the open pit hydraulic</p> <p>11 sink.</p> <p>12 The second observation is groundwater has been</p> <p>13 proven to be impacted by ARD and mine impacted.</p> <p>14 So that's similar to the other one, and so the</p> <p>15 proposed permit condition would be underlining liners,</p> <p>16 which is proposed, and they talked about that as part of</p> <p>17 the plan, but also to have an overlying cover that has a</p> <p>18 low-permeability material in order to limit impact of</p> <p>19 clean water and conversion of clean water into</p> <p>20 mine-impacted water.</p> <p>21 The next observation is that the current</p> <p>22 Reclamation Plan suggests to remove all of the</p> <p>23 mine-impacted water impoundments, and so -- and also to</p> <p>24 not include a groundwater interceptor system which is</p> <p>25 allowed under the Copper Rule. And I think NMED</p>
1505	<p>1 I will interrupt you only as necessary.</p> <p>2 A. Okay. Thank you.</p> <p>3 So in preparation for this trial -- in</p> <p>4 preparation for the statement of intent, we had to</p> <p>5 develop some opinions. And so what I've tried to do</p> <p>6 here is summarize some of those opinions.</p> <p>7 Also, I think I would try to mirror some of</p> <p>8 the comments that were specified earlier this week, that</p> <p>9 a lot of the intent of this trial is to support the --</p> <p>10 the successful operation of this mine and the successful</p> <p>11 adoption of this permit through permit condition</p> <p>12 additions that will support the Copper Rule and protect</p> <p>13 the environment.</p> <p>14 So what I've tried to do here is apply some of</p> <p>15 these observations and then apply some potential</p> <p>16 proposed permit conditions that might be able to</p> <p>17 alleviate those.</p> <p>18 So the first bullet suggests that the current</p> <p>19 pit lake has proven to be contaminated by acid rock</p> <p>20 drainage and/or mine-impacted water. And this is from</p> <p>21 the pit walls, and it's also in the groundwater, and</p> <p>22 that was from a small time period of mining, three</p> <p>23 months.</p> <p>24 And I think it's safe to say that the</p> <p>25 additional operation of this mine may have a likelihood</p>	1507	<p>1 suggested they may require that as needed.</p> <p>2 And so seeing as that the groundwater has been</p> <p>3 contaminated, that might be something to consider to</p> <p>4 avoid any future groundwater impacts and mobility of</p> <p>5 contaminants.</p> <p>6 The next proposed permit condition is to</p> <p>7 include groundwater interceptor system to abate the</p> <p>8 contamination and also avoid mobilization of</p> <p>9 contaminants that are already in the system.</p> <p>10 And I'd also like to recommend, as we've</p> <p>11 heard, I believe, yesterday, that additional monitoring</p> <p>12 wells might help not only detect future contaminants,</p> <p>13 but also assess the nature and extent of the current</p> <p>14 groundwater contamination.</p> <p>15 The aquifer assessment also, in my opinion,</p> <p>16 did not really consider a lot of the uncertainty that</p> <p>17 was available at this site. In fact, the -- there was</p> <p>18 some nonconsideration of some of the available data that</p> <p>19 could be used to evaluate the impact to groundwater, and</p> <p>20 that's a -- that's a part of this -- that's a critical</p> <p>21 part of this permit, and the Copper Rule is assessing</p> <p>22 the impact to groundwater.</p> <p>23 So I would suggest that the aquifer assessment</p> <p>24 include all of the available geochemical and hydrologic</p> <p>25 data.</p>

1508	<p>1 And also, I think I'd reiterate what some of</p> <p>2 the other experts have suggested, that appropriate</p> <p>3 financial considerations are required for this site.</p> <p>4 In order to give a little bit of background,</p> <p>5 we did hear from Dr. Griffiths earlier, but I'd like to</p> <p>6 reiterate some of that in order to support some of the</p> <p>7 proposed permit conditions that I've just mentioned. So</p> <p>8 I'd like to talk a little bit about the potential</p> <p>9 environmental impacts, including those impacts to</p> <p>10 groundwater, that may potentially occur, assuming that</p> <p>11 this permit is approved and the mine operates.</p> <p>12 So the main environmental contamination that</p> <p>13 we've been talking about so far is this acid rock</p> <p>14 drainage. So I wanted to go into that in a little bit</p> <p>15 of detail.</p> <p>16 Mainly the sulfide minerals that are at the</p> <p>17 site include pyrite and chalcopyrite. And so we see</p> <p>18 here pyrite disseminated on a rock here. And what</p> <p>19 happens is when the pyrite is formed, it's formed in the</p> <p>20 deep subsurface of the earth, and it's not exposed to</p> <p>21 the atmosphere.</p> <p>22 Through mining, this pyrite becomes basically</p> <p>23 in contact with both oxygen and water. When that</p> <p>24 occurs, the reaction that you see -- once the reactants</p> <p>25 on the left side are mixed together, it proceeds to the</p>	1510	<p>1 see that iron not only cycles through iron(II) to (III),</p> <p>2 but you get a significant amount of acidity that's</p> <p>3 generated. And that's shown here at this bottom</p> <p>4 equation with the 16 hydrogen.</p> <p>5 Q. And, Dr. Carroll, we're on slide 7 now --</p> <p>6 A. Slide 7.</p> <p>7 Q. -- but please try to refer to the slide as you</p> <p>8 go for the record.</p> <p>9 A. Okay.</p> <p>10 Q. I know that that's difficult when you get to</p> <p>11 going, but --</p> <p>12 A. Okay.</p> <p>13 Q. -- try to make sure that you throw in the</p> <p>14 slide number every now and then.</p> <p>15 Thank you.</p> <p>16 A. Okay. Thank you.</p> <p>17 I do note here that some of these reactions</p> <p>18 may be controlled by other ones, and that's in terms of</p> <p>19 the reaction rates. So let's go to that just in a</p> <p>20 little bit of detail.</p> <p>21 I talked about the chemical reactions being</p> <p>22 equilibrium reactions. So -- and that being said,</p> <p>23 they're kind of independent of time, and so we don't</p> <p>24 really consider how long it might take for those to</p> <p>25 occur. But we do consider that with chemical kinetics.</p>
1509	<p>1 right, and you can see the product of the iron oxide</p> <p>2 solid material, this orange material, and then there's a</p> <p>3 sulfuric acid water, as well.</p> <p>4 So there's both iron and sulfur which -- and</p> <p>5 acidity that's generated. So that's one of the</p> <p>6 environmental impacts that's been discussed.</p> <p>7 And I would argue that this is an equilibrium</p> <p>8 equation, and we'll go into, you know, how kinetics can</p> <p>9 impact this type of equation, as well.</p> <p>10 Just a little bit more detail on this. In</p> <p>11 reality, we're talking about iron and sulfide, and so</p> <p>12 you can consider this reaction at the bottom here, where</p> <p>13 your pyrite is interacting with oxygen and water, and</p> <p>14 you get your iron(II), you -- your sulfate, and then</p> <p>15 you're producing acidity, as well.</p> <p>16 But this is not the only reaction that occurs.</p> <p>17 This is one chemical reaction.</p> <p>18 There's actually several chemical reactions</p> <p>19 that occur, and this is only a few reactions that occur</p> <p>20 specifically with pyrite. So -- and these are all</p> <p>21 equilibrium equations.</p> <p>22 So on the left side of the reactants when you</p> <p>23 bring them together, independent of time, these will</p> <p>24 thermodynamically proceed to the right, produce these</p> <p>25 products, given enough time to react. And so you can</p>	1511	<p>1 So that describes how long it will take for these</p> <p>2 reactions to proceed.</p> <p>3 So this is an example where you can see</p> <p>4 concentrations changing on the Y axis versus time, and</p> <p>5 you can see it takes some time before the concentrations</p> <p>6 become stable, but at some point, they become stable</p> <p>7 until you've reached equilibrium. So kinetics really</p> <p>8 describes the time it will take to proceed to</p> <p>9 equilibrium, but equilibrium is the final state.</p> <p>10 So for this acid rock drainage, these are some</p> <p>11 of the chemical constraints. This -- these are the rate</p> <p>12 coefficients on the right. You can see the chemical</p> <p>13 reactions on the left. And I would note that some of</p> <p>14 these reactions are actually sped up by nonchemical or</p> <p>15 actually biological processes so the microbes can</p> <p>16 actually speed up some of these reactions and facilitate</p> <p>17 them occurring.</p> <p>18 Q. And that was slide 9?</p> <p>19 A. Slide 9. I'm sorry.</p> <p>20 Q. We're now on 10?</p> <p>21 A. 10, yeah.</p> <p>22 So this is an additional reaction. I'm not</p> <p>23 going to go through all of the potential reactions, but</p> <p>24 I wanted to illustrate some of the sources of acidity</p> <p>25 and some of the environmental impacts.</p>

1512	<p>1 So beyond the pyrite, there's -- there's also</p> <p>2 actually some minerals that will collect some of the</p> <p>3 acidity, and then it may be released later. And so this</p> <p>4 is an example where jarosite is a mineral shown down</p> <p>5 here at the bottom reaction, and that actually produces</p> <p>6 acidity, as well.</p> <p>7 So there may be other reactions that would</p> <p>8 occur that may be generating acidity. So this process</p> <p>9 might take some time.</p> <p>10 Slide number 11. So I think Dr. Griffiths</p> <p>11 mentioned that there is another set of reactions that</p> <p>12 actually helps mitigate the acid rock drainage, and so</p> <p>13 this would be acid neutralization and for -- I guess</p> <p>14 just as an example, we'll look here at the carbonate.</p> <p>15 So we have a calcite dissolution, and so the carbonates</p> <p>16 will actually consume the acidity. As you can see,</p> <p>17 we're consuming hydrogen on the top reaction. Then it's</p> <p>18 consuming sulfuric acid in the -- in the bottom</p> <p>19 reaction.</p> <p>20 And so this is a full reaction at the bottom</p> <p>21 with the iron and the pyrite reacting.</p> <p>22 So some of these reactions, both the</p> <p>23 generation of acidity and also the consumption of the</p> <p>24 acidity, may occur at the same time or -- or they may be</p> <p>25 in parallel or in series. But this is relevant for this</p>	1514	<p>1 can precipitate and immobilize some of these metals.</p> <p>2 However, as Mr. Kuipers noted, we are seeing at a lot of</p> <p>3 mine sites or an awful lot of mine sites the impacted</p> <p>4 water being neutral and also having some metals. And so</p> <p>5 there is a potential for some metals to stay stable --</p> <p>6 stable, in fact, some contaminants to stay stable --</p> <p>7 stable after neutralization.</p> <p>8 So one example would be sulfate.</p> <p>9 Slide 14.</p> <p>10 So this has been observed before, and I think</p> <p>11 Mr. Kuipers showed that there have been some potential</p> <p>12 environmental impacts at other sites, and so this is a</p> <p>13 slide showing more of a catastrophic event.</p> <p>14 This was a -- back in 2015. A mine in</p> <p>15 Colorado, it was sealed -- the mine opening was sealed,</p> <p>16 and water had built up behind the seal, and it had</p> <p>17 contained mine waste. When monitoring was ongoing for</p> <p>18 this abandoned mine, the seal was released, and 3</p> <p>19 million gallons of mine-influenced water was discharged</p> <p>20 into a river, the Animas River, that then discharged</p> <p>21 down from Colorado into New Mexico, across the state</p> <p>22 boundary, and so these mine wastes were dispersed across</p> <p>23 a large, large area.</p> <p>24 And you can see this is the Animas River,</p> <p>25 there are kayakers there, and then on the right side is</p>
1513	<p>1 site, as we have seen earlier this week, that there is</p> <p>2 both generation of acidity and also neutralization of</p> <p>3 acidity.</p> <p>4 And so this is just another slide similar to</p> <p>5 Ms. Griffiths. It kind of summarizes that you have to</p> <p>6 consider at equilibrium both the acid generation and</p> <p>7 also the acid consumption or acid neutralization. And</p> <p>8 that's going to help you with your final water</p> <p>9 chemistry.</p> <p>10 And so I think that has been shown, that that</p> <p>11 is kind of the approach that's been taken for the</p> <p>12 prediction of the geochemistry for this site for the</p> <p>13 aquifer assessment.</p> <p>14 I'm sorry. That was slide 12.</p> <p>15 For slide 13, the other potential -- one of</p> <p>16 the other potential environmental impacts that's been</p> <p>17 discussed, but probably not as much, is the impact of</p> <p>18 acid generation on metals mobility. So when you do</p> <p>19 decrease the pH upon the acid generation, you do</p> <p>20 increase the solubility of many metals, and they may be</p> <p>21 leached out of other minerals that are in -- in the</p> <p>22 rock.</p> <p>23 And these metals -- some of them may be toxic,</p> <p>24 and so they are concerns for water quality.</p> <p>25 Now, as the acidity tends to neutralize, you</p>	1515	<p>1 after the spill. I think this is very soon after the</p> <p>2 spill. The orange color in the water is that iron oxide</p> <p>3 that I showed in the slide previously.</p> <p>4 And then we have talked -- this is slide 15.</p> <p>5 We have talked earlier this week about some of</p> <p>6 the other copper mines that are in New Mexico, the</p> <p>7 Chino, Cobre and Tyrone, and so this report that I'm</p> <p>8 citing down here, the NMRT, 2012, does suggest that</p> <p>9 there is groundwater contamination associated with these</p> <p>10 sites, just as an example of impact to groundwater from</p> <p>11 some copper mines that are in New Mexico. And so these</p> <p>12 are plume sizes that are -- that this report is quoting</p> <p>13 for these mines.</p> <p>14 And there is a note in this report that some</p> <p>15 of the concentrations in some locations in groundwater</p> <p>16 have not changed for 20 years, and specifically I think</p> <p>17 they're talking about sulfate. And it does note that</p> <p>18 there is a potential that they will not change for at</p> <p>19 least 100 years.</p> <p>20 I'd like to note that one of the major reasons</p> <p>21 for that is that sulfate in groundwater as long as the</p> <p>22 groundwater is oxidizing is quite stable, and so we</p> <p>23 wouldn't expect the concentrations to decline due to,</p> <p>24 for example, chemical reactions.</p> <p>25 So how does this relate to the Copper Flat</p>

<p style="text-align: right;">1516</p> <p>1 site? Well, we can look at some of the data that was  2 reported in the SRK, 2018, report. That's -- the Bates  3 number is stated at the top.  4 This is Table 1-2. And this is the history of  5 the existing pit lake. And what I've tried to highlight  6 here -- and I've got on the right the water quality  7 standards for selected constituents. And we can see  8 what I've selected here on the table that is circled are  9 the water concentrations that are elevated above these  10 water quality standards.  11 And so you can see it's not just sulfate that  12 the pit lake has been contaminated with. It has a pH at  13 times been down to 3.6, and that is an acidic condition.  14 Additionally, the sulfate has been on average  15 about 5,000 milligrams per liter and then a maximum  16 above 8,000 milligrams per liter. So that's above the  17 standard.  18 And then several of these metals here both on  19 average and then the maximum have been above the  20 standards.  21 And so, you know, obviously, this is on the  22 private property, and we're considering this a  23 hydrologic sink. So this water might potentially not be  24 mobilized. But I would say, you know, there is a  25 potential risk, because they're not likely to mine</p>	<p style="text-align: right;">1518</p> <p>1 The other thing is that the pit wall that's  2 generating these contaminants and this acidity, a lot of  3 those materials will be mined, but a lot of the  4 materials will be low enough ore grade that they will be  5 placed in waste rock piles.  6 So this is another example of what might be in  7 a waste rock pile for the proposed mine.  8 So what do we do and how do we protect the  9 environment with this type of a contamination issue? I  10 would treat -- I would suggest treating these mine waste  11 materials as they are potentially generating  12 contaminants for water as if they might be potentially  13 hazardous waste materials, and if you have a landfill  14 for hazardous waste materials, you would have a more  15 impermeable cover.  16 The cover that's stated in the Copper Rule is  17 a store-and-release cover, and as interpreted in this  18 mine permit, it's a soil. And so I don't believe in my  19 opinion it will really do the job of acting as a cover,  20 which in some ways is described very similarly as an  21 underlining liner which would reduce the flow of water  22 through the waste materials.  23 This is an example of a cover system that's  24 very similar -- I would say, in fact, that it has the  25 geotechnical liner, it would be very similar to your</p>
<p style="text-align: right;">1517</p> <p>1 this -- this open pit with the water in the pit.  2 They're likely to pump the water out.  3 When that occurs, that water will be outside  4 of the hydrologic sink, and there is always a potential  5 for release and discharge outside of that hydrologic  6 sink since groundwater is flowing away from the pit  7 outside of the hydrologic sink.  8 The other thing I'd like to note here is that  9 we've focused a lot this week on modeling, both the  10 hydrology and the geochemistry.  11 This site actually has an interesting  12 component, because a lot of my experience has been in  13 permitting mines before they are started, and it's  14 difficult because you use these models, and there are  15 not a lot of confidence in the models, but this is a  16 site that actually has a pilot test.  17 This mine actually was operated for three  18 months, and we have proof that the pit lake is  19 contaminated and associated groundwater wells that are  20 nearby are contaminated. We have proof that it's  21 generating acid rock drainage from the pit walls.  22 So there is not really for this site any, you  23 know, potential. I mean, there's a high potential that  24 this mine will generate acid and generate contaminants  25 in water. So I think that would be an issue.</p>	<p style="text-align: right;">1519</p> <p>1 liner system that's proposed for the tailing storage  2 facility.  3 The tailing storage facility has been designed  4 to have an underlining liner because there's a concern  5 that contaminants might migrate below the tailings  6 facility and go into the groundwater.  7 I would say that if we want to minimize the  8 generation of acid and the migration of contaminants, we  9 also might want to minimize water becoming contaminated.  10 So minimize the amount of water going into the waste  11 rock facilities and going into the tailings facility.  12 So this is, I guess, my attempt at trying to  13 justify the need for overlying covers with  14 low-permeability materials to decrease infiltration of  15 water into these hazardous materials.  16 And I would also suggest that we may also need  17 underlining liners to prevent contaminated water from  18 discharging below these facilities, which is already  19 considered for the tailings storage facility, but it's  20 not really considered for the waste rock, because of the  21 andesite that's been discussed earlier this week.  22 I'm on slide 17, by the way.  23 Okay. The next slide, I'm just trying to show  24 here a little bit more information about the  25 store-and-release cover system. It's been discussed,</p>

1520	<p>1 but I think we need a little bit more detail on that.</p> <p>2 This is a schematic of -- the curve here shows</p> <p>3 just generally water content on the X axis and an</p> <p>4 elevation on the Y axis. And this is a type of</p> <p>5 schematic where you would have a water table or, you</p> <p>6 know, you would go to really high saturation at the --</p> <p>7 at the base of this elevation. And then as you go</p> <p>8 increasing in elevation, you see fairly constant water</p> <p>9 content.</p> <p>10 At the land surface, you may have</p> <p>11 precipitation and infiltration. That might locally at</p> <p>12 the land surface increase the water content, and you may</p> <p>13 store some of that water in the upper portion of the</p> <p>14 soil and the cover system.</p> <p>15 The intent of the cover system is also to</p> <p>16 extract that water, and the only way that I know of that</p> <p>17 it will do that is through the vegetation. So the</p> <p>18 vegetation would need to decrease the water content back</p> <p>19 to its equilibrium or hydrostatic condition. If it</p> <p>20 doesn't do that, you would have potentially fluid flow</p> <p>21 both laterally and mainly vertically downward through</p> <p>22 the system.</p> <p>23 And I think that has been discussed and</p> <p>24 confirmed, that there is a high probability that you</p> <p>25 would have at least some small amount of water that</p>	1522	<p>1 this steady-state behavior be a small steady-state</p> <p>2 behavior. It would be more like the blue. And I'm just</p> <p>3 talking in relative terms here. If you had a higher</p> <p>4 steady-state infiltration, you'd shift that water</p> <p>5 content to the right and have a higher one.</p> <p>6 But, you know, in general, if you get to a</p> <p>7 steady-state, long-term condition, you would expect that</p> <p>8 these transient things would kind of average out. And</p> <p>9 your inflow and your out -- outflow for the water flow</p> <p>10 through the soil and/or the waste rock and the tailings</p> <p>11 facility would then become, you know, at steady-state,</p> <p>12 which means no storage change. So your inflow could</p> <p>13 equal your outflow.</p> <p>14 So whatever we decide -- and I'm not going to</p> <p>15 speculate as to what exactly the infiltration rate would</p> <p>16 be, because I don't know that much about the cover soil</p> <p>17 or how the vegetation will extract the water, but I</p> <p>18 think there is definitely a plan and a -- it's been</p> <p>19 documented in the record that there will be some water</p> <p>20 that will migrate through and beyond the root zone for</p> <p>21 the plants and the cover system. So there will be some</p> <p>22 infiltration rate.</p> <p>23 And so I would suggest that over time at</p> <p>24 equilibrium that would likely -- or at steady-state that</p> <p>25 would likely mean that that amount of water would also</p>
1521	<p>1 would migrate through the cover system, would not be</p> <p>2 evapotranspired, and would migrate in through the</p> <p>3 tailings facility and in through the waste rock</p> <p>4 facility.</p> <p>5 So -- and just conceptually wanted to talk a</p> <p>6 little bit more about that and just show kind of what</p> <p>7 that would look like.</p> <p>8 So these are again these water saturation and</p> <p>9 water content versus elevation curves, and they have the</p> <p>10 same shape. I have -- I have two placed on here. In</p> <p>11 fact, there's a couple of curves. The yellow curves are</p> <p>12 transient, and I would say that the blue curves -- the</p> <p>13 blue and the green curves -- I think this is -- it's not</p> <p>14 labeled, but -- this is slide 19.</p> <p>15 So the blue and the green curves would show</p> <p>16 more of a steady-state, unsaturated water content</p> <p>17 distribution, and during transient infiltration, say you</p> <p>18 had a rainfall event, you might locally at the land</p> <p>19 surface increase the water content, but then as the</p> <p>20 water would move vertically, it would disperse, and</p> <p>21 there would be storage of the water pipe forces.</p> <p>22 And so you can see it would kind of spread out</p> <p>23 and be absorbed into the -- into the soil.</p> <p>24 But if you were to have a con -- more of a</p> <p>25 constant application of water, you would tend to have</p>	1523	<p>1 be discharging if we don't have an underlining liner</p> <p>2 system, which there is for the tailings storage</p> <p>3 facility.</p> <p>4 So if we do have a waste rock</p> <p>5 conceptualization -- I'm on slide 20 here. This is a</p> <p>6 figure from the JSAI, 2018. I think this is the -- this</p> <p>7 is the Probable Hydrologic Consequences Figure 3-18.</p> <p>8 And we've seen this previously. I think Mr. Finch</p> <p>9 showed this.</p> <p>10 So this suggests that there will be</p> <p>11 infiltration, but the arrows show that it's likely on</p> <p>12 the -- on the sides of the waste rock and not on the</p> <p>13 top. But as we just discussed, and I think was</p> <p>14 confirmed in testimony earlier this week, that there</p> <p>15 will be some infiltration from below the cover system,</p> <p>16 as well. So we could add another couple of arrows at</p> <p>17 the top.</p> <p>18 And then there was also some discussion about</p> <p>19 the permeability or hydraulic conductivity of the</p> <p>20 andesite and having that be the liner. So if there is</p> <p>21 some infiltration into the andesite, that would also</p> <p>22 occur, and then there would be some -- some groundwater</p> <p>23 flow.</p> <p>24 This does show that there will be some</p> <p>25 infiltration in the waste rock and some discharge from</p>



