jbr environmental consultants, inc.
www.jbrenv.com
8160 South Highland Drive • Sandy, Utah 84093 [P] 801.943.4144 [F] 801.942.1852

February 21, 2008
MTN

Mr. Mark Novak
Utah Division of Water Quality
288 North 1460 West
P.O. Box 144870
Salt Lake City, Utah 84114-4870

RE: PR Spring Mine, Request for Permit-by-Rule Determination

Dear Mr. Novak:

On behalf of Earth Energy Resources, Inc. (Earth Energy), thank you for your involvement in the permitting process for the proposed PR Spring tar sands mining and processing operation. As you are aware, Earth Energy's PR Spring project is located primarily in southern Uintah County, and extends into northern Grand County. The project area lands and minerals are under lease from Utah State Institutional Trust Lands Administration.

This letter transmits a brief report with attachments, intended to provide information to support Earth Energy's request for a determination that the proposed means of ore processing and processed sand disposal be considered permitted by rule under Utah's Ground Water Protection Rules (UAC R317.6-6). In part, this information was compiled to address items discussed in the initial January 10, 2007 meeting at the Division of Water Quality (DWQ) office with you, Tom Rushing, and Jodi Gardberg, and additional comments in your e-mail dated March 30, 2007 (attached).

Please contact either the undersigned or Mr. Barclay Cuthbert with Earth Energy Resources, Inc. (403.233.9366) with any questions you may have. Thank you very much.

Sincerely,

Robert J. Bayer, PG
Managing Principal

Enclosure(s)
cc: Barclay Cuthbert/Earth Energy Resources, Inc.

Corporate Office • Sandy, Utah
Boise, Idaho
Eugene, Oregon
Elko, Nevada
Medford, Oregon
Reno, Nevada
St. George, Utah

Earth Energy Resources, Inc.
PR Spring Operation, Uintah and Grand Counties, Utah
Ground Water Discharge Permit-by-Rule Demonstration

Introduction

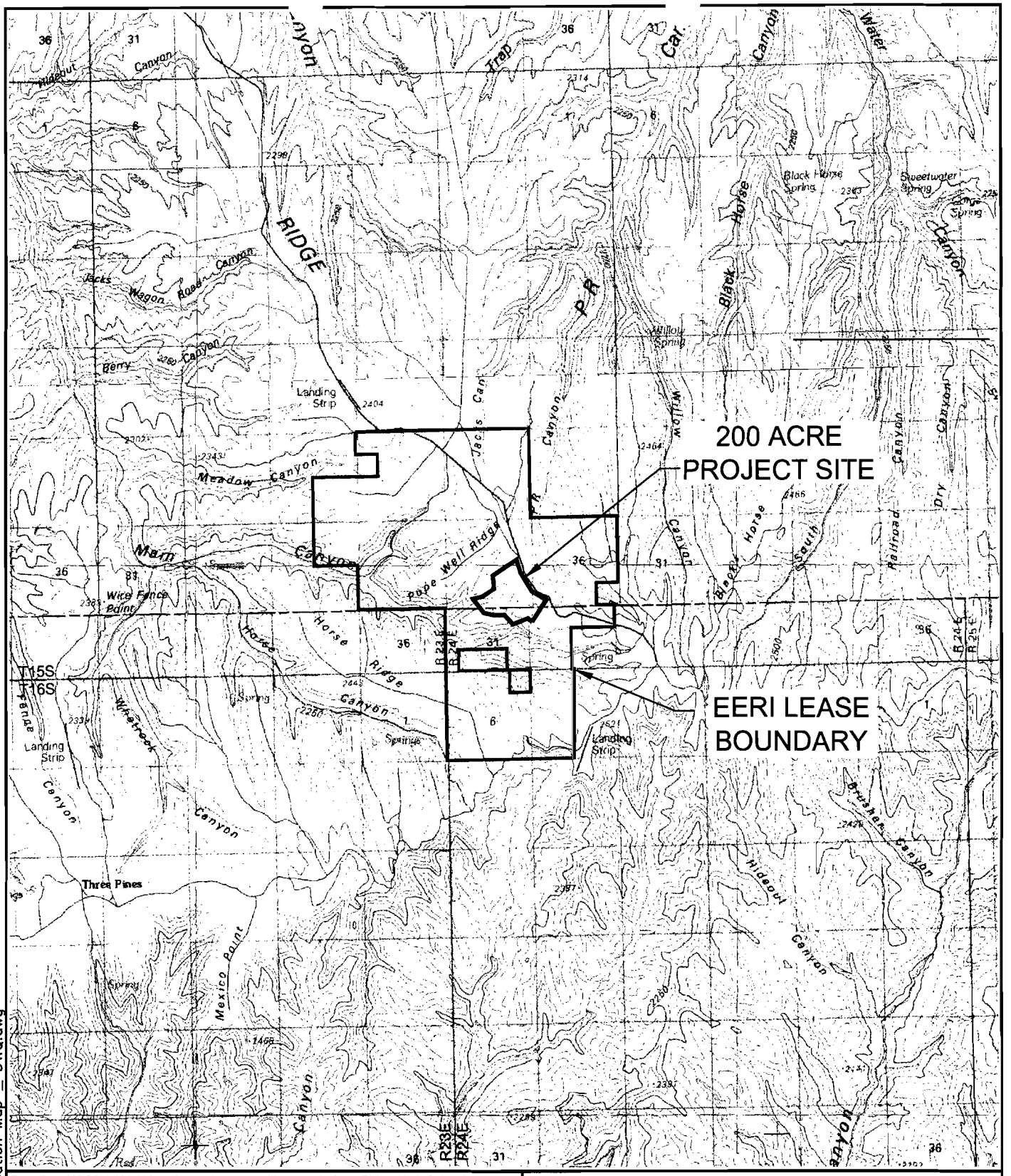
Earth Energy Resources, Inc. (Earth Energy) is in the process of acquiring all required state and federal permits prior to opening and operating a tar sands mine and process plant in northeastern Utah. Known as the PR Spring operation, the mine and plant would initially disturb approximately 200 acres of lands that Earth Energy has leased from Utah State Institutional Trust Lands Administration (SITLA). The project would be located in T15S, R23E, SLB&M, Uintah County, Sections 35 & 36, and T15½S, R24E, Grand County, Sections 31& 32 (**Figure 1**).

This report provides information to support Earth Energy's request to the Utah Division of Water Quality (DWQ) for a determination that the PR Spring operation be considered as a permitted-by-rule facility under Utah's Ground Water Protection Rules (UAC R317-6). UAC R317-6-6.2.A.1 states that "*facilities with effluent or leachate which has been demonstrated to the satisfaction of the Executive Secretary to conform and will not deviate from the applicable class TDS limits, ground water quality standards, protection levels or other permit limits and which does not contain any contaminant that may present a threat to human health, the environment or its potential beneficial uses of the ground water*" are considered to be permitted by rule. Also permitted by rule (at UAC R317-6-6.2.A.25) are "*facilities and modifications thereto which the Executive Secretary determines after a review of the application will have a de minimis actual or potential effect on ground water quality.*" Earth Energy believes that the proposed means of tar sands processing, processed sand disposal, and other aspects of the PR Spring operation meet these criteria, as described in detail below.

