Task:4278

Notice of Intention
To Commence Large Mining Operations

US Oil Sands (Utah) Inc.
PR Spring Mine
M0470090

U.S. OIL SANDS

May 2009

Submitted by:

US Oil Sands (Utah) Inc.
Suite #950 633 – 6th Avenue SW
Calgary, Alberta T2P 2Y5

to:

Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-5801

Prepared in part by:

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Introduction

US Oil Sands (Utah) Inc. (Earth Energy) is a publicly held Canadian firm engaged in the development of process technology for extraction of bitumen from naturally occurring tar sand deposits in the United States and Canada. Earth Energy holds State Institutional Trust Lands Administration (SITLA) oil sands leases on 5,930 acres in Utah's Uinta Basin, near PR Spring. The PR Spring deposits are the largest of the Uinta Basin special Tar Sand Areas defined by the U.S. Geological Survey. Within the SITLA lease areas, Earth Energy has defined a 2,255-acre Study Area for the PR Spring Mine. The initial mine development under this NOI will take place in the southeastern part of this Study Area on approximately 213 acres (referred to throughout this NOI as the Affected Area) (See **Figures 1** and **2**). The Affected Area is equivalent to the area that will be disturbed and the area that will be bonded for and reclaimed. The remaining 2,042 acres within the Study Area were the subject of environmental data collection efforts, but will not be subject to disturbance under this NOI. Should additional mine development be planned in the future, beyond that described herein as occurring on the 213-acre Affected Area, permit amendments or revisions would be required. These amendments or revisions would address any expansion that would occur, including details on any needed re-handling of materials, alterations to the processing plant, etc. Conditional Use Permits (CUP) for the mine from Uintah and Grand Counties are included in Appendix B.

Earth Energy has patented a chemical method for extraction of hydrocarbons from oil sands. Known as the Ophus Process, this production method produces clean (inert), "damp-dry" sand tailings that can be backfilled into the quarry. The planned sequence of exploration and pilot processing and production tests underway are intended to refine and adapt the process to fit the unique characteristics of the Utah PR Spring deposits. Oil (tar) sands in Utah vary significantly from the oil sand deposits and extraction methods commonly used in the Athabasca oil sands of Alberta.

Earth Energy conducted exploration drilling in spring of 2005 under Exploration Permit (E/019/052), Earth Energy PR Spring 1 Project (less than ½-acre disturbance). Additional drilling was conducted under Exploration Permit (E/019/053) within a 100-acre area along Seep Ridge Road. These programs included twenty-five 4-inch diameter holes drilled to depth of 50 to150 feet on 30-foot by 30-foot drill pads located on drill roads or adjacent to the main Seep Ridge Road. The drilling programs were used to select the 5-acre mine site for the fall 2005 production test conducted under a Small Mine Permit, Leonard Murphy #1 (S/019/059).

Other geophysical activities have been ongoing in a small portion of Earth Energy's lease area. These existing rights and activities ongoing in the area are described below in Section 104.2.

Drilling and geophysical work planned for 2009 will provide grade-thickness data of the tar sand beds necessary for detailed planning, permitting, site development and mining to go forward.

R647-4. Large Mining Operations

R647-4-101. Filing Requirements and Review Procedures

101. As is required of the party that is planning to conduct large mining operations, this NOI is submitted by Earth Energy Resources, Inc. for review and Division approval.

2. The Division has 30 days from the last action on the NOI to approve/deny the NOI, and then to publish a Notice of tentative decision in accordance with R647-4-16.

3. As stated at R647-4-101.3, upon Division approval of the NOI and execution of the Reclamation Contract by Earth Energy, both the Division and Earth Energy will be bound by the NOI and implementing regulations, and Earth Energy will be able to begin mining. Earth Energy understands that execution of the Reclamation Contract is not complete until the contract and the surety receives Division approval; only then can mining commence. Further, Earth Energy explicitly commits to conform to all of the operation and reclamation practices that are described in this NOI and that are required by all applicable regulations at R647-4.

4. Earth Energy will provide notification to the Division within 30 days of starting mining operations.

5. Earth Energy's LMO is greater than 50 acres, for purposes of calculating permit fees. Fees are due annually by the last Friday in July unless the NOI is closed out under R647-4-101.5.13.

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R647-4-102. Duration of the Notice of Intention

It is understood that, when approved, Earth Energy's NOI, including any subsequently approved amendments or revisions, remains in effect for the life of the mine.

R647-4-103. Notice of Intention to Commence Large Mining Operations

Earth Energy's NOI addresses the requirements of the rules listed in this section as follows:

104. Operator(s), Surface and Mineral Owner(s)
105. Maps, Drawing, and Photographs
106. Operation Plan
108. Hole Plugging Requirements
109. Impact Assessment
110. Reclamation Plan
112. Variance

Under this section, rules at 107 and 111 are not required to be addressed; however those subjects are covered within the NOI in other sections.

R647-4-104. Operator(s), Surface and Mineral Owner(s)

104.1. Operator Responsible for Mining Operations/Reclamation of the Site

MINE NAME: PR Spring

NAME OF PERMITTEE/ OPERATOR/ APPLICANT: US Oil Sands (Utah) Inc., a Corporation registered to do business in the State of Utah.

Business License #:	5834125-0142
Registered Agent:	Daniel A. Jensen
Address:	185 South State Street, Suite 800 Salt Lake City, UT 84111
Phone:	801-532-7840 Fax: 801-532-7750
E-mail address:	djensen@parrbrown.com

PERMANENT ADDRESS: US Oil Sands (Utah) Inc.
Suite #950, 633 – 6 Avenue SW
Calgary, Alberta T2P 2Y5
Phone: 403-233-9366 Fax: 403-290-0045

COMPANY REPRESENTATIVE: Barclay Cuthbert, Vice President, Operations

Address:	Suite #950, 633 – 6 Avenue SW Calgary, Alberta T2P 2Y5
Phone:	403-233-9366 Fax: 403-290-0045
E-mail address:	barclay.cuthbert@usoilsandsinc.com

LOCATION OF OPERATION: Uintah and Grand Counties, Utah (the CUP's are attached in Appendix B)

Universal Transverse Mercator (UTM) Coordinate System: UTM Datum NAD27 4369592 km Northing, 645187 km Easting, Zone 12

Sections: T. 15 S., R. 23 E., SLB&M, Uintah County, Sections 35 & 36.
T. 15.5 S., R. 24 E., SLB&M, Grand County, Sections 31& 32.

The Uintah County portion of the operations will be on lands under Indian Jurisdiction (tribal land but not part of an Indian Reservation). As such, certain aspects of environmental permitting for the PR Spring Operation will be handled by the Environmental Protection Agency (EPA) rather than Utah's Department of Environmental Quality.

104.2. Surface and Mineral Owners of All Lands to be Affected

OWNERSHIP OF THE LAND SURFACE: Utah State Institutional Trust Lands Administration.

OWNERS OF RECORD OF THE MINERALS TO BE MINED: SITLA (Earth Energy has lease rights to mine up to a 500-foot depth below ground surface)

BLM LEASE OR PROJECT FILE NUMBER(S): None for the mine operation. A BLM right-of-way (No. UTU-86004) has been approved and offered to allow construction of the appurtenant water well and pipeline. Correspondence with the BLM on this issue is included in Appendix B. (This pipeline also crosses SITLA land and the well/pipeline process is permitted by DOGM under Exploration Notice #E0190053)

ADJACENT LAND OWNERS:

Canyon Gas Resources, LLC – Natural Gas Pipeline Right of Way
7400 East Orchard Rd., Suite 30025, Englewood, CO 80111

Uintah County - Road 2810 Right of Way
147 East Main St.
Vernal, UT 84078

Bureau of Land Management, Vernal Field Office
170 South 500 East
Vernal, UT 84078

<u>Township 15 South, Range 23 East, SLB&M</u>

Section 26:

Grazing Permit 20905:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Mineral Lease 49944:	EOG Resources, Inc. PO Box 4362 Houston, TX 77210-4362

Section 27:

Grazing Permit 20905:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Mineral Lease 49280:	Robert L. Bayless Producer LLC 621 17th Street Ste. 1640 Denver, CO 80293

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Section 28:

Grazing Permit 20905:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Mineral Lease 49280:	Robert L. Bayless Producer LLC 621 17th Street Ste. 1640 Denver, CO 80293

Section 33:

Grazing Permit 20905:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Grazing Permit 21202:	Burt De Lambert PO Box 607 Vernal, UT 84078-0607
Mineral Lease 49281:	Robert L. Bayless Producer LLC 621 17th Street Ste. 1640 Denver, CO 80293

Section 34:

Grazing Permit 20905:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Grazing Permit 21202:	Burt De Lambert PO Box 607 Vernal, UT 84078-0607
Mineral Lease 49281:	Robert L. Bayless Producer LLC 621 17th Street Ste. 1640 Denver, CO 80293

Section 35:

Grazing Permit 20905:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Mineral Lease 49944:	EOG Resources, Inc. PO Box 4362 Houston, TX 77210-4362

Section 36:

Grazing Permit 20995:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Mineral Lease 49944:	EOG Resources, Inc. PO Box 4362 Houston, TX 77210-4362

Township 15.5 South, Range 24 East, SLB&M
Section 31:

Grazing Permit 20905:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Grazing Permit 21202:	Burt De Lambert PO Box 607 Vernal, UT 84078-0607
Mineral Lease 49572:	Moose Mountain Land Company 935 E South Union Avenue Suite D-202 Midvale, UT 84047

Section 32:

Grazing Permit 20905:	Alameda Corporation PO Box 22608 Houston, TX 77227-2608
Mineral Lease 49572:	Moose Mountain Land Company 935 E South Union Avenue Suite D-202 Midvale, UT 84047

HAVE THE LAND, MINERAL, AND ADJACENT LANDOWNERS BEEN NOTIFIED IN WRITING? The adjacent owners (BLM and SITLA) will be notified in writing once this NOI is tentatively approved (those agencies are both currently aware that the project is pending), and those agencies will notify other land users or right-of-way holders as they deem appropriate.

DOES THE PERMITTEE/ OPERATOR HAVE LEGAL RIGHT TO ENTER AND CONDUCT MINING OPERATIONS ON THE LAND COVERED BY THIS NOTICE? Yes.

104.3. Federal Mining Claims or Lease Numbers

There are no Federal mining claims or permits.

A summary of lands under lease to Earth Energy is provided in Appendix A.

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R647-4-105. Maps, Drawings and Photographs

105.1. USGS topographic base maps, as well as other select figures in the NOI) provide the following information:

1.11 Property boundaries of surface ownership.
1.12 Water features (including streams and springs), infrastructure, and surface/subsurface facilities within 500 feet of mining operations.
1.13 Access routes.
1.14 Previous mining/exploration impact in the disturbance area is shown on Figure 2.

105.2. Surface facilities maps (Figures 2 and **3) include the following information:**

2.11 Surface facilities
2.12 Disturbance boundary

105.3. Other maps that may be required:

3.11 There would be no re-graded slopes to be left steeper than 2H:1V
3.12 Plan, profile, X-section of any earthen structures to be left as part of post-mining land use.
3.13 There would be no water impounding structures >20 feet high.
3.14 There are no areas that will be left un-reclaimed as part of the post-mining land use.
3.15 There will be no diversion channels constructed.
3.16 Geology, tar sands cross sections, water features and vegetation communities are shown on Figures 5, 6, 7, and 8, respectively.
3.17 Reclamation treatments are shown on Figure 9.
3.18 Mine plan cross sections are provided as Figures 4a, 4b, and 4c.

105.4. Site photographs are included in Appendix F.

105.5. No underground development will occur: Surface mine development is shown on Figure 2.

R647-4-106. Operation Plan

106.1. Mineral to be Mined

The type of mineral to be mined is tar sand. The tar sands occur generally in lenticular beds, with interbedded sandstone, siltstone, shale, mudstone and calcareous marl. The tar sand beds have been defined as the 'D' or upper bed, and the 'C' or secondary bed. Tar sand beds below the C bed are not as well defined based upon drill logs, resistivity testing and modeling. Although current mine plans under this NOI are to a depth of approximately 145 feet, the maximum lease depth is 500 feet.

106.2. Operations to be Conducted

Throughout operations at the PR Spring location, Mine Safety and Health Administration (MSHA) safety requirements and guidelines will be followed, and the operating plan as described in this document will be followed. While operations include both pit backfilling and the use of external overburden/interburden storage areas, where conducive to properly sequenced ore bed depletion and efficient material handling (after threshold opening pit size is established), clean produced sand/clay fine tailings will be preferentially replaced in the depleted mine areas versus discharged in overburden dumps. Further, operations covered in this NOI will minimize any re-handling of material as operations expand. The overburden/interburden storage piles are located in areas devoid of oil sand, and pits will be depleted before refilling and reclamation commence. Surface facilities are constructed on oil sand bearing areas, but these areas are limited; and relocation of the plant facility and ultimate development of the underlying bitumen resource is incorporated within future expansion plans, for which additional permitting would be needed.

The acreages associated with the individual components of these operations are described in Section 106.3. The types of operations to be conducted include the following:

SURFACE PREPARATION/ STORAGE OF OVERBURDEN AND TOPSOIL

Surface preparation will include the clearing of vegetation and removal of topsoil for storage in designated topsoil storage areas, as described further in Section 106.5. Larger vegetation would be cleared by crushing, then pushing into slash piles. This material will be stockpiled within or on top of the salvaged topsoil, or used to form berms surrounding the topsoil piles (see Section 106.6); the estimated volumes of both topsoil and vegetative matter are also provided in Section 106.6. All of this vegetative matter will be redistributed along with the

topsoil during reclamation in order to provide organic matter and help with surface roughness and soil moisture retention.

Where overburden must be removed, it will be scraped and deposited in the overburden/interburden storage areas shown on Figure 2. As mining proceeds, overburden and interburden, along with produced sand from extraction operations, will be back-hauled and re-contoured in the mined pit. These operations are discussed in more detail under the overburden/interburden storage areas and pit backfill subheadings below.

Access Roads

The main access to the PR Spring Mine site is via Uintah County Road 2810 (Figures 1 and 2). Onsite access roads to the mine pit and facilities area (Figure 2) have been designed to minimize grade. In general, they are located around the perimeter of the Affected Area, serving to confine disturbance and manage runoff. In part, these roads cross -- and are integral to -- the overburden/interburden storage areas. In those cases, those road segments will not be constructed until they are needed to access those features. Access roads will be surfaced with crushed overburden (rock) material and maintained with a grader and water truck. In total these roads will be approximately 13,050 feet in length by 80 feet wide.

Mining

Mining will be conducted using a self-contained mobile surface mining machine (e.g. Wirtgen 2200SM Surface Miner). Overburden and interburden will be removed by conventional drill/blast/muck or rip/muck methods. Initially, overburden will be removed on five acres of the initial mine site to expose the uppermost layer of oil sand. The surface miner will then mine through the first layer of oil sand by successively planing 8 to 10 inches of oil sand per pass. When the initial layer of oil sand has been mined, the interburden layer will be exposed and this will be removed to expose the next layer of oil sand.

As oil sand mining is taking place with the surface miner, the conventional mining equipment will be employed for concurrent overburden removal to expose new areas of the oil sand bed and allow oil sand mining to progress. As sufficient area comes available, the mining operation will transition to multiple benches of mining, where oil sand mining occurs on the top layer of newly exposed areas and previously mined areas are excavated to expose the next bed of oil sands. When all target oil sands beds have been mined and access to newly opened areas is established, backfilling of the depleted areas will commence.

Overburden and or interburden may be sufficiently friable to allow removal by ripping with dozers, rather than require blasting. However, where blasting is required to facilitate material removal, each program will be designed as a controlled blast, with adequate stemming to eliminate fly-rock, and minimize

vibration and dust, while generating aggregate size conducive for removal from the mine area. The drill size, spacing and depth of blast holes, and the frequency of blasting, will vary depending upon the situation, but in all cases will be in accordance with local, state and federal rules. Peak particle velocities of any initial blasting operations will be monitored and appropriate blasting protocols refined at the time blasting commences. As typical for these types of operations, a series of test blasts will be monitored to determine the resultant peak particle velocities at specified distances from the blasting area. Blasting will not result in fly rock landing on the adjacent county road. However, warning signs advising the public of blasting protocols will be posted at 150-foot intervals along the fence line, placed at all ready access points, and in any other locations required by MSHA. These signs will include blasting schedules.

Regular and routine inspections will occur throughout the mine area to ensure that operating conditions remain safe, that MSHA safety guidelines are being followed, and that the mining plan stated herein is being followed. This will include inspections to verify that the pit wall slopes are at the correct angles and that they remain stable.

Equipment

Mining equipment will consist of the Wirtgen Surface Miner noted above, trackhoes, dozers, graders, rock drill, loader, water truck, and service trucks. Mining is anticipated to be conducted during the day shift only. A complete list of mining equipment is included in Appendix D.

Mined tar sands will be hauled to the process plant (Figure 3) and either discharged directly to the inlet hopper of the crusher (which is integral to the process train structure) or alternately placed in a storage pile adjacent to the processing facility for feed to the inlet hopper during the night shift. Generally, a two-week reserve supply of ore will be maintained in stockpiles at the processing facility. The mined tar sands storage pile or piles (also known as the reserve ore pile) is not expected to exceed 40,000 yd cubic yards at any time and is typically expected to amount to 30,000 cubic yards of ore. The dimensions of this pile (or combined smaller piles) will not exceed 100 yards by 100 yards by 4 yards in height

It is expected that the mining process will intercept shales and sandstone in addition to the tar sand beds. Interburden material will be placed in the overburden/interburden storage areas defined on Figure 2 and used as pit backfill. These operations are described below.

Pit Design

The 62-acre initial mine pit is delineated on Figure 2, and is designated as the North (Opening) Pit. It is designed with a perimeter highwall, which in all locations (during operations) will be higher than the highest elevation of the pit floor. In this manner, all precipitation falling within the mine pit boundaries will

collect within precipitation collection sumps located in the bottom of the pit and thereby prevent runoff from leaving the mine site. These collection sumps are simply low areas within the working mine pit where precipitation falling directly within the pit perimeter will drain and collect. The accumulated precipitation will be removed from the pit along with the solid materials and processed along with the bitumen bearing sands. As needed, it will also be pumped from the mine and used for dust suppression on mine and plant roads. The active mining area will be a pit at all times (concave to incident precipitation). No pit configurations are planned where storm water will be allowed to egress the active mine workings. Further, the highwall safety berms will prevent runoff from outside the pit perimeter from entering the pit (the pit's location atop the slope minimizes this potential even without the presence of the safety berms).

The pit will be mined at an operating pit slope of 2H:1V. The planned pit design configuration can be achieved using the above-noted mining methods. In addition, the planned pit design will be geotechnically stable and will not create any safety or environmental concerns. Use of 2H:1V pit slopes represents Earth Energy's desire to facilitate pit reclamation, and to provide conservatively designed slopes to compensate for the lack of detailed knowledge regarding the extent of localized faulting or fracture planes that could cause instabilities at steeper slopes than will be used. Site-specific information indicates that much steeper slopes could be justified: numerous existing road cuts and excavations in the area (including Earth Energy's 2005 production test pit) are stable with slopes steeper than 1H:1V. The use of 2H:1V pit wall slopes will also prevent rock falls. Back-break near the highwall will be controlled or eliminated by smooth transition grading. Any required blasting along the highwalls of the pit will be accomplished with small controlled blasts to eliminate over-break and weakening of the remaining material on the face of the slope.

The North (Opening) Pit has approximately 7.9 million cubic yards of material to be mined. Of this, approximately 10-12 percent (by weight of ore) is processed out as bitumen product, which leaves 3,944,228 cubic yards of processed sand that will be disposed of (along with 3,506,465 cubic yards of overburden and interburden as described below). Applying a bulkage factor of 1.3 to the over/interburden and processed sand, this will result in 9.7 million cubic yards of waste material to be disposed of. Filling overburden/interburden storage areas 1 and 2 to their maximum capacity of 4.9 million cubic yards will result in approximately 4.8 million cubic yards to be back-filled in the mine pit.

After the North (Opening) Pit is mined, and assuming that conditions are favorable, Earth Energy would extend mining to the southwest, to a contiguous area designated at the West Pit. Details on the West Pit design are conceptual at this stage; once coring has been accomplished and analyzed, this pit design will be developed more fully. These details will be submitted to DOGM as a Plan Amendment prior to the initiation of mining. At this time, general estimates

as needed to provide bonding calculations have been made; these will also be revised as needed and provided in a subsequent amendment.

Anticipated yearly mined tonnages include: 920,000–1,200,000 tons of oil sand ore mined per year and 1,000,000–1,400,000 tons of overburden/interburden mined per year. The life of the mine is expected to be between 6 and 13 years for both the North (Opening Pit) and the West Pit, depending on the amount of time the processing equipment is on-stream and the number of process trains employed. (Only one process train is covered under this NOI; should additional trains be needed, they would be covered in a permit amendment.) Expansion into the West Pit may occur in the future depending upon numerous factors; at this time, the best estimate of when that might realistically occur is approximately 5 years after the North (Opening) Pit mining has begun.

Hauling

Mined ore will be hauled via the main haul road to the process area and either discharged directly to the inlet hopper of the process unit or placed in a temporary storage pile (see above for pile size information) for off-shift processing. The distance from the approximate center of the North (Opening) Pit to the plant is approximately 2,000 feet. Figure 3 shows the location of the temporary storage pile; the inlet hopper feeds to the east end of the process train, which is also shown on Figure 3.

PROCESSING

General Facility Description

The processing facility will be located adjacent to Uintah County Road 2810 in the area shown on Figure 3. As shown on this plant site diagram, this would be an area of approximately 15 acres including 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 water retention/storage 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 tank farm will be constructed with secondary containment sufficient to meet applicable Spill Prevention Control and Countermeasure Plan (SPCC) regulations for tank farm construction (total volume of the bermed area greater than 110% volume of the largest tank contained in the farm, for example). Tanks will be erected on compacted gravel bases underlain by impermeable (HDPE) liners to prevent migration of spilled or leaked hydrocarbons off of the plant site. HDPE liners will be integrated with secondary containment berms.. The SPCC Plan will cover new and spent fuel, oil, and lubricants, as well as any other hydrocarbons including the processed bitumen. If any hydrocarbon spills occur during mining these will be dealt with as outlined in the SPCC Plan. Other non-hydrocarbon liquids will be similarly managed.

The remainder of the plant site will be constructed to be a self-contained area, through the use of perimeter berms or ditches where needed. The specific locations where berms will be used, as opposed to where ditches will be used, will be determined during final site design and will be based upon best engineering practices. These locations will be indicated on the final site design drawings, which will be submitted to DOGM once they are available as replacement drawings to take the place of the conceptual drawings currently herein. All ditches will be designed to pass the 10-year, 6-hour precipitation event. They will be triangular in cross section with side slopes approximately 2H:1V; depth including freeboard will be less than 2 feet or equivalent in cross section. Berms will generally be 2 feet high, with a two-foot top width and 2H:1V side slopes. Final designs for these structures will be produced concurrent with final engineering designs, and will be submitted to DOGM. However, standard engineering practices will be used to determine these final designs: for example, riprap will be used when or if modeled design runoff velocities indicate that riprap is needed to maintain the structure integrity. All precipitation incident on the site will be collected in the water retention/storage pond located at the low point of the plant site (See Figure 3 for pond location). As the PR Spring operation is located primarily along a fairly flat interfluve with little or no up-gradient, off-site runoff flowing onto the site, the pond will collect only runoff generated from precipitation falling upon the plant site itself. It will also be used to store fresh make-up water, however no process water will be routed to this pond. Any sediments collected in the pond will be removed as needed in order to maintain its design capacity. It will be designed to contain the runoff from the 10-year, 24-hour precipitation event as well as sediment storage and make-up water. The pond would also be HDPE-lined to prevent loss to infiltration (it is not needed as a water quality protection measure). Once final designs are completed, this information will be submitted to DOGM.

The mine office will be a modular building placed on a gravel pad. The process equipment will be skid-mounted and also located on gravel pad, as would the parking areas. The warehouse and maintenance shop will be 'Sprung-type" semi-permanent structures on concrete pads. A list of equipment, buildings, and tanks planned for use in the facilities area is included in Appendix D.

The facility would operate 24 hours per day, approximately 350 days per year, not including unscheduled shutdowns/outages.

Process Flow Details

The process train is designed to accommodate 3,000-3,500 tons of ore per day, producing approximately 2,000 bbl/day of bitumen. The extraction process begins when the mined and conditioned tar sand ore is sent through a crusher/ delumper and reduced to a 2 inch-minus aggregate size. From there, the crushed ore is augered or conveyed to a heated slurry mixer where the cleaning emulsion is introduced 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. The cleaning chemical is then removed from the bitumen by distillation and recycled to the front of the process. Produced bitumen is pumped to a product (sales) tank for heated storage prior to transport.

The clean produced sand is de-watered on a shale shaker (or similar device) and the recovered water is pumped to a holding tank for recycling to the front of the process. Additional cleaning agent is added to the recycled water to bring it back to full strength. De-watered sand and clay fines are then conveyed to a stockpile for loading and backhaul to the mine pit. At this point, the discharged sand and clay fines contain between 10 and 20 percent water.

Water is expected to be consumed at a rate of approximately 1.5-2 barrels for each barrel of produced bitumen. The 2,000 bbl/day operation would use approximately 4,000 barrels of water, or 116 gallons per minute (gpm) based upon 24-hour processing. The majority of the water "consumed" in the process is simply returned to the environment as un-recoverable entrained moisture in the pore spaces of the produced sand and clay fines. All of this residual water is anticipated to evaporate from the loosely consolidated produced sand/fines mix with no free-water run-off. (This subject is described in greater detail in Appendix B, within correspondence requesting Permit-by-Rule coverage under the Utah Division of Water Quality's (DWQ) groundwater protection program.) The process flow diagram is included in Appendix D.

Process Chemical Storage & Handling

The process chemical, in its neat form (without additives), will be transferred from the distillation unit into storage tanks noted on Figure 3, and from the storage tanks to the blending area using appropriate pumps to mitigate the risk of fire or explosion. These factors will be considered fully during engineering of the commercial production unit. There are no other waste streams that might get into the solids or tailings and the chemical is not changed as a result of processing – it acts as a diluent and a cleaning agent, but is not itself altered by bitumen extraction operations.

The process chemical is stable, colorless, evaporates rapidly when exposed to air, and has negligible solubility in water. (This subject is described in greater detail in Appendix B, within correspondence requesting Permit-by-Rule coverage under the Utah Division of Water Quality's (DWQ) groundwater protection program.) When blended into the cleaning emulsion form required for use in the process stream, it has low flammability and presents low risk. The cleaning emulsion's biodegradability has not been determined, but related

chemicals are known to be biodegradable. It will be stored and handled according to regulation.

Power Source

Generators located at the plant site (one natural gas, one diesel) will be used to supply all the electrical requirements for the process train. Under Exploration Notice #E0190053, a three conductor, heavy gauge, armored power supply cable will be buried in the water line trench (described below) to convey power to the nearby water well.

Water Source

Water for processing would be obtained from a well drilled nearby on BLM land, and piped to the site along existing roadways (Figure 2). Correspondence with BLM and the State Engineers Office regarding right-of-way and approval to drill the well are included in Appendix B.

The well is expected to be completed in aquifers that are approximately 1,000 – 2,600 feet below the surface; ground elevation at this location is approximately 8,260 feet. The well would have a bore diameter of 12 inches and would be cased with 12-inch diameter steel casing pipe that is perforated in the water bearing sandstone aquifers. It would be housed within an 8-foot by 8-foot frame building, located on a concrete pad, and surrounded by a chain link fence.

The supply pipeline will be 12,650 feet in length and constructed of 6-inch HDPE pipe. It will be buried to a depth of 5-6 feet for insulation and protection, except at crossings, where it will be buried to a depth of 8-10 feet. The line will be sized and rated to supply 223 gpm at less than 100 pounds per square inch. It will be fitted with valves, hydrants, and air intakes. The initial trench width will be 12-24 inches wherever possible, though in certain areas may need to be wider as required by ground conditions; BLM right-of-way covers a 15-foot corridor width. A three conductor, heavy gauge, armored power supply cable will also be buried in the trench to supply power to the well, as noted above. Gauges will be installed in the pipeline during construction so that any leaks can be detected. Note that the well and pipeline are permitted separate from this NOI, and the above description is provided for descriptive purposes only.

At the terminal end (the plant site), water would be stored onsite in a lined pond adjacent to the tank farm, as shown on the Plant Site diagram (Figure 3); it may also be stored in tanks, which would be outfitted with manifolds and valves. The pond will be lined with a synthetic (HPDE) liner simply to retain water; this lining is not required for any water quality purpose and any infiltration of contained water due an inadvertent leak or tear would not impact surface or groundwater quality.

A 360 acre-foot portion of water right number 41-3523 has been allocated to Earth Energy from the Uintah County Water Conservancy District. A copy of the agreement is contained in Appendix B.

PIT BACKFILL

As mining progresses in the North (Opening) Pit, produced (clean) sand will be used to backfill it. It is estimated that 20 to 25 percent of the 62-acre pit would need to be open in order to begin backfilling. Dump points will vary as needed in order to fill the pit at the desired sequence. Detailed mine plans are developed to ensure that the produced (clean) sand is replaced in the pit in a sequential layered and compacted manner to eliminate potential slope stability concerns.

The discharged sand will contain 10 to 20 percent water and less than 4,000 ppm residual hydrocarbons (principally near-inert asphaltenes). The blended solid tails will have an overall moisture content of about 15 percent (80-85% sand at 12-15% moisture content, 15-20% fines at 20% moisture content) and will be a relatively plastic material that will readily compact to a load-bearing surface for operation of the haul trucks. The "sand" fraction of the tails can be characterized as primarily quartz material in the 80-1,000 µm range (d_{50} = 117 µm), and the "fines" fraction is the sub-80 µm (d_{50} = 18 µm) material comprised of quartz, shale and clays. The density of the damp sand is roughly 2,850 pounds per cubic yard. The nature of the pit backfill materials are described in greater detail in Appendix B, within correspondence requesting Permit-by-Rule coverage under the Utah Division of Water Quality's (DWQ) groundwater protection program.

When the logistics of the mine/truck haul are optimized in the early stages of operations, it is anticipated that over/inter-burden materials from adjacent removal operations will be alternately combined (blended) with the sand tails to result in a stable, compactable, bulk replacement material. Thus, when placed in compactable lifts (compaction primarily from haul trucks), the replacement material will be a more homogenous mixture. Drainage from this fill will be comparable to in-situ materials. The noted level of moisture content of the blended solids tails is near optimal for compaction and will not lead to liquefaction. Blended sand/clay fine tailings will be placed in relatively thin lifts (estimated at 1-3 feet) and in conjunction with the arid climate of the mine area, the deposited tailings will readily dry out to even lower ultimate moisture content. Pore water pressures will not be a concern. In addition to promoting maximum drying, the specified lifts will enhance compaction and subsequent stability.

The volume of the North (Opening) Pit is 7,900,000 cubic yards and approximately 4.8 million cubic yard of overburden, interburden, and tailings (sand and fines) will be replaced in this pit. A bulkage factor of 30 percent has been applied to the replaced material in replacement volume calculations even though commingled produced sand and fines replaced in the pit will compact to a much lower bulkage factor (estimated to be less than 1.1). Upon completion of a pit backfill, that area

of the pit will be reclaimed. As described in the Reclamation Section below, final pit slopes angles will be 2.5-3H:1V; during operations, maximum slope angle will be 2H:1V.

OVERBURDEN/INTERBURDEN STORAGE AREAS

During initial mine development, where overburden and interburden must be removed, it will be scraped and deposited in one of two overburden/interburden storage areas shown on Figure 3. The material will primarily consist of broken sandstones and shales mixed with lesser amounts of fines. Grain sizes will vary from fine to coarse rock rubble (run-of-mine) materials potentially as large as one cubic yard. Once mining has opened a large enough excavation to allow equipment movement and backfilling, these storage areas will no longer be used; instead these materials will be re-deposited in the pit along with the clean produced sand tailings. The volume of overburden and interburden placed in these two overburden/interburden storage areas combined will be approximately 4.9 million cubic yards.

Both of the overburden/interburden storage areas will be constructed outside of the pit limits on the side-slopes of ephemeral draws above Main Canyon. The overall slopes of the land on which the overburden/interburden storage areas will be constructed ranges from 16.5 to 40 percent (10° to 22°). During mining, these overburden/interburden storage areas will be sloped at the angle of repose: 1.5-1.7H:1V (30° to 34°). Upon reclamation the slopes will be graded down to between 2.5H:1V to 3H:1V (18° to 22°). Overburden/interburden storage area No. 1 will be constructed on a 40 percent slope (2.5H:1V) that is concave, grading to a slope angle of about 10 percent (10H:1V) near its base. Overburden/interburden storage area No. 2 will be constructed on a 6H:1V slope. Both overburden/interburden storage areas will be designed and constructed to be stable within standard engineering parameters. Dump points will vary with time and will be chosen to facilitate the desired end configuration as described in this plan. While it will not be necessary to key overburden in to the slopes in all locations or as a matter of general design, on the steepest areas of overburden placement, the toes of fills may be keyed into existing slopes as deemed necessary in the field at time of placement. Exposed faces will be protected with coarse/low sediment potential material, effectively armouring the faces.

Initially produced sand tailings will be impounded in storage cells constructed of coarse overburden materials in the upper reaches (flattest) areas of the overburden/interburden storage areas (Figure 2a). Tailings containment cells will not be constructed on slopes steeper than 20 percent (11 degrees). 15-20 foot high cells will be constructed as compacted berms of overburden material and then filled with commingled clean sand/clay fine tailings. When the first level of cells is filled to capacity, successive tiered levels will be constructed until the mine pit has sufficiently advanced to permit direct replacement of the tailings back into the mine in the method described above. Five to six levels of tiered cells are

anticipated to be required before backfilling of the mine pit can be undertaken. Finished containment cells will prevent erosion of the fine tailings and result in a stable fill structure. Tailings storage in the upper reaches of the overburden/interburden storage areas will ultimately become fully encapsulated within the finished and reclaimed overburden/interburden storage areas.

The top surfaces of these storage areas will be maintained with a very slight grade away from the outslope so as to minimize runoff running over the outslope, thus controlling erosion. Runoff generated from the outslopes of the overburden/interburden storage areas will be controlled by facing the steepest sections of the finished slopes with coarse overburden material and dedicated armoring placed within the contact between the pile and the native slope (essentially forming a triangular channel-type feature), and by installing a rip-rapped energy dissipater at the toe (Figure 2b). Broken rock material has a very low siltation potential and will effectively encapsulate the finer material initially placed in the upper reaches (flatter areas) of the overburden/interburden storage areas, as noted above. The coarser materials will typically end up near the toe of the expanding fills as the dump sites are filled to their maximum capacity. The concentration of coarse materials at the toe of the fills provides a natural energy dissipater for storm runoff from the faces of the dumps. Typical design drawings are included in Figure 2b. These structures, as with all site best management practices (BMPs), will be maintained to ensure that they are functional. See further discussions below in Section 109.4.

When the overburden/interburden storage areas are filled to capacity, their exposed faces will be contoured (to an overall slope of 2.5-3H:1V) to blend in with adjacent canyon wall slopes as indicated on the Reclaimed Mine Contour Plan (Figure 9). Short segments within the overall slope will be steeper than the overall slope, however no portion of the reclaimed slopes will be steeper than 35°. Both the overall slope and any individual slope segments will be well below 45°.

106.3. Disturbance

The following acreages will be disturbed by mining (see Figure 2 for their locations):

Table 1: Disturbance Areas

Facility	Area
Plant Site including Office and Processing facilities	15 acres
Plant perimeter road	5.5 acres
Haul Road Segment #1	5.5 acres
Haul Road Segment #2	0 acres*
Haul Road Segment #3	3.0 acres

Facility	Area
Haul Road Segment #4	0 acres**
Haul Road Segment #5	3.0 acres
North (Opening) Pit	62 acres
West Pit	31 acres
Overburden/interburden storage area 1	36 acres
Overburden/interburden storage area 2	34 acres
Topsoil storage areas	18 acres
Total	213 acres

* Acres for Haul Road Segment #2 are integral to Overburden/interburden storage area 1;
** Acres for Haul Road Segment #4 are integral to Overburden/interburden storage area 2.

Table 2: Disturbance by Year (approximate)

Year	Planned Disturbance (acres)	Type of Disturbance	Cumulative Disturbance (acres)
Year 1	100	Plant site, roads, topsoil storage, portion of North (Opening) Pit, portion of overburden/interburden storage areas	100
Year 2	30	Expansion of North (Opening) Pit, expansion of overburden/interburden storage area	130
Year 3	35	Expansion of North (Opening) Pit, expansion of overburden/interburden storage area	165
Year 4	15	Expansion of overburden/interburden storage area	180
Year 5	5	Expansion of overburden/interburden storage areas	185
Year 6	20	Begin West Pit	205
Year 7	8	Expansion of West Pit	213
Total	213	Disturbance includes all areas bonded under this NOI	213

Notes: (1) After year 7, mining and processing may continue, but no additional disturbance would occur. (2) While year-to-year disturbance given above may change as conditions warrant, in no case will total disturbance exceed the permitted 213 acres.

Deleterious materials and their management during operations are described above within the operating descriptions in Section 106.2.

106.4. Nature and Amount of Materials to be Mined

The materials to be mined are tar sands. In the Uinta Basin of Utah, the tar sands deposits are overlain by the Green River Formation containing lenticular beds of lacustrine sandstone saturated with bitumen separated by intervals of barren sandstone, siltstone, shale, mudstone and calcareous marl. The overburden materials are comprised of siltstone and sandstone with interbedded shale; interburden layers between the tar sand deposits are expected to have the same characteristics as the overburden materials. Figure 5 provides a geology map showing surface formations in the area, and Figure 6 provides a geologic cross section that focuses on the tar sands beds within the Douglas Creek member.

Areas to be mined within the overall pit layout are categorized by geology and presence of overburden/interburden, as shown in the following table. The mining areas have been characterized into layers including overburden, tar sand layers in the 'D' bed and 'C' bed, and interburden. Overburden varies from 0 to 50 foot depth and averages 20 foot depth. Interburden thickness averages 15 feet. The "D" bed averages 21 feet in thickness and the "C" bed averages 24 feet in thickness. This is a ratio of 1.25:1, ore:overburden.

Table 3 provides per-acre and total volumes of material to be mined. The overall material balance is as follows:

	1,996,082 cubic yards of overburden
+	1,510,383 cubic yards of interburden
=	3,506,465 cubic yards of overburden and interburden removed
+	4,382,476 cubic yards of tar sands mined
=	7,888,941cubic yards total volume extracted
-	10 percent (conservative, by weight of tar sands) bitumen
=	3,944,228 cubic yards of sand after processing
+	3,506,465 cubic yards of overburden and interburden
=	7,450,693 cubic yards of material to be disposed of
x	1.3 bulkage factor
=	9.7 million cubic yards of material to be disposed of
-	4.9 million cubic yards put in overburden/interburden storage areas
=	4.8 million cubic yards to be back-filled in the mine pit

Table 3: Material to be Mined from the North (Opening) Pit Exclusive of the West Pit (61.51 acres)

	Total Volume in yd^3	Overburden in yd^3	Tar Sands - D Bed in yd^3	Interburden in yd^3	Tar Sands C - Bed in yd^3
Per Acre Average	128,255	32,451	33,195	24,555	38,053
Total	7,888,941	1,996,082	2,041,807	1,510,383	2,340,669

The material volumes in Table 3 do not include the potential material mined from the West Pit. Anticipated yearly mined tonnages from the North (Opening) Pit include: 920,000 – 1,200,000 tons of oil sand ore mined per year and 1,000,000 - 1,400,000 tons of overburden/interburden mined per year. Once the mining process is underway, it will be determined whether or not to continue the mining of the North (Opening) Pit into the West Pit. The expected life of the mine is expected to be between 6 and 13 years, depending on the amount of time the processing equipment is on-stream and the number of process trains employed. (Only one process train is covered under this NOI; should additional trains be needed, they would be covered in a permit amendment.)

106.5. Existing Soil Types/Location and Extent of Topsoil

EXISTING SOIL TYPES

Soil types in the Study Area include the Seeprid-Utso complex, 4 to 25 percent slopes, on the upper flats, and Tosca gravelly sandy loam, 25 to 40 percent slopes below this, where the terrain starts to drop off into the drainages. The Gompers-Rock Outcrop complex, 50 to 80 percent slopes, lies on the steep, lower sideslopes of significant drainages and may be affected by overburden/interburden storage areas at the heads of drainages, or if mining continues significantly to the north. The Saddlehorse-Rock outcrop-Pathead association, 50-80 percent slopes, is found on south-facing slopes on the north end of the Study Area. It will not be affected in the next five-year development plan, thus it is not discussed further here.

The *Seeprid-Utso complex* is found from 8,100 to 9,200 feet elevation and occurs on the shoulders and summits of hills in the Mountain Stony Loam (browse) ecological site. It is derived from Aeolian deposits over residuum derived from sandstones and shales. Bedrock is generally 40-60 inches from the surface. The top 4 to 18 inches are loam to clay loam. Below 18 inches the soil becomes very channery. The soil is well drained and pH ranges from 6.6 to 7.8 in the top 18 inches. There is some calcium carbonate accumulation below 24 inches. Sodium levels and SAR are very low. The soil supports shrubs with a grass understory.

The *Tosca gravelly sandy loam*, 25 to 40 percent slopes occurs from 7,500 to 8,200 feet elevation on the backslopes of plateaus in the Mountain Stony Loam (browse) ecological site. It is derived from slope alluvium derived from sandstone and shale. Bedrock is generally 40-60 inches deep. Topsoil includes up to 2 inches of organic material underlain by a gravelly sandy loam to 11 inches. Below this the soil is very gravelly to cobbly. The pH ranges from 5.1 to 8.4 in the top 11 inches and from 7.9 to 9.0 below this. Calcium carbonate increases with depth, with the highest percentage between 11 and 39 inches. This soil has very little sodium.

The *Gompers-Rock outcrop complex*, 50 to 80 percent slopes is found from 6,500 to 7,400 feet elevation on cliffs, erosional remnants, escarpments and ledges in the Upland Very Steep Shallow Loam. It is derived from colluvium over shale residuum. Bedrock is within 4-8 inches of the surface. The top 8 inches is a very channery silt loam to loam. It is well-drained; the pH is 7.9 to 9.0. It has a calcium carbonate percent up to 30, and an SAR up to 10.

Table 4: Soil Types

Soil Series	Ecological site	Topsoil depth (inches)	pH	CaCO3 %	Gypsum %	SAR	Precipitation (inches)
Seeprid-Utso complex, 4- to 25% slopes	Mountain Stony Loam (browse)	4-18 *(avg. salvage depth 6 inches, assumed)*	6.6 to 7.8	To 75%	0	0	16-22
Tosca gravelly-sandy loam, 25-40% slopes		0-11 *(avg. salvage depth 4 inches, assumed, slope permitting)*	5.1 to 8.4	To 40%	0	5.0	16-22
Gompers-Rock outcrop complex, 50-80% slopes	Upland Very Steep Shallow Loam	0	7.9-9	To 30	0	5-10	12-16

LOCATION AND EXTENT OF TOPSOIL

Topsoil occurs to some extent on all of the mining area and is suitable for plant growth and reclamation. However, based upon site development to date under the small mine permit, the actual salvageable topsoil depths found on site are less than those reported above. Of the 213 acres that will be affected under this NOI, approximately 18 acres will be used for topsoil storage and topsoil will not be salvaged from this area. On the remaining 195 acres of disturbance, topsoil will be salvaged prior to mining from all areas where it is practical to salvage topsoil (slopes flatter than or equal to than 2H:1V), and it will be stored for reclamation. For the purposes of the topsoil volume summary discussed below, it is assumed that topsoil will be salvaged from 175 acres (142 acres of Seeprid-Utso complex soils and 33 acres of Tosca soils from slopes flatter than 2H:1V). The remaining Tosca soils (20 acres) that occur on slopes steeper than 2H:1V will not be salvaged.

Based upon previous site development, topsoil depth varies from approximately 2 to 4 inches on the ridgetops and 0 to 3 inches on sideslopes. About two-thirds of the Affected Area would occur in the deeper, ridgetop, Seeprid-Utso complex soils. With an average topsoil salvage depth of 6 inches on 142 acres of this soil type, an estimated 114,550 cubic yards of topsoil will be salvaged and stored for future reclamation. For the remaining disturbances where Tosca soils occur on slopes flatter than 2H:1V (33 acres), an average salvage depth of 4 inches is assumed feasible. An estimated 17,700 cubic yards of topsoil will be salvaged and stored for reclamation from these areas. Therefore, the total topsoil salvage for this operation is estimated to be 132,250 cubic yards.

However, it is important to note that this is an estimate only; actual soil salvage volume could be more or less than this amount. The actual amount salvaged would be dependant upon what is encountered in the field: all available topsoil would be salvaged (with the exceptions noted above for the topsoil storage piles), which in some areas may reflect a lesser thickness than assumed and in other areas may be a greater thickness than assumed. The amount calculated above is the amount upon which reclamation is based and for which bonding will be in place.

106.6. Plan for Protecting and Re-depositing Existing Soils

Salvaged topsoils will be collected with a 631 scraper and a D8 dozer used in combination depending upon the gradient and the presence of rock. It will be stored in topsoil storage areas shown on Figure 3. These storage areas are located on flat to gently sloping ground along the margins of the mining and processing areas. This will minimize haul distance, facilitate isolation and protection of the soil resource, and reduce contact with storm water run-on from outside the storage footprint. Topsoils will be protected by seeding with a fast growing cover grass, such as slender wheatgrass and/or Sandberg bluegrass seeded at a total of 10 PLS (pure live seed) pounds per acre. Topsoil piles will be bermed at the outer edges for runoff control, using the salvaged and compacted woody vegetation that is removed prior to topsoil salvage activities. These berms will be trapezoidal in cross section: two feet high, with a two-foot wide top width and approximately 1.5H:1V sideslopes. A sign will be placed at each topsoil storage area, which will read "Topsoil Storage Area – Do Not Disturb". The estimated 93,170 cubic yards of salvaged vegetation will be placed adjacent to or on top of the salvaged soil.

Topsoil will be deposited on areas prepared for reclamation once mining and/or backfilling is complete in an area and the surface is at final grade. It is hoped that 6 inches of soil can be salvaged from the 142 acres of Seeprid-Utso complex soils, and that about 4 inches of soil can be salvaged from approximately 33 acres of the shallower Tosca soils. Soils on the steeper slopes (those greater than 2H:1V) of the Tosca soils covering approximately 20 acres of the total 55 acres of Tosca soils that will be disturbed will not be salvaged. An estimated 132,250 cubic yards of soil will be available for reclamation by the end of development of this mining area. This averages out to a re-spread depth of about 5 inches of topsoil over 195 acres of disturbance (This does not include the 18 acres of disturbance associated with topsoil stockpiles where salvage would not occur and thus would not need topsoiling).

106.7. Existing Vegetative Communities

The Study Area elevations range from 8,222 feet on the ridgetop to 7,560 feet in the drainages. Existing vegetation in the Study Area includes mixed shrub and sagebrush/grassland communities on the ridgetops, with junipers on slopes upper slopes, trending to a Doug fir community as elevation decreases. There are some aspen patches in the drainages. The Affected Area is primarily within the mixed shrub and sagebrush/grassland communities.

Vegetation Cover Levels Sufficient to Establish Re-vegetation Success Standards
On August, 16, 2007 a quantitative vegetation survey utilizing 13 one-meter-square quadrats was conducted on plateaus and slopes located between 7,720 feet and 8,880 feet elevation within the Study area, including within and immediately adjacent to the Affected Area. (See Figure 8 for quadrat locations, and Appendix C for vegetation survey data). On May 16, 2007 a qualitative vegetation survey listing all species noted was conducted on plateaus, slopes, and upper canyon sites located between 7,440 feet and 8,840 feet elevation on hilltops and hillsides within the mine area. Results of the vegetation surveys are summarized in Tables 5 and 6 below.

Table 5: Results of 13 cover transects surveyed August 17, 2007 to determine revegetation success standards.

Life Form	Average Cover (percent)
Shrubs & Trees	*50.3*
Grasses	*14.7*
Forbs	*2.7*
Total vegetation cover	*67.7*
70% of cover value	***47.4***
Litter	*12.7*
Rock	*16.7*
Bare Ground	*21.0*
TOTAL	***100.0***

These results indicate that the post-reclamation vegetative cover for upland areas must be at least 47 percent to meet bond release standards.