1524	<p>1 the waste rock, and it does show that there's a toe                  2 drain on the downslope edge which would collect the                  3 discharge water. I would suggest if the water is moving                  4 through these waste rock materials, it would likely have                  5 a potential to become contaminated.                  6 And so in Mr. Stein's description of the                  7 Reclamation Plan, it was discussed that all of the                  8 process water, mine-influenced water collection and                  9 storage systems would be reclaimed after the reclamation                  10 had occurred.                  11 So if that's the case, there may not be                  12 ability to collect mine-impacted water that's                  13 discharging through these facilities long-term after                  14 closure.                  15 Q. Dr. Carroll, if I might interrupt you for a                  16 moment.                  17 Would it be helpful to have a laser pointer?                  18 A. Sure.                  19 MS. BARNCASTLE: Do you mind taking that to                  20 him?                  21 Thank you.                  22 Q. And before you move on, if I might add a                  23 question or two.                  24 Did I understand your testimony to be that you                  25 do not have a clear idea of what the cover plan is in</p>	1526	<p>1 adhering to the Copper Rule, but I think it would also                  2 be useful to have a cover that's also a low-permeability                  3 material.                  4 You can have the HDPE liner on the top of the                  5 waste rock materials on top of the tailings facility and                  6 then add this soil on top, which would allow for                  7 vegetation to occur.                  8 Q. Thank you.                  9 Please proceed with your presentation.                  10 A. Thank you.                  11 I just also want to clarify since we mentioned                  12 the andesite, there's been some discussion of the                  13 hydraulic conductivity and the permeability of the                  14 andesite. I wanted to talk a little bit about more in                  15 detail what we were talking about just to make sure the                  16 record is clear.                  17 And I think Mr. Stein mentioned a hydrologic                  18 law that we could discuss, and I think Dr. Myers                  19 mentioned it, as well. So it's Darcy's law. This is a                  20 very important principle in law for governing fluid flow                  21 through the subsurface.                  22 And so this is a picture of Henry Darcy, and                  23 this is his experiment. He actually applied fluid flow                  24 through a column of porous media, he measured the                  25 hydraulic head as a function of length, and he</p>
1525	<p>1 this instance?                  2 A. So they discussed the thickness of the cover                  3 and that the material would be likely excavated from the                  4 site, from the surface soils.                  5 There is a discussion in the -- in the MORP.                  6 I wasn't able to read through the entire thing, but I                  7 have not seen any data describing the properties of the                  8 soil. I think Mr. Stein described it as a sandy loam,                  9 which is fairly high conductivity -- hydraulic                  10 conductivity soil.                  11 So I don't think the -- the cover system is                  12 really going to be designed to -- to really inhibit                  13 water flow through the mine waste materials. It's                  14 mainly to store water upon precipitation and then allow                  15 for vegetation to extract that water. It's my -- I                  16 believe it's mainly used to establish a vegetation at                  17 the land surface.                  18 So it would basically bring back the ecology                  19 of the vegetation.                  20 Q. So if you wouldn't mind reminding us again                  21 what your recommendation is based on what you've just                  22 said.                  23 A. My recommendation would be not to change that                  24 plan in terms of having a different type of soil. I                  25 think that soil may be useful for growing vegetation and</p>	1527	<p>1 determined this law, which I'm going to go into in a                  2 little bit more detail, and I think I'm going to try to                  3 explain how this relates to the mine site.                  4 So this is a little bit more detail. I think                  5 Dr. Myers was also trying to apply some definition so                  6 we're clear on what things mean. There has been an                  7 interchange of the terminology "permeability" and                  8 "hydraulic conductivity" throughout this testimony.                  9 And then I think Mr. Finch also mentioned that                  10 the changes in the hydraulic gradient were equal to the                  11 changes in the hydraulic conductivity. And so I just                  12 want to clarify that, because this is Darcy's law, and I                  13 have defined the units here.                  14 The flow rate is this large Q, the capital Q.                  15 That's a volume per unit time.                  16 Hydraulic head, we can also consider that's                  17 the groundwater elevation. And so that's measured at a                  18 couple of different points. It could be measured at                  19 many points.                  20 The hydraulic conductivity is actually a                  21 length per unit time. The cross-sectional area as shown                  22 here for the column, that's the length squared. And                  23 then there's another length here which is the distance                  24 between the two hydraulic head measurements.                  25 And so the hydraulic gradient is actually this</p>

1528	<p>1 term and/or this term. It's the difference in the                  2 hydraulic head divided by the difference in location or                  3 the length through which the groundwater flows.                  4       So this is in measurements of length, and this                  5 is in measurements of length. And this is hydraulic                  6 conductivity. So the hydraulic gradient, if you have                  7 length divided by length, this is a nondimensional term,                  8 whereas the hydraulic conductivity is length per unit                  9 time.                  10       So they're not actually equal to each other,                  11 and changes of these two terms are not equal to each                  12 other.                  13       Q. And that's slide 22?                  14       A. Slide 22.                  15       And then just a little bit more detail on how                  16 this will actually relate to water quality.                  17       So there are three forms that are commonly                  18 used for Darcy's law. This is the -- the top one is the                  19 one we saw in the prior slide.                  20       This is slide 23.                  21       So this is the volumetric discharge rate,                  22 which is equal to the hydraulic conductivity times the                  23 area times the hydraulic gradient. If you were to                  24 divide the volumetric discharge rate by the                  25 cross-sectional area, you'd have another discharge, and</p>	1530	<p>1 this hydraulic gradient.                  2       That's slide 24.                  3       Again with the permeability, comparing that to                  4 the hydraulic conductivity. I think Dr. Myers mentioned                  5 this, as well.                  6       Permeability can be used interchangeably                  7 sometimes, but I just want to note the difference. The                  8 hydraulic conductivity is actually the ability of the                  9 medium to transmit water, and it includes both fluid                  10 properties and also the media properties.                  11       And the media properties are really considered                  12 for the intrinsic permeability, which is the ease at                  13 which a porous medium can transmit a liquid, which could                  14 be a water or could be a different type of -- of fluid.                  15 So it's independent of the fluid and dependent on the                  16 coarse media properties alone.                  17       That's slide 25.                  18       So that kind of illustrates the difference                  19 between those two properties.                  20       Now, I think Mr. Kuipers has noted a need to                  21 examine potential flaws or failures in the potential to                  22 look at uncertainties and potential variability in site                  23 conditions. And so this is a well-known variability in                  24 site conditions related to the hydraulic conductivity                  25 specifically.</p>
1529	<p>1 this is in length per unit time. If you then divide                  2 that by porosity, you would have a velocity. This is                  3 again in length per unit time.                  4       And so the difference between these are this                  5 is a specific discharge which is water flowing through                  6 the bulk system, which is a combination of both the pore                  7 space where the fluid occurs and also through the solid                  8 material. If you divide by the porosity, you're                  9 actually getting the velocity of water flowing through                  10 the pore spaces.                  11       So this is useful because this is the velocity                  12 that the groundwater actually travels. And so you can                  13 calculate the travel time of the water using this type                  14 of an equation.                  15       Okay. Just a little bit more on how you would                  16 determine this. This again is that specific discharge.                  17 This is your hydraulic gradient. If you measure the                  18 specific discharge and you measure the hydraulic                  19 gradient at different values, you can plot a straight                  20 line. The slope of the straight line is then equal to                  21 your hydraulic conductivity.                  22       So again this value is the slope, this                  23 hydraulic conductivity is the slope of the specific                  24 discharge and the hydraulic gradient. This is not --                  25 the changes in this slope are not equal to changes in</p>	1531	<p>1       The spatial variability of hydraulic                  2 conductivity is termed heterogeneity, whereas a spatial                  3 invariance or the -- or the having one property can be                  4 constant as a function of distance called homogeneity.                  5 And so here's some examples.                  6       And generally a rule of thumb is in natural                  7 subsurface materials most of the time you'll have                  8 subsurface variability. And this is a very cartoonistic                  9 sketch, but it illustrates you might have very different                  10 rock types, and they may be spatially variable. And so                  11 if you've collected samples at different locations, you                  12 would be able to measure hydraulic conductivity and get                  13 different results.                  14       What we might even do is then map out a rock                  15 unit and say this rock unit has some variability in the                  16 hydraulic conductivity, but maybe it doesn't vary as                  17 much as another rock unit or another zone of a mine                  18 site, for example.                  19       So we could say that, you know, one media                  20 might be effectively homogeneous or, in general, the                  21 changes in the hydraulic conductivity might not vary                  22 that much. But compared to another media, it might be                  23 different.                  24       So this lends itself very easily to looking at                  25 geologic mapping, and I think that's what basically has</p>

<p style="text-align: right;">1532</p> <p>1 been the approach that's been done at the site, is                  2 looking at the geological materials, we've taken the                  3 geological material homogeneity and applied that to the                  4 homogeneity of the hydraulic conductivity in order to do                  5 the aquifer assessments.                  6       And this is a schematic of what you might                  7 observe if you were to measure hydraulic conductivity                  8 variability in multiple locations throughout a unit.                  9       You might see a -- the black line where you                  10 see some variability here, and you may -- you know, if                  11 you sample here, you might have a high value of                  12 hydraulic conductivity. Here you might have a low value                  13 for the hydraulic conductivity.                  14       But what you could do is you could -- you                  15 could bound the uncertainty, you could look at the range                  16 of possibilities. And then you might say, okay, I've                  17 got, you know, in one unit a -- a value that I could say                  18 is effectively constant throughout a spatial domain.                  19 Even though there is variability it might not vary as                  20 significantly as really is that important.                  21       You can say this is an effective homogeneous                  22 unit, but I would say you also might want to consider                  23 the highs and the lows and actually the range of                  24 potential values that would occur at a site.                  25       Q. And that is slide 27?</p>	<p style="text-align: right;">1534</p> <p>1 lower hydraulic conductivity and then things like this                  2 will be higher hydraulic conductivity. You might even                  3 say you have aquifers on the right side and aquitards on                  4 the -- on the left side.                  5       Clay is an example of that. Clay is a --                  6 commonly considered not an aquifer usually, it's                  7 considered a lower hydraulic conductivity material.                  8       This line, if I've put it there correctly, is                  9 not even in a range of the clay. In fact, it's kind of                  10 in the range of sandstone, which for many people is                  11 considered an aquifer.                  12       And then I'd also like to show here we don't                  13 have andesite on this slide, but we do have another                  14 volcanic material, basalt. And we have other igneous                  15 and metamorphic rocks. And it does range from                  16 unfractured to fractured. And I'd like to note that the                  17 basalt spans the full 12 orders of magnitude for                  18 hydraulic conductivity.                  19       So there is a potential to have a very, very,                  20 very large range of hydraulic conductivities, and based                  21 on the third forum of the Darcy's law that I showed                  22 previously, where the velocity of groundwater is                  23 linearly dependent, all things being given the same is                  24 linearly altered, the velocity can be linearly altered                  25 by the hydraulic conductivity.</p>
<p style="text-align: right;">1533</p> <p>1       A. Slide 27.                  2       And let's get back to why it's important for                  3 this site. And there's been a lot of talk about the                  4 hydraulic conductivity at 10 to the negative-6                  5 centimeters per second. That's a strange number. With                  6 the power -- with it being a negative power, it seems --                  7 seems low. Right? It seems really low. So I wanted to                  8 see what that looks like in comparison to other                  9 materials.                  10       And so this is a graphic that's borrowed from                  11 a USGS report by Heath, and so what they did is they                  12 looked at the range of different geological materials.                  13 So -- and then the line here is showing a range, a                  14 typical range for hydraulic conductivity. And then                  15 these correspond to the values along a scale here for                  16 hydraulic conductivity, and these are in different                  17 units. So this is meters per day, this is feet per day.                  18       So I did the math for the conversion. We've                  19 10 to the negative-6, and that equals about 6 -- or 8 --                  20 8.6 to the 10 to the 4 meters per day. So I put the red                  21 line where we would expect this 10 to the negative-6                  22 centimeters per second to fall.                  23       And, you know, we typically think -- you know,                  24 this is how you would compare it to other materials.                  25       You typically think that things on this side will be</p>	<p style="text-align: right;">1535</p> <p>1       So if your gradient stays the same, if your                  2 area and your porosities stay the same, if you have a                  3 change -- an increase, for example, in your hydraulic                  4 conductivity, you can see an increase in the velocity of                  5 contaminants.                  6       And then I'd also like to note that for the                  7 cover systems, the term "sandy loam" was used, and we                  8 don't have measured values for those, but the NRCS has                  9 suggested that those values for the hydraulic                  10 conductivity could be 10 or 100 times larger than this                  11 value which we've been talking about as a                  12 lower-permeability unit that will inhibit contaminant                  13 migration below the waste rock and the tailings                  14 facilities.                  15       Q. Dr. Carroll, for the record, would you say one                  16 more time -- to the left side of the red line is lower                  17 hydraulic conductivity --                  18       A. Correct.                  19       Q. -- and to the right side of the red line is                  20 higher hydraulic conductivity.                  21       A. Correct.                  22       Q. And the red line is something that you've                  23 added based on your calculation that's shown to the far                  24 left.                  25       A. Yeah. The red line is really just this value</p>

<p style="text-align: right;">1536</p> <p>1 of 10 to the negative-6 centimeters per second that's                  2 been discussed throughout this week. And so I just                  3 wanted to give people an idea of where that falls in                  4 comparison with other materials. Is it really a low                  5 hydraulic conductivity value, or is it not a low                  6 hydraulic conductivity value?                  7 And if you have a cover material that maybe,                  8 you know, implies that it will inhibit infiltration,                  9 it's actually over here somewhere, it's actually a                  10 higher hydraulic conductivity material.                  11 Q. And this 10 to the negative-6 is important                  12 when we were discussing what facet of this project?                  13 A. Well, it was discussed both as a hydraulic                  14 conductivity for the liner and also a hydraulic                  15 conductivity for the andesite.                  16 Q. Do you find it peculiar that the hydraulic                  17 conductivity for the liner was discussed to be similar                  18 or the same as the andesite?                  19 MR. BUTZIER: Objection to the form.                  20 MS. ORTH: What's your objection? The word                  21 "peculiar"?                  22 MR. BUTZIER: Yes.                  23 MS. BARNCASTLE: I'll withdraw the question                  24 for now and think about how to ask it again then.                  25 MS. ORTH: All right.</p>	<p style="text-align: right;">1538</p> <p>1 the area through which the water flows through this unit                  2 and this unit does not change, then if you do have a                  3 lower hydraulic conductivity unit on the right, compared                  4 to the left, you would have to have a larger hydraulic                  5 gradient, which is this term.                  6 So if A and Q are the same, and you decrease                  7 K, you'll have to increase this gradient. So you could                  8 see that there's a higher hydraulic gradient slope here,                  9 a lower hydraulic gradient slope here.                  10 Okay?                  11 Q. (BY MS. BARNCASTLE) Why is that important for                  12 purposes of this project?                  13 A. Well, it was stated that the changes in the                  14 hydraulic conductivity were -- or changes in the                  15 hydraulic gradient were equal to changes in the                  16 hydraulic conductivity. That's not necessarily always                  17 true.                  18 And so I want to show where it might be                  19 possible, where you might have a change in the hydraulic                  20 gradient in one material and then it have a different                  21 hydraulic gradient if you have an adjacent material with                  22 a different hydraulic conductivity. Just for                  23 clarification.                  24 Now, I would say that's not always true.                  25 Here's an example for that.</p>
<p style="text-align: right;">1537</p> <p>1 MR. CARROLL: Are we okay with this slide?                  2 This is 28.                  3 So I want to clarify, because I think I                  4 understand the testimony from Mr. Finch earlier when he                  5 said that there was changes in the hydraulic gradient                  6 that were equal to changes in the hydraulic                  7 conductivity, and I think it does relate to Darcy's                  8 laws. So that's kind of why I went back into this.                  9 And this is a schematic. This is showing one                  10 hydraulic conductivity material and another hydraulic                  11 conductivity material, and they're -- they're layered in                  12 sequence such that you have no flow above, you have no                  13 flow below, and you're forcing flow from one material                  14 into another.                  15 And what you would find based on Darcy's law,                  16 which is again shown up here, is if at steady-state if                  17 these two units are connected, Darcy's law occurs in                  18 this one, and it occurs in this one, and at steady-state                  19 the flow through this unit on the right has to be equal                  20 to the flow on this -- through this unit on the left.                  21 So you have Darcy's law for unit one equal to                  22 Darcy's law in unit two. In other words, the flow is                  23 equal in this unit to this unit.                  24 If -- if that is the case and the                  25 cross-sectional area does not change, in other words,</p>	<p style="text-align: right;">1539</p> <p>1 Your changes in hydraulic gradient are not                  2 always equal to changes in hydraulic conductivity. So                  3 if you have a water table aquifer system, and you                  4 decided to put in some wells, then you decided to pump                  5 these wells, you would create a cone of depression in                  6 the water table, you would draw water in to the well,                  7 and you would decline the hydraulic head at this well                  8 compared to adjacent to the well.                  9 This actually increases the hydraulic gradient                  10 towards that well. So you've altered in this case the                  11 hydraulic gradient, but you haven't altered the                  12 hydraulic conductivity.                  13 Okay?                  14 Q. And that's slide 30.                  15 A. Slide 30.                  16 Okay. And then with the discussion of the                  17 East Animas Fault being a barrier boundary to flow, I                  18 think one of the concerns is the misunderstanding of                  19 that term may occur as in hydrologic sciences, boundary                  20 is used a lot of times for modeling, and sometimes it's                  21 considered for no-flow boundary.                  22 I think Dr. Myers discussed his model                  23 yesterday and discussed that there were some no-flow                  24 boundaries.                  25 So I wanted to show what no flow actually</p>

