APPLICATION

FOR

REVISION OF MINE PERMIT #C1002RE

FROM STANDBY TO ACTIVE STATUS

AND

MODIFICATION OF GROUND WATER DISCHARGE PERMIT DP-61

MT. TAYLOR MINE, SAN MATEO, NEW MEXICO

RIO GRANDE RESOURCES CORPORATION

APRIL, 2013

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1 INTRODUCTION

1.1 Permit Background

1.1.1 Mine Permit

The Mt. Taylor Mine is an existing uranium mine as defined under the New Mexico Mining Act of 1993, NMSA 1978 Section 69-36-3 (E). Existing-mine permit #C1002RE was issued to Rio Grande Resources (RGR) for the mine by the New Mexico Department of Energy, Minerals and Natural Resources, Mining and Minerals Division (MMD) on July 28, 1995 in accordance with NMSA 1978, Section 69-36-1 e.t seq. and the New Mexico Mining Act Rules, 19.10.5 NMAC. A closeout plan was approved by MMD on December 18, 1998, under permit revision 98-1.

RGR applied for standby status for the mine permit in accordance with 19.10.7 NMAC on March 25, 1999. MMD approved standby status on October 12, 1999 under permit revision 99-1 for a term that ended on October 7, 2004. RGR applied for a first renewal of standby status on September 24, 2004, which MMD approved on July 27, 2005, under permit revision 04-1, for a term that ended on July 5, 2010. The second renewal of standby status was granted on January 30, 2012 for a term beginning July 5, 2010 and ending October 12, 2014 (MMD 2012).

In July 2012 RGR submitted an update to the closeout/closure plan for the mine that addressed existing conditions. This closeout plan update was required as condition BB of the MMD's second renewal of standby status (MMD 2012) and included an estimate of financial assurance based on reclamation of presently existing conditions at the mine.

1.1.2 Discharge Permit

Discharge Permit 61 (DP-61) was originally issued by the New Mexico Health and Environment Department, Environmental Improvement Division (NMEID) to the original owner of the mine, Gulf Mineral Resources Company, in 1979 under the Water Quality Act, and 20.6.2.3104 -3111 NMAC. This permit sets conditions for effluent or leachate discharge from the mine facilities. DP-61 (NMED ID 2688) was subsequently modified and renewed by NMEID in 1984 and 1989, and in 1995 by the New Mexico Environment Department (NMED). The permit has been in timely renewal since 1999, during which time several contaminant investigations and an abatement plan have been conducted. The DP-61 closure plan was submitted in 1998.

1.1.3 Return to Operating Status

In accordance with 19.10.5.505 and 19.10.7.701 NMAC, RGR is submitting this application to return the Mt. Taylor Mine permit #C1002RE to operating (also known as active) status by not later than October

12, 2014 before the end of the second standby renewal period. The following information is provided in support of this application as well as modification of DP-61.

1.2 Project Description and History

Rio Grande Resources Corporation (RGR) is owner and operator of the Mt. Taylor Mine, an underground mine located in Cibola County, New Mexico. The surface facilities of the mine are located in Section 24, T13N, R8W, NMPM (Figure 1-1) 1/2 mile northeast of the Village of San Mateo and are accessible from New Mexico State Route 605. The Mt. Taylor Mine was developed in the 1970’s by Gulf Mineral Resources Company and placed into production in 1980. Ownership was transferred to Chevron Resources Company (Chevron) in 1985 when the two companies merged. At the time of this application, the mine remains on standby after mining operations were suspended in 1990 due to the depressed uranium market. RGR acquired the mine in 1991; the mine has been in standby since RGR purchased the property.

Approximately 675,085 tons of ore and approximately 698,000 tons of waste rock were mined at the Mt. Taylor Mine before Chevron suspended production. Uranium ore was extracted from depths of over 3,000 feet below ground surface from ore zones of the Morrison Formation (Figure 1-2) using room-and-pillar and stope mining methods. Two shafts, one for hoisting ore and material to ground surface and the other for hoisting men and material, connect the surface to the underground mine. The ore was shipped off site for milling; there are no mill facilities present within the proposed permit area.

Pumping of ground water from wells began in the early 1970's and was necessary to gain access to the ore zones. The ground water was removed from various water-bearing strata down to and including the mine level to depressurize the ground where shafts and underground workings were developed. Water thus removed is called mine water. Mine water removed from the ore-bearing strata of the mine was treated to remove radium before discharge. Upon return to operating status, and before production of ore can resume, the mine will have to be dewatered again, and the water will be treated to reduce uranium and radium concentrations to current regulatory limits.

The functions and overall dimensions of the Mt. Taylor Mine units described in the Mine Permit Application of December 1994 remain unchanged. The existing mine units will be reactivated and upgraded as necessary to meet current regulatory standards. These upgrades will create no changes to the “nature or scale” of the mine units (19.10.5.505 B(1)(c) NMAC), but some of the upgrades will change shapes and sizes of individual components of some mine units. More detailed descriptions of the mine units are provided in Section 2 of this application.

1.3 Regulatory Requirements for Reactivation to Operating Status

1.3.1 MMD Requirements

As required by 19.10.7.701 H NMAC, RGR is applying to MMD to revise mine permit #C1002RE for the Mt. Taylor Mine to return to operating status from standby status before the end of the second standby renewal period. This application also responds to the requirements of 19.10.5.505 NMAC for existing mine permit modifications or revisions. Submitted under separate cover with this application is the Closeout/Closure Plan (CCP), required by 19.10.5.506 NMAC, modified from the 1998 Closeout Plan and incorporating relevant upgrades to current best practices as well as changes in the post-mining land uses.

1.3.2 NMED Requirements

Regulations issued pursuant to the New Mexico Water Quality Act provide that a discharge permit may be required for certain discharges that may move into groundwater (NMAC 20.6.2.3104). RGR has obtained a discharge permit under Water Quality Act regulations that is under renewal pursuant to 20.6.2.3106 F since 1999. This discharge permit allows the discharge of water pumped from the mine into the mine water treatment area. NMED has no requirements for a permit revision comparable to those of MMD but requires a discharge permit modification, defined in 20.6.2.7 P NMAC. In addition, 20.6.2.3107 C NMAC requires notification to NMED of any facility expansion, production increase or process modification that would result in any “significant modification” in the discharge of water contaminants. “Significant modification” in this context is not defined, but RGR is of the opinion that the upgrades proposed in Section 3 of this application may be handled as a modification to DP-61. This application seeks to modify DP-61.

1.3.3 US EPA Requirements

40 CFR 440.32 (a) establishes effluent limitations representing the degree of effluent reduction in uranium mine drainage attainable by the application of the best practicable control technology currently available (BPT) for existing sources. The effluent limitations are enforced through NPDES #NM 0028100 administered by NMED in accordance with 20.6.2.2001 NMAC. The upgrades proposed in Section 3 are designed for BPT to attain the EPA’s effluent standards.

1.4 Purpose and Scope

This document provides information, as required by the mine permit and discharge plan as well as the foregoing state and federal requirements, to support RGR’s application to revise the status of the Mt. Taylor mine from standby to operating status and to modify DP-61. This information includes the closeout / closure plan (CCP), revised from the CCP submitted in July 2012, which addressed existing conditions only, to cover the extent of disturbances associated with ultimate mine buildout for the remainder of the mine life.

1.4.1 Content of the Application

In addition to the foregoing information, this application contains description of the existing mine units in Section 2, upgrades (Section 3), and rehabilitation (Section 4) of existing mine units. Section 5 addresses other permits that will be affected by mine reactivation. Section 6 describes changes or updates in environmental monitoring related to return to operating status. The operations, health and safety plans that will be required for operations are briefly described in Section 7; the actual plans will be prepared after approval of the change in mine permit status. The tentative schedule for mine reactivation is provided in Section 8. Section 9 summarizes the closeout/ closure plan. Appendices to this application include Appendix A (drawings), Appendix B (engineering analyses), Appendix C (permits), and Appendix D (IX plant design).

2 EXISTING MINE UNITS

The existing mine units are located on 285.6 acres of the 4006.7 acres included in the permit area. Approximately 148 acres are disturbed land and the remaining 138 acres are undisturbed. The Mine Unit, consisting of the underground workings, shafts, and conduits, has no surface disturbance other than that included in the Service and Support Facilities Unit (shaft collars, vent raises). The other units and their disturbed land consist of:

- Service and Support Area – 93.0 acres
- Mine Water Treatment Area - 28 acres
- Ore Stockpile - 6.8 acres
- Waste Rock Pile - 11.5 acres
- Storm Water Retention Ponds (2) - 3.7 acres

These facilities are shown on Figure 2-1 and are described in more detail in the existing mine permit.

The Treated Mine Water Discharge Pipeline (pipeline) extends 4.3 miles from the mine permit area to the outfall point in San Lucas Canyon north of the mine (Figure 2-2).

A maintained gravel access road, NM 334, bisects the mine site and covers 4.7 acres. This is a state road and right-of-way, maintained by Cibola County, which provides public access to the west edge of the Cibola National Forest; it is not part of the mine permit area.

The following subsections describe the existing units of the mine that will be reactivated. These units are defined by function rather than space or dimension, so some units physically overlap others. Additional description of mine units is provided in the Closeout/ Closure Plan submitted with this application.

2.1 Mine Unit

The existing underground mine facilities, including the shafts, shaft stations, drifts, utility conduits, and utilities serving the underground space, constitute the Mine Unit. Upon returning to operating status, restoring to the functionality of these facilities will require some repairs and replacement, some of which will have long lead times. When mining resumes, the underground workings will expand, but none of this expansion is expected to affect ground surface until a new vent shaft is needed approximately 10 years after restart of the mine operations.

2.2 Mine Dewatering and Mine Water Treatment

Several aquifers exist between ground surface and the mine level (Figure 1-2). Each of these must be depressurized sufficiently for mining to be resumed. Ground water in the Westwater Member of Morrison Formation (ore host rock) at mine level contains concentrations of uranium and radium above the human health standards for ground water quality in 20.6.2.3103A NMAC, so the water pumped from the mine level is treated to reduce levels of these two contaminants. Pond sediments tested negative for filterable toxicity characteristics per 40 CFR 261.24. No measureable concentrations of “toxic pollutants”, as defined in 20.6.2.7 WW NMAC, have been detected in the mine water.

The facilities that remove groundwater from the mine and treat the water before release into the pipeline constitute the mine dewatering and water treatment unit (Drawing MT13-AC-01 and MT13-AC-02). This unit includes the dewatering wells, the network of pipes that convey the mine water, the ion exchange (IX) facility, the barium chloride facility, the water treatment ponds, and the hydraulic structures that connect the ponds. In the late-1970’s, the mine water treatment unit (MWTU) was constructed onsite to treat the mine water to meet the discharge standards in effect at that time. The system consisted of eight ponds with a combined water capacity of approximately 62 acre-feet for reducing radium, heavy metals, and total dissolved solids and IX plant for capturing natural uranium. The IX Plant was first authorized by the New Mexico Radiation Protection Bureau (now the Radiation Control Bureau) in 1981 under license #NM-GMT-IX-R1-01. The plant was run for three weeks of testing in the 1980’s. After testing, the IX resin was removed and transferred to the Kerr-McGee uranium mill in Ambrosia Lake. The interiors of the resin tanks were rinsed with clean water. The plant has not been operated since that time because 1) uranium discharged in the mine water met the water quality standards in effect at the time without the need for treatment, and 2) the mine went on standby status in 1990.

When mine dewatering resumes, the initial pumping capacity may be up to 12,000 gallons per minute (gpm) but pumping rates will be limited by the capacities of the IX and barium chloride treatment facilities. After target water levels are achieved, the sustained pumping rates are expected to range from 4000 to 5000 gpm. The volume varies due to the amount of recycled water, which is utilized underground for drill water, pump seal water and cooling water, and by underground mine development.

Under normal operating conditions, raw mine water is first treated to reduce the level of particulates by addition of a flocculant. The normal rate of flocculant addition is 0.5- 1.5 ppm. With this addition, the mine water flows through three settling ponds (#1, 2 & 3). The water discharged from pond 3 is routed to the uranium ion exchange plant (IX unit). The IX unit is presently designed to process a water volume of 5,000 GPM, but has an expansion capability to 10,000 GPM. The water discharged from the IX unit is then directed through the Radium 226 treatment system where barium chloride is added continuously at the rate of 15 ppm, followed by addition of a second flocculant to enhance settlement of the barium - radium sulfate precipitate. Lagoon numbers 8, 4 and 5 are sequentially fed by gravity flow to allow ample time for precipitation. The water continues finally into retention ponds # 6 and 7 to be discharged or partially recycled back into the mine. Discharge volume (approximately 4000-5000 GPM) through the 24 inch discharge pipeline carries the treated water 4.3 miles north to discharge at outfall 001 in an unnamed arroyo in San Lucas Canyon.