Table 6: Species List of all species noted on May and August field trips to EERI Study Area

Scientific name	Common name	Relative abundance
Shrubs, Trees, and Sub Trees		
Quercus gambelii	Scrub oak	Common at mid-hi elev
Cercocarpus montanus	Birchleaf mountain mahogany	Common at mid-hi elev
Purshia tridentata	bitterbrush	Common at mid-hi elev
Amelanchier alnifolia	Utah serviceberry	Abundant at mid-hi elev
Symphoriocarpus albus	Snowberry	Abundant at mid-hi elev
Artemisia tridentata	Big sagebrush	Abundant at mid-hi elev
Artemisia filifolia	Fringed sage	Occasional at mid-hi elev
Artemisia ludoviciana	Herbaceous sage	Occasional at mid-hi elev
Chrysothamnus nauseosus	Rubber rabbitbrush	Occasional at mi-hi elev
Juniperus osteosperma	Utah juniper	Common at mid elev
Pinus edulis	Pinyon pine	Occasional at mid elev
Pseudotsuga menziesii	Douglas fir	Common at lower elev.
Populus tremuloides	Aspen	Common in drainages
Berberis repens	Oregon grape	Occasional at lower elev
Rosa woodsii	Woods rose	Occasional at lower elev
Ribes sp.	Currant	Occasional at lower elev
Pachistima myrsinites	Mountain boxwood	Occasional at lower elev
Forbs		
Opuntia sp.	Prickly pear	Occasional at mid-hi elev
Collinsia parviflora	Blue-eyed Mary	Occasional at mid-hi elev
Taraxicum officionale	Dandelion	Occasional at mid-hi elev
Astragalus beckwithii	Beckwith astragalus	Occasional at mid-hi elev
Phlox longifolia	Long-leafed phlox	Occasional at mid-hi elev
Erigeron pumulis	Shaggy daisy	Occasional at mid-hi elev
Senecio sp.	Senecio	Occasional at mid-hi elev
Delphinium bicolor	Larkspur	Occasional at mid-hi elev
Aquilegia sp.	Columbine	Occasional at lower elev
Frasera speciosa	Monument plant	Occasional at mid-hi elev
Lithospermum incisum	Puccoon or Fringed gromwell	Occasional at mid-hi elev
Stanleya pinnata	Wallflower	Occasional at mid-hi elev
Cryptantha glomerata	Popcorn flower	Occasional at mid-hi elev
Phacelia linearis	Narrow-leafed phacelia	Occasional at mid-hi elev
Antennaria sp.	Pussy toes	Occasional at mid-hi elev
Saxifraga sp	Brook saxifrage	Occasional at mid-elev
Osmorhiza beteroi	Mountain sweet cicely	Occasional at mid-elev
Erodium cicutarium	Red stem filaree	Common under aspen
Achillea millefolium	Yarrow	Occasional under aspen
Maianthemum stellatum	False Solomon's seal	Occasional under aspen
Urtica dioica	Stinging nettle	Occasional under aspen
Descurainia pinnata	Flixweed	Common under aspen
Circium arvense	Canada thistle	Occasional under aspen
Grasses & Grass-likes		
Poa sandbergii	Sandberg bluegrass	Common at mid-hi elev
Pseudoroegneria spicata	Bluebunch wheatgrass	Common at mid-hi elev
Achnatherum hymenoides	Indian ricegrass	Occasional at mid-hi elev

Scientific name	Common name	Relative abundance
Pascopyron smithii	Western wheatgrass	Common at mid-hi elev
Carex sp.	Dry-land or mountain sedge	Common under firs
Calamagrostis purpurascens	Purple Reedgrass	Occasional under firs
Bouteloua gracilis	Grama grass	Occasional at mid-elev
Poa pratensis	Kentucky bluegrass	Common under aspen
Leymus cinereus	Ryegrass	Occasional under aspen
Carex aquatilis	Water sedge	Seasonally
Scirpus sp.	Rush	Seasonally

106.8. Depth to Groundwater

The depth to the regional groundwater table in the vicinity of the Study Area is expected to be 1,500 feet or more (Price and Miller 1975). Nearby springs or seeps (shown on Figure 7) provide evidence of very localized, shallow groundwater, likely representing isolated perched aquifers. Previous geologic exploration drilling at the site, at maximum depths of approximately 150 feet below ground surface, did not encounter groundwater. This drilling consisted of 25 wells drilled under the previously mentioned DOGM exploration permits. Six of these wells were drilled under E/019/052, along Seep Ridge Road south of the County line within Earth Energy's lease area, but just east of main Affected Area. The remaining wells were drilled under E/019/053, also located along Seep Ridge Road, spanning the County line, and within the eastern part of the 213-acre Affected Area. Maps from DOGM exploration permits that show these locations are included in Appendix B. Depth to groundwater is also discussed in Appendix B, within correspondence requesting Permit-by-Rule coverage under the Utah Division of Water Quality's (DWQ) groundwater protection program.

Extent of Overburden Material

The tar sand beds crop out in PR Canyon to the northeast of the mine area, and in Main Canyon to the southwest of the mine area (Murphy, Leonard A., 2003 private report).

Twenty-five holes drilled by Earth Energy in 2005 penetrated to the highest, or "D" bed, of the tar sands. Average depth to mineable ore was 20 feet, with areas near the outcrop having virtually no overburden, and areas on the southwest side having up to 50 feet of overburden.

Between the two beds that will be mined (the higher D bed and lower C bed) there is a layer of interburden that averages 15 feet in thickness (total average thickness of waste rock = 35 feet) (Figure 6). The "D" bed averages 21 feet thickness and the "C" bed averages 24 feet in thickness (total average thickness of ore = 45 feet). This is a ratio of 1.25:1 (ore:waste rock). As noted in Table 3 above (see Section 106.4), it is estimated that there will be 1,996,082 cubic yards of overburden and 1,510,383 cubic yards of interburden salvaged to mine the 62-acre North (Opening) Pit.

Geology

Rocks on Earth Energy lands include thick, buff-to-cream, rim-forming, cross bedded sandstone cropping out in the bottom of Main Canyon. These rocks were mapped by Gaultieri (1988) as the Renegade Member of the Wasatch Formation consisting of medium to thick, indistinctly banded sandstone with sparse shale. These beds are overlain by the Green River Formation containing lenticular beds of lacustrine sandstone saturated with bitumen separated by intervals of barren sandstone, siltstone, shale, mudstone and calcareous marl. 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 of the Green River Formation (Byrd, William D. 1970) and (Clem, K. 1984). The "E" bed is regionally known, but is not present locally. The beds crop out in PR Canyon to the northeast and Main Canyon to the southwest of County Road 2810 (Seep Ridge Road). All four beds occur in an interval 240 to 290 feet thick (Murphy, Leonard A., 2003 private report). Figure 5 provides a geology map and Figure 6 provides a geologic cross section that focuses on the tar sands beds within the Douglas Creek member. In the area of the opening pit, the strike of the beds is N 20° E, and the dip is 1.2-1.7° NW. The axis of the San Arroyo Anticline trends N 60 W veering to a S 45 W trend 1-2 miles east of the Affected Area (Figure 5). The strike and dip of the ore beds vary slightly throughout the planned mine area as the host formations are part of a gentle anticlinal structure, but dip probably averages about 1.5°.

Twenty-five holes drilled by Earth Energy in 2005 penetrated only the highest or "D" bed. Moderate-to-well saturated tar sand was cut at depths ranging from 10 feet to 40 feet with an average depth of 19 feet, ranging in thickness from 10 feet to 30 feet. Information from these holes and work by authors previously mentioned confirm mineable tar sands may be expected in the area.

106.9. Ore and Waste Stockpiles

The mined tar sands will be stockpiled adjacent to the processing facilities in areas shown on Figure 3. Generally, the operator will maintain a two-week supply of ore at the processing facility. It is expected that no more than approximately 40,000 cubic yards of tar sands will be stockpiled at any one time, awaiting processing. This material would be piled within loader range of the inlet feed hopper (about 200 to 500 feet). It would have a maximum footprint of about 100 yards by 100 yards, and a maximum height of four yards, and may be placed within one or more piles in this area whose combined footprint does not exceed that noted above. In addition, up to 2,500 cubic yards of reject material (rejected material barren of bitumen (rocks) and/or loads of ore that have been hauled to the plant site, but which contain too high a percentage of barren material (stringers) to be viable for processing) would be piled at any one time in a location near the ore stockpiles, prior to being returned to the pit as backfill or disposed of in the overburden/interburden storage areas.

Waste sand from the processing operation would contain 10 to 20 percent water and will be fairly neutral chemically. Recent process equipment evaluations indicate the moisture content of the blended sand/clay fine tailings will be in the order of 15%. As noted above, this level of moisture content is near optimal for compaction and will not lead to liquefaction or cause pore water pressures that would be a concern. Earth Energy has received Permit by Rule coverage under DWQ's Groundwater Protection Program, due to the *de minimus* impact of the project, including the planned pit backfills with processed tar sands, on groundwater resources. Copies of related correspondence are included in Appendix B.

Initially, produced sand will be discharged in the upper reaches of the overburden/interburden storage areas until there is sufficient room available in the opened mine pit to permit commencement of backfill to the pit. Once mining has opened a large enough excavation to allow equipment movement and backfilling, produced sands would be re-deposited in the pit.

Runoff from the overburden/interburden storage areas will be controlled in armored (rip-rapped) areas at the margins and energy dissipation at the toes of their slopes. Typical design drawings for these BMPs are shown in Figure2b. These structures, as with all site BMPs, will be maintained to ensure that they are functional.

TAILINGS FACILITIES

There would be no liquid tailings ponds associated with this mining operation.

WATER STORAGE/TREATMENT PONDS

Water for processing would come from a deep water well (1,000 to 2,600 feet deep) drilled approximately 1 mile east of the production facility. A water right transfer with the Uintah Water Conservancy District allows Earth Energy to use up to 360 acre-feet per year of Green River basin water (currently allocated under Water Right No. 41-3523). Approval must be granted from the State Engineer to approve the well location. Well water would be pumped and piped via deep-buried and/or insulated 6-inch-diameter, HDPE pipeline, and stored in the retention pond described below. As noted above, gauges will be installed in the pipeline during construction so that any leaks can be detected. This well and pipeline is permitted separately under Exploration Notice #E0190053). In addition, recycled process water will be stored in an insulated storage tank with an approximate capacity of 4,000 barrels.

There would be no treatment ponds located on the site. However, a retention/storage pond will be located at the low point of the plant site, and will collect all plant site runoff and runoff-transported sediments; it will also be used to store clean reserve make-up water (approximately 10,000 barrels, which equates to a 2.5-day supply. This pond will be lined in order to preserve the availability of make-up water. Lining is not needed to prevent water quality impacts. Any sediments that collect in this pond will be removed as needed to maintain design capacity. All precipitation collected within the working mine pits and process areas will be used in the process or for dust suppression on mine and plant roads.

106.10. Amount of Material to be Extracted, Moved

As illustrated in Table 3 (Section 106.4), over the next five years approximately 4,382,475 cubic yards of tar sand ore will be removed from the mine for processing into bitumen. To accomplish this, approximately 132,250 cubic yards of topsoil will be removed from lands to be disturbed and set aside for reclamation purposes. Approximately 3,506,465 cubic yards of overburden and interburden will be removed during the course of mining, to access the ore. Ore will be mined at a rate of approximately 3,000-3,500 tons of per day, producing approximately 2,000 bbl/day of bitumen from the initial process train.

The total volume of tar sand ore plus overburden and interburden to be extracted from the North (Opening) Pit is therefore approximately 7,900,000 cubic yards (4,382,476 plus 3,506,465). Approximately 4.8 million cubic yards of overburden, interburden, and tailings (sand and fines) will be replaced in this pit. A bulkage factor of 30 percent has been applied to the replaced material (although the replaced sand tailings are expected to have a bulkage factor of <1.1).

R647-4-108. Hole Plugging Requirements

All exploration holes drilled by Earth Energy have been plugged according to the requirements of R647-4-108. Future drill holes, should there be any, would be plugged according to the same requirements. Drill holes would not be left unplugged for more than 30 days unless approved by UDOGM.

Closure of the water well is handled under Exploration Notice #E0190053 and is not part of this NOI.

R647-4-109. Impact Assessment

109.1 Surface and Ground Water Systems

SURFACE WATER

The Study Area is located on the Tavaputs Plateau along the southeastern rim of the Uinta Basin. Hydrologically, it is within the Green River watershed (in HUC 14060005), which is part of the Colorado River system. The 2,255-acre Study Area includes the relatively flat interfluve between PR Canyon and Main Canyon, as well as the headwaters of those canyons and adjacent tributaries. Figure 7 shows watershed boundaries in the Study Area, as well as other water features such as streams and springs or seeps.

The disturbances will be located on this drainage divide and extend southwestward into the Main Canyon watershed. Previous activities associated with an approved Small Mine Operation at this site have modified local natural surface drainage patterns over about five acres. Among those existing disturbances, is a small open pit in which collected runoff and precipitation is impounded.

Main Canyon and several of its tributaries (including Trail and Meadow Canyons) drain the majority of the Study Area. There are several small springs or seeps that issue in the headwater reaches of Main Canyon and support perennial flow for some distance along its main stem. Main Canyon flows generally west and northwest, entering Willow Creek several miles west of the Study Area. Willow Creek in turn flows into the Green River near Ouray. PR Canyon and a tributary named Jacks Canyon drain northward, conveying snowmelt and runoff from the northeast part of the Study Area. Although there is a small spring complex located in PR Canyon, flow in these channels is intermittent or ephemeral. PR Canyon is tributary to Sweet Water Canyon, Bitter Creek, and the White River, prior to the White River entering the Green River near Ouray.

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 Study Area is dissected by numerous ephemeral drainages that, although channels themselves are small, are located within larger canyons with steep slopes. Because the majority of mining and mining-related surface disturbance will be located on the relatively flat interfluve, there is negligible up-gradient watershed area that could contribute run-on. The small headwater drainages that will be filled with overburden/interburden

storage areas flow ephemerally, contain very small active-channel cross sections, and typically show no evidence of live water or riparian vegetation.

Overburden/interburden storage area No. 2, the western-most overburden/interburden storage area, will be located on the area that contains a water right (49-1567) for a spring near the east edge of its fill footprint. However, a May 16, 2007 reconnaissance trip to pin-point this water source and determine a flow rate found no evidence of active flow at the site listed by the State Engineer. 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. It is in the arroyo on top of an aquitard, and only appears following heavy runoff that has migrated down along fractures. It appeared to be associated with a contact point between a shale layer and a more porous overlying area. This is outside of the Affected Area. No other water was found during this survey other than those seeps identified in Figure 7.

The plant site will be constructed to be a self-contained area, through the use of perimeter berms or ditches where needed. Ditches will be designed to pass the 10-year, 6-hour precipitation event. They will either be triangular in cross section with side slopes approximately 1.5H:1V; depth including freeboard will be less than 2 feet; or will have an equivalent cross section. Berms will generally be 2 feet high, with a two-foot top width and 1.5H:1V sideslopes. In some areas, the roads form the perimeter berm or ditch. All precipitation incident on the site will be collected in the water retention/storage pond located at the low point of the plant site (Figure 3) and used in the extraction process or for dust suppression on mine and plant roads. This pond will also be used to store clean reserve process water. If sediments accumulate in the pond, it will be cleaned as needed to maintain its design capacity. The lining used in this pond will prevent loss to infiltration so as to maximize Earth Energy's storage volume; this lining is not needed for any water quality protection purpose, and any inadvertent leak or tear that results in infiltration would not impact surface or groundwater quality. As noted, more detail on the use of all of these structures (berms, ditches, and the water retention/storage pond) will be provided when final engineering designs are available.

The mine pit is constructed with a highwall around the workings, which in all locations (during operations) will be higher than the highest elevation of the pit floor. In this manner, all precipitation on the mine pit will collect in precipitation collection sumps located in the bottom of the pit. These collection sumps are simply low areas within the working mine pit where precipitation falling directly within the pit perimeter will drain and collect. Collected precipitation will be transported to the processing site with mined ore or pumped separately and added to the process stream as part of the make-up water. The active mining area will be a pit at all times (concave to incident precipitation and run-on). No pit configurations are planned where storm water will be allowed to egress the active mine workings.

Runoff and sediment from the outslopes of the overburden/interburden storage areas will be controlled by facing the steepest portions of the slopes with coarse overburden material (similar in appearance to existing natural scree slopes) dedicated armoring placed within the "channel" formed by the contact between the pile and the native slope, and by installing a rip-rapped energy dissipater at the toe. Due to the size of overburden/interburden/ storage area materials (broken sandstones and shales mixed with lesser amounts of fines, with particles varying from fine to coarse rock rubble (run-of-mine) materials potentially as large as one cubic yard), these outslopes will not produce significant amounts of sediment. The minimal erosive potential of the proposed design slopes has been confirmed through monitoring of the similarly constructed overburden storage piles adjacent to the Company's 2005 production test pit. Typical design drawings are included in Figure2a. Runoff and erosion will be minimal from the overburden/interburden storage area top surfaces, because these will be maintained with a gentle grade away from the outslope.

SPCC

All BMPs will be inspected regularly and maintained in operable conditions. These types of BMPs are also described in a Storm Water Pollution Prevention Plan (SWPPP) developed to comply with a State of Utah Multi-Sector General Permit for Industrial Discharges (and/or the analogous EPA permit). That Permit also requires quarterly visual monitoring of storm water. All of these measures would reduce the likelihood of inadvertent discharges of process waters or erosion-produced sediments. This SWPPP is included with the NOI as Appendix G. This subject is discussed further in Section 109.4 below.

GROUNDWATER

The tar sands deposit that would be mined during this project is located in the Green River Formation. The Parachute Member of the Green River Formation is the uppermost bedrock formation found throughout the Study Area. This Formation includes various water bearing zones (including the Birds Nest and Douglas Creek aquifers), though they are apparently of limited extent and yield. The State Water Plan (Utah Division of Water Resources 1999) doesn't include any Green River Formation aquifers as significant enough to be target for groundwater development, and information from wells and springs indicates generally low yields (Price and Miller 1975).

Most springs in the area, including PR Spring, are reported to discharge from the Parachute Creek Member of the Green River Formation (Price and Miller 1975). The BLM (1984) notes that known springs within the combined Hill Creek and PR Spring Special Tar Sands Area (STSA) typically discharge at less than 50 gpm, with most discharging at less than 10 gpm. They 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 Study 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). These springs are not predicted to be impacted by Earth Energy's operation.

Underlying the Green River Formation at depth are the Wasatch Formation and the Mesa Verde Group, which are likely aquifer targets for Earth Energy's water supply well (which is permitted separately under Exploration Notice #E0190053). Price and Miller (1975) indicate that the potentiometric surface in the general area is 1,500 feet or greater below ground surface, with a gradient to the north. Generally, these bedrock sources are thought to be of low permeability and relatively poor water quality (Price and Miller 1975) and thus insufficient for major groundwater development. At its maximum depth of 140 feet, the North (Opening) Pit would not be expected to encounter this regional groundwater table, nor would it be expected to approach it or affect its gradient or quality.

Based upon review of drill logs obtained for a nearby abandoned (watered out) exploratory gas well, a local aquifer is anticipated to yield a sufficient quantity of groundwater for project requirements. The abandoned well of interest is located approximately 1 mile east of the plant site (on BLM land) with the target aquifer at least 1,000 feet below ground (Earth Energy personal communication). An application to the BLM for drilling of a test well at the subject location has been approved. Pending results of this test well, additional permitting through DOGM, the State Engineer's Office, and BLM may be required. Use of this deep groundwater would not affect the nearby springs.

As noted above, Earth Energy has received Permit by Rule coverage under DWQ's Groundwater Protection Program, due to the *de minimus* impact of the project, including the planned pit backfills with processed tar sands, on groundwater resources. Copies of related correspondence are included in Appendix B.

WATER RIGHTS

According to online records of the State Engineer's Office, (Utah Division of Water Rights) there are a number of water rights in and near the Study Area, as shown in Table 7 and on Figure 7. The only one of these that would potentially be affected by Earth Energy's operations would be 49-1567. This right is in the application phase, and has not yet been granted by the State Engineer's Office. It was first filed on in 1995, by Alameda Corporation and their attorney Pruitt-Gushee. The applicant stated that the use of the water would be in conjunction with several other area sources for domestic and livestock uses; these other sources were filed on at the same time as the 49-1567 water right. The quantity of water filed on at this spring was approximately 4.5 gpm. (As noted above, a field visit did not find

any evidence to indicate that a spring of this size exists at this location; it may represent a mis-plotted water right).

The water right application (and others similarly filed by Alameda) was protested by SITLA and Utah Division of Wildlife Resources (DWR), among others, in 1995. A hearing was held in 2004, at which time Alameda was apparently asked to provide additional information. The rights were neither granted nor rejected.

In early 2007, the State Engineer's Office requested that Alameda Corporation supply information on these applications and their intentions regarding them within 90 days. If this was not done, the state indicated that it would reject the applications. In early April of this year, Alameda's current attorney (Mabey and Wright) notified the State Engineer that they were pursuing some of water rights, including 49-1567, and dropping others. They further indicated that they have obtained SITLA's permission to develop the water sources on state land, including 49-1567. They have requested that the State Engineer grant these water rights ASAP.

As explained in the Surface Water section above, the May 16, 2007 reconnaissance trip to GPS the location of this spring or seep and determine a flow rate found no evidence of active flow or hydrophytic vegetation at the site listed by the State Engineer.

Table 7: Water Rights

Water Right No.	Water Source	Quantity (cfs)	Use	Water Right Owner
49-55	Unnamed Spring	0.002	Stock watering	John S. Purdy
49-57	PR Springs	0.002	Stock watering	John S. Purdy
49-193	Unnamed Spring	0.025	Stock watering	Alameda Corp.
49-196	PR Springs	0.021	Stock watering	Alameda Corp.
49-262	PR Springs	0.011	Domestic & stock watering	BLM
49-378	East Fork Jacks Canyon Spring	0.015	Stock watering & wildlife	BLM
49-495	Meadow Spring	0.015	Stock watering & wildlife	SITLA
49-496	South PWR Meadow Spring	0.015	Stock watering & wildlife	SITLA
49-497	North PWR Meadow Spring	0.015	Stock watering & wildlife	SITLA
49-504	Jacks Canyon Spring	0.015	Stock watering & wildlife	BLM
49-1508	Unnamed Spring	0.05	Stock watering	SITLA

Water Right No.	Water Source	Quantity (cfs)	Use	Water Right Owner
49-1566*	Unnamed Spring	0.027	Domestic & stock watering	Alameda Corp.
49-1567*	Unnamed Spring	0.01	Domestic & stock watering	Alameda Corp.
49-1572*	Unnamed Spring	0.004	Domestic & stock watering	Alameda Corp.
49-1581*	Unnamed Spring	0.004	Domestic & stock watering	Alameda Corp.

* Application phase – water right not yet approved

An additional water right of importance is that which will be used by Earth Energy to provide water for processing the ore. Through an agreement with the Uintah Water Conservancy District, Earth Energy's long-term plan is to use Green River Water (currently allocated under Water Right No. 41-3523) via a water rights transfer of about 360 acre-feet/year. Initially, approximately 200 acre-feet/year of groundwater will be pumped from a deep water well (1,000 to 2,600 feet deep) drilled within 1-2 miles of the production facility. This deep well is being permitted by the Utah State Engineer's Office, the BLM, and DOGM (under Exploration Notice #E0190053).

109.2 Wildlife Habitat and Endangered Species

As noted in Section 106.7, the Study Area is on the top of a flat-lying plateau above Main Canyon and PR Spring Canyon. Ephemeral drainages drop steeply off the plateau into these canyons. Existing vegetation in the Study Area includes mixed shrub and sagebrush/grassland communities on the ridgetops, with juniper on upper slopes and sideslopes, trending to a Doug fir community as elevation decreases. There are some aspen patches in the drainages.

The Utah Natural Heritage Program (NHP) of the Division of DWR was contacted directly for information about known occurrences of any species of concern. Their response letter, attached in the correspondence section (Appendix B), listed occurrences of Mexican Spotted Owls (*Strix occidentalis lucida*) and greater sage grouse (*Centrocercus urophasianus*) in the vicinity of Study Area. The Mexican spotted owl was listed as a threatened species on 15 April 1993 (USFWS 2007). Sage grouse are not protected by Federal law, but as a "wildlife species of concern", it is expected that conservation actions may be needed to preclude the need to list sage grouse under the Endangered Species Act. Sage grouse are also currently listed as a sensitive species by the Utah DWR.

GIS Shape files of Mexican Spotted Owl nesting habitat, acquired from the Bureau of Land Management (BLM) Vernal Field Office indicate that there is no known such nesting habitat within 1.5 miles of the Study Area boundary, or within 3 miles of the Affected Area. It is possible, however, that owls may move up the canyons

This page is a reference page used to track documents internally for the Division of Oil, Gas and Mining

Mine Permit Number M/047/0090 Mine Name _____
Operator _____ Date _____ _____
TO _____ FROM _____

X CONFIDENTIAL __BOND CLOSURE __LARGE MAPS __EXPANDABLE
__MULTIPUL DOCUMENT TRACKING SHEET __NEW APPROVED NOI
__AMENDMENT _OTHER _____

Description YEAR-Record Number

X NOI __Incoming __Outgoing __Internal __Superceded
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COMMENTS: _____

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inches high, comprised of three or four strands barbed wire, topped with a log rail. It will be anchored with T-posts.

The UCD website also includes a list of plant and animal species that are Federally listed as Threatened, Endangered, or are Candidates for T&E designation in Utah, or are listed as Sensitive Species by the DWR. Those that are listed as present in the southern portions of Uintah and/or the northern portions of Grand Counties are listed below in Table 7 (with the exception of listed fish species, since there is not adequate live water to support fish on or near the Study Area). The information was taken from the UCD website on May 11, 2007.

Table 7: Threatened, Endangered, and Candidate Species that may be present at Earth Energy Resources Tar Sands Mine

Common Name	Scientific Name	Status	Elevation in Feet / Habitat	Chance of Presence at Project Site
Shrubby Reed-mustard	*Glaucocarpum suffrutescens*	E	6000-7000	None due to elevation
Clay Reed-mustard	*Schoenocrambe argillacea*	T	4725-5750	None due to elevation
Uinta Basin Hookless Cactus	*Sclerocactus glaucus*	T	4500-6500	None due to elevation
White River Beardtongue	*Gila cypha*	C	5000-6680	None due to elevation
Black-footed Ferret	*Mustela nigripes*	T	Prairie dog towns	None due to lack of prairie dogs
Brown (Grizzly) Bear	*Ursus arctos*	T -Extirpated	Mountain timber	None
Southwestern Willow Flycatcher	*Empidomax traillii extimus*	E	Riparian areas with willows	None due to lack of riparian habitat

Shrubby Reed-mustard, *Glaucocarpum suffrutescens,* is a Federally listed endangered plant. This perennial, clump-forming mustard produces yellow flowers in May and June. It grows on shaley, fine textured soils of the whitish, semi-barren Green River Formation, Evacuation Creek Member. It is associated with mixed desert shrub and pinyon-juniper communities at elevations of 6000 ft to 7000 ft. The Study Area elevation is generally above, and the soils thicker and deeper than those noted above, making it highly unlikely that this species would be encountered within the Study Area.

Clay Reed-mustard, *Schoenocrambe argillacea,* is a Federally threatened plant. This mustard produces white, purple-veined flowers that bloom from mid-April to mid-May. The plant is hairless with a stout, woody base. It occurs on the Green River Formation, Evacuation Creek Member, where it prefers precipitous slopes consisting of bedrock or scree mixed with fine-textured soils in mixed desert shrub communities at elevations of 4725 ft. to 5750 ft. It is unlikely that this plant would be present within the Study Area due to elevation and site characteristics.

Uinta Basin Hookless Cactus, *Sclerocactus glaucus,* is a Federally listed threatened plant that is known to occur in central and southern Uintah counties just north of the Study Area. This cactus has a solitary, egg-shaped stem that is 3-12 inches long. Pink flowers are produced late April to late May. It is found on xeric, fine textured soils overlain by cobbles and pebbles on river benches, slopes, and rolling hills of the Green River and Mancos formations from 4500 ft. to 6500 ft. elevation. It is associated with salt desert shrub and pinyon-juniper communities. It is highly unlikely that this plant would occur on the Study Area due to the higher elevation and moister site characteristics of the mine site.

White River Beardtongue, *Penstemon scariosus,* is a candidate for Federal listing as threatened or endangered. It is found in Duchesne and Uintah counties in Utah and Rio Blanco County in Colorado. This figwort has lavender to pale blue flowers that bloom in late May to June. It is found on semi-barren areas on white (infrequently red) soils that are xeric, shallow, fine-textured, and usually mixed with fragmented shale from 5000 ft. to 6680 ft elevation. It is highly unlikely that this plant would occur on the Study Area due to the higher elevation and moister site characteristics of the mine site.

The **Black-footed ferret**, *Mustela nigripes*, is Federally listed as endangered. Thought to be extinct, the species was re-discovered near Meteetse, Wyo. in the 1980's. Since then a captive breeding program has allowed introduction of populations classified as "non-essential-experimental" by the US Fish and Wildlife Service (USFWS) in the Coyote Basin area of Uintah County in 1999, as well as at other locations in the west. There are also unconfirmed sightings of naturally occurring black-footed ferrets in eastern Utah.

Black-footed ferrets are nocturnal and rely on prairie dogs for their primary food, thus they are closely associated with prairie dog towns. Loss of prairie dogs (by plague, poisoning or habitat loss) directly threatens the survival of the ferrets. Due to the lack of prairie dog colonies in the Study Area, no black-footed ferrets would be expected to occur in this area.

The **Grizzly or brown bear,** *Ursus arctos,* was extirpated (eliminated) from Utah in the 1920s. Because of the drastic decline in brown bear numbers and distribution, the U.S. Fish and Wildlife Service has listed it as threatened in the lower 48 states. The last known sighting of a grizzly bear in the state of Utah was over 50 years ago, thus it is highly unlikely this animal would be seen on or near the Study Area and no evaluation is necessary.

The **Southwestern willow flycatcher**, *Empidonax traillii*, is Federally listed as endangered. It is a rare summer resident of southern Utah up to the northern border of Grand County. It prefers riparian habitats with willows. It eats insects, seeds, and berries. It breeds in late spring and early summer in the vertical fork of a willow or other riparian tree. The Study Area is at the northern edge of the range

for this bird; the lack of developed riparian habitat in the Study Area makes it highly unlikely that this bird would occur in the Study Area.

As noted in Section 106.7, the Study Area is on the top of a flat-lying plateau above Main Canyon and PR Spring Canyon. Ephemeral drainages drop steeply off the plateau into these canyons. Existing vegetation in the Study Area includes mixed shrub and sagebrush/grassland communities on the ridgetops, with juniper on upper sideslopes, trending to a Doug fir community as elevation decreases. There are some aspen patches in the drainages.

109.3 Existing *Soil and Plant Resources*

SOILS

Existing soil types in the Study Area are described in Section 106-5 above and are shown on Appendix C. Associated disturbance related to mining and processing at PR Spring mine includes approximately 15 acres to be disturbed by the plant site and 17 acres to be disturbed by the plant perimeter road and the haul road segments that are not integral to the overburden/interburden storage areas. These disturbances will remain un-reclaimed for the life-of-mine. Approximately 62 acres will be disturbed for mining the North (Opening) Pit, 31 acres will likely be disturbed by mining in the West Pit, and 70 acres will be disturbed with two overburden/interburden storage areas. The topsoil storage areas will take up approximately 18 acres of land and will not be stripped. This is a total disturbance footprint of 213 acres.

Of this acreage, 160 acres are within the Seeprid-Utso complex of soils, located on the tops and shoulders of the plateau, while 53 acres are within the shallower Tosca soils, located on the slopes below the plateau.

Reclamation will remain as concurrent as possible as mining advances and produced sand is replaced in the excavated pit. This will allow regrading, topsoiling, and seeding of some lands including portions of the mined-out pit. Thus, the total volume of topsoil stored at any one time will never reach the full 132,250 cubic yards. All salvaged soils will be used on-site in reclamation.

PLANTS

The Study Area intersects four plant communities: Sagebrush-grass, Mixed tall shrub, Pinyon-juniper-Douglas fir, and Aspen glade (Figure 8). All but the Aspen glade community were sampled, as no mining will occur in the aspens. Within the Study Area there are 1,638 acres of Sagebrush-grass community, 1482 acres of Mixed tall shrub community, 1203 acres of Pinyon-juniper-Douglas fir community, and 43 acres of Aspen glade community. Within the Affected Area included in this NOI, approximately 70 percent are within the Mountain tall shrub community, 20 percent are within the Sagebrush-grass community, and 10 percent are within the Pinyon-juniper-Douglas fir community. Further information about existing plant resources is included in Section 106.7, Table 3, and in Appendix C.

109.4 Slope Stability, Erosion Control, Air Quality, Public Health & Safety

SLOPE STABILITY

Generally speaking, for many open-pit mines, slope stability is a concern at the rim and floor of pits, the ground surface on which overburden/interburden storage areas are constructed, and on the slopes of constructed overburden/interburden storage areas and topsoil stockpiles. Earth Energy has specifically considered slope stability in the design of the PR Spring Mine and has ensured -- by applying a conservative approach to design grades -- that the operation will be safe and environmentally sound. The bulk of each mining pit would be constructed within the relatively flat-lying terrain of the plateau top, minimizing slope-related risks. Overburden/interburden storage areas 1 and 2 would be constructed on the steeper side slopes between the plateau top and the base of Main Canyon. Although these overburden/interburden storage areas inherently have a higher potential risk of slope stability issues, the use of flatter-than-needed grades eliminates this risk. All slopes, both interim and final, have been designed to be stable.

Regular and routine inspections will occur throughout the mine area to ensure that operating conditions remain safe; that MSHA safety guidelines are being followed, and that the mining plan stated herein is being followed. This will include inspecting to verify that the pit wall slopes are at the correct angles and that they remain stable.

PITS

The North (Opening) Pit will be incised into the terrain, with the highest walls of the pit being the highwall on the northwest and the sidewall on the northeast. The lowest walls of the pit (low walls) would be located on the southwest and southeast sides of the pit at the head of a natural, ephemeral drainage. All pit walls would be maintained at approximately 2H:1V for stability. Use of this slope represents Earth Energy's desire to facilitate pit reclamation, and to provide conservatively designed pit wall slopes to compensate for the lack of detailed knowledge regarding the extent of localized faulting or fracture planes that could cause instabilities at steeper slopes than those used here. Numerous existing road cuts and excavations in the area (including Earth Energy's 2005 production test pit) are stable with slopes steeper than 1H:1V, providing evidence of the conservative nature of Earth Energy's design. Use of 2H:1V pit walls slope will prevent rock falls. Back-break near the top rim of the pits will be controlled or eliminated by smooth transition grading. Any required blasting along the walls of the pit will be accomplished with small controlled blasts to eliminate over-break and weakening of the remaining material on the face of the slope.

The maximum depth of the North (Opening) Pit would be approximately 140 feet. The minimum depth on the low wall side of the pit would be 20 feet. The thickness of the undisturbed bank of land between the low wall of the pit and the outer side

of the native slope would be approximately 100 feet. Exploratory drill hole data did not encounter any groundwater, thus it is highly unlikely that water-bearing strata in the Parachute Member of the Green River Formation would be significant enough to create ponding behind the low-wall.

The West Pit would expand the highwall about 1500 feet to the southwest and the pit floor to approximately 7860 ft. elevation, starting from the northwest corner of the North (Opening) Pit. No water or stability problems are anticipated with the highwalls or low-walls in this pit extension.

As noted above, regular and routine inspections will occur to verify that the pit wall slopes are at the correct angles and that they remain stable.

OVERBURDEN/INTERBURDEN STORAGE AREAS

Overburden/interburden storage areas No. 1 and No. 2 will be constructed during the mining of the North (Opening) Pit and the west extension of this pit (designated as the West Pit). Both overburden/interburden storage areas will be constructed outside of the pit limits on the side-slopes of ephemeral draws above Main Canyon. The overall slopes of the land on which the overburden/interburden storage areas will be constructed ranges from 16.5 to 40 percent (10° to 22°) (see Table 8 below). During mining, the overburden/interburden storage areas will be sloped at 1.5-1.7H:1V. Upon reclamation the slopes will be graded down to between 2.5H:1V to 3H:1V.

Table 8: Slope Angles of Native Lands and Overburden/interburden storage areas

Overburden /interburden Storage Area **Number**	**Total Height in Feet of** Overburden/interburden storage areas **from toe of** Overburden/interburden storage area **to top of** Overburden/interburden storage area* ***(During Mining / Post-Reclamation)**	**Average Native Slope Angle (H:V)**	**During Mining Average Slope Angle of Outer** Overburden/interburden storage area **Slope (H:V)**	**Post-Mine: Reclaimed Average Slope Angle of Outer** Overburden/interburden storage areas **Slope (H:V)**
1	350 / 390	2.7:1	1.5:1	2.5-3:1
2	240 / 270	6:1	1.5:1	2.5-3:1

APPROVED

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DIV. OIL GAS & MINING

The native slopes on which the overburden/interburden storage areas will be constructed are made up of lacustrine sandstone, siltstone, shale, mudstone and calcareous marl overlain by sandstone and shale alluvium and colluvium, with scattered small escarpments and ledges. The surface material is gravelly to cobbly toward the top of the overburden/interburden storage areas with intermittent rock outcrops along the slope, and the bedrock exposed at the base of the overburden/interburden storage areas. Overburden/interburden storage area No. 1 will be constructed on a 40 percent slope (steeper than 3H:1V) that is concave, grading to a slope angle of about 10 percent (10:1) near its base. Overburden/interburden storage area No. 2 will be constructed on a 6H:1V slope. Both overburden/interburden disposal areas will be designed and constructed to be stable within standard engineering parameters.

Erosion Control

Erosion control at the site will in part be accomplished by measures inherent in the design and siting of the facilities. However, some runoff and erosion control at specific locations is expected to be necessary to prevent off-site impacts. Generally, surface water will be restricted to that generated by on-site precipitation: little or no up-gradient runoff will enter the site. What surface water runoff does occur will be controlled such that erosion is minimized.

A few of the specific means of handling runoff and controlling erosion are described below, with reference to specific typical drawings. The exact placement of most of the features will hinge upon either the final engineered plans for the development, or the specific nature of observed instances of runoff/sediment problems once the site is developed, or both. As committed to, final engineering drawings will be submitted to DOGM once they are available. In addition, should the specific means of handling runoff and controlling erosion that are described in this section be ineffective, Earth Energy would replace them with another type of BMP. These structures will be industry standard, using similar materials, installation techniques, and maintenance protocols as specified in DOGM's reclamation guide (DOGM 2008).

Only minor amounts of runoff will be generated on the outslope faces of the overburden/interburden storage areas, because up-gradient runoff will be kept away from the outslopes, outslope gradients are not excessively steep, and material makeup of outslopes will allow for infiltration. Further, runoff will be controlled by facing the steepest portions of the slopes with coarse overburden material, dedicated armoring placed within the "channel" formed by the contact between the pile and the native slope, and by installing a rip-rapped energy dissipater at the toe. Typical design drawings are included in Figure 2a. Controlling runoff will minimize sediment production, and the energy dissipaters will also serve as sediment traps, causing at least some of the sediments to drop out. Further, as these materials will primarily consist of broken sandstones and shales mixed with lesser amounts of fines, their grain sizes will vary from fine to

coarse rock rubble (run-of-mine) materials potentially as large as one cubic yard. The coarser materials will typically end up near the toe of the expanding fills as the dump sites are filled to their maximum capacity. The minimal erosive potential of the proposed design slopes has been confirmed through monitoring of the similarly constructed overburden storage piles adjacent to the Company's 2005 production test pit. The concentration of coarse materials at the toe of the fills provides a natural energy dissipater for storm runoff from the faces of the dumps. This broken rock material has a very low siltation potential and will effectively encapsulate the finer material initially placed in the upper reaches of the waste dumps. Last, the top surfaces of these overburden interburden storage areas will generate very little runoff or sediment as they will be maintained with a gentle grade away from the outslope (toward the plant site and the pit, from which there will be no runoff and/or sediment discharge). Through the dumping mechanism, both outslopes and top surfaces will generally have roughened surfaces to further reduce runoff velocities and encourage material trapping.

All topsoil piles will be bermed to catch eroded material and prevent run-on and run-off of storm water. As noted in Section 106.6, these berms will either be comprised of topsoil, or built using the salvaged and compacted woody vegetation that is removed prior to topsoil salvage activities. These berms will be trapezoidal in cross section: two feet high, with a two-foot wide top width and approximately 1.5H:1V sideslopes. Figure 2d provides a typical cross section for these types of berms.

The active mining area will be a pit at all times (concave to incident precipitation and run-on). No operational pit configurations are planned where storm water will be allowed to egress the active mine workings. Thus, no specific erosion controls are needed for the pit area.

Most of the haul roads will be integral or adjacent to the pit and overburden/interburden storages areas and will not require separate erosion control. As needed, however, certain haul roads will be ditched, and if the grade increases to above two percent, water turn-outs will be constructed to prevent erosion of the road base. A typical ditch is shown in Figure 2c and a typical rolling dip turnout is shown in Figure 2f. Additionally, these ditches may also be outfitted with small coir rolls, silt fences, or other check features if needed; a typical installation is also shown on Figure 2e.

The facilities site will be constructed to be a self-contained area through the use of perimeter berms or ditches (see Figure 2c-2f for typicals) as needed to direct runoff. All precipitation incident on the site will be collected in the water retention/storage pond located at the low point of the plant site (Figure 3) and used in the extraction process or for dust suppression on mine and plant roads. This pond will also be used to store clean reserve process water. Sediment production from the plant site will be negligible, due to gradient and surfacing; any transported

in runoff would eventually make its way to the water retention/storage pond. This pond will be cleaned of sediments as needed.

All BMPs will be regularly inspected, and maintained in operable condition. These above-noted types of BMPs are also described in a Storm Water Pollution Prevention Plan (SWPPP) developed to comply with a State of Utah Multi-Sector General Storm Water Permit for Industrial Discharges (and/or the analogous EPA permit). The Permit also requires quarterly visual monitoring of storm water discharges. These measures would reduce the likelihood of inadvertent discharges of process waters or erosion-produced sediments. This SWPPP is included with the NOI as Appendix G.

AIR QUALITY

Potential air quality issues include the following:

- Fugitive dust from stripped lands, the mine pit, overburden/interburden storage areas, and topsoil stockpiles.
- Fugitive dust from the plant site area and ore stockpiles
- Emissions from the equipment used to mine, haul and process the ore
- Fugitive dust from newly reclaimed lands

Fugitive dust will be minimal from ore piles. Overburden and interburden may or may not be moist, depending on current weather conditions. However, consistency of raw ore is massive to granular and thus does not readily become airborne.

Once the tar is removed from the ore, clean sands are left to be used as backfill. This sand material will hold approximately 10 to 20 percent moisture. Waste sands and over/interburden will be alternated in construction of the overburden/interburden storage areas and backfill of the pits, to increase stability and reduce wind-blown sand, should it become dry.

Haul roads will be sprayed regularly with water from a water truck. Water will be obtained from the well associated with Exploration Notice #E0190053 and for which Earth Energy retains a water right that allows use of water for this purpose.

Earth Energy has coordinated with EPA on air permitting to sufficiently address the above air quality issues, including those associated with equipment emissions.. (EPA has taken the lead on air permitting for this operation given its Tribal Land location.) Earth Energy intends to comply with the conditions set forth by EPA; documentation is included in Appendix B. .

PUBLIC HEALTH AND SAFETY

The following measures are in place to protect public health and safety:

- MSHA safety guidelines will be followed in all aspects of this project.
- There are no shafts or tunnels within the Affected Area and therefore none that require closing or guarding.
- All trash, scrap metal, and wood, and extraneous debris will be temporarily stored at a designated location prior to being routinely hauled offsite to a licensed facility. Further, volumes of material such as product, waste oil, etc. will be periodically removed from the site as needed so that their allocated storage is not exceeded.
- Any exploratory or other drill holes will be plugged or capped as set forth in Rule R647-4-108.
- Warning signs will be posted in locations where public access to operations is readily available, including at the points of exit/entry from the main access road (Co. Road 2810) to the open pit and processing facilities.
- All blasting materials are kept in locked, ATF-approved magazines.
- Warning signs advising the public of blasting protocols will be posted at the access road to the pit area at the appropriate locations as required by MSHA from the time a blast begins to be set until the all-clear is given. These signs will include blasting schedules.
- The opening pit highwall will be bermed and fenced along the County Road. As recommended by the Utah DWR (personal communication with Brian Williams, DWR Northeast Region), this fence will be between 38 and 48 inches high, comprised of three or four strands barbed wire, topped with a log rail. It will be anchored with T-posts. Signs will be placed along the fence line every 150 feet to warn the public of the mining activity, including the potential for blasting. These signs will include blasting schedules.
- During all Earth Energy mining work in the vicinity of the Canyon Gas natural gas pipeline, Earth Energy would operate safely and in cooperation with Canyon Gas to ensure safety of both operations and the public.
- Containers stored on-site will be labeled so that wastes are clearly identified. Salvageable materials and other wastes will be stored at the plant site within the fenced area. No hazardous materials or hazardous wastes will be generated or used during this operation, thus none will be stored.

R647-4-110. Reclamation Plan

110.1 Current Land Use and Post Mining Land Use

The current land use is mining, exploration, and wildlife habitat/open space. Due to the nature of exploration and ongoing activity in the Uinta Basin, the post mining land use is likely to include exploration (by entities other than Earth Energy who may be exploring for oil and gas), as well as wildlife habitat and open space. While recognizing that oil and gas exploration may occur in the future, no further exploration is currently planned by Earth Energy, and the stated objective of reclamation planning in this NOI is to reclaim the site in order to provide for future post mining land uses of wildlife habitat and open space. In order to ensure an environmentally safe and stable condition for the wildlife in the area that meets the objectives of the Utah Mined Land Reclamation Act 40-8-12, Earth Energy will leave safe, stable topography; establish native vegetation suitable for habitat; remove man-made structures, including tanks, ponds, etc.; and cause no degradation or harm to water sources.

CULTURAL RESOURCES

Cultural resources were reviewed and inventoried onsite. No previously documented or new cultural resources were recorded (See Appendix B).

110.2 Reclamation of Road, Highwalls, Slopes, Etc.

If economics allow, mining may continue in other portions of the Study Area. In this case, facilities, and some roads may be maintained for access, and all new disturbances and operations would be subject to new permit approvals, either through amendments to this NOI or otherwise as required by DOGM. (These amendments or revisions would address how any mine expansion would occur, including details on any limited need for re-handling of materials, alterations to the processing plant, etc.) At this time, however, the mine/reclamation plan and associated bond estimate are based upon initial North (Opening) Pit mining, the West Pit, and associated disturbance. Also, for the purposes of the reclamation plan and bond estimate, it is assumed that all facilities and roads within the 213-acre Affected Area will be reclaimed as stated herein.

The overall objective of the reclamation plan described herein is to reclaim the entire Affected Area so as to allow postmining land uses of wildlife habitat and open space to resume. This objective will be met in part by removing facilities and structures that have been brought to the site, regrading, topsoiling, and reseeding, as described in more detail below. The intent is to meet the requirements of the

Utah Rules at R647-4, as stated in Section 110.6 below, and to meet the objectives of 40-8-12 of the Utah Mined Land Reclamation Act which include provisions for a safe, stable, environmentally functioning site.

Safety will be managed at reclamation by continuing to follow safe operating conditions while using equipment and continuing to follow the appropriate MSHA guidelines and regulations. Throughout the reclamation activities, visual inspections will be made at the site, under the terms of the Storm Water Permit(s) issued by either EPA or DWQ (depending upon Tribal Land jurisdictional decisions), which must remain active until bond release has been obtained. This will focus on erosion and sediment control, further ensuring that reclamation goals can be met. Further, visual inspections will also be made by DOGM, and will include ensuring that all reclamation activity obligations under the Utah Mined Land Reclamation Act and associated rules are being met. These inspections will continue until such time as DOGM approves the reclamation work and releases the surety.

Various types of equipment will be used to accomplish the reclamation objectives, as detailed in the surety calculations (Appendix E). This equipment includes: D6 and D8 dozers, Caterpillar 14 grader, Caterpillar 631 scraper, 65-ton crane, hand power tools, 35-ton dump truck, 950 loader, semi- and low-boy trailers, 100 bbl water truck, trackhoe, backhoe, seeder, and manure spreader. The water truck will be used to provide dust suppression as needed, and water will come from the well associated with Exploration Notice #E0190053 and to which Earth Energy has a water right for such uses.

ROADS

During operations, interim reclamation, and on-going reclamation and while on-site roads are still needed to access Affected Areas during final reclamation, Earth Energy will maintain roads as needed to minimize erosion and off-site sedimentation. Such road maintenance will continue until the roads are fully reclaimed.

There are approximately 17 acres attributed to roads that are not integral to the overburden/interburden storage areas (approximately 9,260 feet in length by 80 feet wide). During final reclamation, these roads would be deep-ripped to relieve compaction, regraded to blend with site topography, topsoiled, and seeded. Except where bedrock is encountered, ripping will be 24 inches deep, with ripper shanks spaced no more than 24 inches apart. In shallow bedrock areas, ripping depth may be less than 24 inches, by necessity. Roads that are integral to the overburden/interburden storage areas will be reclaimed as part of those features.

HIGHWALLS

No highwalls would remain at the end of mining as pits would be backfilled and/or graded off to blend with the existing surrounding topography.

SLOPES

All overburden/interburden storage areas (covering approximately 70 acres) and backfilled pits will be regraded to a 2.5-3H:1V or flatter slope to achieve a stable, natural-looking landscape. While short segments may exceed this overall slope, no areas will be so steep as to be unstable, cause safety hazards, encourage erosion, or hinder successful revegetation. The overburden/interburden storage areas will be re-contoured by dump-top rounding, toe extension and surface recontouring to create an undulating, roughened surface that will blend with the surrounding terrain, provide a site amenable to revegetation, and minimize runoff and erosion. The steepest portions of slopes will be faced with coarse overburden material to minimize erosive potential. This will be done with a trackhoe, backhoe, and/or dozer prior to topsoil placement. Safety and erosion control will be of primary focus during reclamation activities. As described further in Section 110.5, available salvaged topsoil will be applied to all areas with the exception of the armoured drainage channels. The entire area will be seeded with native species to stabilize the soil, and provide for the post-mining land use.

As noted, drainage will not be an issue on these regraded areas as there is little to no run-on and infiltration capacity will be high on reclaimed slopes.

PITS

Pits (approximately 93 acres) would be backfilled to approximately 60-65% of their original volume, primarily with produced sand, inter-mixed with overburden/interburden. Since the pit floor will be backfilled as part of the cast-back mining process, it will not need to be ripped. The final cut during mining will create a 3:1 slope to blend with surroundings. This will create a near-level surface (see cross-sections), thus no additional backfilling will be required during reclamation of the mined-out pits. The rough backfilled surface will be finish-graded and contoured with a road grader to assure the land blends with surroundings.

Remaining pit walls will be graded down to blend with the backfilled materials. The resulting contours would be graded to blend with surrounding topography, topsoiled, and seeded. The pit will not be an impounding feature upon final reclamation.

DRILL HOLES

No drill holes would remain at the end of mining.

FACILITIES AND MATERIALS

Some of the facilities on the 15-acre facility site would be taken apart and hauled away for disposal. Others would be buried onsite. As described further in the surety calculations (Appendix E), the maintenance building, warehouse, power plant, process train, distillation unit, sand dewatering unit, pond liner, Atco trailer, and 22 tanks would be hauled away. The facilities for which on-site burial will occur include the following: gravel from the parking area; foundations of Sprung structures; and reserve ore, sand, fines, and reject materials. Prior to any on-site burial activities, Earth Energy will obtain a solid waste disposal permit, if one is found to be necessary.

The maintenance building and warehouse are "Sprung" aluminum structures and are easily dismantled using hand power tools and crane. The mine office is a one-piece modular "Atco" office structure mounted on I-beams. Atco, which has been in business since 1947, includes removal of the structure in the purchase price, so no reclamation cost is included for this. The Power Plant is approximately 2,500 ft^2, and 20 tons, and consists of 1 gas generator, 1 diesel back-up, and 1 boiler. The process train, including piping, hoses, etc. is skid-mounted and is approximately 480 ft. long by 75 ft. wide by 20 ft. high, with a void volume of 30% for an assembled volume of 8,000 CY of material. Cut up, the volume would be roughly 25% of this, or 2,000 CY. The sand dewatering unit weighs approximately 30 tons.

All process materials will be removed from the train, prior to its being removed from the containment area, disconnected to individual skids, and hauled away. All of the residual process material will be separated into a solid, aqueous, or hydrocarbon phase. The solid phase can be discharged on site to the mined-out pits, as it consists of the same materials that have already been placed in that area. The aqueous phase will be discharged to the water storage/retention pond where it will evaporate or be pumped to a tank or container for off-site disposal. That pond will have been used for similar liquids during operations. Any remaining hydrocarbon phase that is not sold to a refinery will be recovered with a vacuum and hauled off site. No process materials that are hazardous or represent an impact to public health and safety will be disposed on site.