<p style="text-align: right;">1540</p> <p>1 looks like with this. So this is a bucket of water.                  2 And you'll notice that this is a manometer showing a                  3 hydraulic head at this location. And then this is a                  4 plot of the total hydraulic head as a function of                  5 elevation. And it's actually broken out in terms of the                  6 elevation head, the pressure head, which if you sum                  7 these two will equal the total head.                  8       As the -- if you were standing at the bottom                  9 of the bucket, you'll have the height of all of the                  10 weight of the water on top of you so you'll have high                  11 pressure. But as you move from the bottom to the top of                  12 this bucket of water, you would actually decrease the                  13 pressure, because the height of the water standing on                  14 top of you would decrease.                  15       And at the top, relative to atmospheric, you                  16 would have no pressure, it would be 0 or atmospheric                  17 pressure. So your pressure as a function of elevation                  18 would propagate towards 0 at the top and then increase                  19 to higher levels as you went towards the bottom.                  20       Now, the elevation head component would                  21 actually do the reverse. If your datum is here at the                  22 bottom, then your elevation is 0. And then as you                  23 increase from the bucket bottom to the top, you would                  24 increase in elevation, and that increase would increase                  25 linearly with the elevation.</p>	<p style="text-align: right;">1542</p> <p>1       Okay. So this is useful in introductory                  2 hydrogeology for figuring out the flow through a system,                  3 and as long as it's steady-state, what we can define as                  4 a simplified system, and we go through a series of                  5 sketches to draw flow net and calculate the flow through                  6 a system.                  7       You would define your boundaries -- and for                  8 this simplified rectangle -- this, by the way, is from                  9 Applied Hydrogeology. You would have a no-flow boundary                  10 here. So flow would not occur across this boundary.                  11 And then you'd have a no-flow-boundary here, you would                  12 not have flow across this boundary.                  13       But you would have a constant head boundary on                  14 this side and a constant head boundary on this side.                  15 But if this is a high constant head boundary and this is                  16 a low constant head boundary, flow would propagate from                  17 the left to the right.                  18       This is actually not too different from the                  19 conceptual model that Dr. Myers did of the site                  20 propagation of water flow from the site towards the                  21 Caballo Reservoir.                  22       In fact, if you imagine the site as a                  23 rectangle or moving from the site towards the Caballo as                  24 a rectangle, this could be similar to this, to the site                  25 where -- the first thing you would do is you would</p>
<p style="text-align: right;">1541</p> <p>1       So those things being offset, your total head                  2 would not change throughout the elevation of this                  3 bucket. In that way, there is no change in hydraulic                  4 head, and therefore there is no flow.                  5       And the reason that's important is because                  6 when we look at a map of groundwater elevation contours,                  7 there are places where the change in hydraulic head may                  8 not change, and then there's, obviously, locations where                  9 the change in the hydraulic head will change. And so I                  10 tried to describe that here.                  11       Location in a groundwater elevation which is                  12 equal to hydraulic head in a contour map of contour                  13 lines of groundwater elevation, if you're moving along a                  14 contour line, then -- the hydraulic head and/or the                  15 groundwater elevation does not change as a function of                  16 distance. And that's the definition of a hydraulic                  17 gradient. So along those lines, you would have no flow.                  18       But if you're moving between those lines or                  19 not along those lines, then you have a change in the                  20 hydraulic head as a function of distance which is a                  21 hydraulic gradient greater than 0 so you would have                  22 fluid flow. So you would have no flow along the contour                  23 lines, whereas you would have flow occurring                  24 perpendicular to those contour lines.                  25       That's slide 31.</p>	<p style="text-align: right;">1543</p> <p>1 realize that there's no flow across this no-flow                  2 boundary. So you would have to put a directional flow                  3 line adjacent to this no-flow boundary.                  4       And then you could add additional flow lines,                  5 and that would break up the domain into tubes of -- flow                  6 tubes. And then what I just discussed previously is you                  7 would have equipotential lines or groundwater elevation                  8 contour lines. And as I said before, those would be                  9 perpendicular to the direction of flow. So if this is a                  10 flow line, the contour line for the groundwater                  11 elevation would have to be perpendicular.                  12       So you can see that these groundwater                  13 elevation lines have to terminate at a right angle with                  14 the no-flow boundary.                  15       So that's -- that's important because when you                  16 have a barrier boundary, and you consider that as a                  17 no-flow boundary, your groundwater elevations would have                  18 to terminate at a right angle to those barrier                  19 boundaries.                  20       That's slide 32.                  21       Okay. So we've seen this slide before. This                  22 is the Figure Number 2 from the DP-1840. It shows, I                  23 believe, the end of mine life groundwater elevation                  24 contours for the site.                  25       You'll notice here we have the open pit mine.</p>

1544	<p>1 And the pit perimeter is shown here. And we also have</p> <p>2 the East Animas Fault, and then there are some projected</p> <p>3 groundwater contour intervals to the east of the -- of</p> <p>4 the East Animas Fault.</p> <p>5 Notice there are groundwater flow directions</p> <p>6 proposed on here, and we can see that they do tend to</p> <p>7 follow at right angles with these groundwater</p> <p>8 elevations. So if your groundwater elevation contours</p> <p>9 are in this area north/south, your flow would be</p> <p>10 east/west, and it would move from higher hydraulic head</p> <p>11 or higher groundwater elevation toward lower groundwater</p> <p>12 elevation, would flow from west to east.</p> <p>13 And so that would occur in this part of the</p> <p>14 mine, on the southern side of the pit, on the northern</p> <p>15 side of the pit, as well, and then in the waste rock</p> <p>16 facilities to the north of the mine operation site. And</p> <p>17 then also through the tailings facility, the flow would</p> <p>18 be from west to east, as well.</p> <p>19 Note that we do have what has been proposed as</p> <p>20 a hydraulic sink, and I think it is documented in the</p> <p>21 prior testimony. Here in the open pit, we see closed</p> <p>22 contours around the open pit area. So that would mean</p> <p>23 that there's no flow out of the pit, and then if there</p> <p>24 was flow into the pit, it would be along these -- the</p> <p>25 changes in the hydraulic gradient going towards the pit.</p>	1546	<p>1 hydraulic contours are still going north/south, and the</p> <p>2 groundwater flow is still from west to east across that</p> <p>3 fault, which I think was discussed at length in</p> <p>4 Dr. Myers' testimony, as well, previously.</p> <p>5 That --</p> <p>6 Q. So just to follow up, since we're not seeing</p> <p>7 the perpendicular lines where water starts -- water hits</p> <p>8 this fault and starts flowing a different direction,</p> <p>9 it's still flowing across the fault, does this fault</p> <p>10 actually constitute a barrier boundary?</p> <p>11 A. It is not a no-flow boundary to -- to</p> <p>12 groundwater flow.</p> <p>13 Q. Thank you.</p> <p>14 Please continue.</p> <p>15 A. So there's one more slide we've seen on</p> <p>16 groundwater elevation contours, and I know we've seen</p> <p>17 this before, but I just wanted to note a couple things</p> <p>18 to follow on from the prior testimony.</p> <p>19 This, as was noted, is a larger scale</p> <p>20 groundwater elevation contour map, and it does show the</p> <p>21 contours which I just discussed, for groundwater</p> <p>22 elevation are going north/south in the area of the mine</p> <p>23 permit, and so the groundwater discharge is occurring</p> <p>24 from west to east, in the mine permit area.</p> <p>25 But then if you extend outside of the mine</p>
1545	<p>1 But notice that the size of the hydraulic sink</p> <p>2 could likely be limited to the pit, whereas you have a</p> <p>3 green line here which is the surface water catchment for</p> <p>4 the open pit. So that's -- that's the open pit surface</p> <p>5 drainage area.</p> <p>6 So I think in the Copper Rule mainly that open</p> <p>7 pit surface area drainage is used to describe where</p> <p>8 there's maybe not as much of a concern as far as</p> <p>9 migration of contaminants for -- for waste rock</p> <p>10 facilities.</p> <p>11 So this would encompass a larger area and more</p> <p>12 waste rock materials, which you would imagine that</p> <p>13 surface water falling within the footprint of the green</p> <p>14 line would then propagate towards the pit, but</p> <p>15 groundwater discharge as a hydraulic sink would really</p> <p>16 be limited to a smaller footprint.</p> <p>17 So groundwater contamination that's outside of</p> <p>18 this hydraulic sink in the groundwater may still</p> <p>19 propagate from the west to the east even though it's</p> <p>20 inside this open pit surface drainage area.</p> <p>21 The other thing I'd like to note with this</p> <p>22 figure is that the contours for the groundwater</p> <p>23 elevation are running north/south so that groundwater</p> <p>24 discharge is west to east, both within the mine permit</p> <p>25 area, and then across the East Animas Fault. The</p>	1547	<p>1 permit area, I think we discussed that the variability</p> <p>2 in the directions of flow changes quite a bit based on</p> <p>3 this map.</p> <p>4 So if you had discharge to groundwater, let's</p> <p>5 say, for example, from one of the existing or proposed</p> <p>6 waste rock facilities that's on the northern part,</p> <p>7 northeastern part of the mine property, the groundwater</p> <p>8 would occur and move perpendicular to these groundwater</p> <p>9 elevation contours. It would flow more toward this</p> <p>10 direction in the arrow shown on slide 34 to the</p> <p>11 northeast.</p> <p>12 But if you had discharge from, say, the area</p> <p>13 near the tailings facility, it might flow more directly</p> <p>14 towards the -- towards the east despite some</p> <p>15 variability, you know, more to the east, but it might</p> <p>16 even propagate a longer distance -- I think it was</p> <p>17 discussed about 12 miles -- potentially towards the</p> <p>18 Caballo Reservoir.</p> <p>19 And that was again a part of Dr. Myers'</p> <p>20 testimony. He suggested with his model that that was a</p> <p>21 possibility, that groundwater and/or contaminants could</p> <p>22 migrate from the mine permit property toward the Caballo</p> <p>23 Reservoir. And this groundwater elevation map does</p> <p>24 suggest that, as well.</p> <p>25 And then if there were contaminants migrating</p>

<p style="text-align: right;">1548</p> <p>1 maybe from the tailings facility or some other facility  2 on the southern part of the property, they might migrate  3 towards the southeast instead of directly to the east.  4 And I would like to note here there are some  5 wells concentrated on the eastern boundary of the mine  6 property, but there are very few wells to the east of  7 the East Animas Fault, to the east of the mine permit  8 boundary.  9 So I think we discussed this being one of the  10 wells in previous testimony. But if you were to, say,  11 for example, try to characterize groundwater plume, you  12 would probably need more monitoring wells to map out the  13 spatial variability in the groundwater plume and the  14 directions of fluid flow if potentially migrating from  15 the site.  16 There probably is not enough wells to really  17 fully characterize the groundwater flow in this area,  18 including solute transport.  19 Q. Dr. Carroll, are you basically saying there's  20 not enough data to conclude what they've concluded on  21 this issue?  22 A. Yes.  23 Q. Thank you.  24 A. That's slide 34.  25 And I would like to note before we end with</p>	<p style="text-align: right;">1550</p> <p>1 And so this is slide 35.  2 And you can see here there are several  3 monitoring wells. And this is in -- this is more in the  4 area of the pit. So it's near the open pit area. And  5 you can see that there are some pH values in the  6 groundwater that are quite low, below neutral. This  7 is -- would be considered pH that may be acidic waters.  8 And you can also see all of the concentrations  9 measured here are -- that are in bold are exceedances of  10 the water quality standards that are noted here at the  11 top. So there are several constituents in the  12 groundwater at several wells, specifically this 24A and  13 25A, that do have contamination that is existing.  14 Can I go back a slide or two to show where  15 those are just to remind folks?  16 So this is slide 35. This is slide 33. My  17 understanding of those, this is the 25 well, and then  18 this is the 24 well.  19 So those are adjacent to the pit area, and we  20 did discuss the pit would have a hydraulic sink. And  21 what that would mean is you have groundwater flowing  22 into the pit from all directions. So that's actually a  23 nice contaminant containment system because there's no  24 groundwater discharge really away from this pit in this  25 area. So any contaminants in this area would stay</p>
<p style="text-align: right;">1549</p> <p>1 this slide -- I think it has been discussed that there  2 is a well, I believe, on the adjacent property, and I'm  3 not sure if that's used for anything. I can't remember  4 the testimony. But if there were a sulfate plume, let's  5 say, just for example, migrating from a waste rock  6 facility on the northern side of the site, if it were to  7 have groundwater flowing offsite, which we discussed,  8 and if that sulfate did migrate offsite, it would likely  9 migrate toward this well.  10 And I haven't done any specific solute  11 transport calculations, but based on the available data  12 for the groundwater elevation contours, it would be not  13 unreasonable to suggest that that's a direction of  14 potential groundwater flow and contaminant transport  15 migration.  16 This is -- I just want to get into a little  17 bit more with the discussion of the sulfate plume.  18 There has been, I believe, notes in the testimony that  19 the sulfate plume is decreasing or shrinking, and I  20 just -- I -- maybe it's available for that information.  21 I have not seen the information to suggest that that's  22 happening.  23 This is a table from the JSAI, 2013. I think  24 this is the abatement report. Yeah. This is the Status  25 Report for Stage 1 Abatement report.</p>	<p style="text-align: right;">1551</p> <p>1 localized here.  2 But you note that the footprint is not as  3 large as the open pit surface area drainage. So it may  4 be possible -- I'd have to -- I'd have to really examine  5 in more detail, and maybe, you know, the mine has done  6 more examination, but I don't actually know if this  7 hydraulic sink in the groundwater does actually capture  8 contaminants from this 24 or 25 well.  9 In this area, they do have a groundwater  10 direction flowing west to east near this well, and this  11 is adjacent to a waste rock facility that's existing, I  12 believe.  13 And then in this area to the south of this  14 well, there is groundwater flow from the west to east,  15 as well. It's just in between those wells there is a  16 hydrologic sink. So it may be that if this hydrologic  17 sink doesn't capture the contaminants that may be at  18 these locations or migrating, those contaminants may  19 migrate from the west to east, as discussed previously.  20 So that's slide 33, but let's move down back  21 to slide 35.  22 I think I'm done with this slide. I just  23 wanted to note that present in existing groundwater  24 contamination that is at the site, and I would also like  25 to note that this is likely due to the mining activity.</p>

1552	<p>1 I haven't seen any premining groundwater concentrations,                  2 but because of the acid nature of the contamination, I                  3 would suggest that it's likely associated with the                  4 premining -- three months of mining that occurred in the                  5 1980s.                  6 So the next slide, slide 35, is again from                  7 that same report, the JSAI, 2013, but it shows                  8 groundwater data from more downgradient. This is near                  9 the waste rock facility and the tailings facility.                  10 MS. ORTH: 36.                  11 MR. CARROLL: And I think Dr. -- what?                  12 MS. ORTH: 36.                  13 MR. CARROLL: 36 is the slide.                  14 I think Dr. Myers also noted the sulfate plume                  15 in this area, and he noted that the concentrations were                  16 increasing over time. And I just wanted to reiterate                  17 that in this report Figure 7, and then here's the Bates                  18 index, it does show that for these two groundwater wells                  19 they are increasing over time from 1980 to 2014.                  20 And these wells, 3 and 8, these are in the                  21 waste rock area. They're not actually in the tailings                  22 area. And you can't -- you can actually note that --                  23 let's see. The sulfate -- if we're considering this to                  24 be a sulfate plume, there is concentrations that are                  25 exceeding the 600-milligram-per-liter standard in the</p>	1554	<p>1 just wanted to note additional aspect. This again is a                  2 figure -- Figure 3 from the JSAI, 2013, report. Here's                  3 the Bates number.                  4 Here is the mine permit boundary tailings                  5 facility, and then the map here shows the geologic                  6 units. And so this is actually an aquifer. This is the                  7 Upper Santa Fe Group that's been discussed in this trial                  8 previously.                  9 And it does show the -- the well locations.                  10 The wells that are elevated in terms of concentration                  11 are near the northern side where the waste rock                  12 facilities -- it's actually Number 3 and Number 8. So                  13 these wells are not exceeding the standard. These wells                  14 are elevated. And in fact -- which one was it? It                  15 was -- sulfate -- let's see this one. Number 3 is above                  16 the standard. So number 3 is actually above the                  17 standard.                  18 And I just wanted to note, because it just                  19 seemed interesting to me, how close this is to the mine                  20 permit boundary that we have an exceedance of a                  21 groundwater standard at concentrations in an aquifer                  22 system.                  23 So we already noted the idea that there is                  24 groundwater flow across the site. We noted that the                  25 groundwater flow for a lot of this site occurs from west</p>
1553	<p>1 groundwater near the waste rock.                  2 The concentrations are elevated in the                  3 tailings facility groundwater, but it doesn't look from                  4 this table like there are any that are exceeding the                  5 groundwater standard. But they -- there are exceedances                  6 in the waste rock facility, and, in fact, rereading this                  7 report, it does suggest that the waste rock facilities                  8 are the likely source of the sulfate plume, as opposed                  9 to the tailings facility.                  10 Q. (BY MS. BARNCASTLE) Dr. Carroll, do you have                  11 a recommendation about lining for the waste rock storage                  12 facility?                  13 A. Yeah. The recommendation would be to try to                  14 decrease additional groundwater contamination, because                  15 we've already got groundwater contamination here, but to                  16 decrease additional groundwater contamination by                  17 minimizing water access to materials that generate                  18 contaminants. So that would be having an overlying and                  19 underlining layer which has low permeability which would                  20 mitigate water from entering and flowing through these                  21 materials.                  22 I wanted to mention one other thing. Having a                  23 table like this, it's kind of hard to see where these                  24 are. Could -- oh. I think the next slide shows that.                  25 Okay. This again has been shown before, but I</p>	1555	<p>1 to east. And then we have groundwater contamination                  2 that's right adjacent to the northeastern boundary of                  3 the property.                  4 So theoretically any additional groundwater                  5 flow from west to east might have this contamination                  6 migrating across that boundary. And I think we've noted                  7 earlier that there's a well off to the northeast of the                  8 mine permit area.                  9 Slide 37.                  10 Q. Dr. Carroll, would adding additional                  11 contamination on top of the existing contamination cause                  12 any concern to you?                  13 A. Yeah. I -- I think, you know, we should                  14 likely do our best to minimize additional contamination,                  15 but additional groundwater discharge, as Dr. Myers                  16 showed yesterday, would actually allow for more                  17 discharge to occur from west to east. And we already                  18 know that there is groundwater discharge from west to                  19 east.                  20 So just having groundwater discharge would                  21 allow these contaminants to migrate potentially across                  22 that mine permit boundary. So additional contamination                  23 and additional groundwater discharge would exacerbate                  24 that, potentially.                  25 Q. Is it your opinion that additional acid rock</p>



<p style="text-align: right;">1556</p> <p>1 drainage contamination will occur as a result of the  2 proposed mining activity?  3 A. That's a good question. I think I want to go  4 into that in a little bit more detail with the aquifer  5 assessment.  6 Q. Am I jumping the gun? Is that what you're  7 saying?  8 A. That's, I think, a lead-in.  9 So I just wanted to also note, as we discussed  10 before, across the eastern boundary of the mine permit  11 area, the groundwater flow tends to occur from west to  12 east, but then, as noted previously, on the northern  13 side there could be components of the groundwater that  14 might migrate in a direction that's more to the  15 northeast.  16 Okay. So moving on to the -- to the waste  17 rock tailings facility, the potential for acid rock  18 drainage that would occur with the new mine.  19 These are some slides -- or some information  20 from the SRK, 2013, Geochemical Characterization Report.  21 And I think some of this has been discussed before, but  22 I wanted to highlight some of my observations that  23 weren't covered in Dr. Griffiths testimony.  24 I think this was shown that there -- there is  25 some sulfide within the andesite here, and these are the</p>	<p style="text-align: right;">1558</p> <p>1 samples may be characteristic of the other parts of the  2 waste rock.  3 One thing I would like to note here is there's  4 a lot of scatter. The data are all over the place.  5 There is a large part of the data which are in  6 uncertain, and there's actually, I would say,  7 potentially fewer samples that are nonacid-generating.  8 So there's -- based on the acid base  9 accounting, there's probably fewer samples that are  10 confirmed to be nonacid-generating, there's a  11 significant amount that are uncertain, and then there's  12 several that are more certain of creating acidity.  13 These areas of uncertainty may generate acid, and they  14 may not generate acid.  15 So this just highlights Mr. Kuipers' note that  16 there is some uncertainty here and we need to consider  17 some of this uncertainty and not just use, you know, one  18 prediction, two to address an aquifer assessment.  19 Q. And that was slide 39?  20 A. Slide 39.  21 This is just kind of a follow-on with that.  22 The tendency for the samples they collected were that  23 the net neutralization potential would decrease. In  24 other words, the ability of the sample to neutralize  25 acid decreases with the sulfide content. Remember</p>
<p style="text-align: right;">1557</p> <p>1 mean values. These are the boxes. But -- and we do see  2 that some of the waste materials do have sulfide, as  3 well. And they're elevated relative to the -- to the  4 andesite.  5 And that's really to be expected because the  6 mine site is a mine site. It's been -- it's been  7 mineralized so there is sulfide content there, and  8 that's why there's an interest in mining it. This  9 sulfide content is important because that's what's  10 considered to be the content that generates acidity.  11 And I think Dr. Griffiths went into this a  12 little bit of detail, where they had measured from  13 geochemical samples the potential for acid generation  14 using static tests. That's the X axis here. And then  15 the potential for neutralization on the Y axis. And you  16 can see fields here -- I think she mentioned this, as  17 well -- where there's potential acid formation in this  18 triangle, an area of uncertainty in this triangle and  19 then acid -- nonacid-forming in this triangle.  20 And so I know that, you know, there's a --  21 already been a discussion that this transitional waste  22 has a higher potential to generate acid. In other  23 words, a lot of these red squares are occurring in this  24 potentially acid-generating or more likely  25 acid-generating field. And maybe some of the other</p>	<p style="text-align: right;">1559</p> <p>1 sulfide is what generates the acidity.  2 Several of the samples were essentially  3 acid-generating. There's a lot of uncertainty. And  4 then I would say there's not as many samples that are  5 nonacid-generating. So it's likely that a lot of the  6 samples would potentially generate acidity and a lot of  7 the waste rock may potentially generate acidity.  8 This was another plot showing the net  9 neutralization potential versus the net acid generation.  10 And this just again confirms that there are some samples  11 that potentially generate acid and then there are a  12 significant amount that have an area of uncertainty.  13 And then it was noted that some of them are also  14 nonacid-generating. At slide 41.  15 So this is kind of a summary table. I know  16 it's already been discussed that the transitional waste  17 material has been shown with the acid base static  18 testing to generate acidity.  19 But I would like to note that with this legend  20 the pink values and the yellow values are potentially  21 acid-forming, and so that would suggest that most of  22 these rock materials which will end up in the waste rock  23 would potentially generate acid.  24 And the reason I want to discuss this is  25 because I think there is a benefit in the static</p>

