April 23, 2015

Mr. David Mayerson
Ground Water Quality Bureau
New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502

RE: RHR Discharge Permit Application DP-1717
Rio San Jose Characterization Work Plan – Revision 1

Dear Mr. Mayerson:

Roca Honda Resources, LLC. (RHR) is submitting the attached Work Plan entitled *Work Plan for Evaluation of the Potential Effects of Discharge along the Rio San Jose*, for your review. This Work Plan is a revision to the Work Plan submitted to NMED last summer. While the majority of the Work Plan is unchanged additional data has been collected since the last submittal, and RHR thought there was a large enough change to submit a revision rather than replacement pages.

The additional data in this Work Plan includes the results of a seismic survey by Geolines, LLC., which was conducted to determine the thickness of the alluvium in the Rio San Jose to better describe sediment sampling depths. Also, additional data was added on previous water quality sampling, and studies in the Rio San Jose channel above and below RHR's planned discharge point.

Copies of this Work Plan are also being submitted to NM MMD, the USFS, NM State Land Office and NM Game and Fish for their review and comment.

We look forward to continuing to work with NMED to finalize and implement this Work Plan. If you have any questions feel free to contact myself or Dan Kapostasy.

Sincerely,

Michael Neumann
Manager, Roca Honda Resources, LLC.

Cc: David Clark, NM MMD (4 copies)
Diane Tafoya, USFS (4 copies)
Michael Mariano, NM SLO (1 copy)
Matt Wunder, NM Game and Fish (1 copy)

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ROCA HONDA RESOURCES, LLC

WORK PLAN FOR EVALUATION OF THE POTENTIAL EFFECTS OF DISCHARGE ALONG THE RIO SAN JOSE

ROCA HONDA MINE DISCHARGE PERMIT APPLICATION (DP-1717)

AUGUST 2014
REV 1. APRIL 2015

Submitted to
New Mexico Environment Department
Ground Water Quality Bureau
&
New Mexico Mining and Minerals Division
Energy, Minerals and Natural Resources Department
&
U.S. Forest Service (Cibola National Forest)

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Prepared by:

Roca Honda Resources, LLC
4001 Office Court, Suite 107, Santa Fe, NM 87507

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1.0 Introduction

Roca Honda Resources, LLC (RHR) has prepared this Work Plan, with revisions (April 2015) at the request of the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) Mining Environmental Compliance Section following a meeting with NMED staff on July 10, 2014 regarding Discharge Permit Application DP-1717. Due to a proposed change in the location of the discharge of treated mine water from the Roca Honda Mine, it was deemed appropriate to 1) determine extent, if any, of previous contamination in the Rio San Jose (RSJ); and 2) evaluate the effects, if any, to the water quality from discharging treated water into the RSJ.

Previously, RHR had proposed treating mine water onsite in a water treatment plant and discharging the water approximately 8 miles north of the project site into an irrigation system designed for a local rancher. The water would have been stored in the Laguna Polvadera, a natural impoundment, a storage tank, or discharged into San Lucas Canyon. The current plan, which is now part of a Draft Supplemental Environmental Impact Statement (SEIS) with the Cibola National Forest, is to discharge the treated water into the RSJ near the Village of Milan. The purpose of this Work Plan is to provide details regarding characterization of the RSJ, to better evaluate this alternative.

The treated mine water will be discharged under a National Pollutant Discharge Elimination System (NPDES) permit and will be treated to meet effluent limitations specified in the permit by the U.S. EPA. The discharged treated mine water will also meet New Mexico Water Quality Control Commission (WQCC) standards as set forth in NMAC Section 206.2.3103, human health standards for groundwater.

This Work Plan replaces the Work Plan previously submitted to NMED dated August 2014. Since submittal of that Work Plan, RHR determined it was necessary to obtain more information on the Rio San Jose to fully answer and justify the sampling proposed in August 2014, and better respond to NMED's questions regarding that Work Plan. In an effort to complete that task, RHR contracted Geolines, LLC out of Albuquerque, NM to perform a series of seismic microtremor surveys at various locations along the Rio San Jose in order to better understand both the depth to bedrock (alluvial thickness) and the depth to water in areas where there is not standing water at the surface. The data gained from this study is included in section 1.2 Seismic Studies, of this revised Work Plan. The sampling program has been amended where necessary to incorporate this new data. This updated Work Plan also details work completed by various organizations including NMED, USGS, EPA, and the Pueblo of Laguna to describe baseline conditions in the RSJ.

1.1 Background

The Rio San Jose forms at the confluence of Bluewater Creek and Mitchell Draw approximately 10 miles northwest of the village of Milan and the RHR proposed discharge point (Figure 1-1). Most of the upstream section of the channel (above Grants) is highly engineered and the channel has been straightened, dredged, and leveed for agricultural use and flood control. The Rio San Jose receives water from the Bluewater Dam which flows down Bluewater Creek into the Rio San Jose. Additional water inflow from Mitchell Draw is seasonal and flows correspond with the summer monsoon season. Downstream of the discharge point on the eastern side of Grants, the city's wastewater treatment plant supplied a perennial flow of approximately 1-2 cubic feet per second for about 15 years from 1978. The wastewater treatment plant closed in the early

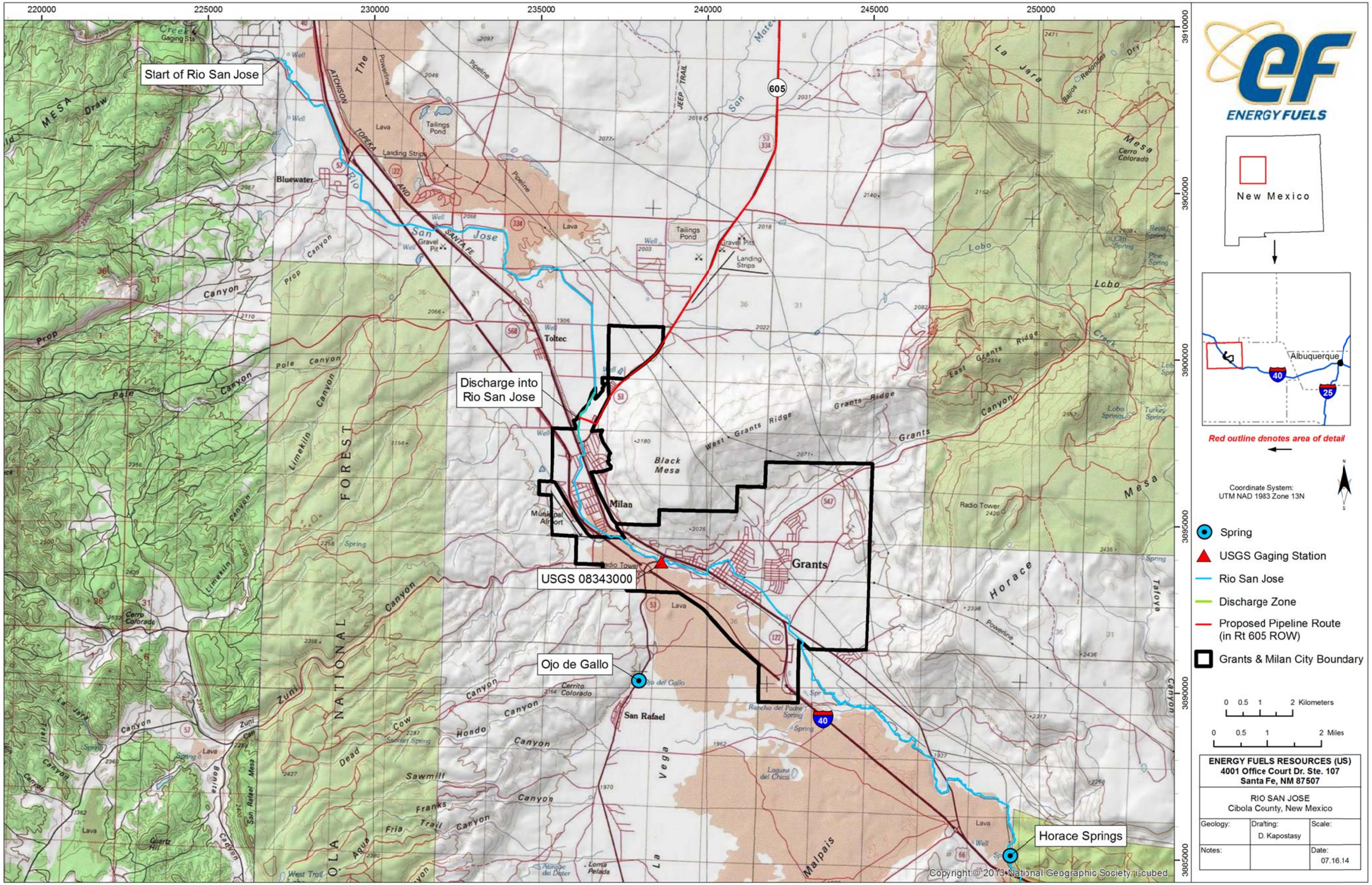

Figure 1-1. Location Map of the Rio San Jose

1990s and current wastewater from a new plant is used as irrigation on the city's golf course. Today the RSJ is usually dry through the city of Grants and for several miles downstream. About six miles downstream to the east of Grants, the RSJ is perennial due to flow contributions from Horace Springs. The RSJ channel passes through both the Pueblo of Acoma and Laguna Pueblo as it flows southeast, eventually confluencing with the Rio Puerco.