The flow system through the six major treatment ponds is designed to allow isolation of each pond if, or when, clean-out or repairs becomes necessary.

During the periods of prior operation, the ion exchange facility was not operated because uranium concentrations in the ground water did not exceed the maximum concentration limits in effect at that time. The ion exchange building and equipment remain intact, but the equipment will be reconfigured and new equipment installed.

Except for ponds 6 and 7, the mine water treatment ponds had compacted clay liners. Ponds 6 and 7 were lined with hypalon geomembrane, which is no longer serviceable. The clay liners of the other ponds remain in place but do not meet the current standards of liners designed for ground water protection (NMED 2007; 40 CFR 440 Subpart C: 40 CFR 264 Subpart K). The hydraulic structures that connect the mine water treatment facilities consist of concrete and steel pipes, channels, gates, weirs, and screens. These structures remain largely intact but will require some repairs and reconditioning. The inlet hydraulic structures at the east ends of ponds 6 and 7 were used in the initial dewatering phase of mine development and are no longer needed; they will be removed.

2.3 Service and Support Facilities

Service and Support facilities include all surface functions other than mine water treatment, ore stockpiling, and mine waste rock disposal. The location and identification of these facilities are shown on Figure 2-1.

Service facilities are those units at ground surface that support the overall mine operation but do not provide direct support of underground operations, and that will be either removed from the site or converted to post-mining use after closeout. These facilities include the guard house, fire equipment building, service building, electrical substation, car shop, carpenter shop, electrical building, waste treatment building, storage building, core storage building, water tanks, fuel storage tanks, fan shop, septic tank, leach field, sanitary treatment plant (STP), and water wells for potable water supply to the mine.

During mine standby, the STP was not operated, and the small volume of sanitary waste from mine facilities was treated through a septic tank and leach field. Upon mine reactivation, the STP will be put back in operation and the septic tank and leach field will remain available if needed. The STP is permitted under DP-61 and the outfall for its discharge is permitted under NPDES #NM0028100.

Support facilities consist of those facilities at ground surface that have a direct function in underground mining operations and that will be either removed from the site or converted to post-mining use after closeout. These units supply air for ventilation; pumping of water from the underground space; cooling and heating of underground air; and hoisting of personnel, materials and ore to and from the underground mining levels. The present mine support facilities include the compressor buildings, York chiller, cooling tower, pump building, shaft heating building, hoist house, head frames, and exhaust fans.

An electrical substation is located at the north side of the Service and Support facilities area. This substation, owned by the Continental Divide Electrical Cooperative and Public Service of New Mexico, is not part of the mine permit but provides electrical power for mine operations.

2.4 Waste Water (Sewage) Treatment Plant

The sewage treatment plant (STP) (Drawing MT13-AC-14) consists of two side-by-side, packaged, Case/Cotter extended aeration plants. Each of these units is capable of treating up to 25,000 gallons per day of waste water from the surface facilities. These units are designed for pre-grinding and screening, aeration, settling (with a sludge return from the settling tank to the aeration tank) and chlorination.

During standby, the STP is inactive, and sewage is handled through a septic tank and leach field. When the STP is active, all final effluent is treated with chlorine, either by gas metering installation or by using HTH cakes at the discharge end of the STP unit. The effluent discharge is metered as it flows into a concrete retaining sump where it is collected for discharge. The pumping system, automatically controlled by high/low level probes, consists of one 10 horsepower pump with a second pump alongside for standby replacement.

When the STP is active, treated effluent is pumped directly into the 24- inch treated mine water pipeline at outfall 01A where it comingles with the treated mine water and monitored to ensure that discharge standards are met. During previous operation of the STP, the average daily discharge from the STP units was 0.0109 million gallons (or 10,900 gallons), which equates to an average of approximately 7.57 GPM. Table 2.1 shows the quality of certain parameters of water discharged from the STP unit.

The STP discharge is combined with the treated mine water and discharged to San Lucas Canyon permitted under NPDES #NM 0028100.

2.5 Waste Pile

The waste pile occupies 11.5 acres in the southwest corner of the surface facility area. Upon resumption of mining, waste rock will be placed on this pile until it reaches the maximum build-out configuration (Drawing MT13-AC-08). The waste pile contains waste rock, excavated during mine development and production, from non-ore bearing formations or below-ore-grade rock from the mine. The mound of material at the southwest corner of the waste pile is primarily shaft muck excavated from strata above mine level, making its radionuclide content essentially background level.

The waste pile also contains a variety of non-rock waste from the mine such as rock bolts, timbers, and other hardware. These materials occur randomly throughout the pile.

Analyses were performed previously to determine the structural stability (resistance to mass movement) of the pile upon ultimate buildout, the largest size that the pile could have. This condition would include slopes that are higher than those that exist now. The results of these analyses, documented in Appendix B of the Closeout/ Closure Plan, show that the minimum factors of safety are 2.42 under static load conditions and 1.61 under pseudostatic (earthquake) load conditions. These values are well above the minimums necessary (1.00) to ensure stability.

2.6 Ore Stockpile

The ore stockpile presently covers 6.8 acres and contains approximately 60,000 tons of low-grade ore. The entire surface of the ore is covered with approximately two feet of native soil that is supporting well-established vegetation consisting mostly of grasses.

Upon resumption of mine operations, the existing stockpile of ore will be shipped off site to be used as feed stock in uranium milling. After the stockpiled ore is removed, the ore pad will be reconstructed to current standards, as described in Section 3.3.

2.7 Storm Water Retention Ponds

Two storm water retention ponds capture and retain runoff from areas of the mine surface that contain ore or waste rock. The sediments in both ponds have radium levels exceeding the 6.8 pCi/g limit; these sediments will be removed and placed on the waste pile.

The north pond (ore pad runoff retention pond) is 0.9 acres and located between the ore stockpile and the mine water treatment area. It retains runoff from the ore stockpile and holds it until it evaporates. When the mine returns to active status and before ore production resumes, this pond will be reshaped and a double liner with a leak detection and collection system will be installed to receive runoff from the ore pad.

The south storm water retention pond, 1.45 acres, retains storm water from the waste pile and a portion of the Service and Support facilities area. After contaminated sediments are removed to the waste pile, this pond will be upgraded with a clay liner because this pond will receive runoff only after infrequent storm events.

Presently, Pond #2 in the mine water treatment unit receives most of the runoff from the Service and Support unit area through a system of subgrade drainage pipes. When the mine returns to active status, this runoff will be diverted to the south storm water retention pond and to arroyos north and south of the mine site, similar to the natural, pre-mining drainage patterns.

2.8 Access Road

The maintained gravel road, NM 334, is a public road and right-of-way, totaling approximately 4.7 acres, maintained for the State of New Mexico by Cibola County, that provides access to the west edge of the Cibola National Forest. Although this road bisects the mine, it is not part of the mine permit area and is not subject to actions by RGR for mine reactivation.

3 UPGRADES TO EXISTING MINE UNITS

In the years since the mine was built, technical advances and regulatory changes have occurred that will necessitate upgrades to the mine upon return to active status and before actual ore production resumes. The proposed upgrades are described in the following sections.

3.1 Mine Water Treatment Unit

40 CFR 440.32 (Subpart C), 7–1–96 Edition, requires Best Practicable Control Technology Currently Available (BPT) for effluent discharges from uranium mines. BPT is defined at Section 304(b)(1) of the Clean Water Act (CWA). In specifying BPT, EPA considers a number of factors including the total cost of applying the control technology versus effluent reduction benefits, the age of the equipment and facilities, the processes employed and any required process changes, engineering aspects of the control technologies, and non-water quality environmental impacts including energy requirements (US EPA 2012).

Mine water, intended for discharge such that it could impact ground water, must meet the human health standards established by the New Mexico Water Quality Act through 20.6.2.3103A and 20.6.2.3109C(2) NMAC or existing concentration as provided for in 20.6.2.3101 and 20.6.2.3103 NMAC. The Mt. Taylor mine water contains levels of radium and uranium prior to treatment that may exceed discharge standards. The mine water treatment system will remove particulates, uranium, radium 226 and other parameters (possibly selenium) that might exceed the New Mexico Water Quality Control Commission Regulations before any discharge. For removal of radium to below the 30 pCi/l standard (20.6.2.3103A NMAC), the Mt. Taylor Mine has employed co-precipitation of radium with $BaSO_4$ by adding $BaCl_2$ to the mine water discharging from the sedimentation stage (ponds 1, 2 and 3) of the mine water treatment cycle. This method of radium removal remains BPT and will be used when operations resume. Specific equipment in the radium removal process will be repaired or replaced as necessary, but no technology upgrades will be needed.

3.1.1 Ion Exchange

In 2007, the New Mexico Water Quality Control Commission (WQCC) promulgated the standard of

0.03 mg/L for uranium discharges in the New Mexico Water Quality Regulations, paragraph (12) of subsection A of 20.6.2.3103 NMAC. To reduce mine water uranium concentrations below the required standard, 0.030 mg/l, (20.6.2.3103 A NMAC), upon return to operating status, the existing ion exchange (IX) equipment will be upgraded and new columns, tanks and resins added within the existing IX building. The ion exchange process for recovering uranium from mine water utilizes a quaternary amine incorporated onto a porous styrene divinylbenzene bead. The amine has the ability to give up anions in exchange for anions in solution, in this case uranium. The resin will be Dow Chemical Company DOWEX 21K 16/20, or an equivalent resin. The DOWEX 21K 16/20 resin is a high efficiency, large bead, strong base anion exchange resin. The selection of the resin was based on field tests conducted by RGR under DP-1712. That testing was completed, and DP-1712 has subsequently been terminated. The upgraded Mt. Taylor IX system (Appendix D) is designed to treat 10,000 GPM of mine water for removal of uranium at 0.07 parts per million (ppm) initially, with trend increasing.

The system will incorporate seven IX trains each consisting of two IX columns in series. Each IX column will have a load consisting of 400 cubic feet of ion exchange resin having a maximum loading capacity of 0.09 pounds of U per cubic foot of resin. Each train has been designed to handle a maximum flow rate of 1,650 gallons per minute (GPM) and will be operated at a nominal flow rate of 1,429 GPM. The individual trains will be sampled and assayed to ensure that the discharge water does not exceed the uranium discharge limits.

The Mt. Taylor ion exchange (IX) treatment is intended for water quality treatment, not for uranium recovery. The amount of uranium in the mine water is relatively small and not sufficient to support commercial recovery.

Discharge water from each train will be sampled and assayed to verify compliance with the uranium discharge limit. The samples will be composites drawn over an 8-hour period, and will be assayed daily using KPA (Kinetic Phosphorescence Analysis). KPA achieves highly specific analyses for uranium in water down to 0.01 ug/L (ppb).

The IX columns are designed for transfer of the resin in the lead IX column when it reaches a loading of about 0.06 pound of U per cubic foot, to prevent discharge exceeding 30 parts per billion (ppb) U. This resin will be transferred to one of two loaded resin storage tanks and then this loaded resin will be off-loaded to a resin tanker. When loaded with uranium, the resin will be transported to offsite facility to be regenerated with a concentrated brine solution in a split elution cycle. The regenerated resin will be returned to Mt. Taylor to be reused.

Each of the IX columns will be operated in an up-flow mode with safeguards to prevent resin leakage between IX columns or resin spills. Each of the IX columns will have safety to prevent resin spills as follows: 1) resin screens in the overflow in each column, 2) a level control system that will reduce the input flow rate to the lead IX column; and 3) a bypass on the tail column will reroute bypass fluid to an overflow storage tank. The fluid sent to the overflow storage tank will be recycled back to the main supply wet well whereby it will be fed to the lead IX column.

The uranium collected at the IX Plant will be in the form of natural uranium (U-nat). The maximum amount of U-nat that could be present at any time in-process and in-storage at the IX Plant is 900 pounds (281.92 millicuries). The maximum loading capacity of the resin is 0.27 pounds of U per cubic foot of resin for a possession limit of 2700 pounds U (845.77 millicuries).

3.1.2 Ponds

The eight ponds of the mine water treatment unit are used to remove solids (sediments and barium sulfate precipitate) from the mine water and to contain and manage the mine water through the treatment process until the water is discharged via the pipeline. Solids generated by the mine water treatment are excluded from the definition of hazardous waste (40 CFR 261.4(b)(7). Nevertheless, the suspended solids and dissolved contaminants must be contained until removed from the water. In addition to the water quality criteria of 20.6.2.3103 A NMAC, 20.6.2.3109 C(3)(b)(i) NMAC limits effluent discharge from mines to 0.5 acre-feet/acre/year, and 20.6.2.310 C(3)(c)(i) NMAC requires capability for sampling and flow monitoring sufficient to determine discharge to the ground.