<p style="text-align: right;">1560</p> <p>1 testing. In my impression, the static testing allows  2 for completion of the acid generation and acid  3 neutralization reactions. So that's the balance that I  4 discussed earlier on in the slides where the reactions  5 are allowed to proceed to equilibrium potentially.  6 And you can kind of figure out which is going  7 to win, is there going to be more acid generation, or is  8 the acid going to be consumed by the buffering and  9 neutralization capacity of the material. And so this is  10 useful for looking at long-term behaviors if you're  11 considering an aquifer assessment.  12 That's slide 42.  13 The reason that's relevant is because we also  14 have another type of geochemical testing which was the  15 kinetic testing, or humidity cell testing, and that was  16 discussed again by Dr. Griffiths. But we didn't, I  17 don't think, get to see a lot of the data. So I wanted  18 to show people what it kind of looks like.  19 These are weeks on the X axis, and then the pH  20 is on the Y axis, but this might be concentration for  21 contaminants in the water as reacted by materials from  22 the mine site.  23 There are several samples here. Notice many  24 of them have neutral pHes, and the pH is stable over  25 time which is a good thing. There are a couple of</p>	<p style="text-align: right;">1562</p> <p>1 your modeling results.  2 And I think that's what most people do in  3 these types of geochemical modeling results, or  4 modeling -- these are the data that are used as input to  5 the geochemical modeling. But I would like to show here  6 that there is some concentration that's increasing and  7 some that are decreasing.  8 Okay?  9 So this is -- one more. This is uranium. And  10 concentration on the Y axis and then time on the X axis.  11 Notice that there are some higher concentrations early  12 on, and then they decline. It's shown here that there  13 is a standard for water quality in New Mexico.  14 Early on there were some exceedances, and then  15 it declined, and the concentrations stabilized at low  16 concentrations below the exceedance. So you would want  17 to say, okay, let's look at the long-term data, and we  18 can use that for prediction of the concentrations over  19 the long-term in, you know, these facilities.  20 And I also want to argue that you could have  21 also potentially looked at using this static testing as  22 that also shows the longer-term equilibrium behavior  23 potentially.  24 But this is a long-term, I would say  25 steady-state weathering rate that could be used, and, in</p>
<p style="text-align: right;">1561</p> <p>1 samples which decrease pH and even went to lower pH.  2 This might be considered acid-generating, and I think  3 that's what we were talking about with the transitional  4 waste.  5 So the kinetic testing is useful, and I think  6 Dr. Griffiths also explained that that was useful for  7 determining a rate kinetic that could be used for the  8 modeling.  9 So one other slide here. The copper milligram  10 or kilogram per week, this is a rate of concentration of  11 copper leaching from a material, and that's used in the  12 prediction of the pit lake. It's used in prediction of  13 the -- of the waste rock and the tailings facility.  14 And you can see that over time some of the  15 concentrations stabilized so you could pick a stable  16 value, because some of the concentrations were declining  17 over time, and some of them were increasing. And I  18 think that's the reason why they let the test go on so  19 long, over 100 weeks. And I think they noted that that  20 was longer than typical for a lot of sites, and I think  21 it's useful that they did that data collection.  22 Usually what you want to do is you want to  23 have the concentrations stabilize to more of a constant  24 value, and then you would use this constant long-term  25 value as a long-term weathering rate that you'd use in</p>	<p style="text-align: right;">1563</p> <p>1 fact, they did. They used this data type for the input  2 for all the geochemical modeling, as far as I know.  3 That's what it mentioned in this report. And then this  4 was also mentioned in the SRK, 2018, which is the  5 geochemical modeling report.  6 But they did a little selection of the data  7 that they inputted. They said they -- they wanted to  8 use all of the data over all of the weeks for the major  9 ions, and so those are listed here. And so what they  10 did is they took an average of 0 to 100, or however many  11 weeks they had, so it averaged out this higher  12 concentration and the lower concentration. And then  13 they used that result as the input to the modeling.  14 But for some of the water quality  15 constituents -- and they're noted here, silver, arsenic,  16 boron, barium, cadmium, cobalt, chromium, copper,  17 mercury, molybdenum, nickel, lead, antimony, selenium,  18 uranium, vanadium and zinc -- they only used the data  19 that were after the 20 weeks.  20 So they would basically take this data, these  21 data to these data, and average these. So you can  22 imagine a low concentration, steady-state average, and  23 they basically ignored the early time which could have  24 been a higher concentration.  25 And why that might be relevant is because a</p>

<p style="text-align: right;">1564</p> <p>1 lot of these are the regulated toxic contaminants that  2 would be considered in an aquifer assessment. And so if  3 you don't average all of the data, if you just average  4 these lower concentration late time data, you may be  5 having a lower input into your geochemical model.  6 And I would say that might be potentially  7 appropriate if they were to say that was the case for  8 all of the data, but they did select these salts. And  9 they used the average for the entire time period for  10 those. So I just don't know what the designation is,  11 why they decided to select the long -- the average  12 through all the data for these constituents and only the  13 after 20 weeks for these ones.  14 And I do want to note -- if somebody remembers  15 what the predicted exceedance would be? Was it this  16 one? Wasn't that the predicted exceedance?  17 The one that -- I believe that's the one -- we  18 have to confirm that.  19 Q. Yeah. I believe that fluoride is already  20 elevated in the groundwater in this area and that was  21 the testimony.  22 MR. BUTZIER: Correct.  23 MR. CARROLL: So it's interesting that the one  24 exceedance that they did predict was in the suite of  25 elements that they decided to average the entire data</p>	<p style="text-align: right;">1566</p> <p>1 more with this, because it -- the geochemical modeling  2 that's done is to predict the concentrations in the  3 water in the future that will be in the pit lake, that  4 will be flowing through the waste rock piles and through  5 the tailings facilities.  6 So it is important to consider what the inputs  7 are for these models in terms of the aquifer assessment,  8 and it's also important to consider the range of data  9 that are available for modeling the potential range of  10 environmental impacts to the groundwater.  11 And I have on occasion done a few geochemical  12 models and specifically added this type of humidity cell  13 test results to geochemical models, but not in my  14 experience have I used part of an average solution and  15 then part of another average solution to predict a water  16 chemistry for a pit lake or a waste rock or a tailings  17 facility.  18 So I'm not aware that this is used or has been  19 used before in any other location, this approach of  20 using a mixed input. Okay.  21 And that was slide 45.  22 This is slide 46.  23 I know that there was discussion in the past  24 in the record about how long you should run these  25 humidity cell tests, and one of the issues with this</p>
<p style="text-align: right;">1565</p> <p>1 set, and most of these others are not regulated of  2 concern except for sulfate.  3 MS. ORTH: Ms. Barncastle, we need a break  4 soon.  5 MS. BARNCASTLE: Whenever --  6 MR. CARROLL: This is probably --  7 MS. BARNCASTLE: I'll ask the witness.  8 MR. CARROLL: This is fine.  9 MS. BARNCASTLE: Okay. Thanks.  10 MR. CARROLL: Yeah.  11 MS. ORTH: All right. 20 minutes.  12 (Proceedings in recess from 3:41 p.m. to  13 4:02 p.m.)  14 MS. ORTH: Okay. When we broke, we were in  15 the middle of Dr. Carroll's testimony.  16 Ms. Barncastle.  17 MS. BARNCASTLE: Thank you, Madam Hearing  18 Officer.  19 And I would note that we have only about eight  20 more slides to go on direct so we're close.  21 MS. ORTH: Okay.  22 Q. (BY MS. BARNCASTLE) Dr. Carroll, would you  23 please pick up where you left off.  24 A. Yes. Thank you.  25 I do want to just summarize just a little bit</p>	<p style="text-align: right;">1567</p> <p>1 site is, as noted by Dr. Griffiths, the encapsulation of  2 sulfide minerals within silicate minerals could delay  3 the release of acidity. And so it was important for  4 them, I think, to continue to run these humidity cell  5 tests for longer periods of time than are even  6 recommended.  7 And so 100 weeks is a long time, but it's not  8 the longest time that someone might run that humidity  9 cell test.  10 This is an excerpt from a paper in 1999 saying  11 humidity cells, how many and how long, and it does  12 suggest that some humidity cells have been run for three  13 to seven years, and there's roughly a 50 percent chance  14 that the cells will become stable over a short period of  15 time, and then there's a 50 percent chance that some of  16 the cells may have to be continued for three to five  17 years.  18 And what we're talking about here in that  19 middle paragraph is making sure you have a stable  20 geochemical signature in terms of the concentration and  21 that it average over -- averages to be a similar result  22 over multiple weeks.  23 And so I know that that may have been the case  24 for several of the elements, but I know that some of  25 these materials are reactive, and they are reacting over</p>

<p style="text-align: right;">1568</p> <p>1 time, as we discussed in the earlier parts of this  2 presentation. You have the equilibrium chemistry which  3 basically you can say you're going to have some  4 materials generate acid, you have some materials  5 neutralize acid, and which one wins will determine  6 whether or not you're going to go acidic.  7 And the static test helps test that. And I  8 showed slides earlier suggesting that many of the  9 materials will potentially go acidic over time.  10 Now, the kinetics tells you how long that  11 might take. And we need to do the humidity cell test in  12 order to evaluate how long it may take, or at least to  13 get the long-term steady-state weathering rates that can  14 be used in the aquifer assessment prediction modeling.  15 So I would like to show here this  16 neutralization potential remaining.  17 And again this is SRK, 2013, Figure 6-10, and  18 the slide 47.  19 Many of these reaction cells still had  20 declining neutralization potential even after the end of  21 the test, towards the end of the test. Some of the  22 cells in the upper part near 100 percent, you could say  23 there's not much change, there's a trend, but not much  24 change in the decline in the neutralization potential.  25 But several of these tests were declining.</p>	<p style="text-align: right;">1570</p> <p>1 results that generated acid, but the static tests had  2 more results that generated acid. So there was a  3 conflux between the data. They suggested -- you know,  4 they don't match up.  5 And so what they decided was it's likely that  6 the static tests overpredicted the acidity and that  7 the -- mainly the humidity cells were more  8 representative. So then they used the humidity cell  9 tests for the geochemical modeling going forward in the  10 future, and we know that the predictions for the pit  11 lake and the other materials did not become acidic.  12 Those are predictions.  13 One also could take an alternate approach or  14 look at a range of approaches for data that are  15 available. You could say, for example, that because of  16 the silicate encapsulation of these minerals, the  17 humidity cells did not run long enough to show the acid  18 generation that was suggested or observed in the static  19 tests. So it could be that the humidity cells actually  20 underestimated the acid generation potential. It's an  21 alternative interpretation of the results.  22 But I think that should be considered if  23 you're doing an aquifer assessment.  24 If you do have a -- and I'll go through this  25 pretty quickly. If you do have acid rock drainage, if</p>
<p style="text-align: right;">1569</p> <p>1 I can see three of these humidity cells that  2 did complete to zero neutralization potential, and those  3 are the ones that had the lower pH that I showed  4 earlier, I think.  5 And then the next slide shows the sulfide  6 remaining versus time, and you could argue that these  7 are very shallow slopes for many of these. You can see  8 at least one that had a really steep slope and then a  9 couple others that had, you know, intermediate slopes  10 and then some that had not very steep slopes.  11 But I would argue that we know that this  12 material does not react as quickly as some other mine  13 sites, hence the encapsulation in the silicate minerals.  14 But I'm not sure we have really examined the long-term  15 weathering rates at steady-state.  16 That's slide 48.  17 And then this is a summary for consideration  18 of a comparison of the kinetic tests with the static  19 tests. So again the static tests are kind of like  20 equilibrium. You have the acid generation versus the  21 neutralization, you figure out which one, you know, wins  22 over, and then you've got the kinetic test which tells  23 you the long-term behavior, does it go acidic or not.  24 The SRK report does describe here that the  25 humidity cell tests did not in general have that many</p>	<p style="text-align: right;">1571</p> <p>1 you do have a neutral drainage, mine-impacted water  2 drainage in the groundwater, you can apply some  3 mitigation procedures, and I think in the Copper Rule it  4 allows for a groundwater interceptor system.  5 This is just a flow diagram showing some  6 potential methods for abatement of acid rock drainage.  7 So part of it would be neutralizing the acidity. That  8 can either be an active system or a passive system.  9 Active system might be your pumping in groundwater  10 potentially, passive maybe you have it flowing through a  11 wetland or some reactive barrier or something like that.  12 That's slide 50.  13 Slide 51 is more specific to sulfate, because  14 I think sulfate is more of a common problem for some of  15 these sites, and it is, you know, observed here at this  16 site in the groundwater.  17 So what can you do for a sulfate groundwater  18 plume? You can do a groundwater interceptor system.  19 There is a -- there are treatment methods for sulfate.  20 There is -- there is actually some in situ methods, as  21 well. You could look at reduction and removal of  22 sulfate.  23 And then the last slide just kind of  24 summarizes an excerpt from the JSAI, 2018. This is the  25 Probable Hydrologic Consequences of the Copper Flat</p>

<p style="text-align: right;">1572</p> <p>1 Project. And I think this has been noted a few times in  2 the testimony before, but I just wanted to reiterate.  3 This is just a quote. There will be possible  4 groundwater consequences to the groundwater both from  5 the pumping the supply wells, but also due to the mining  6 and the activities that occur at the site, there will be  7 groundwater inflow to the -- to the pit area.  8 We will see potential groundwater discharges  9 from the tailings facility and/or the -- or the waste  10 rock stockpiles.  11 And I didn't write this. This was the JSAI's  12 report.  13 I don't know how much of an impact these will  14 be. I think people have had different estimates based  15 on modeling results. But it is agreed upon, I believe,  16 both in this report, and we've discussed it this week,  17 that there will be hydrologic impacts, and these will  18 not only be associated with water resources, but the  19 flow of water also impacts water quality. And so these  20 impacts could also impact water quality and  21 environmental impacts.  22 And so this is just kind of a summary. This  23 is the first opinion slide that I showed before, both  24 observations that I hope I have described today, but  25 also associated permit conditions that I'd like to</p>	<p style="text-align: right;">1574</p> <p>1 MR. BUTZIER: I would also object. That's a  2 fairly broad-brush question. I'm not sure what specific  3 unit of the mine she's talking about. Is she just  4 talking generally?  5 MS. BARNCASTLE: Yes.  6 MS. ORTH: Please clarify.  7 Q. (BY MS. BARNCASTLE) In general, based upon  8 your experience in general, are there enough wells for  9 an adequate detection and monitoring system at this  10 proposed mine?  11 A. So I would think that, you know, the Mine Plan  12 has -- has, as we discussed earlier this week, noted to  13 add additional monitoring wells, and NMED has requested  14 additional monitoring wells. So I think the effort is  15 there, and I think those parties probably acknowledge  16 that there's a need for additional groundwater  17 characterization.  18 I think one of the things that I tried to  19 highlight with this presentation is when you have a  20 groundwater plume, typically in order to figure out if  21 we can abate that groundwater plume, we have to  22 characterize the nature and extent of the groundwater  23 plume. That means defining the boundary and defining  24 the transport directions.  25 So I'm not sure that there are enough wells to</p>
<p style="text-align: right;">1573</p> <p>1 propose.  2 We can see that there is a potential for acid  3 generation and/or contaminant generation in waters that  4 would be discharging from waste rock and tailings.  5 There is already these types of contaminants in the  6 groundwater system.  7 It would be best, I think, to try to mitigate  8 the flow of water -- additional water through the waste  9 rock facilities and through the tailings facilities.  10 And I think the Copper Rule allows for a groundwater  11 interceptor system to prevent the mitigating -- the  12 transport of contaminants off the mine site property.  13 I think that's my last slide.  14 Q. I just have a few follow-up questions.  15 Dr. Carroll, does the lack of -- or the fact  16 that there are very few wells give you any concern when  17 it comes to detection and monitoring issues?  18 MR. BUTZIER: Objection, that assumes facts  19 not in evidence.  20 MS. ORTH: If you would please explore with  21 him what he understands about the wells out there.  22 Q. (BY MS. BARNCASTLE) Dr. Carroll, do you  23 believe there are enough wells, detection and  24 monitoring -- for adequate detection and monitoring  25 purposes at this proposed mine site?</p>	<p style="text-align: right;">1575</p> <p>1 do that at this point.  2 Q. Dr. Carroll, if you would go back to your  3 slide 45.  4 Would you agree that this is an example of  5 what Mr. Kuipers testified was the use of best case or  6 ideal scenarios in determining -- or in the predictions  7 for how this mine will operate and the impact that it  8 will have?  9 A. Well, I don't think that I would speculate as  10 to an intent as -- as far as why certain data were --  11 were selected for this.  12 This report does describe -- and I didn't note  13 it, but I'm glad you brought up this question. This  14 report does describe the rationale for using a different  15 approach for part of the water chemistry as the other  16 part of the chemistry was that the original pit lake  17 modeling did not match the observed pit lake. So that  18 does get to Mr. Kuipers' testimony that these models may  19 have some uncertainties in their predictions, but also  20 in processes.  21 If the model does not include or accurately  22 describe some process, it may not predict existing pit  23 lake, they modified the inputs in order to match the  24 existing pit lake. I would just suggest that there may  25 be some uncertainty in the modeling and that maybe a</p>

<p style="text-align: right;">1576</p> <p>1 range of input parameters might better help the range of                  2 predictions and help the range of estimated aquifer                  3 assessment impacts.                  4 Q. Would you agree that many aspects of this                  5 project do not have sufficient data on which to rely to                  6 properly determine the effect of the proposed mine on                  7 the Rio Grande Project?                  8 A. I think that's a fair assessment. We just                  9 talked about the groundwater wells. I think I had asked                  10 previously if there was any hydraulic testing in the                  11 wells adjacent to the East Animas Fault, and Mr. Finch                  12 said no, there hadn't been. I asked Mr. Stein about                  13 data for the cover, and I don't think I've ever seen                  14 data on the material for the cover in terms of its                  15 hydraulic properties.                  16 So there are a few aspects that could use some                  17 more data to actually understand the uncertainty and the                  18 potential risks to groundwater.                  19 Q. Now, there's always a concern about                  20 appropriate financial assurance being made available to                  21 address potential environmental impacts.                  22 Do you have an opinion on that issue here?                  23 A. Well, I don't know that I'm -- I've never                  24 really assessed in the cost of environmental impacts per                  25 se, but I have observed long-term contamination and</p>	<p style="text-align: right;">1578</p> <p>1 And that leads a connection to Dr. King's                  2 testimony this morning, that if environmental impacts do                  3 potentially reach the Caballo Reservoir, which is, as                  4 Dr. Phil King mentioned this morning, an international                  5 water, it could potentially lead to impact both across                  6 states and different nations.                  7 Q. Before putting that colorful slide up in front                  8 of the audience here, did you consider analyzing the                  9 distinctions between the Gold King situation and the New                  10 Mexico Copper Copper Flat proposal?                  11 A. I'm not sure I did it in the detail you would                  12 desire.                  13 Q. I've looked through your 43-page resume,                  14 Dr. Carroll, and I may have missed it, but have you --                  15 have you ever worked -- have you ever provided any                  16 consulting services to the mining industry?                  17 A. Yes.                  18 Q. Can you please identify that for me?                  19 A. Yeah.                  20 MS. BARNCASTLE: Clarification.                  21 Does he -- Mr. Butzier, do you want him to                  22 find in his resume those references or just state for                  23 you what his experience is?                  24 MR. BUTZIER: Either way.                  25 MR. CARROLL: Okay. I worked for a -- two</p>
<p style="text-align: right;">1577</p> <p>1 remediation activities at -- and I know that it                  2 potentially could be costly.                  3 So I just think that the final -- financial                  4 assessment should consider any of these potential                  5 environmental impacts and add them into the financial                  6 assessment, as Mr. Kuipers said up front, so we have                  7 them available, so we know that the mine will have the                  8 ability to potentially clean up any potential                  9 environmental impacts that would be occurring.                  10 Q. Thank you.                  11 That concludes my direct examination of                  12 Dr. Carroll.                  13 MS. ORTH: Okay.                  14 Mr. Butzier.                  15 CROSS EXAMINATION                  16 BY MR. BUTZIER:                  17 Q. Good afternoon, Dr. Carroll.                  18 A. Good afternoon.                  19 Q. What was the point of the slide that related                  20 to Gold King?                  21 A. Well, I think it was important to remind folks                  22 that there is a long history of environmental impacts                  23 associated with mining, both in general, but also in the                  24 state, and it is one example of an interstate                  25 environmental impact that's of recent history.</p>	<p style="text-align: right;">1579</p> <p>1 consulting firms, one hydrogeochem and then also a water                  2 management consultants.                  3 Q. (BY MR. BUTZIER) And what specifically did                  4 you do in connection with mining there, and were they                  5 your projects, or were you a junior assistant on the                  6 project?                  7 A. I was a project hydrogeologist and geochemist                  8 for most of that time period. If you -- if you do have                  9 Exhibit 4, my CV, I have listed selected mining                  10 experience on page 2, and it does extend to 3, 4, and it                  11 ends at the top of page 5. So it lists specific mines                  12 and what I did for those mines.                  13 And I did the math, and so as far as sampling                  14 of mine materials for geochemical characterization, I                  15 added up about 10 different mines for geochemical                  16 modeling for different mines for various mine                  17 facilities. Including pit lakes and waste rock and                  18 tailings facilities, that would include 12 different                  19 mines.                  20 Q. How many geochemical models have you                  21 performed, modeling exercises have you performed?                  22 A. It's hard to estimate that. I would say over                  23 that four years or 12 sites there could have been easily                  24 over 50 to 100 geochemical models.                  25 Q. That you yourself --</p>