The re-bar reinforced concrete foundation under the warehouse and maintenance shop (each 10,000 ft^2) will be ripped up and broken into chunks using the D8 dozer.

The water/storage pond liner (60 mil) will be removed and hauled to the Uintah County Landfill on a flatbed as part of other loads. Gravel from the equipment

parking and service area (approximately 2.6 acres in size, or 1,396 CY of gravel) will be pushed into water retention pond after removal of liner with dozer. Reserve, sand and fine tails, and reject ore stockpiles (approximately 60,000 CY, total) will be loaded into trucks and hauled back to pit where an opening will be made to place unused ore in the backfilled pit. The 15-acre facilities area will be ripped, topsoiled, and reseeded.

Trash removal will occur after all buildings and facilities are removed; it will involve collection of all refuse, litter, stray metal, pipe, wood, insulation, and other debris. The 213-acre area will be inspected to check for and collect trash.

There would be no shafts or adits, or similar structures that would require reclamation. As noted above under the Pits subheading, the operating pit that forms an impoundment will not be impounding after backfilling and reclamation. Further, as described, the water retention pond will be reclaimed and thus will not remain an impounding feature.

110.3 Surface Facilities to Remain

The processing plant, all associated support facilities, and mining equipment would be removed from the site, unless economic conditions allow for continued mining, in which case the site processing facilities would remain intact on the 15-acre processing site.

Approximately 4,000 feet of fence with a wooden top rail (as per DWR request) will be in place when reclamation commences, as well as two metal safety gates, and safety signs. The fence and signs located along the county road will be left in place until bond release, at which time they would be removed.

110.4 Treatment, Location and Disposition of Deleterious Materials

During operations, all new and spent fuel, oil, and lubricants will be stored within secondary containment as required by the SPCC Plan, as further described in the operations Section 106.2. These containers and their contents will be removed to a licensed disposal facility prior to reclamation of the process facility. If any hydrocarbon spills occur during mining these will be dealt with as outlined in the SPCC Plan, and thus will not pose a problem during reclamation. Any fuel spills that occur during the reclamation process would be similarly managed.

Any other chemicals, including the process chemical, present during operations, would be consumed during mining and processing. Any of the stored substances remaining onsite at the end of mining would be properly removed and disposed of, prior to final reclamation. Any remaining fuels would be used to fuel equipment used in reclamation work. Fuels and liquids remaining after reclamation will be

removed for disposal or re-use by a company such as Tri-State Recycling. No acid forming or deleterious material would be left on-site.

110.5 Revegetation Planting Program and Topsoil Redistribution

Table 9, below, shows that all of the 213 acres of Affected Areas will be reclaimed by various methods. This includes redistributing topsoil on all areas except those associated with the armored drainage channels and the topsoil storage areas (soils will not have been salvaged on those areas, so original topsoil will remain).

Table 9 Reclamation Treatment Acres

Facility	Affected Area (acres)	Acres to be graded	Acres to be ripped	Acres to be topsoiled	Seeded Acres
Plant Site including Office and Processing facilities	15	0	15	15	15
Plant Perimeter Road	5.5	5.5	5.5	5.5	5.5
Haul Road Segment 1	5.5	5.5	5.5	5.5	5.5
Haul Road Segment 3	3.0	3.0	3.0	3.0	3.0
Haul Road Segment 5*	3.0	3.0	3.0	3.0	3.0
North (Opening) Pit	62	62	0	62	62
West Pit	31	31		31	31
Overburden/interburden storage area 1	36	36	0	36	36
Overburden/interburden storage area 2	34	34	0	34	34
Topsoil storage areas	18	0	18	0 (topsoil already in place)	18
Total	213	180	50	195	213

*Haul Road Segments 2 and 4 are integral to overburden/interburden storage areas and reclamation treatments are included within those facilities.

SOIL MATERIAL REPLACEMENT

Once final grading is complete, as described above, topsoil will be replaced using scrapers and dozers. Topsoil would be placed on the backfilled and regraded surfaces of the pit and overburden/interburden storage areas (with exceptions as noted previously) as the mining/processing/ backfilling sequence allows. Approximately 132,250 cubic yards of topsoil will be redistributed to about a 5-inch depth with a scraper and dozer assist, over approximately 195 acres of the mine. Topsoil storage areas will not be topsoiled.

The graded/topsoiled surfaces would be ripped with a road grader on the contour to provide a greatly roughened surface to retain seed and to enable root penetration. Vegetative matter gathered during the topsoil salvage operations and stockpiled as a component of those piles would also be spread along with the topsoil, providing organic matter and helping with soil moisture retention. Any additional salvaged vegetation that was stored in slash piles will be placed and redistributed on reclaimed areas in order to provide organic matter and surface roughness.

Equipment used for this task is likely to be a dozer, scraper and farm tractor/ implements.

SEED BED PREPARATION

As described above, the topsoil will be spread and left in a very roughened surface that will be loose but not erodible. Ripper shanks on a road grader will be used to stabilize soil, depending on field conditions. The ripper will be used with shanks spaced approximately 36 inches apart and 18 inches deep. The salvaged topsoil will provide a reasonable growth medium for the site. No mulch or fertilizer will be used in reclamation efforts. The final surface will be rough, creating small depressions for water retention sites and habitat niches.

Seed Mixture

A single seed mix (below) will be used for all reclaimed surfaces and is based on sampling results and NRCS ecological site data. Any alterations beyond what is included in the list would require agency approval. All 213 acres affected will be seeded with a D6 tractor-pulled broadcast seeder.

Table 10: Seed Mix

SPECIES	SEEDS/LB	PLS* LB/AC
Forbs -		
Blue flax (*Linum lewisii*)	293,000	0.50
Rocky Mountain penstemon var. Bandera (*Penstemon strictus*)	592,000	0.25
Small burnet (*Sanguisorba minor*)	55,000	1.00
Lupine (*Lupinus caudatus* or *L. alpestris*)	27,600	1.00
Total forbs in seed mix		2.75
Grasses -		
Muttongrass (*Poa fendleriana*)	890,000	2.00
Canby bluegrass (*P. canbyi*)	926,000	1.00
Indian ricegrass (*Achnaetherum hymenoides*)	150,000	2.00
Great basin wildrye var. Magnar (*Leymus cinereus*)	130,000	2.00
Bluebunch wheatgrass (*Pseudoroegneria spicata ssp. spicata*)	140,000	3.00
Western wheatgrass (*Pascopyrum smithii*)	110,000	3.00
Total grass in seed mix		13.00
Shrubs -		
Sagebrush – Wyoming or Mountain (*Artemisia tridentata wyomingensis or vaseyana*)	2,500,000	0.25
Bitterbrush var. Lassen (*Purshia tridentata*)	15,000	2.00
Serviceberry (*Amelanchier alnifolia*)	25,800	1.00
Snowberry (*Symphoricarpos oreophilus* or *S. albus*)	75,000	1.00
Total in shrubs in seed mix		4.25

Total pounds of seed applied per acre: 20.0 PLS lb/ac

* PLS = Pure Live Seed

Seeding Method

The seed mix would be broadcast seeded on all areas that will be reclaimed, including regraded overburden/interburden storage area slopes and pit slopes. Revegetation work, including both seedbed preparation and seed application will take place in the late fall season and seed would be spread as soon as possible following seedbed preparation.

Other Revegetation Procedures

As noted throughout this document, all reclaimed slopes will be stabilized by regrading to 2.5H:1V or flatter and leaving them in a very roughened form to maximize infiltration and minimize runoff. It is important to note that there will be little to no run-on on these reclaimed surfaces. Further, in regard to the overburden/interburden storage area slopes, the coarser materials will typically end up near the toe of the expanding fills as the dump sites are filled to their maximum capacity. The concentration of coarse materials at the toe of the fills provides a natural energy dissipater for storm runoff from the faces of the dumps. The broken rock material has a very low siltation potential and will effectively encapsulate the finer material initially placed in the upper reaches of the overburden/interburden storage areas.

Earth Energy would monitor for noxious weeds, and would provide weed control measures according to County directives should noxious weeds pose a potential problem. This would be done in the early summer months each year after reclamation until bond release has occurred. The monitoring would consist of a site visit by a biologist familiar with the potential noxious weeds, and a simple visual walk around the 213-acre area would be sufficient for this small area. If any noxious weeds are identified, the County would be informed of their extent, and actions taken as directed by them.

Further, Earth Energy would qualitatively and visually monitor revegetation success for the first two years after reclamation, during the growing season. During the third summer, quantitative surveys, following the appropriate Division guidelines, will be conducted to assess revegetation success. This will determine whether revegetation has achieved 70 percent of the pre-mining cover, and survived after three growing seasons, as required by R647-4-111.13.11.

110.6 Statement

Earth Energy would conduct reclamation as required under the Utah Rules R647-4.

R647-4-112. Variance

No variances are being requested for this mining operation.

R647-4-113. Surety

A reclamation surety estimate is being provided to the Division and is summarized below. See Appendix E for the spreadsheet and backup information. The bond is for 213 acres and is shown as "Affected Area" acres on Figures.

1)	Clean-up and removal of structures	$ 244,744.
2)	Backfilling, grading and contouring	$ 18,740.
3)	Soil material redistribution and stabilization	$ 120,281.
4)	Revegetation (preparation, seeding, mulching)	$ 174,387.
5)	Safety gates, berms, barriers, etc.	$ 14,208.
6)	Demolition, removal or burial of facilities/structures, regrading/ripping of facilities areas	$ 127,697.
7)	Regrading, ripping of waste dump tops and slopes (overburden/interburden storage areas)	$ 362,549.
8)	Regrading/ripping of topsoil stockpile areas	$ 1,788.
9)	Ripping access roads	$ 4,834.
10)	Drainage reconstruction	$ 0.
11)	Mulching, fertilizing and seeding the Affected Area	$ 0.
12)	General site clean-up and removal of trash and debris	$ 18,791.
13)	Removal/disposal of hazardous materials	$ 275.
14)	Equipment mobilization	$ 9,721.
15)	SUBTOTAL 1 Base cost for reclamation	$ 1,098,014.
	15.1 Supervision during reclamation	$ 109,801.
	15.2 Revegetation monitoring & weed control	$ 119,361.
16)	SUBTOTAL 2 Reclamation, Supervision, & Monitoring	$1,327,176.
	16.1 Contingency (5%)	$ 66,359.
17)	SUBTOTAL 3:	$1,393,535.
	17.1 Escalation (for 5 years at 3.8% per yr.)	$ 285,675.
18)	TOTAL: Reclamation liability estimation	$1,679,210.
	ROUNDED TOTAL:	$1,679,200.

References

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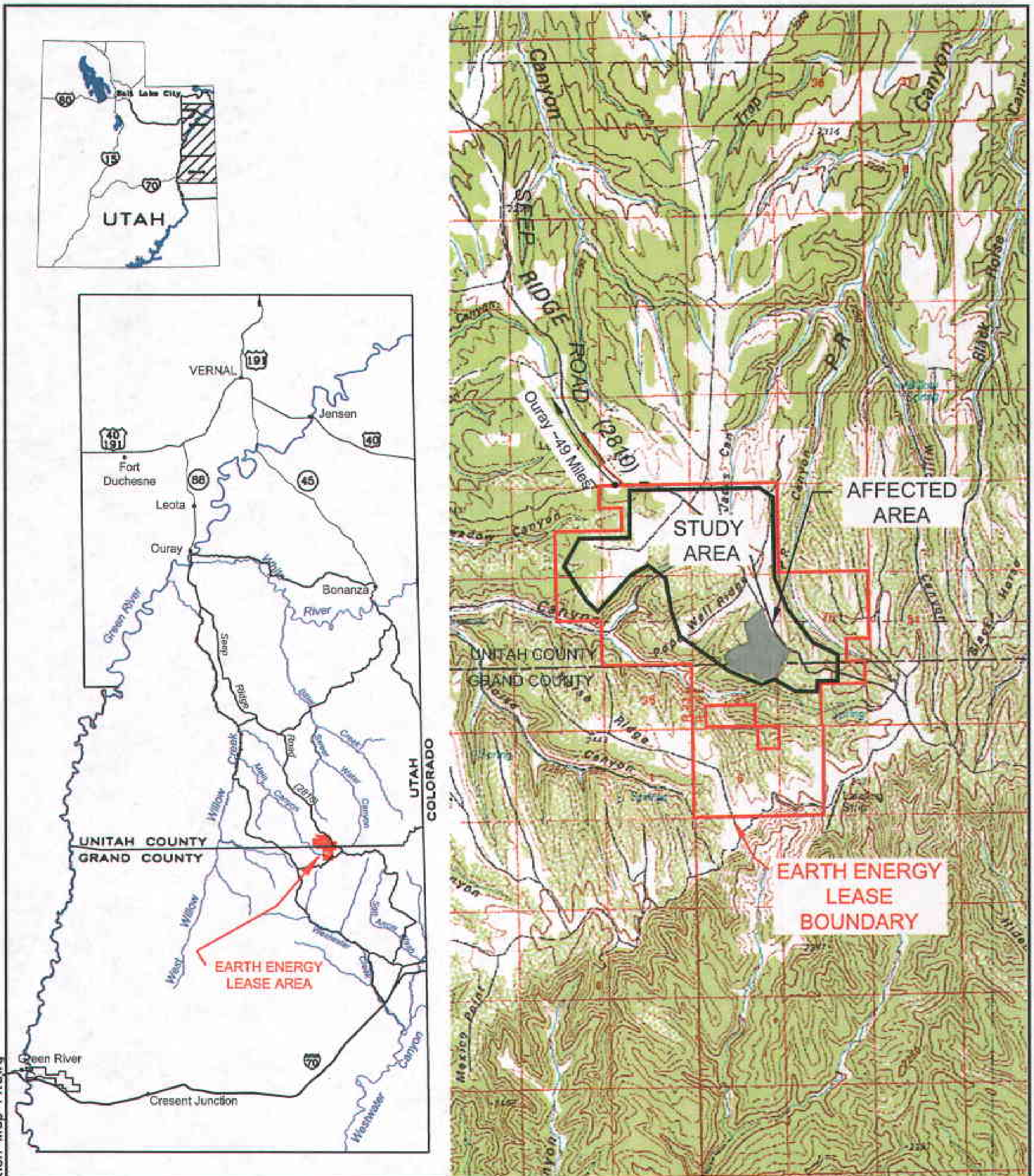
Figures



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

1 0 1 2 3 4 KILOMETERS

1 0 1 2 MILES

Contour Interval 50 Meters

drawings\EarthEnergy\Fig1 Location Map r1.dwg

EARTH ENERGY RESOURCES, INC.

PR SPRING TAR SANDS DEVELOPMENT PROJECT

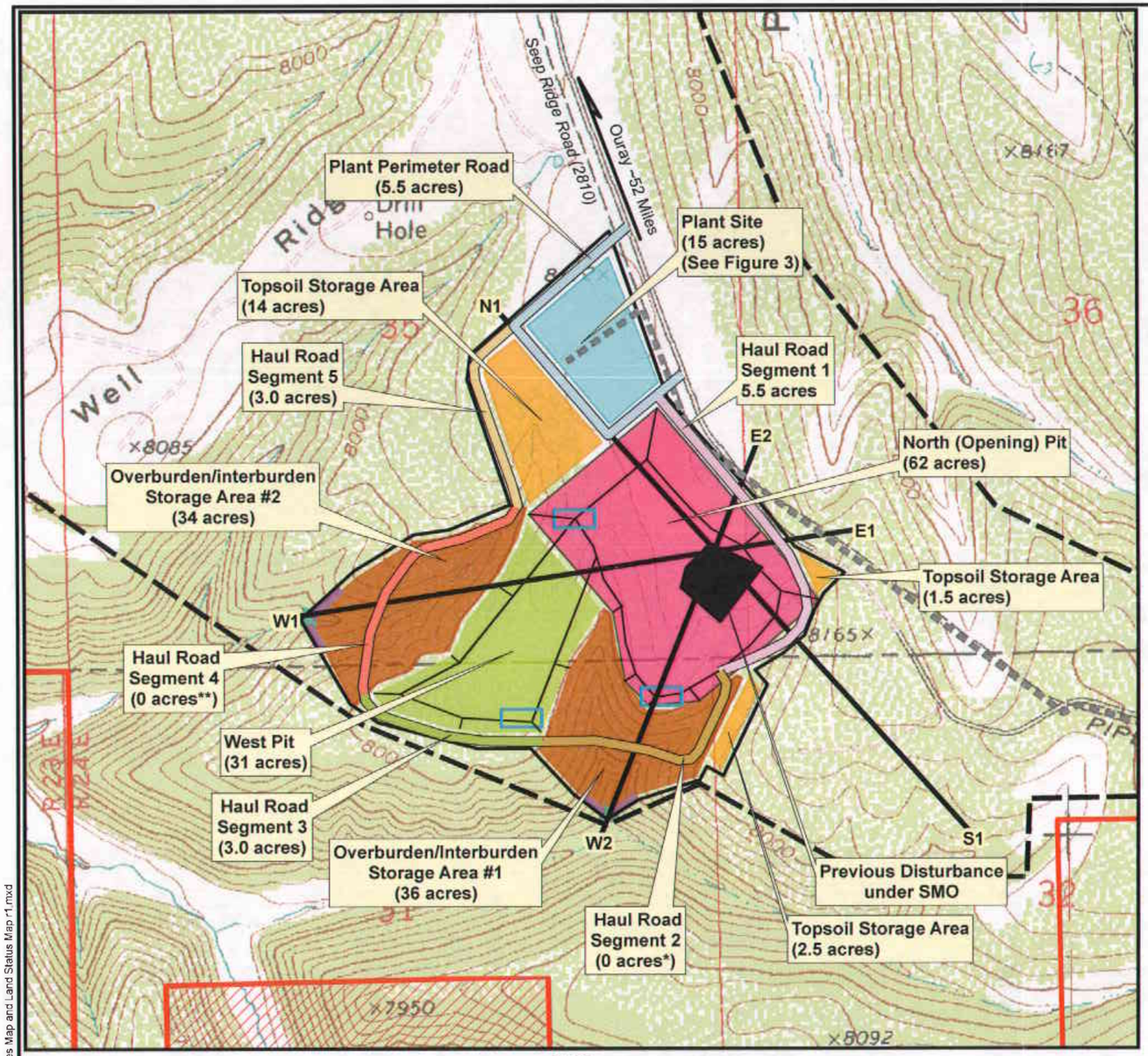
FIGURE 1
PROJECT LOCATION MAP

APPROVED SEP 1 2009 DIV. OIL GAS MINING

jbr environmental consultants, inc.

DESIGN BY	LM	DRAWN BY	CP	CH'D BY		SCALE	1:100,000

DATE DRAWN 9/11/07
REVISION 3/31/08
10/30/08



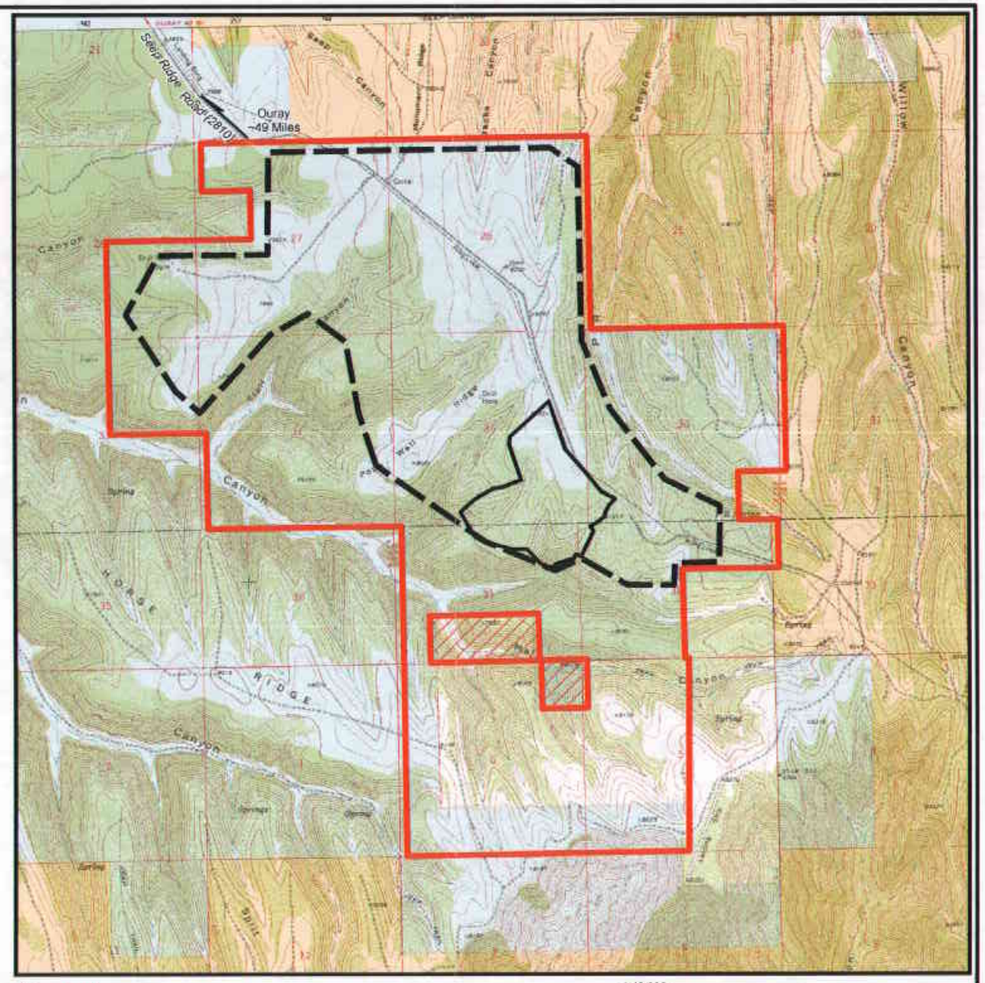
1:12,000

Legend

- Earth Energy Lease Boundary
- Property Excluded from Lease
- Affected Area
- Study Area Boundary
- Cross Section Line
- Water Pipeline (Water line not part of this NOI - permitted under Exploration Notice #E0190053)
- Previous Disturbance under SMO
- Plant Site
- Topsoil Storage Areas
- West Pit
- Overburden/Interburden Storage Areas
- North (Opening) Pit
- Collection Sump (inflow)
- Rip-Rap Energy Dissipater
- Rip-Rap Armoured Channel Bed
- Plant Permimter Road
- Haul Road Segment 1
- Haul Road Segment 2*
- Haul Road Segment 3
- Haul Road Segment 4**
- Haul Road Segment 5

* Acreage Intergal with Overburden/Interburden Sorage Area #1

** Acreage Integral with Overburden/Interburden Storage Area #2



1:48,000

Legend

- Affected Area
- Study Area Boundary
- Earth Energy Lease Boundary
- Property Excluded from Lease

Land Status

- BLM
- State

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N

EARTH ENERGY RESOURCES, INC.

PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 2
MINE SURFACE FACILITIES
AND LAND STATUS MAP

jbr environmental consultants, inc.

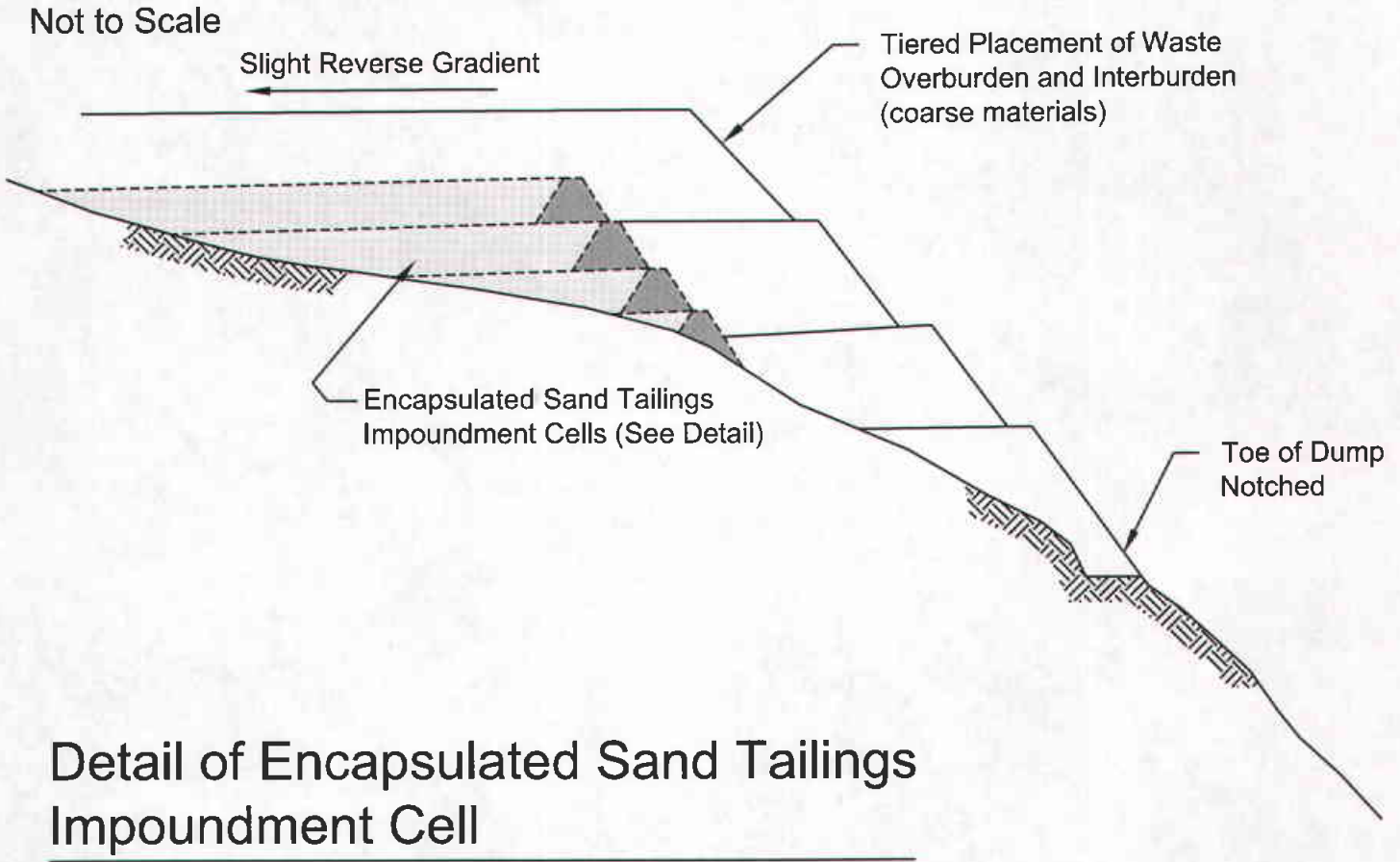
DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	REVISIONS
LM	CP	As Shown	9/11/07	3/31/08
				5/08/08
				10/30/08

drawings\Earth Energy\Fig2 Mine Surface Facilities Map and Land Status Map r1.mxd

drawings\Earth Energy\Fig2a Overburden Dump and Sand Tailings Cells.dwg

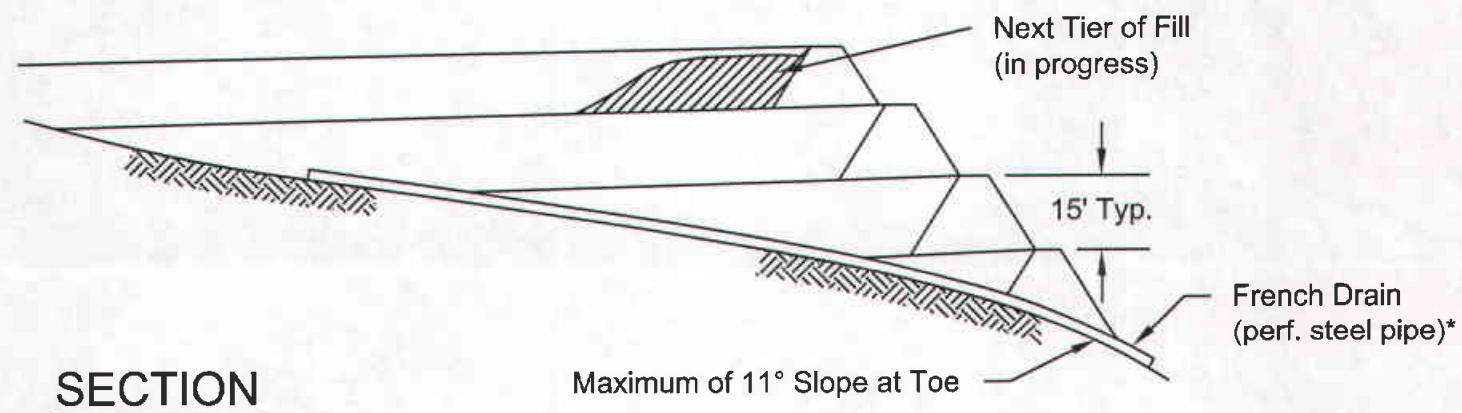
General Arrangement of Overburden Dump and Sand Tailings Encapsulation Cells

Not to Scale

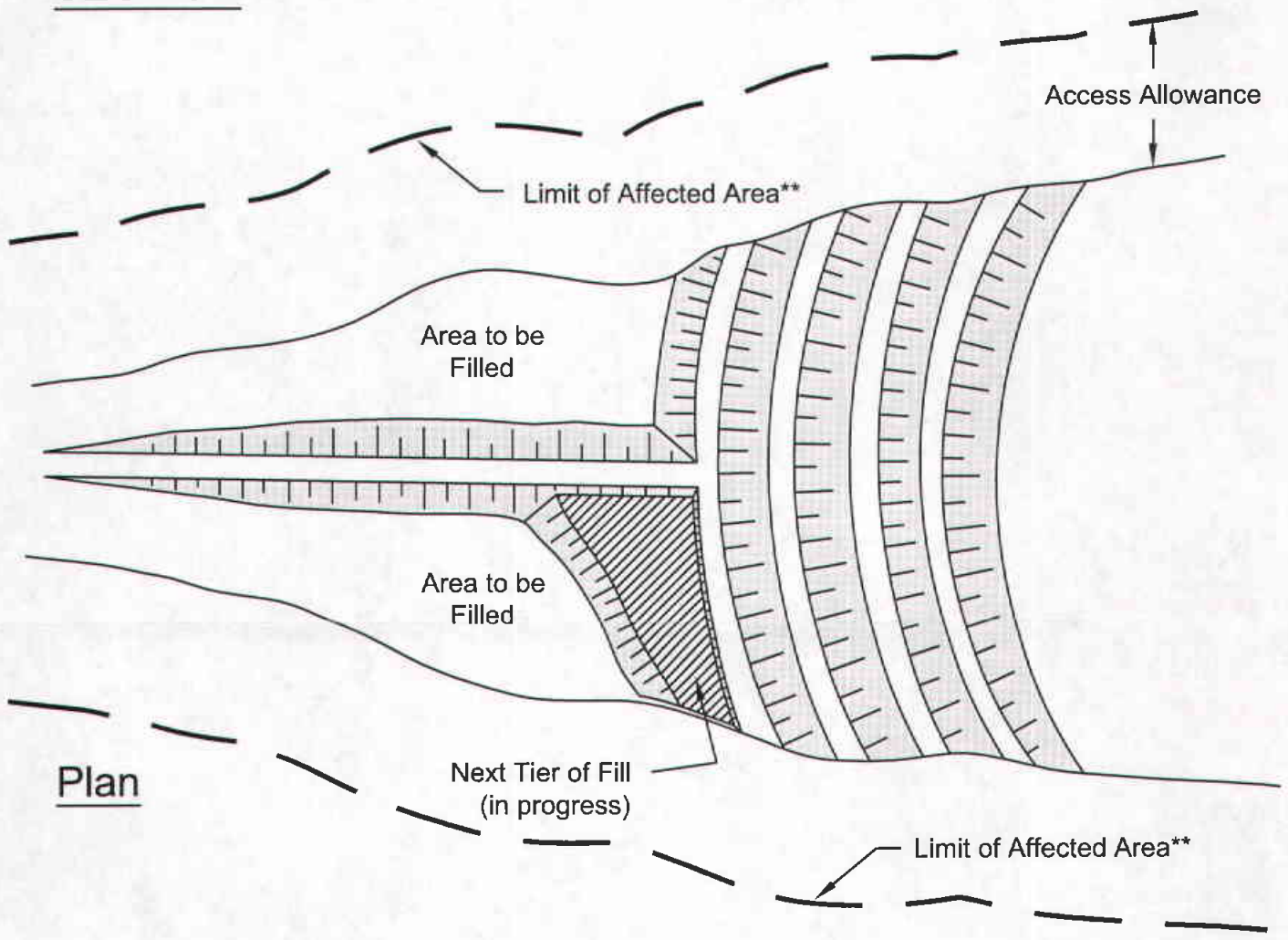


Detail of Encapsulated Sand Tailings Impoundment Cell

Not to Scale



SECTION



Plan

*Or similar means to provide drainage.
**Sufficient acreage maintained to allow truck access to the lower areas of the overburden/interburden storage area.

Note: Construction access will be within defined affected area boundary.

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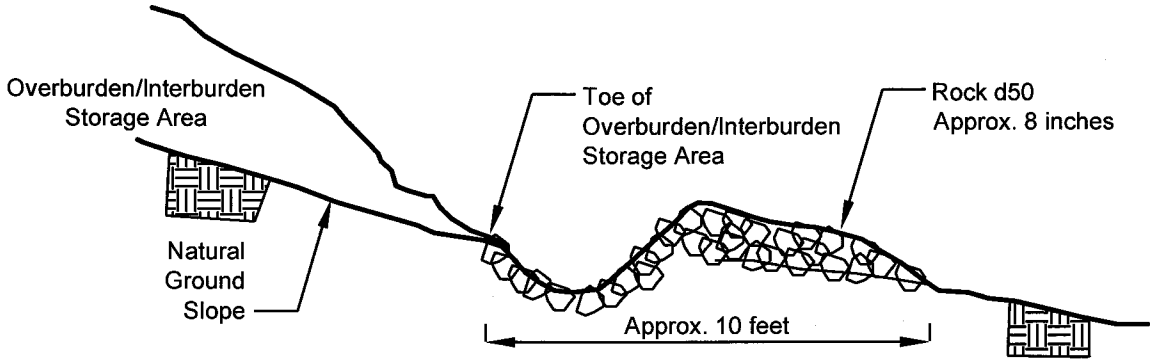
PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 2a
GENERAL ARRANGEMENT OF OVERBURDEN STORAGE AREA AND SAND TAILINGS ENCAPSULATION CELLS

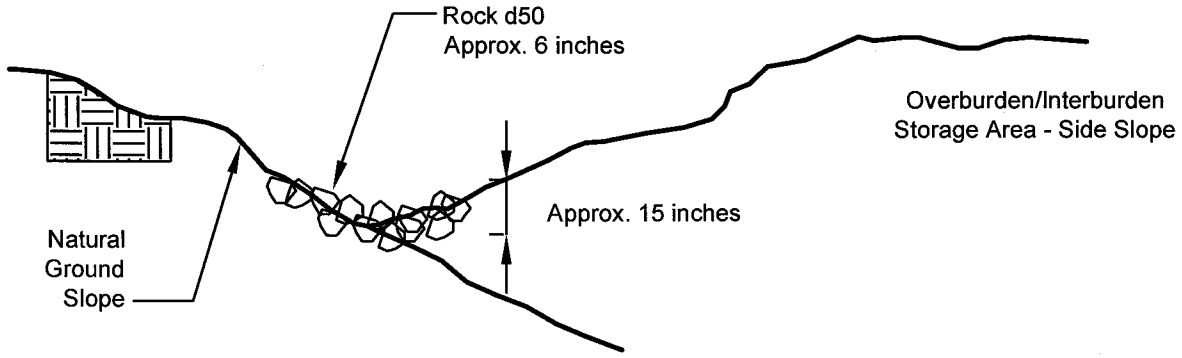
jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	REVISION
Earth Energy	CP	NTS	03/09/09	05/07/09

IR - 000113



Energy Dissipater Schematic
Cross-Section (not to scale)



Overburden/Interburden Storage Area
Side Slope Contact with Natural Ground Slope
Schematic Cross-Section (not to scale)

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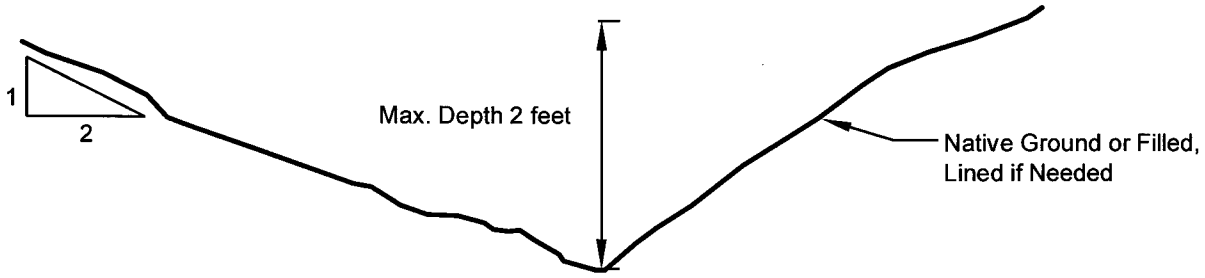
FIGURE 2b
OVERBURDEN/INTERBURDEN STORAGE AREAS
RUNOFF AND EROSION CONTROL STRUCTURES

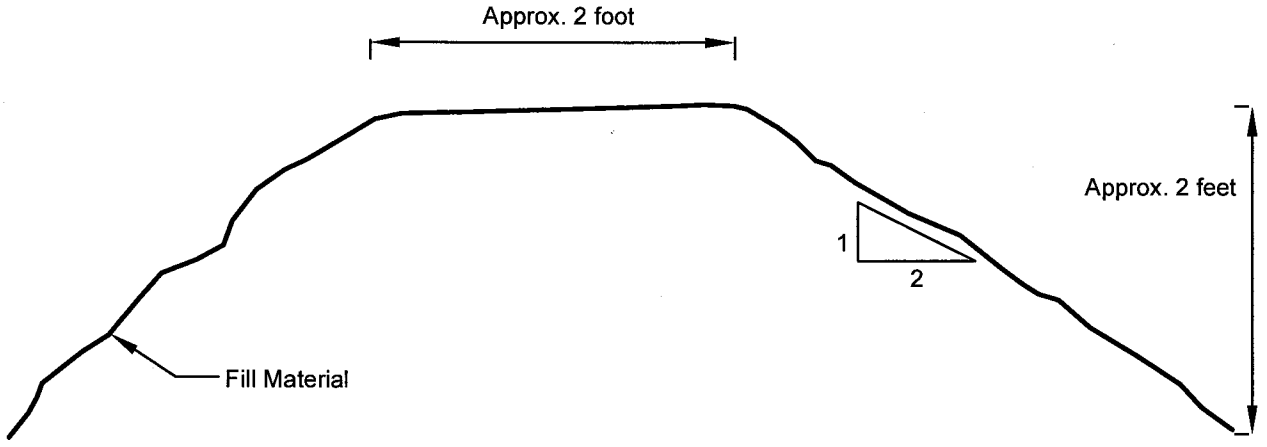
jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
KK	RD		NTS	05/07/08	

drawings\EarthEnergy\Fig2b Overburen Interburden Storage Areas Runoff Erosion Control Structures.dwg



Typical Perimeter Ditch
Schematic Cross-Section (not to scale)



Typical Perimeter Berm
Schematic Cross-Section (not to scale)

drawings\EarthEnergy\Fig2c Plant Site Runoff and Erosion Control Structures_r1.dwg

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PR SPRING TAR SANDS DEVELOPMENT PROJECT

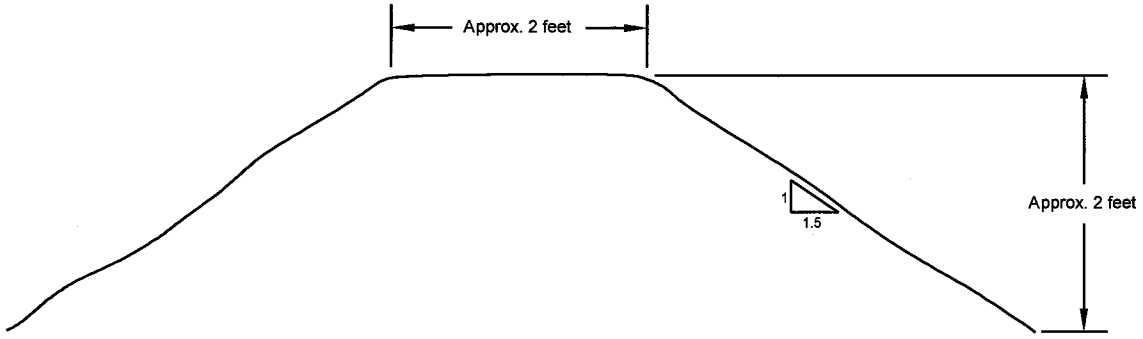
FIGURE 2c
PLANT SITE RUNOFF AND
EROSION CONTROL STRUCTURES

jbr environmental consultants, inc.

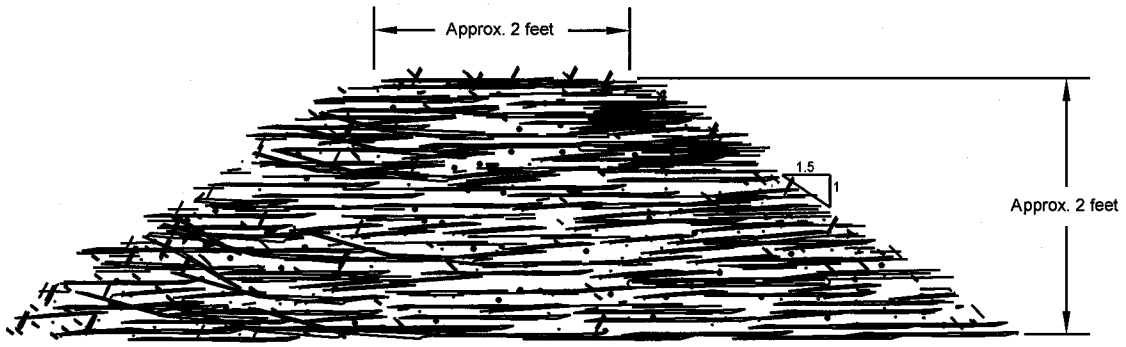
DESIGN BY	KK	DRAWN BY	RD	CH'D BY		SCALE	NTS

DATE DRAWN	05/07/08
REVISION	05/07/08

IR - 000115



Typical Topsoil Storage Area Berm
Schematic Cross-Section (not to scale)



Typical Woody Material Berm
Schematic Cross-Section (not to scale)

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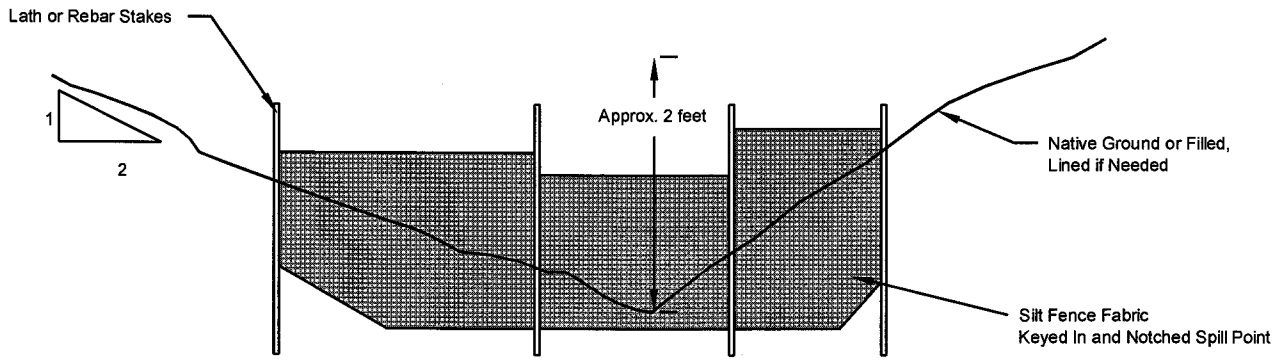
PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 2d
PLANT SITE RUNOFF AND
EROSION CONTROL STRUCTURES

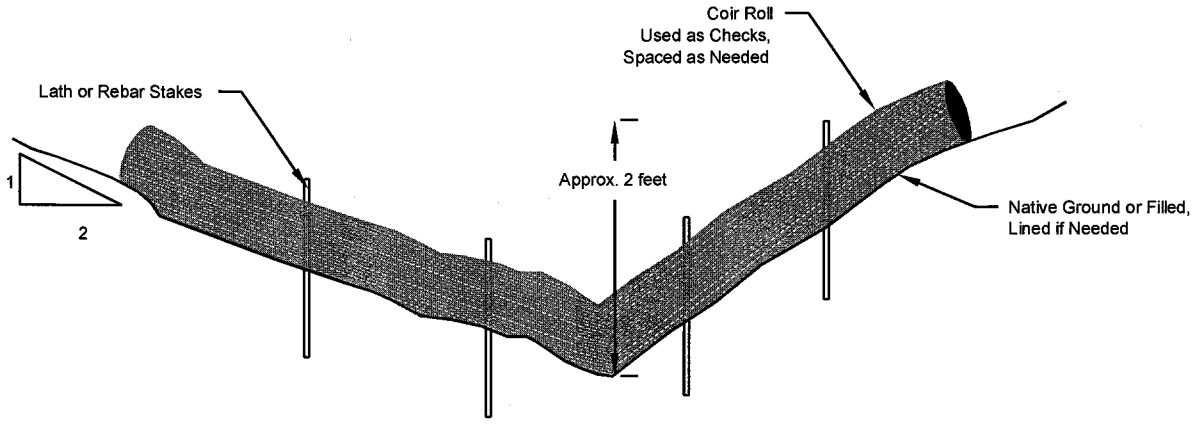
jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
KK	CP		NTS	10/27/08	

drawings\EarthEnergy\Fig2d Plant Site Runoff and Eronsion Control Structures.dwg



Typical Perimeter Ditch with Silt Fence
Schematic Cross-Section (not to scale)



Typical Perimeter Ditch with Coir Roll
Schematic Cross-Section (not to scale)

drawings\EarthEnergy\Fig2e Plant Site Runoff and Eronsion Control Structures.dwg

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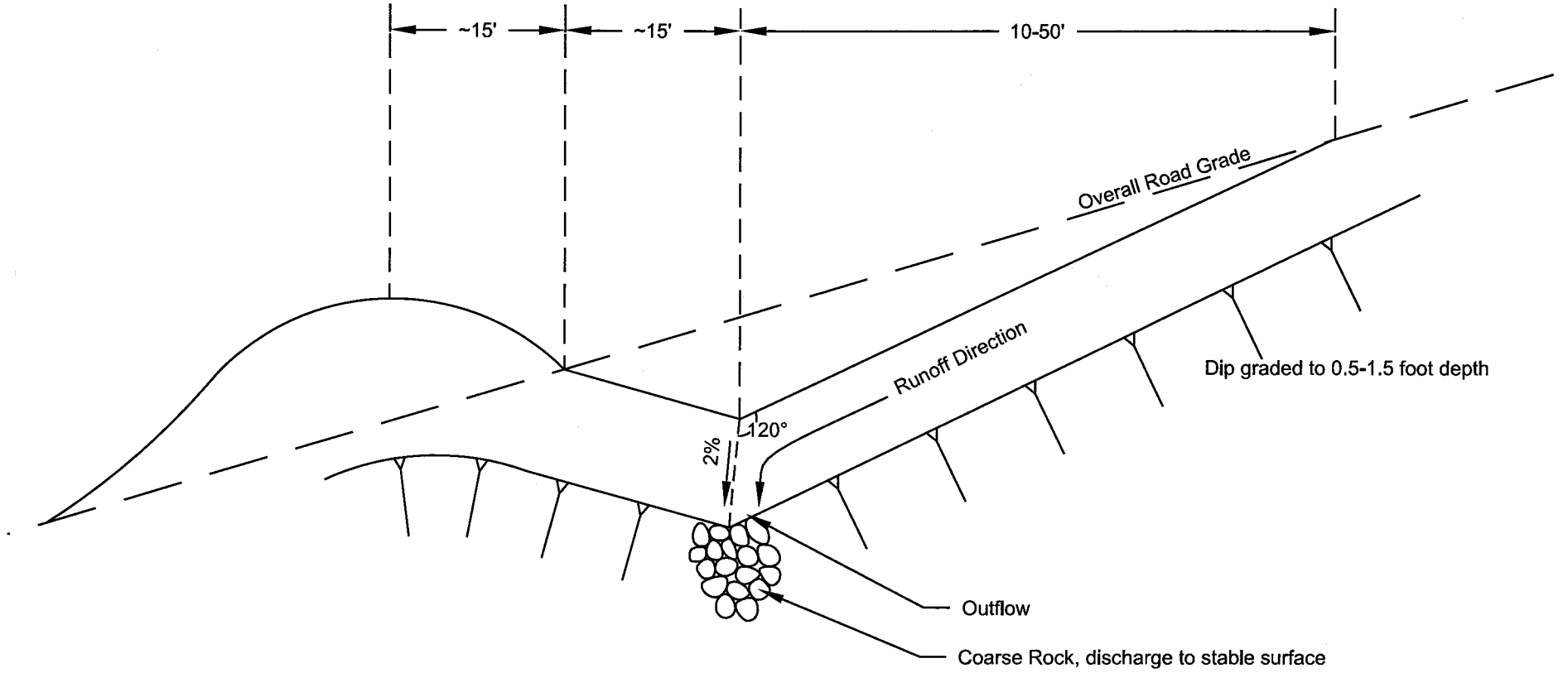
PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 2e
PLANT SITE RUNOFF AND
EROSION CONTROL STRUCTURES

jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
KK	CP		NTS	10/27/08	

drawings\EarthEnergy\Fig2f Plant Site Runoff and Eronsion Control Structures.dwg



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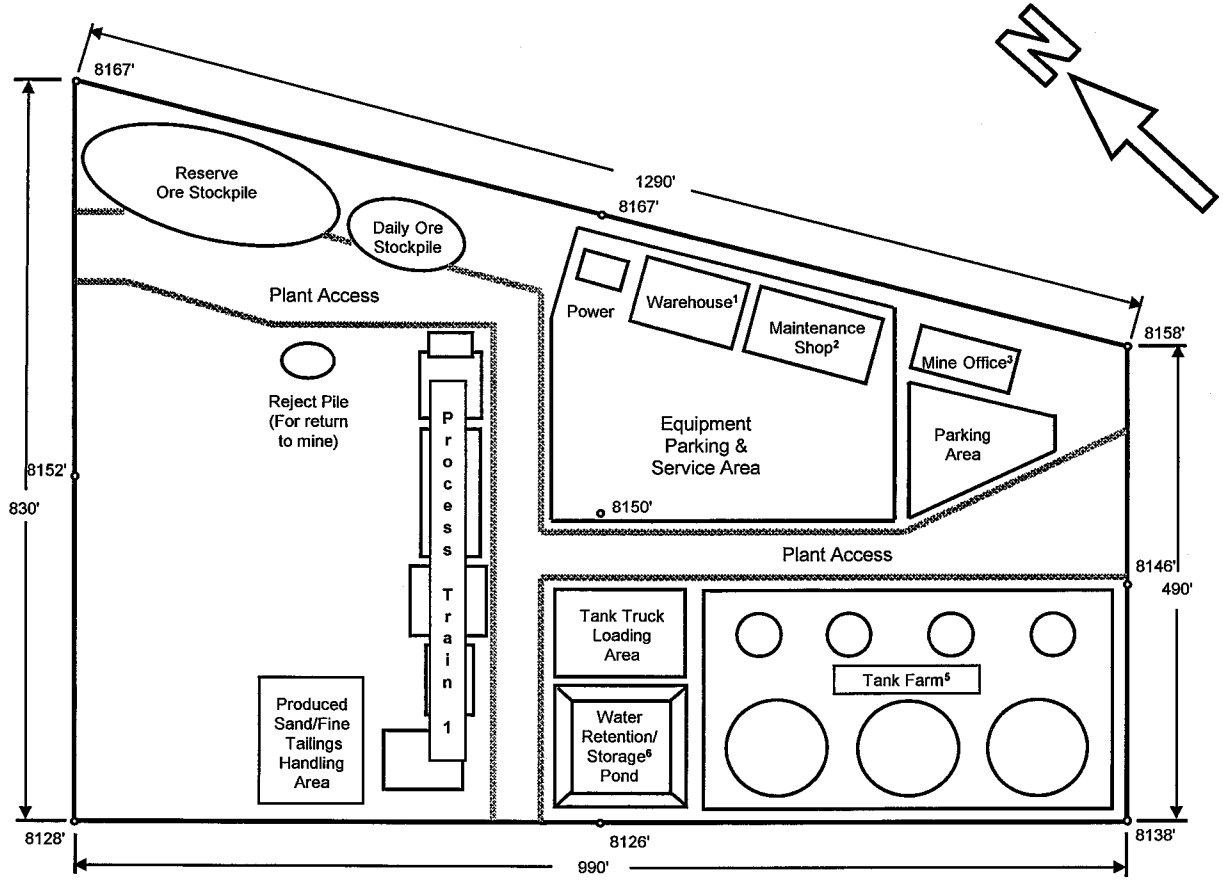
PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 2f
TYPICAL HAUL ROAD
ROLLING DIP TURNOUT

jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
KK	CP		NTS	10/27/08	

IR - 000118



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NOTES:

1) "Sprung type" structure on concrete pad
2) "Sprung type" structure on concrete pad
3) "Atco type" modular office (2-3 unit) on gravel pad
4) All process equipment skid-mounted c/w sill plates
5) Actual size and no. of tanks may vary from that shown
6) All site drainage to be collected in retention/storage pond
7) Area of Plant Site: ~15 acres
8) Spot Elevations: ft. ASL (from BigTopo)

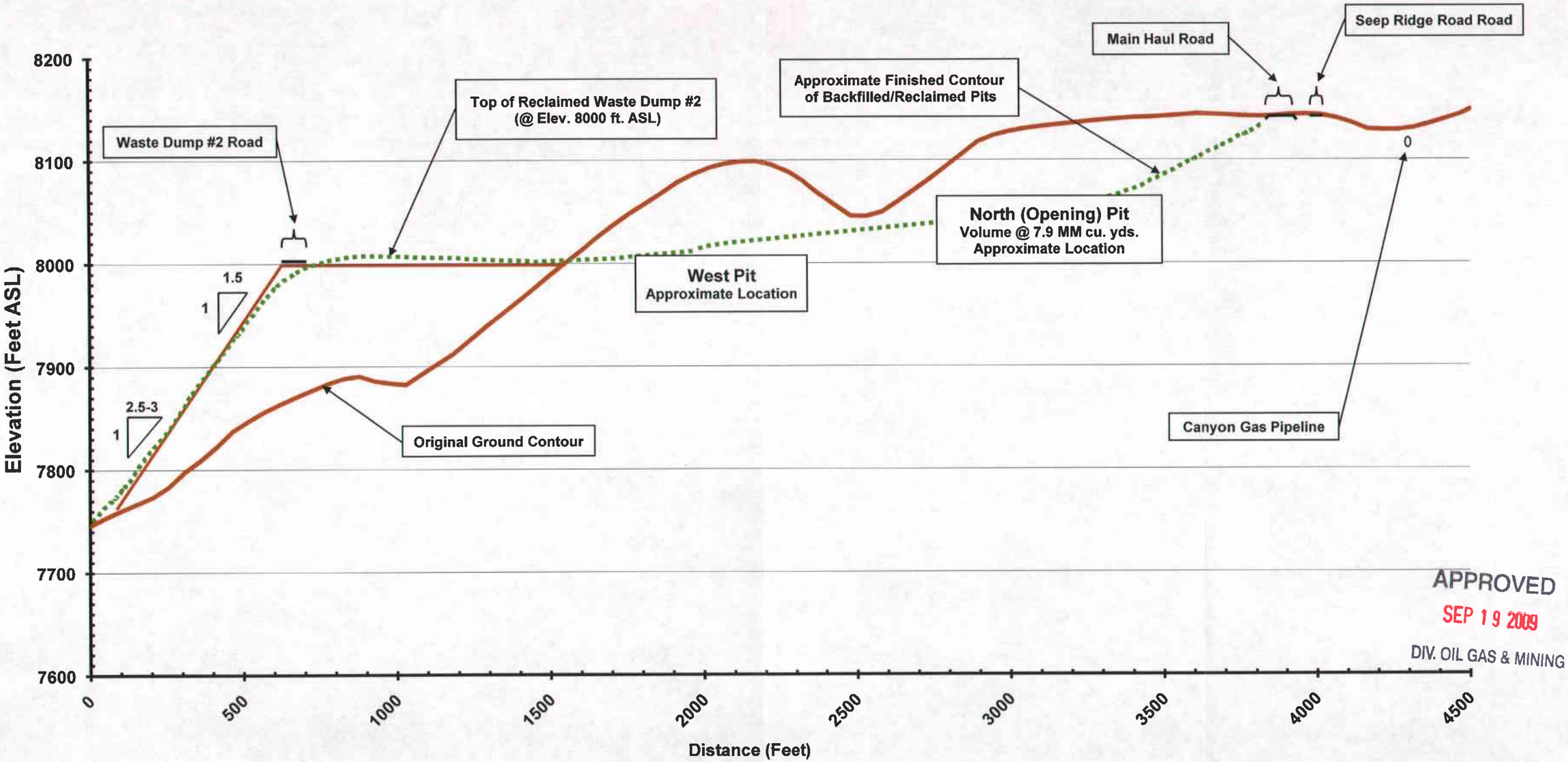
Earth Energy Resources
Figure 3
PR Spring Plant Site - Plot Plan
Preliminary Equipment Layout - Rev.4

Drawing Not to Scale

Drawn by: TJW Date: Feb 13, 2008

IR - 000119

Figure 4a
Earth Energy Resources Inc. - PR Spring Oil Sand Mine
Transverse Mine Section W1-E1 Rev.3



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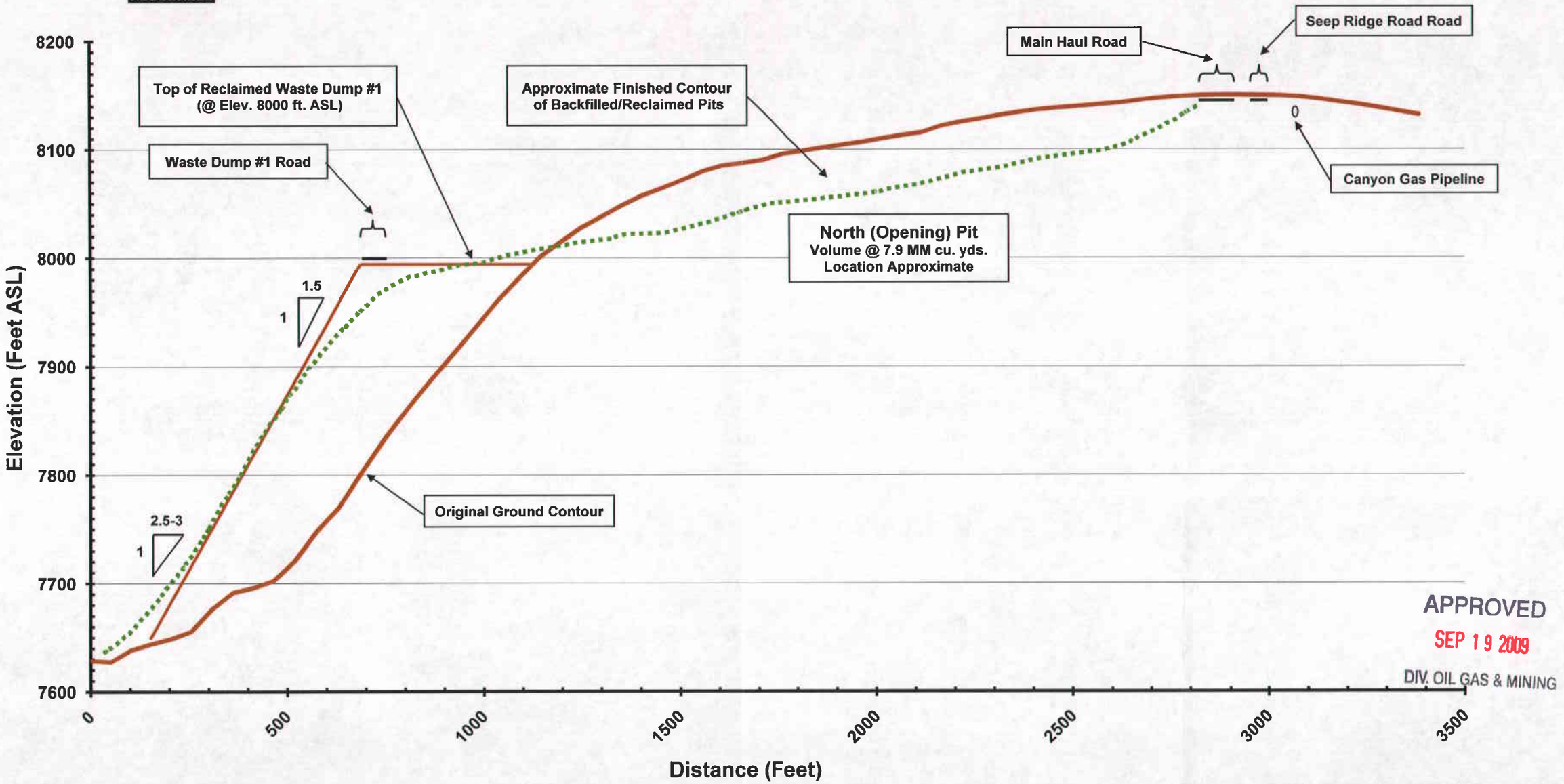
Drawn by: TJW Date: Sept 20, 2007
Revised by: CLP Date: March 3, 2009

IR - 000120

Figure 4b
Earth Energy Resources Inc. - PR Spring Oil Sand Mine
Transverse Mine Section W2-E2 Rev.3



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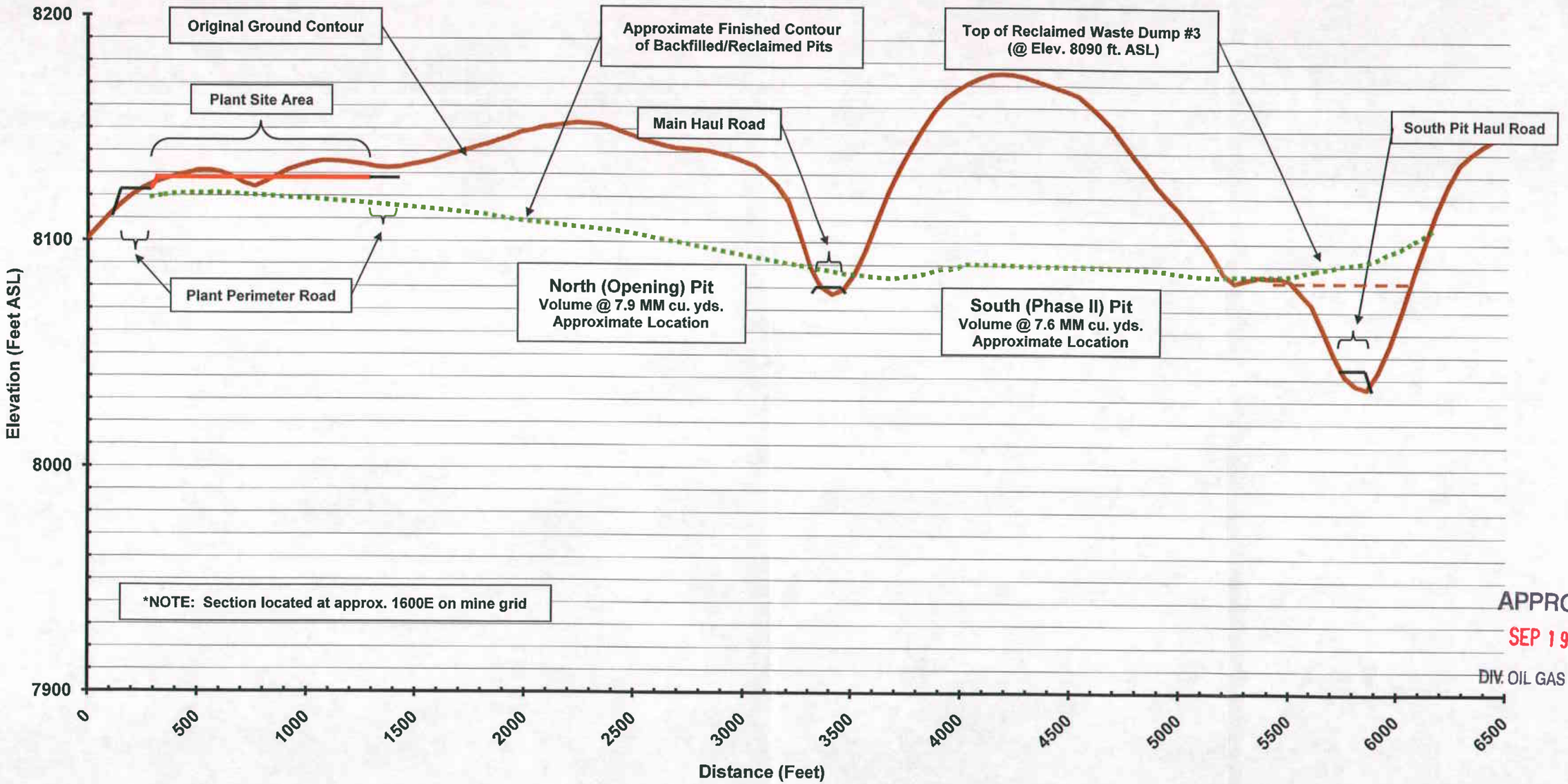
Drawn by: TJW Date: Sept 20, 2007
Revised by: CLP Date: March 3, 2009

IR - 000121

Figure 4c
Earth Energy Resources Inc. - PR Spring Oil Sand Mine
Longitudinal Mine Section N1-S1* Rev.3



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Drawn by: TJW Date: Sept 20, 2007
Revised by: CLP Date: March 3, 2009

IR - 000122

This page is a reference page used to track documents internally for the Division of Oil, Gas and Mining

Mine Permit Number M/047/0090 Mine Name PR Springs
Operator Earth Energy Date March 23 2010
TO _____ FROM _____

X CONFIDENTIAL __BOND CLOSURE __LARGE MAPS __EXPANDABLE
__MULTIPUL DOCUMENT TRACKING SHEET __NEW APPROVED NOI
__AMENDMENT _OTHER_____

Description YEAR-Record Number

X NOI __Incoming __Outgoing __Internal __Superceded

NOI

___NOI __Incoming __Outgoing __Internal __Superceded

__NOI __Incoming __Outgoing __Internal __Superceded

__NOI __Incoming __Outgoing __Internal __Superceded

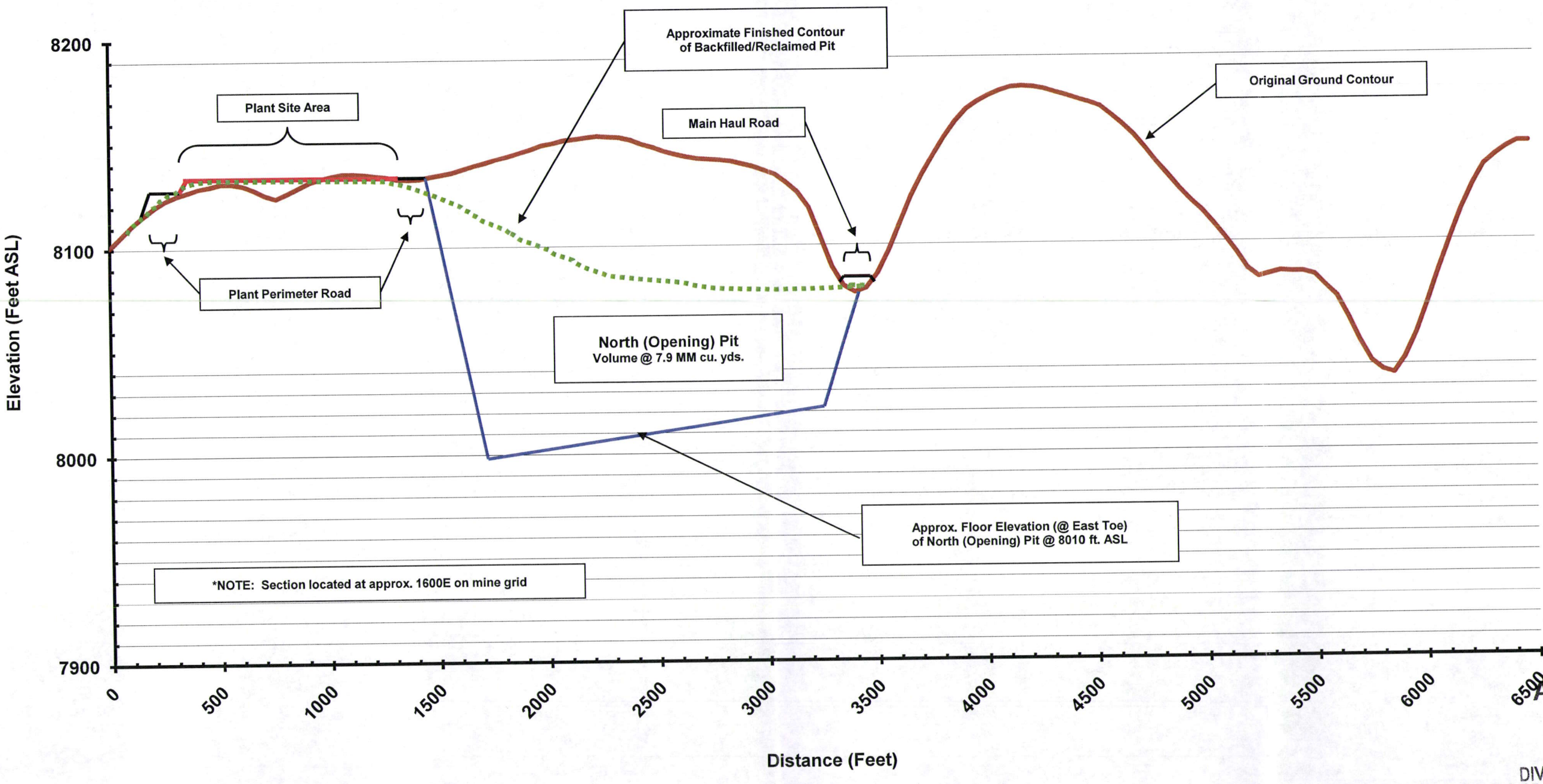
__TEXT/ 81/2 X 11 MAP PAGES __11 X 17 MAPS __LARGE MAP

COMMENTS: _____

CC: _____

IR - 000123

Figure 4c
Earth Energy Resources Inc. - PR Spring Oil Sand Mine
Longitudinal Mine Section N1-S1* Rev.4



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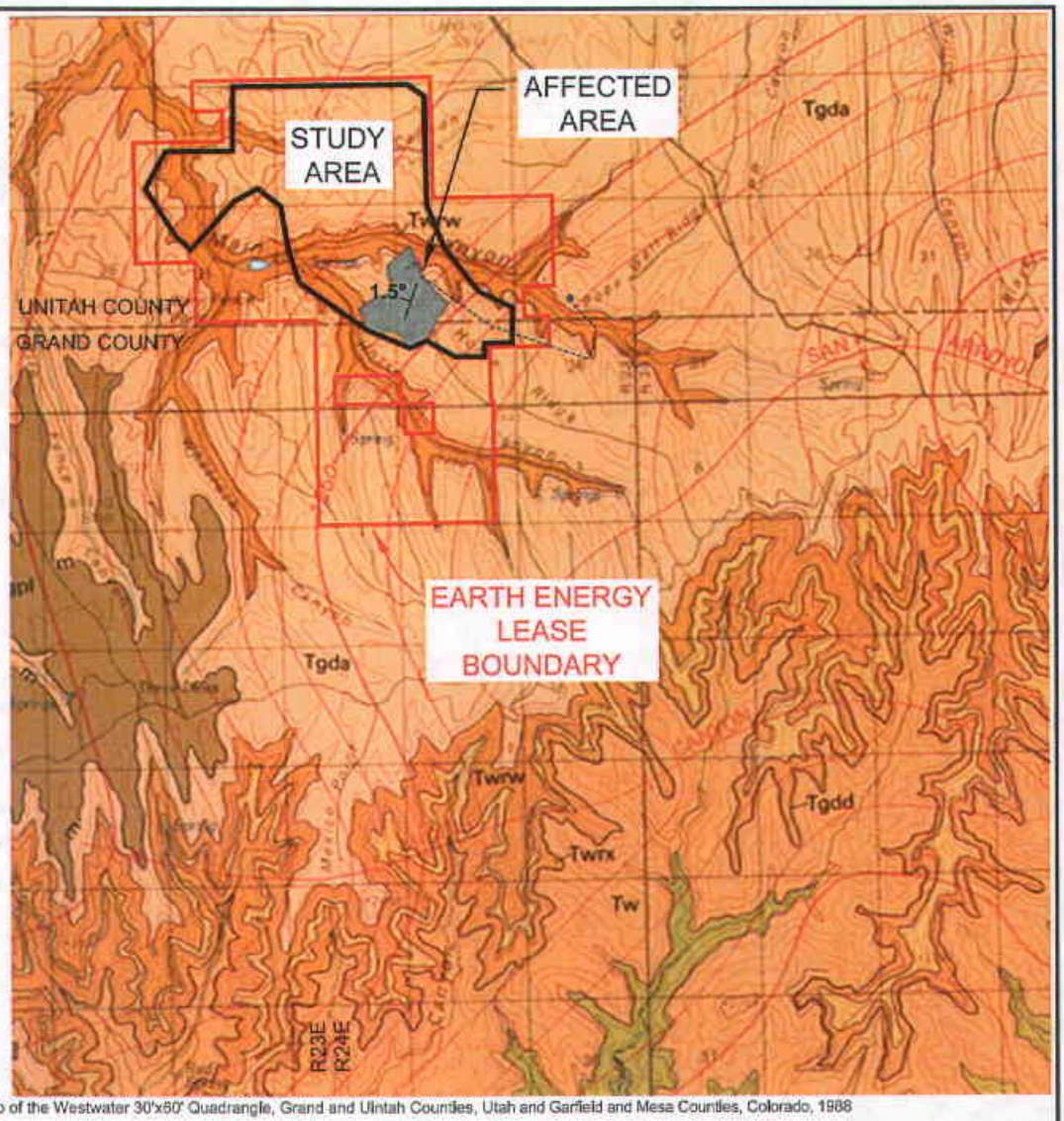
Revised by: CLP Date: March 17, 2010



Geology from J. L. Gualtieri, Geologic Map of the Westwater 30'x60' Quadrangle, Grand and Uintah Counties, Utah and Garfield and Mesa Counties, Colorado, 1988

DESCRIPTION OF MAP UNITS

Green River Formation (Eocene)

- Tgpl — Parachute Creek Member, lower part
- Douglas Creek Member
- Tgda — Tonque a
- Tgdc — Tontue c

Wasatch Formation (Eocene and Paleocene)

- Twrw — Unit w of Renegade Tongue
- Twrx — Unit x of Renegade Tongue
- Tw — Wasatch Formation, main body
- Kt — **Tuscher Formations (Upper Cretaceous)**
- Kf — **Farrer Formation (Upper Creataceous)**

- Contact
- Fault
- Anticline
- Syncline
- 1000 — Structure Contours

N

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1 0 1 2 3 4 KILOMETERS
1 0 1 2 MILES
Contour Interval 50 Meters

EARTH ENERGY RESOURCES, INC.

PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 5
GEOLOGY MAP

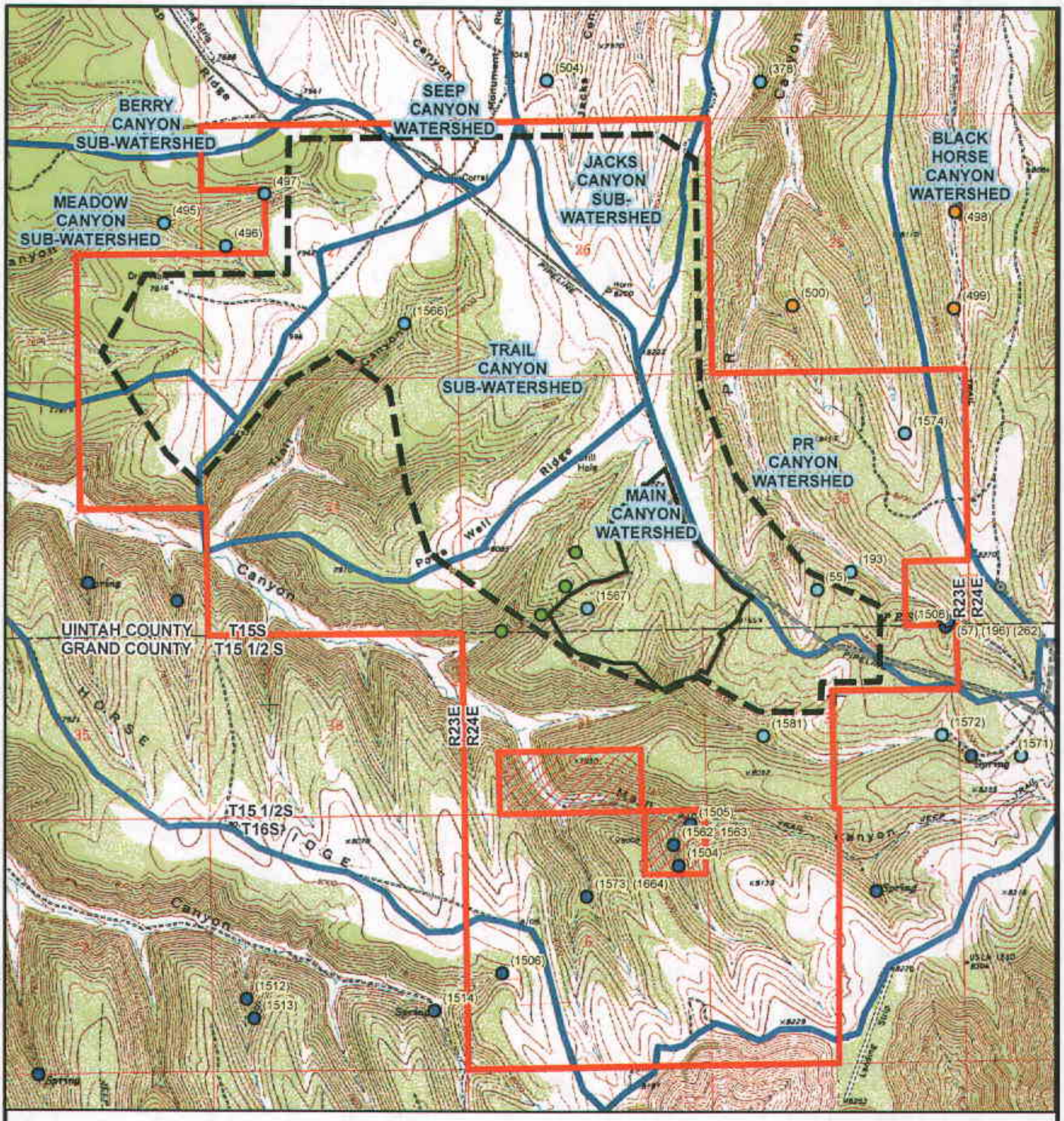
jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
KK	CP		1:100,000	4/1/08 10/01/08	

drawings\EarthEnergy\Fig5 Geology Map.dwg

IR - 000125

FIGURE 6 IS LOCATED IN THE CONFIDENTIAL BINDER



1,000 0 4,000 Feet

1,000 0 1,000 Meters

Contour Interval 40 Feet

N

Legend

- Earth Energy Lease Boundary
- Property Excluded from Lease
- Study Area Boundary
- Affected Area
- Watershed Boundary
- USGS Mapped Spring
- Water Right Filing for Seep or Spring
- Surface Water Right Point of Diversion
- Seep Identified in Field
- (1506) Water Right Number

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EARTH ENERGY RESOURCES, INC.

PR SPRING TAR SANDS DEVELOPMENT PROJECT

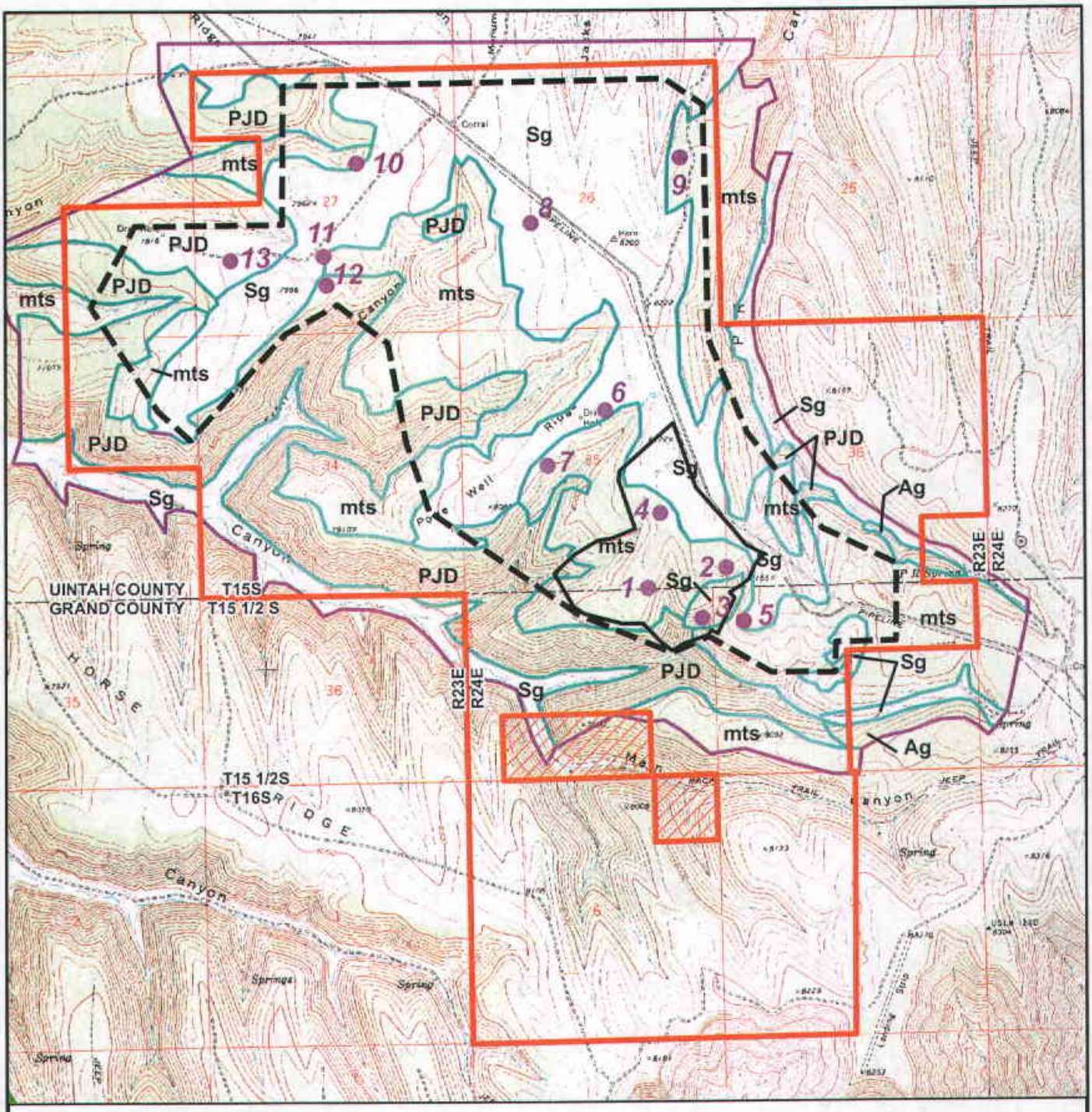
FIGURE 7
WATER FEATURES

jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	REVISIONS
KK	CP	1:36,000	9/11/07	4/03/08
				10/31/08

drawings\Earth Energy\Fig7 Water Features

IR - 000127



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DIV. OIL GAS & MINING

Legend

- Earth Energy Lease Boundary
- Property Excluded from Lease
- Study Area Boundary
- Affected Area
- Limit of Vegetation Survey
- Vegetation Community Boundary
- • 1 Quadrat Location and Number

Vegetation Types

Sg	Sagebrush - grass (1638 acres)
mts	mixed tall shrub (1482 acres)
PJD	Pinyon-Juniper-Douglas fir (1203 acres)
Ag	Aspen glade (not sampled) - (43 acres)

1,000 0 4,000 Feet

1,000 0 1,000 Meters

Contour Interval 40 Feet

N

EARTH ENERGY RESOURCES, INC.

PR SPRING TAR SANDS DEVELOPMENT PROJECT

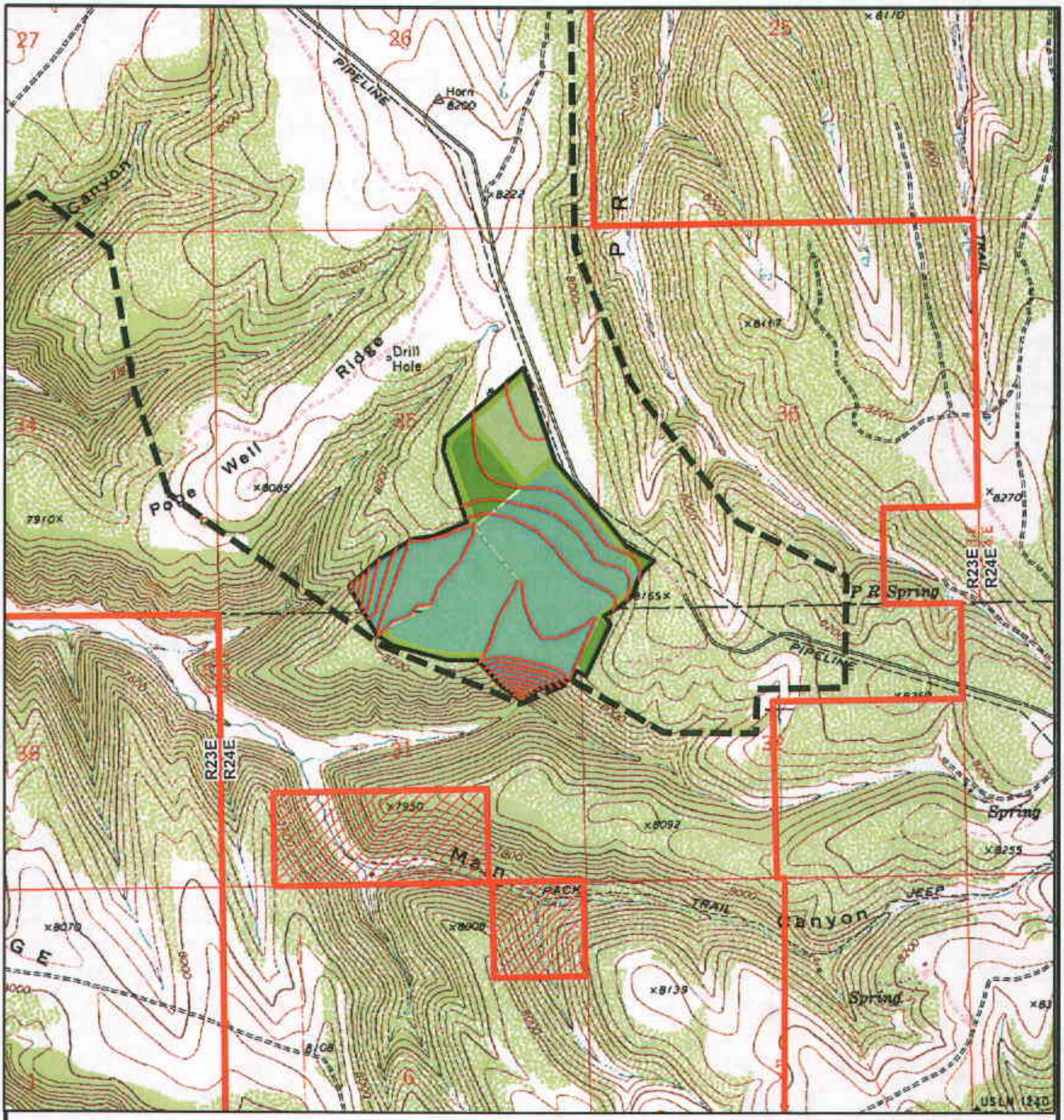
FIGURE 8
VEGETATION MAP

jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	REVISIONS
MS	CP	1:36,000	9/11/07	4/02/08
				10/31/08

drawings\Earth Energy\Fig8 Vegetation Map.mxd

IR - 000128



Legend

- Earth Energy Lease Boundary
- Property Excluded from Lease
- Study Area Boundary
- Affected Area

Reclamation Treatments

- Regrade, Topsoil, and Seed (163 acres)
- Rip and Seed (18 acres)
- Rip, Topsoil, and Seed (15 acres)
- Regrade, Rip, Topsoil, and Seed (17 acres)
- Reclamation Contours

APPROVED

SEP 19 2009

DIV. OIL GAS & MINING

2,000 0 2,000 Feet

500 0 500 Meters

Contour Interval 40 Feet

N

EARTH ENERGY RESOURCES, INC.

PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 9
RECLAMATION MAP

jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	REVISIONS
KK	CP	1:24,000	9/14/07	4/02/08
				10/31/08

drawings\Earth Energy\Fig9 Reclamation Map r1.mxd

Appendix A
Site Exploration & Summary of Lands Under Lease

Earth Energy Resources, Inc.
Summary of lands under lease
Date prepared: 22 June 2006

Mineral Lease No.	Date	Expiry	Location	Description	Acreage	Royalty*
49579 - OBA	01 January 2005	2 years	Grand County State of Utah	T. 15.5 S, R. 24 E., SLB&M Section 32: Lots 1 and 6 (E1/2NE1/4)	50.42	6.50%
49927 - OBA	01 June 2005	10 years	Uintah/Grand Counties State of Utah	T. 15 S., R. 23 E., SLB&M, Uintah County Section 26: All (640.00 Acres) Section 35: All (640.00 Acres) Section 36: N1/2, SW1/4, N1/2SE1/4, SW1/4SE1/4 (600.00 Acres) T. 15.5 S, R. 24 E., SLB&M Grand County Section 31: Lots 1-6, NE1/4SW1/4, N1/2SE1/4, SE1/4SE1/4 (352.65 Acres) Section 32: Lots 2-5, SW1/4 (279.01 Acres) T. 16 S., R. 24 E., SLB&M, Grand County Section 4: Lots 3 - 7, SE1/4NW14, E1/2SW1/4 Section 5: Lots 1 - 6, SW1/4NW1/4, W1/2SW1/4 Section 6: Lots 2 - 7, S1/2NE1/4, SE1/4NW1/4, E1/2SW1/4, SE1/4 (all) Section 7: Lots 1 and 2, NE1/4, E1/2NW1/4 Section 8: Lots 1 and 2, NW1/4, S1/2NE1/4	4,319.87	6.50%
49280 (Sublease)	31 March 2005		Uintah County State of Utah	T. 15 S., R. 23 E., SLB&M, Uintah County Section 27: NE1/4, N1/2NW1/4, SE1/4NW1/4, S1/2 Section 28: SE1/4	760.00	
49281 (Sublease)	31 March 2005		Uintah County State of Utah	T. 15 S., R. 23 E., SLB&M, Uintah County Section 33: NE1/4 Section 34: All	800.00	
Sub-total					5,930.29	

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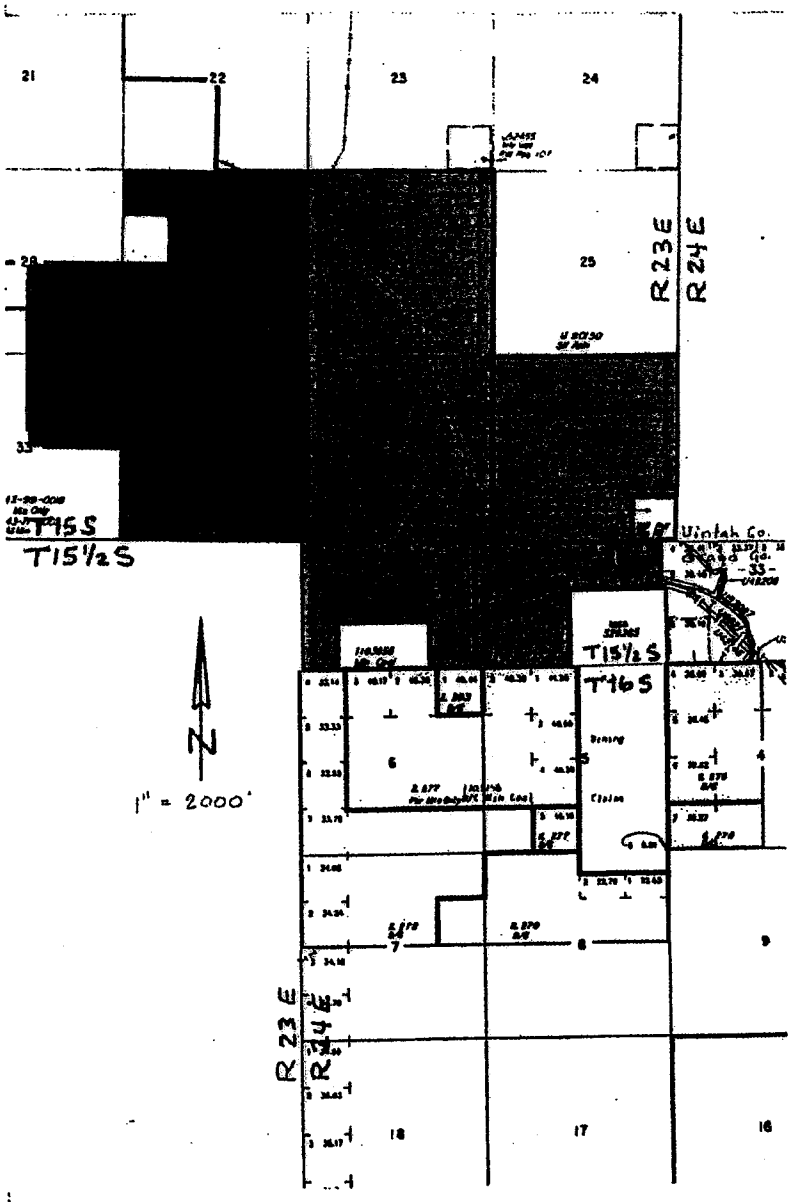

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SEP 19 2006

DIV. OIL GAS & MINING

IR - 000132

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

August 23, 2005

Mr. Page van Loben Sels
Earth Energy Resources, Inc.
One Beechwood Drive
Oakland, California 94618

Subject: Complete Notice of Intention to Commence Small Mining Operations; Earth Energy Resources, Inc.; Leonard Murphy #1 Mine; S/019/059; Grand County; Utah

Dear Mr. van Loben Sels:

The Division has reviewed your Notice of Intention to Conduct Exploration for the referenced project received May 23, 2005, and finds it to be complete. We are prepared to issue final approval when we receive your reclamation surety in the amount of $32,100 and a reclamation contract.

The reclamation surety can be submitted in one of several forms, including a certificate of deposit, a letter of credit, and a surety bond. Please contact Beth Ericksen at 801-538-5318 for further information regarding the surety. We have enclosed a reclamation contract for your use. Please send/fax a "draft" copy of the contract for our review before it is signed.

In addition, you must adhere to the requirements of the Division of Water Quality. As we discussed with Lyle Stott, the mine will process the smallest amount of tar sand that can be run through your equipment. The waste sand will then be placed on a liner and a sample taken and analyzed using a synthetic leach test. Results will be forwarded to Water Quality who will then decide whether additional permitting is needed.

If you have questions or concerns regarding this letter, please contact Paul Baker at 538-5261. We look forward to receiving your surety bond and completed reclamation contract.

Sincerely,

Susan M. White
Mining Program Coordinator
Minerals Regulatory Program

SMW:PBB:jb
Enclosure: Reclamation Contract form
cc: Will Stokes, SITLA
O:\M019-Grand\S0190059-LeonardMurphy1\final\condapp-08222005.doc

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
Telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

June 16, 2005

Mr. Page van Loben Sels
Earth Energy Resources, Inc.
One Beechwood Drive
Oakland, California 94618

Subject: Deficient Notice of Intention to Commence Small Mining Operations; Earth Energy Resources, Inc.; Leonard Murphy No. 1 Mine; S/019/059; Grand County; Utah

Dear Mr. van Loben Sels:

The Division of Oil, Gas and Mining received the referenced Notice of Intention to Commence Small Mining Operations on May 19, 2005, and forwarded a copy to the Division of Water Quality. We have not yet received their comments but anticipate they will need further information.

The notice is mostly complete, but in order for us to calculate an accurate reclamation surety we would like a list of equipment that will be used to process the tar sands. We need any information that would help us make a reclamation cost estimate. For example, you indicated in a telephone conversation that the equipment will be on skids. Please provide this and other pertinent information in writing. You and the Division will probably want to have some buffer in the bond amount so it doesn't have to change if you bring in additional equipment.

Please provide this information by June 30, 2005. If you have questions about the type of information needed, please call Paul Baker at (801) 538-5261. Thank you for your cooperation.

Sincerely,

Susan M. White

Susan M. White
Mining Program Coordinator
Minerals Regulatory Program

SMW:PBB:jb
cc: Will Stokes, SITLA
P:\GROUPS\MINERALS\WP\M019-Grand\S0190059-LeonardMurphy#1\final\def-06132005.doc

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

June 2, 2005

Mr. Page van Loben Sels
Earth Energy Resources, Inc.
One Beechwood Drive
Oakland, California 94618

Subject: Complete Notice of Intention to Conduct Exploration, Earth Energy Resources, Inc.; EER PR Spring #2 Project; E/019/053; Grand County; Utah

Dear Mr. van Loben Sels:

The Division has reviewed your Notice of Intention to Conduct Exploration for the referenced project received May 10, 2005, and finds it to be complete. We are prepared to issue final approval when we receive your reclamation surety in the amount of $9200 and a reclamation contract.

The reclamation surety can be submitted in one of several forms, including a certificate of deposit, a letter of credit, and a surety bond. Please contact Beth Ericksen at 801-538-5318 for further information regarding the surety. We have enclosed a reclamation contract for your use. Please send/fax a "draft" copy of the contract for our review before it is signed.

If you have questions or concerns regarding this letter, please contact Paul Baker at 538-5261. We look forward to receiving your surety bond and completed reclamation contract.

Sincerely,

Susan M. White
Mining Program Coordinator
Minerals Regulatory Program

SMW:PBB:jb
Enclosure: Reclamation Contract form
cc: Will Stokes, SITLA
O:\M019-Grand\E0190053-PRSprings#2\final\condapp-06022005.doc

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

May 26, 2005

Mr. Page van Loben Sels
Earth Energy Resources, Inc.
One Beechwood Drive
Oakland, California 94618

Subject: Acceptance of Notice of Intention to Conduct Exploration and Approval of Reclamation Bond and Reclamation Contract, Earth Energy Resources, Inc.; EER PR Spring 1 Project; E/019/052; Grand County; Utah

Dear Mr. van Loben Sels:

On May 24, 2005, John Baza, Director of the Division of Oil, Gas and Mining, signed the reclamation contract for the referenced exploration operation. ***The Division finds your exploration notice of intention complete and approves the reclamation surety for the PR Spring #1 project.*** Copies of the fully signed and executed documents are enclosed for your files.

We have received notification from the Division of State History that no historic properties should be affected by your operation, but if you encounter cultural resources, you are asked to immediately cease operations and notify both the Division of Oil, Gas and Mining and the Division of State History.

The acceptance of this notice and surety is for an exploration operation only, **not to exceed 0.5 acres.** You are not authorized to disturb additional areas without first amending your notice, adjusting the bond amount and receiving written acceptance from this office.

If you have questions or concerns regarding this letter, please contact me at (801) 538-5258 or Paul Baker at (801) 538-5261. Best wishes with your exploration operation.

Sincerely,

Susan M. White
Mine Program Coordinator
Minerals Regulatory Program

SMW:PBB;jb
Enclosure: Copy of RC & surety forms
O:\M019-Grand\E0190052-PRSprings1\final\appvl-05252005.doc

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*

Appendix B
Correspondence

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref: 8ENF-AT

MAR 10 2010

Barclay Cuthbert
Vice President
Earth Energy Resources
Suite #740
404 – 6 Avenue S.W.
Calgary, AB T2P 0R9 Canada

Subject: Subpart Ja Applicability Determination Request – Earth Energy Resources, Inc., Oil Sand Mining and Processing – PR Spring Mine

Dear Mr. Cuthbert:

I am responding to your May 29, 2009, letter requesting an applicability determination for the Earth Energy Resources, Inc. (Earth Energy) PR Spring Mine with regards to New Source Performance Standard (NSPS) Subpart Ja.[1] Earth Energy proposes to operate an oil sand mine and processing facility (i.e., mill) in eastern Utah. The operation will include mining of the naturally occurring oil sands and extraction of the bitumen from these sands. As discussed below, EPA does not believe that the Earth Energy PR Spring Mine is subject to NSPS Subpart Ja.