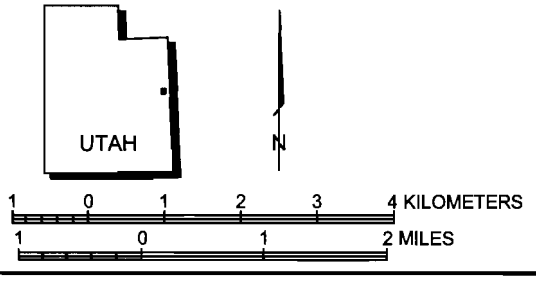
Environmental Setting

Earth Energy's PR Spring project would be located on the Tavaputs Plateau along the southeastern rim of the Uinta Basin. The site is within the Willow Creek sub-basin of the Green River watershed. The proposed disturbances would be located on a relatively flat interfluve between PR Canyon and Main Canyon, extending into the heads of two small ephemeral tributaries to Main Canyon. Average elevation at the project site is approximately 8,100 feet. The small headwater drainages contain very small active-channel cross-sections, and typically show no evidence of live water or riparian vegetation. Precipitation in this area is estimated at about 12 inches annually (Price and Miller 1975), which is generally not sufficient to sustain perennial flow in the smaller watersheds in this region. Instead, much of the area is dissected by numerous ephemeral drainages located in large canyons with steep side slopes.

Thick, cross-bedded sandstone, mapped by Gaultieri (1988) as the Renegade Member of the Wasatch Formation, crops out in the bottom of Main Canyon. These beds are overlain by the Green River Formation, which contains lenticular beds of lacustrine sandstone saturated with bitumen separated by intervals of barren sandstone, siltstone, shale, mudstone and calcareous



Base from USGS 1:100,000-scale *metric* topographic map of: Seep Ridge, Utah-Colorado, 1981 and Westwater, Utah-Colorado, 1980.



EARTH ENERGY RESOURCES, INC.

PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 1
PROJECT LOCATION MAP

jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
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drawings\EarthEnergy\Fig1 Location Map _ DWG.dwg

marl. The Parachute Member of the Green River Formation is the surface bedrock formation found throughout much of Earth Energy's lease, and the underlying Douglas Creek member of that formation contains the tar sands deposit that would be mined during this project. Five distinct asphalt impregnated sands, labeled "A", "B", "C", "D" and "E" with "E" the highest strata, occur in the upper portion of the Douglas Creek Member (Byrd, William D. 1970; Clem, K. 1984). The "E" bed is regionally known, but is not present locally. The remaining beds crop out in PR Canyon to the northeast and Main Canyon to the southwest of Earth Energy's proposed operations. All four beds occur in an interval 240 to 290 feet thick (Murphy, Leonard A., 2003 private report). Earth Energy's primary targets at this time are the "C" and "D" beds. The Douglas Creek Member forms the uppermost recognized aquifer in the project area.

BLM wrote the following about the geology and hydrogeology in the general vicinity of the project area (USDI BLM 2007):

> The Douglas Creek Aquifer receives recharge mainly by infiltration of precipitation and surface water in its outcrop area, with little leakage from underlying bedrock aquifers. It discharges locally to springs in the outcrop area and to alluvium along major drainageways such as the Green and White Rivers. In the study area, flow is generally to the north and northwest. The unit is roughly 500 ft thick, although in the center of the Uinta Basin it is as thick as 1,000 ft. Maximum well yields are less than 500 gpm. Water type is typically sodium sulfate to sodium bicarbonate. TDS levels range from 640 to 6,100 mg/L (Holmes and Kimball 1987).

Previous geologic exploration drilling at the site, at maximum depths of approximately 150 feet below ground surface, did not encounter ground water. However, there are several nearby springs and/or seeps that provide evidence of localized, shallow ground water. Most springs in the area, including the nearby PR Spring, are reported to discharge from the Parachute Creek Member of the Green River Formation (Price and Miller 1975), and represent isolated, perched aquifers. PR Spring is located slightly less than one mile east of Earth Energy's proposed operation, and is associated with several water rights for stock watering uses. It issues in the canyon bottom near the head of PR Canyon. Other springs mapped by the USGS and within a similar proximity to the site are located south of the proposed operation in the bottom of Main Canyon and its tributaries. PR Spring issues at an elevation of approximately 8,040 feet; other nearby springs issue at elevations ranging from about 7,700 to 8,160 feet.

While the Green River Formation includes various other water bearing zones (including the Birds Nest zone of the Parachute Creek Aquifer and the Douglas Creek Aquifer), the State Water Plan (Utah Division of Water Resources 1999) does not include any aquifers within this formation as significant enough to be targets for ground water development. Further, information from Green River Formation water wells and springs indicates generally low yields (Price and Miller 1975). Instead, the underlying Wasatch Formation and the Mesa Verde Formation (Group) are the nearest aquifers of a regional extent.

Price and Miller (1975) indicate that the potentiometric surface in the general area is 1,500 feet below ground level (BGL) or greater, with a gradient to the north. The Division of Oil, Gas and Mining's (DOGM) oil and gas well log records (DOGM 2007) were searched for relevant information on stratigraphy and ground water. Two of the well records (Webb (API #43-047-

30097, drilled in 1970-71), Lindisfarne (API #43-047-35567) drilled in 2006)) and other reports (Howells et al. 1987) describe the Mesa Verde as the nearest fresh water aquifer, under the low-permeability Green River and Wasatch formations. The average distance from ground level to the Mesa Verde was 2,011 feet, based on DOGM records of oil/gas wells within 3.3 miles of the project site and surrounding it in all directions. Table 1 shows the distance from ground level to the top of the Mesa Verde, taken from DOGM well files. Only recorded data is entered (e.g., if surface formation was not described it was left blank, if surface was described as the Green River Formation, zero (0) was entered in column 5).

Table 1. Distance BGL to Aquifer (from DOGM well files)

		Location Relative to Project Site		Distance BGL (in ft)			
Well Name	T-R-S	Direction	Distance (mi)	Green River Formation	Wasatch Formation	Mesa Verde Formation	Noted Water Occurrence
Lindisfarne	15-23-26	NNW	1.35	0	1,282	1,966	
Black Horse Canyon	15-24-31	ENE	1.2			1,905	
Webb	15-24-31	E	1.3			1,266	1,266
Divide 32-32	15.5-24-32	ESE	0.7	0		2,148	
UTFEE	15.5-24-32	SE	1.1	0	710	1,768	
UTON	16-24-5	SSE	1.8	0	600	1,800	
Horse Point	16-24-6	SSW	1.2			2,123	
Little Berry	16-23-2	SW	3.3			2,108	
Duncan 3	15-23-28	W	2.8	0	900	2,100	
Duncan 14	15-23-28	WNW	3.1	0		2,465	
Main 1	15-23-28	NW	2.35	0	1,365	2,475	

The nearest water well in the State water rights database (DWR 2007) is a BLM well (water right #49-1597) approximately three miles east in T15S, R24E, SESE Section 32; BLM initially drilled and abandoned a dry well (822 feet deep), then drilled a second well six feet away from the first and finished the well at 98 feet (static water level 60.9 ft; pumping at two gallons per minute (gpm) for one hour caused a 15-foot drop) (DWR 2007). According to the database, no proof of beneficial use was ever submitted for the water right associated with this well, and the right lapsed in 2002. The current physical status of the well is not known; there is no record in the database of the well having been plugged and abandoned.