The USGS maintained a stream gage in the RSJ on the western end of Grants (Figure 1-1 that operated between 1912 and 2011 (USGS 08343000). Data from this gage indicate that flow through the city of Grants is intermittent and seasonal, corresponding to spring runoff and the summer monsoon season. Figure 1-2 presents the hydrograph from station 08343000. The USGS also collected water samples at the gage location between 1973 and 2010. The water quality data is presented in Appendix A of this Work Plan.

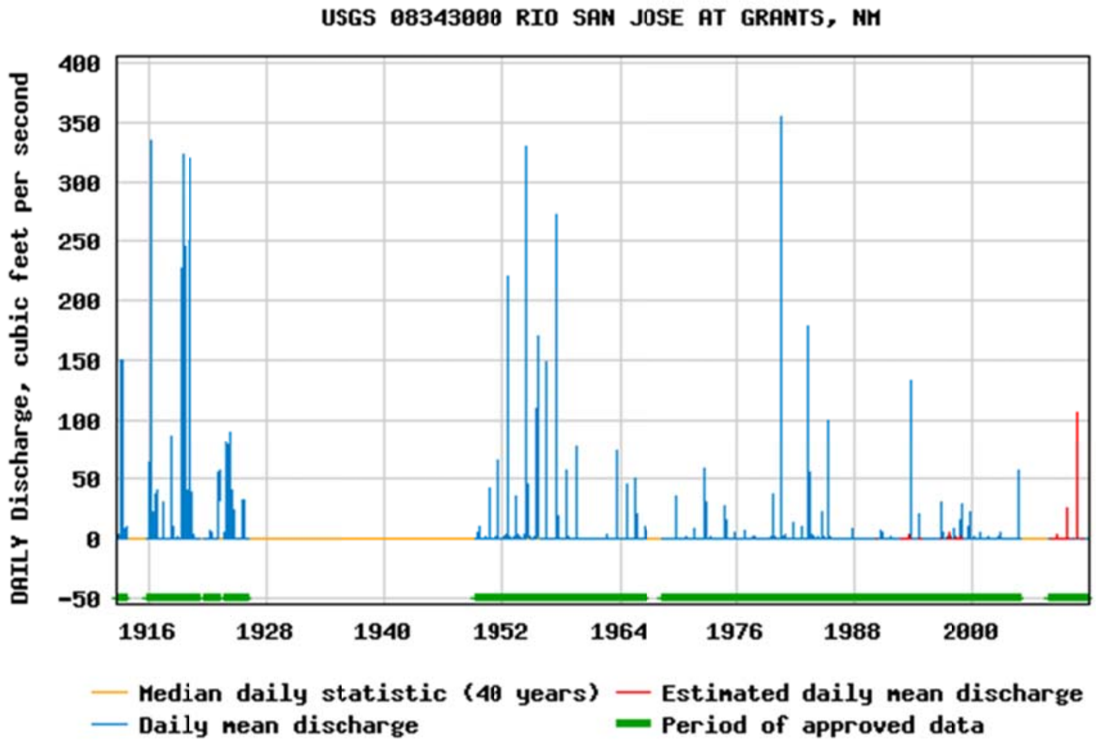

Figure 1-2. Hydrograph from USGS Gaging Station 08343000 in the Rio San Jose

The EPA, as part of its 5-year plan to address contamination from historic uranium mining and milling, flew a series of aerial radiological surveys over the Grant/Milan area (USEPA, 2010). One of those surveys flew along the length of the RSJ from upstream of the proposed discharge point through the city of Grants. Data collected in the study includes gamma count rate (in cps), exposure rate (in µR/hr), and soil uranium concentration (in pCi/g). A review of this report shows no "hot spots" or areas of concern in or along the RSJ with regards to radiometric contamination. While additional characterization work needs to be completed as described in this Work Plan, results of EPA's radiological survey provide useful information and can be used to support the findings of this Plan.

Additionally, a significant amount of discharge, chemistry and biota data have been collected within the Rio San Jose watershed over the last 40 years at various locations and times and for various purposes by several different federal and state agencies, as well as by local tribes. In

2004, the Rio Puerco stream system, of which the Rio San Jose is part, was surveyed by the Monitoring and Assessment Section of the Surface Water Quality Bureau of the New Mexico Environment Department (NMED SWQB) in accordance with Section 303(d) of the Federal Clean Water Act which requires states to develop Total Maximum Daily Load (TDML) management plans for water bodies determined to be water quality limited. Water quality samples were taken monthly at four locations within the RSJ watershed in that year and then again quarterly in 2011. Between 2007 and 2013, Laguna Pueblo monitored the Rio San Jose at six locations for an extensive suite of chemical constituents. Also, at various times over the last 40 years, the USGS collected surface water samples, and until recently maintained a network of streamflow gaging stations, one of which (Rio San Jose at Acoma) is presently active. In 2011, the EPA performed ambient toxicity monitoring on tributaries to the Rio San Jose. These monitoring programs are summarized and the data collected are discussed in Section 1.2.

1.2 Rio San Jose Water Quality

A significant amount of water quality data has been collected by governmental agencies for the reach of the Rio San Jose between its confluence with Bluewater Creek to east of the boundaries of Laguna Pueblo. The water samples were reportedly analyzed according to standard techniques, and the data are considered reliable. The data and metadata are available from the EPA's STORET on-line data compilation center (www.epa.gov/STORET). Table 1-1 below lists locations at which water quality data have been collected within the Rio San Jose watershed, the stations at which they were collected, and the entity that collected the data. Figure 1-3 shows the locations of these sites.

1.2.1 NMED SWQB Data

Water quality assessments of the Rio Puerco watershed were conducted by the Monitoring and Assessment Section of the Surface Water Quality Bureau of the New Mexico Environment Department (NMED SWQB) in 2004 to fulfill Section 303(d) of the Clean Water Act, *Work Program for Water Quality Management*. As a tributary of the Rio Puerco, the Rio San Jose was included in this survey. A summary of the results is available in *Water Quality Survey Summary for the Rio Puerco Watershed* (NMED SWQB, 2010); the actual data are in EPA's STORET. The establishment of TDMLs is discussed in the agency's *USEPA-Approved Total Daily Maximum Load (TMDS) for the Rio Puerco Watershed*, Part 1 and Part 2 (2007a and 2007b). The agency re-sampled in 2011, and although there does not appear to be a report associated with this sampling event, the data are available from STORET.

Sampling at stream stations for the establishment of TDMLs occurred monthly from March through October of 2004 when water was present. Analytes included between 70 and 90 constituents for each sampling event, including total nutrients, total and dissolved metals, cations and anions, radionuclides, and fecal coliform. Sites on the Rio San Jose included Bluewater Creek at mouth of Bluewater Canyon and Rio San Jose near Laguna. Most of these data were from grab samples, although temperature data loggers were installed at the two Bluewater Creek stations. Water quality samples were collected 12 times at the Bluewater Creek station and four times at the Laguna station during 2004. During 2011, five samples were collected at the Bluewater Creek station. The data are attached as Table 2 and Table 5 in the Appendix.

1.2.2 Laguna Pueblo

Laguna Pueblo collected water along the Rio San Jose at six locations within and outside of Pueblo boundaries between one and four times per year from April, 2007 through November, 2013. The water samples were analyzed for total nutrients, total and dissolved metals, cations and anions, radionuclides, and fecal coliform, and organic and inorganic pollutants. These data are presented on tables 6 through 13 in the Appendix.

1.2.3 USGS

The USGS collected various water quality data between 1972 and 2013 at the agency's streamflow gaging sites on the Rio San Jose, particularly the Rio San Jose at Acoma and the Rio San Jose at Grants. Sampling and analysis at the Acoma station was extensive: 255 constituents were analyzed, usually semiannually each year from 1972 through 1996. The constituents include cations, anions, metals, radionuclides, organic and inorganic pollutants, and biota. Collection and analysis at the Grants station were much more limited. Tables 3 and 4 in the Appendix tabulate the water quality data. Since 1996 a much more limited sampling program has been in place.