1580	<p>1 A. That I developed.</p> <p>2 Q. -- developed and --</p> <p>3 A. Yeah.</p> <p>4 Q. Okay.</p> <p>5 A. Their -- their PHREEQC models would be</p> <p>6 probably not too different from the models that were</p> <p>7 used for this site.</p> <p>8 Q. And how many of those models involved the</p> <p>9 circumstances that we have at the Copper Flat where</p> <p>10 there's, for example, an existing pit lake where you're</p> <p>11 able to do calibration with respect to an existing</p> <p>12 condition at the site?</p> <p>13 A. Very few.</p> <p>14 Q. Okay.</p> <p>15 And I think you -- you acknowledged that it's</p> <p>16 very helpful --</p> <p>17 A. Absolutely.</p> <p>18 Q. -- to have that kind of situation in order to</p> <p>19 be able to calibrate, correct?</p> <p>20 A. Absolutely.</p> <p>21 Q. Okay.</p> <p>22 And although you didn't identify it in your</p> <p>23 direct, I think to your credit in response to</p> <p>24 Ms. Barncastle's question, you did acknowledge in</p> <p>25 connection with the slide that's up right now, which is</p>	1582	<p>1 the static testing to better analyze the long-term</p> <p>2 situation at the site? Could you elaborate on that,</p> <p>3 please?</p> <p>4 A. Yeah. So with the static testing, what you're</p> <p>5 measuring is the acid generation and also the acid</p> <p>6 neutralization, and it does not involve time. So in my</p> <p>7 mind, that is potentially a good way to evaluate what</p> <p>8 will happen over the long-term. Over the long-term, if</p> <p>9 you don't consider time, the mine materials will</p> <p>10 potentially become oxidized and generate acid, and</p> <p>11 additional materials will potentially neutralize that</p> <p>12 acid.</p> <p>13 So at long-term, you no longer have kinetic</p> <p>14 limitations, and therefore the static testing may be an</p> <p>15 appropriate evaluation of the long-term behavior.</p> <p>16 Q. I think we've -- I've already acknowledged I'm</p> <p>17 not a geochemist in this proceeding, but isn't it the</p> <p>18 case that the kinetic testing is the more useful test to</p> <p>19 determine the long-term -- to be able to make long-term</p> <p>20 projections on the potential for acid drainage?</p> <p>21 A. I would like to describe my understanding of</p> <p>22 the kinetic testing and use an analogy that I tried to</p> <p>23 illustrate earlier on in the slides in the difference</p> <p>24 between equilibrium and kinetics.</p> <p>25 You can have some reactions where the kinetics</p>
1581	<p>1 slide 45, that the report that this was drawn from does</p> <p>2 include a rationale for why they took the approach they</p> <p>3 took.</p> <p>4 A. Absolutely.</p> <p>5 Q. And is that a reasonable approach?</p> <p>6 A. In my opinion, I do not think it is a</p> <p>7 reasonable approach.</p> <p>8 Q. And is it -- is the approach partly related to</p> <p>9 calibrating to the existing conditions at the site?</p> <p>10 A. That's what it was noted in the report.</p> <p>11 Q. And that's a very important thing to do when</p> <p>12 you have that available, right?</p> <p>13 A. Yes.</p> <p>14 Q. Okay.</p> <p>15 Now, I'd like to go back to -- I don't think</p> <p>16 we need to go back to the slides, but let's talk a</p> <p>17 little bit about the static testing versus the kinetic</p> <p>18 testing.</p> <p>19 Did you come to an understanding of SRK's use</p> <p>20 of static testing and the fact that that was a screening</p> <p>21 level test that was used to determine whether to go on</p> <p>22 to do -- to do additional kinetic testing?</p> <p>23 A. I believe that is stated in the report.</p> <p>24 Q. And what about static testing gives you -- I</p> <p>25 think you testified that you need to take into account</p>	1583	<p>1 are slow and it could take time to reach equilibrium for</p> <p>2 a chemical reaction. But thermodynamically, if you</p> <p>3 don't -- if you -- if time isn't a factor, the reactants</p> <p>4 will proceed to the products. And so the static testing</p> <p>5 does provide an estimate of how those reactions that</p> <p>6 generate acid would then react with products that</p> <p>7 neutralize acid.</p> <p>8 And so over the long-term if time is not</p> <p>9 considered or at steady-state, you could potentially</p> <p>10 look at what the chemistry would be or if the acid would</p> <p>11 be consumed by neutralization.</p> <p>12 Now, the humidity cell tests do provide an</p> <p>13 ability to look at the natural weathering process over</p> <p>14 time. The way they do that is they have a sample that</p> <p>15 is open to the atmosphere so it allows oxygen to be</p> <p>16 there, and they also add water. They equilibrate that</p> <p>17 each week, and then they collect a sample of the water,</p> <p>18 and they analyze the concentrations.</p> <p>19 Q. Now, what --</p> <p>20 A. I'm sorry. Can I finish?</p> <p>21 I would say that over a mine life over 12</p> <p>22 years and then closure over 100 more years, I'm not sure</p> <p>23 that the kinetic testing really describes the full</p> <p>24 kinetic or time-dependent nature of these reactions.</p> <p>25 Q. Do you understand -- well, can you tell us</p>

<p style="text-align: right;">1584</p> <p>1 what you do to materials that you apply static testing  2 to in terms of attempting to establish particle size and  3 what have you?  4 A. I'm sorry. Say that again?  5 Q. Isn't it the case that in static tests you  6 basically pulverize the material before you perform the  7 test?  8 A. Sure.  9 Q. Okay.  10 A. I think that is --  11 Q. And one of the reasons why static testing is a  12 screening level test is that that doesn't necessarily  13 portray the potential for acid generation of materials  14 as they may exist in the -- in the environment, correct?  15 A. So what I think you're suggesting is that the  16 grain size will -- if you have a larger grain size, you  17 will get more neutralization of acid.  18 Is that what you're saying?  19 Q. No. I'm asking -- I'm asking you. I'm asking  20 for your --  21 A. Okay. I will tell you that I do not think  22 that if you have a large grain size you will have more  23 neutralization potential. The grain size is a physical  24 property of the -- of the material and not a chemical  25 property of the material.</p>	<p style="text-align: right;">1586</p> <p>1 water going through these materials. And I'm not sure,  2 because I really have not seen any data or any  3 evaluation, that a cover material of a sandy loam will  4 really do the job.  5 Q. Can we return to slide 5, please.  6 So this slide is basically part of the  7 tutorial on acid rock drainage potential?  8 A. Yes.  9 Q. It's not specific to the Copper Flat site?  10 A. Are you saying that pyrite is not at the  11 Copper Flats?  12 Q. I'm saying this is not an attempt to analyze  13 the Copper Flat site.  14 A. Correct.  15 Q. And can we go -- just sort of go through the  16 slides, because I think we went through -- you went  17 through a number of slides with various equations.  18 Those are basically you as a -- as a PhD  19 professor sort of giving us your perspective on general  20 oxidation principles and other things, not specifically  21 analyzing the Copper Flat site, correct?  22 A. Well, I think, as I tried to allude at the  23 end, I also wanted to tie in those concepts of  24 equilibrium and kinetics, whereas kinetics the both acid  25 generation, acid neutralization could take time to</p>
<p style="text-align: right;">1585</p> <p>1 Q. Okay.  2 Let me turn now to your idea of putting a  3 geomembrane liner not just beneath a waste rock pile,  4 but on top of a waste rock pile.  5 Do you recall that testimony?  6 A. Yes, I do.  7 Q. Are you aware of that being done in  8 significant waste rock piles at mining sites? And if  9 so, where?  10 A. I am not aware of that.  11 Q. And in arid environments in particular, isn't  12 it a better approach and a more accepted approach in the  13 mining industry to use a store-and-release cover of  14 where you can rely on evaporation as well as  15 evapotranspiration in order to take care of the water  16 that's coming into the facility, precipitation water?  17 A. I would say that it could be. I would say  18 that we would need to evaluate the effectiveness, and I  19 just have not really seen any measurements for this  20 cover material. And I just wanted to propose the idea  21 that if you can minimize the reactions of water with  22 these materials you can minimize the generation of  23 contaminants.  24 I think having a liner underneath is an  25 excellent idea, but I think it would be nice to minimize</p>	<p style="text-align: right;">1587</p> <p>1 occur, whereas at equilibrium it might be appropriate  2 for long-term analysis.  3 Q. Did you review the supplemental soils  4 investigation report submitted as part of Mr. Stein's  5 report?  6 A. No. I didn't get time. I think we had about  7 three weeks to review these materials, and there were  8 18,000 pages. I think I asked Mr. Stein when he was  9 testifying, and he didn't show any data, and he didn't  10 have data on the soil properties, but he -- he did  11 describe the soil that would be used as a cover as a  12 sandy loam.  13 Q. Isn't it the case that he described that cover  14 material as a loam that ranges in texture from sandy  15 loam to clay loam material, not just sandy loam?  16 A. I would have to check the record. I wrote  17 down sandy loam.  18 Q. Now, at some -- one or two points, you  19 referred to the uncertainty issue raised by Mr. Kuipers.  20 And can you recall what you were saying? Was  21 that related to the use of the static test results in  22 addition to the kinetic test results?  23 A. Yeah. There was several issues that I believe  24 I brought up, both that there is a range of uncertainty  25 in the groundwater fluid flow, the fluid flow through</p>



1588	<p>1 the rock materials through the tailings facility, and</p> <p>2 then, additionally, the geochemical data there is some</p> <p>3 uncertainty. And so I think a range of predictions</p> <p>4 might help better explain the potential impacts to</p> <p>5 groundwater.</p> <p>6 Q. Could we return to slide 48, please.</p> <p>7 Maybe it was 49.</p> <p>8 I'm not sure I've got the right slide, but do</p> <p>9 you recall testifying I think in connection with</p> <p>10 modeling that not in your experience -- I think it may</p> <p>11 go back to the -- what you've described as sort of mixed</p> <p>12 data relating to using 20 years and beyond for some --</p> <p>13 some constituents and the whole suite for the rest?</p> <p>14 MS. BARNCASTLE: Can I clarify that?</p> <p>15 I think we may be talking about slide 45.</p> <p>16 MR. BUTZIER: That may be.</p> <p>17 Yes. Thank you.</p> <p>18 Q. So I think when this slide was up,</p> <p>19 Dr. Carroll, you indicated that not in your experience</p> <p>20 have you used this kind of mixed parameters in a</p> <p>21 modeling exercise.</p> <p>22 Is that -- was that your testimony?</p> <p>23 A. That is my experience.</p> <p>24 Q. So you yourself have not used this kind of</p> <p>25 mixed parameter in your modeling.</p>	1590	<p>1 prescriptive cover system that is included within the</p> <p>2 Copper Rule; is that correct?</p> <p>3 A. That's correct.</p> <p>4 Q. And you wouldn't consider yourself to be an</p> <p>5 expert with respect to design and implementation of</p> <p>6 cover systems?</p> <p>7 A. That's correct.</p> <p>8 Q. Are you aware that the very prescriptive cover</p> <p>9 system requirements in the Copper Rule are based on</p> <p>10 experience gained from implementation and performance</p> <p>11 monitoring of these types of cover systems within both a</p> <p>12 landfill and mining industry that have demonstrated that</p> <p>13 they are effective at meeting New Mexico Water Quality</p> <p>14 Act requirements?</p> <p>15 A. I would say that I'm not -- I'm not aware of</p> <p>16 that. I would hope that would be the case.</p> <p>17 When I did read the Copper Rule, it does</p> <p>18 describe a store-and-release cover, but there, to my</p> <p>19 knowledge, is not a lot of specification on like how</p> <p>20 that's to be designed or any requirements specifically</p> <p>21 as far as -- the only requirement is, I believe, a</p> <p>22 certain percentage of the precipitation, percentage of</p> <p>23 the infiltration. So a storage capacity.</p> <p>24 Q. Let's see. Could we go back to -- I believe</p> <p>25 slide 32. That's the -- oh, sorry. It's 33.</p>
1589	<p>1 A. That's -- that's my experience.</p> <p>2 Q. And I think you said you're not aware that</p> <p>3 it's been used.</p> <p>4 Have you -- do you have knowledge of when this</p> <p>5 has been used on other occasions by other people who</p> <p>6 have done geochemical modeling?</p> <p>7 A. No, I do not.</p> <p>8 Q. You're not representing that you've done a</p> <p>9 thorough search to determine that as part of your</p> <p>10 testimony.</p> <p>11 A. That's correct. I'm just testifying on my</p> <p>12 experience.</p> <p>13 Q. Yeah.</p> <p>14 All right. I don't have any more questions,</p> <p>15 Madam Hearing Officer.</p> <p>16 MS. ORTH: All right.</p> <p>17 Mr. Knight, do you have questions?</p> <p>18 MR. KNIGHT: I do.</p> <p>19 CROSS EXAMINATION</p> <p>20 BY MR. KNIGHT:</p> <p>21 Q. Good afternoon, Dr. Carroll.</p> <p>22 A. Good afternoon, Mr. Knight.</p> <p>23 Q. You were not a member of the technical</p> <p>24 advisory committee that included a variety of soil cover</p> <p>25 design experts who achieved a consensus in drafting the</p>	1591	<p>1 Slide 33, in this slide, I think you're -- is</p> <p>2 it correct you were testifying that the capture zone</p> <p>3 around the existing open pit might not be sufficiently</p> <p>4 large to capture contaminants that are found at the two</p> <p>5 monitoring wells, one at the north and one to the south</p> <p>6 of the current open pit?</p> <p>7 A. Based on this figure, there is a potential</p> <p>8 that the capture zone may not include those. I think it</p> <p>9 warrants further investigation. I have not done that</p> <p>10 investigation, but there is a potential.</p> <p>11 Q. If there were some way to enlarge the capture</p> <p>12 zone in that area around the open pit, would that</p> <p>13 increase the likelihood of contaminants at those wells</p> <p>14 being captured and contained?</p> <p>15 A. Absolutely.</p> <p>16 Q. Thank you.</p> <p>17 That's all the questions I have.</p> <p>18 MS. ORTH: All right.</p> <p>19 Mr. de Saillan.</p> <p>20 MR. DE SAILLAN: Thank you, Madam Hearing</p> <p>21 Officer. Again I just have a few questions here.</p> <p>22 CROSS EXAMINATION</p> <p>23 BY MR. DE SAILLAN:</p> <p>24 Q. Good afternoon, Mr. Carroll -- Dr. Carroll, I</p> <p>25 mean.</p>

1592	<p>1 A. Good afternoon, Mr. de Saillan.</p> <p>2 Q. First of all, you testified a little bit about</p> <p>3 the permeability of the andesite.</p> <p>4 Were you here when Dr. Myers proposed that</p> <p>5 additional characterization be done of the andesite</p> <p>6 bedrock at the Copper Flat Mine?</p> <p>7 A. I was.</p> <p>8 Q. And do you agree with that recommendation?</p> <p>9 A. Yes. I think I noted in the testimony that I</p> <p>10 believe additional characterization of several aspects</p> <p>11 of this Discharge Permit could be conducted -- you</p> <p>12 could -- you could definitely collect more data, and I</p> <p>13 think it would help reduce the uncertainty or at least</p> <p>14 bound the uncertainty which would allow for a prediction</p> <p>15 over a range of potential environmental impacts.</p> <p>16 Q. Okay. Thank you.</p> <p>17 And then I don't remember if it was on this</p> <p>18 slide or slide 34 -- and when I say this slide, I mean</p> <p>19 slide 33 -- but you talked about the -- the distinction</p> <p>20 between the area of open pit hydraulic containment and</p> <p>21 the open pit surface drainage area.</p> <p>22 Was that on this -- on this slide?</p> <p>23 A. Yes. It is. So the -- this green line --</p> <p>24 this is slide 33. This is the open pit surface area,</p> <p>25 surface drainage area. So this is a surface water</p>	1594	<p>1 A. I think that's possible.</p> <p>2 Q. Okay.</p> <p>3 And then, also on this slide, you talk --</p> <p>4 again you talk about the -- the flow of groundwater.</p> <p>5 Were you present when Dr. Myers talked about</p> <p>6 the possibility of fracture flow moving water or</p> <p>7 transporting water to the northeast?</p> <p>8 A. Yes.</p> <p>9 Q. And do you agree with that?</p> <p>10 A. I would have to rely on the groundwater</p> <p>11 contours that are shown here and the next slide.</p> <p>12 Q. Okay. Thank you.</p> <p>13 A. So --</p> <p>14 MR. DE SAILLAN: I have no further questions.</p> <p>15 MR. CARROLL: All right.</p> <p>16 MS. ORTH: Okay.</p> <p>17 Does anyone present have questions of</p> <p>18 Dr. Carroll based on his testimony?</p> <p>19 All right. Ms. Barncastle, do you have any</p> <p>20 follow-up?</p> <p>21 MS. BARNCASTLE: Briefly. Thank you.</p> <p>22 REDIRECT EXAMINATION</p> <p>23 BY MS. BARNCASTLE:</p> <p>24 Q. Dr. Carroll, the attorney for the New Mexico</p> <p>25 Environment Department just asked you whether you were a</p>
1593	<p>1 foot -- collection footprint.</p> <p>2 So the surface water precipitation that will</p> <p>3 occur in this area should drain and report to this pit.</p> <p>4 I think that was the testimony of Mr. Finch, also. And</p> <p>5 that's surface water, and that's useful, but you also</p> <p>6 have groundwater to consider. And the groundwater will</p> <p>7 report to the pit based on these closed contours. And</p> <p>8 where the groundwater -- where the contour -- where</p> <p>9 arrows that are perpendicular to these groundwater</p> <p>10 elevation contours would -- would be pointing towards</p> <p>11 the pit.</p> <p>12 And so you can see that the arrows that are</p> <p>13 pointing to the pit may not be a large enough -- they</p> <p>14 may not be the same areal extent as the surface water.</p> <p>15 So although it's great to have the surface water</p> <p>16 collected into the pit, the groundwater outside of the</p> <p>17 hydraulic sink may not be collected in that pit.</p> <p>18 Q. Okay. That's -- you're sort of getting where</p> <p>19 I'm going.</p> <p>20 So the area of the surface water drainage that</p> <p>21 drains into the pit, because it's outside the area of</p> <p>22 open pit hydrologic containment -- because of that fact,</p> <p>23 water infiltrating in the larger area could get into</p> <p>24 groundwater, but not necessarily flow into the pit; is</p> <p>25 that correct?</p>	1595	<p>1 participant in the cover system's design committee, and</p> <p>2 you stated that you were not; is that correct?</p> <p>3 A. That's correct.</p> <p>4 Q. What department and college are you a</p> <p>5 professor in at NMSU?</p> <p>6 A. The college is the Agricultural College at</p> <p>7 NMSU, and then the soil -- the department is called</p> <p>8 plant and environmental sciences, but it is also the</p> <p>9 soils department for the college. So all of the soil</p> <p>10 scientists are in the plant and environmental science</p> <p>11 department of the College of Agriculture.</p> <p>12 Q. And going back to your slide 45, Mr. Butzier</p> <p>13 asked you about the reason in the report regarding why</p> <p>14 New Mexico Copper averaged the high concentration</p> <p>15 chemistry when -- and then took the low concentration</p> <p>16 late time data for toxic heavy metals.</p> <p>17 Do you recall that question?</p> <p>18 A. Yes.</p> <p>19 Q. And in connection with that, you were asked if</p> <p>20 that was a reasonable thing to do, and you stated no; is</p> <p>21 that correct?</p> <p>22 A. Yeah. I stated that it's my experience that</p> <p>23 it would not be a reasonable approach.</p> <p>24 Q. Could you elaborate on your opinion further?</p> <p>25 A. Well, one of their reasons is that -- that the</p>