Your May 29, 2009, letter explains that the Earth Energy PR Spring Mine extraction process will be as follows: (1) mined and conditioned oil sand ore is sent through a crusher/delumper and reduced to 2 inch-minus aggregate size; (2) crushed ore is augured or conveyed to a heated slurry mixer where the cleaning emulsion is introduced and the ore slurried to the consistency of a thick gritty milkshake; (3) oil sand slurry is then moved by screw conveyor to the slurry tank where primary separation of the bitumen from the sand occurs; (4) produced sand with residual bitumen is pumped through a series of separation towers where the last traces of bitumen are removed; (5) all the liberated bitumen is captured, polished with cyclones and/or centrifuges, and pumped to a storage tank; (6) the cleaning chemical is then

[1] Subpart Ja, 40 C.F.R. §§60.100a et seq., is entitled "Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007."

removed from the bitumen by distillation and recycled to the front of the process[2]; and (7) produced bitumen is pumped to a product (sales) tank for heated storage prior to transport.[3]

NSPS Subpart Ja applies to certain affected facilities in petroleum refineries. The definition of "petroleum refinery in 40 C.F.R. 60.101a reads: "Petroleum refinery means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives." Even though the Earth Energy PR Spring Mine will be producing bitumen, the operation will not be producing the bitumen "through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives." Although distillation will be occurring at the Earth Energy PR Spring Mine, it will be for the purpose of recovering the cleaning chemical from the bitumen and not to upgrade the bitumen to a refined product. Additionally, the produced bitumen will be sent off-site to a petroleum refinery for further processing. Therefore, EPA does not believe the Earth Energy PR Spring Mine would be considered a "petroleum refinery" and subject to NSPS Subpart Ja.

The above discussion is consistent with EPA's December 22, 2008 proposed revision to the definition of "petroleum refinery" in NSPS Subpart Ja (73 FR 78522). In the December 22, 2008 proposal notice (at 78526), EPA indicated that "Facilities that only produce oil shale or tar sands-derived crude oil for further processing using only solvent extraction and/or distillation to recover diluent that is then sent to a petroleum refinery are not themselves petroleum refineries. This is because they are only producing feed to a petroleum refinery as a product and not refined products. Facilities that produce oil shale or tar sands-derived crude oil and then upgrade these materials and produce refined products would be a petroleum refinery." The revised definition of "petroleum refinery" proposed on December 22, 2008, reads:

> Petroleum refinery means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives. A facility that produces only oil shale or tar sands-derived crude oil for further processing at a petroleum refinery using only solvent extraction and/or distillation to recover diluent is not a petroleum refinery.

---

[2] Electronic communication (email) on November 2, 2009, from Mr. Erin Hallenburg, JBR Environmental, to Carol Smith, EPA, indicates that "any light ends from the bitumen that may accumulate in the TAI [cleaning chemical] would be recovered through a second stage distillation process. This process would distill any light boiling fractions from the TAI and these recovered fractions would be blended into our sales bitumen tank."

[3] In the email referenced in footnote 2, Mr. Hallenberg also indicated that "no further processing is performed on site. The final product, bitumen, will be headed to an oil refinery for further processing."

If you have any questions or concerns regarding this letter, please contact Laurie Ostrand of my staff at (303) 312-6437 or by email at ostrand.laurie@epa.gov.

Sincerely,

Cynthia J. Reynolds, Director
Technical Enforcement Program

cc: Donald Law, EPA Region 8

Mr. Erin Hallenburg, QEP, P.E.
JBR Environmental Consultants, Inc.
8160 S. Highland Dr.
Sandy, UT 84093

RECEIVED
MAR 2 3 2010
DIV. OF OIL, GAS & MINING

APPROVED
MAR 2 3 2010
DIV. OIL GAS & MINING

www.earthenergyresources.com

May 29, 2009

Ms. Cynthia Reynolds
USEPA REGION 8
1595 Wynkoop St., 8ENF-AT
Denver, CO 80202

Re: Subpart Ja Applicability Determination Request – Earth Energy Resources, Inc., Oil Sand Mining and Processing – PR Spring Mine

Earth Energy Resources, Inc. (Earth Energy) is requesting an applicability determination for the Earth Energy PR Spring Mine with regards to CFR 40 Part 60 Subpart Ja - Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced after May 14, 2007.

Earth Energy has proposed to operate an oil sand mine and processing facility (i.e. mill) in eastern Utah. The operation will include mining of the naturally occurring oil sands and extraction of the bitumen from these sands. Earth Energy originally submitted a Notice of Intent (NOI) to the Utah Division of Air Quality (UDAQ) for a Permit to Construct (PTC) in October of 2007. After several months, the UDAQ informed Earth Energy in January of 2008 that the facility location was on Indian Jurisdictional lands and thus the EPA would be the permitting authority. There have been extensive conversations with the EPA, and several consultant-based determinations submitted, as well as a face-to-face meeting (July 15, 2008) at the EPA Region 8 offices, initiated by Earth Energy.

At the July meeting in Denver, Earth Energy and their consultant representatives were told that a determination would be made in regard to Subpart Ja and other issues in October 2008. Earth Energy and their consultants pressed for an answer from EPA in October 2008. As a result, Earth Energy was informed by the EPA Region 8 that a "determination request" in regards to the applicability of Subpart Ja would be need to be submitted to the EPA's Compliance Division. The following information is being provided to EPA Compliance Division, in response to this request for a compliance determination on the applicability for 40 CFR Part 60 Subpart Ja.

.

Process Description

The extraction process begins when the mined and conditioned oil sand ore is sent through a crusher/ delumper and reduced to a 2 inch-minus aggregate size. From there, the crushed ore is augured or conveyed to a heated slurry mixer where the cleaning emulsion is introduced 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 pumped to a storage tank. The cleaning chemical is then removed from the bitumen by distillation and recycled to the front of the process. Produced bitumen is pumped to a product (sales) tank for heated storage prior to transport.

The clean 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 clay fines are then conveyed to a stockpile for loading and backhaul to the mine pit. At this point, the discharged sand and clay fines contain between 10 and 20% water.

When the cleaning emulsion contacts the bitumen in the oil sand, the limonene and emulsifier partition into the hydrocarbon phase to promote the stripping and extraction of the bitumen from the solids matrix of the ore. Once the hydrocarbon phase is separated from the water phase and solids (both coarse sand and clays and fines), it is distilled to recover the limonene. The limonene is re-used in the process, while the emulsifier remains in the bitumen, which exits the process as the residual from the distillation step.

The composition of the cleaning emulsion is:

Component	Weight percent
D-Limonene	35.82%
Water	63.97%
Emulsifier	0.21%
Anti-foam	0.00%
Total	100.00%

The emulsifier is an alkylbenzenesulphonate, branched and straight chain and the anti-foam is a silicone based antifoam (such as those used in Jacuzzi spas).

Earth Energy has examined the applicability requirements and associated definitions in Subpart Ja and provided comments about the facility in italics.

60.100a Applicability, designation of affected facility, and reconstruction.

Suite #740, 404 – 6 Avenue S.W., Calgary, AB T2P 0R9 Canada Office: 403.233.0366 Fax: 403.668.5097

(a) The provisions of this subpart apply to the following affected facilities in petroleum refineries: fluid catalytic cracking units (FCCU), fluid coking units (FCU), delayed coking units, fuel gas combustion devices, including flares and process heaters, and sulfur recovery plants. The sulfur recovery plant need not be physically located within the boundaries of a petroleum refinery to be an affected facility, provided it processes gases produced within a petroleum refinery.

The PR Springs Mine does not have FCCU or FCU, or a delayed coking unit. In addition, the processes at the facility including process heaters are not fueled by gases produced at the plant and the plant will not be involved in sulfur recovery. As such, there are no sources at the PR Spring Mine to which Ja is applicable.

§ 60.101a Definitions

Petroleum refinery means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives.

The process does not produce gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation or redistillation of petroleum. The only distillation process involved is recovery of the d-limonene which does not result in a petroleum product.

There have been concerns raised about data that suggested that 3% of the bitumen light ends might be fractionated off during the solvent distillation. Earth Energy performed an assay on a sample of bitumen from the PR Spring mine site. The initial boiling point of the bitumen is 213°C/415°F [ASTM D2892/D5236], which is well above the distillation temperature used to recover the d-limonene. The data from the assay show good agreement with physical properties of PR Spring bitumen measured by the Utah Heavy Oil Center, University of Utah, where volatiles distilling below 204°C/399°F is less than 0.4%.

Fuel gas means any gas which is generated at a petroleum refinery and which is combusted. Fuel gas includes natural gas when the natural gas is combined and combusted in any proportion with a gas generated at a refinery. Fuel gas does not include gases generated by catalytic cracking unit catalyst regenerators and fluid coking burners, but does include gases from flexicoking unit gasifiers. Fuel gas does not include vapors that are collected and combusted to comply with the wastewater provisions in §60.692, 40 CFR 61.343 through 61.348, 40 CFR 63.647, or the marine tank vessel loading provisions in 40 CFR 63.562 or 40 CFR 63.651.

The process does not involve the use of gas produced at the facility to operate any equipment.

Earth Energy has been working with the EPA for over 2 1/2 years to determine the permitting requirements for this facility. Based on previous communications with the EPA, the Subpart Ja applicability determination can only be performed by EPA and requires a formal request. It was our impression that EPA Region 8 Task Force was in the process of making the determination after our July 15, 2008 meeting and would decide by October, 2008. Since all future permitting and project feasibility is dependant on this determination, we respectfully request the EPA Compliance Division to inform us of the requirements for the PR Spring oil sand mine and processing facility in the very near future. Additional information on the process, permitting and/or timeline can be found either in your files, by contacting JBR Environmental (801-943-4144) or by contacting me directly.

Yours truly,
Earth Energy Resources, Inc.

Barclay Cuthbert
Vice President

Enclosures (2)

cc: Tim Wall, Earth Energy Resources, Inc.
File

Suite #740, 404 – 6 Avenue S.W., Calgary, AB T2P 0R9 Canada Office: 403.269.9366 Fax: 403.668.5097

DOGM Correspondence and Related Information

Response to Fourth REVIEW OF NOTICEOF INTENTION TO COMMENCE LARGE MINING OPERATIONS

Earth Energy Resources
PR Spring Mine

M/047/0090
May 7, 2009

105.3 - Drawings or Cross Sections (slopes, roads, pads, etc.)

Comment #	Sheet/Page/ Map/Table #	Comments	Initials	Review Action
	Figure 2a / Page 20	Figure 2a and paragraph 4 say the containment "cells will not be constructed on slopes greater than 20 percent (11 degrees)" yet Figure 2a notes "maximum of 20 degrees slope at the toe." Please correct or clarify the text or figure to reflect slope stability model that used for mine planning from the engineer of record.	lah	Figure 2a has been corrected.
	General	It is DOGM's recommendation that slope designations (percent, degrees or horizontal:vertical) are consistent throughout the document.	lah	Thank you for the recommendation. No change has been made to the plan at this time.
	Figure 2a	Upper drawing, berm should not be shown as the same material as the sand tailings.	lah	Figure 2a has been revised.

106.6 - Plan for protecting & re-depositing soils

Comment #	Sheet/Page/ Map/Table #	Comments	Initials	Review Action
	Omission	Please include a statement in the NOI that all available topsoil will be salvaged (include page number, as a new page 26-27 was not submitted)	lah	This statement occurs in the NOI on page 26, in the paragraph prior to Section 106.6.

R647-4-113 – Surety

Comment #	Sheet/Page/ Map/Table #	Comments	Initials	Review Action
	Page 62	Include on surety summary sheet "Bond is for 213 acres and is shown as 'Affected Area'" acres as shown on Figures.	lah	The noted statement has been added to the Surety summary sheet on page 62.

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

April 28, 2009

Barclay Cuthbert
Earth Energy Resource Inc.
Suite 740, 404-6 Avenue S. W.
Calgary, Alberta, Canada T2P 0R9

Subject: Fourth Review of Notice of Intention to Commence Large Mining Operations, Earth Energy Resources, PR Springs Mine, M0470090, Uintah County, Utah

Dear Mr. Cuthbert:

The Division has completed a review of your Notice of Intention to Commence Large Mining Operations for the PR Springs Mine, which was received March 25, 2009. The attached comments will need to be addressed before tentative approval may be granted.

The comments are listed under the applicable Minerals Rule heading; please format your response in a similar fashion. We anticipate the plan will be complete after we receive this submittal, so please submit two complete, clean (redline/strikeout removed) copies of the plan. The Division will stamp both copies approved and return one to you. We will also begin the process of issuing tentative approval, including public notice and notification of the Resource Development Coordinating Committee.

The Division will suspend further review of the Notice of Intention until your response to this letter is received. If you have any questions in this regard please contact me at 801-538-5261 or Leslie Heppler, at 801-538-5257. Thank you for your cooperation in completing this permitting action.

Sincerely,

Paul B. Baker
Minerals Program Manager

APPROVED
SEP 19 2009
DIV. OIL GAS & MINING

PBB:lah:vs
Attachment: Review
cc: SITLA – WStokes@utah.gov
P:\GROUPS\MINERALS\WP\M047-Uintah\M0470090-PRSpringMine\final\REV4-2929-04092009.doc

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • www.ogm.utah.gov

Fourth REVIEW OF NOTICEOF INTENTION
TO COMMENCE LARGE MINING OPERATIONS

Earth Energy Resources
PR Springs Mine

M/047/0090
April 28, 2009

105.3 - Drawings or Cross Sections (slopes, roads, pads, etc.)

Comment #	Sheet Page Map Table #	Comments	Initials	Review Action
	Figure 2a Page 20	Figure 2a and paragraph 4 say the containment "cells will not be constructed on slopes greater than 20 percent (11 degrees)" yet Figure 2a notes "maximum of 20 degrees slope at the toe." Please correct or clarify the text or figure to reflect slope stability model that used for mine planning from the engineer of record.	lah	
	General	It is DOGM's recommendation that slope designations (percent, degrees or horizontal:vertical) are consistent throughout the document.	lah	
	Figure 2a	Upper drawing, berm should not be shown as the same material as the sand tailings.	lah	

106.6 - Plan for protecting & re-depositing soils

Comment #	Sheet Page Map Table #	Comments	Initials	Review Action
	Omission	Please include a statement in the NOI that all available topsoil will be salvaged (include page number, as a new page 26-27 was not submitted)	lah	

R647-4-113 – Surety

Comment #	Sheet Page Map Table #	Comments	Initials	Review Action
	Page 62	Include on surety summary sheet "Bond is for 213 acres and is shown as 'Affected Area'" acres as shown on Figures.	lah	

APPROVED

SEP 19 2009

DIV. OIL GAS & MINING

April 28, 2009

Barclay Cuthbert
Earth Energy Resource Inc.
Suite 740, 404-6 Avenue S. W.
Calgary, Alberta, Canada T2P 0R9

Subject: ~~Initial~~ Fourth Review of Notice of Intention to Commence Large Mining Operations, Earth Energy Resources, PR Springs Mine, M0470090, Uintah County, Utah

Dear Mr. Cuthbert:

The Division has completed a review of your Notice of Intention to Commence Large Mining Operations for the PR Springs Mine, which was received March 25, 2009. The attached comments will need to be addressed before tentative approval may be granted.

The comments are listed under the applicable Minerals Rule heading; please format your response in a similar fashion. Please address only those items requested in the attached technical review by sending replacement pages of the original mining notice using **redline and strikeout** text, so we can see what changes have been made. After the notice is determined technically complete and we are prepared to issue final approval, we will ask that you send us two clean copies of the complete and corrected plan. Upon final approval of the permit, we will return one copy stamped "approved" for your records.

The Division will suspend further review of the Notice of Intention until your response to this letter is received. If you have any questions in this regard please contact me at 801-538-5261 or Leslie Heppler, at 801-538-5257. Thank you for your cooperation in completing this permitting action.

Sincerely,

Paul B. Baker
Minerals Program Manager

PBB:lah:vs
Attachment: Review
cc: SITLA – WStokes@utah.gov
O:\M047-Uintah\M0470090-PRSpringMine\draft\REV4-2929-04092009.doc

APPROVED
SEP 19 2009
DIV. OIL GAS & MINING

IR - 000149

Fourth REVIEW OF NOTICEOF INTENTION TO COMMENCE LARGE MINING OPERATIONS

Earth Energy Resources
PR Springs Mine

M/047/0090
April 28, 2009

105.3 - Drawings or Cross Sections (slopes, roads, pads, etc.)

Comment #	Sheet/Page/ Map/Table #	Comments	Initials	Review Action
	Figure 2a / Page 20	Figure 2a and paragraph 4 say the containment "cells will not be constructed on slopes greater than 20 percent (11 degrees)" yet Figure 2a notes "maximum of 20 degrees slope at the toe." Please correct or clarify the text or figure to reflect slope stability model that used for mine planning from the engineer of record.	lah	
	General	It is DOGM's recommendation that slope designations (percent, degrees or horizontal:vertical) are consistent throughout the document.	lah	
	Figure 2a	Upper drawing, berm should not be shown as the same material as the sand tailings.	lah	

106.6 - Plan for protecting & re-depositing soils

Comment #	Sheet/Page/ Map/Table #	Comments	Initials	Review Action
	Omission	Please include a statement in the NOI that all available topsoil will be salvaged (include page number, as a new page 26-27 was not submitted)	lah	

R647-4-113 – Surety

Comment #	Sheet/Page/ Map/Table #	Comments	Initials	Review Action
	Page 62	Include on surety summary sheet "Bond is for 213 acres and is shown as 'Affected Area'" acres as shown on Figures.	lah	

www.earthenergyresources.com

March 25, 2009

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-5801
Telephone: (801) 538-5261
Facsimile: (801) 359-3940

For the attention of: Mr. Paul Baker, Minerals Program Manager

REFERENCE: **Notice of Intent To Commence Large Mining Operations**
M0470090, Task 2386

Dear Mr. Baker:

Earth Energy Resources is herewith transmitting the revised pages of the above-noted Notice of Intent (NOI). This version addresses DOGM's 3rd review comments, which were transmitted on January 12, 2009. The submittal includes the NOI replacement pages formatted in track changes mode (minus appendices in which no changes have been made), a response document that lists each DOGM comment with a direct response, and a separate packet of information that we request be held confidential. The enclosed packet of confidential information is intended to fully replace the contents of the confidential binder included with the November 2008 submittal. Specific pages of confidential information include:

1. Figures
    a. Figure 4 (a-c) – Mine Cross Sections (an edited version has been retained in the publically available NOI; the confidential version includes ore bed information)
    b. Figure 6 – PR Spring North (Opening) Pit Showing Tar Sands Beds at Section 715 N
2. Appendix B
    a. Analytical data appended to DWQ PBR submittal
    b. Ophus Process, Process Flow Diagram appended to DWQ PBR submittal
3. Appendix D
    c. Demonstration Unit PFD, Rev. 2
    d. Ophus Process, Process Flow Diagram

We have identified the above noted information as materials that the public at large has no interest in, in its evaluation and/or interest in our NOI as it might affect the general public.

Suite #740, 404 – 6 Avenue S.W., Calgary, AB T2P 0R9 Canada Office: 403.233.9366 Fax: 403.668.5097

www.earthenergyresources.com

We feel that the release of the above-noted information, submitted to support our NOI, to persons or entities outside of the relevant government agencies required to review such information in connection with the approval of our NOI, will constitute a release of confidential information. After your review of this request, should you determine that any of the above noted pages are, in your opinion, not confidential, please so advise in advance of the release of such information, as we would appreciate the opportunity to explain our position. If this matter requires any additional clarification or information, please contact me at your convenience.

We look forward to your review of this version of the NOI and hope to receive your final approval for our operations very soon. We understand that you are still in the process of reviewing the previous bond submittal; as such, the surety section of the NOI has not yet been revised.

Yours truly,
Earth Energy Resources, Inc.

J. Wall P.Eng.

for Barclay Cuthbert
Vice President

APPROVED
SEP 19 2009
DIV. OIL GAS & MINING

EARTH ENERY RESPONSE TO
REVIEW OF NOTICE OF INTENTION TO COMMENCE LARGE MINING OPERATIONS

Earth Energy Resources
PR Springs Mine
M0470090
March 25, 2009

Review Action Key: **A = Comment noted by Earth Energy, but no requirement for changes to current version of NOI**
B = Changes made to current version of NOI in response to comment

General Comments:

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
1	General	Submittal should be formatted to easily incorporate additional revisions and amendments. (lah)	A	This comment was carried over from the Initial Review. It was thoroughly and completely addressed by Earth Energy in the response to that review, and the May 9, 2008 2nd draft NOI was significantly reformatted to meet the Division request. On September 11, lah indicated that the comment was left in simply as a reminder. Accordingly, the reformatting changes have been continued with the current version of the NOI.
2	General Page i	Table of Content page numbers do not match page numbers, Format document to incorporate revisions, page numbers can be "tied" to info in the Table of Contents. (lah)	B	We will ensure that the page numbers indicated in the table of contents match the page number where the relevant information is located.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
3	General Page ii	List of figures shown doesn't note the actual location of the Figure, specifically it is not clear what figures are in the confidential notebook. (lah)	B	For any figure that is deemed confidential, it's location in the confidential notebook will be noted in the List of Figures. A place holder or non-confidential version of the figure will be inserted in the Notice of Intention.
4	Intro Page 1	Page numbers are not consistent, ie pages listed as "ii, 1, ii, 3" Keep pages consistent and format document for revisions…check all page numbers. (lah)	B	The page number for page 2 of the text is reformatted correctly.
5	Intro Page ii – Para 2	As written "second half of 2008…" Where are the results of the drilling and geophysical data? Where will it be incorporated into the document? (lah)	B	The time period for the drilling and geophysical work is changed to 2009. It is not Earth Energy's intention to include the grade and tar sand bed thickness data in the Notice of Intention.
6	General - All	Some of the information in the confidential folder does not appear to meet the criteria in R647-4-115 for keeping it confidential. Information about the general location of the mine and the mine plan should be public. More specific information relating to ore quality and location, such as seam thickness, and also proprietary information can be kept confidential. (lah and PBB)	B	All information in the confidential folder has been reviewed. Following this review, the following information was deemed non-confidential and included within the Notice of Intention: Figure 1 – Location Map; Figure 2 – Surface Facilities Map; Figure 3 – Plant Sit Layout; Figure 5 – Geology Map; Figure 7 – Watersheds Map; Figure 8 – Vegetation Map; Figure 9 – Reclamation Map; List of tankage and buildings located within the Processing Site, Rev.2; List of Equipment for Utah DAQ Emissions Inventory, Rev. 6; and the EER PR Spring Mine Site photo. Further, for confidential Figures 4a-4c; the confidential information was removed from and the "sanitized" versions of these figures are included in the Notice of Intention.

R647-4-104 – Filing Requirements and Review Procedures

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
7	Page 6	Grand County CUP (Conditional Use Permit) will be required for the approved NOI by DOGM, as written when the CUP is received this page will have to be amended. Consider rewording statement, so this page would not have to be revised. (lah)	B	Changes have been made to the current version of the NOI (in the introduction and on page 6 in Section 104.1) to read as if both CUPs are in Appendix B. A place holder for the Grand County CUP, which cannot be obtained until the DOGM NOI is approved, has been added to the appendix.

R647-4-105 - Maps, Drawings & Photographs

General Map Comments

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
8	Conf - Figure 2	Rip-rap armored channel – As shown channels will be difficult to build without disturbance outside the "affected area". (lah)	A	Rock rubble riprap will be placed in erosion prone drainage channels with as little disturbance to adjacent land as possible. All disturbance will however be contained within the perimeter of the disturbance boundary. Should construction of erosion controls be required outside the present limits of the disturbed area boundary, Earth Energy will seek an amendment to the NOI.
9	Conf - Figure 3	Great figure to tie to the bond calc sheet. (lah)	A	As discussed during the meeting of January 14, 2009, the description of facilities in Figure 3 matches the descriptions used in the bond calculation sheet. We feel that additional revisions to Figure 3 to attempt to tie the Figure to the bond calculation sheet will not be informative or helpful.

R647-4-106 – Operation Plan

106.2 Type of operations conducted, mining method, processing etc.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
10	Page 13 – para 3	List of mining equipment is noted in Appendix D, but it is actually in confidential notebook, it is unclear why a list of Mining Equipment is confidential?? (lah)	B	The list of mining equipment is included in Appendix D, and has been removed from the confidential folder.
11	General	It was noted in a site visit that water ponds on top of the oil sands. Please include a discussion indicating how this aquitard situation will affect the mining method. (lah)	A	Discussions of the collection of incident precipitation and the uses of this collected precipitation are discussed on pages 14 and 36 of the Notice of Intention.
12	Page 17 – Para 3 & 5	DWQ Permit by Rule determination is required for the approved NOI by DOGM, as written when the determination is received this page will have to be amended. Consider rewording statement, so this page would not have to be revised. (lah)	A	Earth Energy has received Permit by Rule designation from DWQ and information about this approval is included in Appendix B. Sections of the Notice of Intention that refer to the documentation submitted to DWQ in order to obtain the Permit by Rule designation are accurate and do not require amendment to reflect that the Permit by Rule is included in Appendix B.
13	Page 19 – para 2	"Earth Energy will supply…" perhaps rewrite to note 'processed sand will be placed to eliminate potential slope stability failure surfaces' or wording that is similar. This would eliminate the need to revise text in a future amendment. (lah)	B	The text has been modified to the following: "Detailed mine plans are developed to ensure that the produced (clean) sand is replaced in the pit in a sequential layered and compacted manner to eliminate potential slope stability concerns."

106.6 Plan for protecting & redepositing soils

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
14	Page 26 - 27	After a site visit it noted that greater 24" of topsoil was noted on the ridge top. As noted topsoil depth varies. Document should reflect the variable amount (lah)	A	As noted on page 27 of the Notice of Intention: "However, it is important to note that this is an estimate only; actual soil salvage volume could be more or less than this amount. The actual amount salvaged would be dependant upon what is encountered in the field: all available topsoil would be salvaged (with the exceptions noted above for the topsoil storage piles), which in some areas may reflect a lesser thickness than assumed and in other areas may be a greater thickness than assumed."

R647-4-109 - Impact Assessment

109.1 Impacts to surface & groundwater systems

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
15	49	The SWPPP plan must be incorporated into the Notice of Intent prior to approval. (TM)	B	The SWPPP is now included with the NOI as Appendix G.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
16	47	It appears that the majority of runoff will occur as snowmelt or short duration thunderstorms. The slopes on the overburden interburden storage areas are 400 feet long with no proposed slope breaks. This not standard engineering practice and fails to provide the assurance needed that these slopes will be an erosional problem. The plan describes the coarse nature of these overburden and interburden storage areas yet 50 percent of the dumps will be constructed of the processed sand with a 20 percent clay component which if exposed would probably tend to be very erosive. Therefore the construction of these overburden/interburden storage areas will define whether impact to the surface water systems will occur. Please elaborate on how the containment pens, mixing of the overburden and interburden with the sand will provide a stable surface free of fines. (TM)	B	As described in Section 106, subsection OVERBURDEN/INTERBURDEN STORAGE AREAS, initial quantities of commingled sand/clay fine tailings will be impounded in storage cells constructed of coarse overburden materials in the upper reaches (flattest) areas of the proposed overburden/interburden storage areas. 15-20 foot high cells will be constructed as compacted berms of overburden material and then filled with commingled clean sand/clay fine tailings. When the first level of cells is filled to capacity, successive tiered levels will be constructed until the mine has sufficiently advanced to permit direct replacement of the tailings back into the pit, in the layered method described in Section 16.2 Subsection PIT BACKFILL. Five to six levels of tiered cells are anticipated to be required before backfilling of the mine pit can be undertaken. Tailings storage cells in the upper reaches of the overburden/interburden storage areas will ultimately become fully encapsulated within the finished and reclaimed overburden/interburden storage areas as described in Section 110.2 Subsection RECLAMATION OF SLOPES. Tailings containment cells will be not be constructed on slopes steeper than 20 percent (11 degrees). A figure (2a) has also been added to the NOI to depict these tiered cells.

109.4 Slope stability, erosion control, air quality, safety

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
17	20	Runoff will be controlled on the exposed faces of the overburden/interburden storage areas with coarse/low sediment potential material. Since the dumps will be constructed or sloped at the angle of repose (30 degrees to 34 degrees). Please give a better description of how these waste dumps will be constructed (end dumping, bulldozed, etc). Please show a typical drawing of the containment pens and how this method of construction will be accomplished on a 40 degree slope and will fit with the dump construction methods. Are the waste dump slopes going to be constructed by end dumping, alternating between the overburden and the sand and clay waste stream material? How will the clay and sand waste be mixed and placed with the overburden when the overburden will be a totally different composition? Would it not be better to build these dumps in lifts, creating more stability and making reclamation easier at the end of mine life? (TM)	B	As described in Section 106, Subsection OVERBURDEN/INTERBURDEN STORAGE AREAS, initial quantities of commingled sand/clay fine tailings will be impounded in storage cells constructed of coarse overburden materials in the upper reaches (flattest) areas of the proposed overburden/interburden storage areas. 15-20 foot high cells will be constructed as compacted berms of overburden material and then filled with commingled clean sand/clay fine tailings. When the first level of cells is filled to capacity, successive tiered levels will be constructed until the mine pit has sufficiently advanced to permit direct replacement of the tailings back into the mine in the layered method described in Section 16.2 Subsection PIT BACKFILL. Five to six levels of tiered cells are anticipated to be required before backfilling of the mine pit can be undertaken. Finished containment cells will prevent erosion of the fine tailings and result in a stable placement as pointed out in the reviewer's comments. Tailings storage cells in the upper reaches of the overburden/interburden storage areas will ultimately become fully encapsulated within the finished and reclaimed overburden/interburden storage areas as described in Section 110.2 Subsection RECLAMATION OF SLOPES . Tailings containment cells will not be constructed on slopes steeper than 20 percent (11 degrees).
18	Page 49 Omission	Air Quality – Most of the written discussion is in regards to dust and equipment emissions. What Air Quality issues will be addressed regarding the process facilities? (lah)	A	All air quality issues, including those regarding the process facilities, are addressed in the documentation submitted to EPA and the documentation received from EPA with regard to air quality permitting will be included in Appendix B.

R647-4-110 - Reclamation Plan

110.2 Roads, highwalls, slopes, drainages, pits, etc., reclaimed

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
19	44	This page describes concurrent reclamation of the pit areas but does not discuss the waste dump topsoil placement. Please provide how these overburden interburden storage areas will be topsoiled and reclaimed. (TM)	B	Topsoil salvaged from disturbed areas will be spread on the recontoured faces of overburden/interburden storage areas with the exception of rock armoured drainage courses or other areas deemed to have higher erosion potential, that will be similarly protected with coarse rock material. Further detail is provided in Section 110.2 Subsection RECLAMATION OF SLOPES and in Section 109.4 Subsection EROSION CONTROL.

110.5 Revegetation planting program

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
20	Pg. 59 Seedmix	The seed mix provided is not specific as to what is actually planned. (i.e only 11 of the 17 species listed will be used). Please indicate which species are the preferred species and omit the rest (if at the time of reclamation, the preferred species are not available then substitutions can be made at that time, with species that are available). It is suggested that both forb species and all shrub species be used (for a total of 14 species). (LK)	B	Both forb species and all shrub species will be included in the seed mix. In addition, a specific seed mix is now listed in the Notice of Intention so that there is no ambiguity in the Notice of Intention.

R647-4-113 – Surety

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
21	Page 62	Item 15&16 – Post mine monitoring is not a subtotal, escalation applies. (lah)	A	The Subtotals are additive. Subtotal 1 - Item 15 in the Surety section of the NOI - is a total of all the reclamation items above it. Subtotal 2 - Item 16 in the Surety section of the NOI- includes Subtotal 1 plus the reclamation Supervision and Monitoring. Once the 5% contingency is added to Subtotal 2 (the Base Reclamation cost (Subtotal 1) + Supervision and Monitoring), then the escalation is applied to this entire amount.
22	Appendix E	DOGM standardized Spread Sheet will be supplied. (WHW)	A	Thank you for supplying the standardized spreadsheet. However, from recent discussions with DOGM, we understand that the previously developed spreadsheet for surety calculations will be used in the Notice of Intention.
23	Appendix E - Page 3	Bond Calculation is to assume the worst-case scenario, calc needs to assume the pit has not been backfilled and the slope s will need to be bonded. (lah)	A	The bond calculation as presented is associated with a worst case scenario for reclamation of the site. As mining operations progress, Earth Energy will commence with concurrent reclamation of the overburden storage areas and of depleted areas of the mine pit. However, the bond calculation includes reclamation for the entire Affected Area; at no point would reclamation of all 213 acres be required. In regard to an unplanned scenario where operations cease prior to backfill beginning, please note that this does not represent worst-case. At most, only the very initial stages of the pit would be opened, without backfilling occurring. During that, and all times, the operational pit slope angle is 2h:1v. At no time will the pit walls be at or near the 45-degree angle stipulated at R647-4-111, so filling or laying back these slopes would not be needed. Therefore, no additional measures would be required to attain stability of these highwall slopes in the event the pit is developed and abandoned prior to backfilling.
24	Appendix E - Page 3	As noted "mine will be backfilled 50-60%..." Does this statement reflect Figure 9? (lah)	A	Figure 9 does reflect the final contour of the mine pits upon backfilling of however, a revision has been made to increase the percentage of pit backfill to 60-65% of the original volume.

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
25	General	The Division is pleased with the Reclamation Map figure 6, but we would like a "Bond" map that would associate the site with the bond calc that is a worst-case scenario. (lah)	A	See response to Comment 23 above. Note that the Figure 5 Reclamation Map therefore is a bond map representing the worst-case scenario.
26	General	More comments will be forthcoming when standardized spread sheet is utilized. (lah)	A	From recent discussions with DOGM, we understand that the previously developed spreadsheet for surety calculations will be used in the Notice of Intention.

EARTH ENERY RESPONSE TO REVIEW OF NOTICE OF INTENTION TO COMMENCE LARGE MINING OPERATIONS

Earth Energy Resources
PR Springs Mine
M0470090
November 10, 2008

Review Action Key: **A = Comment noted by Earth Energy, but no requirement for changes to current version of NOI**
B = Changes made to current version of NOI in response to comment

General Comments:

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
1	General	Based on the content of the submittal, it appears there may be expansions that will require revisions to the permit in time. Because of the change dynamics, the submittal should be formatted to easily incorporate into future revisions or amendments. Further discussion with the Division is suggested. (BE)	A	This comment was carried over from the Initial Review. It was thoroughly and completely addressed by Earth Energy in the response to that review, and the May 9, 2008 2nd draft NOI was significantly reformatted to meet the Division request. On September 11, lah indicated that the comment was left in simply as a reminder. Accordingly, the reformatting changes have been continued with the current version of the NOI.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
2	General	It has been noted in the submittal that there maybe additional resource reserves, yet the plan does not indicate how an expansion would be incorporated into the plan. Ie something would have to be rehandled, processing plant, the moving of a dump etc. (lah)	B	Development of additional resources will be dealt with through future NOI applications to DOGM. Changes to the current version of the NOI (in the introduction and on page 51 in Section 110.2) have been made to clarify this commitment. It is beyond the scope of Earth Energy's proposed operations to develop detailed plans for any expansions at this time or in this NOI. Such expansions will be dependant upon the results of the initial development and continuing market conditions. Note that Earth Energy's operations are planned to minimize any re-handling of material as operations expand. The overburden/interburden storage piles are located in areas devoid of oil sand and mines will be depleted before refilling and reclamation commence. Surface facilities are constructed on oil sand bearing areas, but these areas are limited; and relocation of the plant facility and ultimate development of the underlying bitumen resource is incorporated within our future plans. Changes have been made to page 11 in Section 106.2 to explicitly state this intent.

R647-4-104 – Operator's, Surface and Mineral Ownership

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
3	General	Once the conditional use permit from Grand County is granted, please include this as an appendix to the plan. (BE) Provide Appendix number and a place holder for the permit to be inserted (lah)	B	Changes have been made to the current version of the NOI (in the introduction and on page 6 in Section 104.1) to reference the appendix in which the Grand County CUP will be placed when available. A place holder for the document has been added to the appendix.

R647-4-105 - Maps, Drawings & Photographs

General Map Comments

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
4	General	There is no shown and labeled public access route from nearest highway. (BE)	B	The public access route, Seep Ridge Road, was previously shown and labeled on Figure 2 in the May 9, 2008 2nd draft of the NOI. The nearest highways were previously shown on Figure 1 in that 2nd draft. In the current version of the NOI, these features continue to be shown and labeled on these two figures, and additional labeling has been added to them as well. In addition, a reference to Figure 2 has been included on page 12 in Section 106.2.

Specific Map Comments

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
5	General	The below review comments are specific to the identified maps. The items will require clarification and updates, improvements, or corrections. These should be made to each of the maps accordingly. Do not assume this information is all-inclusive as other changes may result once clarity is established. (BE & lah)	A	This comment does not appear to require a response.
6	Figure 2	Label permit area, include pipeline disturbance, include acres to match Bonded acres (lah)	B	The term "Permit Area" is not used in the May 9, 2008 2nd draft of the NOI or the current version; instead, the term used to describe the 213-acre area which will be disturbed by the operations, bonded for, and subsequently reclaimed is "Affected Area". Figure 2 in the 2nd draft previously properly labeled this area. Bonded acres have been added to this figure as well, however please note that the initial review indicated that figures were too cluttered, and thus acreage labels were removed for the May 9, 2008 2nd draft NOI. Also, note that the 4.4 acres of water well and pipeline disturbances are now being permitted separate from this project, under Exploration Notice #E0190053. As a result, the Affected Area (and total bonded acres) no longer includes the water well and pipeline, and bonding for those is covered by the Exploration Notice.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
7	Figure 2	The word proposed mine operations shows several colors of hatching, however none of them are identified using a key. There is no indication of what they mean. Please correct. (BE)	A	This comment was carried over from the Division's Initial Review. In response to the comment, the figure was removed from the May 9, 2008 2nd draft NOI and information was presented in other figures. Thus, the comment is irrelevant to the current version of the NOI, and no further response is needed.
8	Figure 2a	Include either plan view of feature or more description of where feature will be used. Nothing has been included catch basins, sediment ponds, etc (lah)	B	These features will be used at locations shown on Figure 2. They will function as sediment traps/energy dissipation at the toe of the overburden/interburden storage areas. By design and by nature, these areas are not expected to generate large quantities of sediment or runoff: they will not collect up-gradient runoff, they are constructed at moderate gradient, and their substrate is coarse and porous. Therefore, large sediment ponds are not needed to control either runoff or sediment from these overburden/interburden storage areas. See the text in Section 109.4 of the May 9, 2008 2nd draft of the NOI, and the current version of the NOI for additional discussion of this issue. Further, as was indicated in numerous locations in the May 9, 2008 2nd draft of the NOI, a water retention/sediment pond is planned to prevent sediments from moving off the plant site; that pond was shown on Figure 3. Please refer to responses detailed in sections 42, 43, 55 & 58 that follow below.
9	Figure 2a	Overburden should be keyed into natural slope for stability FOS (lah)	B	Earth Energy mine engineers do not feel that it is necessary to key overburden in to the slopes in all locations or as a matter of general design. However, on the steepest areas of overburden placement, the toes of fills may be keyed into existing slopes as deemed necessary in the field at time of placement; a statement to this effect has been added to the NOI, but figure changes have not been made. Also see the response to Comment #51, which discusses the conservative nature of the overburden/interburden storage area design.
10	Figure 2b	Include either plan view of feature or more description of where feature will be used. Where will a unlined ditch be used as opposed to a rip rap lined ditch, where will the berm be used in the plan (lah)	B	Earth Energy does not believe that a plan view of a typical berm or a typical ditch is needed; the cross sections provided in Figure 2b are fully understandable and these features are common, typical, and standard. Cross sections are a standard way to describe such structures. In regard to exactly where they will be used, and additional descriptions, please see changes that have been made to pages 16 in Section 106.2 in the current version of the NOI.
	Figure 3	Define 203 acres listed in text and in bonded area. (lah)	B	Please see the response to Comment #6. Also note that acreage values have been refined throughout the current version of the NOI.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
12	Figure 3	Label figure 3 - features to be tied to surety bond (lah)	A	There is no good way to add all of the surety information onto this figure. The surety table includes references to these features and the assumptions used therein and does not need to be duplicated on this figure.
13	Figure 3	The facilities map should include the dimensions of the buildings, ponds, piles etc. These dimensions can be part of the legend and referenced appropriately. The map should show roads, including access and haul roads; utilities and power lines (water, gas, power, telecommunications etc); and drainage control devices. (BE) Maximum size of the facilities are needed for bonding calculation purposes. (lah)	A	Earth Energy respectfully disagrees that dimensions should be placed on Figure 3 for every specific structure, for the following reasons. First, with the additional labeling already added to this figure in response to Comment 12, the figure is simply too cluttered to contain the additional information. Second, the figure is meant to represent the conceptual plans for the surface facility, as they are currently known; detailed engineering designs have not yet been prepared and Earth Energy has committed to submit those detailed designs, which will include dimensions, once they are available. Third, the figure as is contains overall site dimensions, from which the relative and general sizes of the specific features within the site can be generally and easily inferred. Last, Earth Energy recognizes that dimensions are important for surety purposes; to that end, the bond calculation worksheets spell out the presumed maximum sizes for specific structures.
14	Figure 4a,4b,4c,6	FYI only, best if drawn with no vertical exaggeration, best if all x-sections are the same scale, engineering standards for drawing are lacking (lah)	A	Earth Energy respectfully disagrees that these cross sections are best shown without vertical exaggeration. Necessary detail would be lost if scales were equivalent, and vertical exaggeration is a standard practice to solve this problem. No changes to the scale of these drawings have been made.
15	Figure 4a,4b,4c	Slope angles shown on x-section are incorrect. (lah)	A	Earth Energy believes that the shown slope angles on all three of these figures are correct. Please note that a replacement for Figure 4b was submitted to the Division on May 15, 2008 to correct an error in the May 2008 2nd draft NOI submittal.
16	Figure 5	As per 105.3.16 A geology map is required, include Geomechanical data; include orientation of bedding and structural features include faults, and joint sets orientations to demonstrate pit wall stability . (lah)	B	In response to a comment in the Division's Initial Review, the best available geologic map was provided as Figure 5 in the May 9, 2008 2nd draft NOI. The response letter accompanying that 2nd draft stated that it was the best available map. As requested by Comment # 40, generalized strike/dip information for bedding has been added to Figure 5. The other more detailed geologic information that the Division is requesting is simply not available, to Earth Energy's best knowledge, so it cannot be added to the map.
17	Figure 5-d	There may be related issues within the other figures and more information may be required. (BE)	A	Figure 5-d was taken out of the May 9, 2008 2nd draft NOI. No further response to this comment is warranted.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
18	Figure 5-d	Is this figure to remain in the plan? Why is it labeled proprietary & confidential? (lah)	A	Figure 5-d was taken out of the May 9, 2008 2nd draft NOI, and remains withdrawn. Thus, its labeling is not relevant to either the 2nd draft or the current version of the NOI.
19	Figure 9	Good regrading plan. Better scale and more detail needed (match to surety bond) needed (lah)	B	Changes have been made to Figure 9 in the current version of the NOI., however we believe the scale as-is is adequate.
20	General	As per 105.3.16 A geology map is required, include Geomechanical data; include orientation of bedding and structural features include faults, and joint sets orientations to demonstrate pit wall stability. (lah)	B	This comment is identical to #16 above. See Earth Energy's response to that comment.
21	General	A map should be submitted that shows adjacent land owners, including access road from the nearest public state road. (BE) As per 105.3.18 County road is not labeled on Figure 1 as written in text page 10 para 5 (lah)	A	Land ownership and access road information was previously provided on Figure 2 of the May 9, 2008 2nd draft NOI; please refer to that figure. Also, please see response to Comment #4.

R647-4-106 – Operation Plan

106.2 Type of operations conducted, mining method, processing etc.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
22	Page 11 para 4	FYI – Caterpillar performance handbook provides ripper performance chart for dozers based on Seismic Shear Wave Velocities. (lah)	A	Earth Energy appreciates the Division providing the information, however we do not believe it is relevant to our project. No changes have been made to the current version of the NOI in response to this comment.
23	Page 11 para 4	Safety items regarding blasting such as closure distances and times should not be committed to in the Mine permit., as loading specifics are not known. Give minimums or maximum as each apply. (lah)	B	The noted paragraph has been rewritten in the current version of the NOI to address these blasting comments, including deleting reference to closure distance and times. Peak particle velocities of initial blasting operations (if blasting is required) will be monitored and appropriate blasting protocols refined at the time blasting commences. As typical for these types of operations, a series of test blasts will be monitored to determine the resultant peak particle velocities at specified distances from the blasting area.
	Omission	Include posting of sign with Blasting schedules on public roads. (lah)	B	The current version of the NOI has been modified on page 13, Section 106.2 and pages 53, Section 109.4 to include signage information.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
25	Page 11 para 4	"Blasting is not expected...." As per Public Safety R647-4-109 4. NO FLY WILL BE TOLERATED ON PUBLIC ROADS (lah)	B	The noted paragraph and elsewhere in the current version of the NOI have been changed to eliminate the mitigation for fly rock on public road. This information had only been added to the May 9, 2008 2nd draft of the NOI in specific response to a Division Initial Review comment to address migration of materials during blasting.
26	Page 12 Para 3	Why is the processing procedure listed under equipment? (lah)	A	This text was included to assist the reader in understanding the utilization of the mining equipment. As Earth Energy believes that it is useful, it remains in the current version of the NOI.
27	Page 13 Para 1	Slope stability and Blasting are related, perhaps info should adjacent in text. (lah)	A	Earth Energy believes that the discussion on slope stability and blasting is coherent as written; no changes have been made to the current version of the NOI in response to this comment.
28	Page 13 Para 1	Controlled Blasting is not normally done on slopes of 2H:1V (lah)	A	Earth Energy appreciates the Division providing the information. However, we continue to believe that controlled blasting on 2H:1V slopes is a feasible and effective way to mine these pits. No changes have been made to the current version of the NOI in response to this comment.
29	Page 14 Para 4	Show locations of water retention/storage ponds on a map.(lah)	B	The only planned water retention storage pond was previously shown on Figure 3 in the May 9, 2008 2nd draft of the NOI. It remains shown on that Figure in the current version of the NOI. A reference to that figure has been added to the current version of the NOI on page 15 in Section 106.2. The small in-pit collection areas were, and are, shown on Figure 2.
30	Page 15 Para 5 & 6	It is unclear if slope stability will have an adequate Factor of Safety in the unconsolidated waste dumps with the increased pore water pressures proposed. (lah)	A	Earth Energy has designed the pit and the overburden/interburden storage areas with very conservative slopes to compensate for the lack of available geotechnical data in order to ensure that slopes will be stable. Please also refer to responses detailed in sections 42, 43, 55 & 58 that follow below.
31	Page 16 Para 6	Most ground water wells have a minimum of 4" of gravel pack around the OD of the well screen. (lah)	A	Earth Energy appreciates the Division providing the information. No changes to the well design or to the relevant NOI text have been made in response to this comment. The well will meet all of the requirements imposed by the Utah State Engineers Office, who is the regulating authority for groundwater wells in the state. Further, note that the well is now included with the Exploration Notice #E0190053 and not the current NOI.
32	Page 17 Para 2	Is there any monitoring or gages planned for the pipeline to monitor for leaks? (lah)	B	Gauges will be included in the pipeline construction to monitor for leaks. Information to that effect has been added to the current version of the NOI on page 19 in Section 106.2 and page 34 in 106.9.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
33	Page 17 Para 5	Has there been any triaxial shear tests run on "discharge sands" to determine cohesion and phi angle? (lah)	A	No, no such tests have been run and none are planned. Triaxial shear tests are intended for clay and similar materials much finer than the discharge sands and would not be relevant for the discharge sands. The noted soil testing has not been carried out on the sand tailings as placement will be in a manner as described in sections 42, 43, 55 & 58 that follow below.
34	Page 17, 18 General	General Engineering parameters should be defined, such as FOS's used (lah)	A	Earth Energy has designed the pit and the overburden/interburden storage areas with very conservative slopes to compensate for the lack of available geotechnical data in order to ensure that slopes will be stable. Also see responses to comments 42, 43, 55 and 58.
35	Page 18 Para 5	Reference drawing detail for runoff detail. (lah)	B	The requested reference was already included in that paragraph in the May 9, 2008 2nd draft of the NOI, however another reference has been added in the current version of the NOI.
36	Page 19 General	Maximum slope angles have been noted for waste piles but nothing noted for pit slope angles (lah)	B	The May 9, 2008 2nd draft NOI included the maximum operating pit slope angle of 2H:1V on page 13 and the backfilled/reclaimed pit slope angle of 2.5-3H:1V on page 49. Additional references to these maximum slope angles have been added to the current version of the NOI page 20 under the pit backfill subheading in Section 106.2. Also refer to Figures 4a, 4b, and 4c for slope angle information during operations and after reclamation.

106.6 Plan for protecting & redepositing soils

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
37	Page 23	The plan says on page 23 that soil will not be salvaged from the water well pad or the pipeline corridor because these areas are within previously disturbed corridors. Please explain further. What type of disturbance or corridors are in this area? (PBB)	B	As noted in the response to Comment 6, the 4.4 acres of water well and pipeline disturbances are now being permitted separate from this project, under Exploration Notice #E0190053. As a result, soil salvage in those areas is covered by that Notice and is not addressed herein.

106.8 Depth to groundwater, extent of overburden, geology

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
38	Page 28 omission	No geologic setting is provided for ephemeral spring noted on page 29 para 4 (lah)	B	The relevant text in the current version of the NOI has been revised to note that the observed feature is at most a seep and not a spring, and is outside of the planned affected area. Other than the overall geologic description of the area, a specific geologic setting for the feature associated with the water right and covered by the overburden/interburden storage area is not provided; no contact, mass movement, fault, or other explanation for its occurrence at this specific location has been noted by Earth Energy's contract geologist, and no water feature was observed to mark this location. The lack of such an occurrence may in fact provide some evidence that the supposed spring feature is simply associated with a mis-identified water right location. For the location identified as a seep, outside of the direct disturbance area, a short description of the geologic setting has been added to Section 109.1 in the current version of the NOI.
39	Page 28 Para 2	"Geologic Setting" is NOT the correct title for the paragraph (lah)	B	Because the paragraph was not particularly important to the narrative, it and the heading were simply deleted in the current version of the NOI.
40	Page 28 para 3	Add strike and dip, and fault to Figure 5 (lah)	B	Strike/dip associated with the general bedding has now been added to Figure 5. The published geologic maps do not show any faults within the area of concern. Mention in the text in the May 9, 2008 2nd draft of the NOI, regarding a fault that was noted by other observers, has been removed because it could not be substantiated; as geologic exploration work continues in the area, evidence of faulting would be among the types of data that would be recorded.