Table 1-1. Rio San Jose Watershed Water Quality Monitoring Sites

Site Designation	Site Description	Latitude (NAD 83)	Longitude (NAD 83)	Sampling Agency
36Bluewa003.5	Bluewater Creek at mouth of Bluewater Cnyn	35.2926	-108.027	NMED
36RSanjo040.6	Rio San Jose Nr Laguna, NM	35.023615	-107.325559	NMED
RSJ01	Rio San Jose (within reservation)	35.041167	-107.523550	Laguna Pueblo
RSJ02	Rio San Jose (within reservation)	35.037519	-107.379222	Laguna Pueblo
RSJ03	Rio San Jose (within reservation)	35.020103	-107.309792	Laguna Pueblo
RSJ04	Rio San Jose (Sedillo Grant)	34.931839	-107.103978	Laguna Pueblo
RSJ05	Rio San Jose (Sedillo Grant)	34.894067	-107.069289	Laguna Pueblo
RSJ06	Rio San Jose (within reservation)	35.023739	-107.326331	Laguna Pueblo
USGS 08343500	Rio San Jose at Acoma Pueblo, NM	35 04'27.88"	107 45'04.01"	USGS
USGS 08343000	Rio San Jose at Grants, NM	35 9'16" (NAD27)	107 52'11" (NAD27)	USGS

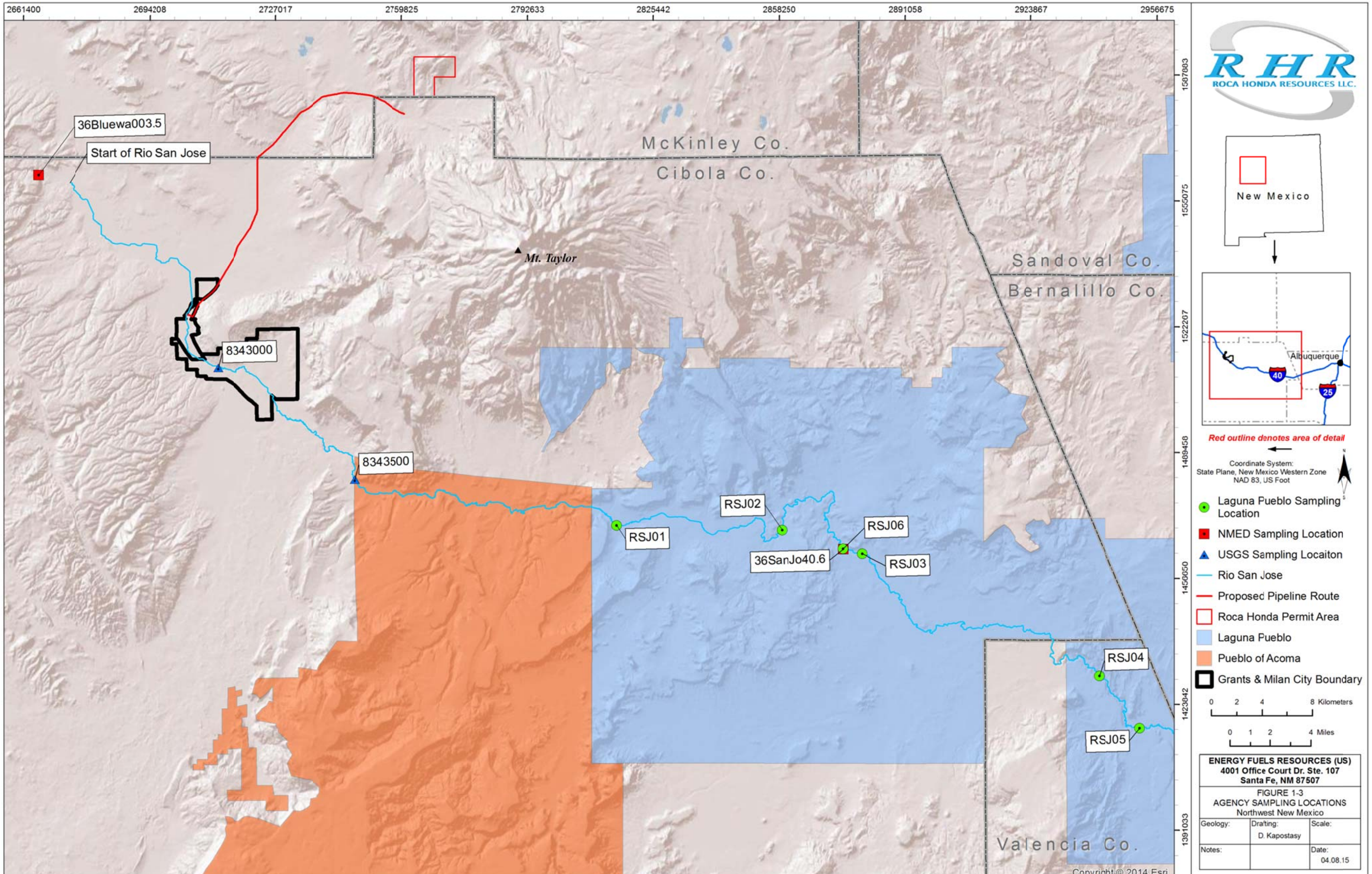

Figure 1-3. Agency Sampling Location Map

1.3 Seismic Study

In an effort to better understand the RSJ through the Village of Milan and City of Grants, and to better answer questions posed by NMED to the August 2014 version of this Work Plan, RHR commenced an ambient noise/refraction microtremor study of the RSJ. Geolines, LLC. (Geolines) of Albuquerque, NM, conducted the seismic surveys to determine both the depth to bedrock beneath the RSJ (alluvial thickness) and the depth to water, where water is not present at the surface. Field work for this study was completed in Milan and Grants between December 2014 and March 2015. The field work was delayed multiple times due to weather and saturated ground conditions. The data collected was analyzed and the results were provided to RHR in March 2015.

A seismic refraction survey is a non-intrusive method for determining the depth to changes in material rock properties. For this study there were two goals 1) to determine the thickness of the alluvium associated with the RSJ, and 2) to determine the depth to groundwater underlying the RSJ. Results of this survey are given in the following sections.

1.3.1 Alluvial Thickness

Geolines completed ambient noise/refraction microtremor studies at 8 separate locations along the RSJ in the Village of Milan and City of Grants (Figure 1-4). These locations were selected to provide data on sampling locations previously provided to NMED in the August 2014 Work Plan. At each location, a 480 ft. geophone array was laid out parallel to the RSJ. In some cases the array was placed directly on the stream bed in others where access was difficult or there was water in the channel the array was set up on the bank. Along the array 24 geophones were evenly spaced to collect the data generated by hitting a steel plate repeatedly with a sledge hammer. Typically a geophone array can collect data approximately half as deep as the array itself, in this case approximately 200 ft deep. The overall depth is impacted by the types of material encountered.

1.3.1.1 RSJ East Grants

The eastern most survey location was selected to correspond to the former discharge location of the Grants wastewater treatment plant. There were issues accessing the location at the discharge point, so the location was moved to a portion of the RSJ near the corner of E. Santa Fe Ave and Highway 66 along a section of the RSJ that parallels the railroad. At this location the alluvium is approximately 40 ft thick, and water ponds on the surface. The water was not flowing at the time of the survey. The channel has been highly engineered through this section.

1.3.1.2 Nimitz Dr Bridge

The second location was along the bank of the RSJ where Nimitz Dr. crosses the RSJ. At this location the alluvium is approximately 25 ft. thick and as at the RSJ location in East Grants, water ponds on the surface, but does not flow.