1596	<p>1 chemistry of a water especially with water-rock  2 interactions is not really just one reaction. There are  3 several reactions that are occurring. And what they're  4 doing with these humidity cell tests is they're  5 measuring several constituents that are dissolving from  6 the rock.  7 So I would imagine that the water chemistry  8 may have some dependence between the constituents in the  9 water. So it's basically a function of several  10 reactions, it's a function of all of the constituents in  11 the water. I'm not sure it makes sense to only use part  12 of the chemistry from a water sample and not use another  13 part of it.  14 MS. BARNCASTLE: Thank you.  15 That concludes my direct and redirect for this  16 witness.  17 MS. ORTH: All right. Thank you.  18 Any reason not to excuse Dr. Carroll?  19 No?  20 Thank you very much, Dr. Carroll.  21 MR. CARROLL: Thank you.  22 MR. BUTZIER: That's his rebuttal?  23 MS. BARNCASTLE: This concludes my case in  24 chief and rebuttal, and -- yeah, with the exception of  25 my closing argument which I'll submit in writing.</p>	1598	<p>1 going to be here until midnight.  2 MS. ORTH: All right. I'm here for it.  3 Do you need a short break in order for them to  4 set up?  5 MR. BUTZIER: I don't think so. I think we're  6 ready.  7 MS. ORTH: All right. Let's press on.  8 MR. BUTZIER: While we're getting our  9 slideshow together, I'm going to pass out the slides  10 we're going to use in the rebuttal.  11 MS. ORTH: Thank you.  12 (Discussion off the record.)  13 MS. BARNCASTLE: Madam Hearing Officer, I was  14 remiss in -- I forgot to move the admission of  15 Dr. Carroll's slides, and since those were primarily  16 rebuttal, I don't believe they were required to be  17 submitted beforehand with our statement of intent. So  18 I'd like to move the admission of those slides now at  19 this point in time.  20 MS. ORTH: And how would you mark them?  21 MS. BARNCASTLE: I would mark them, staying  22 consistent with the previous numbering, even though I've  23 decided not to admit several into evidence, Exhibit EBID  24 Exhibit 22.  25 MS. ORTH: 22.</p>
1597	<p>1 MS. ORTH: In writing, yes. Thank you very  2 much.  3 Let me ask now, since we've just finished the  4 final technical witness and the direct case, if there is  5 anyone who would like to offer public comment. This  6 would be a good time. And it will be one of your last  7 chances.  8 No?  9 All right.  10 Mr. Butzier, I invite rebuttal in the same  11 order in which the direct case was made.  12 Do you have rebuttal?  13 MR. BUTZIER: I do, Madam Hearing Officer, but  14 I've lost my mic.  15 MS. ORTH: Oh, yes.  16 MS. BARNCASTLE: You've lost your mind? What?  17 MR. BUTZIER: Yeah. That, too.  18 MS. ORTH: The communal microphone over here.  19 MR. BUTZIER: Madam Hearing Officer, we would  20 like to just very quickly run through each of our expert  21 witnesses in rebuttal. I don't expect it to take very  22 long at all. So --  23 MS. ORTH: All right.  24 MR. BUTZIER: I don't want you to be afraid  25 that since we're going to put them all five on we're</p>	1599	<p>1 Any objections to the slides?  2 MR. BUTZIER: I apologize. I missed what it  3 was that we're --  4 MS. ORTH: She offered Dr. Carroll's slides as  5 Exhibit 22.  6 MR. BUTZIER: Yeah. No objection.  7 MR. KNIGHT: No objection.  8 MS. ORTH: All right. Thank you.  9 It's admitted.  10 (Exhibit EBID 22 admitted into evidence.)  11 MS. BARNCASTLE: And I will send around a copy  12 of that as soon as I get back to civilization with a  13 faster Internet service. Mine doesn't work here. For  14 whatever reason, my phone doesn't want to work at all.  15 So unless someone has a hot spot for me to send this out  16 right now, which I could do.  17 MS. ORTH: All right. Thank you very much for  18 offering.  19 Mr. Smith, you remain under oath.  20 JEFFREY SMITH  21 having been previously duly sworn or affirmed, was  22 examined and testified further as follows:  23 DIRECT EXAMINATION  24 BY MR. BUTZIER:  25 Q. Good afternoon, Mr. Smith.</p>

1600	1602
<p>1 Am I correct that you've been present 2 throughout the week-long hearing? 3 A. I have. 4 Q. And do you recall the testimony of Dr. Myers 5 relating to open pit contours? 6 A. I do. 7 Q. And do you have a response to some of the 8 points that he made in connection with that? 9 A. Yes. I just want to clear up some confusion 10 that I saw in Dr. Myers' testimony about the contours. 11 This diagram on the screen is the same open 12 pit outline that Dr. Myers showed in his testimony. 13 What's missing is the water that was there that was 14 present. 15 These contours in this pit are mid-bench 16 contours. The confusion that I sensed during the 17 testimony was they were confused perhaps with being the 18 toe elevation of the bench. But standard practice in 19 open pit design uses mid-bench contours to outline the 20 pit benches. 21 The toe and crest lines are not shown. These 22 will be -- these contours are drawn at the mid-bench 23 interval. At the Copper Flat open pit, the bench height 24 is 25 feet, and so the mid-bench interval will be 25 12.5 feet up the bench face.</p>	<p>1 A. Yes, I am. 2 Q. Okay. 3 Now, you, Mr. Smith -- you have overseen 4 basically all aspects of the consultant work and the 5 development work in connection with this property, 6 correct? 7 A. Yes, I have. 8 Q. Has there been anything that you've heard over 9 the course of this week that causes you to feel you need 10 to change your testimony or your approach? 11 A. No. 12 Q. In your view, would the granting of DP-1840 13 pose either a hazard to public health or undue risk to 14 property as contemplated by the Copper Rule? 15 A. Granting the permit will not result in what 16 you've described. 17 MR. BUTZIER: Thank you. 18 That's all I have for Mr. Smith. 19 MS. ORTH: All right. Thank you. 20 Mr. Knight? 21 MR. KNIGHT: I have no questions for this 22 witness. 23 MS. ORTH: Okay. 24 Mr. de Saillan? 25 MR. DE SAILLAN: Yeah. Just -- if I could</p>
1601	1603
<p>1 So the elevations that are shown are the bench 2 elevations. This is the 4,900 bench here. And this 3 contour line above the 4,900 is the bench elevation plus 4 one-half of the bench height, or that is the 4,912.5 5 elevation contour, which circles the entire bench. The 6 elevation of that contour on the outside of the 4,900 7 bench is actually 4,900 minus -- or -- I'm sorry -- 8 4,900 minus 12.5. 9 So the water level that we show is at the -- 10 slightly below the 4,900 bench. 11 Q. And at reclamation and closure, what will 12 happen on that bench? 13 A. That bench will stay dry. 14 Q. And will anything be added to cover that as 15 part of the reclamation? 16 A. As part of the reclamation, there will be 17 three foot of cover placed on that bench. So the final 18 elevation will be raised three feet, to 4,903 elevation. 19 Q. And is part of the design of the pit intended 20 to avoid having the pit lake extend onto federal public 21 lands? 22 A. Yes. That's correct. 23 Q. And are you confident based upon the input 24 you've received from your hydrology consultants that 25 that will occur based on a steady-state pit?</p>	<p>1 have just a second. 2 MS. ORTH: Yeah. 3 MR. DE SAILLAN: I need a microphone, as well. 4 CROSS EXAMINATION 5 BY MR. DE SAILLAN: 6 Q. Now, Mr. Smith, I think that the -- and, 7 unfortunately, I don't have the other map handy, but 8 there was another map that Dr. Myers referred to that 9 showed different levels for the pit lake? 10 A. I'm not sure what you're referring to. 11 MS. BARNCASTLE: Can I just ask off the record 12 just for my reminder sake? 13 (Discussion off the record.) 14 Q. (BY MR. DE SAILLAN) So, Mr. Smith, I've just 15 provided you with an exhibit from Dr. Myers' slide 16 presentation, and it shows side-by-side two depictions 17 of the open pit. And the one on the right, I think, has 18 labeled contours, which don't exactly correspond to the 19 numbers that you've just suggested. 20 So I'm wondering if you can explain the 21 discrepancy. 22 A. The labels on Figure 3.13, Jones and Finch, 23 correspond to the contours, the bench elevations. So 24 the contours are labeled. This flat bench is the 4,900 25 bench elevation.</p>

1604	<p>1 Q. Okay.</p> <p>2 Thank you.</p> <p>3 I have no further questions, then.</p> <p>4 MS. ORTH: All right.</p> <p>5 Ms. Barncastle?</p> <p>6 MS. BARNCASTLE: I have no questions of this</p> <p>7 witness. Thank you.</p> <p>8 MS. ORTH: Thank you.</p> <p>9 Anyone else have a question of Mr. Smith based</p> <p>10 on his rebuttal testimony?</p> <p>11 No?</p> <p>12 Any follow-up?</p> <p>13 MR. BUTZIER: No follow-up.</p> <p>14 MS. ORTH: All right. Thank you very much,</p> <p>15 Mr. Smith.</p> <p>16 MR. BUTZIER: I'd like to next call Mr. --</p> <p>17 MS. ORTH: Are you offering 106?</p> <p>18 MR. BUTZIER: Yes. Thank you.</p> <p>19 I would like to offer into evidence</p> <p>20 Exhibit 106.</p> <p>21 MS. ORTH: Any objections?</p> <p>22 MR. KNIGHT: No objection.</p> <p>23 MS. ORTH: Mr. de Saillan, do you object to</p> <p>24 the admission of 106?</p> <p>25 MR. DE SAILLAN: No objection.</p>	1606	<p>1 and some witnesses have brought into question your</p> <p>2 assessment of the hydraulic conductivity.</p> <p>3 Would you like to respond to those points,</p> <p>4 please?</p> <p>5 A. Sure. I'll -- first I kind of want to revisit</p> <p>6 it wasn't just my idea of the low-permeability andesite.</p> <p>7 It's been well known for quite some time.</p> <p>8 And up on this, which is slide 2 of my</p> <p>9 rebuttal exhibit, I have a list of references that play</p> <p>10 into that. So I'm just going to go briefly through each</p> <p>11 one.</p> <p>12 Shomaker is the first one that really</p> <p>13 described the andesite block and the Animas Uplift as a</p> <p>14 low-permeability unit. And his observations were based</p> <p>15 on the local geology, mining workings and results of --</p> <p>16 of dewatering efforts for mines within the andesite. So</p> <p>17 that's historical documentation. Then some selected</p> <p>18 hand-dug wells and things and mine shafts that he</p> <p>19 observed from that.</p> <p>20 And then moving on, in 1996, there was a</p> <p>21 consultant, Adrian Brown, that did some of the testing</p> <p>22 that I presented the results for the andesite. So the</p> <p>23 slug tests were performed by -- by them. So that is</p> <p>24 documented in -- throughout our reports for this project</p> <p>25 and in the record.</p>
1605	<p>1 MS. BARNCASTLE: No objection.</p> <p>2 MS. ORTH: All right. 106 is admitted.</p> <p>3 (Exhibit NMCC 106 admitted into evidence.)</p> <p>4 MR. BUTZIER: I'd like to call our next</p> <p>5 rebuttal witness, Mr. Steve Finch.</p> <p>6 MS. ORTH: You are still under oath,</p> <p>7 Mr. Finch.</p> <p>8 STEVEN FINCH</p> <p>9 having previously first duly sworn or affirmed, was</p> <p>10 examined and testified further as follows:</p> <p>11 DIRECT EXAMINATION</p> <p>12 BY MR. BUTZIER:</p> <p>13 Q. Mr. Finch, have you been present throughout</p> <p>14 this week-long hearing?</p> <p>15 A. Yes, I have.</p> <p>16 Q. And did you prepare a series of PowerPoint</p> <p>17 slides to assist you in discussing and responding to</p> <p>18 some of the points made in the hearing?</p> <p>19 A. I have, as rebuttal exhibits.</p> <p>20 MR. BUTZIER: And could we call that set of</p> <p>21 slides up, please.</p> <p>22 Okay. Thank you.</p> <p>23 And going to the next slide.</p> <p>24 Q. There's been a lot of discussion about the</p> <p>25 permeability or hydraulic conductivity of the andesite,</p>	1607	<p>1 Then again SRK did independent analysis and</p> <p>2 came up with the same result.</p> <p>3 Now, I put up here on number 4 JSAI, 2011,</p> <p>4 which was the Stage 1 Abatement Plan amendment. I had</p> <p>5 to abbreviate that. I apologize. And in that</p> <p>6 amendment, that was just the plan of what we're going to</p> <p>7 do for sampling under Stage 1 Abatement, but we also</p> <p>8 recognize there from the previous work that the andesite</p> <p>9 is of low permeability.</p> <p>10 And the baseline data report, this is</p> <p>11 reflected INTERA -- by INTERA independently.</p> <p>12 And then under number 6 here, it's described</p> <p>13 in detail in our Stage 1 Abatement. And unfortunately,</p> <p>14 I think some of the other reviewers have overlooked a</p> <p>15 lot of the information that's in the Stage 1 Abatement.</p> <p>16 I'll briefly go over that.</p> <p>17 And then to further validate that, Mike Jones,</p> <p>18 one of my coworkers -- or who I work with at John</p> <p>19 Shomaker &amp; Associates, did the model and calibrated the</p> <p>20 model and found that the andesite is of low</p> <p>21 permeability.</p> <p>22 So those are the reference materials, and</p> <p>23 these are all throughout the reports that we have</p> <p>24 prepared for this project.</p> <p>25 I'll just briefly go over Shomaker's concept.</p>

<p style="text-align: right;">1608</p> <p>1 This is slide 3.  2 And I believe this was an exhibit out of my  3 original direct. It's a regional geologic map. And the  4 only thing I've done here is I've added the blue -- the  5 blue flow arrows.  6 And so what Shomaker noted was that there was  7 regional flow coming out from the west that went around  8 this andesite block. So -- and that's also what creates  9 springs. I believe there's a spring over here and the  10 springs that go -- that come out of the -- the bedrock  11 along the Animas Uplift to the north.  12 So therefore, flow to those springs does not  13 come from the andesite -- that was his conclusion --  14 because of its low permeability and its extensive depth.  15 This is a table that Mr. Myers presented, and  16 I did have to go back in time to figure out where this  17 came from, but it's from the Stage 1 Abatement amendment  18 that we did in 2011.  19 And he noted that a lot of the wells that --  20 in this table that had well type of supply and they were  21 in the andesite. What you'll find, if you knew about  22 these wells and if you've been to them, most of them are  23 hand-dug, they don't yield water as you would think of  24 as a supply well, and are not even operable as a supply  25 well.</p>	<p style="text-align: right;">1610</p> <p>1 Q. Mr. Finch, is that the Rogers Well?  2 A. I believe it is. I always refer to it as  3 GWQ-4 back from the '93 study.  4 Q. Okay.  5 A. Many of these other wells are hand-dug. These  6 are hand-dug mine shafts. And as Dr. Shomaker had  7 explained to me, most of those are holes that fill up  8 with near surface seeps that are resembling  9 precipitation that has -- that's moving along the valley  10 bottoms. And the alluvial material are the weathered  11 bedrock horizon.  12 The only reason why they're labeled as supply  13 wells is to differentiate them between their -- the  14 construction of the other wells listed on here which are  15 monitoring wells. And the monitoring wells have a  16 specific -- they're specific to this project for  17 monitoring groundwater and sampling.  18 The other thing to point out is that our area  19 that we're talking about for the andesite is on the side  20 of Animas Peak. It's not in a valley. Completely  21 different. And the same as the results of GWQ-5R, which  22 is over here. It's also out of the valley, which I  23 believe Mr. -- Dr. Myers calculated the hydraulic  24 conductivity of that as less than 10 to the minus-7  25 centimeters per second.</p>
<p style="text-align: right;">1609</p> <p>1 Q. And, Mr. Finch, just to lay a little  2 groundwork for that, have you personally been to all of  3 these supply wells that were listed on this in the  4 andesite?  5 A. I have in the course of, yes. All the other  6 projects I've done at this site and area.  7 So I want to briefly point out some of these  8 wells on this map, which comes out of the same report.  9 This is slide 5 out of the JSAI, 2011, Stage 1  10 Abatement Plan amendment.  11 In this map, the wells that were listed in the  12 previous table are shown here. And you'll see these --  13 first of all, this is an areal map, and if you look at  14 this color change, this is the andesite limits. You can  15 see the circular nature of the andesite. Within that  16 you'll -- there are -- these labeled here is Dolores,  17 Pague, and then the Pitchfork wells we talked about, and  18 then there's a couple of others out here.  19 If you look at all those wells that were --  20 those were the supply wells that were mentioned in the  21 table. They're all in drainages. And what we found  22 through detailed analysis of particularly this one, the  23 Pitchfork, is that it's based on the chemistry that the  24 water resembles surface water. So it's infiltrated  25 surface water. And --</p>	<p style="text-align: right;">1611</p> <p>1 Another line of evidence for the low  2 permeability in the andesite comes from the Stage 1  3 Abatement report of -- I apologize. It's not -- I  4 believe it's 2014. This is Table 3 out of the first  5 year Stage 1 Abatement results.  6 And there are several tables that list the  7 field data, and this is one of the tables. There's  8 field data for each quarter of data collected.  9 And over here, these two wells are andesite,  10 if you remember these numbers, GWQ96-22B, and then these  11 are in the monzonite, 96-23A.  12 If you look over here in the far column under  13 comments, you'll see pumped off, and then a micropurge  14 in screen, pumped off. We're able to get -- each time  15 we sample these wells, we never -- we rarely got  16 anything more than a well volume.  17 And if I -- I believe I overheard Dr. Myers  18 say something to the effect that that would constitute  19 low permeability in his direct, if you looked at how  20 much the well would yield.  21 You'll see the same results, I believe, I  22 presented as far as the -- the ability of a well to  23 yield water was in that graph I presented in my direct  24 testimony for GWQ-5R.  25 Moving on to slide 7, I want to switch to a</p>

<p style="text-align: right;">1612</p> <p>1 different topic, and that is the East Animas Fault that  2 has been -- which we characterized as a barrier. But  3 that's been questioned by others.  4       There's a lot of data that goes into that  5 characterization and that I summarized in my direct that  6 didn't really have -- go into great detail on in regards  7 to how we evaluated that data.  8       This comes from -- this slide 7 is a graph  9 that comes from the modeling report, which is Jones, et  10 al., 2014. And these -- this hydrograph represents --  11 we have on the Y axis water-level elevation, and we have  12 date on the bottom. And you can see this is every 10  13 years for the major date.  14       So they start the water levels for these wells  15 for right below the tailings dam. And in these wells,  16 you'll see when Quintana operated water levels went  17 straight up, and there was a little delayed effect on a  18 couple of these due to they're off more to the side.  19       But one thing we found was that the water  20 levels stayed there. See out in time here, this is --  21 this represents baseline data. So they flattened out  22 and stayed there. And so did the sulfate concentration  23 resembled the same trend.  24       The groundwater model was calibrated to very  25 exact response. We had estimates of seepage from the</p>	<p style="text-align: right;">1614</p> <p>1 currently beneath the tailings impoundment. As you can  2 see from the data, it has not gone much further than --  3 than this zone because of this barrier effect. Even on  4 the other side we have extremely low concentrations of  5 sulfate.  6       So with all this line of evidence, that's what  7 we have used to show that this fault acts as a barrier  8 to flow and that the plume has not migrated beyond this  9 fault zone.  10       The other thing I'd like -- the other lines of  11 evidence, this well was intentionally put directly  12 downgradient of this. And we believe if there was flow  13 through the fault, it would have been at that well.  14 That's why it was located where it was.  15       And if you took the results from Mr. Myers --  16 or Dr. Myers' interpretive model, when I -- when I  17 looked at it -- I don't have his slides, but the one  18 thing is it's -- you're forcing flow through the --  19 through the boundary that you created because you have  20 these constant heads that simulate somewhere on the  21 order of 1,300 gallons a minute.  22       Even though he's adding these little bits  23 of -- you know, like 20 gallons a minute or four gallons  24 a minute of seepage from the -- from some source, the  25 system is simulating 1,300 gallons a minute through it,</p>
<p style="text-align: right;">1613</p> <p>1 tailings impoundment, we calibrated to this data, and  2 the only way we could get this data to calibrate was  3 having a barrier boundary there representing the East  4 Animas Fault.  5       Q. So, Mr. Finch, would it be incorrect, as a  6 couple of witnesses have characterized, that the  7 characterization of the Animas fault as a barrier was  8 based on one well that was on the eastern side of the  9 fault line?  10       A. Right. That's not the full picture.  11       Q. Thank you.  12       A. Presented here as slide 8 is -- we've seen  13 this before many times. This is the cross-section  14 through the tailings impoundment area.  15       This is slightly different. This comes from  16 the Stage 1 Abatement. And the only difference here is  17 I have sulfate concentrations shown in the wells that  18 were sampled on either side of the fault below the  19 tailings dam.  20       I'm going to zoom this up a little bit. I  21 believe this is Figure 9 from the Stage 1 Abatement  22 report of 2014.  23       The next slide, slide 9, will be a zoom-in on  24 this. And this is the sulfate plume, actually probably  25 likely extends up to the water table here, that resides</p>	<p style="text-align: right;">1615</p> <p>1 which, to me, is -- is not the proper way to do even an  2 interpretive model of this as -- because we have no --  3 we have no mechanism with the hills behind there to  4 force 1,300 gallons a minute through that -- that area  5 of the model.  6       You can look at the model report. There  7 isn't -- in that zone, there is nothing that you can --  8 you can't get 1,300 gallons a minute of recharge from  9 the andesite block or even from the run-off from it. So  10 there's a fundamental flaw in his interpretive model.  11       Another just quick line of evidence that would  12 have been -- that would have been useful to check the  13 interpretive model with so you can limit your  14 uncertainty is you can take the baseline data and see if  15 there's any signs of this contamination moving  16 downgradient.  17       There are numerous wells going all the way out  18 to Caballo. There's the production wells, and there's a  19 series of test wells, MW1 through MW6, 7 or 8, I  20 believe. They are all drilled out east of this area.  21 And those were all sampled as part of the baseline data  22 collection with no indication of elevated sulfate.  23       Q. Did you have anything you wanted to say,  24 Mr. Finch, on some of Dr. Myers' conclusions relating to  25 the spacing of monitoring wells?</p>