106.9 Location & size of ore, waste, tailings, ponds

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
41	General	The Division appreciates the efforts of obtaining information to follow DWQ guidelines for minimize impact of ore and waste stockpiles on groundwater. Specific design information and control measures should be provided in the plan. (BE)	B	The May 9, 2008 2nd draft NOI was intended to have included the DWQ information in Appendix B. It may have been inadvertently left out of the submittal, but has been included in the current version of the NOI. Final site designs will be provided to the Division of Oil, Gas and Mining when available.

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
42	Page 29 Para 2	Note "waste sand would be nearly dry"..page 17 notes discharged sand to contain 10 to 20 percent water (lah)	B	Text on page 33 in Section 106.9 of the current NOI has been changed to indicate that waste sand will contain 10-20% water. Recent process equipment evaluations are indicating the moisture content of the blended sand/clay fine tailings will be in the order of 15%. This level of moisture content is near optimal for compaction and will certainly not lead to liquefaction. Blended sand/clay fine tailings will be placed in relatively thin lifts and in conjunction with the arid climate of the mine area, the deposited tailings will readily dry out to even lower ultimate moisture content. Pore water pressures will not be a concern. Relevant portions of the current NOI also includes this information.
43	Page 29 Para 3	Provide phase maps to show the backfilling of the pit sequence (lah)	A	Phase maps are not included at this time. Earth Energy will gladly commit to supplying a greater level of detail with regard to sequencing of tailings replacement when a detailed mine plan and truck operation is fully developed. In general terms however, clean produced sand/clay fine tailings will be placed in relatively thin lifts (estimated at 1-3 ft thickness) to promote maximum drying, compaction and subsequent stability. Where conducive to properly sequenced ore bed depletion and efficient material handling (after threshold opening pit size is established), clean produced sand/clay fine tailings will be preferentially replaced in the depleted mine areas vs discharged in overburden dumps. The current version of the NOI incorporates this information and the commitment to supply additional design information when it is developed.
44	Page 29 Para 4	Provide drawing for avoiding ephemeral spring (lah)	B	Field observations have shown the ephemeral spring to be outside of the Affected Area, and that the supposed spring associated with the water right location (which is within the affected area) is not present. Thus, construction of some form of diversion structure is not warranted. References to it have been removed from the current version of the NOI.
45	Page 30 Para 4	Note steel pipeline, elsewhere HDPE is noted (page 17 para 1) (lah)	B	Text on page 31 in Section 106.9 of the current NOI has been changed to indicate that the pipeline will be HDPE.
46	Page 30 Para 2	Provide drawing for storage pond, include location and design standards (lah)	A	The location and general size of the water storage pond are shown in Figure 3. The facilities plan is preliminary and will be finalized upon completion of detailed engineering, at which time a drawing of the pond will be provided to the Division. Design standards were included on pages 14 and 15 in Section 106.2 of the May 9, 2008 2nd draft of the NOI.

106.10 Amount of material to be moved

R647-4-107 - Operation Practices

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
47	General	The plan states that there will not be a problem with drainage, and page 20 says, 'Surface water resources will be protected during operations as described above in Section 107.' There is **no** section 107 in the plan. The Division requires that the BMPs to be used on site be described in the plan and a typical drawing submitted of how the BMP will be installed and a figure showing where on the ground it will be implemented referencing the BMP. Temporary BMPs are not recommended for long term operations as they are not always maintained. The Division recommends the use of berms to direct runoff to small catch basins that can be cleaned out after storm events, since the maintenance of these controls is more predicable. Provide this additional information. This ensures the proposed controls will be effective and there will not be any problems with offsite drainage. (TM & lah)	B	This comment is repeated verbatim from the Division's Initial Review. In the response letter to that review, regarding the first two sentences, Earth Energy stated: "*The reference to Section 107 was a misprint and has been corrected. As described in R647-4-103, that section is not required to be addressed in NOIs for Large Mining Operations, however the content asked for in the Section 107 rules is provided in other sections of the NOI.*" That response fully addressed the Division concern and no additional response is warranted. In response to the remaining sentences in the comment, Earth Energy provided additional typical drawings and discussions in the May 9, 2008 2nd draft of the NOI, including incorporating the reviewer's recommendation to use berms to route site runoff to a storage/retention pond. Because of the topography, locating such ponds at the toe of the overburden/interburden storage piles are not practical because could not be readily accessed or cleaned out with equipment. Instead, other means of reducing runoff and providing sediment control were described in the May 9, 2008 2nd draft of the NOI. Earth Energy has provided yet more discussion of this issue in Section 109.4 of the current version of the NOI.

R647-4-108- Hole Plugging Requirements

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
48	Page 31 Para 2	The plan states SITLA?...it was my understanding the well will be on BLM land and also noted on page of this report and shown on Figure 1. (lah)	B	The text in the current version of the NOI has been revised in several locations, as the well is now being handled under separate permitting actions (DOGM Exploration Notice #E0190053 and BLM ROW Grant UTU-86004, in particular.)

R647-4-109 - Impact Assessment

109.1 Impacts to surface & groundwater systems

Comment #	Sheet/Page #	Comments	Review Action	Earth Energy Responses
49	Page 34 Para 2	The plan does reference any sort of sediment control other than BMPs included in the SWPPP plan by reference. The SWPP needs to be included in the plan when approved. Since the term BMPs references a large variety of sediment control devices, the Division requires that the operator specify what specific BMP controls are going to be used and a typical design drawing included in the plan. There is no reference to any sediment controls such as sediment ponds, etc. The plan says the mine is on flat ground in the headwaters of main canyon, inferring there is no runoff. The pits are likely to catch a major amount of drainage from rain and snow, and this water needs to be factored into the site plan. Therefore, a plan must be provided on how this runoff water will be handled operationally both in the pits and running off waste piles. Please include these plans and designs in the mine plan. (TM) Provide drawing with hydrology detail. As you have noted on page 34, "the SWPPP will be added" Provide a place holder for the permit to be inserted (lah)	B	This comment is repeated verbatim from the Division's Initial Review. In the response letter to that review, and in the May 9, 2008 2nd draft of the NOI, Earth Energy committed to including the SWPPP in the plan once was available, and provided discussions of specific BMPs including sediment controls, management of runoff water, and the other requested information. As also noted in the 2nd draft, additional detail will be provided once final engineering designs are completed. In Section 109.4 of the current version of the NOI, Earth Energy has provided additional information on BMPs and provided additional schematics as Figures 2c-e. As noted in a meeting with lah on September 11, 2008, the Division's preference is to have Earth Energy provide a set (so-called "tool kit") of structures that can be used in many situations should one type of structure fail or underperform. Earth Energy has attempted to do that in the referenced section. In addition, a place holder has been added for the SWPPP. In addition, and as indicated in other sections of this NOI, the mine pits have been designed as catchments to prevent run-off of water (that has traversed active mine workings) from moving off the mine area. Impounded run-on water will be collected and used for dust suppression on mine roads or used directly as make-up in the extraction process in place of groundwater pumped from the supply well.

109.4 Slope stability, erosion control, air quality (fugitive dust control plan), safety

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
50	Page 46 Para 1	The plan says Earth Energy is in the process of obtaining an Approval Order from the Division of Air Quality. Please include a copy of this Approval Order in the plan once it has been issued. (PBB) Provide Appendix number and a place holder for the permit to be inserted (lah)	B	Page 47 in Section 109.4 of the May 9, 2008 2nd draft of the NOI indicated that EPA had taken over the air permitting issues for this project due to its location within Tribal Land. Thus, no Utah DAQ Approval Order will be needed or issued. As was noted previously on that page, the EPA approval will be placed in Appendix B once it has been obtained. A place holder has been provided in the current NOI.
51	Page 42 Para 1	Will the valley fill dumps be keyed into the slopes? (lah)	B	No, Earth Energy does not feel that keying of the overburden/interburden storage areas is needed; from a geotechnical standpoint the design slopes will be stable as is without this additional measure. Note also that these features are placed above the steepest portions of these drainages. Changes have been made in multiple locations in the current version of the NOI, notably in Section 109.4, to provide assurances that stable slopes are being used.
52	Page 46 all	See comments listed above regarding public safety (lah)	B	The public health and safety subsection in the current version of the NOI has been edited to eliminate the Division's concerns regarding language about blasting.
53	Page 46 Bullet 9	Fly rock is bad blasting…the proper blast design has no fly rock, the use of adequate stemming is the solution. (lah)	B	Bullet 9 in the public health and safety subsection in the current version of the NOI has been edited to eliminate the Division's concerns regarding language about fly rock

R647-4-110 - Reclamation Plan

110.1 Current & post mining land use

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
54	General	Exploration cannot be a post mining land use. Closure plans should be dependent on the area being used as open space/habitat. (BE & lah)	B	Page 49 in Section 110.2 of the May 9, 2008 2nd draft of the NOI stated "While recognizing that exploration may occur in the future, the stated objective of reclamation planning in this NOI is to reclaim the site in order to provide for future post mining land uses of wildlife habitat and open space." Thus, as the comment requested, the closure plan already is dependant upon the area being used as open space/habitat. The reason that exploration was listed as a potential postmining use of the land after reclamation is simply to acknowledge that it is a potential future use. Changes have been made to the current version of the NOI in this portion of the text to clarify that no such postmining exploration uses are contemplated by Earth Energy themselves.

110.2 Roads, highwalls, slopes, drainages, pits, etc., reclaimed

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
55	Page 50 Para 2	"pits (approx 92 acres....)" It is unclear which part of the 92 acres will be back filled, please, submit phasing as plan view diagrams. (lah)	A	The 93 acres refers to the North (Opening) Pit and West Pit, all of which will be backfilled (see cross sections in Figures 4a, 4b and 4c.) Phase maps showing backfilling of the pits will be prepared as part of the detailed mine planning; they will be provided to DOGM at that time. It is currently premature to prepare them because the final pit configurations and detailed plans cannot be finalized until the high density coring program and core assays are completed on the proposed mine area. In conceptual terms however, mining will commence in the "D" bed at the S.W. limit of the north (opening) pit and will advance north into the "D" bed until a sufficient bench area is established to begin mining the "C" bed. Overburden/ interburden and produced sand tailings from this threshold opening area of the North pit will be discharged in the upper reaches of Overburden/ Interburden Storage Area #1. When a sufficient area of the North pit has been depleted of ore, sand tailings will be backhauled to the mine pit for direct replacement in the mine (onset of concurrent reclamation operations). Percentages of overburden removed ahead of the advancing active pit face may be co-mingled with the replaced sand tailings to minimize discharge to Overburden/ Interburden Storage Area #1and further stabilize the replaced fill material by creating a broader gradation.

110.3 Description of facilities to be left (post mining use)

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
56	Page 51 Para 6	As stated water well is to revert to SITLA. Well is located on BLM land and other documentation refer to reverting to BLM. Please clarify (lah)	B	Please see response to Comment #48.

110.5 Revegetation planting program

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
57	Page 52 Para 3	It is unclear why pipeline construction is "except" from redistribution of topsoil. (PB & lah)	B	Please see response to Comment #6. Pipeline reclamation is now handled under Exploration Notice #E0190053.

R647-4-111 - Reclamation Practices

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
58	General	The plan says on page 36 that no significant drainages will be disturbed so none will be reconstructed. The plan needs to address landform and final drainage on waste dump faces. Please show how waste pile outslopes and reclaimed pit slopes will be stabilized, water directed off the slope, erosion controlled, and how sediment will be kept from leaving the site. (TM) According to Plan, the dumps will contain a significant amount of fine grained material, not just waste overburden, address how fine grained sediments will be kept from leaving the site…siltation basins ?, sediment ponds (lah)	B	Exposed waste dump faces will be protected with coarse/low sediment potential material, effectively armouring the faces. Initially produced sand tailings required to be discharged to Overburden/ Interburden Storage Area #1 (prior to direct discharge back to the depleted mine pit) will be placed within containment "pens" formed by initial placement of coarse overburden materials. In this manner, resultant waste dump fills end up being "celled" with a buried internal framework of interlocked coarse overburden materials. Dumps constructed as a series of interlocking deposition cells can be made very stable and sequenced effectively as the waste materials are generated. Section 106.2 in the current version of the NOI now contains this additional explanation. Note that this comment (which remains from DOGM's initial review) was also addressed in the May 9, 2008 response document, though the current reviewer apparently did not have access to that.

R647-4-113 – Surety

Reclamation:

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
60	General	This review cannot capture every omission and make a statement accordingly. It is anticipated that communications will occur in the interim and the dialog will provide elaboration on the generalities made within the scope of this review. (BE)	A	This comment does not appear to require a response. Note that the DOGM comments appear to skip from 58 to 60, with no comment #59.
61	General	On the sub sections within each category on the cost estimation, please include the dollar amount. (BE)		Subtotal dollar amounts were included in the surety table in the May 8, 2008 2nd draft of the NOI within each subsection for all categories except Category 1. Subtotal dollar amounts for Category 1 have been added to the surety table in the current version of the NOI.
62	-	Category 1. The spread sheet dollar amount of $210,627 is different than the category one summary amount of $263,427. (BE)		This error has been corrected in the surety table in the current version of the NOI.
63	Page 50	Page 50 of the draft indicates that some of the demolition activities will require burial. Have these costs been accounted for? If so, an explanation of that should be provided in the spread sheet or within a surety summary narrative. (BE)		The current version of the NOI text has been clarified in regard to items that will be buried (see response to Comment 65). Because the items will simply be buried in-place, costs are accounted for in the other tasks such as ripping, grading and topsoiling. A notation to this effect has been added to the surety table.
64	Page 50 Para 5	Page 50 the new text uses the word proposed. Please remove the use of the word and write the narrative as though the Division has approved. (BE)		The noted occurrence of the word "proposed" has been removed from the current version of the NOI. Further, that word has not been used elsewhere in the current version of the NOI.
65	Page 50 Para 5	The first sentence of the Facilities and Materials paragraph requires some clarification and requires specific action outline. When reading it lends the impression that either burial or dismantling will occur. In reality dismantling will occur with the exception of the mentioned burial work. (BE)		The current version of the NOI includes clarifications to the noted paragraph.
66	-	Although the surety spreadsheet identifies the equipment used in category one reclamation. It is extremely helpful to provide the equipment within the reclamation narrative as well. (BE)	B	A paragraph that lists reclamation equipment has been added to page 56 in Section 110.2 of the current version of the NOI.

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
67	Page 51 Para 1	Page 51, the process train indicates process materials will be drained. Please elaborate on where the drainage will occur, and explain if the process materials are hazardous and/or are an impact to public health and safety. (BE)	B	The requested elaboration has been added to page 52 in Section 110.2 of the current version of the NOI. Additional costs have been added to the surety. Hazardous materials have been previously discussed.
68	General	There is indication that there are two process trains. It appears there are reclamation costs for only one. Page 2 of the summary surety draft does not show costs for two process trains. Please correct and/or explain. (BE)	B	Page 14 in Section 106.2 of the current version of the NOI has been revised to state that only one process train will be permitted under this NOI. Additional clarifications to this end have also been made, including removing the optional process train from Figure 3.
69	General	Please provide the weight of one cubic yard of cut up process train. (BE)	A	There is no reason to discuss or calculate the weight of one cubic yard of cut up process train. The surety calculation was based upon weight, not density, and thus its density is irrelevant. No changes have been made to the NOI narrative or surety for this comment.
70	Page 49 Para 1	Page 49, reclamation activities will involve the Division. Surety release will not occur until the Division approves the reclamation work, which typically requires 'visual inspections'. It may be helpful to include narrative that indicates the reclamation activity obligations under the Act and rules. (BE)	B	Page 56 in Section 110.2 of the current version of the NOI has been revised to include the requested information.
71	Page 49 Para 2	Page 49, during interim and on going reclamation, a commitment should be made that indicates that maps will be submitted to the Division showing 'active roads' or a reference that the roads shown on the reclamation activities map are active during the early reclamation phases. (BE)	B	A statement has been added to page in Section of the current version of the NOI to clarify that all roads or portions of them remain active during the early reclamation phases.
72	Genaral	What are the road dimensions? (BE)	B	Road dimensions have been added to page 56 in Section 110.2 of the current version of the NOI.
73	General	What is the water source for the water truck? (BE)	B	A statement has been added to page 52 in Section 109.4 in the current version of the NOI to reiterate that Earth Energy will use water from the water well that will be drilled and for which a water right has been obtained.

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
74	Page 49 Para 5	Page 49, correction is required, there is a comment that indicates that a variance is required for slopes exceeding 45°. That 45° rule is for highwall remediation. By rule, slopes are to be regraded to a stable configuration, and sloped to minimize safety hazards and erosion while promoting successful revegetation. Please remove/re-write the comment. (BE)	B	Page 51, Section 110.2 in the current version of the NOI has been revised to eliminate the variance reference. Please note that the reference was put in to the May 9, 2008 2nd draft of the NOI specifically because of the following statement quoted from the Division's Initial Review "It appears the waste slope angles are greater than 45°, transverse mine sections W1-E1 & W2-E2 reclaimed waste slope angles are 60° or greater. Therefore a highwall variance will be required. (BE)" To clarify, neither the 2nd draft nor the current version of the NOI call for any slopes greater than 45° on any feature.
75	Page 49 Para 5	Spelling comment: regarding should be 'regrading', page 49. (BE)	B	The requested correction has been made.
76	General	What is the remaining height of the pits once sand mix has been placed? (BE)	A	The pits will be backfilled, and their backfilled contours are shown in Figures 4a-4c.
77	Page 50 Para 3	Page 50, for clarity and to eliminate oversight, please relocate the comment under the title "DRILL HOLES', 2nd paragraph about the 'impounding pit'. (BE)	B	The current NOI has been revised on pages 51 and 52 in Section 110.2 to delete the statement from page 51 and insert it on page 52.
78	General	If on site burial of facility components occurs, a solid waste permit may be required. Please make a statement to that affect. (BE)	B	A statement to this effect has been added to page 52 of Section 110.2 in the current version of the NOI.
79	-	Page 1/Surety Estimation under items to be removed, the mine office building is not included. Although ATCO removes it, please include it in the table and make that statement there as well. (BE)	B	The office building has been added to the surety table in the current version of the NOI, along with an explanatory comment about its fate.
80	General	For clarification purposes, does ATCO remove the mine office building without any prep work by operator? Does the mine office building have contents that must be removed? It is assumed gutting is required for this building and others. However, there is no cost. Please explain or include gutting costs.(BE)	B	Prep work will consist of disconnecting the hoses. Gutting will not be required, as it is assumed that ATCO will reuse the building at another site. The surety table in the current version of the NOI now includes this information.

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
81	General	The 'rates and seed mix' sheet shows that labor hourly rates are on pg 629 of the 2008 Means Heavy Construction Cost Data book. That page is an overview of 'new titles'. Please correct and reference the right pages from the book. (BE)		The rate reference from Means has been revised in the current version of the NOI.
82	General	Clarification is required on the bond estimate summary for the following statements: Laborers, assumes 4/laborers per crane hour. If there is a total of 8 crane hours for removal of the water storage pond liner, then a multiplier (number of laborers/crane hour) is missing and should be included before multiplying by the dollars/hour. (BE)	B	The missing multiplier has been added to the surety table in the current version of the NOI.
83	General	Please place the cost (hourly/weekly rate) of the crane on the equipment costs table. (BE)	B	The crane rate has been added to the equipment portion of the surety table in the current version of the NOI. .
84	General	Page 1/6 of the bond summary worksheet shows a crane being used for the removal of several items, however the hourly equipment cost associated with the water storage pond liner is $55.82. The item to be removed description specifically states that a crane will be used. Please clarify/correct. (BE)	B	A correction has been made to the equipment cost line associated with the water storage pond liner, in the surety table in the current version of the NOI. .
85	General	Please check subtotal columns, especially the first one in each sub category. There appears to be consistent errors. Example, tanks (22): 49X47.05 = 2305.45, the cell shows 2290.00. There are more of these errors, please review and correct. (BE)	B	Summations have been checked and corrected where needed.
86	General	What is the basis for the crane hours/laborer hours relationship? (BE)	B	A notation has been added to the surety table in the current version of the NOI to indicate that the basis is professional judgment and past experience.
87	General	Page 2 of the bond estimate summary, please use standard the cost reference number format: NOT: 31 23.23.18 4700 but 31 23-23.18-4700. (BE)	B	The requested DOGM-preferred punctuation has been used throughout the surety table in the current version of the NOI.
88	General	Page 2 of the bond estimate summary, Please reference the $/mile cost of $2.04 (BE)	A	The $/mile cost was already included at the appropriate line at the base of the rows which use that rate. No further changes have been made to the current version of the NOI.

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
89	General	Page 2, bond estimate summary, there is a dedicated water truck, but no costs. Please correct. (BE)	B	The water truck is not needed for the Task 1 components, so that portion of the table has been removed from the current version of the NOI, rather than have it included with a $0 cost, as was done in the May 9, 2008 version.
90	-	Page 2 of bond estimate summary, ripping of concrete foundation in less than an hour is inaccurate. What is the concrete thickness? Is the concrete reinforced? Area is typically square feet and not acres for concrete ripping/burying. (BE)	B	Revisions have been made to the surety table in the current version of the NOI to increase the time to rip concrete. Notes have been added to indicate that the concrete thickness is 6 inches and that standard rebar reinforcement will be used. Acres are the correct unit in this case because the production rate is acre-based; however, note that total square feet was also listed in the May 9, 2008 version of the NOI in the heading of the concrete ripping table.
91	-	Why is there just the equipment operator for concrete ripping? No laborers? No additional equipment? Please reevaluate these costs. (BE)	A	There are no other laborers planned or needed for this task, nor is there additional equipment needed. No changes have been made to the current version of the NOI.
92	-	Page 3 of the bond estimate summary (2), indicates 61.5 acres will be graded. It is unclear how this number has been derived from the explanation given.	B	All acreage numbers in the bond estimate can easily be tied to features shown on Figure 2, reclamation treatments shown on Figure 9, and in tables in the current version of the NOI.
93		page 6/6 15.1, the monitoring and weed control plan should be better defined and should describe specifically the tasks and actions associated with the plan. The cost for a second seeding of 100% or something reasonable. (BE)		Costs have been added to Section 15.1 in the bond estimate, along with a description of what the costs can be attributed to.
94		page 6/6 15.1, the costs associated with weed control should be included. (BE)		Costs have been added to Section 15.1 in the bond estimate, along with a description of what the costs can be attributed to.
95		page 6/6 15.1, there should be an administrative costs for reporting/recording. (BE)		Costs have been added to Section 15.1 in the bond estimate, along with a description of what the costs can be attributed to.
96		page 6/6 15.1, the cost of gas should be included. (BE)		Costs have been added to Section 15.1 in the bond estimate, along with a description of what the costs can be attributed to.
97		page 6/6 15.1, the number of trips/year should increase during post mining monitoring. (BE)		Costs have been added to Section 15.1 in the bond estimate, along with a description of what the costs can be attributed to.
98		page 5/6 12, general site clean up indicates 3 laborers will be involved, however the costs are for one laborer. Please correct. (BE)	B	The correction has been made to the surety table in the current version of the NOI to provide costs for 3 laborers rather than 1.
99	General	Plan needs a map that clearly defines perimeter of bonded area (lah)	A	This outline is shown on Figures 2 and 9 in the current version of the NOI.
100	General	Plan needs a map that ties surety spreadsheet to physical locations (lah)	B	Figures 2, 3 and 9 of the current version of the NOI are sufficient to tie spreadsheet information to physical locations.

Comment #	Sheet/Page #	Comments From Initial Review	Review Action	Earth Energy Responses
101	General	Example surety spread sheet is available from DOGM (lah)	A	This comment does not appear to require a response.

Linda Matthews

From: Leslie Heppler [lheppler@utah.gov]
Sent: Wednesday, July 30, 2008 8:29 AM
To: Linda Matthews
Subject: @LMO-review
Attachments: Second review_M0470090.doc

slie Heppler
ah Division of Oil, Gas & Mining
01) 538-5257 (Mon thru Thur)
eppler@utah.gov

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DIV. OIL GAS & MINING

July 22, 2008

Barclay Cuthbert
Earth Energy Resources
Suite 740, 404-6 Avenue S. W.
Calgary, Alberta, Canada T2P 0R9

Subject: Second Review of Notice of Intention to Commence Large Mining Operations, Earth Energy Resources, PR Springs Mine, M0470090, Task 2386, Uintah County, Utah

Dear Mr. Cuthbert:

The Division has completed a review of your Notice of Intention to Commence Large Mining Operations for the PR Springs Mine, located in Uintah County, Utah, which was received May 9, 2008. The attached comments will need to be addressed before tentative approval may be granted.

The comments are listed under the applicable Minerals Rule heading; please format your response in a similar fashion. Please address only those items requested in the attached technical review by sending replacement pages of the original mining notice using **redline and strikeout** text, so we can see what changes have been made. After the notice is determined technically complete and we are prepared to issue final approval, we will ask that you send us two clean copies of the complete and corrected plan. Upon final approval of the permit, we will return one copy stamped "approved" for your records.

The Division will suspend further review of the Notice of Intention until your response to this letter is received. If you have any questions in this regard please contact me at 801-538-5320 or Leslie Heppler at 801-538-5257. Thank you for your cooperation in completing this permitting action.

Sincerely,

Dana Dean P.E.
Associate Director -Mining

DD:lah:eb
Task # 2386
Attachment: Review
cc: Will Stokes, SITLA
P:\GROUPS\MINERALS\WP\M047-Uintah\M0470090-PRSpringMine\draft\Second review_M0470090.doc

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DIV. OIL GAS & MINING

IR - 000186

REVIEW OF NOTICE OF INTENTION TO COMMENCE LARGE MINING OPERATIONS

Earth Energy Resources
PR Springs Mine
M0470090
July 16, 2008

General Comments:

Comment #	Sheet/Page #	Comments	Review Action
1	General	Based on the content of the submittal, it appears there may be expansions that will require revisions to the permit in time. Because of the change dynamics, the submittal should be formatted to easily incorporate into future revisions or amendments. Further discussion with the Division is suggested. (BE)	
2	General	It has been noted in the submittal that there maybe additional resource reserves, yet the plan dose not indicate how an expansion would be incorporated into the plan. Ie something would have to be rehandled, processing plant, the moving of a dump etc. (lah)	

R647-4-104 – Operator's, Surface and Mineral Ownership

Comment #	Sheet/Page #	Comments	Review Action
3	General	Once the conditional use permit from Grand County is granted, please include this as an appendix to the plan. (BE) Provide Appendix number and a place holder for the permit to be inserted (lah)	

R647-4-105 - Maps, Drawings & Photographs

General Map Comments

Comment #	Sheet/Page #	Comments	Review Action
4	General	There is no shown and labeled public access route from nearest highway. (BE)	

Specific Map Comments

Comment #	Sheet/Page #	Comments	Review Action

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Comment #	Sheet/Page #	Comments	Review Action
5	General	The below review comments are specific to the identified maps. The items will require clarification and updates, improvements, or corrections. These should be made to each of the maps accordingly. Do not assume this information is all-inclusive as other changes may result once clarity is established. (BE & lah)	
6	Figure 2	Label permit area, include pipeline disturbance, include acres to match Bonded acres (lah)	
7	Figure 2	The word proposed mine operations shows several colors of hatching, however none of them are identified using a key. There is no indication of what they mean. Please correct. (BE)	
8	Figure 2a	Include either plan view of feature or more description of where feature will be used. Nothing has been included catch basins, sediment ponds, etc (lah)	
9	Figure 2a	Overburden should be keyed into natural slope for stability FOS (lah)	
10	Figure 2b	Include either plan view of feature or more description of where feature will be used. Where will a unlined ditch be used as opposed to a rip rap lined ditch, where will the berm be used in the plan (lah)	
11	Figure 3	Define 203 acres listed in text and in bonded area. (lah)	
12	Figure 3	Label figure 3 - features to be tied to surety bond (lah)	
13	Figure 3	The facilities map should include the dimensions of the buildings, ponds, piles etc. These dimensions can be part of the legend and referenced appropriately. The map should show roads, including access and haul roads; utilities and power lines (water, gas, power, telecommunications etc); and drainage control devices. (BE) Maximum size of the facilities are needed for bonding calculation purposes. (lah)	
14	Figure 4a,4b,4c,6	FYI only, best if drawn with no vertical exaggeration, best if all x-sections are the same scale, engineering standards for drawing are lacking (lah)	
15	Figure 4a,4b,4c	Slope angles shown on xsection are incorrect. (lah)	
16	Figure 5	As per 105.3.16 A geology map is required, include Geomechanical data; include orientation of bedding and structural features include faults, and joint sets orientations to demonstrate pit wall stability . (lah)	
17	Figure 5-d	There may be related issues within the other figures and more information may be required. (BE)	
18	Figure 5-d	Is this figure to remain in the plan? Why is it labeled proprietary & confidential? (lah)	
19	Figure 9	Good regrading plan. Better scale and more detail needed (match to surety bond) needed (lah)	
20	General	As per 105.3.16 A geology map is required, include Geomechanical data; include orientation of bedding and structural features include faults, and joint sets orientations to demonstrate pit wall stability. (lah)	
21	General	A map should be submitted that shows adjacent land owners, including access road from the nearest public state road. (BE) As per 105.3.18 County road is not labeled on Figure 1 as written in text page 10 para 5 (lah)	

R647-4-106 - Operation Plan

106.2 Type of operations conducted, mining method, processing etc.

Comment #	Sheet/Page #	Comments	Review Action
22	Page 11 para 4	FYI - Caterpillar performance handbook provides ripper performance chart for dozers based on Seismic Shear Wave Velocities. (lah)	
23	Page 11 para 4	Safety items regarding blasting such as closure distances and times should not be committed to in the Mine permit., as loading specifics are not known. Give minimums or maximum as each apply. (lah)	
24	Omission	Include posting of sign with Blasting schedules on public roads. (lah)	
25	Page 11 para 4	"Blasting is not expected...." As per Public Safety R647-4-109 4. NO FLY WILL BE TOLERATED ON PUBLIC ROADS (lah)	
26	Page 12 Para 3	Why is the processing procedure listed under equipment? (lah)	
27	Page 13 Para 1	Slope stability and Blasting are related, perhaps info should adjacent in text. (lah)	
28	Page 13 Para 1	Controlled Blasting is not normally done on slopes of 2H:1V (lah)	
29	Page 14 Para 4	Show locations of water retention/storage ponds on a map.(lah)	
30	Page 15 Para 5 & 6	It is unclear if slope stability will have an adequate Factor of Safety in the unconsolidated waste dumps with the increased pore water pressures proposed. (lah)	
31	Page 16 Para 6	Most ground water wells have a minimum of 4" of gravel pack around the OD of the well screen. (lah)	
32	Page 17 Para 2	Is there any monitoring or gages planned for the pipeline to monitor for leaks? (lah)	
33	Page 17 Para 5	Has there been any triaxial shear tests run on "discharge sands" to determine cohesion and phi angle? (lah)	
34	Page 17, 18 General	General Engineering parameters should be defined, such as FOS's used (lah)	
35	Page 18 Para 5	Reference drawing detail for runoff detail. (lah)	
36	Page 19 General	Maximum slope angles have been noted for waste piles but nothing noted for pit slope angles (lah)	

106.6 Plan for protecting & redepositing soils

Comment #	Sheet/Page #	Comments	Review Action
37	Page 23	The plan says on page 23 that soil will not be salvaged from the water well pad or the pipeline corridor because these areas are within previously disturbed corridors. Please explain further. What type of disturbance or corridors are in this area? (PBB)	

106.8 Depth to groundwater, extent of overburden, geology

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Comment #	Sheet/Page #	Comments	Review Action
38	Page 28 omission	No geologic setting is provided for ephemeral spring noted on page 29 para 4 (lah)	
39	Page 28 Para 2	"Geologic Setting" is NOT the correct title for the paragraph (lah)	
40	Page 28 para 3	Add strike and dip, and fault to Figure 5 (lah)	

106.9 Location & size of ore, waste, tailings, ponds

Comment #	Sheet/Page #	Comments	Review Action
41	General	The Division appreciates the efforts of obtaining information to follow DWQ guidelines for minimize impact of ore and waste stockpiles on groundwater. Specific design information and control measures should be provided in the plan. (BE)	
42	Page 29 Para 2	Note "waste sand would be nearly dry"..page 17 notes discharged sand to contain 10 to 20 percent water (lah)	
43	Page 29 Para 3	Provide phase maps to show the backfilling of the pit sequence (lah)	
44	Page 29 Para 4	Provide drawing for avoiding ephemeral spring (lah)	
45	Page 30 Para 4	Note steel pipeline, elsewhere HDPE is noted (page 17 para 1) (lah)	
46	Page 30 Para 2	Provide drawing for storage pond, include location and design standards (lah)	

106.10 Amount of material to be moved

R647-4-107 - Operation Practices

Comment #	Sheet/Page #	Comments	Review Action
47	General	The plan states that there will not be a problem with drainage, and page 20 says, 'Surface water resources will be protected during operations as described above in Section 107.' There is **no** section 107 in the plan. The Division requires that the BMPs to be used on site be described in the plan and a typical drawing submitted of how the BMP will be installed and a figure showing where on the ground it will be implemented referencing the BMP. Temporary BMPs are not recommended for long term operations as they are not always maintained. The Division recommends the use of berms to direct runoff to small catch basins that can be cleaned out after storm events, since the maintenance of these controls is more predicable. Provide this additional information. This ensures the proposed controls will be effective and there will not be any problems with offsite drainage. (TM & lah)	

R647-4-108- Hole Plugging Requirements

Comment #	Sheet/Page #	Comments	Review Action
48	Page 31 Para 2	The plan states SITLA?...it was my understanding the well will be on BLM land and also noted on page of this report and shown on Figure 1. (lah)	

R647-4-109 - Impact Assessment

109.1 Impacts to surface & groundwater systems

Comment #	Sheet/Page #	Comments	Review Action
49	Page 34 Para 2	The plan does reference any sort of sediment control other than BMPs included in the SWPPP plan by reference. The SWPP needs to be included in the plan when approved. Since the term BMPs references a large variety of sediment control devices, the Division requires that the operator specify what specific BMP controls are going to be used and a typical design drawing included in the plan. There is no reference to any sediment controls such as sediment ponds, etc. The plan says the mine is on flat ground in the headwaters of main canyon, inferring there is no runoff. The pits are likely to catch a major amount of drainage from rain and snow, and this water needs to be factored into the site plan. Therefore, a plan must be provided on how this runoff water will be handled operationally both in the pits and running off waste piles. Please include these plans and designs in the mine plan. (TM) Provide drawing with hydrology detail. As you have noted on page 34, "the SWPPP will be added" Provide a place holder for the permit to be inserted (lah)	

109.4 Slope stability, erosion control, air quality (fugitive dust control plan), safety

Comment #	Sheet/Page #	Comments From Initial Review	Review Action
50	Page 46 Para 1	The plan says Earth Energy is in the process of obtaining an Approval Order from the Division of Air Quality. Please include a copy of this Approval Order in the plan once it has been issued. (PBB) Provide Appendix number and a place holder for the permit to be inserted (lah)	
51	Page 42 Para 1	Will the valley fill dumps be keyed into the slopes? (lah)	
52	Page 46 all	See comments listed above regarding public safety (lah)	
53	Page 46 Bullet 9	Fly rock is bad blasting...the proper blast design has no fly rock, the use of adequate stemming is the solution. (lah)	

R647-4-110 - Reclamation Plan

110.1 Current & post mining land use

Comment #	Sheet/Page #	Comments From Initial Review	Review Action
54	General	Exploration cannot be a post mining land use. Closure plans should be dependent on the area being used as open space/habitat. (BE & lah)	

110.2 Roads, highwalls, slopes, drainages, pits, etc., reclaimed

Comment #	Sheet/Page #	Comments From Initial Review	Review Action
55	Page 50 Para 2	"pits (approx 92 acres....)" It is unclear which part of the 92 acres will be back filled, please, submit phasing as plan view diagrams. (lah)	

110.3 Description of facilities to be left (post mining use)

Comment #	Sheet/Page #	Comments From Initial Review	Review Action
56	Page 51 Para 6	As stated water well is to revert to SITLA. Well is located on BLM land and other documentation refer to reverting to BLM. Please clarify (lah)	

110.5 Revegetation planting program

Comment #	Sheet/Page #	Comments From Initial Review	Review Action
57	Page 52 Para 3	It is unclear why pipeline construction is "except" from redistribution of topsoil. (PB & lah)	

R647-4-111 - Reclamation Practices

Comment #	Sheet/Page #	Comments From Initial Review	Review Action
58	General	The plan says on page 36 that no significant drainages will be disturbed so none will be reconstructed. The plan needs to address landform and final drainage on waste dump faces. Please show how waste pile outslopes and reclaimed pit slopes will be stabilized, water directed off the slope, erosion controlled, and how sediment will be kept from leaving the site. (TM) According to Plan, the dumps will contain a significant amount of fine grained material, not just waste overburden, address how fine grained sediments will be kept from leaving the site...siltation basins ?, sediment ponds (lah)	

R647-4-113 – Surety

Reclamation:

Comment #	Sheet/Page #	Comments From Initial Review	Review Action
60	General	This review cannot capture every omission and make a statement accordingly. It is anticipated that communications will occur in the interim and the dialog will provide elaboration on the generalities made within the scope of this review. (BE)	
61	General	On the sub sections within each category on the cost estimation, please include the dollar amount. (BE)	
62	-	Category 1. The spread sheet dollar amount of $210,627 is different than the category one summary amount of $263,427. (BE)	
63	Page 50	Page 50 of the draft indicates that some of the demolition activities will require burial. Have these costs been accounted for? If so, an explanation of that should be provided in the spread sheet or within a surety summary narrative. (BE)	
64	Page 50 Para 5	Page 50 the new text uses the word proposed. Please remove the use of the word and write the narrative as though the Division has approved. (BE)	
65	Page 50 Para 5	The first sentence of the Facilities and Materials paragraph requires some clarification and requires specific action outline. When reading it lends the impression that either burial or dismantling will occur. In reality dismantling will occur with the exception of the mentioned burial work. (BE)	
66	-	Although the surety spreadsheet identifies the equipment used in category one reclamation. It is extremely helpful to provide the equipment within the reclamation narrative as well. (BE)	
67	Page 51 Para 1	Page 51, the process train indicates process materials will be drained. Please elaborate on where the drainage will occur, and explain if the process materials are hazardous and/or are an impact to public health and safety. (BE)	
68	General	There is indication that there are two process trains. It appears there are reclamation costs for only one. Page 2 of the summary surety draft does not show costs for two process trains. Please correct and/or explain. (BE)	
69	General	Please provide the weight of one cubic yard of cut up process train. (BE)	
70	Page 49 Para 1	Page 49, reclamation activities will involve the Division. Surety release will not occur until the Division approves the reclamation work, which typically requires 'visual inspections'. It may be helpful to include narrative that indicates the reclamation activity obligations under the Act and rules. (BE)	
71	Page 49 Para 2	Page 49, during interim and on going reclamation, a commitment should be made that indicates that maps will be submitted to the Division showing 'active roads' or a reference that the roads shown on the reclamation activities map are active during the early reclamation phases. (BE)	
72	Genaral	What are the road dimensions? (BE)	
73	General	What is the water source for the water truck? (BE)	
74	Page 49 Para 5	Page 49, correction is required, there is a comment that indicates that a variance is required for slopes exceeding 45°. That 45° rule is for highwall remediation. By rule, slopes are to be regraded to a stable configuration, and sloped to minimize safety hazards and erosion while promoting successful revegetation. Please remove/re-write the comment. (BE)	
75	Page 49 Para 5	Spelling comment: regarding should be 'regrading', page 49. (BE)	

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DIV. OIL GAS & MINING

Comment #	Sheet/Page #	Comments From Initial Review	Review Action
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77	Page 50 Para 3	Page50, for clarity and to eliminate oversight, please relocate the comment under the title "DRILL HOLES', 2nd paragraph about the 'impounding pit'. (BE)	
78	General	If on site burial of facility components occurs, a solid waste permit may be required. Please make a statement to that affect. (BE)	
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99	General	Plan needs a map that clearly defines perimeter of bonded area (lah)	
100	General	Plan needs a map that ties surety spreadsheet to physical locations (lah)	
101	General	Example surety spread sheet is available from DOGM (lah)	

Linda Matthews

From: Beth Ericksen [bethericksen@utah.gov]
Sent: Thursday, May 15, 2008 2:45 PM
: Linda Matthews
bject: Re: Earth Energy PR Spring NOI (M/047/0090)

Attachments: Beth Ericksen.vcf

Beth Ericksen.vcf
(515 B)

Hi Linda,

I have received the attachments. You may have to eventually follow up with a more formal submittal. I will keep you posted. This information will get us by for now.

Thank you for being so prompt.

Beth

Beth Ericksen
State of Utah
Division of Oil, Gas and Mining

>> "Linda Matthews" <lmatthews@jbrenv.com> 05/15/2008 2:31 PM >>>
Beth:

Based upon our phone conversation this morning, I am attaching Figure 1 for the Earth Energy PR Spring NOI - which was unfortunately omitted in the May 9, 2008 submittal; and Figure 4b - which was revised to show the accurate horizontal to vertical alignment of the reclaimed waste dump slope at 1.5 H:1V. Please accept these Figures for the May 9, 2008 response to the Initial Review of NOI to Commence Large Mining Operations, Earth Energy Resources, PR Spring Mine (M/047/0090).

Thank you very much for bringing this to my attention.

Regards,
Linda

Pam - Please PRINT to color printer.
Thank you!

--
Linda J. Matthews
jbr environmental consultants, inc.
8160 S. Highland Drive, Sandy, Utah 84093 Ph. 801.943.4144 Fax. 801.942.1852

Linda Matthews

From: Linda Matthews
Sent: Thursday, May 15, 2008 2:31 PM
To: [redacted] 'bethericksen@utah.gov'; 'pamsandberg@utah.gov'
Cc: 'Barclay Cuthbert'
Subject: Earth Energy PR Spring NOI (M/047/0090)
Attachments: Fig4b Transverse Mine Section W2-E2.pdf; Fig1 Location Map Layout1 (1).pdf

Hi Beth:

Based upon our phone conversation this morning, I am attaching Figure 1 for the Earth Energy PR Spring NOI - which was unfortunately omitted in the May 9, 2008 submittal; and Figure 4b - which was revised to show the accurate horizontal to vertical alignment of the reclaimed waste dump slope at 1.5 H:1V. Please accept these Figures for the May 9, 2008 response to the Initial Review of NOI to Commence Large Mining Operations, Earth Energy Resources, PR Spring Mine (M/047/0090).

Thank you very much for bringing this to my attention.

Regards,
Linda

Pam - Please PRINT to color printer.
Thank you!

[redacted]. Matthews
or environmental consultants, inc.
3160 S. Highland Drive, Sandy, Utah 84093
Ph. 801.943.4144
Fax. 801.942.1852

[redacted]

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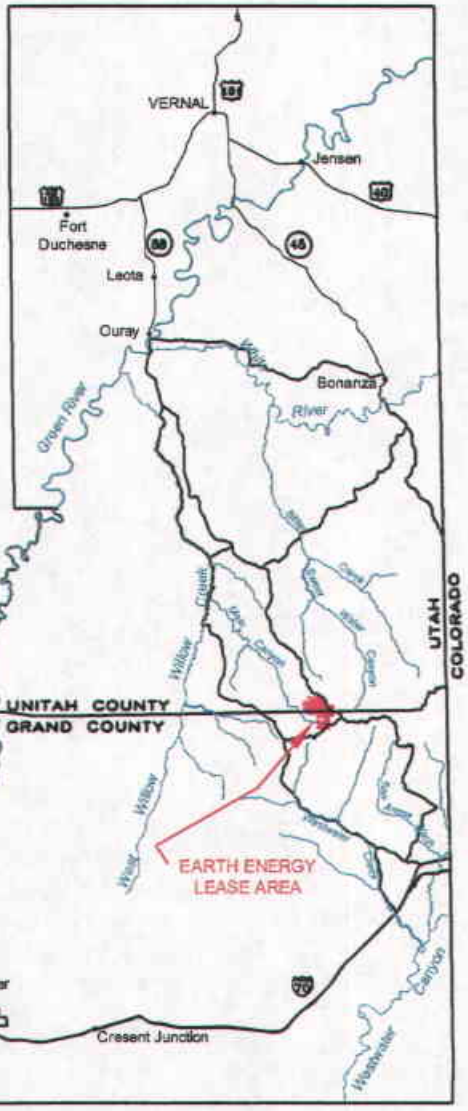
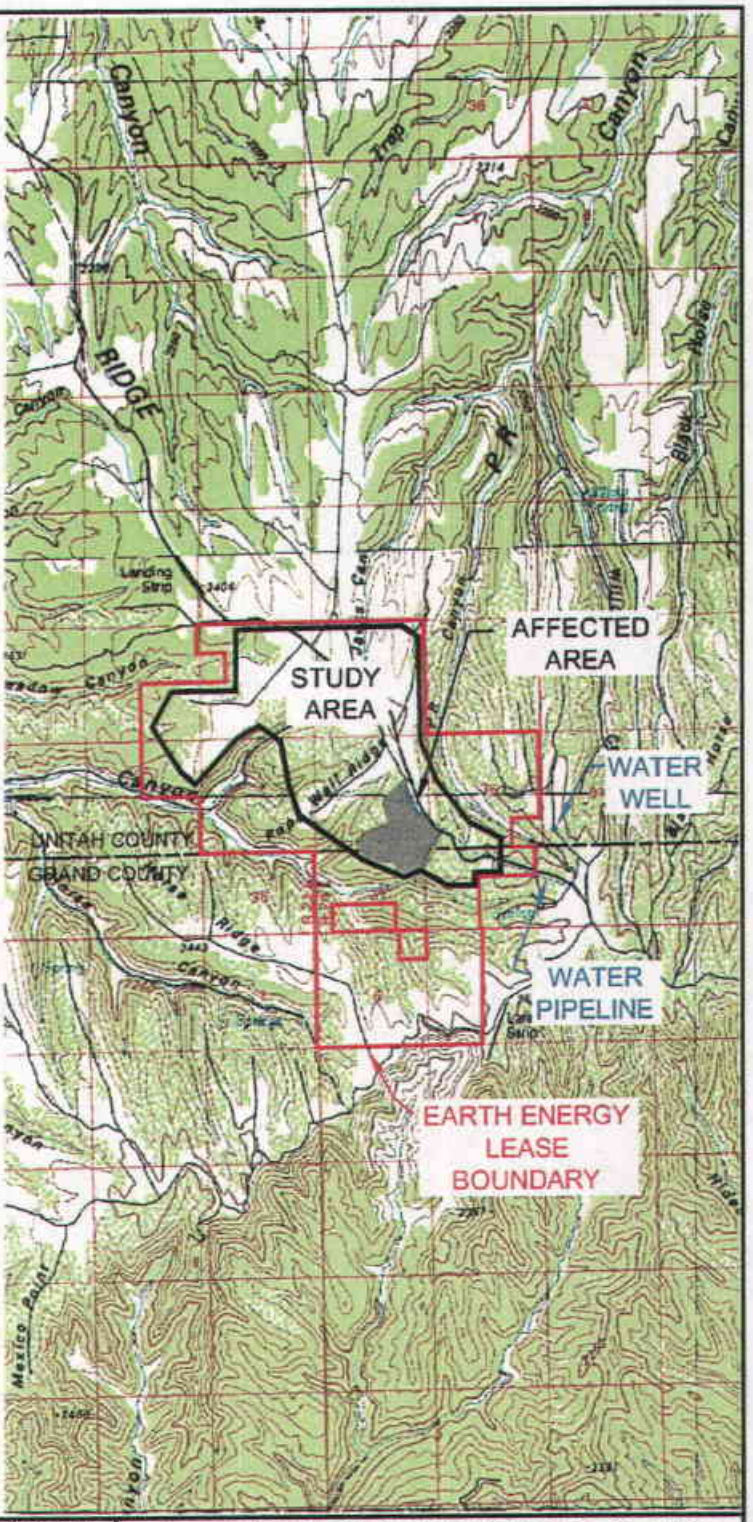
10/7/2008





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

N

1 0 1 2 3 4 KILOMETERS

1 0 1 2 MILES

Contour Interval 50 Meters

drawings\EarthEnergy\Fig1 Location Map.dwg

EARTH ENERGY RESOURCES, INC.

PR SPRING TAR SANDS DEVELOPMENT PROJECT

FIGURE 1
PROJECT LOCATION MAP

jbr environmental consultants, inc.