To achieve these standards, RGR will replace the old liners with new liners, as illustrated in Drawings MT13-AC-02 through -07. Ponds 1, 2, 3, 4, 5, and 8 will have double membrane liners that include:

- Clay underliner of 1.0 feet of locally available sandy clay or clay (Cl, CH soil) or clayey sand (SC soil) compacted to not less than 90 percent Standard Proctor density (ASTM D-698).
- Secondary geomembrane of 40 mil HDPE
- Leak detection and collection layer of 250 mil HPDE geonet
- Primary geomembrane of 60 mil HDPE

Ponds 6 and 7 receive treated water that meets the water quality criteria of 20.6.2.3103A NMAC. Therefore, these ponds will be lined with a single 60 mil HDPE geomembrane.

Except for pond #2, the ponds were dry and supported volunteer vegetation at the time of this application. The surfaces of the ponds will be prepared by stripping away existing vegetation and regrading the pond slopes to not steeper than 3H:1V. Historical data and previous topographic maps indicated total pond system holding capacity of approximately 62 acre-feet (ac ft). With reshaping and addition of liners to the pond, the holding capacity of the pond system will not increase (Appendix B, MT13.04) but will be redistributed toward better surge capacity in ponds #1- #3, upstream of the IX. Some capacity lost in ponds #4 - #8, downstream of the IX, will be recaptured in pond #1- #3 to provide additional space for up to two hours of temporary mine water retention in the event of an upset condition in the IX plant at maximum pumping rate of approximately 12,000 gpm.

The base of each pond will be cleared of contaminated sediments, then sloped to a corner of the pond where the leak detection and collection system (LDCS) sump will be located. The leak detection and collection system (LDCS) of each pond, illustrated in Drawing MT13-AC-06B, will consist of:

- The geonet between the two HPDE geomembranes
- A sump at the lowest corner of each pond, filled with gravel placed at the end of the geonet and between the two geomembranes
- An HDPE pipe extending from the sump bottom to the top of the pond slope between the geomembranes.

The LDCS will collect water that leaks through the primary geomembrane into the high-permeability geonet, which then drains the water to the sump, where the HDPE pipe provides access to both monitor and remove water that collects in the LDCS. The LDCS of each pond will be monitored as described in Section 6.

Drawings MT13-AC-03, -03A and -04 illustrate the typical pond liner for ponds 1, 2, 3, 4, 5 and 8. These ponds will contain mine water that is undergoing treatment and, therefore, probably exceeds discharge standards for radium and uranium. Ponds 6 and 7 (Drawing MT13-AC-05) will hold treated water with radium and uranium concentrations below discharge limits, so a single 60 mil HDPE liner will be sufficient to contain this water within 20.6.2.3109 C(3)(b)(i) NMAC limits until it is circulated for use in the mine cooling circuit and mine plant operations or released through the treated water pipeline for discharge.

The HDPE geomembrane will be attached and sealed to the hydraulic control structures in each pond (Drawing MT13-AC-07). Steel or aluminum battens will be used to secure the geomembrane to existing concrete surfaces of the hydraulic structures. Where new concrete will be used to repair or extend the existing hydraulic structures, the geomembrane will be attached to HDPE channel embedded in the concrete. Pipe clamps or concrete collars will be used to seal the geomembrane to large diameter steel pipe inlet structures.

3.1.3 Hydraulic Control Structures

Hydraulic control structures consist of steel and concrete structures that control the movement of water into and out of the mine water treatment ponds (Drawing MT13-AC-02, -07). Each of the ponds has one or more hydraulic control structures. Most of the control structures will require rehabilitation, including repair of concrete and replacement of steel components. Two structures, the inlet works at the east and south of ponds 6 and 7, are no longer needed and will be removed and replaced by two new inlet structures for the bypass pipe around pond 5 (Drawings MT13-AC-02 and -05).

Existing spillways at the inlet structures to the ponds will be removed and replaced with new concrete spillways, formed and poured in place and connected to both the existing hydraulic control structures and the new pond liners (Drawings MT13-AC-06A and -06B).

Concrete surfaces exposed to flowing or standing water will be protected with a coating of water-proof elastomeric polyurethane such as Polibrid 705 or approved equivalent material.

3.1.4 Pond Bypass

To allow each pond to be taken out of service for inspection or repair, a bypass must be provided to route water around the pond without interrupting the function of the mine water treatment unit. A bypass exists around each pond except for pond 5. A new bypass will be constructed around pond 5, connecting pond 4 to ponds 6 and 7 (Drawings MT13-AC-02 and -05). The bypass will be 24 inch diameter steel pipe with separate branches to pond 6 and pond 7.

3.1.5 Treated Mine Water Pipeline

During mining, part of the treated mine water is used on site and part is discharged off site. Treated water is used for general plant water supply and for cooling water in the mine air refrigeration plant. The remainder is then pumped through a 4.3 mile long, 24-inch pipeline and discharged to San Lucas Canyon (Figure 2-2) under authority of NPDES permit # NM0028100. The pipe consists of 1/4-3/8 inch wall thickness steel sections welded in the field. The pipeline will be rehabilitated as described in Section 4 but otherwise will remain as originally constructed.

3.2 Waste Piles

3.2.1 South Waste Pile

The existing south waste rock pile covers 11.5 acres in the southwest corner of the mine area. The waste pile contains waste rock from the mine level with above-background levels of uranium and radium as well as waste rock (muck) from shaft sinking and mine development containing background levels of these radionuclides. The latter material is suitable for use as cover soil for waste pile reclamation (see Closeout/Closure Plan, RGR 2013) and will be segregated from the rest of the waste rock.

Upon reactivation of the mine and before ore production resumes, the existing waste pile will be reshaped. The west and south slopes will be flattened to not steeper than 5H:1V to facilitate contemporaneous stabilization and reclamation while waste rock in placed on the eastern (backslope) of the waste pile. The thin wedge of waste rock presently on the east side of the pile (Drawing MT12-CL-08 and -09, RGR 2013) will be excavated and pushed west over the area of thicker waste rock. The ultimate waste pile footprint will lie within 11.5 acres.

As part of the original closeout plan, analyses were performed to determine the structural stability (resistance to mass movement) of the pile after maximum buildout and stabilization. The results of these analyses, documented in Appendix B of the CCP (RGR 2013), show that the minimum factors of safety are 2.42 under static load conditions and 1.61 under pseudostatic (earthquake) load conditions for slope gradients that are steeper than those proposed for the reconfiguration of the existing waste pile. These values are well above the minimums necessary (1.00) to ensure stability. The configuration of the pile reshaped from its present (2013) form will have even higher factors of safety, given the lower height and flattened slopes compared to those of the model. Therefore, although there is no concern about structural stability of the existing west and south pile slopes, these slopes will be flattened to not more than 5H:1V to facilitate cover placement, erosion protection, and revegetation for better erosional stability.

3.2.2 North Waste Pile

Although the north waste pile is a future pile that has not yet been constructed, it is included as a unit within the existing mine permit. The north waste rock pile will be located north of the Mine Water Treatment Unit, as shown on Drawings MT13-AC-01 and -10. The design of the north waste rock pile incorporates provisions that will accomplish closeout of the pile progressively through the operating life of the pile. The pile will be built in 10-foot high lifts to the lines and grades needed for closeout, enabling stabilization contemporaneously with build-out. The north, west, and east slopes of each lift will be built at 5H:1V to facilitate cover placement and vegetation of the side slopes before the next lift is started. The top surface of each lift will slope to the east at approximately 1%. The side slopes of each lift will be covered with 2.0 feet of soil after the lift has reached design configuration, and revegetation seeding and erosion protection for the lift will be accomplished at the same time.

The maximum buildout/ closeout configuration of the new waste rock pile is illustrated on Drawings MT13-AC-10 and -11.

The base of the north waste pile will be excavated into bedrock, which lies at the surface or below a thin cover of alluvial or residual soil. The excavation will extend laterally beyond the toe of the waste pile to create a runoff collection swale around the pile to collect runoff and sediment from the pile. The base of the excavation and the swales will be sloped at natural grade to carry runoff to a storm water retention basin at the west end of the waste pile. This basin will be approximately 700 feet long (N-S) by 100 feet (E-W) with a maximum depth of 10 feet, providing sufficient pond capacity to contain the 100-year storm runoff from the north waste pile. Soil eroded by runoff from the soil stockpile surfaces will be contained within the excavated swales and the retention basin and will not reach watercourses.

A compacted clay liner will be placed across the base of the waste pile excavation and the storm water retention basin. The clay liner will be constructed of one foot of locally available clay (SC, CL, CH soil) compacted to not less than 90% of Standard Proctor (ASTM D 698) dry density to produce a hydraulic conductivity of not more than 10^{-7} cm/sec. .

Analyses were performed to determine the structural stability of the north pile after complete buildout. The results of these analyses, which assumed steeper slopes separated by benches, documented in Appendix B of the Closeout/ Closure Plan, (RGR 2013), show that the minimum factors of safety are 2.32 under static load conditions and 1.58 under pseudo-static (earthquake) load conditions. These values are well above the minimums necessary (1.00) to ensure stability.

3.3 Ore Pad

The existing ore pad presently holds approximately 60,000 tons of ore. After this ore is removed and shipped off site for milling, the pad will be rebuilt to include a liner and a truck wash facility (Drawings MT13-AC-12 and -13). These upgrades will be made to provide additional protection against release of solid or liquid contaminants from the ore pad, in accordance with BPT per 40 CFR 440.

3.3.1 Liner

The ore pad liner will consist of a 60 mil HDPE geomembrane covered with 1.5 feet of compacted clay or clayey sand fill. This thickness of fill provides adequate support for the largest equipment (assumed to be a CAT 988 loader) used on the ore pad (Appendix B, Calculation MT13.03). A travel course and drainage layer of at least one 1.0 feet of free-draining crushed sandstone or aggregate will be placed over the fill. The entire liner system will be sloped at the grade of 0.01 from east to west to drain runoff to two catch basins located along the west side of the ore pad. The liner will be terminated in an anchor trench within the perimeter containment berm surrounding the ore pad.

The catch basins will be designed to collect both runoff from the ore pad surface (Appendix B, Calculation MT13.02) and any water that has infiltrated to the geomembrane liner (interflow). Each catch basin will trap and retain sediments so that the size and quantity of suspended sediments in water released from the catch basins will be minimized.

3.3.2 Truck Wash Facility

To minimize the potential of release of radiological or hydrocarbon contamination on ore trucks leaving the ore pad, a truck wash facility will be constructed near the southwest corner of the ore pad (Drawing MT13-AC-12). This facility will be designed according to guidance in EPA 816-F-01-024 (U.S. EPA 2001). A touchless rollover wash system will be installed on a concrete deck, at least 30 feet wide and 60 feet long, that drains to a catch basin with an oil separator. All trucks and other equipment used to handle ore, except the muck truck that remains on site, will be run through the truck wash before leaving the ore pad area.

3.3.3 Catch Basins and Discharge Pipe

The wash water and associated sediments from the truck wash as well as the ore pad runoff and interflow will be drained to catch basins. One catch basin will be located adjacent to the truck wash near the southwest corner of the ore pad, the other near the northwest corner of the ore pad (Drawing MT13-AC-12). Each basin will be configured to trap sediment and to convey runoff from the ore pad resulting from the 100-year storm (Appendix B). The catch basins will be pre-cast concrete or pre-formed CMP segments selected from vendors' standard designs and assembled in the field.

Water released from each catch basin will drain through the discharge pipe to the ore pad runoff retention pond (previously called the north storm water retention pond) described in Section 3.4.2. The water will discharge from the pipe to that pond through a concrete spillway.

3.4 Surface Drainage and Storm Water Retention Ponds

The existing National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges for Multi-Sector General Permit (MSGP) Activity #NMR05GB27 meets the MSGP General Permit 8.G.1.2 requirements for STORM WATER DISCHARGE, INDUSTRIAL PLANT for Uranium-Radium-Vanadium Ores (SIC 1094) as described in EPA, 2006. This permit will be renewed in September 2013.

The NPDES stormwater permit covers runoff from existing facilities; in the future it will be modified to include the north waste pile before that facility is constructed.