1616	<p>1 You had testified in your direct testimony</p> <p>2 that you thought the proposed monitoring wells that were</p> <p>3 originally proposed without the additional ones NMED has</p> <p>4 proposed were adequate.</p> <p>5 Do you have anything you want to say? You</p> <p>6 don't have to if you don't want to, but --</p> <p>7 A. I think the spacing is adequate, and even if</p> <p>8 you consider the theory that Dr. Myers had that you'll</p> <p>9 have some dispersion, then we're still going to detect</p> <p>10 contaminants even if it's not in the direct line of</p> <p>11 fire, and that will -- if you read the Copper Rule, that</p> <p>12 requires additional monitoring.</p> <p>13 So there are safeguards in place with the</p> <p>14 Copper Rule that allows for additional investigation if</p> <p>15 something is detected.</p> <p>16 Q. Now, you have served as a hydrogeologist</p> <p>17 consultant for New Mexico Copper on this project as well</p> <p>18 as for years prior on other projects related to this</p> <p>19 same site; is that correct?</p> <p>20 A. That is correct.</p> <p>21 Q. Did you hear any -- and were you here</p> <p>22 throughout the entire week of the hearing?</p> <p>23 A. I was.</p> <p>24 Q. Did you hear anything in the course of the</p> <p>25 testimony that came out in the hearing that causes you</p>	1618	<p>1 public health or undue risk to property, in your</p> <p>2 opinion?</p> <p>3 A. It would not.</p> <p>4 MR. BUTZIER: That's all I have.</p> <p>5 MS. ORTH: I'm going to go first.</p> <p>6 EXAMINATION</p> <p>7 BY MS. ORTH:</p> <p>8 Q. Mr. Finch, I have a question.</p> <p>9 I think it was Dr. Myers who questioned the</p> <p>10 depiction on this slide of the red clay to the east of</p> <p>11 well GWQ94-21, and to the west of well MW-4 -- oh, which</p> <p>12 is projected, I guess.</p> <p>13 Do you remember he questioned the depiction of</p> <p>14 the red clay there?</p> <p>15 A. I do remember him questioning some aspects of</p> <p>16 our -- where we have the red clay.</p> <p>17 Q. So my question would be what is that depiction</p> <p>18 based on?</p> <p>19 A. What we have shown here?</p> <p>20 Q. Yes.</p> <p>21 A. The well logs presented. You see the data.</p> <p>22 So we have much more detailed data on MW-4 as than what</p> <p>23 was -- than what he looked at from the Stage 1</p> <p>24 Abatement. Their original logs provide way more detail</p> <p>25 than what the summary has provided in the diagrams, I</p>
1617	<p>1 to change any opinion expressed or create any lesser</p> <p>2 confidence in the opinions you expressed in your direct</p> <p>3 testimony?</p> <p>4 A. I have the same level of confidence as I</p> <p>5 expressed in my -- or demonstrated in my direct, and I</p> <p>6 have no change.</p> <p>7 Q. And in addition to serving as the</p> <p>8 hydrogeologist consultant on this project, is it the</p> <p>9 case that you worked closely with and shared data and</p> <p>10 reviewed data with SRK, who is the geochemistry</p> <p>11 consultant on this project?</p> <p>12 A. That's true. There's -- there's a lot of peer</p> <p>13 review amongst ourselves between my company, SRK, even</p> <p>14 New Mexico Copper employees and Golder, and it's -- it</p> <p>15 was -- and Dr. Shomaker, for that matter. I can almost</p> <p>16 treat him as a -- everybody knows him. He is like an</p> <p>17 independent reviewer within our company.</p> <p>18 Q. And based upon that involvement -- and you</p> <p>19 were admitted as an expert not only in hydrogeology, but</p> <p>20 as geochemistry, as I recall; is that correct?</p> <p>21 A. That is correct.</p> <p>22 Q. Based on those disciplines and your</p> <p>23 involvement and review of others' work on this project,</p> <p>24 in your opinion, in your professional opinion, if</p> <p>25 DP-1840 were to be granted, would it pose a hazard to</p>	1619	<p>1 believe, of where he got the Stage 1 Abatement, as --</p> <p>2 it's just a summary of geology next to the -- to the</p> <p>3 well completion diagram.</p> <p>4 And our -- this was an effort that was not</p> <p>5 only done by me, but others in my office. Dr. Erwin</p> <p>6 Melis is a structural geologist, very familiar with this</p> <p>7 area, contributed to this.</p> <p>8 So the red clay -- we do know it resides in</p> <p>9 MW-4, at that interval, and then the others to the west</p> <p>10 of the fault is defined by the -- the other well logs.</p> <p>11 Now, there are -- this is interpreted right</p> <p>12 between that one well log and the fault zone, and -- but</p> <p>13 we -- we feel that that's a solid interpretation based</p> <p>14 on the modeling efforts and all the other data I showed,</p> <p>15 that there has to be some there to hold the water back,</p> <p>16 in these beds.</p> <p>17 MS. ORTH: Okay. Thank you.</p> <p>18 Mr. Knight, do you have questions of</p> <p>19 Mr. Finch?</p> <p>20 MR. KNIGHT: I do not.</p> <p>21 MS. ORTH: Mr. de Saillan.</p> <p>22 MR. DE SAILLAN: Yes, I do.</p> <p>23 Thank you, Madam Hearing Officer.</p> <p>24</p> <p>25</p>



1620	<p>1 CROSS EXAMINATION</p> <p>2 BY MR. DE SAILLAN:</p> <p>3 Q. Good evening, Mr. Finch.</p> <p>4 A. Good afternoon or evening, however you define</p> <p>5 that.</p> <p>6 Q. I'm sorry?</p> <p>7 A. I said good afternoon or evening, however you</p> <p>8 define that.</p> <p>9 Q. Okay.</p> <p>10 Actually, Madam Hearing Officer, I was</p> <p>11 wondering if I could have like about two minutes to</p> <p>12 consult with one of my experts.</p> <p>13 MS. ORTH: Certainly.</p> <p>14 MR. DE SAILLAN: Thank you.</p> <p>15 (Proceedings in recess from 5:27 p.m. to</p> <p>16 5:33 p.m.)</p> <p>17 MS. ORTH: Let's come back from the break.</p> <p>18 Mr. de Saillan.</p> <p>19 MR. DE SAILLAN: Thank you.</p> <p>20 Q. I want to go to your first slide after the</p> <p>21 title page, please, Mr. Finch.</p> <p>22 And you listed a number of sources here, and,</p> <p>23 first of all, I want to ask you if these are all, to</p> <p>24 your knowledge, in the administrative record for this</p> <p>25 proceeding.</p>	1622	<p>1 But that information is not in the</p> <p>2 administrative record.</p> <p>3 A. It is. It's all discussed in the number 7</p> <p>4 reference here, or I believe there's a lot of it that's</p> <p>5 appended in Jones, et al., 2014.</p> <p>6 Q. Okay.</p> <p>7 And then the next one you mentioned is the</p> <p>8 Adrian Brown report, and you say he did -- I believe you</p> <p>9 said he did an independent analysis? When you say an</p> <p>10 independent analysis, do you mean he collected</p> <p>11 additional data and drew his own conclusions --</p> <p>12 A. Certainly.</p> <p>13 Q. -- or do you mean that he merely relied on the</p> <p>14 work that Dr. Shomaker had done?</p> <p>15 A. He did his own analysis.</p> <p>16 Q. And what data did he rely on?</p> <p>17 A. Well drilling. So the wells that we've been</p> <p>18 talking about, the -- I believe the GWQ96-22 and 23.</p> <p>19 Q. Okay.</p> <p>20 A. Those were drilled and tested by Adrian Brown.</p> <p>21 Q. Okay.</p> <p>22 And then the 1997, SRK, I think -- I believe</p> <p>23 you said that was an independent analysis, also.</p> <p>24 So what data did he rely on -- or did they</p> <p>25 rely on? Excuse me.</p>
1621	<p>1 A. I believe they are referenced. Some are --</p> <p>2 the complete documents are in there, or they're</p> <p>3 referenced in those documents.</p> <p>4 Q. Okay.</p> <p>5 Do you know which ones are in the</p> <p>6 administrative record and which ones are merely</p> <p>7 referenced in other documents that are in the</p> <p>8 administrative record?</p> <p>9 A. 4 through 7, I'm fairly certain all of those</p> <p>10 are in the administrative record. 1, 2 and 3 are</p> <p>11 references that come out of the Stage 1 Abatement and</p> <p>12 also the modeling groundwater flow which is -- well,</p> <p>13 actually 1, 2 and 3 are referenced throughout 4 through</p> <p>14 7.</p> <p>15 Q. Okay.</p> <p>16 Now, you referred, first of all, to the</p> <p>17 Shomaker, 1993, report, and you said that that was based</p> <p>18 on -- I believe you said local geology and hand-dug</p> <p>19 wells; is that correct? Or was there more to it than</p> <p>20 that?</p> <p>21 A. There was more to it that was -- there were --</p> <p>22 Dr. Shomaker also looked at the pumping rates out of the</p> <p>23 Quintana pit and used that to calculate a hydraulic</p> <p>24 conductivity.</p> <p>25 Q. Okay.</p>	1623	<p>1 A. They relied on all the previous data, so from</p> <p>2 Adrian Brown, Shomaker. And as far as what they</p> <p>3 collected on their own, I'd have to go back and -- and</p> <p>4 redo that. But their -- their report is independent of</p> <p>5 Adrian Brown and Shomaker.</p> <p>6 Q. Okay.</p> <p>7 But they were still relying on the same data,</p> <p>8 which is -- as far as the Adrian Brown wells, we're</p> <p>9 talking basically two data points.</p> <p>10 A. Four, because each one --</p> <p>11 Q. Okay. Each one had a deep and a shallow.</p> <p>12 A. That's correct.</p> <p>13 Q. Okay. I stand corrected.</p> <p>14 Okay. Let's move on to the next slide, then.</p> <p>15 I want to look -- I want to direct your</p> <p>16 attention to the left side of this slide -- and we're</p> <p>17 looking at slide number 3 here -- which shows a number</p> <p>18 of arrows on the left side, which seem to indicate the</p> <p>19 flow of groundwater around the pit?</p> <p>20 A. No.</p> <p>21 Q. Okay. Could you explain to me what those</p> <p>22 arrows mean, then?</p> <p>23 A. Those are regional flow arrows around the</p> <p>24 andesite block that's in green. That -- that's a --</p> <p>25 this map is more or less an illustration of how Shomaker</p>

1624	<p>1 conceptualized the andesite block within the Animas 2 Uplift. 3 Q. So those arrows are not groundwater flows? 4 A. They are. 5 Q. Okay. 6 That doesn't seem to correspond to the other 7 maps that we've seen throughout this proceeding that 8 show groundwater flow through this area from the west to 9 east. 10 A. That's -- 11 MR. BUTZIER: Madam Hearing Officer. 12 MS. ORTH: Yes. 13 MR. BUTZIER: Do we have a specific reference? 14 Because I think some of those maps were on a 15 much smaller scale than this one. 16 MR. DE SAILLAN: I -- I think that's true, 17 Mr. Butzier, but certainly not true of all of them, and 18 none of them -- none of them depicted anything like 19 this. 20 MR. BUTZIER: Madam Hearing Officer, if he's 21 going to be asking generally about how this compares to 22 other maps, I'd like to know what maps we're talking 23 about. 24 MS. ORTH: Yeah. 25 MR. DE SAILLAN: If I could have just a</p>	1626	<p>1 one of those is hand-dug to about 30, 40 feet. 2 Q. Okay. 3 So -- 4 A. It's in a drainage. 5 Q. So one of them is hand-dug. 6 Is the other one hand-dug? 7 A. The other one is cased to about the same 8 depth, I believe. 9 And then moving down this -- I guess we have 10 to go all the way down to the bottom here. The Dolores 11 is a mine shaft. Pague is a hand-dug. The Paxton Well 12 is a hand-dug well. 13 I believe LRG-4156 is probably Pitchfork 14 Ranch, and that's not hand-dug. That one's drilled. 15 And -- what else do we have left here? 16 I believe that covers it, but I'm not sure if 17 I got them all, but -- 18 Q. Well, there are, I think, two more at the 19 bottom there. 20 So those ones were not hand-dug? 21 A. I'm not sure about LRG-4159, is the only one I 22 see at the bottom there. If you look at the depth, 23 that's another key here. So that one is not hand-dug. 24 So that one has a screen. Paxton is, obviously, a mine 25 shaft given its size, or maybe it's hand-dug, either</p>
1625	<p>1 second, please. 2 MS. ORTH: Yes. (Proceedings in brief recess.) 3 MR. DE SAILLAN: Okay. Let me try -- or let 4 me move on to the next slide. 5 Q. You -- with reference to slide 4, you 6 mentioned that some of the wells there were -- were 7 hand-dug wells, but they were nevertheless dug below the 8 water table, right? 9 A. It's difficult to determine if they were below 10 a regional or perched water table without having an 11 additional well next to it that's deeper. 12 Q. Okay. You also -- I think when you were 13 testifying, you said most of these wells were hand -- 14 hand-dug. 15 Could you explain which ones were and which 16 ones were not? 17 A. I believe it's pretty close, although that was 18 in 1993. I'll do my best here. 19 We -- under GWQ-6(N) and 6(S) -- this is slide 20 4 of my rebuttal exhibit -- those are the Hillshire 21 House wells, which are on the mine site property there. 22 Right west of the tailings impoundment, there's a house 23 on top of the hill. That house has -- has not -- 24 anybody in it, and those wells haven't been used, but</p>	1627	<p>1 one. Those -- yeah. Okay. That covers it. 2 Q. Okay. 3 The next slide, you indicated that -- I think 4 you said water chemistry data indicated that the Rogers 5 Well was supplied by surface water? 6 A. That's correct. 7 Q. What kind of water chemistry led you to that 8 conclusion? 9 A. Back in '93 we collected a sample. I don't 10 believe they were allowed to collect a sample during the 11 baseline data assessment, that being INTERA. So I used 12 that data and collected through the stormwater samples 13 that we get from SWQ-1, which is very close proximity to 14 that well. And that was done -- it's not part of the 15 administrative record, but it was done as a response to 16 the EIS, the Draft EIS. 17 So we wanted to -- we were asked to look to 18 see what the effects of this project would be on that 19 well. 20 Q. So is it possible, in your view, that it could 21 have been partially surface water and partially 22 groundwater? 23 A. That's a possibility. Yes. 24 Q. Okay. Let's move on to slide number 7, 25 please.</p>


1628	<p>1 And you reached some conclusions about</p> <p>2 mounding here from beneath the tailing storage</p> <p>3 facility, and you referred to a mounding of the</p> <p>4 groundwater when you -- when you discussed this; is that</p> <p>5 right?</p> <p>6 A. That's correct.</p> <p>7 Q. Now, wouldn't that mounding phenomenon have</p> <p>8 continued as a result of -- continued in time as a</p> <p>9 result of additional precipitation and additional</p> <p>10 draindown of the tailings?</p> <p>11 A. Well, there really is not much tailings there</p> <p>12 to drain down.</p> <p>13 Q. Okay.</p> <p>14 Well, then, what about infiltration of</p> <p>15 precipitation?</p> <p>16 A. It's so small in comparison to what was added</p> <p>17 during the start-up of the tailings impoundment, that</p> <p>18 was unlined. There are estimates of water at --</p> <p>19 infiltrated from start-up of that that is in the model</p> <p>20 report.</p> <p>21 Q. Okay. But precipitation would have still</p> <p>22 created a similar albeit smaller mounding occurrence.</p> <p>23 A. It could have depending on the rain patterns.</p> <p>24 Q. Okay.</p> <p>25 And then the next slide, which is number 8 --</p>	1630	<p>1 indicated for the wells was collected in 1996?</p> <p>2 A. No. We have 2010, and then 2013 is -- would</p> <p>3 be this well -- GWQ13-28.</p> <p>4 So when you read these well numbers, and when</p> <p>5 you read GWQ then the number, that's the year in which</p> <p>6 it was drilled, and then -- then there's a number -- a</p> <p>7 dash and a number that follows that. So that well was</p> <p>8 drilled in 2013.</p> <p>9 So there are a mixture. The ones without</p> <p>10 labels are from the Stage 1 Abatement and were collected</p> <p>11 in 2013.</p> <p>12 Q. Okay. So that's still five years ago.</p> <p>13 Okay. Thank you.</p> <p>14 I have no further questions.</p> <p>15 MS. ORTH: All right.</p> <p>16 Ms. Barncastle?</p> <p>17 MS. BARNCASTLE: Just a -- yes.</p> <p>18 MS. ORTH: All right.</p> <p>19 MS. BARNCASTLE: I need a --</p> <p>20 MS. ORTH: Would you send the microphone over.</p> <p>21 MS. BARNCASTLE: I got two coming.</p> <p>22 There we go.</p> <p>23</p> <p>24</p> <p>25</p>
1629	<p>1 maybe it would be easier just to go to number 9, because</p> <p>2 that's a little bit bigger.</p> <p>3 I just want to make sure I understand the --</p> <p>4 you have no data to support the -- the drawing of the</p> <p>5 red clay between the well marked GWQ94-21B and the</p> <p>6 fault; is that correct?</p> <p>7 A. As I believe I explained to the Hearing</p> <p>8 Officer, that we do not have well data, but we have</p> <p>9 other data that supports the clay being there.</p> <p>10 Q. Okay.</p> <p>11 And how long of an area is that? In other</p> <p>12 words, what is the distance from that well that I just</p> <p>13 mentioned to the fault, according to this scale?</p> <p>14 A. Based on where we have the fault located,</p> <p>15 which is somewhere between those two wells, it could be</p> <p>16 200 to 500 feet.</p> <p>17 Q. Okay.</p> <p>18 And again the well -- I mean, the fault</p> <p>19 location is not precise, it's estimated?</p> <p>20 A. Well, it's precise as you're going to get it</p> <p>21 here. I mean, it's way more precise than others that</p> <p>22 have been estimated.</p> <p>23 Q. And I -- I also want to make sure I understand</p> <p>24 the labels on the data here.</p> <p>25 It looks like most of the data that's</p>	1631	<p>1 CROSS EXAMINATION</p> <p>2 BY MS. BARNCASTLE:</p> <p>3 Q. I'm on slide 9. Okay. You're there.</p> <p>4 Looking at this contamination plume, I'd like</p> <p>5 to know how the limits of that plume were determined</p> <p>6 from one well.</p> <p>7 A. It's not. There are wells that -- that's just</p> <p>8 the one well in the cross-section. There are other</p> <p>9 wells that are north and south to the cross-section. If</p> <p>10 you look at the full report, there is a plan view of the</p> <p>11 plume, and then there are cross-sectional views of the</p> <p>12 plume.</p> <p>13 Q. Okay. So those are just not shown on this</p> <p>14 diagram.</p> <p>15 A. That's correct.</p> <p>16 MS. BARNCASTLE: Okay. No further questions.</p> <p>17 MS. ORTH: All right. Thank you.</p> <p>18 Does anyone else have a question of Mr. Finch</p> <p>19 based on his testimony?</p> <p>20 No?</p> <p>21 Mr. Butzier, do you have any follow-up?</p> <p>22 MR. BUTZIER: I have no further questions of</p> <p>23 Mr. Finch.</p> <p>24 MS. ORTH: All right. Great. Thank you.</p> <p>25 Mr. Finch, you're excused again.</p>