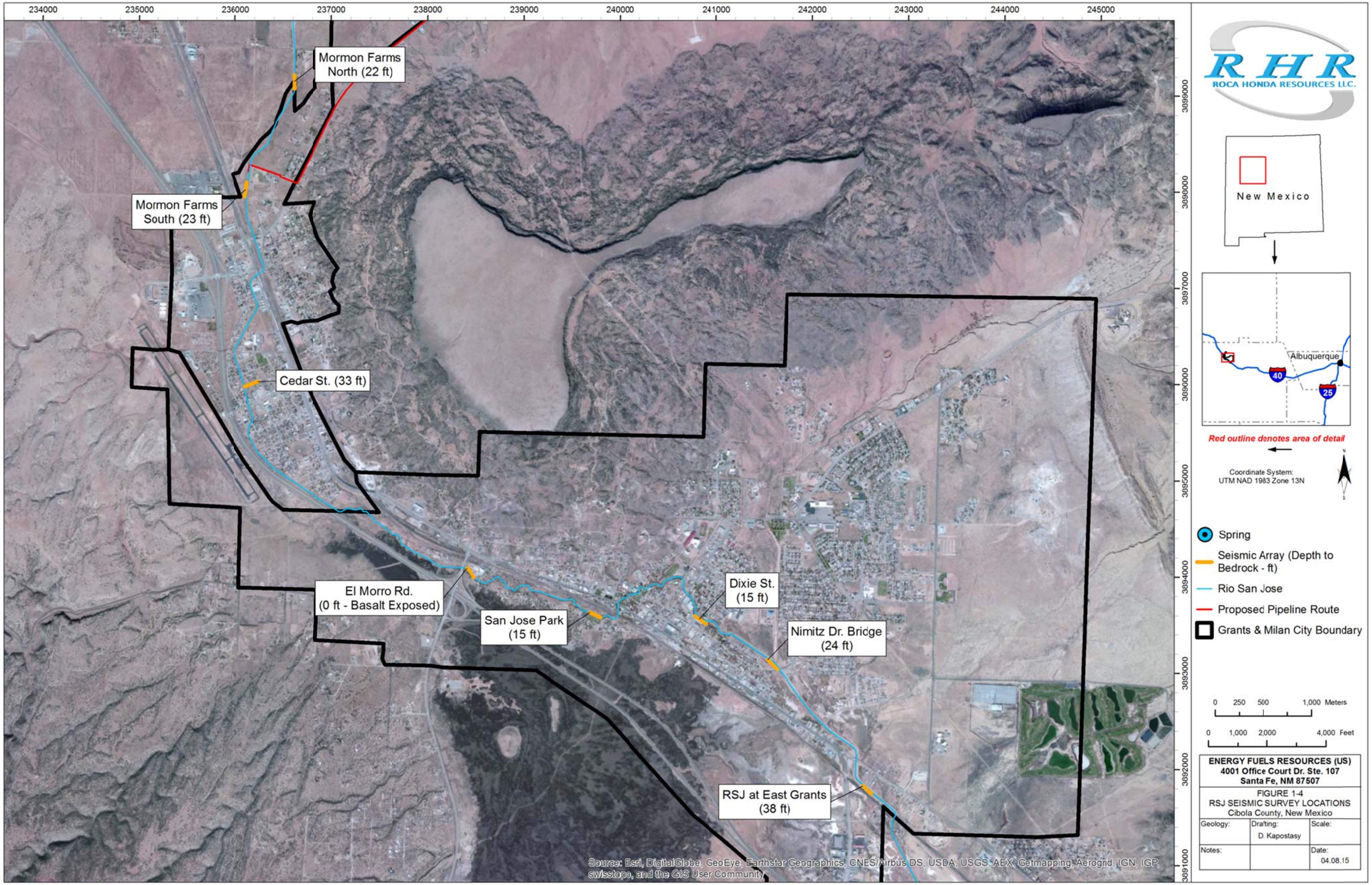

Figure 1-4. Seismic Survey Location Map

1.3.1.3 Dixie St.

The third location was along the RSJ behind a warehouse. The array was set up along the bank of the RSJ due to trash and tumble weeds filling the channel at this location. This site was selected due to previous Superfund clean-up by the EPA. This section of the RSJ was dry during the seismic survey. At this location the depth to bedrock is 15 ft.

1.3.1.4 San Jose Park

The fourth location was the first location where it was possible to set the array on the bottom of the RSJ channel. The channel here was dry and the depth to bedrock is 15 ft.

1.3.1.5 El Morro Rd. (Behind the Diamond G)

This site is located just past the large railroad bridge behind the Diamond G True Value hardware store. This site was selected because it is the location of USGS gaging station 08343000 whose data is shown in Figure 1-2. This stretch of the RSJ was dry during the survey and the data was collected along the channel bottom. At this location basalt is exposed at the surface and there is very little sediment in the channel.

1.3.1.6 Cedar St (Milan)

This site is located in the village of Milan in a neighborhood approximately halfway between the El Morro Rd location and the discharge point. The survey was arranged perpendicular to the RSJ due to access issues. The depth to bedrock at this location is approximately 30 ft.

1.3.1.7 Mormon Farms

Two surveys were performed along this stretch of the RSJ in the channel. This location is the proposed discharge area for the pipeline. Both locations indicated that there is likely bedrock approximately 20 ft beneath the surface.

1.3.2 Summary

The data given in the results section above provide good insight for implementing an effective sampling protocol along the RSJ. Section 2.0 of this Work Plan, Scope of Work, has been revised from the August 2014 version submitted to NMED to reflect the information gained by the seismic study.

2.0 Scope of Work

A Work Plan regarding the characterization of San Mateo Creek was submitted to and reviewed by NMED in January 2011. That Work Plan described in detail work that needed to be completed to characterize San Mateo Creek in order to accept discharge water from the Roca Honda Mine. San Mateo Creek received discharge from various uranium mines in the past and there was concern about possible remobilization of contaminants from mine water discharge. The same concerns do not apply to the RSJ, so while the general methods of characterization presented in the January 2011 Work Plan will be similar, the extent of characterization required is less exhaustive.

NMED requested in a letter dated July 27, 2010 that RHR accomplish the following two tasks for the characterization of San Mateo Creek.

1. Develop a comprehensive plan for sampling both shallow alluvial groundwater and sediments within San Mateo Creek, including sampling at various depths to address vertical heterogeneity.
2. Demonstrate that applicable surface water standards will not be exceeded as a result of the discharge.

This work plan will address the same tasks only as related to the RSJ rather than San Mateo Creek.

Strathmore's (now Energy Fuels) SOP-007 "Sediment Sampling" was relied on for development of this Work Plan. SOP-007 summarizes the technical guidance provided in the USEPA and USGS documents listed in the References. Additional SOPs were also used in development of this Work Plan, and are mentioned below where necessary.

2.1 Task 1 – Identify Sediment Sampling Locations

RHR will concentrate on defining the existing (i.e., baseline) chemistry of the Rio San Jose sediments. This task will identify sampling locations to capture baseline data above and below the proposed discharge point.

Selection of sample sites within the streambed will take into account the fact that under non-flood conditions the Rio San Jose is normally dry, with areas of ponded water. The alluvium is shown to be saturated, from the proposed RHR discharge point through the city of Grants. RHR sample locations will be selected to: 1) determine existing conditions in the RSJ; and 2) obtain representative samples of RSJ alluvium at regular intervals. If necessary, the proposed locations will be adjusted based on site access, property boundaries, and surface obstructions. The field team will observe the area to be sampled and select a cross-section upstream of visible signs of trash, culvert entries, bridges, and slumping banks, areas where the potential for atypical sediment contamination is high. Due to a lack of tributaries upstream of the discharge point, only the RSJ channel will be sampled. As stated above the main two sources of water in the RSJ upstream of the discharge point are Bluewater Creek and Mitchell Draw.

At each sample location several depositional zones representing upstream influences and various flow regimes will be sampled; e.g., left bank, right bank, and center channel. In order to accomplish this, each sample location will be transected and 6 to 10 sub-samples will be collected from the same depth along the transect and mixed to form a composite sample. Samples will be collected and composited at two depths: 0.5 and 1.5 feet below streambed surface. The number of samples from each transect will be based on the areal size of the channel; that is, the wider the channel, the greater the number of sub-samples collected. Compositing sub-samples from the same depth across a stream transect will smooth the local scale variability and provide samples that are more representative of the average or mean contaminant concentrations at that depth.

The sample collection strategy for bed sediment focuses on obtaining samples of sediments from natural depositional zones, i.e., locations in streams where the energy regime is low and fine-grained particles accumulate in the stream bed. Depositional zones can cover large areas at some sites and small pockets at other sites.

The approximate locations of the nine (9) sediment sampling sites are shown in Figure 2-1. The proposed RHR treated mine water discharge point is indicated as a reference point. The first sample location (#1) is located upstream from the proposed discharge and will be used to determine the contamination, if any, in sediments upstream of the proposed discharge. The second location (#2) is at the current proposed discharge location. Six of the remaining seven locations (Samples #3 - #8) are in the channel of the RSJ and will be used to determine baseline quality of the stream bed and determine the extent of contamination, if any, downstream of the discharge point. One of the sample locations is at the USGS gaging station 08343000 and another is at the former discharge location of the city of Grants wastewater treatment facility. The final sample location (#9) is in a tributary to the RSJ coming out of Lobo Canyon. This location was selected to determine the contamination, if any, being contributed by tributaries to the RSJ. Only three (3) of these nine (9) sites will be sampled for volatile and semi-volatile organic constituents. These three locations are shown in Figure 2-1. While that plume has since been remediated, and it is not thought that there are organic constituents in the RSJ channel through Milan and Grants, samples will be taken in the channel at these three locations to verify the presence or absence of these chemicals.

In addition to the samples taken at 0.5 and 1.5 feet below the surface correspondence from NMED indicated that they would also like to see a sample taken at the base of the alluvium. The seismic survey indicated that the sediment in the RSJ ranges in depth from 0 to 40 feet thick. RHR proposes collecting a sample at the alluvium bedrock contact at Rio San Jose Park (Figure 2-1, location #5), where the depth to bedrock is around 15 ft. If contamination is discovered at this location then additional sampling points will be selected to better characterize the contamination.