3.4.1 Grading and Drainage

3.4.1.1 Existing Drainage and Flood Potential

The mine water treatment area will be protected from flooding by (1) a major natural drainage system north of the property called Marquez Creek (Arroyo), (2) a secondary man-made diversion ditch which flows to Marquez Creek (flowing northwest) collecting surface runoff from above the mine site and east of the ore pad, and 3) diversion of the Service and Support area runoff to a culvert discharging to the south storm water retention pond.

Hydrologic analyses using the HEC-1 and HEC-2 models, described in the Closeout/Closure Plan (RGR 2013, Appendix B), show that Marquez Canyon arroyo will convey the 24-hour, 100-year flood without need for erosion protection or channel improvements. These analyses show that the design flood water and energy surfaces are well within the arroyo banks, indicating that there should be no out-of-bank flow during the design flood and that the arroyo morphology appears to be in equilibrium with much larger runoff events. A surface water diversion channel, located east of the 14-foot shaft and ore stockpile areas, intercepts and diverts runoff from the east northward to Marquez Arroyo. The channel is very stable, with substantial amount of rock and vegetation in place, and will be preserved in this condition in closeout. Therefore, no upgrades to surface drainage will be needed for the part of the mine area tributary to the Marquez Arroyo.

Runoff from the mesa slopes east of the south part of the Service and Support area and from the south side of the existing waste pile drains to a secondary diversion ditch (man-made arroyo), which collects surface runoff from above the mine site and flows southwest and west at the south edge of the mine site. An existing storm drain collection system collects surface runoff from the Service and Support area and directs it to the south storm water retention pond for evaporation (Drawing MT13-AC-14). The pre-mining middle arroyo was largely filled in during site construction in the late 1970s and is now covered mostly by the Service and Support area and the south waste pile. Its remnants lead to the south storm water retention pond north of the waste rock pile. The middle arroyo has a very small watershed;

therefore, it received little runoff, which has been accommodated with site grading and culverts (Drawing MT13-AC-14).

3.4.1.2 **Drainage Upgrades**

Some minor upgrades will be made to the site grading and drainage plan (Drawing MT13-AC-14).

In the mine water treatment area, surface grading will direct runoff away from the water treatment ponds. Runoff from east of the ore pad that had previously drained to the north storm water pond will be redirected toward Marquez arroyo, where it had previously naturally flowed. Runoff from the mine water treatment area will continue to follow the natural gradient of the ground to the northwest as sheet flow into Marquez arroyo. The north storm water pond will be renamed the ore pad runoff retention pond and will receive runoff only from the ore pad and truck wash.

Runoff from the north portion of the Service and Support area that presently discharges into pond 2 will be diverted into a new culvert that replaces the existing, east-sloping culvert along the south side of the county road. The new culvert will slope to the west along the south side of the county road to the south storm water retention pond. This culvert (county road culvert) will include two or more manholes to intercept local runoff and reduce the sediment load reaching the south storm water retention pond.

A system of catch basins and connecting culverts will be installed from the east edge of the existing waste pile to the south storm water retention pond (Drawing MT13-AC-14). The catch basins will intercept runoff and trap sediments from the backslope (east face) of the waste pile, and the culvert will route the water to the retention pond.

With the exception of these upgrades, the site drainage will remain as it has been since mine development. Spilled ore and runoff around the 24-foot shaft, where ore spills are concentrated, are controlled by a concrete pad that drains to a sump at the southeast corner of the shaft area, from which the runoff is discharged via a pipe through the utility tunnel to mine water treatment pond #1. Within the rest of the Service and Support area, water drains south to the arroyo or north to the county road, where the new culvert will channel runoff to the south storm water retention pond.

3.4.1.3 **Ore pad runoff retention pond**

The north storm water retention pond will be slightly modified to receive runoff only from the ore pad and truck wash and will be renamed the ore pad runoff retention pond. The pond basin will be reshaped to create uniform slopes at 3H:1V, contaminated sediments will be removed for disposal on the existing waste pile, and a double liner with LDCS, as described in Section 3.1.2, will be installed. A concrete inlet structure with spillway will be constructed on the east side of the pond to control release of runoff from the ore pad and truck wash into the pond. Design of these pond upgrades is shown on Drawing MT13-AC-15.

3.4.1.4 South storm water retention pond

The south storm water retention pond receives runoff from the Service and Support facilities area as well as from the existing waste pile. As a result, sediments with elevated levels of uranium and radium have accumulated in this pond. The sediments will be removed and placed on the existing waste pile before the pond is reshaped with 3H:1V slopes. Concrete spillways will be constructed at the northeast corner and along the east side of the pond for control of runoff discharging from the county road culvert and the waste pile culvert, respectively (Drawing MT13-AC-16).

After the contaminated sediments have been removed from the pond basin to the waste pile, the pond will be enlarged by widening and deepening it, to provide capacity to retain approximately 15 ac-ft, or almost two times the 100-year storm runoff from its watershed (Appendix B, MT13.01). A clay liner will be constructed to provide an adequate barrier to infiltration of pond water into the substrate. Previous studies by Kleinfelder (2012) have shown that there has been no infiltration of water from this pond to the ground water plume emanating from the old sewage lagoon. The data from that study, as well as records of the monitor wells down-gradient from the pond, show that the pond substrate has naturally low permeability.

The liner will be constructed of not less than 1.0 feet of locally available clay (SC, CL, CH) across the bottom and side slopes of the pond compacted to limit the hydraulic conductivity to not more than 10^{-7} cm/sec. The hydraulic conductivity limit can be achieved using soils with clay properties common to on-site soils (Benson and Trast 1995). If necessary, the local clay will be augmented with bentonite to meet this specification. A test fill consisting of selected clays, and additives if needed, will be constructed, then tested using an infiltrometer.

4 MINE FACILITIES REHABILITATION

RGR has employed staff, under the direction of its mine manager, to maintain the mine facilities during standby. With the exception of the mine unit underground workings and wells, the mine water treatment system, and some components of the Service and Support unit (e.g.; the sanitary treatment plant, or STP), the mine facilities have been maintained in operating condition. Mine facilities not kept operational during standby will require rehabilitation including:

- *The treated water discharge pipeline* will be lined with an HDPE liner manufactured specifically for this purpose by United Pipeline Systems. The liner has small channels in its outer surface to intercept and direct leakage through the liner to points of collection along the pipeline. This liner will reduce the cross section of the pipe interior slightly but will also reduce pipe wall roughness, thereby reducing friction while also protecting the pipe steel. No substantial change in pipe flow capacity is expected.
- *The sanitary treatment plant (STP)* will be rehabilitated to its original configuration and operating condition with replacements of parts and equipment as necessary. No modifications

that "will change substantially the quantity or quality of the discharge from the system" (20.6.2.1202 NMAC) will be made.

- *Electrical and mechanical systems* will be replaced or repaired as needed. The specific repairs will be identified by serviceability surveys of all electrical and mechanical equipment when the mine permit has been revised and a detailed schedule for mine restart has been developed.
- *Shaft liners* for both shafts have been examined by downhole video camera and appear to be in good condition. However, direct inspection to determine the structural condition of the liners cannot be performed until mine dewatering resumes and water levels in the shafts drop enough to allow direct access. Both shafts have cast-in-place reinforced concrete liners from collar level to mine level. The liner thickness increases with depth, from 1.0 feet at subcollar level to 3.0 feet at mine level. The rock/ concrete contact is pressure-grouted through the saturated section from the Point Lookout aquifer to the shaft stations at mine level, isolating the shafts from the aquifers above mine level and the aquifers from each other. Direct inspection will include visual examination and physical testing, as needed, of the liners to ascertain the structural integrity and water barrier performance.

5 OTHER PERMITS AND REGULATIONS

In addition to the Mine Permit #C1002RE and Discharge Permit DP-61, other permits and regulations are relevant to the reactivation of the Mt. Taylor Mine. The permits are listed in Table 5.1. These permits and the applicable regulations are described below.

5.1 Radioactive Material License

A license is required by 20.3.3 NMAC for certain types of radioactive material associated with the mine, including uranium removed from mine water by the Ion Exchange (IX) plant water treatment circuit. RGR has a license (SO043) issued by the New Mexico Radiation Control Bureau.

5.1.1 Renewal of the Existing License

RGR's existing license authorizes possession and use of Cesium-137 and Radium-226. These radionuclides are used to calibrate instruments that are used for radiation monitoring and ore assays. This license was renewed on November 20, 2012 for a five-year period ending on December 31, 2017.

5.1.2 Application for Amendment

An application for amendment to License SO043 is being submitted to the New Mexico Radiation Control Bureau to include authorization of the IX plant and the handling of uranium that it will remove from the mine water. This application includes:

- basic engineering drawings that show facility processes in addition to estimates on the maximum quantity (mass) of uranium to be possessed,

- description of IX plant operation and radiation safety processes,
- revisions and additions to the radiation safety program, and
- explanation of plans to transfer uranium-bearing resin from the IX plant to persons authorized by NRC or Agreement States to receive such material.

5.2 Air Quality

No air quality permits will be required for reactivation and operation of the Mt. Taylor Mine. However, the mine will be required to comply with the emissions standards, recordkeeping, and reporting requirements for Ambient Air Quality Standards (AAQS) and for National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for uranium mine radon emissions.

5.2.1 AAQS Criteria Pollutants

Mt. Taylor Mine will be required to comply with the AAQS under EPA and NMED regulations. These agencies have set AAQS for "criteria pollutants" (40 CFR 50 and 20.2.3 NMAC), listed in Table 5.2, that do not include radionuclides. During operation, Mt. Taylor Mine will be required to evaluate emissions of AAQS criteria pollutants and ensure that the corresponding limits are not exceeded. Upon request by NMED, records must be kept pursuant to 20.2.5.108 NMAC and semiannual reports must be made pursuant to 20.2.5.109 NMAC.

Criteria pollutant inventories must be 1) kept if annual emissions exceed 10 tons total [20.2.73.300.A(3) NMAC] and 2) reported if annual emissions exceed 100 tons [20.2.73.300.B(1) NMAC]. NMED may require annual reporting even if annual emissions do not exceed 100 tons [20.2.73.300.B(4) NMAC].

5.2.2 NESHAPS for Radon Emissions from Underground Uranium Mines

Mt. Taylor Mine will be required to comply with the provisions of 40 CFR 61 Subpart B, National Emission Standards (NESHAPS) for Radon Emissions from Underground Uranium Mines. This regulation does not impose permit or fee requirements; however, it stipulates provisions for designation of facilities, definitions, standard for compliance, determination of compliance, recordkeeping, and annual reporting. The standard is radiation dose-based at 10 millirem per year to the maximally exposed member of the public [40 CFR 61.22]. Compliance is determined using EPA's COMPLY-R computer code. [40CFR 61.23(a)] (EPA 1990). Reports must be submitted annually to EPA (40 CFR 61.24).

5.2.3 Source Modification

As defined by subsection P of 20.2.72.7 NMAC, "modification" means any physical change in, or change in the method of operation of, a stationary source which results in an increase in the potential emission rate of any regulated air contaminant emitted by the source or which results in the emission of any regulated air contaminant not previously emitted. The Mt. Taylor Mine is an existing stationary source.

An NMED Part 72 construction permit is required if, as a result of the modification, facility emission rates could exceed 10 pounds per hour or 25 tons per year of the AAQS criteria pollutants [20.2.72.200.A(2) NMAC]. Hence, case-by-case potential to exceed (PTE) assessments must be done to determine whether these emissions thresholds will be exceeded, thus requiring a Part 72 construction permit. No modifications are planned that will be expected to result in such quantities of criteria pollutant emissions being emitted by mine operations.

5.2.3.1 ***AAQS Criteria Pollutants***

Radionuclides are not listed as AAQS pollutants. In addition, the EPA Administrator has not determined that radionuclide-only emissions constitute a “major source” that would precipitate NMED source modification permitting in accordance with 20.2.72.200.A(6) NMAC. Vehicle exhaust emissions during facility source reconfigurations are exempt per 20.2.72.202.A(3) NMAC.

5.2.3.2 ***NESHAP Regulations***

Regulation 2.2.72.202.C NMAC specifically excludes modification permits at facilities subject to, and that comply with, the notification requirements of 10 CFR 61. Radon emissions during mine operation must comply with the 10 CFR 61 Subpart B, NESHAP; hence, radon exhausted by the mine is not subject to the source modification requirements of 20.2.72 NMAC.

5.2.4 Part 70 Operating Permits

According to 20.2.70.202.A(3) NMAC, a facility is not required to obtain a Part 70 “Title V” operating permit solely because of radionuclide emissions. In addition, the EPA Administrator has not determined that radionuclide-only emissions constitute a “major source” that would require Title V permitting. Therefore, at the current time, there are no major source categories of radionuclide emissions listed by EPA.