A water rights application (No. 49-1567) has been filed with the State Engineers Office by a private party on a small spring located within Earth Energy's proposed disturbance area, as well as several other nearby springs; in general, these springs are ones that are not shown on USGS mapping. To date, the State Engineer has not granted this water right, in part because there were official protests filed and in part because the applicant has not submitted requested information to the State Engineer. A May 16, 2007 reconnaissance trip to locate the on-site spring and determine a flow rate found no evidence of ground water discharge at this site. It is not known whether such a spring previously discharged at this location or whether the site location associated with the water right application was reported incorrectly. A very minor seep, with

flow too small to be measured, was found approximately 100 vertical feet down from, and ¼ mile west of, the spring identified with the water right. No other water was found in the immediate vicinity during this survey. Further, as noted above, exploration drilling in the vicinity, to depths of 150 feet, did not encounter ground water.

The baseline water quality of ground water underlying the project area is not known. However, the BLM (1984) notes that known springs within the combined Hill Creek and PR Springs Special Tar Sands Area (STSA) typically range from fresh to moderately saline, with total dissolved solids (TDS) ranging from about 300 mg/L to 6,100 mg/L (BLM 1984). Generally, the springs are freshest near the southern extent of the STSA, in the vicinity of the Project Area, with TDS concentrations of less than 500 mg/L (Price and Miller 1975). In 1964, PR Spring was discharging at 5.6 gpm and had a dissolved solids concentration of 380 mg/L (Price and Miller 1975).

More recently BLM has written the following (USDI BLM 2007):

> Dissolved salt in the rivers is a major concern in the Uinta Basin. The salts originate from marine and lacustrine sedimentary rocks and their derived soils that have high salt content. Surface runoff, irrigation return flow, saline groundwater discharges, and evapotranspiration are the major causes of the elevated TDS concentrations in the surface water (Price and Miller 1975). The concentrations of dissolved salt in streams generally are low near headwater areas, but increase dramatically near the lower reaches of the streams. This is magnified during low-flow periods.

In spring 2008, Earth Energy plans to drill a test water well approximately 1¼ mile east of the proposed PR Spring operation, in order to develop a source for its process water requirements. Geologic logging will include observations on specific locations where ground water is encountered, an aquifer pump test will be conducted, and water quality samples of the target aquifer will be collected. These will help to further define the location and the baseline chemistry of the area's ground water.

Surface water quality data for nearby streams is lacking. However, Willow Creek, to which Main Canyon is tributary, is listed as an impaired stream on Utah's 303(d) list. The listed pollutant is total dissolved solids (DWQ 2006).

PR Spring Operation Description

Earth Energy plans to mine tar sands from a 62-acre open pit (**Figure 2**), from which it will also remove overburden and interburden. Under the terms of the SITLA lease, mining may occur up to a maximum depth of 500 feet below ground surface; the current pit design, which will mine the D and C beds, extends to a maximum depth of about 150 feet. Based upon exploration boreholes and a five-acre test pit, overburden varies from 0 to 50-feet thick, and interburden thickness averages 15 feet. The "D" bed averages 21 feet thick, and the "C" bed averages 24 feet thick.

The mined tar sands would be stockpiled adjacent to the processing facility; up to about 40,000 yd^3 of tar sands (a two-week supply) could be stockpiled at any one time. Overburden and interburden would initially be placed in overburden/interburden disposal sites, which will be constructed as small valley fills. As the tar sands are processed and mining progresses, sand and fines remaining after extraction of the bitumen will be used to backfill the open pit. The waste sand and fines will be alternately placed with the available over/interburden rock to provide stability. At the end of this phase of mining, two external overburden/interburden disposal sites (approximately 25 acres each) will remain, and the open pit will have been backfilled to about 50-percent of capacity.

The processing facility (**Figure 3**) will be adjacent to the open pit, covering approximately 15 acres, and will include a mine office and associated parking area; a maintenance shop, warehouse, power plant, equipment parking and service area; process equipment, sand de-watering equipment, a tank farm, tank truck loading area, and a lined water storage pond that will serve as a reserve process water pond and plant-site runoff collection pond; and stockpiles for processed sand, reject materials (ore loads that contain too much interburden or overburden to be viable for processing), and ore. The mine office will be a modular building placed on a gravel pad. The process equipment will be skid-mounted. The warehouse and maintenance shop will be "Sprung-type" semi-permanent structures placed on concrete pads. The tank farm will be designed, constructed, and operated as required by the Spill Prevention, Control, and Countermeasures (SPCC) regulations at 40 CFR 112. Among other requirements, these regulations set forth requirements for secondary containment of stored oil products (i.e. 110 percent of the capacity of the largest tank). Because the tank truck loading area will involve the transfer of large quantities of hydrocarbons, Earth Energy's SPCC Plan will also address best management practices (BMPs) to prevent or manage releases from this area as well as from the tank farm.

Earth Energy has patented a chemical method for extracting hydrocarbons from tar sands. Known as the Ophus Process, this production method produces clean (chemically inert), "damp-dry" sand tailings that can be backfilled into the quarry. The method relies upon a proprietary cleaning emulsion, whose specifications and Material Safety Data Sheet (MSDS) have been provided to DWQ as confidential information. As indicated in the MSDS, while the cleaning emulsion's biodegradability has not been determined, related chemicals are known to be biodegradable. Further, the emulsion evaporates rapidly when exposed to air and is insoluble in water.

Figure 4 shows the process flow diagram (confidential). The extraction process begins when the mined tar sand is sent through a crusher or de-lumper and reduced to a two-inch-minus aggregate size. From there, the crushed ore is augered to a heated slurry mixer where the cleaning emulsion is introduced along with water and the ore slurried to the consistency of a thick, gritty milkshake. The oil sand slurry is then moved by screw conveyor to the slurry tank where primary separation of the bitumen from the sand occurs. The produced sand with residual bitumen is then pumped through a series of separation towers where the last traces of bitumen are removed. All of the liberated bitumen is captured, polished with cyclones and/or centrifuges and then pumped to a storage tank for heated storage prior to transport. The cleaning chemical is then removed from the bitumen by distillation and recycled to the front of the process.

Although this is a closed system, Earth Energy is coordinating with EPA and the Utah Division of Air Quality in regard to possible air emissions due to fugitive or other losses. The chemical is not changed as a result of processing – it acts as a diluting and a cleaning agent, but is not itself altered by bitumen extraction operations.

Approximately 85 percent of the total water used during the extraction of bitumen from oil sand will be recycled. The chemically cleaned produced sand is de-watered on a shale shaker (or similar device) and the recovered water is pumped to a holding tank for recycle to the front of the process. Additional cleaning agent is added to the re-cycled water to bring it back to full strength. De-watered sand and fines represent the two solid streams of residual waste material that will then be conveyed to a stockpile for loading and backhaul to the mine pit. The first stream, coarse solids, is primarily quartz sand which has particle sizes large enough to separate from the hydrocarbon phase and gravimetrically separate from the liquids. This phase is collected at the bottom of the separation towers and dewatered. The second stream is the fines (including clays), which typically remain entrained in the hydrocarbon phase during the initial bitumen separation. After the bitumen is extracted from the oil sands, a combination of hydrocarbon phase, water, and clays and fines are routed to the separation/polishing components of the Ophus Process where they are separated. The dewatered sands and fines are placed in a temporary storage pile, from which they are back-hauled to the pit backfill every 24 hours. The dewatered residual solids in the storage pile will contain approximately 15 to 20 percent moisture and when mixed will have a plastic consistency that will not release free water while in the stockpile. This material will be near optimum moisture for compaction when it is returned to the pit.