All sample locations mentioned were accessed for the seismic survey and both the City of Grants and Village of Milan were helpful in coordinating those activities. While unforeseen circumstances may arise that would prohibit sampling at one or more of the sites, at present access to the sites described should not be an issue.

2.2 Task 2 – Collect Sediment Samples for Analysis

2.2.1 General Sampling Procedures

The following procedures will be performed before the field team enters the first location or collects the first sample. The Field Leader will secure permission to enter the property and explain to the land owners what work is being conducted. Additional steps that will be

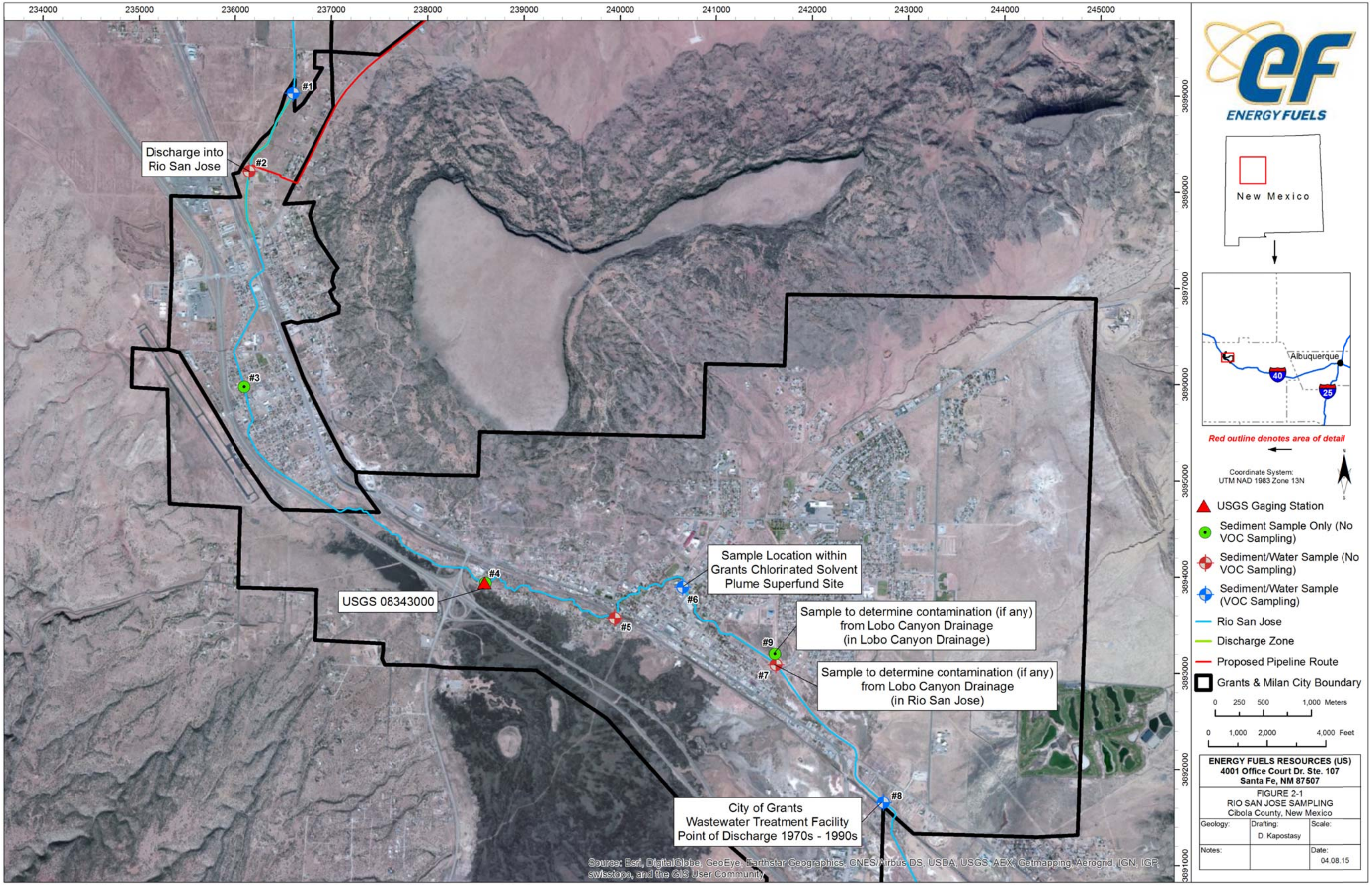

Figure 2-1. Sediment and Well Point Location Map

performed before sampling such as health and safety and quality assurance and quality control briefings are discussed in Section 3 of this Work Plan. The details of equipment decontamination and sample handling/chain-of-custody are discussed in Strathmore Standard Operating Procedures (SOPs) Nos. 003 and 006 (adopted by Energy Fuels).

2.2.2 Equipment Cleaning

All equipment will be cleaned prior to field activities and between sample sites. Initial cleaning procedures are designed to remove paper, glue, plasticizers, oils, and metals from the new sampling and processing equipment. The clean equipment will be separated and stored in a plastic bag. Dedicated equipment for sediment samples is impractical due to the large number of sediment samples which will be required. An extra set of equipment will be available if equipment is damaged or lost. Sampling equipment will be cleaned between samples in the field (SOP-003).

2.2.3 Sample Collection

Sample sites will be photographed, GPS coordinates recorded, and a gamma scan will be done with the results recorded in counts per second (CPS) using a hand held Ludlum (model 2241) radiation survey meter, before samples are collected. A diagram of the sampling location will be recorded in the field logbook. The date and time of sample collection, sample number, sample team members, weather conditions, air temperature, sample container, sample collection method, sample volume, and field observations will be recorded in the field logbook and other appropriate forms. The volume of sample to be collected is a function of the analytical requirements, as provided by the analytical laboratory.

This Work Plan proposes sediment sampling at 0.5 feet and at 1.5 feet below the surface. The spoon and scoop method for shallow samples and the auger method for below surface samples are both discussed in Strathmore SOP-007 (adopted by Energy Fuels), *Sediment Sampling*. Sieving will be conducted at the analytical laboratory and the quantity of sample requested by the laboratory will account for the sieving losses. The sample locations will be left as they were found by placing any waste in trash bags and carrying it back to the vehicle for proper disposal. Excess sediment from auger holes will be replaced in the hole to not leave an open hazard to wildlife or cattle.

Sampling at the alluvium/bedrock contact will be done using a hand auger which will be used to drill to the bedrock and collect an alluvial sample. As with the shallower samples, the sample will be collected in accordance with SOP-007 and a gamma reading will be taken using a hand held Ludlum (model 2241) radiation survey.

2.2.4 Sample Processing

Sediment samples for several types of analyses can be processed from the composite sample. The analytical laboratory will sieve a portion of the sample to less than 63 microns and analyze for trace elements, major ions, and organic and inorganic carbon. A second portion will be sieved to less than 2.0 mm and analyzed for organic contaminants, total-organic carbon, total-inorganic carbon, and percent moisture. The third portion will also be sieved to less than 2.0 mm and analyzed for percent particle-size distribution less than 63 micron (sand/silt). Sediments samples will also be analyzed for radiometrics from this sample. Samples will be properly packaged, documented and shipped to the laboratory. Chain-of-custody forms will be maintained for each complete sample.

Appendix B to this Work Plan presents the parameters, analytical methods, and detection limits for water sampling, sediment sampling and sediment leaching (SPLP) to be used in this study. Appendix C is a table of the proper containers, preservation and holding times for sediment and water samples.

2.3 Task 3 – Install Well Points/Monitor Wells at Selected Locations

The installation of small diameter wells using well points will aid in determining whether the alluvium of the Rio San Jose is saturated. Well points will allow the measurement of water levels to construct a water table map and the collection of water samples to characterize the existing chemistry of the groundwater in the alluvium if sufficient quantities are present. Figure 2-1 shows the proposed six (6) well point locations. Well point locations were selected to be in the same locations as sediment samples so that comparisons can be made between sediment chemistry and water chemistry at certain locations.

Prior to installation of the well points, stakes or flags will be used to identify and mark the sampling locations. Field personnel will use topographic maps and aerial maps on which the sample sites have been identified and GPS coordinates noted and will verify that they are at the correct site(s).

A soil auger will be used to remove the initial 10 or 20 feet of alluvial material from the well point site. The well point will then be driven into the bottom of the prepared hole as deeply as possible or at least 2 feet and preferably 5 feet below the water table.

2.4 Task 4 – Collect Water Level Data and Water Samples from Well Points/Monitor Wells

Water levels will be measured in the well point wells. If a sufficient number of water levels can be obtained, a water table map of the alluvial groundwater system will be constructed.