Although a Part 70 operating permit will not be required, Mt. Taylor Mine will nevertheless need to comply with EPA and NMED ambient air quality standards (AAQS) and the 10CFR61 uranium mine radon NESHAP.

5.3 NPDES for Mine Water Discharge

RGR has an existing National Pollution Discharge Elimination System (NPDES) permit, #NM0028100, issued by the US EPA and authorizing RGR to discharge from Mt. Taylor Mine through the treated mine water pipeline to outfall #001 in an arroyo located in San Lucas Canyon in McKinley County and tributary to the Rio Puerco. This permit became effective on August 1, 2010 and will expire on July 31, 2015. The permit sets limits on specific pollutants in the water including total suspended solids (TSS), radium, uranium, molybdenum, and selenium. The water withdrawn from the mine historically met the then-existing discharge limits. It would meet the current discharge limits with the exception of those for radium and uranium. The mine water treatment unit targets those two contaminants so that water released from ponds 6 and 7 will satisfy the NPDES water quality requirements before entering the pipeline.

NPDES permit #NM0028100 also authorizes RGR to discharge treated sanitary wastewater from the STP at Inter Outfall OIA, which is the connection of the 6-inch STP discharge pipe with the 24-inch treated mine water pipeline. The permit sets limits of this discharged water for pH, TSS, and biochemical oxygen demand (BOD).

5.4 NPDES for Stormwater Discharges

The existing National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges for Multi-Sector General Permit (MSGP) Activity #NMR05GB27 was issued by the EPA to the Mt. Taylor Mine in response to RGR's Notice of Intent (NOI) in 2008. The NOI meets the MSGP General Permit 8.G.1.2 requirements for STORM WATER DISCHARGE, INDUSTRIAL PLANT for Uranium-Radium-Vanadium Ores (SIC 1094) as described in EPA 2006. This permit expires in September 2013 and will be renewed at that time.

Upgrades to site drainage described in Section 3.4 will be addressed in the application for renewal of #NMRO5GB27. The buildout of the existing (south) waste pile and additional drainage controls will be covered in the renewal. However, the new (north) waste pile will not be started during the next renewal period; it will be included in a later renewal when the new waste pile is expected to start.

The Stormwater Pollution Prevention Plan (SWPPP) for MSGP #NMR05GB27 will be updated to account for the upgraded surface drainage and runoff controls, described in section 3.4.1., before construction of these upgrades begins.

5.5 USDA Special Use Permit

The US Forest Service issued Special Use Permit #MOT220 to the Mt. Taylor Mine for the 3.35 acres, and/or .01 miles in Sec. 12, T. 13 N., R. 8 W for transport of mine discharge water where the mine water discharge pipeline crosses Cibola National Forest. The permit expires on 12/31/2028.

5.6 Solid Waste Landfill Registration

The Solid Waste Bureau of NMED granted a solid waste landfill registration to the Mt Taylor Mine for mine waste disposal on site in the existing south waste pile. There is no expiration of this registration and no renewal required.

5.7 Dam Permits

A surface water impoundment structure (dam) comes under the jurisdiction of the New Mexico Office of the State Engineer (19.25.12 NMAC) if it:

- Is 25 feet or greater in height and impounds more than 15 acre-feet of water, or
- impounds 50 acre-feet or more of water and is 6 feet or greater in height.

None of the mine water treatment ponds or storm water retention ponds meets these criteria. Therefore, no permits from the Office of the State Engineer will be required for dams.

6 ENVIRONMENTAL MONITORING

6.1 Radiological Monitoring

In 2012, the Mt. Taylor Mine resumed its routine radiation safety environmental monitoring program. Seven initial monitoring locations, shown on Figure 6-1, were established. A radon track-etch detector and a gamma radiation dosimeter are located at each station and will be exchanged and analyzed every three months. The data are used to monitor public and worker radiation dose.

Gamma radiation surveys have been performed routinely on the surface of the Service and Support area. In 2012, gamma radiation and contamination surveys were performed inside the buildings. These surveys will continue after startup with gamma surveys performed at least monthly and contamination surveys performed at least weekly. Contamination surveys will be performed in buildings and underground lunch rooms. The radiation and contamination surveys are (will be) used as a part of the radiation safety program to monitor radiation dose and to control intakes of radioactive materials.

At the restart of operations, air monitors will be utilized at the mine and the mine vicinity to evaluate airborne radioactivity from particulate matter (i.e., ore dusts). The monitoring and analysis for intake of respirable particulates will use methods consistent with Nuclear Regulatory Commission (NRC) guidances such as Regulatory Guides 4.14, 8.34, and 8.37.

The airborne radioactivity monitoring will consist of continuous and grab samples using filter media on calibrated air samplers (pumps). The filters will have high efficiency for removal of sub-micron particles. The guidance in ANSI/HPS N13.1-1999 (section 6.6.2 Filter media) will be followed in using the filter media. Particulate collected on the filters will be analyzed for radioactivity per unit volume of air. Analysis will be performed at the mine Rad Lab using alpha-beta radiation bench counters.

Radiation dose will be estimated using the derived air concentrations (DAC) and annual limits on intake (ALI) for natural uranium given in 20.3.4.461 NMAC.

6.2 Air Quality Monitoring

Although no air quality permits will be required for restart and operation of the Mt. Taylor Mine, the ambient air quality (NMED) and radon discharged by the mine (EPA) will require evaluation or monitoring, recordkeeping, and reporting to the respective agency. Refer to Section 5.2 for explanation.

Emissions of Radon-222 to the ambient air from underground uranium mines are not allowed to exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 millirem per year (mrem/y). Data collected from mine exhaust monitoring will be used in EPA's COMPLY-R code to compute radiation dose to demonstrate compliance with this requirement.

Radon ventilated from the mine will be monitored in accordance with the NESHAP requirements of 40 CFR 61.23(a). Monitoring protocols will be based on section 1 of Method 115 in Appendix B of 40 CFR 61. The radon concentrations exhausted will be monitored continuously inside the duct at the base of the exhaust stack.

Method A-6 of Method 114 in Appendix B of 40 CFR 61 will be used for the analysis of Radon-222. Radon-222 is measured directly in a continuously extracted sample stream by passing the air stream through a calibrated scintillation cell. Prior to the scintillation cell, the air stream is treated to remove particulates and excess moisture. The alpha particles from Radon-222 and its decay products strike a zinc sulfide coating on the inside of the scintillation cell producing light pulses. The light pulses are detected by a photomultiplier tube which generates electrical pulses. These pulses are processed by the system electronics and the read out is in picocuries per liter (pCi/L) of Radon-222.

As an alternative, the use of test method A-7 of Method 114 may be requested to EPA. Using this method,Rradon-222 is measured directly in the air exhaust stream using alpha track detectors (ATD). Alpha particles emitted by Radon-222 and its decay products strike a small plastic strip and produce submicron damage tracks. The plastic strip is placed in a caustic solution that accentuates the damage tracks which are counted using a microscope or automatic counting system. The number of tracks per unit area is correlated to the radon concentration in air using a conversion factor derived from data generated in a radon calibration facility. The ATD will be provided and analyzed by an EPA-certified vendor laboratory. Results will be provided by the lab in units of picocuries per liter (pCi/L).

6.3 Mine Water Discharge Monitoring

Monitoring of water discharged from the mine will resume when the mine water treatment system upgrades are complete and mine dewatering commences.

During treatment of the mine water to remove uranium by IX, Kinetic Phosphorescence Analysis will be used to measure uranium concentrations in the IX discharge, as described in Section 3.1.1. RGR will also sample the treated mine water for the parameters and at the frequencies listed in Table 6.1. Under NPDES Permit #NM0028100 (Appendix C), Part 1 Section A.1, RGR will sample and test daily the treated water discharging at outfall 001 for radium, uranium, a suite of metals, pH, e. coli, TSS, and COD and quarterly for whole effluent toxicity (Table 6.1). Sampling of the mine water discharge for water quality monitoring is accomplished with an EPA approved Collins Model 42 automatic sampler, which provides an automatic flow-weighted, measured water sample for a 24-hour period.. The sample system is complete with a refrigeration box to keep the sample temperature at 4 degrees centigrade. This sampler is located in the mine yard where security and electrical power allows taking a truly representative sample. A second Horizon Sampler is available for use when the Collins Sampler is pulled out for repair or routine maintenance.

The discharge volume is recorded at the mine water discharge point, outfall 001, at Latitude 35˚ 24’ 00”, Longitude 107˚ 38’ 24”, located approximately 4.3 miles north of the mine site where the 24- inch pipeline discharges into an unnamed arroyo, thence to San Miguel Creek. No wells are located within a mile of this outfall. The discharge volume is recorded on a circular Foxboro recorder activated by an in-line annubar tube. These flow records will be retained for five years.

6.4 Pond Leak Detection Monitoring

Mine water treatment ponds 1-5 and 8 and the ore pad runoff retention pond will have double liners with leak detection and collection systems (LDCS) described in section 3.1.2. Each LDCS has a riser pipe through which water that has leaked through the primary liner can be measured and collected. Using a water depth meter and mobile submersible pump, RGR will determine the depth of water collected in the sump of each pond. Based on its size, each pond will have an Action Leakage Rate (ALR), as defined in 40 CFR 264.222 as “the maximum design flow rate that the leak detection system can remove without the fluid head on the bottom liner exceeding 1 foot”. The ALR, in units of gallons/acre/day, is the maximum leakage that can occur before the 1.0 foot of head is exceeded and pumping of water must begin to remove the water and return it to the pond. If leakage measurements indicate that the leakage rate exceeds the capacity of the pumping system, RGR will identify and repair leaks or upgrade the pumping system within 30 days.

RGR will measure the leakage rates of each pond weekly and will maintain written records of leakage rates versus ALRs of ponds 1-5 and 8. As part of the annual reporting requirements under DP-61, RGR will submit a written record of the leakage rates. Ponds 6 and 7, containing treated water, will have single liners with no LDCS, so no leakage measurements will be needed for these ponds.

6.5 Ground Water Monitoring

6.5.1 Ground Water Conditions

Ground water at the Mt. Taylor Mine is described in the Closeout/ Closure Plan (RGR 2013), the Site Assessment (RGR 1994a), the original mine permit application (RGR 1994b), and the Waste Pile Characterization Report (Kleinfelder 2012). The alluvium is generally thin and unsaturated over most of the mine site. Alluvial ground water is limited to the perched water that emanated from the buried waste lagoon under the waste pile and possibly some isolated, spring-fed locations in paleochannels at the alluvium/bedrock contact at 30-60 feet.

The perched zone plume has been investigated for uranium contamination, which is currently being addressed in an NMED-approved abatement plan (Metric 2010). The abatement plan is applying phytoremediation using Salt Cedar trees to remove contaminants from the perched water plume and includes continuing monitoring of ground water levels and contaminant concentrations in monitor wells MW-5, WP-5, WP-4, and MW-4 down-gradient from the existing waste pile and MW-6 in the waste pile.

No ground water wells have been developed in the alluvium within or close to the mine permit area. Shallow, low-volume aquifers in the Upper Menefee produced water to domestic wells in the village of San Mateo, southwest of the mine, prior to mining (RGR 1994a).

The shallowest ground water aquifer below the mine is the Point Lookout Sandstone in the Lower Menefee at approximately 650 to 800 feet depth with a potentiometric surface at a depth of approximately 500-600 feet below the surface. This sandstone unit is separated vertically from the surface and alluvium by several hundred feet of east-dipping shale and sandy shale sequences in the Upper Menefee, minimizing the possibility of any seepage water reaching the Pt. Lookout aquifer. Similarly, Point Lookout is separately from the aquifers below it by hundreds of feet of shale, providing hydrologic isolation for this drinking water from the mine water. Stage 1 depressurizing watering wells and the mine drinking water wells are completed in the Point Lookout. Stage 2 and 3 depressurizing wells are completed in other, deeper aquifers down to and including the Westwater Sandstone.

The mine shafts have been constructed to protect isolation of aquifers. The hydrologic isolation of the shafts and the mine water from the Point Lookout aquifer is demonstrated by the difference in 2012 static water levels between the shafts and the Phase I dewatering wells in the Point Lookout aquifer; the shaft water levels are 820 feet below ground surface, or about elevation 6520, versus the water elevation of about 6780 in the Phase I wells in the Point Lookout aquifer. After 23 years without dewatering, this water level difference of 260 feet over a distance of 200-400 feet shows that there is no measurable hydrologic connection between the mine water (Morrison/ Recapture/Westwater) and the Point Lookout. Any connection would have equalized the water levels in the mine shafts to those in the Point Lookout by flow from the Point Lookout to the shafts during the time since pumping stopped. The isolation of mine water from the Point Lookout is also evident from the contrast in water quality between the mine water sampled in the 24-foot shaft and the Point Lookout water sampled in well 2A (Table 6.2).