The final grading plan for the plant site will ensure that all plant site run off, including any free water from the residual solids storage pile (after a precipitation event, for example) will flow to the reserve water pond. The water in the reserve pond will be used during outages of the main water supply system, and may also be used for dust suppression on haul roads and in the open pit.

Water is expected to be consumed at a rate of approximately 1.5-2 barrels for each barrel of produced bitumen. The 2,000 barrel/day operation would use approximately 4,000 barrels of water, or 116 gpm based upon 24-hour processing. All of the water that is not recycled would either evaporate or be returned to the open pit as moisture within the processed sand, which would be mixed with returned overburden and interburden as pit backfill. The backfill would be unsaturated and non-free-draining.

In Utah, discharge of process waters, wastewaters, and storm water runoff from industrial facilities to surface water is typically regulated by DWQ through the Utah Pollutant Discharge Elimination System (UPDES) program, except where Tribal Land is involved, in which case EPA has regulatory authority over such discharges. Earth Energy's PR Spring operation will be located partially on Tribal Land and partially on non-tribal land, thus both EPA and DWQ have jurisdiction over any such discharges to surface water. As there will be no discharge of process water or wastewater to surface waters, a permit for these types of discharges will not be required from either agency. The need to obtain a permit for storm water discharges is currently being investigated with both EPA and DWQ. However, regardless of whether a permit is required by

either or both agencies, storm water generated on-site will be managed so as to prevent its release to surface water (through BMPs such as grading, impoundment, and re-use).

Demonstration of Permit-by-Rule Conformance

Earth Energy believes that all aspects of the PR Spring operation will conform to the requirements stated at UAC R317-6-6.2.A.1 and A.25 (quoted above), thus allowing it to be considered as permitted by rule. First, the facility design and the nature of the operation minimize the potential for contaminant release. Second, the characteristics of residual water associated with the tar sands process do not suggest an environmental threat. Last, the hydrogeologic setting of the area in combination with various aspects of the project design limits the vulnerability of the aquifer to direct or leached contamination. In sum, Earth Energy's PR Spring operation is expected to have no more than a *de minimis* effect on ground water or surface water. These subjects are discussed in detail below.

Potential for Contaminant Release

As described above, the 15-acre process facility would include a fuel farm with full secondary containment capacity, a lined water pond, and self-contained process equipment. All of these facilities are designed to prevent release of fuels, process water, or process chemical. Any inadvertent release due to an accident or upset condition would be properly contained and mitigated. Temporary stockpiles of raw or processed tar sands would be protected from storm water run-on: the site is located atop a flat ridge with little or no up-gradient watershed, and berms would be used to control what runoff is produced from local precipitation. Further, as noted above, the process chemical itself is not water soluble and does not pose a threat other than that due to its flammability. There would be no effluent released during the operations; water would be used and recycled in a closed-loop fashion, with only a small portion exposed and lost to the environment as unrecoverable entrained moisture in the pore spaces of the produced sand and fines.

The overburden/interburden disposal sites would contain excavated non-oil-bearing sedimentary rock that would be chemically inert. The western-most of these disposal sites would be located on the area for which a water right (discussed above) has been filed on a small spring. Although there is no sign that such a spring exists at this location, the disposal site has been designed with a drain system to accommodate any flow from such a spring, should one be located within its footprint. Any such outflow would be routed down-slope along the eastern limit of the fill to a discharge point below the toe of the disposal site.

In sum, all of the above-described aspects of the PR Spring operation represent a negligible potential for contaminant release.

The processed tar sands that would be disposed back into the open pit represent the material with the characteristics most likely to contaminate water that contacts the material. Petroleum compounds associated with bitumen residual, entrained process water, or remaining process chemical represent, in theory, potential sources of contamination. To further investigate this

potential, lab analyses -- using Toxicity Characteristic Leaching Procedure (TCLP Method 1311) and Synthetic Precipitate Leachate Procedure (SPLP Method 8270C/3510C and GC/MS 8260B), as well as leaching procedures using other solvents (EPA Method 8015B/3545), were run on unprocessed tar sands, processed sands and processed fines. Results of those tests are described below.

Characteristics of Residual

After processing, the tar sands will be nearly dry (10 to 20-percent moisture remaining from entrained process water); they will also contain some residual hydrocarbon due to a less-than-100-percent processing efficiency, and some residual process chemical. Processing produces two streams of residual material: 1) eighty percent in the sand size-class (d_{50} = 117 μm), and 2) twenty percent fines (d_{50} = 18 μm)[1]. This material would be placed back into the open pit and layered with removed overburden and interburden as a disposal/reclamation practice. Once the backfill is complete, the area would be topsoiled and revegetated. Any residual extraction fluid would be expected to evaporate quickly, due to its high volatility.

To investigate the chemical characteristics and leaching potential of the processed tar sands, two sets of samples were collected and analyzed. In 2005, samples of unprocessed tar sand were obtained from the Leonard Murphy #1 pit at the PR Spring site. The Leonard Murphy #1 pit is a small (approximately five acres) test pit located within the footprint of the proposed 62-acre quarry. One of the tar sands samples was analyzed in its raw state, and one was processed through a shop-scale demonstration plant prior to laboratory analysis. In 2007, additional tar sands samples were obtained from Asphalt Ridge, located approximately 40 miles north of the PR Spring site. One of the tar sands samples was analyzed in its raw state, and one was processed at Earth Energy's pilot-scale plant in Grande Prairie, Alberta prior to analysis; the produced sands and fines were analyzed separately because they are generated as two separate waste streams, as described above. For both the 2005 and the 2007 sampling events, the tar sands were processed using the same Ophus Process that was described above and proposed for the upcoming PR Spring operation. The Asphalt Ridge samples are assumed to be a valid stand-in for the PR Spring operation because of their similarity geologically and analytically. Results from both sets of analyses are provided in Tables 2 and 3 and the discussion that follows. The full laboratory analysis reports for the 2007 samples are attached.

Table 2 Leonard Murphy #1 Tar Sands Analytical Summary

Analytical Parameter (units)	Unprocessed tar sand	Processed Sand
Total Petroleum Hydrocarbon – Diesel Range Organics		
TPH-DRO (mg/kg)	19,000	2,700
TCLP Volatiles [1]		
Benzene (mg/L)	NA	<0.042
Ethylbenzene (mg/L)	NA	<0.042
Toluene (mg/L)	NA	<0.042
Xylenes, total (mg/L)	NA	<0.042

[1] Note that the unmilled PR Spring ore has a d_{50} of 173 μm.