Assuming sufficient quantities of water to facilitate sampling, groundwater from the well points will be sampled by use of a portable pump. Groundwater sampling procedures outlined in Strathmore SOP 002 (adopted by Energy Fuels) will be followed, and the samples will be sent to an accredited laboratory. The analytical methods for water samples are presented in Appendix B and the collection containers, preservation techniques, and holding times for water samples are presented in Appendix C. The three sample locations used for sediment organic analysis will be used for organic analysis in the three groundwater samples if groundwater can be collected.

In order to analyze for all constituents listed in Appendix B a large quantity of water will be collected from each well point. If the quantity of water collected from a well point is less than what is necessary to analyze for all the constituents listed in Appendix B than a decision will be made in the field based on the amount of water what will be analyzed. Due to the nature of the characterization RHR proposes that under these circumstances, radiochemistry, metals, and general parameters (in that order) be analyzed.

2.5 Determine Saturated and Unsaturated Water Chemistry after Treated Water Discharge

RHR will discharge water that meets WQCC and NPDES standards. A bench scale was completed in December 2014 that shows the proposed treatment method will remove constituents of concern, specifically uranium and radium, to below NPDES and WQCC standards. Additional bench scale work is currently on going, but is being done to improve plant efficiency. Once the bench scale work has been completed, data and results will be provided to NMED. The water will have a near neutral pH (slightly basic) meaning that it would contribute less to the remobilization of constituents than rain water, which typically is slightly acidic. The continual flow of clean water will raise the alluvial static water level and recharge aquifers at various locations along the stream channel just as natural storm water flows would. Data collected under the Groundwater Monitoring Plan will be compared to the data collected under the previously described tasks to determine whether changes in groundwater chemistry occur due to discharge of treated mine water.

2.6 Determine Treated Water Discharge Effect on Surface Water Quality

The water discharged from the RHR mine will be treated with barium chloride, filtered to remove solids, and processed through an ion exchange facility as necessary to remove any constituents of concern. The treated water will be sampled and analyzed in accordance with approved permit requirements. Except during times of high precipitation, RSJ is ephemeral/intermittent through the village of Milan and city of Grants. Under non-flood conditions, the entire flow of RSJ below the RHR discharge point to Horace Springs will likely consist of treated mine water. WQCC surface water standards in RSJ will therefore not be exceeded if the quality of the treated mine water does not exceed standards.

3.0 Project Requirements

3.1 Personnel and Equipment

The equipment required to implement the tasks identified in Section 2 of this Work Plan is specified in the applicable Strathmore SOPs (adopted by Energy Fuels), or in the operating procedures supplied by the subcontractors performing the work (if applicable). Personnel will be designated by RHR prior to commencing field activities.

3.2 Health and Safety

The field work will be performed in accordance with the Energy Fuels Health and Safety Program. A qualified health and safety representative will conduct health and safety briefing before field work begins for all staff involved in the sampling activities. The representative will assign the field leader to conduct daily reminders every morning before work begins for as long as the sampling continues. The briefings will be noted in the log book.

3.3 Environmental Compliance

No federal or state environmental regulations are applicable for the sediment sampling or well point installation and sampling, however, the various guidelines listed under “References” will be utilized to collect and analyze the samples. Permissions for access will be obtained and the property and any livestock will be respected by not disturbing any more area than necessary and not leaving trash.

3.4 Quality Assurance/Quality Control

All work on the task will comply with the requirements of the Strathmore SOPs (adopted by Energy Fuels). Quality control will be provided through the use of qualified, trained personnel using tested procedures and properly maintained equipment. The following specific quality assurance requirements apply to this task:

- Planning: Copies of the Work Plan and applicable procedures will be reviewed by the personnel assigned to the task.
- Responsibilities: Responsibilities and authorities will be assigned between Energy Fuels and subcontractor personnel.
- Training: The Field Leader will brief all field personnel on health and safety and quality assurance before the work begins and document the briefings in the log book.
- Documentation: The Field Leader will maintain a field log book of the daily activities.
- Samples Control: The samples collected will be handled and labeled according to SOP 006.
- Analyses: The samples will be analyzed by an EPA certified commercial laboratory.

Quality data begins with this detailed Work Plan as guidance for the sampling effort. The Field Leader will be experienced and the field members will be trained to the Work Plan. The procedures and guidance from references for selecting the sample locations, for cleaning of equipment, for collection of samples, for preservation and shipping samples will be followed. The sample analyses will be performed by an EPA certified analytical laboratory. Field instruments and equipment will be operated in accordance with manufacturer instructions. If equipment calibration is required it will be completed before sampling begins and on a regular basis if required by the manufacturer. Field duplicate samples will be taken as a quality control measure and recorded in the log book.

The Field Leader will be responsible for the field log and will train any field members not familiar with log book protocols. Information to be recorded daily includes weather, field conditions at each sample location, personnel involved, sample numbers, sample quantities, photos, GPS coordinates, equipment malfunctions, calibration details, deviations in procedures, and reference to Chain of Custody forms and shipping information. Any additional information the field team believes would be useful for interpretation of results will be recorded.

3.5 Schedules and Deliverables

The implementation of the field sampling will begin after approval of this Work Plan. The actual schedule will remain flexible to accommodate staffing, budgets, and avoid rainy periods. The results of the field tests and the analyses will be incorporated in the Discharge Plan, and/or documents or reports required by the NMED or other regulatory agencies.

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Appendix A

Water Quality Data from USGS Gaging Station 08343000

Table A-1. Water Quality Data for USGS Gaging Station 08343000

Parameter	Unit	Sample-1	Sample-2	Sample-3	Sample-4	Sample-5	Sample-6	Sample-7	Sample-8
Sample Date		10/2/1973	10/11/1973	04/18/1980	04/19/1980	04/22/1980	04/29/1980	01/13/2004	08/05/2010
Sample Time		10:15	15:15	16:25	13:35	15:05	13:15		16:00
Water Temp.	˚C	10	16	14	14	16	4.5		21.5
Discharge Vol.	cfs	7.2	4.6	45	163	246	76		109
Gage Ht.	ft								3.78
Conductivity	us/cm	1210		510		310	300		
Hydrogen Ion	mg/l			0.00003		0.00002	0.00001		
pH				7.6		7.8	8		
CO2	mg/l			6.4		3			
Carbonate	mg/l			130		97			
Total Nitrogen	mg/l			15		2			
Organic N	mg/l			14		1.6			
Ammonia as N	mg/l			0.15		0.34			
Ammonia + Organic N as N	mg/l			14		1.9			
Nitrate + Nitrite unfiltered	mg/l			1.1		0.13			
Nitrate + Nitrite filtered	mg/l			0.69		0.1			
Orthophosphate	mg/l			0.34		0.12			
Phosphorous as P	mg/l			3.8		0.61			
Orthophosphate as P	mg/l			0.11		0.04			
Organic Carbon	mg/l		2	160		33			
Hardness	mg/l			250		130			
Noncarbonate Hardness	mg/l			120		35			
Calcium	mg/l			75		39			
Magnesium	mg/l			16		8.4			
Sodium	mg/l			13		5.9			
Sodium Adsorption Ratio	number			0.4		0.2			
Sodium fraction of cations	%			10		9			
Potassium	mg/l			11		2.4			
Chloride	mg/l			12		2.7			
Sulfate	mg/l			130		49			
Fluoride	mg/l			0.3		0.3			
Silica	mg/l			1.9		39			
Boron	mg/l			80	50	50			
Boron, Suspended	mg/l				60				
Boron - unfiltered	mg/l				110				
Molybdenum	mg/l				0				
Molybdenum, Suspended	mg/l				0				
Molybdenum - unfiltered	mg/l				0				
Vanadium	mg/l				5				
Selenium	mg/l			1	1	0			
Selenium, suspended	mg/l				1				
Selenium - unfiltered	mg/l				2				
Gross Alpha					5.6		2.7		
Gross Alpha, suspended					82		15		
Gross Beta					6.2		4.2		
Gross Beta, suspended					120		14		
Radium - 226					0.13		0.07		
Gage height above datum	m								1.15
Instantaneous Discharge	cms	0.2	0.13	1.3	4.6	7	2.2		3.1
Fecal coliform	colonies/100 ml	8	1						
Dissolved Solids	mg/l			356		172			
Dissolved Solids (sum)	mg/l			341		206			
Dissolved Solids	t/day			43.3		114			
Dissolved Solids	t/ac-ft			0.48		0.23			
Suspended Sed.	% < 0.0625mm			99	95	91	60		
Ammonia as NH4	mg/l			0.18		0.41			
Phosphorous as P	mg/l			12		1.9			
Nitrate as N	mg/l			67		9			
Gross Alpha	um/l				8.2		4		

Parameter	Unit	Sample-1	Sample-2	Sample-3	Sample-4	Sample-5	Sample-6	Sample-7	Sample-8
Gross Alpha, suspended	um/l				120		22		
Gross Beta	pCi/l				5.9		4		
Gross Beta, suspended	pCi/l				110		13		
Suspended Sed.	mg/l			8300	4050	1290	524		
Suspended Sed. Discharge	t/day			1010	1780	857	108		
Specific Conductance	us/cm							990	291