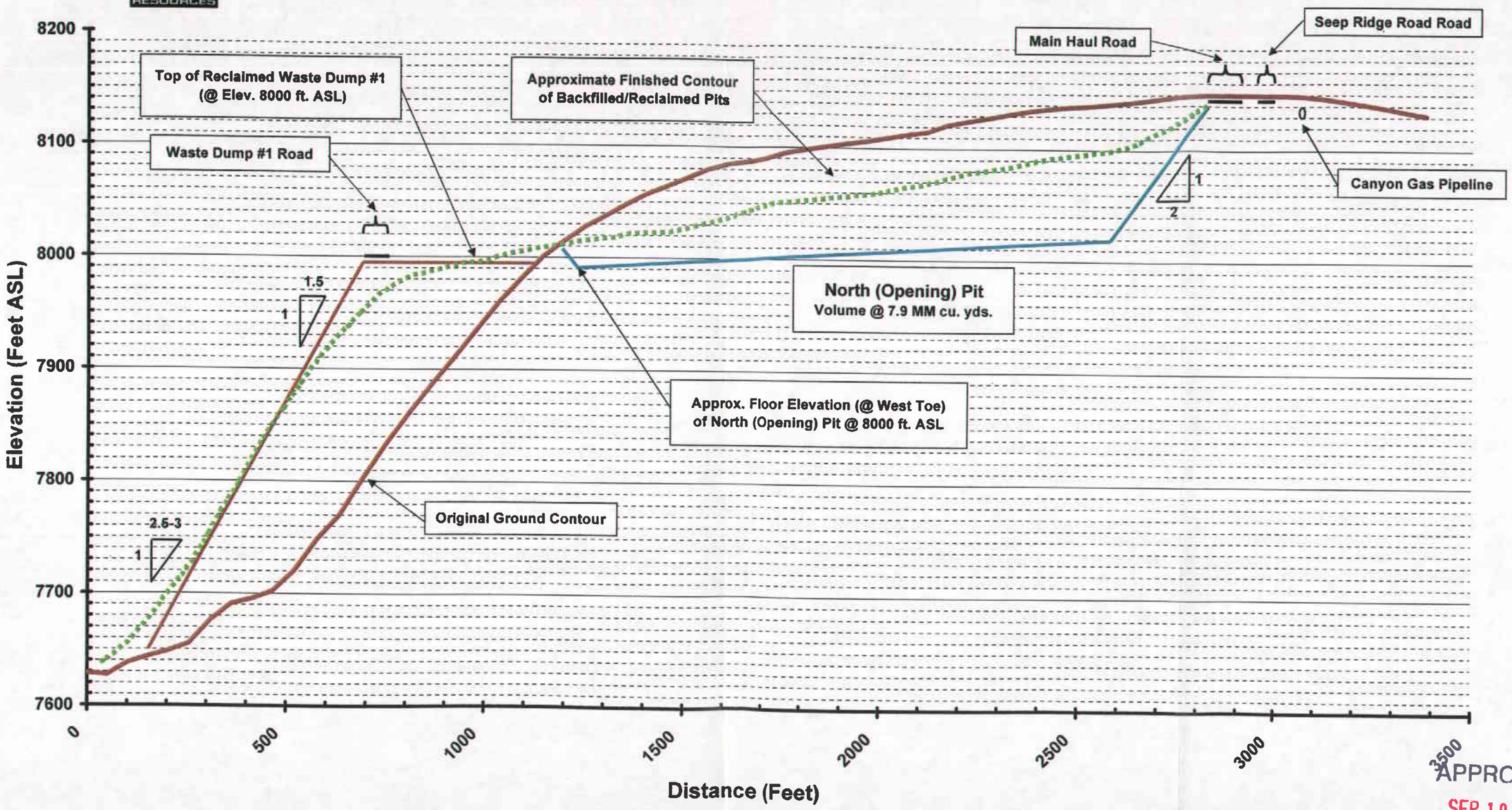
DESIGN BY	DRAWN BY	CHK'D BY	SCALE	DATE DRAWN	REVISION
LM	CP		1:100,000	9/11/07 3/31/08	

APPROVED

SEP 19 2009

DIV. OIL GAS & MINING

Figure 4b
Earth Energy Resources Inc. - PR Spring Oil Sand Mine
Transverse Mine Section W2-E2 Rev.2



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SEP 19 2009
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Drawn by: TJW Date: Sept 20, 2007

IR - 000199

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May 9, 2008

Susan M. White
Mining Program Coordinator
Minerals Regulatory Program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

RE: Response to Review of NOI to Commence Large Mining Operations, Earth Energy Resources, PR Spring Mine (M/047/0090)

Dear Ms. White:

This letter is a response to the Division's January 10, 2008 review of Earth Energy Resources' NOI to Commence Large Mining Operations at the PR Spring Mine. In addition to the responses included in this letter, red-lined/strikeout pages are provided for the revised pages of the NOI text. JBR is submitting this response on behalf of Earth Energy Resources, Inc.

General Comments:

The September 28, 2007 NOI (in Section 101.3), as previously submitted to the Division, committed to comply with and conform to all aspects of the NOI as well as the applicable regulations. This implicitly includes operation and reclamation practices. The NOI did not include separate sections to address Operation Practices under R647-4-107 or Reclamation Practices under R647-4-111 because, as stated at R647-4-103, these are not required for NOI's for Large Mining Operations. However, in order to address this comment, an additional statement has been added to the April 2008 NOI that explicitly says that Earth Energy commits to conform to operation and reclamation practices that are contained within the NOI and that are required by regulation. Further, Earth Energy plans to comply with all of the relevant rules, and thus does not agree with the Division that variances would be required for either erosion control or slopes.

The word 'proposed' has been omitted from the NOI text and maps; the narrative in the April 2008 NOI has been written as though the Division approved this mining operation.

Because there may be expansions that will require revisions to the permit over time, the April 2008 has been reformatted to easily incorporate into future revisions or amendments due to these changing dynamics. In addition to the previous use of a three-ring binder, which inherently facilitates incorporating revisions or amendments, each major heading within the April 2008 NOI begins on a new page and in other selected

locations, artificial page breaks or added spaces are inserted between subsections. These measures will facilitate the production of future replacement pages that so that they can be incorporated with minimal effects on pagination.

R647-4-101 – Filing Requirements and Review Procedures

The statement addressing when Earth Energy can begin mining has been rewritten in the April 2008 NOI to acknowledge that the reclamation contract and surety must receive Division approval before mining can commence.

Earth Energy has clarified text throughout the NOI and revised figure labels to clearly indicate the areas and activities that would be approved with this plan (and thus subject to bonding). Specifically, the North (Opening) Pit and the West Pit are both proposed for mining in the NOI. While details on the West Pit mining are not as well developed as for the North (Opening) Pit, pending coring results, sufficient assumptions have been made in order to calculate a bond amount for this area. Prior to actual mining of the West Pit, Earth Energy will submit a Plan Amendment to DOGM with more detailed pit designs for this area. The South (Phase II) Pit was included in certain of the September 28, 2007 NOI drawings as a future (more than five years away) plan; it has been removed from text and drawings in the April 2008 NOI.

Earth Energy agrees to notify the adjacent land owners (BLM and SITLA) in writing. Language has been revised in Section 104.2 of the April 2008 NOI.

R647-4-104 – Operator(s), Surface and Mineral Owner(s)

DOGM is correct: SITLA has the mineral rights to this area. Earth Energy's lease covers from the ground surface to a depth of 500 feet only. Section 104.2 of the NOI has been revised to clarify this.

In this section (104.2), all reference to acreage has been eliminated, and the surface owner is simply listed as required. Throughout the NOI, changes have been made to text and mapping to indicate the extent and acreage of the lease area, the Study Area (which reflects the area over which environmental resources were described in order to facilitate future NOI amendments as mining operations are proposed to be expanded), and the Affected Area (which is the same as the disturbed area and/or bonded area).

The Grand County conditional use permit will not be obtained until after Earth Energy receives approval of the NOI (the County has indicated that that is their preference). When available, Earth Energy will supply the Division with a copy of that conditional use permit. A reference to that effect has been added to this section.

R647-4-105 – Maps, Drawings & Photographs

General Map Comments

Within the September 28, 2007 NOI, Figures 1, 2, 3, 5-d, 6, 7, and 8 all showed streams located within the area covered by the specific map. Also within that NOI, Figures 1, 3, 6, and 7 each showed springs as mapped by the USGS. The only "infrastructure" within the mapped areas is also already shown on these various figures. In order to highlight water features, the previously included Figure 6, Watersheds Map, has

been modified to better show streams, USGS-mapped springs, and to also show other identified springs and water right locations (this figure has been renumbered as Figure 7 and re-titled as Water Features Map). Section 105.1 has been revised to note that these features are located on the relevant maps in the April 2008 version of the NOI.

The contour interval has been added on all maps in the April 2008 version of the NOI.

The public access route to the PR Spring operation from the nearest highway is shown and labeled on an inset that has been added to Figure 1 in the April 2008 version of the NOI.

A geologic map that shows the area geology has been added to the April 2008 version of the NOI as Figure 5. In addition, a geologic cross section that shows the five asphalt sands A-E detail within the Douglas Creek Member has been added as Figure 6.

Specific Map Comments

The specific comments have been addressed for each of the identified maps, and as required, clarification and updates, improvements, or corrections were made. Earth Energy understands that the reviewer may still require other changes.

Figure 2

The 2255.15-acre area that was labeled as NOI Permit Area in Figure 2 of the September 28, 2007 NOI has been relabeled as "Study Area" to reflect that this area was the subject area for resource descriptions. This change was also made to all other figures that included this boundary.

Figures 2 and 3 have been combined into a single Figure 2 to provide consistency and to reduce the DOGM confusion.

The April 2008 version of the NOI includes maps that show the mine operations area with necessary detail.

The word proposed has been removed from all figures, and acreages have been removed from maps to reduce clutter (but are described thoroughly in the text).

Page 6 of the September 28, 2007 narrative was modified to indicate that surface and subsurface facilities are shown on various figures.

Scale information has been modified and corrected.

Figure 2 has been modified to include the southern portion of the lease boundary. It is now all-encompassing, showing all boundaries.

Figure 3
In the September 28, 2007 version of this figure, the haul road acreage was included within the separate other mine components through which the road traversed. In the April 2008 NOI, as part of addressing other DOGM comments, including reducing clutter, all reference to acreage has been removed from figures. Instead, disturbance is discussed in detail within the NOI text. Further, Figure 3 has been combined with Figure 2.

Figure 4
This is now Figure 3. Where known, dimensions have been added; however it is key to note that the plant site and mine plan designs are still in the engineering phase and are somewhat conceptual. When engineering is complete, Earth Energy will provide additional detailed drawings; at this time, all disturbances will be confined within the areas stipulated, will be laid out generally as shown, and will not result in disturbances greater than or significantly different than indicated. The well site and water line/power cable corridor has been added to various figures, sediment and drainage control features have been added to Figures 2 and 3. Utility lines are not present, other than the already noted pipeline corridor that appears on Figure 2.

As noted above, to reduce map clutter, acreages are not being placed on figures; instead they are given in the NOI text.

Figure 5-d
DOGM simply states that "There may be related issues within the other figures and more information may be required." Earth Energy has no specific response to this item, other than to state that if more information is required, we will attempt to provide it once we know what is being asked for.

The locations of the three cross sections are now shown on Figure 2. Figures 4a, 4b, and 4c provide these cross sections.

The figure has been revised and a legend has been provided.

Figure 6
The previously included Figure 6, Watersheds Map, has been modified to better show streams, USGS-mapped springs, and to also show other identified springs and water right locations (this figure has been renumbered as Figure 7 and re-titled as Water Features Map. As with any topographic map, the direction of water flow is inherent in the drawing without directional areas, particularly in the steep country represented on this figure. The longest flow path is not relevant to this drawing. Earth Energy does not feel that it is necessary or appropriate to show vegetation on the map; the figure that follows this Water Features Map (Figure 8 Vegetation Map) clearly shows vegetation on a map at the same scale and on the same base. Other DOGM comments requested that figures be made less congested; unnecessarily adding to the congestion of this map is not warranted.

Figure 8
This figure has been revised to show additional project information.

Figure 9
This figure now includes contour lines for the reclaimed area, storm water controls, and cross section locations. Springs are the same under both pre-mining and reclamation conditions; see Figure 7 for locations. The bonded area is the same as the Affected Area, which is outlined on this figure. Acreage is provided in the text, so as to not increase congestion.

The various reclamation treatments have been added to this figure.

The volume of topsoil is noted various places in the NOI text; it is not added to the figure in order to minimize congestion.

Nothing is proposed to be buried during reclamation, thus nothing indicating burial locations is provided on this figure. (The buried water line will remain during reclamation, and its location is shown.)

105.2 Surface Facilities Map
At the time of the September 28, 2007 NOI, the location of the water well and associated pipeline were not known, so they were not shown on any mapping. Now that these locations have been identified, they are shown on various NOI figures, and are included within the Affected (disturbed, bonded) Area.

A geology map is now provided as Figure 5. There is no more detailed geologic mapping available.

Pit contours have been added to Figure 2. The designed pit perimeter wall is simply meant to reflect the cut nature of the pit which results in the pit being an impounding structure during operations, as described in the NOI.

Figure 2 shows the pit and adjacent areas such as the topsoil piles, plant site, and overburden/interburden storage areas. Earth Energy does not believe that there is anything to indicate that there may be stability issues at the adjacent areas of the pit and dumps; this issue is discussed at greater length within this response letter and the March NOI.

The North (Operating) Pit is shown on various Figures.

R647-4-106 – Operation Plan

106.2 Type of operations conducted, mining method, processing etc.
Section 106.2 in the April 2008 version of the NOI has been modified to indicate that vegetation would either be included with soil stockpiles or stockpiled separately for later distribution, so as to add organic matter and help with surface roughness and soil moisture retention. The NOI text associated with the reclamation plan has also been modified to describe placement of vegetation slash piles.

The volume of additional vegetal matter that will be stockpiled alongside, within, or on top of the topsoil piles is estimated to be 93,170 cubic yards; this quantity has been added to the soil stockpile volume estimates. It was conservatively derived by using the transect-measured ground cover for trees and shrubs, assuming an average height of 6 feet for trees and 2 feet for shrubs, an average void space of 50 percent, and an average compaction of 50 percent. Some of this slash will be contained within the stored topsoil, some will be stacked on top of the pile, and some will be used to form the berms around the base of the topsoil piles. This volume and a description have been added to Section 106.6, where the topsoil pile storage volumes are given.

Some of the requested information was previously included in Section 106.4 (Nature and Amount of Materials to be Mined). Additional tonnage and rate information has been added to that section, and has also been included in this section as requested by DOGM. These two sections now indicate that the anticipated yearly mined tonnages include: 920,000 – 1,200,000 tons of oil sand ore mined per year and 1,000,000 -1,400,000 tons of overburden/interburden mined per year. They have also been revised to state that the expected life of the mine is expected to be between 6 and 13 years, depending on the amount of time the processing equipment is on-stream and the number of process trains employed.

The timing of any planned expansion beyond the initial 62-acres North (Opening) Pit would be dependent upon many factors, as is typical of a mining operation. Earth Energy's best guess is that the West Pit may be planned for mining within about 5 years after mining is initiated in the North (Opening) Pit. This information has been added to this section of the NOI.

The distance from the pit to the processing plant (2,000 feet) has been added to this section of the NOI.

The tar sands stockpile and reserve ore pile refer to the same ore storage area. This amount of material is not expected to exceed 40,000 yd^3 at any time (as stated in the NOI previously under Section 106.9) and is typically expected to amount to 30,000 yd^3 of ore. The material may be stored in one or more piles within the same area as shown on Figure 3. The dimensions of the pile (or multiple piles) will not exceed 100 yards by 100 yards by 4 yards. This information has been added to Section 106.2 as well as being kept in 106.9.

Since the September 28, 2007 version of the NOI was submitted to the Division, Earth Energy has been able to define a well location for the water source. An approval to drill a test well at this location has been obtained from the State Engineers Office, and a right-of-way application is on file with the BLM for the well and associated pipeline. The location of this test well will hopefully be the location which is ultimately developed as the water source; it has been added to various NOI figures. The elevation of the test well site is approximately 8,260 feet; this, as well as additional descriptions of the well, has been added to the April 2008 version of the NOI.

Now that the well location has been identified, the distance of the pipe run from the well to the site has been defined to be 12,650 feet. This information, as well as other descriptive information on the pipeline, has been included in the April 2008 version of the NOI.

Mining will be conducted using a self-contained mobile surface mining machine. Over- and inter-burden will be removed by conventional drill/blast/muck or rip/muck methods. Text in Section 106.2 has been clarified to indicate this. The surety estimate in the April 2008 NOI reflects these statements.

These mining methods will enable the pit design configuration that is shown in NOI figures to be achieved. A statement to that effect has been added to the discussion on mining methods.

Currently, it is not known if blasting will be required to fracture overburden/interburden to facilitate its removal. This material may be sufficiently friable to allow removal by ripping with dozers. If blasting is required, each program will be designed as a controlled blast to minimize fly-rock, vibration, and dust, and to generate aggregate size conducive for removal from the mine area. The drill size, spacing and depth of blast holes, and frequency of blasting will vary depending upon the situation, but in all cases would be in accordance with state and federal rules. Warning signs advising the public of blasting protocols will be posted at 150-foot intervals along the fence line, placed at all ready access points, and further, as required by MSHA. All of this information has been added to the April 2008 NOI, in Sections 106.2 and 109.4.

The mining method approach and general mining plan will be as follows: Initially, overburden will be removed on five acres of the initial mine site to expose the uppermost layer of oil sand. The surface miner will then mine through the first layer of oil sand by successively planing 8–10 inches of oil sand per pass. When the initial layer of oil sand has been mined, the interburden layer will be exposed and this will be removed to expose the next layer of oil sand. As oil sand mining is taking place with the surface miner, the conventional mining equipment will be employed for concurrent overburden removal to expose new areas of the oil sand bed and allow oil sand mining to progress. As sufficient area comes available, the mining operation will transition to multiple benches of mining, where oil sand mining occurs on the top layer of newly exposed areas and previously mined areas are excavated to expose the next bed of oil sands. When all target oil sands beds have been mined and access to newly opened areas is established, backfilling of the depleted areas will commence. This information has been added to the April 2008 NOI in Section 106.2.

The statement that the processing site area will be constructed to allow appropriate runoff and minimize erosion has been elaborated upon to indicate that it will be constructed to be a self-contained area and all precipitation incident on the site will be collected in the lined water storage pond and used in the extraction process. Further, the section on pit design now states that all precipitation on the mine pit will collect in the bottom of the pit, elaborating on the previous statement that runoff would be collected in the pit and used in the process. Runoff from the interburden/overburden storage areas will be controlled in armored (rip-rapped) channels with energy dissipation at the toes of those features, as now indicated in Section 106.9. These issues have also been addressed in Sections 109.1 and 109.4.

The section on pit backfill has been expanded to state that the blended solid tails (80-85% sand at 12-15% moisture content, 15-20% fines at 20% moisture content) will be a relatively plastic material that will readily compact to a load-bearing surface for operation of the haul trucks. The "sand" fraction of the tails can be characterized as primarily quartz material in the 80-1,000 µm range and the "fines" fraction is the sub-80 µm material comprised of quartz, shale and clays. When the logistics of the mine/truck haul are optimized in the early stages of operations, it is anticipated that over/inter-burden materials from adjacent removal operations will be alternately combined (blended) with the sand tails to result in a stable, compact, bulk replacement material. Thus, rather than layering, the replacement material will be a more homogenous mixture.

The volume of the north pit is 7,900,000 yd^3 and approximately 6 million yd^3 of overburden, interburden, and tailings (sand and fines) will be replaced in this pit. A bulkage factor of 30% has been applied to the replaced material. This information has been added to the section on pit backfill in the April 2008 NOI, and to Section 106.10.

The density of the damp sand is roughly 2,850 lb/yd3. A bulkage factor of 30% has been used in replacement volume calculations. The combination of produced sand and produced fines will be mixed with overburden and interburden materials to create a stable compactable fill. Drainage from this fill will be comparable to in-situ materials. This information is now included in the pit backfill section of the NOI.

The "sand" fraction of the tails can be characterized as primarily quartz material in the 80-1,000 µm range (d_{50} = 117 µm), and the "fines" fraction is the sub-80 µm (d_{50} = 18 µm) material comprised of quartz, shale and clays. The particle size range of the mined overburden/interburden will vary from fine to coarse rock rubble (run-of-mine) materials potentially as large as one cubic yard.

106.3 Estimated acreages disturbed, reclaimed, annually.
Text, tables, and figures in the April 2008 version of the NOI have been revised to be consistent with the terminology for "pit" and "dump" features. The terms now in use are: North (Opening) Pit, West Pit, and overburden/interburden disposal site

An estimate of the disturbance expected by year has been added to the NOI in Section 106.3.

We do not understand why DOGM is requesting that statements regarding deleterious materials and their management be included in the acreage section of the NOI. However, we have added a statement to that section indicating that this subject is described in the NOI in Section 110.4 Treatment, Location, and Disposition of Deleterious Materials.

106.6 Plan for protecting & redepositing soils.
As noted in the September 28, 2007 NOI in Section 106.5, Earth Energy's experience during exploration drilling in the area indicates that actual topsoil depths are generally significantly less than that reported in the NRCS soil surveys. Therefore a more conservative depth of available material was used to calculate the topsoil balance in the NOI. However, Earth Energy commits to salvaging available topsoil to whatever

depths are encountered during stripping. The April 2008 version of the NOI has been modified to reflect a salvage depth that is greater than was previously assumed, but still less than that available indicated by the NRCS. While these numbers (6 inches average over the Seeprid-Utso complex and 4 inches average over the Tosca soils) are now used in the balance calculations and for surety purposes, the actual salvage depths may be greater or less than these averages, depending upon field conditions. Appropriate text changes have been made.

Earth Energy agrees to salvage soil where it is available on slopes shallower than or equal to 2H:1V; appropriate text changes, including revised acreage and volume numbers, have been made.

Including the additional volume of salvaged soil does not require additional topsoil storage areas; as noted by the Division, height of topsoil piles will be increased instead, but will still be reasonable.

Earth Energy agrees to place topsoil on all disturbed areas during reclamation, with the exception of the 15 acres of topsoil stockpiles, from which topsoil won't have been previously salvaged. Figure 9 has been modified to indicate this, and text has been clarified to specify this as well.

The Tosca soils underlying the disturbed area cover 51 acres, as indicated in Section 109.3. Of this 51 acres, approximately 18 are on slopes steeper than 2H:1V and 33 are on slopes flatter than 2H:1V. These numbers have been added to this section of the April 2008 version of the NOI. (Numbers in the September 28, 2007 NOI were broken down differently because they were based upon 3H:1V cutoff for soil salvage.)

Topsoil will be salvaged with a 631 scraper and a D8 dozer used in combination depending upon the gradient and the presence of rock.

Topsoil storage areas are located on flat to gently sloping ground along the margins of the disturbed area. This will minimize haul distance, facilitate isolation and protection of the soil resource, and reduce contact with storm water run-on from outside the storage footprint. These descriptions have been added to Section 106.6 of the April 2008 version of the NOI.

Earth Energy agrees to place a sign at each topsoil storage area. The signs will read "Topsoil Storage Area – Do Not Disturb". Text has been added to Section 106.6 to reflect this commitment.

Topsoil storage pile berms will be formed using the crushed and compacted woody vegetation that will be salvaged. These berms will be essentially trapezoidal in cross section: two feet high, with a two-foot wide top width and approximately 1.5H:1V sideslopes. Appropriate descriptions have been added to the NOI.

106.8 **Depth to ground water**, extent of overburden, geology.
USGS-mapped springs were shown on several figures in the September 28, 2007 NOI; these have been highlighted on the revised watersheds figure (now titled Figure 7 Water Features). Further, springs whose locations are inferred based upon water rights filings are also shown on Figure 7, as are the seeps that were identified by JBR's wetland specialist and described in Section 109.1. As indicated by that figure,

none of the USGS-mapped springs are within the 198-acre study area. Three of the springs that are inferred based upon water rights filings are within this 198-acre area, however at least one of these has no field evidence of a spring (as discussed in further in Section 109.1).

As stated in the September 28, 2007 NOI in this section (106.8) and according to Earth Energy, none of the Earth Energy exploration holes have encountered groundwater; this statement applies to the 25 exploration holes drilled in 2005. The first set of wells, drilled under DOGM exploration permit E/019/052, was located along Seep Ridge Road south of the County line within Earth Energy's lease area, but just east of the 198-acre study area. The second set of wells, drilled under E/019/053, was also located along Seep Ridge Road, spanning the County line, and within the eastern part of the 198-acre study area. This location description has been added to the NOI text in this section, and the maps that were part of the approved DOGM exploration permits have been added to the Appendix B information that includes correspondence on these permits.

In the area of the opening pit, the strike of the beds is N 20° E, and the dip is 1.2-1.7° NW. The axis of the San Arroyo fault is known to trend in an East-West orientation, approximately one mile to the north of the mine area. The strike and dip of the ore beds vary slightly throughout the planned mine area as the host formations are part of a gentle anticlinal structure. This information has been added to Section 106.8 of the NOI.

106.9 Location & size of ore, waste, tailings, ponds.

As yet, there is no other specific design information and/or control measures for the waste sands or ore stockpiles, other than that already contained in the NOI. Should further consultations with DWQ via the Permit-by-Rule request result in additional design measures, DOGM will be informed.

106.10 Amount of material to be moved.

This DOGM comment, regarding sediment control, appears to be mistakenly placed in this section on amount of material to be moved. The response is included here, however, changes in the NOI have been made in multiple locations throughout the NOI, including in Section 109.4. Earth Energy commits to including the SWPPP in the plan once it is complete. Specific BMPs and their locations are now shown on Figure 2, and include precipitation collection sumps, a retention/storage pond, armored channels, and riprapped energy dissipators. As noted, the PR Spring operation is located primarily along a fairly flat interfluve with little or no up-gradient, off-site runoff flowing onto the site. Precipitation collection sumps are simply low areas within the working mine pit where precipitation falling directly within the pit perimeter will drain and collect. The retention/storage pond will be located at the low point of the plant site, and will collect all plant site runoff; it will also be used to store clean reserve process water. All precipitation collected within the working mine pits and process areas will be used in the process or for dust suppression on mine and plant roads. Runoff and sediment generated from precipitation falling on the

overburden/interburden storage areas will be controlled by armoring the "channel" formed by the contact between the pile and the native slope, and by installing a riprapped energy dissipater at the toe. Typical design drawings have been added to the NOI on Figure 2a.

R647-4-107 – Operation Practices

The reference to Section 107 was a misprint and has been corrected. As described in R647-4-103, that section is not required to be addressed in NOIs for Large Mining Operations, however the content asked for in the Section 107 rules is provided in other sections of the NOI. BMPs to be used on site are described through the April 2008 NOI, including in Section 109.4, figures showing where on the ground BMPs will be implemented are provided in Figures 2 and 3, and typical BMP drawings are provided in Figure 2a. In all cases, however, Earth Energy commits in the NOI to maintain all BMPs in operable conditions. As recommended by the Division, specified BMPs include the use of berms to direct runoff from the plant site to the water retention/storage pond. This pond will be cleaned of sediments as needed.

R647-4-109 – Impact Assessment

109.1 Impacts to surface & ground water systems.

All pit walls, including the lower wall side of the North (Opening) Pit are internally draining and stable. Therefore, their drainage, runoff potential, and sediment production is not an issue in regard to impacts to surface and ground water systems. As described throughout the April 2008 NOI, including in Sections 109.1 and 109.4, the pit floor will include precipitation collection sumps, which will collect precipitation, pit wall runoff, and sediments. This material and water will either remain in the pit or will be hauled out along with the ore and run through the process system. Upon reclamation, the pit walls will be covered because the pits will be backfilled as described throughout the NOI. The portions of the upper walls that would remain exposed if future mining does not occur will be stable and in rock, generating little, if any sediments. Any such sediments would be retained within the perimeter of the backfilled pit area.

The narrative in this section previously described the potential to impact a seep located within the footprint of an overburden/interburden storage area, and the management of that impact. There are no other impacts predicted to any springs or groundwater. A statement to that effect has been added to the April 2008 version of the NOI.

Rather than provide information in the narrative in this section (Impacts to surface and groundwater systems) about the sequencing of waste placement, it has been added to Section 106.2 Operations Description, in the April 2008 NOI. That information states that the blended solid tails (80-85 percent sand at 12-15 percent moisture content, 15-20 percent fines at 20 percent moisture content) will be a relatively plastic material that will readily compact to a load-bearing surface for operation of the haul trucks. The "sand" fraction of the tails can be characterized as the material in the 80-1000 µm range and the "fines" fraction is the sub-80 µm material. When the logistics of the mine/truck haul are optimized in the early stages of operations, it is anticipated that over/inter-burden materials from adjacent removal operations will

be alternately combined (blended) with the sand tails to result in a stable, compact, bulk replacement material.

More information regarding how erosion control of the overburden/interburden storage areas and topsoil piles will be managed has been added to this and other sections of the NOI. As those sections indicate, erosion of overburden/interburden storage areas will be managed by controlling runoff from the top of the area, preventing it from running down the outslope and thus eroding it. Runoff from the outslope faces of the overburden/interburden storage areas will be controlled by armouring placed within the "channel" formed by the contact between the pile and the native slope, and by installing a riprapped energy dissipater at the toe. Controlling runoff will minimize sediment production, and the energy dissipators will also serve as sediment traps, causing at least some of the sediments to drop out. Topsoil storage area erosion will be managed by placing these features on flat to gently sloping ground along the margins of the mining and processing areas; protecting them by seeding; and berming their the outer edges for runoff control, using either topsoil or overburden.

Overburden/interburden/ storage area materials will primarily consist of broken sandstones and shales mixed with lesser amounts of fines. Grain sizes will vary from fine to coarse rock rubble (run-of-mine) materials potentially as large as one cubic yard. The coarser materials will typically end up near the toe of the expanding fills as the dump sites are filled to their maximum capacity. The concentration of coarse materials at the toe of the fills provides a natural energy dissipater for storm runoff from the faces of the dumps. As all of the topsoil will be salvaged for final reclamation, only minimal quantities of fine-grained particles will be placed in the dumps. Broken rock material has a very low siltation potential and will effectively encapsulate the finer material initially placed in the waste dumps. Active slopes will be at the angle of repose for the dumped materials (1.5-1.7H:1V). When the dumps are filled to capacity, their exposed faces will be contoured to blend in with adjacent canyon wall slopes (2.5-3H:1V) as indicated on the Reclaimed Mine Contour Plan (Figure 9). Indicated slopes on cross-sections apply to local slopes only and do not traverse (span) dumps and pit areas. No reclaimed slopes will be steeper than 30°.

Final designs for ditches and/or berms located at the process site can only be produced once final engineering designs are complete. For the current version of the NOI, Earth Energy provides conceptual information for these structures, as follows. All ditches will be designed to pass the 10-year, 24-hour precipitation event. They will likely be triangular in cross section with side slopes approximately 2H:1V; depth including freeboard will be less than 2 feet. Berms will generally be 2 feet high, with a one-foot top width and 1.5H:1V sideslopes.

Except for the very initial stages of operation, the pit will be an impounding structure. Therefore, drainage, runoff potential, and sediment production are not an issue in regard to impacts to surface and ground water systems. As described throughout the April 2008 NOI, including in Sections 109.1 and 109.4, the pit floor will include precipitation collection sumps, which will collect precipitation, pit wall runoff, and sediments. This material and water will either remain in the pit or will be hauled out along with the ore and run through the process system. The precipitation collection sumps are not the type of structures that require specific engineering or design storm calculations; if the sump is too small, collected water would simply overflow the

sump but would still remain in the pit. If need be from an operational standpoint, the sump could easily be enlarged to provide more capacity.

Ditching/berming will be used at the plant site to direct runoff generated on the plant site to a water collection/retention pond located at the down gradient end of the plant site. These ditches will be designed to convey runoff from a 10-year, 24-hour storm event. The collection/retention pond will be used to supply reserve process water.

As the September 28, 2007 NOI previously stated, Earth Energy will prepare a Storm Water Pollution Prevention Plan as required by the terms of the State of Utah Multi-Sector General Storm Water Permit for Industrial Discharges. The April 2008 version of the NOI retains that commitment, and also commits to appending the SWPPP to the NOI once it is complete.

The April 2008 version of the NOI includes additional information about management of storm water. It also explicitly commits to ensuring that BMPs (which would include storm water management structures) would be maintained in a functional state. Further, the Storm Water Pollution Prevention Plan as required by the terms of the State of Utah Multi-Sector General Storm Water Permit for Industrial Discharges requires that BMPs be inspected and maintained, and requires quarterly visual monitoring of storm water.

More detailed descriptions of BMPs have been added to the April 2008 version of the NOI, as requested.

The depth to groundwater from the base of the pit is not known. However, using a conservative assumption that the regional water table is 1,500 feet below ground surface (see text in this section of the NOI for justification for this number), and knowing that at it's deepest point the pit would be approximately 140 feet deep (see text in Section 109.4 of NOI), by subtraction, the depth to groundwater from the base of the pit can be projected to be 1,300-1,400 feet. A statement to this effect has been added to the April 2008 version of the NOI.

109.2 Impacts to threatened & endangered wildlife/habitat.

The Division is correct. The Mexican spotted owl was listed as a threatened species on 15 April 1993 (USFWS 2007. Mexican Spotted Owl webpage at: http://www.fws.gov/southwest/es/mso/). The text has been changed to reflect this designation.

It is possible that Mexican spotted owls may move up the canyons from known habitat areas to forage in areas closer to the mine. There is concurrent gas well development in the area, which may have already acclimated the birds to industrial activities. Conversely, this existing and previous activity may have caused them to avoid the area already. If the former, once the mine is in operation, forage within the area affected by the mining operation would not be available for Mexican Spotted Owl to forage in. This loss would be temporary, as forage habitat would be reestablished after reclamation occurs. Additional information has been added to Section 109.2.

The US Fish and Wildlife Service and the BLM have been consulted regarding the planned use of water for this operation. The source for this water would be deep groundwater (greater than 1,000 feet). Use of groundwater that does not have a hydrological connection with surface waters is not considered to be a depletion under the Upper Colorado River Basin Recovery Program. The BLM has made the determination (at least in the Uintah Basin area) that water sources deeper than 500 feet do not have such a connection and thus do not represent a depletion for which mitigation fees are needed.

A lek, known as the Monument Lek, is located within the Study Area and approximately 3,000 feet due north of the initial mine development, but within 100 feet of the active Seep Ridge Road and a buried gas transmission line. The Seep Ridge Road is currently used as a thoroughfare for oil and gas development. During one visit in Summer, 2007 trucks passed the mine area approximately every 20 minutes. While the mine has no control over vehicles associated with gas development, during mining, impacts to grouse strutting on the Monument Lek can be mitigated. Prior to Spring 2009, Earth Energy will coordinate with DWR to see if the lek has been active in 2008 (it has not been active in recent years). If active in 2008, Earth Energy will commit to observe the Monument Lek three times in 2009 during early morning hours between March 15 and April 15 to see if it is active. During that time interval, they will cease mining between ½ hour before to 1 hour after sunrise, and 1 hour before to 1 hour after sunset. If no grouse are using the lek after three observations, mining can continue during those hours. If grouse are found to be using the lek, the twice-a-day mining cessation will continue until May 15th. This will be repeated on an annual basis, if the lek remains active. This commitment has been added to Section 109.2. Further, reclamation will reestablish the disturbed area to provide potential brood-rearing habitat.

109.4 Slope stability, erosion control, air quality (fugitive dust control plan), safety.

Earth Energy agrees to include a copy of the Approval Order from the Division of Air Quality once it has been issued.

Earth Energy has consulted with the Utah Division of Wildlife Resources in regard to the design of the fence between the highwall and the county road. As recommended by that agency, (personal communication with Brian Williams, DWR Northeast Region), this fence will be between 38 and 48 inches high, comprised of three or four strands barbed wire, topped with a log rail. It will be anchored with T-posts. Appropriate changes have been made to the April 2008 version of the NOI.

Earth Energy assumes that the comment is referring to storage volume, locations, and containers from a safety aspect. As such we have added statements to this section of the April 2008 version of the NOI to indicate the following. Volumes of material such as product, waste oil, etc. will be periodically removed from the site as needed so that their allocated storage is not exceeded. Containers stored on-site will be labeled so that wastes are clearly identified. Salvageable materials and other wastes will be stored at the plant site within the fenced area. No hazardous materials or hazardous solids wastes will be generated or used during this operation, thus none will be stored. Liquid hazardous wastes will be stored in an identified

tank within the tank farm and periodically removed for disposal at an approved facility by local disposal companies (vacuum trucks). Further, produced sand and fines will typically remain at the facilities site during the night shift. The following day, the material will be removed and disposed in either waste dumps or in mine pit reclamation.

Earth Energy has considered that the placement of warning signs will be visible from more than one location. That is the reason that signs will be placed at 150-foot intervals along the fence line, placed at all ready access points, and further, as required by MSHA.

Blasting would take place within the confines of the pit and, by design, would not result in material (other than acceptable levels of fugitive dust) migrating outside the pit. Loose material within the pit will remain in the pit until it is removed as part of the orderly progression of the mining sequence. Should, by any unforeseeable event, blasting result in large loose material migrating outside of the pit and outside of the 198-acre affected area, it will be removed immediately. Blasting is not expected to result in fly rock landing on the adjacent county road. However, during blasting, the road will be closed for 1,000 feet on either site of the blast site. Flaggers will be posted to accomplish this, and resultant wait time for any travelers would not be expected to be more than 10-15 minutes. Statements to this effect have been added to the NOI text.

An ultimate pit mine plan, pit slope design sectors and geotechnical basis, pit dimensions (i.e. width, length, depth), plan of pit roads, and stockpiles etc. were all previously provided in the NOI. The April 2008 NOI has added information on annual production sequence, a geologic map with major structures, information on joint sets and bedding, dump points, and crusher dockets.

Pit wall height and other technical information regarding mine pit construction is included within the NOI narrative and Figures in a form expanded from what was previously provided.

Pit walls have been designed -- and are shown on supporting drawings -- with 2H:1V backslopes. In the September 28, 2007 NOI, the text mistakenly mentioned 1.5H:1V for these slopes, which was an error and was inconsistent with the slopes as portrayed on the figures. All text and figure references in the April 2008 version of the NOI correctly reflect Earth Energy's plans to construct all pit slopes at 2H:1V slopes. Use of this slope represents Earth Energy's desire to facilitate pit reclamation, and to provide conservatively designed pit wall slopes to compensate for the lack of detailed knowledge regarding the extent of localized faulting or fracture planes that could cause instabilities. Note that numerous existing road cuts and excavations in the area (including Earth Energy's 2005 production test pit) are stable with slopes steeper than 1H:1V. In the vicinity of the opening pit, the strike of the beds is at N 20° E and the dip is at 1.2-1.7° NW, raising no concerns with dip-related instability. A typical geologic cross-section from the middle of the opening pit (at Station 715N) has been included in the April 2008 NOI for reference.

Pit walls are designed at a 2H:1V slope to prevent rock falls. Back-break near the top rim of the pits will be controlled or eliminated by smooth transition grading. Any required blasting along the walls of the pit will be accomplished with small controlled blasts to eliminate over-break and weakening of the remaining material

on the face of the slope. Similar techniques are commonly employed in the construction of rock cuts for highways, railways and pipelines.

Information has been added to Sections 106.2 and 109.4 to state that pit wall slopes will be monitored regularly for signs of instability. Further, numerous mentions are now made in the NOI that the area will be managed in accordance with MSHA safety guidelines and the plan.

It is not clear why DOGM believes that the waste slope angles are greater than 45°, and/or that transverse mine sections W1-E1 & W2-E2 reclaimed waste slope angles are 60° or greater. Neither the September 28, 2007 NOI text nor figures indicated such slope angles. Perhaps the reviewer did not account for the vertical exaggeration as reflected by the different x and y axis scales. No slopes in the overburden/interburden storage areas exceed 45°. When initially discharged, the angle of repose for the over/inter-burden is expected to be in the 1.5-1.7H:1V range translating to slope angles in the 30^0-34^0 range. Final grading (after the overburden/interburden storage areas have been filled to capacity) will see the slopes contoured to blend with the adjacent canyon slopes (approx. 2.5-3H:1V). The transverse mine section W2-E2 indicates a portion of the slope at about 30°, but the overall slope would be much flatter than this, and in any case, does not come close to 45°, much less 60°. Therefore, there does not appear to be a need to request a variance for slope angle for this project.

R647-4-110 – Reclamation Plan

General

The statement that the Division notes as missing is not missing. It was, in fact, contained in the September 28, 2007 NOI under Section 110.6, which is the proper placement and section following the rules format. Please refer to the same section in the April 2008 version of the NOI, where this statement remains.

The table requested by the Division showing the acreages to be topsoiled and reseeded has been added to Section 110.5 of the April 2008 version of the NOI.

A new paragraph has been added to the April 2008 version of the NOI, in Section 110.2, to explicitly state the reclamation objectives. In addition, throughout the reclamation plan section, language has been clarified and expanded upon so that the Division can more readily understand Earth Energy's objectives.

Section 110.5 of the April 2008 version of the NOI has been revised to describe planned monitoring for reclamation success and noxious weeds. A paragraph has been added to Section 110.2 to describe other monitoring that will continue throughout the reclamation period as part of the Storm Water Permit.

In order to ensure an environmentally safe and stable condition for the various wildlife in the area that meets the objectives of the mined land reclamation act 40-8-12, Earth Energy has proposed to leave safe, stable topography; establish native vegetation suitable for habitat; remove man-made structures, including tanks, ponds, etc.; and cause no degradation or harm to water sources. All of these issues were

addressed in the NOI, but a blanket statement to this effect has been added to Section 110.1 of the April 2008 version.

Safety will be managed at reclamation by continuing to follow safe operating conditions while using equipment and continuing to follow the appropriate MSHA guidelines and regulations. A statement to this effect has been added to Section 110.2.

110.1 Current & post mining land use.

Reclamation and closure plans have been developed with the intent of allowing post mining land uses of open space and wildlife habitat. While future exploration may also be one of the post mining land uses, Earth Energy acknowledges that reclamation and closure plans will not be based upon that use. The language in this section of the April 2008 version of the NOI now clarifies this.

110.2 Roads, highwalls, slopes, drainages, pits, etc., reclaimed.

Earth Energy agrees to commit to ripping roads to a depth of 24 inches, with ripper shanks placed no more than 24 inches apart, where depth to bedrock allows. A statement to that effect has been added to the April 2008 version of the NOI.

Earth Energy agrees to maintain on-site roads that are needed throughout the operations, interim reclamation, and reclamation phases of the project in order to minimize erosion until such time as they are no longer needed and are fully reclaimed. A statement to that effect has been added to the April 2008 version of the NOI.

Earth Energy has clarified that the reclamation and bond includes reclaiming all roads within the 198-acre affected area.

It is not clear why DOGM believes that the reclaimed waste slope angles are greater than 45°; perhaps the reviewer did not account for the vertical exaggeration as reflected by the different x and y axis scales. Neither the September 28, 2007 NOI text nor figures indicated such slope angles. No slopes in the overburden/interburden storage areas exceed 45°. Final grading (after the overburden/interburden storage areas have been filled to capacity) will see the slopes contoured to blend with the adjacent canyon slopes (approx. 2.5-3H:1V). The transverse mine section W2-E2 indicates a portion of the slope at about 30°, but the overall slope would be much flatter than this, and in any case, does not come close to 45°, much less 60°.

During reclamation, erosion will be minimized throughout the area by regrading slopes to gentler angles, leaving surfaces with roughened micro-topography, and reseeding in a timely fashion. The April 2008 NOI makes these commitments more apparent.

As stated throughout this response letter and the April 2008 NOI, there will be no slopes left steeper than 2.5:1, thus there is no concern about their long-term stability; with those final slopes, safety hazards are minimized, vegetation growth will be encouraged, and erosion will be reduced.

When the final pit is reclaimed, the potential to form a pit water collection area will be eliminated.

The active mining area will be a pit at all times (concave to incident precipitation and run-on). No operational pit configurations are planned where storm water will be allowed to egress the active mine workings. Please refer to the revised figures in the NOI. Further, the NOI text has been revised to include a statement that explicitly states this.

110.3 Description of facilities to be left (post mining use).
The water will revert to SITLA once Earth Energy's operations have concluded. The surface facilities associated with the well will remain in place and unreclaimed (though the pipeline will be decommissioned as described). Changes have been made to this section of the April 2008 version of the NOI.

110.4 Description or treatment/disposition of delirious or acid forming material.
This section has been revised in the April 2008 NOI, including eliminating the term "berm" and referring to secondary containment by reference to the operation description.

110.5 Revegetation planting program.
Earth Energy agrees to provide a roughened surface to retain seed and to enable root penetration. This will include leaving numerous gouges and rips that will trap seed and moisture and provide erosion and sediment control. The April 2008 version of the NOI has been modified to show that the surface will be left very rough.

Additional details for grading and stabilization have been added to the April 2008 NOI. This includes discussion that the overburden/interburden storage areas will be re-contoured by dump-top rounding and surface recontouring to create an undulating, roughened surface that will blend with the surrounding terrain. This will be done with a dozer prior to topsoil placement. Seedbed preparation discussions have also been expanded to restate the development of a roughened surface.

By regrading the exposed pit walls and the overburden/interburden storage areas, several things will be accomplished: the regulatory requirements final slopes will be met; runoff and erosion considerations will be minimized; a surface amenable to revegetation will be created; and slopes will blend with the surrounding topography. As noted, drainage will not be an issue on these regraded areas as there is no run-on and infiltration capacity will be high on reclaimed slopes. The requested table has been added as Table 9.

R647-4-111 – Reclamation Practices
As noted throughout the April 2008 NOI, all reclaimed slopes will be stabilized by regrading to 2.5H:1V or flatter and leaving them in a very roughened form to maximum infiltration and minimize runoff. It is important to note that there will be little to no run-on on these reclaimed surfaces. Further, in regard to the overburden/interburden storage area slopes, the coarser materials will typically end up near the toe of the

expanding fills as the dump sites are filled to their maximum capacity. The concentration of coarse materials at the toe of the fills provides a natural energy dissipater for storm runoff from the faces of the dumps. The broken rock material has a very low siltation potential and will effectively encapsulate the finer material initially placed in the waste dumps.

R647-4-112 – Variances

Earth Energy does not believe that there were any comments made in the September 28, 2007 NOI, or in the April 2008 NOI, that indicate that steep slopes will remain. A Division-approved variance is not needed.

R647-4-113 – Surety

Operations

A list of equipment used during the operational phase was provided in Appendix D of the April 2008 NOI. Equipment removal costs are included in Appendix E.

Reclamation

Earth Energy understands that some of the review comments may be general in scope.

Information on the acres in each reclamation category has been added to the reclamation plan and provided in the surety Appendix (E).

No drainages will be constructed, therefore no drainages will be reclaimed. The headwaters of two ephemeral drainages affected by mining will be filled with overburden/interburden storage areas. No drainage reconstruction will be required during reclamation.

Information on reclamation of the pond has been added to Section 110.2 and Appendix E.

Removal of equipment/materials associated with bitumen storage has been provided in Appendix E.

The costs to remove and dispose of the skid-mounted equipment, power plant, plant office and buildings are included in Appendix E, and described in Section 110.2.

The cost to remove the lining from the truck loading area is included in Appendix E.

Information has been added to the reclamation plan on how the facilities area will be reclaimed, including the cost for removing the contents of the tanks and buildings. Detail and references have been added to Appendix E.

A fence will be left between the Seep Ridge Road and the mine area until the site is ready for bond release, at which time all fences, gates, and signs will be removed.

Since the plant site borders the Seep Ridge Road there is essentially no access road. During final reclamation, on-site roads would be deep-ripped to relieve compaction, regraded to blend with site topography, and seeded. This description is included in Section 110.2, Roads. The reclamation costs are included in Appendix E.

The costs for topsoil relocation have been revised and are provided in Appendix E.

The pit is backfilled as part of mining, as explained in Section 106.2, Pit Backfill.

Associated disturbance as stated in 109.3, includes those disturbances related to mining and processing at PR Spring mine that are not mining specific and include approximately 15 acres to be disturbed by the plant site and 24 acres to be disturbed by haul roads. These disturbances will remain unreclaimed for the life-of-mine.

The clean-up estimate in the original submittal assumed that not all areas of the mine would have loose trash on them. However, for simplicity's sake the surety now contains a figure that assumes trash removal is required on all acres of the mine. The surety cost assumes that three laborers would be used to pick up trash and perform loading work. The cost for a front-end loader and other equipment includes operator costs. All assumptions are included in Appendix E.

An estimate of the volume of trash that will be found on the 98-acre site is included in the surety calculations. See below for definition of trash. Dump fees, and transport costs to the nearest licensed landfill, are now included in the reclamation surety, detailed in Appendix E.

The surety calculations separate "Trash" from "Demolition debris" and "Hazardous Materials".

"Trash" includes those items that missed the trash can, such as fast food wrappers, loose oil cans that sat out for a year before being discovered, lids, stray rags, office and food waste, stuff that fell off while loading skid structures onto the lowboy for removal from the mine, etc. The entire mine will be scoured for trash prior to preparing the seed bed. All trash collected will be disposed of at a licensed landfill.

"Demolition" and "facilities removal" includes organized demolition and/or removal of all buildings, tanks, skid structures and the like and has been separated out on the surety spreadsheet. After facilities removal the site will be checked for any small items (such as stray angle iron, cable, wood, insulation, paper), which will be treated as trash and removed accordingly.

Removal of "hazardous materials" (such as fuel tank contents) is now listed as a separate task in the surety spreadsheet. Fuel/lubricant removal by truck will be free, as quoted by Tri-State Recycling (307-746-3688)

on April 1, 2008. A transport cost has been included to remove remaining contents of the process water, chemical additive, and cleaning emulsion tanks as these items may not have sufficient re-sale value. Cost per trip included in the revised surety calculations is based on 176 miles round trip, and $1.56 per mile.

Detail has been added to the description of the building demolition. The distance from Earth Energy's PR Spring mine to a licensed facility (Uintah County Landfill on east side of Vernal) is 88 miles. Cost to transport materials this distance is itemized in the surety calculations, Appendix E.

The tanks and everything else are being transported. The narrative and surety calculations have been re-worded to make this clearer.

All non-hazardous materials will be disposed of at the Uintah County Landfill.

Demolition debris consists of all buildings, equipment, tanks, etc. from the plant site, and includes modular office and maintenance buildings, tanks, processing structures, etc. as itemized in the revised surety calculations.

Dump fees are currently $30/load for a 10-12 yard dump truck, $50/load for a 35-50 yard dump truck, and $15/ton for materials brought in on other vehicles, such as trailers. These values are used and noted in the revised surety calculations.

The precise Means publication used is noted in each bulleted item.

An additional transport fee, based on 629 Means Heavy Construction Cost Data (2008) (31 23 23.18 4700) for the full 88 miles of haulage is included in the revised surety calculations.

An estimate of the volume of demolition material is included in the surety calculations. As noted above, Demolition material is not considered trash.

The only facilities with foundations are two aluminum-framed, semi-permanent, movable "sprung" structures (go to http://www.sprung.com/en/index.php for information on these structures, which are in use at Kennecott Utah Copper). These foundations cover 0.46 acres. Ripping and burial of the concrete is included as a line item in the revised surety calculations.

Tank contents have re-sale value. Tri State Recycling (307-746-3688) will remove fuel, gasoline, propane, etc. for free if quantities are over roughly 300 gallons. If the quantities are less, the company is currently charging $1.56/mile to remove these smaller quantities of fuels. The surety calculations assume that three trips would be required to remove remaining contents of the process water, chemical additive, and cleaning emulsion tanks as these items may not have sufficient re-sale value. The cost per trip included in the revised surety calculations is based on 176 miles round trip, and $1.56 per mile.

The source of information for the cranes is from the Cost Reference Guide (2008). Cost for the use of a lowboy trailer is included in the mob/demob costs as this equipment is used to transport dozers, etc. to the reclamation site. This equipment is then used to haul waste materials to the Uintah County Landfill. Costs for this activity is from 629 Means Heavy Equipment Construction Cost Data (2008) 31 23 23.18 4700. This information has been added to the revised surety calculations.

A more detailed equipment list is included in the revised surety calculations, and the equipment to be used is listed under each item.

The facilities to be demolished and buried are described in Section 110.2. All other materials will be hauled to the Uintah County Landfill.

Tri State Recycling (307-746-3688) will remove fuel, gasoline, propane, etc. as described above.

A more detailed equipment list is included in the revised surety calculations, and the mob/demob. costs have been revised.

The referenced cost information by equipment type has been added to the surety section.

Unit costs have been reviewed and adjusted as necessary in the revised surety calculations.