1632	<p>1 MR. FINCH: Thank you.</p> <p>2 MR. BUTZIER: I'd next like to call Dr. Ruth</p> <p>3 Griffiths.</p> <p>4 Actually -- I'm sorry. I did forget one</p> <p>5 question, with your indulgence, Madam Hearing Officer.</p> <p>6 MS. ORTH: All right.</p> <p>7 MR. BUTZIER: Or did I ask it?</p> <p>8 Did I ask you the -- I think I did ask you.</p> <p>9 No -- I have no questions.</p> <p>10 MS. ORTH: Okay.</p> <p>11 MR. BUTZIER: Sorry.</p> <p>12 RUTH GRIFFITHS</p> <p>13 having been previously duly sworn or affirmed, was</p> <p>14 examined and testified further as follows:</p> <p>15 DIRECT EXAMINATION</p> <p>16 BY MR. BUTZIER:</p> <p>17 Q. Good evening, Dr. Griffiths.</p> <p>18 A. Good evening.</p> <p>19 Q. Have you been at the hearing throughout the</p> <p>20 week?</p> <p>21 A. I have.</p> <p>22 Q. And have you listened to all of the testimony?</p> <p>23 A. I have.</p> <p>24 Q. And have you heard anything over the course of</p> <p>25 the week that causes you to change your opinions that</p>	1634	<p>1 sample. So it's carried out on a -- on a crushed rather</p> <p>2 than a pulverized material. So it's much more</p> <p>3 representative of the weathering rates you would expect</p> <p>4 in the field.</p> <p>5 Q. And what about the mixed parameters?</p> <p>6 A. Sorry. If I could just add --</p> <p>7 Q. Oh.</p> <p>8 A. -- further.</p> <p>9 Q. Okay. I'm sorry.</p> <p>10 A. I think with the Copper Flat project we've</p> <p>11 also established that the mineralogy is very important.</p> <p>12 We recognize that there's encapsulation of sulfide</p> <p>13 minerals and slow-reacting silicate minerals, and for</p> <p>14 that reason, you know, we feel that the kinetic testing</p> <p>15 measure is a much more reliable indicator of acid</p> <p>16 generation.</p> <p>17 Q. Okay.</p> <p>18 And do you have anything you'd like to respond</p> <p>19 to in relation to the testimony from Dr. Carroll</p> <p>20 relating to mixed parameters?</p> <p>21 A. Yes. In response to that, I would say there's</p> <p>22 perhaps no standard method for incorporating humidity</p> <p>23 cell data into models. And in my experience, I've seen</p> <p>24 all weeks of humidity cell data used. I've seen</p> <p>25 steady-state weeks used. I've seen first flush weeks</p>
1633	<p>1 you expressed as part of your direct testimony?</p> <p>2 A. No. I haven't heard anything that would cause</p> <p>3 me to change my opinion.</p> <p>4 Q. Okay.</p> <p>5 Now, there were some questions -- or there was</p> <p>6 some testimony that we received from Dr. Carroll</p> <p>7 relating to static and kinetic testing.</p> <p>8 Do you recall that?</p> <p>9 A. I do.</p> <p>10 Q. And there was also some testimony from</p> <p>11 Dr. Carroll that seemed to draw into question the use of</p> <p>12 mixed data, so to speak, in connection with some of the</p> <p>13 modeling parameters that were used in your modeling,</p> <p>14 correct?</p> <p>15 A. Correct.</p> <p>16 Q. Could you -- do you have any response that you</p> <p>17 would like to provide to either or both of those issues?</p> <p>18 A. Sure. So firstly, if we go to the static</p> <p>19 versus kinetic testing data, I believe I kind of</p> <p>20 responded to this in my direct testimony, but, you know,</p> <p>21 static testing is commonly used as a screening level</p> <p>22 test. It's conducted on pulverized material, and it's</p> <p>23 just looking purely at the potential for ARD.</p> <p>24 Whereas kinetic testing evaluates rates over</p> <p>25 time, it takes into account the mineralogy of the</p>	1635	<p>1 used. I've even seen just one single week of humidity</p> <p>2 cell data used.</p> <p>3 And the reason we used the approach we did for</p> <p>4 this project is, as Dr. Carroll recognized, for</p> <p>5 calibration purposes, and we found that when we used</p> <p>6 that approach we saw a much better calibration with the</p> <p>7 existing pit lake.</p> <p>8 Q. And so by doing so, did that increase your</p> <p>9 confidence in the modeling results that you received?</p> <p>10 A. Absolutely.</p> <p>11 Q. Okay.</p> <p>12 Now, I asked Mr. Finch a question about</p> <p>13 whether he was involved in some of the geochemistry</p> <p>14 aspects of the Copper Flat project, and I'll ask you</p> <p>15 similarly.</p> <p>16 Have you coordinated, and have you been</p> <p>17 involved in and reviewed the work of other experts</p> <p>18 involved in this -- in this project, including the</p> <p>19 geohydrology as well as the reclamation and closure</p> <p>20 aspects of this site?</p> <p>21 A. Yes. We've been working closely with the</p> <p>22 other consultants ever since -- well, certainly, I</p> <p>23 personally started working on this project since 2010.</p> <p>24 And there's been a constant review.</p> <p>25 I think, you know, the first stage in terms of</p>

1636	<p>1 receiving data, hydrological data for a geochemical 2 modeling is -- geochemical model is to review that. So, 3 you know, there was extensive review of both the water 4 balance data and the -- and the reports and for use in 5 the geochemical model.</p> <p>6 Q. And based upon that involvement that you had 7 on this project, if DP-1840 is granted, in your view, 8 would it pose a hazard to public health or an undue risk 9 to property?</p> <p>10 A. In my opinion, it would not.</p> <p>11 MR. BUTZIER: That's all the questions I have.</p> <p>12 MS. ORTH: All right. Thank you.</p> <p>13 Mr. Knight?</p> <p>14 MR. KNIGHT: I have no questions for this 15 witness.</p> <p>16 MS. ORTH: Mr. de Saillan?</p> <p>17 MR. DE SAILLAN: No questions. Thank you, 18 Madam Hearing Officer.</p> <p>19 MS. ORTH: Ms. Barncastle?</p> <p>20 MS. BARNCASTLE: I have no questions of this 21 witness. Thanks.</p> <p>22 MS. ORTH: Anyone else?</p> <p>23 No?</p> <p>24 All right. Thank you very much, 25 Dr. Griffiths.</p>	1638	<p>1 Q. And in that context, have you interacted with, 2 for example, the other Golder witness here, Mr. Todd 3 Stein, in connection with closure and reclamation 4 issues?</p> <p>5 A. To a lesser extent, but yes.</p> <p>6 Q. Okay.</p> <p>7 But you've had some involvement with basically 8 all of the consultants over the course of --</p> <p>9 A. Yes.</p> <p>10 Q. -- the work that you've done on this project?</p> <p>11 A. Yes.</p> <p>12 Q. Given all that involvement, if DP-1840 were to 13 be issued by the New Mexico Environment Department, in 14 your professional opinion, would it pose a hazard to 15 public health or undue risk to property?</p> <p>16 A. I don't feel that it would.</p> <p>17 MR. BUTZIER: Thank you.</p> <p>18 That's all I have, Madam Hearing Officer.</p> <p>19 MS. ORTH: Okay.</p> <p>20 Questions?</p> <p>21 Mr. Knight?</p> <p>22 MR. KNIGHT: No questions.</p> <p>23 MS. ORTH: Mr. de Saillan?</p> <p>24 MR. DE SAILLAN: No questions.</p> <p>25 MS. ORTH: Ms. Barncastle?</p>
1637	<p>1 Mr. Butzier.</p> <p>2 MR. BUTZIER: I'll next call Mr. David Kidd. 3 DAVID KIDD 4 having been previously duly sworn or affirmed, was 5 examined and testified further as follows: 6 DIRECT EXAMINATION 7 BY MR. BUTZIER: 8 Q. Good evening, Mr. Kidd. 9 A. Good evening. 10 Q. Have you been present throughout the week and 11 listening to all of the testimony in this proceeding? 12 A. I have. 13 Q. And have you heard anything this week from any 14 of the witnesses that gives you reason to want to change 15 any of the opinions expressed in your direct testimony 16 or that gives you a lesser confidence in the conclusions 17 you reported?</p> <p>18 A. No changes in my opinions, and no changes in 19 my testimony.</p> <p>20 Q. Thank you. 21 Have you also been involved as part of a 22 coordinated effort to conduct consulting services to New 23 Mexico Copper in connection with the Copper Flat 24 project? 25 A. Yes.</p>	1639	<p>1 MS. BARNCASTLE: No ma'am. Thank you.</p> <p>2 MS. ORTH: Anyone else?</p> <p>3 MR. KIDD: Thank you.</p> <p>4 MS. ORTH: Thank you.</p> <p>5 MR. BUTZIER: One more witness, Madam Hearing 6 Officer, Mr. Todd Stein. 7 TODD STEIN 8 having been first duly sworn or affirmed, was 9 examined and testified as follows: 10 DIRECT EXAMINATION 11 BY MR. BUTZIER: 12 Q. Good evening, Mr. Stein. 13 A. Good evening. 14 Q. Have you been present throughout the week and 15 listening to all of the testimony in this proceeding? 16 A. Yes, I have. 17 Q. Have you heard anything that causes you to 18 want to change any of your opinions expressed in your 19 direct testimony or that gives you some lesser 20 confidence level in the opinions you expressed? 21 A. No, I have not. 22 Q. Okay. 23 And have you likewise been part of a 24 coordinated team of consultants on this project such 25 that you've been involved with reviewing hydrological</p>

1640	<p>1 information, for example, as well as geochemical 2 information? 3 A. Yes, I have. 4 Q. And as a result of that or given that 5 involvement in this project, if DP-1840 were to be 6 granted, do you in your professional opinion believe 7 that it would pose a hazard to public health or undue 8 risk to property? 9 A. I do not. 10 MR. BUTZIER: That's all I have, Madam Hearing 11 Officer. 12 MS. ORTH: Thank you. 13 Questions? 14 MR. KNIGHT: No questions. 15 MR. DE SAILLAN: No questions. 16 MS. BARNCASTLE: We have nothing either. 17 MS. ORTH: All right. 18 Anyone else? 19 No? 20 Thank you very much, Mr. Stein. 21 Mr. Butzier, are you going to offer 107? 22 I noticed that each page had a different 23 exhibit sticker. 24 MR. BUTZIER: Yes. I would. Thank you, Madam 25 Hearing Officer.</p>	1642	<p>1 well. 2 MS. ORTH: Okay. Thank you, all. 3 Is there anyone left to offer public comment? 4 This is really truly your last chance. 5 No? 6 And by the way, for the parties' information, 7 Mr. Baca and I have consistently informed people that 8 for the purposes of this hearing, unlike the EMNRD 9 hearing, public comment has to come in by today as 10 opposed to subsequent to today. 11 So is there anything else we need to do except 12 talk about the posthearing process briefly? 13 I assume we'll get the transcript. When the 14 transcript is received by the hearing clerk, the hearing 15 clerk will send a notice of transcript filing so that 16 all parties know what day that is. And that's 17 important, because that's the day from which we will 18 count 30 days for posthearing submittals. 19 Mr. -- 20 MR. BUTZIER: Madam Hearing Officer, I would 21 request, given how many delays have already occurred in 22 this proceeding, that we go three weeks rather than a 23 full month from the receipt of the transcript to the 24 submission of posthearing findings of facts and 25 conclusions of law.</p>
1641	<p>1 I would like to offer into evidence New Mexico 2 Copper Corporation's Exhibit 107 through 115. 3 MS. ORTH: All right. 4 Objections? 5 MS. BARNCASTLE: No objection. 6 MR. DE SAILLAN: No objections. 7 MR. KNIGHT: No objection. 8 MS. ORTH: All right. NMCC 107 through 115 9 are admitted. 10 (Exhibits NMCC 107 through 115 admitted into 11 evidence.) 12 MS. ORTH: Is that all, Mr. Butzier? 13 MR. BUTZIER: That's all, Madam Hearing 14 Officer. 15 MS. ORTH: All right. 16 Mr. Knight, will the department have rebuttal? 17 MR. KNIGHT: We will not. 18 MS. ORTH: Okay. 19 Mr. de Saillan? 20 MR. DE SAILLAN: We've already presented our 21 rebuttal, Madam Hearing Officer. So we are also 22 finished. 23 MS. ORTH: All right. 24 And Ms. Barncastle. 25 MS. BARNCASTLE: We are completely done, as</p>	1643	<p>1 MS. ORTH: How do the other counsel feel about 2 that? 3 MR. DE SAILLAN: Madam Hearing Officer, we 4 were actually going to suggest 60 days for submitting 5 proposed findings of fact and conclusions of law and 6 closing arguments as we have done in previous mine 7 Discharge Permit hearings. 8 We would also like to have the opportunity to 9 file responses to the other parties' proposed findings 10 of fact, conclusions of law and closing arguments as we 11 have also done in other mining Discharge Permit 12 hearings. 13 MS. ORTH: I take it you're referring to the 14 last set of hearings we did a long time ago, Chino and 15 Tyrone. 16 MR. DE SAILLAN: Chino and Tyrone and 17 Molycorp. Yes, Madam Hearing Officer, those are the 18 ones. 19 MS. ORTH: Those are the ones. 20 Any other opinions about this? 21 MS. BARNCASTLE: I certainly would prefer more 22 time rather than less, especially given that this was 23 five full days of hearing, this is not going to be a 24 short transcript. 25 And when Mr. Butzier refers to all of the</p>

<p style="text-align: right;">1644</p> <p>1 delays so far, I can't venture to imagine what he's 2 talking about given that my request for an extension was 3 denied. So that's one -- at least one delay that did 4 not happen. So the only possible delay that he could be 5 referring to is the extension on the public comment 6 period. 7 MS. ORTH: Okay. 8 MR. DE SAILLAN: Madam Hearing Officer. 9 MS. ORTH: Mr. de Saillan. 10 MR. DE SAILLAN: If I may, I would also point 11 out, as you well know, that we have a Mining Act 12 hearing -- permit hearing coming up in October which is 13 going to occupy a lot of our time and a lot of your 14 time, as well, as I understand. 15 MS. ORTH: Right. I don't know that we'll 16 have the transcript by then, but thank you for that 17 point. 18 Mr. Knight, any opinion? 19 MR. KNIGHT: Yes. Thank you. 20 Madam Hearing Officer, I certainly see no 21 reason to deviate from the rules in terms of the times 22 for posthearing submittals. Personally, I would be in 23 favor of a three-week time period from the time the 24 transcript is received. I know -- I know that I will 25 personally be working on my posthearing submittal</p>	<p style="text-align: right;">1646</p> <p>1 weeks. If the Hearing Officer is inclined to hear the 2 pleas for additional time, I would certainly not want to 3 see it go beyond 30 days. 4 And I don't find anything in the procedural 5 rules that contemplate the process that Mr. de Saillan 6 proposed of responding to each other's. That -- there's 7 a whole series, there's an opportunity for the parties 8 after 15 days from receipt of the Hearing Officer's 9 report to -- to respond and ask for a hearing at that 10 point. 11 And so I don't think we need to elongate the 12 whole process unnecessarily. 13 MS. ORTH: Yeah. We do have a lengthy process 14 as it is set out in 20.1.4. So in consideration of the 15 upcoming hearing for the other agency that we're doing, 16 I won't shorten it from 30 days, but I don't feel as 17 though it should be necessary to go to the 60 days 18 you've proposed. 19 The last set of hearings we did, we spent at 20 least two weeks in Questa on the Molycorp hearing, two 21 weeks on Chino, two weeks on Tyrone. Those were at 22 least twice as long as this hearing. 23 So for now, let's stick with 20.1.4, and I 24 want you to assume that we're going to stick with 20.1.4 25 and the deadlines there for the -- for the time being</p>
<p style="text-align: right;">1645</p> <p>1 starting on Monday, and I will not be waiting for the 2 transcript, and personally I see no reason to do that. 3 But, you know, certainly the transcript will 4 be necessary to fill in the citations to such, but I -- 5 my opinion is that three weeks from the time the 6 transcript is filed is what I would prefer, but in no 7 case would I -- would I be in favor of going beyond the 8 time frames that are laid out in the -- in the rules. 9 MS. ORTH: 20.1.4. 10 MR. KNIGHT: That's right. 11 MS. ORTH: Right. 12 MS. BARNCASTLE: Madam Hearing Officer, if I 13 might add, EBID has consistently leveled a complaint 14 with the lack of time we have had to prepare for this 15 hearing and to prepare for the public comment phase. 16 So, you know, I would -- I would suggest to you that I 17 am further aligning myself with Mr. de Saillan's 18 position moving forward. 19 MS. ORTH: All right. 20 So, Mr. Butzier, any response? 21 MR. BUTZIER: Yes. I want to just draw 22 attention to 20.1.4.500B, part of the hearing procedures 23 applicable here. It does mention 30 days, which the 24 Hearing Officer initially proposed. 25 I share Mr. Knight's preference for three</p>	<p style="text-align: right;">1647</p> <p>1 going -- going forward to the end of the process. 2 The only other thing I can ask you to 3 consider, Mr. Butzier, because I know you're paying for 4 the agency's transcript, is an expedited process there. 5 That's the only other thing I can think of. 6 MR. BUTZIER: Thank you. I will take that 7 under consideration. 8 MS. ORTH: Okay. 9 Is there anything else we need to talk about? 10 Again the posthearing submittals will look 11 like proposed findings of fact, proposed conclusions of 12 law and any written closing argument you would like to 13 make. It's not required, but it's often very helpful to 14 have the perspective of the evidence that actually came 15 in during this week and to argue from that evidence. 16 MR. KNIGHT: Madam Hearing Officer, may the 17 parties advocating for the same position combine their 18 posthearing submittals and -- to reduce the number of 19 documents that you will -- the number of undoubtedly 20 lengthy documents you will need to review? 21 MS. ORTH: You know what, I have an iron 22 bottom. So I'm not going to ask them to do that. 23 However, if that's something that occurs to them, 24 certainly not objectionable to me, if you want to 25 combine your proposed findings and conclusions, or even</p>

<p style="text-align: right;">1648</p> <p>1 some of them, if you know what I mean, some of the more  2 fundamental things you would find.  3 Another thing that I've seen, and again I  4 don't find it objectionable, is because the applicant  5 bears a lot of the burden here of proving that the  6 permit should be issued and the department bears the  7 burden of proving that the permit conditions they've  8 suggested and the nature of their review that has to be  9 proved by them -- I have seen cases in which those who  10 either oppose a permit fundamentally and/or have  11 conditions above and beyond what the department would  12 like to impose focus their findings and conclusions on  13 those.  14 It's a way of narrowing perhaps what you might  15 have otherwise had in mind for the document.  16 MS. BARNCASTLE: I might just state for the  17 record, though, in response to Mr. Knight's comment,  18 that Mr. de Saillan and I were admonished to make sure  19 we did not duplicate our testimony and cases.  20 MS. ORTH: Yes.  21 MS. BARNCASTLE: So suggesting that we file  22 something together would be a little difficult given  23 that we've presented two very different cases.  24 MS. ORTH: Right. And so I'm definitely not  25 suggesting that to you. I think he was -- Mr. Knight</p>	<p style="text-align: right;">1650</p> <p>1 STATE OF NEW MEXICO )  2 ) ss.  3 COUNTY OF BERNALILLO )  4  5  6 I, CHERYL ARREGUIN, the officer before whom the  7 foregoing proceeding was taken, do hereby certify that  8 the witnesses whose testimony appears in the foregoing  9 transcript were duly sworn or affirmed; that I  10 personally recorded the testimony by machine shorthand;  11 that said transcript is a true record of the testimony  12 given by said witnesses; that I am neither attorney nor  13 counsel for, nor related to or employed by any of the  14 parties to the action in which this proceeding is taken,  15 and that I am not a relative or employee of any attorney  16 or counsel employed by the parties hereto or financially  17 interested in the action.  18  19   20 NOTARY PUBLIC  21 CCR License Number: 21  22 Expires: 12/31/2018  23  24 My Commission Expires: 12/12/19  25</p>
<p style="text-align: right;">1649</p> <p>1 was trying to be helpful, and I don't know that I can  2 offer any other suggestion besides what I just offered.  3 Anything else?  4 Mr. Butzier?  5 MR. BUTZIER: Just a thank you to the court  6 reporter --  7 MS. ORTH: Yes.  8 MR. BUTZIER: -- Cheryl Arreguin.  9 MS. ORTH: Yes. Thank you.  10 THE REPORTER: Thank you.  11 MR. BUTZIER: I know everybody shares in that.  12 THE REPORTER: Thank you very much.  13 MR. DE SAILLAN: And I will second that.  14 MR. KNIGHT: Here, here.  15 MS. ORTH: Great. Thank you so much.  16 Safe travels home.  17 And we're adjourned.  18 (Proceedings adjourned at 6:13 p.m.)  19  20  21  22  23  24  25</p>	



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