Appendix B

Parameters and Methods to be used in Water, Sediment and SPLP Sampling

Table B-1. Parameters, Methods and Detection Limits for Water Sampling

FIELD MEASUREMENTS			
Parameter	**Method**	**Detection Limit**	**Units**
pH	HANNA Multiparameter Meter		s.u.
Temperature	HANNA Multiparameter Meter		deg. F
Salinity	HANNA Multiparameter Meter		sal
Electrical Conductivity	HANNA Multiparameter Meter		umhos/cm
Total Dissolved Solids	HANNA Multiparameter Meter		mg/l
Dissolved Oxygen	HANNA Multiparameter Meter		%
Turbidity	HANNA Multiparameter Meter		NTU
GENERAL PARAMETERS			
Parameter	**Method**	**Detection Limit**	**Units**
pH	SM 4500 H B	0.1	s.u.
Electrical Conductivity	SM 2510B	5	umhos/cm
Hardness (as CaCO3)	SM 2340B	1	mg/l
Total Dissolved Solids (180)	SM 2540	10	mg/l
Total Dissolved Solids (Calc)	SM 1030 E	10	mg/l
Total Suspended Solids	SM 2540	5	mg/l
Floading Solids	SMEWW 2530B		
Oil & Grease	EPA 1664A	3.11	mg/l
E. coli	SM 9223B	1	MPN/100mL
Color	SM 2120B	1	C.U.
Odor	SM 2150B	1	TON
Silica as SiO2	EPA 200.7	0.1	mg/l
Cyanide, Total	EPA 335.4	0.005	mg/l
Total Carbon	SM 5310 B	1	mg/l
Total Organic Carbon	SM 5310 B	1	mg/l
Phenolics, Total Recoverable	EPA 420.4	0.05	mg/l
Langelier Value	Calculation		
NITROGEN			
Parameter	**Method**	**Detection Limit**	**Units**
Nitrogen, Ammonia (as N)	EPA 350.1	0.1	mg/l
Nitrogen, Nitrate (as N)	EPA 353.2	0.1	mg/l
Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	0.1	mg/l
Nitrogen, Nitrite (as N)	EPA 353.2	0.1	mg/l
Nitrogen, Nitrite (as N)	EPA 351.2	1	mg/l
Total Nitrogen	Calculation	1	mg/l
ALKALINITY			
Parameter	**Method**	**Detection Limit**	**Units**
Bicarbonate as HCO3	SM 2320B	5	mg/l
Carbonate as CO3	SM 2320B	5	mg/l
Hydroxide as OH	SM 2320B	5	mg/l
Total (as CaCO3)	SM 2320B	5	mg/l
CATIONS			
Parameter	**Method**	**Detection Limit**	**Units**
Calcium	EPA 200.7	1	mg/l
Magnesium	EPA 200.7	1	mg/l
Potassium	EPA 200.7	1	mg/l
Sodium	EPA 200.7	1	mg/l

ANIONS			
Parameter	**Method**	**Detection Limit**	**Units**
Chloride	EPA 300.0	1	mg/l
Phosphorus, Orthophosphate as P	EPA 300.0	0.1	mg/l
Sulfate	EPA 300.0	1	mg/l
Fluoride	SM 4500FC	0.1	mg/l

DISSOLVED METALS			
Parameter	**Method**	**Detection Limit**	**Units**
Aluminum	EPA 200.7	0.1	mg/l
Antimony	EPA 200.8	0.005	mg/l
Arsenic	EPA 200.8	0.005	mg/l
Barium	EPA 200.8	0.005	mg/l
Beryllium	EPA 200.7	0.003	mg/l
Boron	EPA 200.7	0.1	mg/l
Cadmium	EPA 200.8	0.00008	mg/l
Chromium	EPA 200.7	0.01	mg/l
Cobalt	EPA 200.8	0.005	mg/l
Copper	EPA 200.8	0.004	mg/l
Iron	EPA 200.7	0.05	mg/l
Lead	EPA 200.8	0.001	mg/l
Manganese	EPA 200.7	0.02	mg/l
Mercury	EPA 245.1	0.001	mg/l
Molybdenum	EPA 200.8	0.005	mg/l
Nickel	EPA 200.7	0.01	mg/l
Selenium	EPA 200.8	0.001	mg/l
Silver	EPA 200.8	0.0008	mg/l
Thallium	EPA 200.8	0.0001	mg/l
Uranium	EPA 200.8	0.0003	mg/l
Vanadium	EPA 200.8	0.02	mg/l
Zinc	EPA 200.7	0.01	mg/l

TOTAL METALS			
Parameter	**Method**	**Detection Limit**	**Units**
Mercury	EPA 245.1	0.0001	mg/l
Selenium	EPA 200.8	0.001	mg/l
Uranium	EPA 200.8	0.0003	mg/l

RADIOCHEMISTRY			
Parameter	**Method**	**Detection Limit**	**Units**
Gross Alpha	SM 7110B	2	pCi/l
Gross Beta	SM 7110B	3	pCi/l
Radium 226 (Dissolved)	SM 7500 Ra-B	0.2	pCi/l
Radium 228 (Dissolved)	Ga-Tech	1	pCi/l
Radon 222	SM 7500-RN	500	pCi/l
Thorium 229 (Tracer)	ACW 10	0.2	pCi/l
Thorium 230 (Dissolved)	ACW 10	0.2	pCi/l
Radium 226 + 228	Calculation	1	pCi/l

ORGANICS			
Parameter	**Method**	**Detection Limit**	**Units**
Organics	EPA 608	10	mg/l
Organics	EPA 623	10	mg/l

Table B-2. Parameters, Methods and Detection Limits for Sediment Sampling

GENERAL PARAMETERS			
Parameter	**Method**	**Detection Limit**	**Units**
pH	USDA 60-21a	0.1	s.u.
Oil & Grease	Modified 9071 B	0.1	%
Moisture	ASTM D2216	0.1	%
SOIL TEXTURE ANALYSIS			
Parameter	**Method**	**Detection Limit**	**Units**
Clay	ASTM D422	0.1	%
Sand	ASTM D422	0.1	%
Silt	ASTM D422	0.1	%
Texture	ASTM D422	0	%
NITROGEN			
Parameter	**Method**	**Detection Limit**	**Units**
Nitrogen-TKN	ASA9 31-3	0.01	%
SATURATED PASTE ANIONS			
Parameter	**Method**	**Detection Limit**	**Units**
Chloride	EPA 300.0	1	ppm
Fluoride	EPA 300.0	0.1	ppm
Sulfate	EPA 300.0	1	ppm
TOTAL METALS			
Parameter	**Method**	**Detection Limit**	**Units**
Aluminum	6010C	0.5	mg/Kg
Antimony	6010C	1	mg/Kg
Arsenic	6010C	0.5	mg/Kg
Barium	6010C	0.5	mg/Kg
Beryllium	6010C	0.5	mg/Kg
Boron	6010C	4.2	mg/Kg
Cadmium	6010C	0.5	mg/Kg
Calcium	6010C	5	mg/Kg
Chromium	6010C	0.5	mg/Kg
Cobalt	6010C	0.5	mg/Kg
Copper	6010C	0.5	mg/Kg
Iron	6010C	0.5	mg/Kg
Lead	6010C	0.5	mg/Kg
Magnesium	6010C	9	mg/Kg
Manganese	6010C	0.5	mg/Kg
Mercury	7471A	0.2	mg/Kg
Molybdenum	6010C	0.5	mg/Kg
Nickel	6010C	0.5	mg/Kg
Potassium	6010C	2.6	mg/Kg
Selenium	6010C	1	mg/Kg
Silver	6010C	0.5	mg/Kg

TOTAL METALS (CONTINUED)			
Parameter	**Method**	**Detection Limit**	**Units**
Sodium	6010C	73	mg/Kg
Thallium	EPA 200.8 (soil)	0.5	mg/Kg
Uranium	EPA 200.8 (soil)	0.5	mg/Kg
Vanadium	EPA 200.8 (soil)	0.8	mg/Kg
Zinc	6010C	1.3	mg/Kg

RADIOCHEMISTRY			
Parameter	**Method**	**Detection Limit**	**Units**
Gross Alpha	SM 7110	10	pCi/g
Gross Beta	SM 7110	10	pCi/g
Radium 226	EPA 901.1 Mod.	0.2	pCi/g
Radium 228	EPA 901.1 Mod.	0.2	pCi/g
Thorium 229 (Tracer)	ACW 10		pCi/g
Thorium 230	ACW 10		pCi/g

ORGANICS			
Parameter	**Method**	**Detection Limit**	**Units**
Organics	EPA 608	10	mg/l
Organics	EPA 623	10	mg/l