Analytical Parameter (units)	Unprocessed tar sand	Processed Sand
TCLP Metals		
Arsenic (mg/L)	<0.10	<0.10
Barium (mg/L)	0.47	1.6
Cadmium (mg/L)	<0.030	<0.030
Chromium (mg/L)	<0.050	<0.050
Lead (mg/L)	<0.10	<0.10
Mercury (mg/L)	<0.0010	<0.0060
Selenium (mg/L)	<0.10	<0.10
Silver (mg/L)	<0.10	<0.10
TRPH		
TRPH (mg/L)	3.3	<3.0

(Source: American West Analytical Laboratories)
[1]Sample was received with headspace, which could compromise results

Table 3 Asphalt Ridge Tar Sands Analytical Summary

Analytical Parameter (units)	Unprocessed tar sand	Processed Sand	Processed Fines
Total Petroleum Hydrocarbon – Diesel Range Organics			
TPH-DRO (mg/kg)	12,000	930	3,400
SPLP Semi-volatiles[1]			
3&4-Methyphenol (mg/L)	<0.025	<0.025	<0.025
2-Methylphenol (mg/L)	<0.025	<0.025	<0.025
2,4-Dinitrotoluene (mg/L)	<0.025	<0.025	<0.025
Hexachlorobenzene (mg/L)	<0.025	<0.025	<0.025
Hexachlorobutadiene (mg/L)	<0.025	<0.025	<0.025
Hexachloroethane (mg/L)	<0.025	<0.025	<0.025
Nitrobenzene (mg/L)	<0.025	<0.025	<0.025
Pentachlorophenol (mg/L)	<0.025	<0.025	<0.025
Pyridine (mg/L)	<0.025	<0.025	<0.025
2,4,5-Trichlorophenol (mg/L)	<0.025	<0.025	<0.025
2,4,6-Trichlorophenol (mg/L)	<0.025	<0.025	<0.025
SPLP Volatiles[1]			
Benzene (mg/L)	<0.040	<0.040	<0.040
Carbon tetrachloride (mg/L)	<0.040	<0.040	<0.040
Chlorobenzene (mg/L)	<0.040	<0.040	<0.040
Chloroform (mg/L)	<0.040	<0.040	<0.040
1,4-Dichlorobenzene (mg/L)	<0.040	<0.040	<0.040
1,2-Dichloroethane (mg/L)	<0.040	<0.040	<0.040
1,1-Dichloroethane (mg/L)	<0.040	<0.040	<0.040
2-Butanone (mg/L)	<0.020	<0.020	<0.020
Tetrachloroethene (mg/L)	<0.040	<0.040	<0.040
Trichloroethene (mg/L)	<0.040	<0.040	<0.040
Vinyl chloride (mg/L)	<0.020	<0.020	<0.020
TCLP Metals			
Calcium (mg/L)	2.1	0.71	3.1
Magnesium (mg/L)	<0.50	<0.50	0.77
Potassium (mg/L)	<0.50	<0.50	1.2
Sodium (mg/L)	3.8	9.9	29
Inorganic Analysis			
Alkalinity (as $CaCO_3$) (mg/kg)	<20	63	75
Bicarbonate (as $CaCO_3$)	<20	63	66

ANALYTICAL PARAMETER (UNITS)	UNPROCESSED TAR SAND	PROCESSED SAND	PROCESSED FINES
(mg/kg)			
Carbonate (as $CaCO_3$) (mg/kg)	<10	<14	<12
Chloride (mg/kg)	<5.0	19	21
Sulfate (mg/kg)	<5.0	60	61
Total Dissolved Solids (mg/kg)	24	300	6,100
Other Hydrocarbons			
Oil & Grease (mg/kg)	140,000	3,000	30,000
TRPH (mg/kg)	64,000	1,100	9,500

(Source: American West Analytical Laboratories)
[1] Holding times were exceeded

Volatile and Semi-Volatile Organics

All sample results – before and after processing – show that both volatile and semi-volatile organics were below detection in the leachate, confirming that the organics present are among the least mobile. However, it may be relevant to note that the analyses for these parameters were compromised to an unknown extent: the 2005 samples were received with headspace in the vials, which does not meet sampling protocol, and the 2007 samples were not analyzed by the lab within the allowable holding times. In addition to these sampling and lab errors, reporting limits for volatiles and semi-volatiles were generally above the applicable ground water standard for these analytes. Thus, it is possible that greater concentrations than those measured by the lab were actually present in the samples. Tar sands are comprised of bitumen, which is the non-volatile end member of the petroleum maturation process. By definition, then, bitumen contains little or no volatile or semi-volatile constituents. Therefore, it is believed that the results still indicate a *de minimis* effect on ground water from volatile or semi-volatile components, particularly given the hydrogeologic setting as described below.

Non-volatile Hydrocarbons

As expected, all sample results show that TRPH, TPH-DRO, and oil and grease were very high in the unprocessed ore and significantly reduced by processing. In spite of these reductions, some levels remain relatively high, particularly in the processed fines. In fact, the lab analytical reports note that the results for oil and grease are outside the method limits for the unprocessed ore and the processed fines, as well as for TRPH for the processed fines. Note that both of these analyses used EPA Method 1664a, which uses n-Hexane as the solvent; while this may be useful in characterizing the processed tar sand material, it does not characterize the likely leachate from precipitation. The absence of volatile or semi-volatile constituents in the processed material indicates that the organic compounds in the residual material are likely to be no more mobile than the *in situ* tar sands themselves.

One way of considering the environmental effects of the residual material is to compare it with the Utah's Department of Environmental Quality, Division of Environmental Response and Remediation's clean-up standards for petroleum-contaminated soils at underground storage tank sites. The initial screening and Tier 1 risk-based screening levels for oil and grease or TRPH are 1,000 mg/kg and 10,000 mg/kg, respectively. Of the total petroleum analyses preformed on the Asphalt Ridge samples, only the oil and grease analysis for the processed fines sample exceeded the Tier 1 screening level. However, when the processed fines are mixed with the processed

sands in their produced ratio of 1:4, the combined result would be 8,400 mg/kg, which complies with the applicable Tier 1 screening level. Table 4 shows the effect of recombining the processed sands and fines for the three types of total petroleum analyses performed on the Asphalt Ridge samples.

Table 4 Comparison of Total Petroleum Analyses with Tier 1 Screening Levels

Analysis	Processed Sand	Processed Fines	((b*.708)+(c*.177))/(.708+.177)	Tier 1 Screening Criteria
TPH-DRO	930	3,400	1,424	5,000
Oil & Grease	3,000	30,000	8,400	10,000
TRPH	1,100	9,500	2,780	10,000
All analyses are in mg/kg				

Metals and Other Inorganics

The 2005 samples were analyzed for TCLP trace metals, and non-detects were reported for all of the analyzed metal constituents except barium. At DWQ's request, the 2007 samples were analyzed for TCLP calcium, magnesium, potassium, and sodium as a means of determining the potential of the leachate to cause salinity in any ground water it might enter. The results were detectable, but levels of the constituents were unremarkable. In regard to ground water quality standards, for those parameters for which TCLP metals were analyzed in 2005, the following is noted: barium, chromium, lead, and silver concentrations met ground water quality standards. The detection limits for the TCLP extract from analysis of arsenic, cadmium, mercury, and selenium were greater than the ground water quality standards for these parameters; therefore, comparison of these analyses with ground water quality standards is not possible.

It is believed that the results indicate a *de minimis* effect on ground water from the analyzed metals, particularly given the hydrogeologic setting as described below.