6.5.2 Ground Water Monitoring Plan

Upon revision of the mine permit to active status and through the initial dewatering phase of reactivation, during which no ore production will occur, ground water monitoring will incorporate:

- monitoring of the water levels and water quality in wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6 and WP-4 and WP-5 in accordance with the Stage 2 abatement plan,
- quarterly water levels of depressurizing wells in the Point Lookout formation
- discharge rates from depressurizing wells to the mine water treatment system, reported quarterly.

6.5.2.1 **Alluvial Ground Water Monitoring**

Investigations on the mine site performed over the years through 2012 (RGR 2012; Kleinfelder 2012; RGR 1994a; NMEI 1974) indicate that alluvium forms a discontinuous, thin veneer over residual soil and rock of the east-dipping Menefee shales and interbedded sandstones (RGR 2012, Figure 2-1). The alluvial soil cover is thin or absent over most of the mine site. Shallow alluvial ground water occurs only in the paleoarroyo that lies below part of the Service and Support area and the existing waste pile. The underlying Menefee strata are unsaturated above the Pt. Lookout at 700-800 feet depth. Therefore, there is no ground water that could be potentially impacted by leakage from the mine water treatment ponds (20.6.2.3108 F NMAC).

The alluvial monitor wells already in place (MW and WP series) span the width of saturation in the paleoarroyo; therefore, no additional shallow monitor wells are needed. Upon resumption of ore production, quarterly ground water monitoring will be continued in wells MW-5 WP-5, WP-4, and MW-4 after completion of the abatement plan to detect and evaluate infiltration of storm water from the south storm water retention pond into the alluvium. The target water quality parameters to be tested are uranium, radium, selenium, chloride, and sulfate.

In the mine water treatment unit (MWTU) area, the Menefee strata are exposed or subcrop below a thin soil cover. Therefore, no shallow ground water exists in the vicinity of the treatment ponds, and no monitor wells will be needed. If the pond leak detection monitoring (Section 6.4) indicates that hydrostatic head on the secondary liner of a pond is continually exceeding the Action Leak Rate criterion despite corrective measures, tensiometers with pressure transducers would be installed down-gradient from the pond(s) where such leakage is occurring. The tensiometers would be used to monitor the pressure potential at various depths in unsaturated soils. These measurements would be used to calculate the pressure gradient with depth in order to assess whether pond leakage is penetrating the surrounding ground and if water is moving up or down in the soil profile. These findings would support a decision about what, if any, corrective actions should be taken.

6.5.2.2 **Deep Aquifer Ground Water Monitoring**

During the initial dewatering phase of reactivation, water levels in the deep wells will be changing rapidly. RGR will measure the water levels in the mine shafts at least quarterly until the drawdown target levels have been reached. Water levels will be measured by pressure transducer, manual sounding or galvanometer and recorded in the site database.

Ground water removed from the bedrock aquifers to depressurize and dewater the mine will be routed directly to the mine water treatment unit, where it will be treated to remove uranium and radium. Discharge of the treated water is regulated under NPDES #NM0028100, which requires water quality sampling and testing as described in Section 6.3. Ground water quality and monitoring requirements contained in 20.6.2.3103A and 20.6.2.3107 NMAC, and necessary to satisfy monitoring requirements of DP-61 for mine water discharges, will be combined with those required by the NPDES permit to constitute a single, unified monitoring program (Table 6.1).

An updated water quality baseline for the mine water will be established upon initiation of pumping of the deep (phase 3) wells, at which time samples will be taken and tested for the parameters listed in Table 6.1.

At least two rounds of quarterly sampling and testing are expected before baseline concentrations can be established. When the updated baseline of these constituents has been determined, RGR will submit its plan for adjustments, if any, to the sampling frequency of treated mine water.

6.6 Sanitary Treatment Plant Discharge Monitoring

The quality of STP unit effluent will be monitored for three parameters on a monthly basis. A 24-hour sample and a grab sample will be taken each month for analysis of NPDES-reported parameters by a contract laboratory. The volume of water exiting from the sewage treatment units will be recorded with a Badger meter controlled by a Model ML-MN transmitter and float assembly. The monthly sample at the STP unit will be composited with a Horizon Masterflex sampler equipped with a timer for intermittent continuous sampling. Under NPDES Permit #NM0028100 (Appendix C), Part 1 Section A.2, RGR will sample and test daily for pH, TSS, and BOD.

7 OPERATIONS AND HEALTH AND SAFETY PLANS

RGR will update and consolidate the original plans, created by previous owners, which addressed operation of various mine units to produce a comprehensive Mine Plan of Operations (MPO). The MPO is not required by MMD for the mine permit revision or by NMED for the discharge permit modification but will include relevant portions of the mine permit and discharge plan. The MPO will be developed for RGR's use in management of mine operations when the mine returns to active status.

RGR's mine health and safety protocols will be updated to comply with 19.6.3 NMAC (Mine Safety for Underground Workers) and current federal Mine Safety and Health Administration (MSHA) under 30 CFR 57 and other applicable New Mexico State Mine Inspector regulations and guidelines.

8 SCHEDULE

RGR intends to initiate reactivation of the Mt. Taylor Mine upon approvals of the mine permit revision to active status and the modification and renewal of DP-61, both of which are expected in or before 2014.

When these approvals are received, RGR will begin the procurement process for long-lead equipment, specifically the shaft hoists and the depressurization pumps. RGR will also begin the detailed design and procurement for mine water treatment pond liners, hydraulic control upgrades, and site drainage and storm water controls (culverts and manholes).

Mine water pumping and treatment facilities will be the first to be placed in operation. Design and procurement for these facilities will begin upon obtaining a mine permit revision and a discharge permit modification, and construction will begin within one year of those approvals. Dewatering sufficient to enable access to the underground workings is expected to take 2-3 years.

When the shafts are accessible, RGR will begin rehabilitation of the shafts and activation of the hoisting and ventilation systems. One to two years of this work will overlap the initial dewatering period so that the mine should be ready for entry and rehabilitation of shaft stations and primary drifts approximately 4-5 years after permit revision/ modification. Ore production will begin as soon as possible thereafter.

9 CLOSEOUT AND CLOSURE PLAN

The Closeout/ Closure Plan (CCP) submitted in July, 2012 (RGR 2012) has been revised to incorporate the ultimate buildout configuration, described in the original closeout plan (RGR 1998), with the existing conditions and updated technical and regulatory requirements represented in the July 2012 submittal. This revised CCP (RGR 2013) was prepared under separate cover and has been submitted with this revision application.

10 REFERENCES

Bonnin, G.M., D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley, 2006. *Precipitation-Frequency Atlas of the United States*, NOAA Atlas 14, Volume 1, Version 4, National Weather Service.

FHWA, 2012, *Hydraulic Design of Highway Culverts*, 3rd Edition, Publication No. FHWA-HIF-12-026, Hydraulic Design Series Number 5, Federal Highway Administration U.S. Department of Transportation

Geohydrology Associates, Inc., 1994, *Water Resources Report, Mt. Taylor Uranium Mine, Cibola County, New Mexico* (unpublished)

Kang, J and C. D. Shackelford, 2010*, Membrane Behavior of Compacted Clay Liners,* ASCE Journal of Geotechnical and Geoenvironmental Engineering, October, 2010

Kleinfelder, 2012, *Mine Waste Rock Pile Characterization Report, Mt.. Taylor Mine, San Mateo, New Mexico*

METRIC Corporation, 2010. *Stage 2 Abatement Plan for the Rio Grande Resources Corporation, Mt.. Taylor Mine*, August 2010

New Mexico Environment Department (NMED), 2007, *Synthetically Lined Lagoons – Liner Material and Site Preparation Guidelines,* Rev. 0.0 , , Ground Water Pollution Prevention Section, May 2007

New Mexico Environmental Institute (NMEI), 1974, *An Environmental Baseline Study of the Mt. Taylor Project Area of New Mexico,* prepared for the Gulf Mineral Resources Company, Project No. 3110-301

New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division (MMD), 2012, Permit Revision 10-1 to Permit No. C1002RE Mt. Taylor Mine, Existing Mine Operation, January, 2012

New Mexico State Highway and Transportation Department (NMDOT), 1998, *Drainage Manual, Vol. II, Hydraulics, Sedimentation, and Erosion,*

NRCS, Natural Resource Conservation Service, 1980, *Range Site Descriptions*, Section lie, Technical Guide, USDA SCS, NM MLRA 36-119-N

NRCS (Natural Resources Conservation Service), 2006. *Soil Survey of McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties*, U.S. Department of Agriculture,

Peterka, A. J. 1974, *Hydraulic Design of Stilling Basins and Energy Dissipators*, Engineering Monograph No. 25, US Bureau of Reclamation, Denver, Colo.

Rio Grande Resources (RGR), 1994a, *Environmental Site Assessment, Mt.. Taylor Uranium Mine Operations*

Rio Grande Resources (RGR), 1994b, *Existing Mine Permit Application, Mt.. Taylor Mine*

Rio Grande Resources (RGR), 1998, *Mt. Taylor Mine Closeout Plan*, January 1998

Rio Grande Resources (RGR), 1999, *Renewal Application for DP-61, Mt.. Taylor Mine,* letter submittal to NMED on 9/6/1999

Rio Grande Resources (RGR), 2012, *Mt.. Taylor Mine Closeout/ Closure Plan*, July, 2012

Rio Grande Resources (RGR), 2013, *Mt.. Taylor Mine Closeout/ Closure Plan*, April, 2013

Soil Conservation Service (SCS), 1993, *Soil Survey of Cibola Area, New Mexico, Paris of Cibola, McKinley, and Valencia Counties,* U.S. Dept. of Agriculture

Trinitek, 2012, April 2012 Soil Investigation, *Memorandum Report to Rio Grande Resources*

U.S. Army Corps of Engineers (USACE), 1990, *Hydraulic Design of Spillways*, EM 1110-2-1603, 16 Jan 1990

U.S. Army Corps of Engineers (USACE), 2009*, Estimating Vertical Stress on Soil Subjected to Vehicle Loading*, EDRC/CRREL TR-09-2, Engineering Research and Development Center, February 2009

United States Environmental Protection Agency, (U.S. EPA), 1990, *COMPLY-R Computer Program for Determining Compliance with 40 CFR 61, Subpart B*; Environmental Standards Branch, http://www.epa.gov/rpdweb00/docs/neshaps/comply_r_guideepa520_1_89_029.pdf

United States Environmental Protection Agency, (U.S. EPA), 2001, *Managing Vehicle Washing to Prevent Contamination of Drinking Water*, Source Water Protection Practices Bulletin EPA 816-F-01-024, Office of Water Environmental Protection, July 2001

U.S. EPA . 2006, *Industrial Stormwater Fact Sheet Series, Sector G: Metal Mining (Ore Mining and Dressing) Facilities*, Office of Water, EPA-833-F-06-022, December 2006

U.S. EPA, 2009, *Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators,* EPA 833-B-09-002, Office of Water Environmental Protection, February 2000

US EPA, 2012, *Industry Effluent Guidelines*, http://water.epa.gov/scitech/wastetech/guide/industry.cfm, December 2012

Table 2.1 Sanitary Treatment Plant (STP) Discharge Water Quality

Parameter	Limit, mg/L (1)	Most Recent, mg/L, 11/1/1989
As	0.1	0.017
Ba	1.0	0.05
COD	<125	<0.1
Cl	250	11
F	1.6	0.903
Mo	1	0.87
NO_3 as N	10.0	0.1
Pb	0.05	<0.005
Se	0.05	0.059
SO_4	600	350
TDS	1000	730
TSS		1.4
U	0.03	0.753
V		0.01
Zn	10	0.019
Ra 226/228	30 pCi/L	2.1 pCi/L
Pb 210		0.8 pCi/L
Po 210		5.1 pCi/L
pH	6-9 SU	8.88 SU

(1) per 20.6.2.3103 NMAC, in mg/L except as indicated

Table 5.1 List of Relevant Permits and Licenses

Permit /License Name	Permit /License #	Issuing Agency
Mine Permit (Existing)	C1002RE	Mining and Minerals Division
Discharge Permit	DP-61	NMED Ground Water Quality Bureau
NPDES (Mine Water Discharge)	NM0028100	US EPA
NPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP) (Stormwater)	NMR05GB27	US EPA
Source Material License	SO043	NMED Radiation Control Bureau
Special Use Permit	MOT 220 USDA	US Forest Service
Solid Waste Landfill for Mine	none	NMED Solid Waste Bureau