Table B-3. Parameters, Methods and Detection Limits for SPLP Leaching

FIELD MEASUREMENTS			
Parameter	**Method**	**Detection Limit**	**Units**
pH	HANNA Multiparameter Meter		s.u.
Temperature	HANNA Multiparameter Meter		deg. F
Salinity	HANNA Multiparameter Meter		sal
Electrical Conductivity	HANNA Multiparameter Meter		umhos/cm
Total Dissolved Solids	HANNA Multiparameter Meter		mg/l
Dissolved Oxygen	HANNA Multiparameter Meter		%
Turbidity	HANNA Multiparameter Meter		NTU
GENERAL PARAMETERS			
Parameter	**Method**	**Detection Limit**	**Units**
pH	SM 4500 H B	0.1	s.u.
Electrical Conductivity	SM 2510B	5	umhos/cm
Hardness (as CaCO3)	SM 2340B	1	mg/l
Total Dissolved Solids (180)	SM 2540	10	mg/l
Total Dissolved Solids (Calc)	SM 1030 E	10	mg/l
Total Suspended Solids	SM 2540	5	mg/l
Floading Solids	SMEWW 2530B		
Oil & Grease	EPA 1664A	3.11	mg/l
Color	SM 2120B	1	C.U.
Odor	SM 2150B	1	TON
Silica as SiO2	EPA 200.7	0.1	mg/l
Cyanide, Total	EPA 335.4	0.005	mg/l
Total Carbon	SM 5310 B	1	mg/l
Total Organic Carbon	SM 5310 B	1	mg/l
Phenolics, Total Recoverable	EPA 420.4	0.05	mg/l
Langelier Value	Calculation		
NITROGEN			
Parameter	**Method**	**Detection Limit**	**Units**
Nitrogen, Ammonia (as N)	EPA 350.1	0.1	mg/l
Nitrogen, Nitrate (as N)	EPA 353.2	0.1	mg/l
Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	0.1	mg/l
Nitrogen, Nitrite (as N)	EPA 353.2	0.1	mg/l
Nitrogen, Nitrite (as N)	EPA 351.2	1	mg/l
Total Nitrogen	Calculation	1	mg/l
ALKALINITY			
Parameter	**Method**	**Detection Limit**	**Units**
Bicarbonate as HCO3	SM 2320B	5	mg/l
Carbonate as CO3	SM 2320B	5	mg/l
Hydroxide as OH	SM 2320B	5	mg/l
Total (as CaCO3)	SM 2320B	5	mg/l
CATIONS			
Parameter	**Method**	**Detection Limit**	**Units**
Calcium	EPA 200.7	1	mg/l
Magnesium	EPA 200.7	1	mg/l
Potassium	EPA 200.7	1	mg/l
Sodium	EPA 200.7	1	mg/l

ANIONS			
Parameter	**Method**	**Detection Limit**	**Units**
Chloride	EPA 300.0	1	mg/l
Phosphorus, Orthophosphate as P	EPA 300.0	0.1	mg/l
Sulfate	EPA 300.0	1	mg/l
Fluoride	SM 4500FC	0.1	mg/l

DISSOLVED METALS			
Parameter	**Method**	**Detection Limit**	**Units**
Aluminum	EPA 200.7	0.1	mg/l
Antimony	EPA 200.8	0.005	mg/l
Arsenic	EPA 200.8	0.005	mg/l
Barium	EPA 200.8	0.005	mg/l
Beryllium	EPA 200.7	0.003	mg/l
Boron	EPA 200.7	0.1	mg/l
Cadmium	EPA 200.8	0.00008	mg/l
Chromium	EPA 200.7	0.01	mg/l
Cobalt	EPA 200.8	0.005	mg/l
Copper	EPA 200.8	0.004	mg/l
Iron	EPA 200.7	0.05	mg/l
Lead	EPA 200.8	0.001	mg/l
Manganese	EPA 200.7	0.02	mg/l
Mercury	EPA 245.1	0.001	mg/l
Molybdenum	EPA 200.8	0.005	mg/l
Nickel	EPA 200.7	0.01	mg/l
Selenium	EPA 200.8	0.001	mg/l
Silver	EPA 200.8	0.0008	mg/l
Thallium	EPA 200.8	0.0001	mg/l
Uranium	EPA 200.8	0.0003	mg/l
Vanadium	EPA 200.8	0.02	mg/l
Zinc	EPA 200.7	0.01	mg/l

TOTAL METALS			
Parameter	**Method**	**Detection Limit**	**Units**
Mercury	EPA 245.1	0.0001	mg/l
Selenium	EPA 200.8	0.001	mg/l
Uranium	EPA 200.8	0.0003	mg/l

RADIOCHEMISTRY			
Parameter	**Method**	**Detection Limit**	**Units**
Gross Alpha	SM 7110B	2	pCi/l
Gross Beta	SM 7110B	3	pCi/l
Radium 226 (Dissolved)	SM 7500 Ra-B	0.2	pCi/l
Radium 228 (Dissolved)	Ga-Tech	1	pCi/l
Thorium 229 (Tracer)	ACW 10	0.2	pCi/l
Thorium 230 (Dissolved)	ACW 10	0.2	pCi/l
Radium 226 + 228	Calculation	1	pCi/l

ORGANICS			
Parameter	**Method**	**Detection Limit**	**Units**
Organics	EPA 608	10	mg/l
Organics	EPA 623	10	mg/l

Appendix C

Analytical Method, Container, Preservation, and Holding Time Requirements

Table C-1. Analytical Method, Container, Preservation, and Holding Time Requirements

SAMPLE CONTAINERS AND SHIPPING – WATER/SPLP			
Parameter	**Sample Container**	**Preservative**	**Hold Time**
pH	500 mL Plastic	None, Cool to <4 ˚C	ASAP
Total Dissolved Solids			7 Days
Total Suspended Solids			
Alkalinity (Total)			28 Days
Electrical Conduct.			
Chloride			
Fluoride			
Sulfate			
Color			48 Hours
Nitrogen, Nitrite			
Phosphate			
Floating Solids	Gallon Plastic		2 Hours
Odor	500 mL Glass		6 Hours
E. coli	150 mL Sterile Plastic		30 Hours
Nitrogen, Ammonia	150 mL Plastic	H_2SO_4 to pH<2, Cool to <4 ˚C	28 Days
Nitrogen, Nitrate			
Nitrogen, Nitrate+Nitrite			
Nitrogen, Total Kjeldahl			
Phenolics, Total	500 mL Glass		
Total Carbon	40 mL VOA Glass (2)	None, Cool to <4 ˚C	
Total Organic Carbon	40 mL VOA Glass (2)	HCl to pH<2, Cool to <4 ˚C	
Oil and Grease	1 L Glass	HCl to pH<2, Cool to <4 ˚C	
Cyanide, Total	250 mL Dark Plastic	NaOH to pH>12, Cool to <4 ˚C	14 Days
Gross Alpha	½ Gallon Plastic (3)	None	6 Months
Gross Beta			
Radium 226			
Radium 228			
Thorium			
Radon 222	40 mL VOA Glass (2)		4 Days
Calcium	250 mL Plastic (filtered through a 0.45 µm filter)	HNO_3 to pH<2	180 Days
Magnesium			
Potassium			
Sodium			
Aluminum			
Antimony			
Arsenic			
Barium			
Beryllium			
Boron			
Cadmium			
Chromium			
Cobal			
Copper			
Lead			
Manganese			
Molybdenum			
Nickel			
Selenium			
Silver			
Thallium			
Uranium			
Vanadium			
Zinc			
Mercury			28 Days
Selenium, Total	250 mL (unfiltered)	HNO_3 to pH<2	180 Days
Uranium, Total			
Mercury, Total			28 Days
Chlorine Pesticides	1 L Glass (2)	None, Cool to <4 ˚C	14 Days
Organic Compounds			

SAMPLE CONTAINERS AND SHIPPING - SEDIMENT			
Parameter	**Sample Container**	**Preservative**	**Hold Time**
pH	1 Gallon Plastic Bag	None	ASAP
Moisture			
Nitroge, Total Kjeldahl			28 Days
Chloride			
Fluoride			
Sulfate			
Particle Size and Texture			180 Days
Calcium			
Magnesium			
Potassium			
Sodium			
Aluminum			
Antimony			
Arsenic			
Barium			
Beryllium			
Boron			
Cadmium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Manganese			
Molybdenum			
Nickel			
Selenium			
Silver			
Thallium			
Uranium			
Vanadium			
Zinc			
Gross Alpha			
Gross Beta			
Radium 226			
Radium 228			
Thorium			
Mercury			28 Days
Oil and Grease	4 oz Glass Jars (2)		
Chlorine Pesticides	4 oz Glass Jars (2)		14 Days
Organic Compounds			