Total Dissolved Solids

Because the project is located within the Colorado River Basin, salinity (as measured by total dissolved solids) is a concern for any potential discharges to surface waters or ground water. Further, ground water in the State is classified according to its TDS, which, in-turn, drives protection levels established in a ground water permit. The TDS concentration of ground water in the general project vicinity varies by an order of magnitude (from 300 to 6,000 mg/L as described above), but site-specific TDS data for ground water underlying the project area are not available. The TDS analyses in Table 3 are reported in mg/kg and result from a non-standard analytical method; therefore these results are not considered relevant for estimation of the TDS of leachate from the process residuals. The expected TDS of leachate that might develop from the processed oil sands is not known, however, the Orphus process affects organic compounds and does not possess the acid or caustic qualities necessary to dissolve inorganic compounds. In addition containment of the residual material in the open pit will generally prevent the release of any fluids from the waste material.

Extraction Fluid Residual

In addition to the residual product characterized in the above tables, there would likely be some residual extraction fluid in the processed residual. The previously provided MSDS for the proprietary extraction fluid supports the contention that, in the unlikely event that leaching by rain water mobilizes residual extraction fluid, the fluid poses virtually no ecological or human health risk. Given the nature of this emulsion and the concentration in which it will occur in the produced sands and fines, no impact to water quality would be expected as a result of its use and the subsequent placement of dried produced sands and fines at the proposed disposal site.

Hydrogeologic Setting

Another factor in assessing risk to ground water is the vulnerability of the aquifer to direct or leached contamination from the storage site. The lack of water wells in the area complicates this task, but also suggests that no productive aquifer has been located close enough to the ground surface to provide an economical water source. As discussed above, the relevant major, regional aquifer in this area is likely to be associated with the Mesa Verde Formation (Group). The vertical distance between the placed processed sands and this aquifer is documented in oil and gas well logs to be in the range of 1,500 to 2,000 feet, which would provide a sufficient interval of protection from any leachate.

At the same time, there is evidence of shallower, localized ground water in the area (see the Environmental Setting section, above). While the presence of such ground water directly underlying the storage site is thought to be unlikely (no springs have been noted and exploration drilling did not encounter ground water between the surface and 150 feet), it is not possible to preclude its presence.

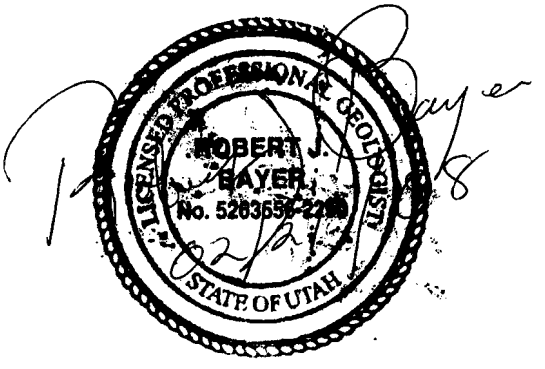
To analyze the potential for precipitation falling on the disposed processed residual material to migrate through the depository to native materials at the bottom of the pit excavation, the following factors need to be considered. The processed sand will be dry (10-20 percent moisture content), and because of the low rainfall in the area, breakthrough of infiltrating precipitation to the base of the pit waste deposits is not anticipated to occur. In order for breakthrough to occur, the dried sand and clay fines would have to exceed their field capacity. The addition of the intervening layers of waste rock, which is comprised primarily of shale, will help to further reduce infiltration as time goes on.

State and federal publications (Price and Miller 1975; Howells, Longson & Hunt 1987) describe the Green River, Mesa Verde and Wasatch formations as intermixed strata of sandstone, shale, siltstone, and mudstone, with permeabilities ranging from very low to high. This profile is in keeping with the documented springs in the area, localized/perched aquifers, fresh to briny ground water quality, and lack of ground water developments. While none of this precludes the possibility of shallower localized ground water in the area, it reduces the likelihood that leachate from the processed sands could reach and contaminate an aquifer of economic significance. It should also be noted that the maximum surface area of exposed residual material at any one time will be approximately 25 acres, since areas would be reclaimed (topsoil and vegetation) as soon as they are "filled."

Nevertheless, to err on the side of caution, Earth Energy will implement several measures during the initial operations. First, the additional exploration drilling scheduled for the spring of 2008, within a wider area of the proposed pit (and storage site for processed sands), will provide more information on subsurface conditions and encountered water, if any. Should evidence of shallow ground water be discovered, Earth Energy will coordinate with DWQ to further investigate this issue. When pit excavations begin, visual monitoring for the presence of intercepted ground water will be performed routinely. While precipitation will also be contributing water to the pit, careful observation, along with sampling, should allow the two sources to be distinguished from each other. Again, if it appears that ground water has been intercepted, Earth Energy will coordinate with DWQ to further investigate this issue.

Summary

The above information supports Earth Energy's request that DWQ find the PR Spring operation to be permitted by rule as allowed by the Ground Water Protection rules. The operation is not expected to generate contaminants in quantities that would present a threat to human health or the environment, and the hydrogeologic setting of the operation greatly reduces the potential for any water associated with the operation to commingle with ground water. Chemical analyses of leachate from processed materials revealed no problematic results, except where leaching was performed using solvents that would not accurately characterize leachate from precipitation. Further, the operation will manage process water and storm water so as to avoid discharge of either to surface waters. We believe this demonstrates a *de minimis* impact from the proposed operation.



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AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

August 24, 2007

Barclay Cuthbert
Earth Energy Resouces, Inc.
Suite 704, 404 - 6th Avenue SW
Calgary, Alberta T2P 0R9

TEL: (403) 233-9366
FAX: (403) 668-5097

RE: RJN #028-Asphalt Ridge

Lab Set ID: L79307

Dear Barclay Cuthbert:

American West Analytical Labs received 3 samples on 8/10/2007 for the analyses presented in the following report.

All analyses were performed in accordance to National Environmental Laboratory Accreditation Program (NELAP) protocols unless noted otherwise. If you have any questions or concerns regarding this report please feel free to call. The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction and/or purging efficiency.

Thank you.

Approved by: _____
Laboratory Director or designee

INORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Lab Sample ID: L79307-01C
Field Sample ID: **Unprocessed Oil Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

TCLP METALS Method 1311

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result
Calcium	mg/L	8/20/2007 1:36:00 PM	6010B	0.50	**2.1**
Magnesium	mg/L	8/20/2007 1:36:00 PM	6010B	0.50	< 0.50
Potassium	mg/L	8/20/2007 1:36:00 PM	6010B	0.50	< 0.50
Sodium	mg/L	8/20/2007 1:36:00 PM	6010B	0.50	**3.8**

INORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Lab Sample ID: L79307-02C
Field Sample ID: **Processed Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

TCLP METALS Method 1311

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result
Calcium	mg/L	8/20/2007 1:52:00 PM	6010B	0.50	**0.71**
Magnesium	mg/L	8/20/2007 1:52:00 PM	6010B	0.50	< 0.50
Potassium	mg/L	8/20/2007 1:52:00 PM	6010B	0.50	< 0.50
Sodium	mg/L	8/20/2007 1:52:00 PM	6010B	0.50	**9.9**

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

INORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Lab Sample ID: L79307-03C
Field Sample ID: **Processed Fines**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