Table 5.2 AAQS Criteria Pollutants

Criteria Pollutants (Promulgating Agency) [Regulatory Citation]		Averaging Time	Limit	Indications
Carbon Monoxide (NMED) [20.2.3.111.A NMAC]		8-hour	8.7 ppm	Maximum allowable concentration
		1-hour	13.1 ppm	Maximum allowable concentration
Nitrogen Dioxide (NMED) [20.2.3.111.B NMAC]		24-hour	0.1 ppm	Maximum allowable concentration
		Annual	0.05 ppm	Arithmetic average
Particle Pollution (EPA)	$PM_{2.5}$ [40CFR50.7]	Annual	12 $\mu g/m^3$	Averaged over 3 years
		Annual	15 $\mu g/m^3$	Averaged over 3 years
		24-hour	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10} [40CFR50.6]	24-hour	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Total Suspended Particulate (NMED) [20.2.3.109 NMAC]		24-hour	150 $\mu g/m^3$	Maximum allowable concentration
		7-day	110 $\mu g/m^3$	Maximum allowable concentration
		30-day	90 $\mu g/m^3$	Maximum allowable concentration
		Annual	60 $\mu g/m^3$	Geometric Mean
Sulfur Dioxide (EPA) [40CFR50.4]		1-hour	0.075 ppm	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		3-hour	0.5 ppm	Not to be exceeded more than once per year

Table 6.1 Mine Water Discharge Monitoring Parameters of NM0028100 and DP-61

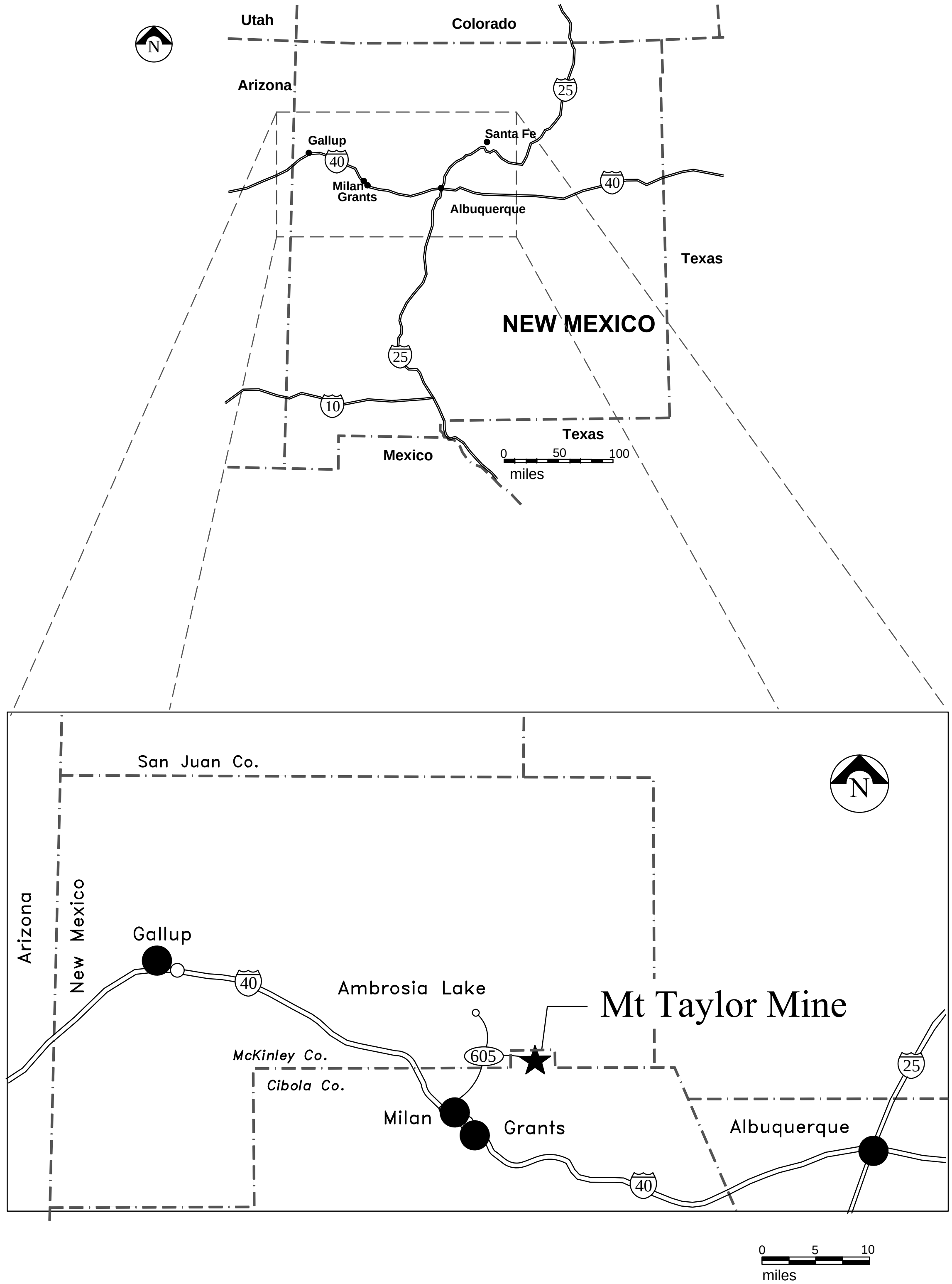
PARAMETER	DISCHARGE LIMIT 30 Day Avg., mg/l*	DISCHARGE LIMIT Daily Max., mg/l*	PERMIT STANDARD USED (1)
pH	6.6-9.0 Standard Units	6.6-9.0 Standard Units	NM0028100
Total Suspended Solids	20	30	NM0028100
Chemical Oxygen Demand	100	125	NM0028100 (2)
Ra 226 (dissolved)	3 pCi/l	10 pCi/l	NM0028100 (2)
Total Ra 226	10 pCi/l	30 pCi/l	NM0028100 (2)
Total Ra 226+Ra 228	20 pCi/l	30 pCi/l	NM0028100
Uranium	0.03	0.03	DP-61
Zinc	0.5	1.0	NM0028100
Aluminum	3.3	5.0	NM0028100
Boron	0.5	0.75	NM0028100
Cadmium	0.01	0.01	DP-61
Chromium	0.05	0.05	DP-61
Cobalt	0.033	0.05	NM0028100
Copper	0.35	0.53	NM0028100
Mercury	0.00051	0.00077	NM0028100
Molybdenum	0.67	1.0	NM0028100
Selenium	0.0033	0.005	NM0028100
Vanadium	0.067	0.1	NM0028100
Total Alpha	10 pCi/l	15 pCi/l	NM0028100
E. Coli	126 cfu/100 ml (3)	410 cfu/100 ml (3)	NM0028100
Arsenic	0.1	0.1	DP-61 (2)
Barium	1.0	1.0	DP-61 (2)
Fluoride	1.6	1.6	DP-61 (2)
Lead	0.05	0.05	DP-61 (2)
Chloride	250	250	DP-61 (2)
Sulfate	600	600	DP-61 (2)
Nitrate (NO_3 as N)	10	10	DP-61 (2)
Daphnia pulex	(4)	(4)	NM0028100
Flow	(5)	(5)	NM0028100

* mg/l unless otherwise noted

(1) If the standard of both permits for this parameter is not the same, the more stringent of the standard of NPDES Permit # NM0028100 or of DP-61 is used.
(2) Not required by the other permit.
(3) cfu = Colony Forming Unit
(4) Whole effluent toxicity testing - 48-Hour Static Renewal. Monitoring frequency 1/3-month for the first year of the permit. If all tests pass, reduce the frequency to 1/6-month for years 2 – 5, and resume the frequency of 1/3-month on the last day of the permit. If any test fails during the period of the permit, return the frequency to 1/3-month for the remainder of the permit.
(5) Report discharge flow in MGD.
(6) Samples taken in compliance with the monitoring requirements of NM0028100 shall be taken daily at Outfall 001. Other parameters sampled only for DP-61 will be taken quarterly.

Table 6.2 Water Quality in Point Lookout Aquifer and Mine Pool

CONSTITUENT	20.6.2.3103 NMAC STANDARDS FOR GROUND WATER OF 10,000 mg/l TDS CONCENTRATION OR LESS	Point Lookout Aquifer, Well 2A		Mine Pool in 24-ft Shaft	
		MEASURED VALUE OF SAMPLE COLLECTED ON 3/10/10	VALUE VS STANDARD	MEASURED VALUE OF SAMPLE COLLECTED ON 09/26/07	VALUE VS STANDARD
Uranium	0.03 mg/l	0.0012 mg/l	below standard	0.071 mg/l	above standard
Radium 226	30 pCi/l	0.24 pCi/l	below standard	16.8 pCi/l	below standard
Selenium	0.05 mg/l	0.001 mg/l	below standard	not detected	below standard
	for Domestic Water Supply				
Chloride	250 mg/l	6 mg/l	below standard	4 mg/l	below standard
Iron	1.0 mg/l	not detected	below standard	0.05 mg/l	below standard
Sulfate	600 mg/l	92 mg/l	below standard	44 mg/l	below standard
Total dissolved solids	1000 mg/l	523 mg/l	below standard	358 mg/l	below standard
Zinc	10 mg/l	0.11 mg/l	below standard	not detected	below standard
pH	6 to 9 s.u.	9.0 s.u.	within range	8.38.0 s.u.	within range
	for Irrigation Use				
Molybdenum	1.0 mg/l	not detected	below standard	0.2 mg/l	below standard



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MOUNT TAYLOR MINE - Grants, NM 87020

Prepared By:

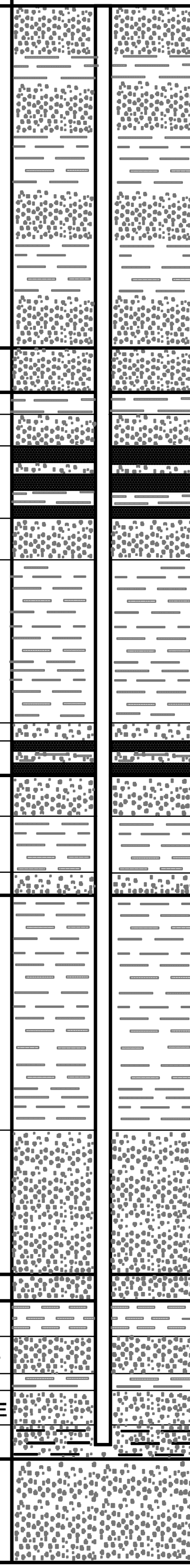
Alan Kuhn Associates LLC

FIGURE 1-1

Site Location Map

SYSTEM	FORMATION	MEMBER	ELEVATION IN FEET
CRETACEOUS	MENEFEE	MENEFEE SANDSTONE & SHALE	(767) 7340 - 6573
	PT. LOOKOUT	POINT LOOKOUT SANDSTONE	(115) 6573 - 6458
	CREVASSE CANYON	SATAN TONGUE SHALE	(23) 6458 - 6435
		LOWER HOSTA SANDSTONE	(81) 6435 - 6354
		GIBSON COAL	(165) 6354 - 6189
		DALTON SANDSTONE	(84) 6189 - 6105
		MULLATTO TONGUE OF MANCOS SHALE	(395) 6105 - 5710
		STRAY SANDSTONE	(8) 5710 - 5702
		DILCO COAL	(92) 5702 - 5610
	GALLUP	UPPER GALLUP SANDSTONE	(95) 5610 - 5515
		GALLUP SHALE	(130) 5515 - 5385
		LOWER GALLUP SANDSTONE	(40) 5385 - 5345
	MANCOS	MAIN BODY OF MANCOS SHALE	(536) 5345 - 4809
		TRES HERMANOS SANDSTONE	(326) 4809 - 4483
	DAKOTA	DAKOTA SANDSTONE	(58) 4483 - 4425
JURASSIC	MORRISON	BRUSHY BASIN MUDSTONE	(80) 4425 - 4345
		UPPER WEST WATER SANDSTONE	(123) 4345 - 4222
		GREEN SHALE	(12) 4222 - 4210
		LOWER WEST WATER SANDSTONE	(64) 4210 - 4146
		RECAPTURE CREEK SS & SHALE	(79) 4146 - 4067
		BLUFF SANDSTONE	(223) 4067 - 3844

LITHOLOGY



FEET: 7000, 6500, 6000, 5500, 5000, 4500, 4000

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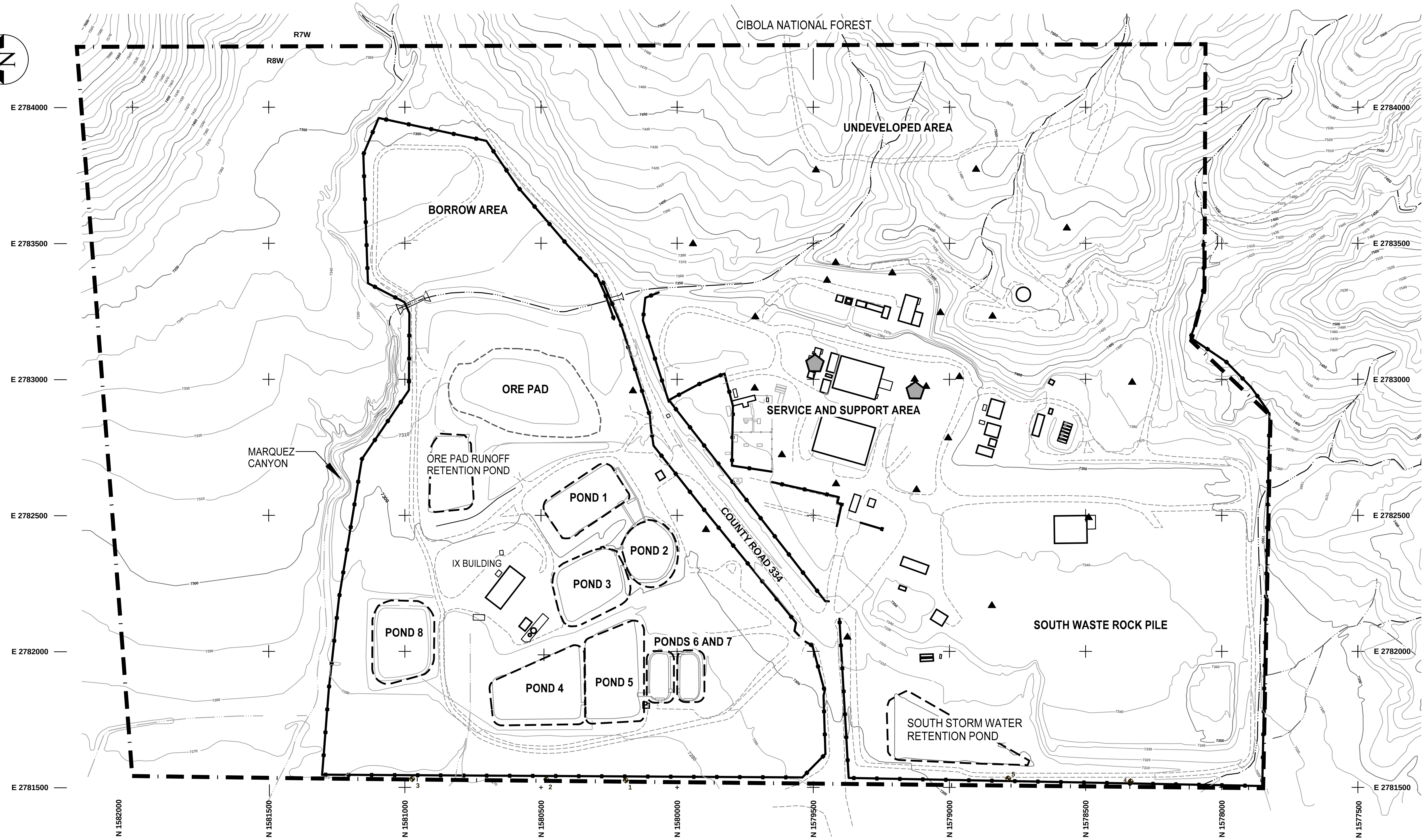
FIGURE 1-2

Geological Section



LEGEND

- MINE PERMIT BOUNDARY
- DEWATERING WELLS
- PONDS
- SUPPORT BUILDINGS
- MINE SHAFT

0 200 400 FT

SCALE IN FEET

500' GRID = NAD 83 NEW MEXICO WEST

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MOUNT TAYLOR MINE - Grants, NM 87020

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FIGURE 2-1
EXISTING MINE UNITS

1 PRIMARY PUMP STATION

2 DISCHARGE POINT
OUTFALL 001

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MOUNT TAYLOR MINE - Grants, NM 87020

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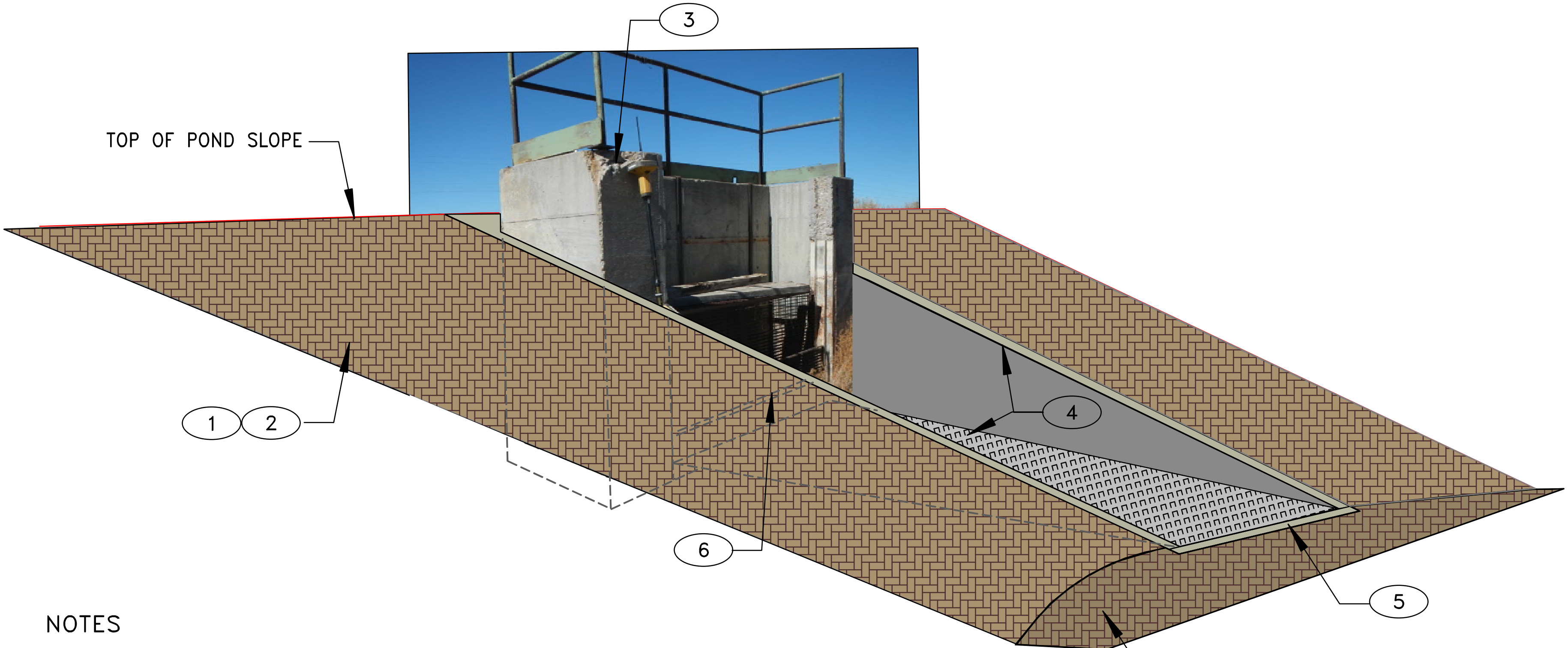
FIGURE 2-2
Treated Water Pipeline



NOTES

1 POND SLOPES 3H TO 1V

2 DOUBLE LINER (SEE DRAWING MT13-AC-07 FOR DETAILS)

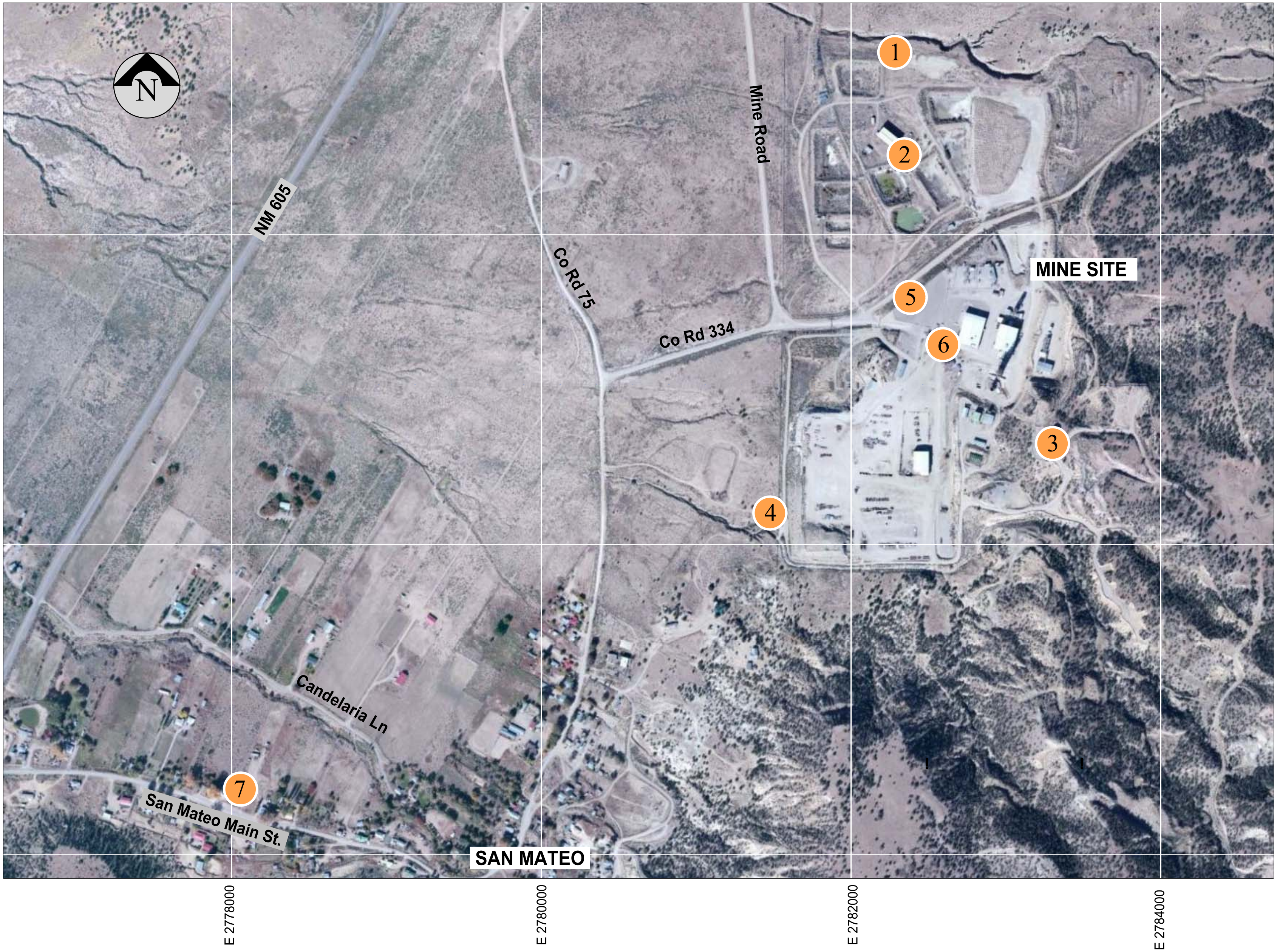
3 EXISTING HYDRAULIC STRUCTURES
REPAIR DAMAGED OR CRACKED AREAS
APPLY POLIBRID COATING

4 NEW CONCRETE CURB AND SPILLWAY
SEE DRAWING MT13-AC-06 FOR DETAILS

5 DOUBLE LINER ATTACHED TO CONCRETE CURB
BY EXTRUSION WELD TO EMBEDDED HDPE CHANNEL
SEE DRAWING MT13-AC-06 FOR DETAILS

6 CONCRETE WEIR

RIO GRANDE RESOURCES CORPORATION MOUNT TAYLOR MINE - Grants, NM 87020 Prepared By: Alan Kuhn Associates LLC	FIGURE 3-1 Isometric View of Typical Hydraulic Control Structure



LEGEND

\# RADIOLOGICAL MONITORING STATION

2000' GRID = NAD 83 NEW MEXICO WEST

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FIGURE 6-1

RADIOLOGICAL MONITORING LOCATIONS