TCLP METALS Method 1311

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result
Calcium	mg/L	8/20/2007 1:56:00 PM	6010B	0.50	**3.1**
Magnesium	mg/L	8/20/2007 1:56:00 PM	6010B	0.50	**0.77**
Potassium	mg/L	8/20/2007 1:56:00 PM	6010B	0.50	**1.2**
Sodium	mg/L	8/20/2007 1:56:00 PM	6010B	0.50	**29**

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

INORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

Lab Sample ID: L79307-01
Field Sample ID: **Unprocessed Oil Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	
Alkalinity,(As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	20	< 20	*
Bicarbonate (As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	20	< 20	*
Carbonate (As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	10	< 10	
Chloride	mg/kg-dry	8/17/2007 1:33:00 PM	9251	5.0	< 5.0	1
Oil & Grease	mg/kg-dry	8/15/2007 11:10:00 AM	1664 MOD.	150	140000	#
Sulfate	mg/kg-dry	8/13/2007 8:00:00 AM	9038	5.0	< 5.0	*
TDS	mg/kg-dry	8/17/2007 1:45:00 PM	160.1	10	24	H
Total Recoverable Petroleum Hydrocarbons	mg/kg-dry	8/15/2007 3:15:00 PM	1664-SGT	150	64000	

**Analysis is performed on a 1:1 DI water extract for soils.*
 # Analyte concentration is above the method range of 1000 mg/sample indicating a potential for low recovery.
1 Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).
H - Sample was received outside of holding time.

AMERICAN WEST ANALYTICAL LABORATORIES
463 West 3600 South
Salt Lake City, Utah
84115
(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

INORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

Lab Sample ID: L79307-02
Field Sample ID: **Processed Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	
Alkalinity,(As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	27	**63**	*
Bicarbonate (As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	27	**63**	*
Carbonate (As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	14	< 14	
Chloride	mg/kg-dry	8/17/2007 1:33:00 PM	9251	6.8	**19**	
Oil & Grease	mg/kg-dry	8/15/2007 11:10:00 AM	1664 MOD.	200	**3000**	
Sulfate	mg/kg-dry	8/13/2007 8:00:00 AM	9038	18	**60**	*
TDS	mg/kg-dry	8/17/2007 1:45:00 PM	160.1	14	**300**	H
Total Recoverable Petroleum Hydrocarbons	mg/kg-dry	8/15/2007 3:15:00 PM	1664-SGT	200	**1100**	

**Analysis is performed on a 1:1 DI water extract for soils.*
H - Sample was received outside of holding time.

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

INORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Lab Sample ID: L79307-03
Field Sample ID: **Processed Fines**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result	
Alkalinity,(As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	25	**75**	*
Bicarbonate (As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	25	**66**	*
Carbonate (As CaCO3)	mg/kg-dry	8/13/2007 8:40:00 AM	310.1	12	< 12	
Chloride	mg/kg-dry	8/17/2007 1:33:00 PM	9251	6.2	**21**	
Oil & Grease	mg/kg-dry	8/15/2007 11:10:00 AM	1664 MOD.	190	**30000**	3
Sulfate	mg/kg-dry	8/13/2007 8:00:00 AM	9038	16	**61**	*
TDS	mg/kg-dry	8/17/2007 1:45:00 PM	160.1	12	**6100**	H
Total Recoverable Petroleum Hydrocarbons	mg/kg-dry	8/15/2007 3:15:00 PM	1664-SGT	190	**9500**	3

**Analysis is performed on a 1:1 DI water extract for soils.*
3 Analyte concentration is too high for accurate spike recovery.
H - Sample was received outside of holding time.

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

ORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc.
Project ID: RJN #028-Asphalt Ridge

Contact: Barclay Cuthbert

AMERICAN WEST ANALYTICAL LABORATORIES

Lab Sample ID: L79307-01A
Field Sample ID: **Unprocessed Oil Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/10/2007
Analyzed: 8/13/2007 4:57:42 PM

Analysis Requested: TPH by SW8015B

Analytical Results — **TPH-DRO bv 8015B/3545**

Units = mg/kg-dry — **% Moisture: 0.6**
Dilution Factor = 10

Compound	Reporting Limit	Analytical Result
Total Petroleum Hydrocarbon (DRO - C10-28)	800	12000
Surr: 4-Bromofluorobenzene	10-169	52.0

The reporting limits were raised 4x due to sample matrix interference.

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

ORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc.
Project ID: RJN #028-Asphalt Ridge

Contact: Barclay Cuthbert

Lab Sample ID: L79307-02A
Field Sample ID: **Processed Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/10/2007
Analyzed: 8/13/2007 5:18:25 PM

Analysis Requested: TPH by SW8015B

Analytical Results — **TPH-DRO bv 8015B/3545**

Units = mg/kg-dry — **% Moisture: 26**
Dilution Factor = 10

Compound	Reporting Limit	Analytical Result
Total Petroleum Hydrocarbon (DRO - C10-28)	270	**930**
Surr: 4-Bromofluorobenzene	10-169	**76.3**

ORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc.
Project ID: RJN #028-Asphalt Ridge

Contact: Barclay Cuthbert

AMERICAN WEST ANALYTICAL LABORATORIES

Lab Sample ID: L79307-03A
Field Sample ID: **Processed Fines**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/10/2007
Analyzed: 8/13/2007 5:39:07 PM

Analysis Requested: TPH by SW8015B

463 West 3600 South
Salt Lake City, Utah
84115

Analytical Results — **TPH-DRO by 8015B/3545**

Units = mg/kg-dry — **% Moisture: 20**
Dilution Factor = 10

Compound	Reporting Limit	Analytical Result	
Total Petroleum Hydrocarbon (DRO - C10-28)	250	**3400**	
Surr: 4-Bromofluorobenzene	10-169	**214**	**S**

S - High surrogate recovery attributed to TPH interference. The method is in control as indicated by the MB & LCS.

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

ORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Lab Sample ID: L79307-01C
Field Sample ID: **Unprocessed Oil Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/15/2007 11:06:24 PM
Analyzed: 8/21/2007 11:51:00 A

Analysis Requested: Semi Volatiles by SW 8270C

Analytical Results for SPLP **SPLP Semivolatile Organics by 8270C/3510C**

Units = mg/L **% Moisture: 0.6**

Dilution Factor: 1 Compound	Reporting Limit	Analytical Result
3 & 4-Methylphenol	0.025	< 0.025
2-Methylphenol	0.025	< 0.025
2,4-Dinitrotoluene	0.025	< 0.025
Hexachlorobenzene	0.025	< 0.025
Hexachlorobutadiene	0.025	< 0.025
Hexachloroethane	0.025	< 0.025
Nitrobenzene	0.025	< 0.025
Pentachlorophenol	0.025	< 0.025
Pyridine	0.025	< 0.025
2,4,5-Trichlorophenol	0.025	< 0.025
2,4,6-Trichlorophenol	0.025	< 0.025
Surr: 2,4,6-Tribromophenol	14-159	**65.0**
Surr: 2-Fluorobiphenyl	10-124	**68.2**
Surr: 2-Fluorophenol	10-106	**39.7**
Surr: 4-Terphenyl-d14	10-199	**49.0**
Surr: Nitrobenzene-d5	10-180	**65.2**
Surr: Phenol-d6	10-122	**31.0**

H - Sample was tumbled outside of holding time.

ORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Lab Sample ID: L79307-02C
Field Sample ID: **Processed Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/15/2007 11:06:24 PM
Analyzed: 8/21/2007 3:40:00 PM

Analysis Requested: Semi Volatiles by SW 8270C

Analytical Results for SPLP **SPLP Semivolatile Organics by 8270C/3510C**

Units = mg/L **% Moisture: 26**
Dilution Factor: 1

Compound	Reporting Limit	Analytical Result
3 & 4-Methylphenol	0.025	< 0.025
2-Methylphenol	0.025	< 0.025
2,4-Dinitrotoluene	0.025	< 0.025
Hexachlorobenzene	0.025	< 0.025
Hexachlorobutadiene	0.025	< 0.025
Hexachloroethane	0.025	< 0.025
Nitrobenzene	0.025	< 0.025
Pentachlorophenol	0.025	< 0.025
Pyridine	0.025	< 0.025
2,4,5-Trichlorophenol	0.025	< 0.025
2,4,6-Trichlorophenol	0.025	< 0.025
Surr: 2,4,6-Tribromophenol	14-159	**63.5**
Surr: 2-Fluorobiphenyl	10-124	**49.2**
Surr: 2-Fluorophenol	10-106	**28.6**
Surr: 4-Terphenyl-d14	10-199	**43.1**
Surr: Nitrobenzene-d5	10-180	**42.7**
Surr: Phenol-d6	10-122	**21.1**

H - Sample was tumbled outside of holding time.

ORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

AMERICAN WEST ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Lab Sample ID: L79307-03C
Field Sample ID: **Processed Fines**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/15/2007 11:06:24 PM
Analyzed: 8/21/2007 4:13:00 PM

Analysis Requested: Semi Volatiles by SW 8270C

Analytical Results for SPLP **SPLP Semivolatile Organics by 8270C/3510C**

Units = mg/L **% Moisture: 20**

Dilution Factor: 1 Compound	Reporting Limit	Analytical Result
3 & 4-Methylphenol	0.025	< 0.025
2-Methylphenol	0.025	< 0.025
2,4-Dinitrotoluene	0.025	< 0.025
Hexachlorobenzene	0.025	< 0.025
Hexachlorobutadiene	0.025	< 0.025
Hexachloroethane	0.025	< 0.025
Nitrobenzene	0.025	< 0.025
Pentachlorophenol	0.025	< 0.025
Pyridine	0.025	< 0.025
2,4,5-Trichlorophenol	0.025	< 0.025
2,4,6-Trichlorophenol	0.025	< 0.025
Surr: 2,4,6-Tribromophenol	14-159	**69.7**
Surr: 2-Fluorobiphenyl	10-124	**49.0**
Surr: 2-Fluorophenol	10-106	**30.9**
Surr: 4-Terphenyl-d14	10-199	**50.1**
Surr: Nitrobenzene-d5	10-180	**45.9**
Surr: Phenol-d6	10-122	**22.0**

H - Sample was tumbled outside of holding time.

ORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Lab Sample ID: L79307-01C
Field Sample ID: **Unprocessed Oil Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/15/2007 11:08:40 PM
Analyzed: 8/17/2007 8:06:00 AM

Analysis Requested: 8260B/5030B
Analytical Results for SPLP

SPLP VOLATILES by GC/MS 8260B

Units = mg/L
Dilution Factor: 20

Compound	Reporting Limit	Analytical Result	
Benzene	0.040	< 0.040	H
Carbon tetrachloride	0.040	< 0.040	H
Chlorobenzene	0.040	< 0.040	H
Chloroform	0.040	< 0.040	H
1,4-Dichlorobenzene	0.040	< 0.040	H
1,2-Dichloroethane	0.040	< 0.040	H
1,1-Dichloroethene	0.040	< 0.040	H
2-Butanone	0.20	< 0.20	H
Tetrachloroethene	0.040	< 0.040	H
Trichloroethene	0.040	< 0.040	H
Vinyl chloride	0.020	< 0.020	H
Surr: 1,2-Dichloroethane-d4	81-143	112	H
Surr: 4-Bromofluorobenzene	85-115	106	H
Surr: Dibromofluoromethane	80-124	106	H
Surr: Toluene-d8	88-120	105	H

H - Sample was received outside of holding time.

ORGANIC ANALYSIS REPORT

Client: Earth Energy Resouces, Inc. Contact: Barclay Cuthbert
Project ID: RJN #028-Asphalt Ridge

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84115

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Fax (801) 263-8687
e-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Lab Sample ID: L79307-02C
Field Sample ID: **Processed Sand**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/15/2007 11:08:40 PM
Analyzed: 8/17/2007 8:27:00 AM

Analysis Requested: 8260B/5030B
Analytical Results for SPLP

SPLP VOLATILES by GC/MS 8260B

Units = mg/L
Dilution Factor: 20

Compound	Reporting Limit	Analytical Result	
Benzene	0.040	< 0.040	H
Carbon tetrachloride	0.040	< 0.040	H
Chlorobenzene	0.040	< 0.040	H
Chloroform	0.040	< 0.040	H
1,4-Dichlorobenzene	0.040	< 0.040	H
1,2-Dichloroethane	0.040	< 0.040	H
1,1-Dichloroethene	0.040	< 0.040	H
2-Butanone	0.20	< 0.20	H
Tetrachloroethene	0.040	< 0.040	H
Trichloroethene	0.040	< 0.040	H
Vinyl chloride	0.020	< 0.020	H
Surr: 1,2-Dichloroethane-d4	81-143	111	H
Surr: 4-Bromofluorobenzene	85-115	104	H
Surr: Dibromofluoromethane	80-124	104	H
Surr: Toluene-d8	88-120	105	H

H - Sample was received outside of holding time.

ORGANIC ANALYSIS REPORT

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Project ID: RJN #028-Asphalt Ridge

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Lab Sample ID: L79307-03C
Field Sample ID: **Processed Fines**
Collected: 7/31/2007 3:55:00 PM
Received: 8/10/2007

Extracted: 8/15/2007 11:08:40 PM
Analyzed: 8/17/2007 8:48:00 AM

Analysis Requested: 8260B/5030B
Analytical Results for SPLP

SPLP VOLATILES by GC/MS 8260B

Units = mg/L
Dilution Factor: 20

Compound	Reporting Limit	Analytical Result	
Benzene	0.040	< 0.040	H
Carbon tetrachloride	0.040	< 0.040	H
Chlorobenzene	0.040	< 0.040	H
Chloroform	0.040	< 0.040	H
1,4-Dichlorobenzene	0.040	< 0.040	H
1,2-Dichloroethane	0.040	< 0.040	H
1,1-Dichloroethene	0.040	< 0.040	H
2-Butanone	0.20	< 0.20	H
Tetrachloroethene	0.040	< 0.040	H
Trichloroethene	0.040	< 0.040	H
Vinyl chloride	0.020	< 0.020	H
Surr: 1,2-Dichloroethane-d4	81-143	111	H
Surr: 4-Bromofluorobenzene	85-115	104	H
Surr: Dibromofluoromethane	80-124	104	H
Surr: Toluene-d8	88-120	105	H

H - Sample was received outside of holding time.