A list of all facilities, generators, pipes, pumps, etc. has been provided and cost of removal is included in the revised surety calculations, Appendix E.

We look forward to your review and consideration of this response and additional information for Earth Energy's PR Spring NOI.

Thank you.

Regards,

Linda Matthews
JBR Environmental Consultants, Inc.

Cc: Barclay Cuthbert, Earth Energy

APPROVED

SEP 19 2009

DIV. OIL GAS & MINING

Linda Matthews

From: Paul Baker [paulbaker@utah.gov]
Sent: Thursday, January 10, 2008 10:27 AM
To: Linda Matthews
Subject: Final Version

Attachments: rev1-prsprings-01102008.doc

rev1-prsprings-011
02008.doc (8...

Attached is what I think will be the final version of our PR Springs review. There's not much difference between this and the review I sent previously. The most substantive change is one I made in the section on threatened and endangered species concerning the endangered fish of the Upper Colorado. I believe I mentioned this in our meeting.

January 10, 2008

Barclay Cuthbert
Earth Energy Resources
Suite 740, 404-6 Avenue S. W.
Calgary, Alberta, Canada T2P 0R9

Subject: First Review of Notice of Intention to Commence Large Mining Operations, Earth Energy Resources, PR Springs Mine, M0470090, Task 2032, Uintah County, Utah

Dear Mr. Cuthbert:

The Division has completed its initial of your Notice of Intention to Commence Large Mining Operations for the PR Springs Mine, received September 28, 2007. The attached comments will need to be addressed before tentative approval may be granted.

The comments are listed below under the applicable Minerals Rule heading. Send replacement pages of the original notice **using redline and strikeout text** and indicate how these are to be incorporated into the plan using Form-MR-REV-att found on the Divisions web page. After the notice is determined technically complete you will be asked to send us two final clean copies, one of which will be returned.

The Division requests that submittals are made according to the following format. Notices and changes should be three hole punched, maps folded and placed in a plastic 8 ½ by 11 sleeve, and binders provided for new notices, revisions, applications, or other changes of 30 pages or more (binders need only be provided once). An additional electronic copy is appreciated. You may request some proprietary information relating to the location, size, and nature of the mineral deposit to be kept confidential. Confidential information must be clearly marked and provided in a separate binder.

If you have any questions in this regard please contact me, Tom Munson, Paul Baker or Beth Ericksen of the Minerals Staff. If you wish to discuss this review, please contact us at your earliest convenience. Thank you for your cooperation in completing this permitting action.

Sincerely,

Susan M. White
Mining Program Coordinator
Minerals Regulatory Program

SMW:PBB:pb
cc: Will Stokes, SITLA
O:\M047-Uintah\M0470090-PRSpringMine\draft\rev1-prsprings-01102008.doc

APPROVED

SEP 19 2009

DIV. OIL GAS & MINING

REVIEW OF NOTICE OF INTENTION TO COMMENCE LARGE MINING OPERATIONS

Earth Energy Resources
PR Springs Mine
M0470090
January 10, 2008

General Comments:

The submitted notice does not address nor commit to conform to operation and reclamation practices. Variances may be required which will require an outline of the method or measure that is consistent with the Act. Variances related to erosion control and slopes would be necessary. Please look at the narrative within the impact assessment, as it may be as simple as providing more detail in the mitigation portion of the narrative. (BE)

The submittal uses the word 'proposed' within the context of the text and maps as well. Omit this word and write the narrative as though the Division approved this mining operation. (BE)

Based on the content of the submittal, it appears there may be expansions that will require revisions to the permit in time. Because of the change dynamics, the submittal should be formatted to easily incorporate into future revisions or amendments. Further discussion with the Division is suggested. (BE)

R647-4-101 - Filing Requirements and Review Procedures

Page two, number 3, indicates that the company can begin mining when the reclamation contract is completed and the *NOI is approved.* This statement is not true in its entirety, and the following applies: The reclamation contract and surety must receive Division approval before mining can commence. Please re-write that statement. (BE)

The mine plan shows a "possible" west pit extension, and Figure 5c contains a footnote, which states, "Any Phase II activities or areas depicted on this drawing are conceptual only and are not currently proposed under this NOI." On the other hand, Section 10.2, page 30, says the mining and reclamation plan and associated bond estimate are based upon initial North pit mining, the West extension, and associated disturbances. Please clarify these comments. Is the west pit part of the proposal? The plan needs to clearly delineate those activities that would be approved with this plan and those that are conceptual. (PBB)

The Division recommends that adjacent landowners be notified in writing. (PBB)

R647-4-104 – Operator's, Surface and Mineral Ownership

The minerals ownership section (104.2, page 3) says Earth Energy has a lease but does not say who owns the mineral rights. From the cover letter, this is understood to be the School and Institutional Trust Lands Administration (SITLA). Please state the mineral right owner. (PBB)

Page three of the submittal indicates the permit area is 2255 acres with the initial disturbance of 198 acres. The submittal, including the surety calculations contains information pertaining only to 198 acres.

Further clarification is required since permit area is defined as just an area of land on the approved map, and to avoid confusion, Operator intent of the use of including this title on the map is requested. Please label the area "SITLA lease area" instead of permit area. (BE)

Once the conditional use permit from Grand County is granted, please include this as an appendix to the plan. (BE)

R647-4-105 - Maps, Drawings & Photographs

General Map Comments

There are no maps that show streams, springs, waterways, and infrastructure. (BE)

Please state the contour interval on all maps. (BE)

There is no shown and labeled public access route from nearest highway. (BE)

The narrative outlines the area geology, which should be shown on a geologic map. In addition to the geology map, the Division would like to see the five asphalt sands A-E detail within the Douglas Creek Member. (BE)

Specific Map Comments

The below review comments are specific to the identified maps. The items will require clarification and updates, improvements, or corrections. These should be made to each of the maps accordingly. Do not assume this information is all-inclusive as other changes may result once clarity is established. (BE)

Figure 2:

See comment under **R647-4-104 – Operator's, Surface and Mineral Ownership**. Figure 2 shows and labels the NOI permit area as 2255.15 acres, but unless complete information is submitted for this entire area, the NOI will not be approved for this acreage. Further discussion suggested. (BE)

The word proposed mine operations shows several colors of hatching, however none of them are identified using a key. There is no indication of what they mean. Please correct. (BE)

The mine operations area should be submitted in a map that shows necessary detail. Some information is contained in figure 8, please read those comments. (BE)

Please remove the word proposed from the 200-acre mine operation. For consistency, the disturbed area should be shown as 198 acres. (BE and PBB)

Be specific on the number of acres; do not use +/- in front of the number. (BE)

The narrative indicates that surface and subsurface facilities are shown on figure 2, however, they are missing. Please see Page 6 of the narrative. (BE)

The narrative indicates that figure 2 is at a scale of 1 inch = 2083 feet. The bar scale on the map does not correspond with the map scale. Please make adjustments. (BE)

The lease boundary on the bottom portion of the map is omitted (cut-off). It should be all-encompassing showing all boundaries. (BE)

Figure 3

The acreage is not shown for the gray mine haul road. Please label. (BE)

Figure 4

The facilities map should include the dimensions of the buildings, ponds, piles etc. These dimensions can be part of the legend and referenced appropriately. The map should show roads, including access and haul roads; utilities and power lines (water, gas, power, telecommunications etc); and drainage control devices. (BE)

Note the acreage on this map. (BE)

Figure 5-d

There may be related issues within the other figures and more information may be required. (BE)

This figure does not look like a cross section as the narrative indicates. It, however, does show the location of the cross sections but in addition it includes important information that would not be easily found because of its titling under the table of contents. Please consider changing. (BE)

This figure contains a lot of information; it is very congested. Can you adjust or split the map information in two maps? A legend is required. (BE)

Figure 6

Provide direction of water flow(s), ephemeral stream channels, show the longest flow path, and show vegetation areas on the watershed map. (BE)

Figure 8

More information that further clarifies the pit configuration may be required, which may include an additional map. (BE)

The reclaimed area should show topographic lines, which can be shown in different colors representing the waste areas and the pit area. They should be labeled and contour intervals identified. If there are any

storm water controls, they should be shown as well as drainages, springs, etc. The cross section locations should be shown as well. Highlight the bonded area on this map as well, and include acreage. (BE)

The surety is partially determined by earthwork to be performed in the area. Please show areas that will be ripped, seeded, and contoured since the plan doesn't include each of these tasks over the entire area. (BE)

On this same map, perhaps in the legend, indicate the volume of topsoil available. (BE)

If materials are going to be buried, show locations. (BE)

105.2 Surface facilities map
The water well and associated pipeline need to be included as part of the disturbed area and need to be shown on a map. (PBB)

105.3.16 A geology map is required that identifies faults (strikes and dips), rock types, interbeds, and predominant joint (bedding and cross joints) orientations to help demonstrate generally stable pit wall configurations. (BE)

A map should be provided that shows the pit design with contours. It appears from the submitted maps that the pit may have a tendency to collect water. Please include the designed perimeter wall as described in the narrative. (BE)

The above-mentioned pit map should show adjacent areas such as the topsoil piles, plant site, and waste dumps. Based on the outlay, it appears there may be stability issues at the adjacent areas of the pit and dumps. (BE)

There is an explanation of the north pit on page 27. Please provide a specific map of this area for clarity. (BE)

105.3.18
A map should be submitted that shows adjacent land owners. (BE)

R647-4-106 - Operation Plan

106.2 Type of operations conducted, mining method, processing etc.

The plan says (Section 106.2, page 7) that vegetation would be cleared by pushing into piles for burning. The Division recommends that vegetation be included with soil stockpiles or stockpiled separately for later distribution. The vegetation adds organic matter and also helps with surface roughness and soil moisture retention. (PBB)

Per the above comment, ensure there are volume determinations identified and included which will increase the volume of the soil stockpiles, or indicate there will be an addition of vegetation piles separate from the topsoil stockpiles. (BE)

The narrative provides as an estimated volume of mineable material but more information is required such as anticipated yearly tonnages mined. In addition, please indicate the expected life of mine in years. (BE)

It is apparent that expansions beyond the initial 62-acre pit are planned. Please provide a date estimate of when any expansions will occur. (BE)

Provide the distance from the pit to the processing plant in feet or miles. (BE)

Provide the maximum footprint dimensions of the tar sands storage pile and reserve ore pile, include volumes too. (BE)

The narrative refers to the water source as being a well. Show the location of the well on one of the maps and refer to the map in the text including its elevation. (BE)

What is the distance of the pipe run from the well to the site? (BE)

The narrative indicates there will be one of two mining approaches used, and at this time it is unknown. It will be necessary to amend the plan once the mining method is certain. From a surety estimation standpoint, assumptions may need to be made that will influence the surety estimate. (BE)

In addition to the above comment, either mining method used should ensure the pit design configuration as shown can be achieved and a statement should be made to that effect. (BE)

If blasting will occur, then some blasting specifics will be required. (BE)

Provide information about the mining method approach and general mining plan. (BE)

The statement that the site area will be constructed to allow appropriate runoff and minimize erosion requires further elaboration. (BE)

The pit backfill plan requires additional information such as: the thickness of the various layers of interburden/fines. (BE)

What is the volume of the pit and comparatively, the volume of sand/interburden to be placed there? (BE)

What is the sand density? Will this material bulk? Will it be compacted when placed in the pit? Will it drain appropriately? (BE)

What is the particle size range for the over/interburden and the sand? (BE)

106.3 Estimated acreages disturbed, reclaimed, annually.

Table 1 within the narrative refers to the north pit but figure 3 refers to it as initial pit. The table refers to overburden/interburden disposal site, and figure 3 refers to it as waste dumps. Please coordinate consistent titling. (BE)

Indicate the number of acres that will be disturbed on an annual basis. (BE)

Please make a statement that no deleterious are on site if that is the case. If not, provide a table and information identifying the materials. Elaborate on how they are managed. (BE)

106.6 Plan for protecting & redepositing soils

According to the plan, an average of three inches of soil will be salvaged from 132 acres of the Seeprid-Utso complex soils. This compares with the soil survey which says topsoil—note this is topsoil and not just soil—depth ranges from 4-18 inches (although the plan says soils in the mine area are anticipated to be shallower than stated in the soil survey). An average of two inches of soil will be salvaged from less steep portions of the Tosca soils. Topsoil in the Tosca soils is described in the soil survey as being 0-11 inches thick. Soils on slopes steeper than 3h:1v will not be salvaged.
Two to three inches of soil is not adequate for reclamation to the vegetation communities that exist in this area. The Seeprid-Utso soils, according to the soil survey, have 4-6 percent organic matter which probably qualifies them as Mollisols. These are ideal soils for reclamation, and the opportunity to salvage these soils and use them in reclamation must not be wasted. The Division anticipates a minimum of six inches of soil, and possibly twelve inches or more, could be salvaged from the Seeprid-Utso soils and used in reclamation. The Tosca soils are likely to be more variable, but the amount of soil salvaged, where available, should be maximized. If soil cannot be salvaged from some areas, there should be adequate soil available in others to make up the shortfall. (PBB)

In most cases, soil can be salvaged from slopes as steep as 2h:1v. Please modify the plan accordingly or include a request for a variance from this requirement with appropriate justification and alternate methods to be used. (PBB)

Soil storage for this increased volume should not be a problem since, 1. The amount of soil in the storage area can be doubled with the depth increasing to just under five feet which is not extreme, and 2. The operator will be doing concurrent reclamation, which will reduce the amount of soil needing to be stored at any one time. (PBB)

Figure 8 shows disturbed areas that will be reclaimed but that will not receive topsoil. This is logical for the topsoil storage area, but there should be adequate soil available that soil can be spread over the entire disturbed area (see preceding paragraphs). Please make the appropriate changes. (PBB)

How many acres comprise the steeper slopes of the Tosca soils? (BE)

What equipment will be used to scrape the topsoil? (BE)

Provide a description of the topsoil placement area considering adverse influencing factors. Are the placement areas on a relatively flat surface? (BE)

Consider placing signs at the topsoil areas. (BE)

What are topsoil pile berm materials? Provide basic berm design including materials used. (BE)

106.8 Depth to groundwater, extent of overburden, geology

The narrative indicates there are nearby springs. Are they located within the project area of 198 acres? More information is needed about the springs including their location on a map. See other related comments. (BE & TM)

Provide location information of where the exploration drilling occurred. Show on a map to clarify if necessary. Did any of the 25 holes drilled in 2005 encounter water? (BE)

Provide the strike and dips of the mine area and explain any folds and faults in the area. (BE)

106.9 Location & size of ore, waste, tailings, ponds

The Division appreciates the efforts of obtaining information to follow DWQ guidelines for minimize impact of ore and waste stockpiles on groundwater. Specific design information and control measures should be provided in the plan. (BE)

106.10 Amount of material to be moved

The plan does reference any sort of sediment control other than BMPs included in the SWPPP plan by reference. The SWPP needs to be included in the plan when approved. Since the term BMPs references a large variety of sediment control devices, the Division requires that the operator specify what specific BMP controls are going to be used and a typical design drawing included in the plan. There is no reference to any sediment controls such as sediment ponds, etc. The plan says the mine is on flat ground in the headwaters of main canyon, inferring there is no runoff. The pits are likely to catch a major amount of drainage from rain and snow, and this water needs to be factored into the site plan. Therefore, a plan must be provided on how this runoff water will be handled operationally both in the pits and running off waste piles. Please include these plans and designs in the mine plan. (TM)

R647-4-107 - Operation Practices

The plan states that there will not be a problem with drainage, and page 20 says, 'Surface water resources will be protected during operations as described above in Section 107.' There is **no** section 107 in the plan. The Division requires that the BMPs to be used on site be described in the plan and a typical drawing submitted of how the BMP will be installed and a figure showing where on the ground it will be implemented referencing the BMP. Temporary BMPs are not recommended for long term operations as they are not always maintained. The Division recommends the use of berms to direct runoff to small catch basins that can be cleaned out after storm events, since the maintenance of these controls is more predicable. Provide this additional information. This ensures the proposed controls will be effective and there will not be any problems with offsite drainage. (TM)

R647-4-109 - Impact Assessment

109.1 Impacts to surface & groundwater systems

The lower wall side of the North pit area toward waste dump #1 is laid out in such a way that high erosion potential is a concern. The drainage in that area is a concern as well as runoff potential. How is the pit floor designed to handle any sediment load during operations and at reclamation? (BE)

Provide a narrative that describes impacts to the springs and groundwater and explains management of those impacts. (BE)

Provide information in the narrative about the sequencing of waste placement. (BE)

Provide more information regarding how erosion control of the waste dumps and topsoil piles will be managed. There are detailed comments below. (BE)

Due to the placement location of the waste dumps, more information is needed regarding erosion control measures to be implemented in these areas. Describe the dump material characteristics; Figure 5-b shows the reclaimed waste dump at approximately 400-ft high without slope breaks and at a steep angle. The combination of these factors may result in high runoff velocity and a minimal catchment area that may result in failure or impact to streams and channels. This same figure shows the slope at 1H:1.5V but the narrative refers to 1.5H:1V. Please refer to comments under figure 5-b in conjunction with this comment. Table 8 uses averages for the native slope angle, average slope angle of outer dump slope, and the post mine slope, these averages are within what overall distances? The waste dump slope angles should be calculated independently and not be part of the north pit and main haul road distances and then used to determine a slope angle. (BE)

More information is needed regarding the ditch and berm designs among other erosion control measures. Provide material source if applicable, dimensions of berms and ditches along with designed storm event information. (BE)

Please explain how erosion, storm water, sediment etc. will be managed within the pit at initial phase of operations. What are the calculations used to determine the sizing of the storm control structures? (BE)

Does the ditched areas flow to a catchment basin or any drainage catch points? (BE)

A storm water pollution prevention plan is suggested. (BE)

Provide information about management of storm water including monitoring events to ensure all water controls are being managed effectively. (BE)

Provide a complete overview of site specific BMP's. (BE)

What is the depth to groundwater from the base of the planned excavation? (BE)

109.2 Impacts to threatened & endangered wildlife/habitat

In Section 109.2, page 23, the plan says Mexican spotted owls are not protected by federal law and that conservation actions may be needed to preclude the need to list them under the Endangered Species Act. This is not correct. Mexican spotted owls are officially listed as threatened, and the plan should be modified to reflect this status. (PBB)

The plan says that, according to GIS shape files obtained from the BLM, there is no known Mexican spotted owl nesting habitat within 1.5 miles of the permit boundary or within three miles of the proposed affected area.
Please discuss whether there is foraging habitat within the project area. If there is, the plan should discuss potential impacts to the birds and measures that will be taken to mitigate these impacts. (PBB)

It is expected that the mine will use 116 gallons of water per minute on a 24-hour basis which equates to approximately 180 acre-feet per year.
Water use is considered to adversely affect the four endangered fish species in the Upper Colorado River Basin. Please discuss this effect and how it will be mitigated. If this project was on federal land, mitigation would consist of a one-time payment for the Fish and Wildlife Service. (PBB)

The plan also discusses sage grouse habitat in the area. This species is not listed as threatened or endangered but has been listed as a sensitive species by the Utah Division of Wildlife Resources. In an electronic mail message dated November 1, 2007, Brian Maxfield, sensitive species biologist with Wildlife Resources, stated:

> The area for the mine will impact brooding and possibly nesting sage-grouse habitat. The ridge tops on the Book Cliffs are the primary habitat for the sage-grouse. Grouse have been known to nest and brood-rear in this area.

On-site mitigation will be difficult with the nature of the project. When the mine is in production grouse will avoid the entire area. They do not tolerate heavy traffic, buildings, or noise. As you can tell, we know little about the grouse in this area. It is far from anywhere and lek counts are difficult. No research has been conducted on the grouse in this area. We have just started a research project on sage-grouse in the area (main focus is East Bench - north of this project) but we are trying to expand the study to include all the sage-grouse in the Book Cliffs area. The more we learn the better we can help mitigate for projects like this one. If there is a possibility for funding to help with this research it would be very appreciated. Funding is what is holding the work up.

Rules R647-4-109.2 and -109.5 only require impact analyses and mitigation plans for threatened and endangered species, not for sensitive or other uncommon species. The Division, therefore, requests that the operator consider the probable impacts to sage grouse from the mine and contact Wildlife Resources about providing funding for this research as discussed in the e mail message. (PBB)

109.4 Slope stability, erosion control, air quality (fugitive dust control plan), safety

The plan says Earth Energy is in the process of obtaining an Approval Order from the Division of Air Quality.
Please include a copy of this Approval Order in the plan once it has been issued. (PBB)

The opening pit highwall will be bermed and fenced along the county road.
Please contact the Division of Wildlife Resources for recommended fence designs. (PBB)

Identify lengths of time and allowed volumes of materials will be left on site before removal. Indicate that containers will be labeled so wastes are clearly identified. Indicate in the narrative storage locations of salvageable and hazardous wastes. (BE)

Please consider that the placement of warning signs will be visible from more than one location. (BE)

If blasting occurs a statement should be included that indicates loose material that migrates will be removed immediately. (BE)

As an overview, the Division expects an ultimate pit mine plan, annual production sequence, pit slope design sectors and geotechnical basis, geologic map with major structures, joint sets, bedding etc., pit dimensions (i.e. width, length, depth), plan of pit roads, dump points, crusher dockets, stockpiles etc. (BE)

Comments about slope stability have been captured elsewhere within this review. There is limited information regarding the pit walls height nor is there a design map that incorporates this information. The profile sections provide some indication, however there a complete pit overview is missing. (BE)

Keeping the pit walls at 1.5H:1V will not necessarily maintain stability. Stability is material dependent and additional design considerations should be made that include a geologic profile that includes strikes, dips etc. (BE)

Provide information about how rockfalls and backbreak will be managed. This information is especially important if blasting. (BE)

Information should be included that quarry slopes will be monitored regularly for signs of instability and that the area will be managed in accordance with MSHA safety guidelines and the plan. (BE)

It appears the waste slope angles are greater than 45°, transverse mine sections W1-E1 & W2-E2 reclaimed waste slope angles are 60° or greater. Therefore a variance will be required. (BE)

R647-4-110 - Reclamation Plan

General:

There is no statement that reclamation will occur according to state regulations, specifically the Utah Mined Land Reclamation Act and its associated rules. Please provide this statement. (BE)

Please provide a table that outlines each area, its acres, and the number of acres within the area that will be revegetated and topsoiled. (BE)

The reclamation objectives are not stated very clearly, basic information is provided, but more is needed in the narrative. (BE)

Provide information about the monitoring control at reclamation. (BE)

Outline actions that will be implemented to ensure an environmentally safe and stable condition for the various wildlife in the area that meets the objectives of the mined land reclamation act 40-8-12. (BE)

How will safety be managed at reclamation? (BE)

110.1 Current & post mining land use

Exploration cannot be a post mining land use. Closure plans should be dependent on the area being used as open space/habitat. (BE)

110.2 Roads, highwalls, slopes, drainages, pits, etc., reclaimed

According to the plan, onsite roads will be deep ripped.
Please specify the depth of ripping and the distance between ripper shanks. Roads should be ripped 24 inches deep with ripper shanks spaced no more than 24inches apart. (PBB)

Roads left while reclamation is occurring will require maintenance to minimize erosion. Please make such a statement. (BE)

There is a statement that mining may occur in other areas of the permit, but for the sake of this NOI, indicate that all roads will be reclaimed. The plan can be changed at any time in the future. (BE)

The reclamation plan indicates slopes will be regraded to a 2.5-3:1 or flatter, however the profiles reveal the waste dumps slopes are greater than 45°. (BE)

There are no methods outlined that cover how erosion will be minimized throughout the area. This information should be included. If there are portions of the NOI that apply to reclamation, please state that. (BE)

There is concern about the slopes in the area and to assure long-term stability, the slopes should be regraded in such a way that safety hazards are minimized and to encourage vegetation growth while reducing erosion. Please outline a plan that incorporates this information. The reclamation map is unclear and there is limited information about the long term management and control. (BE)

The final pit appears as though there is a potential to form a pit water collection area, please elaborate on how it will be managed. (BE)

There is an area on the upper north west portion of the pit where runoff may occur, and information should be provided that outlines the management of it although clarification showing topographic lines may help understand the topography. (BE)

110.3 Description of facilities to be left (post mining use)

Will the water well remain upon mine closure? (BE)

110.4 Description or treatment/disposition of deleterious or acid forming material

Describe the berm design parameters and how they will be managed at final reclamation. (BE)

110.4 Revegetation planting program

According to the plan, the topsoiled surface will be lightly scarified to provide a roughened surface to retain seed and to enable root penetration.
It is important that the surface be left very rough, and this is often accomplished by a smart, experienced equipment operator at the time of reclamation. However, the description in the plan that the topsoiled surface will be "lightly scarified" is not consistent with the concept of leaving numerous gouges and rips that will trap seed and moisture and provide erosion and sediment control. Please modify the plan to show that the surface will be left very rough. (PBB)

There is no information in the plan that includes grading and stabilization procedures and seed bed preparation for the site. There is indication that once final grading is complete, topsoil will be placed, but there is no elaboration on procedures used. This information is important and should be included. (BE)

Describe what you intend to accomplish with grading efforts. How is drainage considered? Provide a table that includes areas that will be graded, ripped, topsoiled, pocked, etc. Include acres of each. (BE)

R647-4-111 - Reclamation Practices

The plan says on page 36 that no significant drainages will be disturbed so none will be reconstructed. The plan needs to address landform and final drainage on waste dump faces. Please show how waste pile outslopes and reclaimed pit slopes will be stabilized, water directed off the slope, erosion controlled, and how sediment will be kept from leaving the site. (TM)

R647-4-112 – Variance

There have been comments made within the submittal that indicate that steep slopes will remain. A Division approved variance must be granted. (BE)

R647-4-113 – Surety

Operations:

Provide a list of all equipment used in the operational phase. (BE)

Reclamation:

This review cannot capture every omission and make a statement accordingly. It is anticipated that communications will occur in the interim and the dialog will provide elaboration on the generalities made within the scope of this review. (BE)

The reclamation plan should include the number of acres associated with each reclamation category within the narrative. (BE)

Please explain how affected drainages will be reclaimed. (BE)

Provide information about how the pond will be reclaimed. (BE)

Where is the cost associated with removing any equipments and/or materials associated with the bitumen storage? (BE)

What is the cost to remove and dispose of all the skid mounted equipment, power plant, plant office and buildings? (BE)

What is the cost to remove the lining from the truck loading area? (BE)

Information is required on how the facilities area will be reclaimed. Including the cost for removing the contents of the tanks and buildings (if applicable). (BE)

Overall, the surety bond estimate lacks detail in the form of reference and other factors such as production rate, any correction factors, material densities, average distances, terrain grade. (BE)

There should be costs associated with the removal of gates, signs, fencing unless they are to remain in place after reclamation. (BE)

Costs are not provided for reclamation of roads. Please provide. (BE)

Detail the costs for topsoil relocation to demonstrate $\$1.62/yd^3$. (BE)

Where are the costs to backfill the pit with fines/interburden? (BE)

Cost Summary 9.2, Explain and describe associated disturbance. (BE)

Justify the statement 'estimate five out of fifteen acres for clean up'. How and what contributes to this estimate? Where is the amount of $75/acre for trash removal obtained? There is no reference in the Cost Summary. The same applies to the loading/trucking. There is an estimate for number of trips, but the trash must be gathered and loaded on the equipment. There are no costs for that work including costs for workers to perform the loading work. In addition, there is no information about the vehicles used in the Cost Estimate; one has to refer back to the text to see what equipment is being used. What is the quantity of trash (and your definition of trash)? There is no indication of dump fees. Generally speaking, these estimations are too vague. (BE)

In continuation of the above comment, the surety narrative includes cleaning and demolition within the trash category, so does the definition of trash consist of cleaning and demolition in addition to regular trash? (BE)

The building demolition lacks appropriate detail. What is the distance in miles to the 'licensed facility'? Why are the tanks only being transported to a facility? Where and how will the demolished materials be disposed of? What does the demolished debris consist of (metal, siding, gypsum etc)? What are the dump fees? There is a reference to 'Means 2007', which Means publication is being used? There are several and the one used should be referenced. If Heavy Construction Cost Data manual 2007 was used, there is only an allowance for a 20-mile haul within the reference used in the Cost Summary. It is suspected that the haul distance is greater than 20 miles. Confirmation or additional information is needed. (BE)

What is the estimated volume of the demolished material and is demolished material considered trash (see above related comment)? (BE)

Do the facilities have foundations? Information must be provided and made clear. If there are any foundations or concrete pads, a table must be provided with dimensions included thickness and volume. The costs should be determined that includes break-up the concrete and the disposal of it. (BE)

The tank and building demolition lacks information about costs to remove the contents. (BE)

Is it true that a crane can be rented for only 3 days? What is the daily rate and where has the rate been obtained? This statement applies to the lowboy as well. Why is the lowboy rate on a per load basis and the crane on a per day basis? Provide source and cost information. (BE)

The statement in the surety narrative that other equipment will be available as needed, is not acceptable. Identify the equipment, its application and possible scenarios of when it will be needed. (BE)

There is a reference that some of the demolished material will be buried, but the narrative does not identify what is going to be buried, nor is there any elaboration on the method of the materials buried or where the burial will take place. There is no volume of buried materials stated estimated either. (BE)

There are 22 tanks, but there is no information regarding how the contents will be handled or where they will be emptied. (BE)

The equipment list has no basis for $2000/pc of equipment for mob/demob. Where is the cost for the lowboy on the equipment list? If it is contracted out, then the costs listed that involve the use of the lowboy should indicate that it includes the mob and demob. In addition, the lowboy should be on the equipment list and reference that the mob/demob is included in the contractor statement (if that is even the case). What size crane and track hoe will be used? (BE)

There is no referenced cost information by equipment type. This information is required with a reference. (BE)

Part 6 of the surety narrative indicates the cost for clean up, demolition and structure removal, however the stated cost of 0.30 per cubic yard should be 0.30/cubic *foot*. There are other sections in the narrative that use these incorrect units and they should be corrected. (BE)

What are the infrastructure removal costs? It is expected there are costs associated with the removal of generators, pipes, pumps, gates and signs etc. They must be listed and show costs. Part 9.1 of the surety estimate show $0 removal for gates and signs, there should be a cost shown for removal. (BE)

www.earthenergyresources.com

September 28, 2007

Ms. Susan White, Mining Program Coordinator
Department of Natural Resources
Utah Division of Oil, Gas and Mining
P.O. Box 145801
Salt Lake City, Utah 84114-5801

RE: Earth Energy Resources, Inc. Notice of Intent to Commence Large Mining Operations, PR Spring Mine

Dear Susan:

Enclosed is Earth Energy Resource's Notice of Intent to begin tar sand mining and processing operations at the PR Spring Mine, Uintah and Grand Counties, Utah. Per the requirements of Form MR-LMO, the initial submission fee of $850 ($1,000 fee less $150 fee previously tendered for small mine permit S/019/059) will be forwarded by mail today from our offices in Calgary. By my signature below, I hereby certify that the information in the enclosed Notice is true and correct as of the time of this submittal. Confidential information is included in this Notice, and is labelled as such.

We look forward to your review and would like to meet with you sometime in mid-October to discuss your initial questions or concerns regarding the proposed operations. We will be in contact with you to schedule an October meeting.

If you have any questions, feel free to give me a call at 403.233.9366. Thank you.

Yours truly,
Earth Energy Resources, Inc.

Barclay Cuthbert
Vice President

Enclosure

Suite #740, 404 – 6 Avenue S.W., Calgary, AB T2P 0R9 Canada Office: 403.233.9366 Fax: 403.668.5807

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

August 28, 2006

U.S. Fish and Wildlife Service
Utah Field Office - Ecological Services
Attn.: Betsy Herrmann
2369 West Orton Circle
West Valley City, UT 84119

Dear Ms. Herrmann:

Earth Energy Resources Inc. is proposing to mine and process tar sand deposits within an area of approximately 6,000 acres, currently under lease from the State of Utah's School and Institutional Trust Lands Administration (SITLA). The project area is located at the southern extent of Seep Ridge in Uintah and Grand Counties, on the east edge of R 23 E (see enclosed map). The initial development area would encompass about 500 acres, with approximately 50 acres of proposed active disturbance at any one time.

We request that your office provide a site specific list of endangered, threatened, and candidate species and any known occurrences for Earth Energy Resources Inc.'s planned tar sands mining operation location delineated above.

The information you provide will be used to assist us in complying with the Endangered Species Act and in preparing a Notice of Intention to Commence Large Mining Operations. We appreciate your time and effort in dealing with this request. If you have any questions, please contact me at (801) 943-4144.

Sincerely,

Linda Matthews
JBR Environmental Consultants, Inc.

enclosures – map

MONTGOMERY
ARCHAEOLOGICAL
CONSULTANTS
Box 219, 322 East 100 South, Moab, Utah 84532 (435) 259-5764 Fax (435) 259-5608

June 7, 2007

Linda J. Matthews
JBR Environmental Consultants, Inc.
8100 S. Highland Drive
Sandy, UT 84003

Dear Ms. Matthews:

Enclosed please find two copies of the report entitled "Class I Literature Review and Class III Inventory of Earth Energy Resources, Inc.'s PR Spring Oil Sand Project in Uintah and Grand Counties, Utah." The Class I literature search indicated that 17 previous cultural resource inventories were conducted in the EER's. Lease Area resulted in the documentation of one ineligible lithic scatter (42Un1788). The Class III inventory of EER's PR Spring Oil Sand Mine resulted in no previously documented sites. Hence archaeological clearance is recommended for this undertaking.

We appreciate the opportunity in providing consulting services for this project. We have sent a PDF and WORD version documents of the report to you.

Sincerely,

Jacki Montgomery
Project Archaeologist

RECEIVED
06/11/28

JON M. HUNTSMAN, JR.
Governor
GARY R. HERBERT
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
Division of Oil, Gas & Mining

MICHAEL R. STYLER
Executive Director
JOHN R. BAZA
Division Director

Supervisor

Inspection Report
Minerals Regulatory Program
Report Date November 15, 2006

Mine Name: Leonard Murphy
Operator Name: Earth Energy Resources

Permit number: M0190059
Inspection Date: October 12, 2006
Time: 3:00-3:50 PM

Inspector(s): Paul Baker
Other Participants: None
Mine Status: Inactive at present

Weather: Mostly cloudy, 30's, some snow in protected areas

Elements of Inspection	Evaluated	Comment	Enforcement
1. Permits, Revisions, Transfer, Bonds	☒	☐	☐
2. Public Safety (shafts, adits, trash, signs, highwalls)	☒	☐	☐
3. Protection of Drainages / Erosion Control	☐	☐	☐
4. Deleterious Material	☐	☐	☐
5. Roads (maintenance, surfacing, dust control, safety)	☒	☐	☐
6. Concurrent Reclamation	☐	☐	☐
7. Backfilling/Grading (trenches, pits, roads, highwalls, shafts, drill holes)	☐	☐	☐
8. Water Impoundments	☐	☐	☐
9. Soils	☒	☒	☐
10. Revegetation	☐	☐	☐
11. Air Quality	☐	☐	☐
12. Other	☒	☒	☐

Purpose of Inspection:
This was a routine inspection. I had never been to the site and decided to inspect it since it is in a remote location and I was in the area.

Inspection Summary:
9. Soils
The operator has salvaged and stockpiled soils from some of the disturbed area but not all. Photo 5 shows an area southeast and downhill of the pit. Since vegetation is protruding through the overburden, it is apparent the soil was not removed. There are other similar areas, but there are also places where the operator has stockpiled soil (Photos 6 and 7).

12. Other
There are several pieces of equipment on site, and I don't know what most of them are. In the background on the left side of Photo 3 are three tanks in an unlined bermed area.

Conclusions and Recommendations:
I believe the operator has stockpiled enough soil to reclaim the disturbed area, but if additional area is disturbed, the operator should ensure that soil is salvaged. Soil in the area is well developed with a fair amount of organic matter, and it should not be wasted.

If petroleum products are to be stored in the tanks, the bermed area should be lined.

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • www.ogm.utah.gov

SEP 19 2006

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I used a GPS unit to map the mine area, and a copy of this map is attached. There are two short access roads that should be included as part of the disturbed area. The main part of the mine area is 3.59 acres. With the roads included, the total disturbed is unlikely to exceed four acres.

Inspector's Signature _____ **Date:** 11/16/06

PBB:pb
cc: Barclay Cuthbert, Earth Energy
Will Stokes, SITLA
Attachment: GPS & Photos

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ATTACHMENT
Photographs
M0190059, Leonard Murphy Mine, Earth Energy
Inspection Dated: October 31, 2006;Report Dated: November 15, 2006

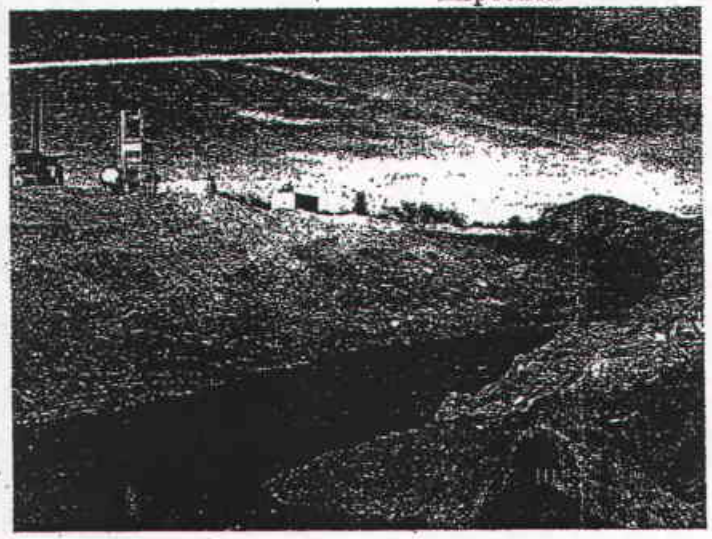


Photo 1. The mine pit on the southeast side of the disturbed area. Some of the processing facilities can be seen on the left.

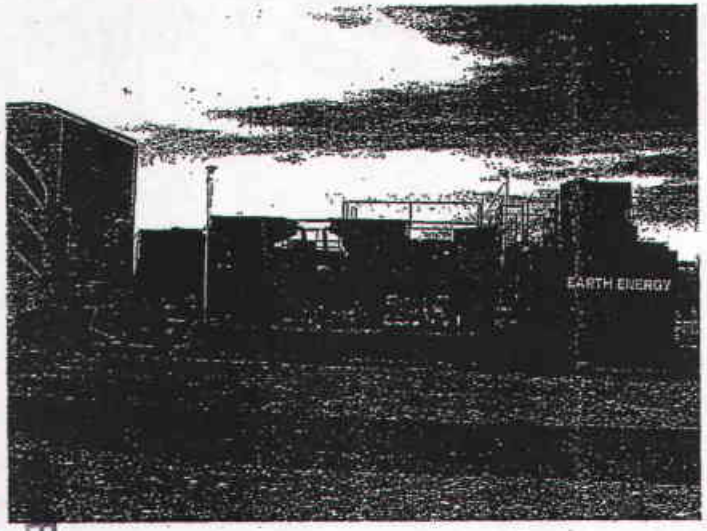


Photo 2. This photo and Photos 3 and 4 show some of the facilities.

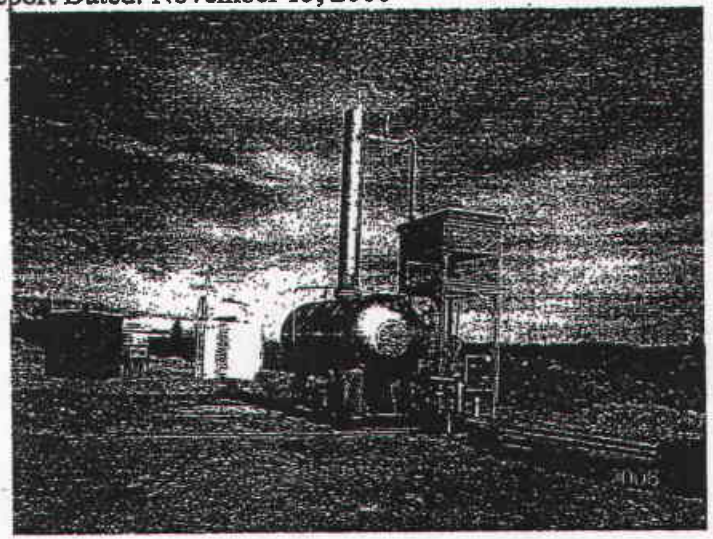


Photo 3.

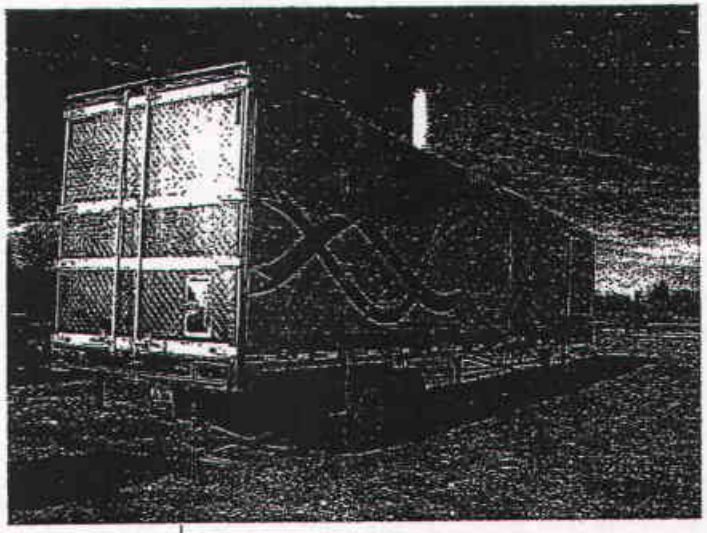


Photo 4.

Photo 5. This shows an area on the outslope of the pit. Since vegetation is protruding from under the overburden, it does not appear soil was salvaged from this area.

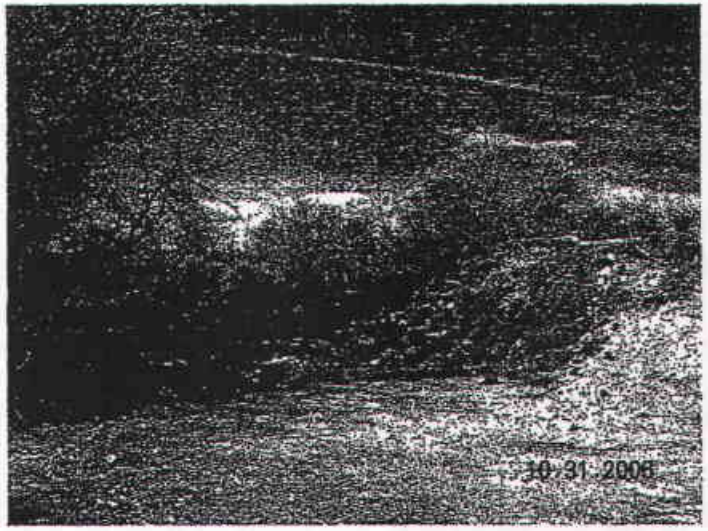


Photo 6. This photo and Photo 7 show areas on the northwest side of the disturbed area where it appears soil has been stockpiled or windrowed.

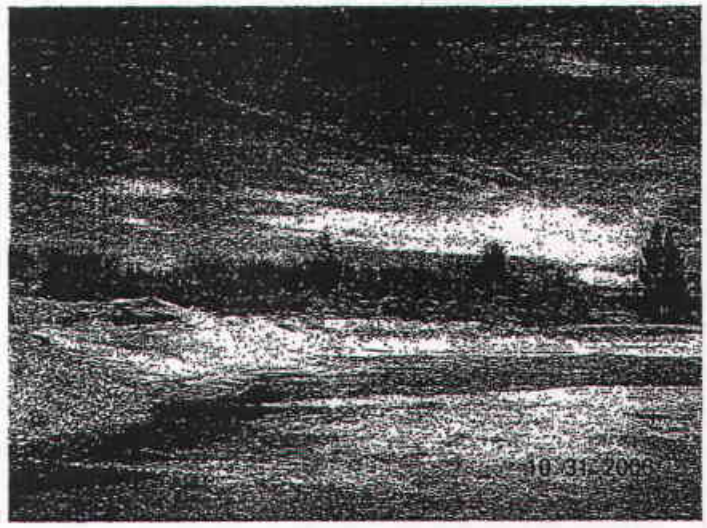
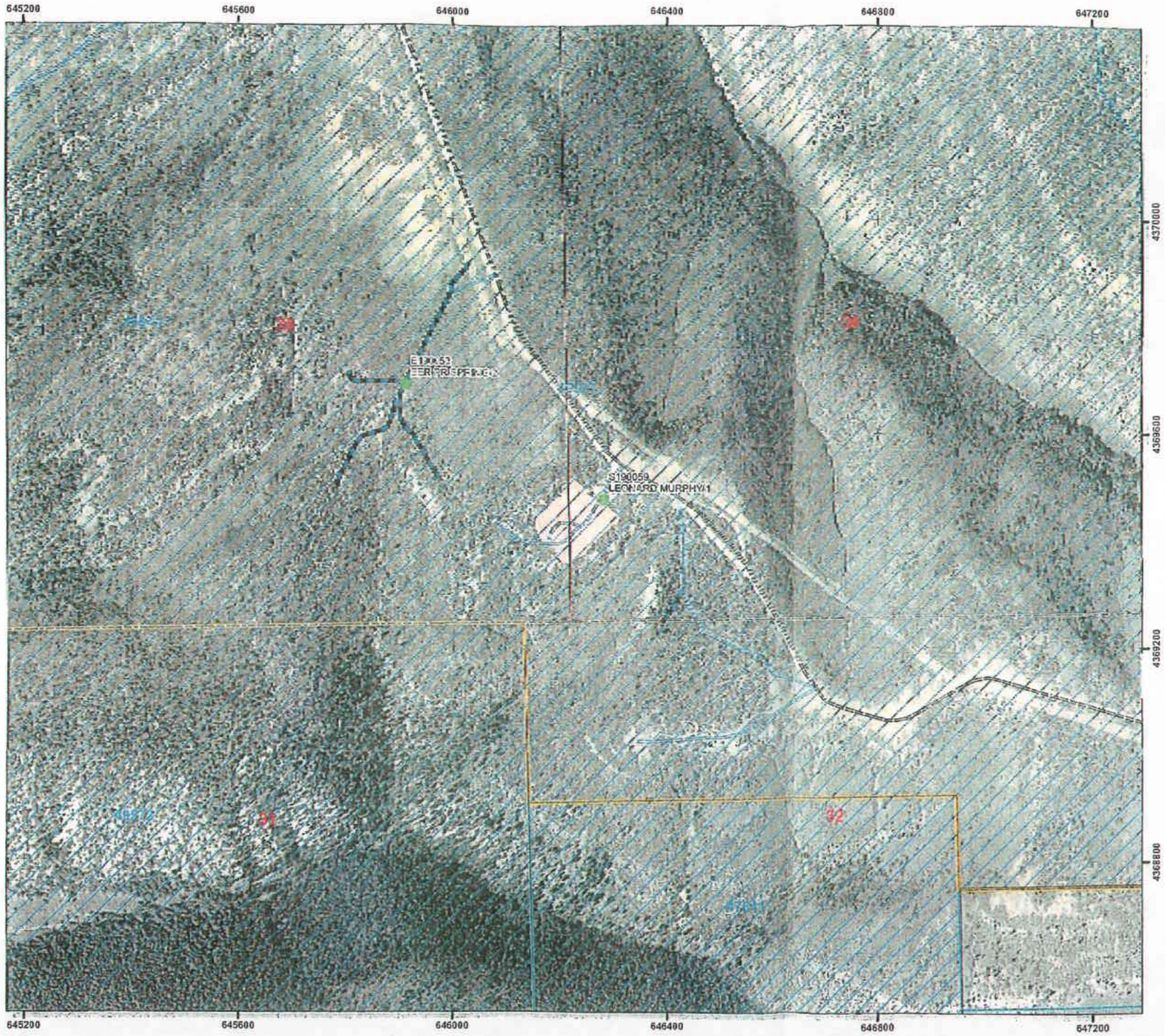


Photo 7.



Mine Number: S0190059
Mine Name: Leonard Murphy 1
Township 15.5 S Range 24 E Section 32 SLBM

Inspection Date Oct. 31, 2006
Map Produced by DKS

Acres Disturbed	3.59
Acres Regraded	0
Acres Seeded	0
Road Acres Disturbed	0
Total Acres Distrubed	3.59
Acres Released	0
Acres Excluded	0
Acres PreExisting	0
Acres Prelaw	0

Legend
All items symbolized in legend may not be appear on map

- County Boundary
- Access
- Mine
- NonMine
- Reclaimed
- Other
- Interstate
- US Route
- State Route
- Primary Route
- Secondary Route
- Main Dirt Road
- Unimproved Road
- Interchange
- Trail
- Township or range Line
- Township or range line; location doubtful
- Section line
- Section line; location doubtful
- Disturbed
- Regraded
- Seeded
- Released
- Excluded
- PreExisting
- Prelaw
- Bond Area
- SITLA Mineral Leases
- BLMSalableMinerals
- CommunityPit
- SITLA Mineral Ownership

DOQ imagery data 2004

UTAH DNR OIL, GAS & MINING

N
W E
S

0 625
Feet
1:7,500 1 inch equals 625 feet
Verify Scale

Dept. of Natural Resources
Division of Oil, Gas, and Mining
Mineral Mines Program

Different data sources and input scales may cause misalignment of data layers. This product may not meet DOGM standards for accuracy and content.

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IR - 000246

Grand County Conditional Use Permit

Uintah County Conditional Use Permit

APPROVED

SEP 19 2009

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UINTAH COUNTY PLANNING COMMISSION

****

IN THE MATTER OF:
EARTH ENERGY RESOURCES, INC.
APPLICATION FOR: CUP FOR A TAR SANDS MINING AND PROCESSING FACILITY ON PROPERTY LOCATED AT SECTIONS 35&36 TOWNSHIP 15 South RANGE 23 EAST, Uintah County.

FINDINGS OF FACT, STATEMENT OF LAW AND RECOMMENDATION

****

Facts

1. On May 16, 2007 Earth Energy Resources, Inc. appeared before the Uintah County Planning Commission requesting a Conditional Use Permit (CUP) to allow a tar sands mining and processing facility at Range 23E, Township 15S, Sections 35 & 36 in Uintah
2. Property is zoned MG-1.
3. A tar sands mining and processing facility is a conditional use in the MG-1 Zoning District.
4. The property is about 3,440 acres with about 200 acres being used for this purpose.
5. Meeting was advertised in the Vernal Express and Uintah Basin Standard, posted on the Uintah County website & posted in three (3) public places.
6. The Uintah County Planning Department has not received any comments from the public in regards to this CUP.

Decision and conditions issued

We, the Uintah County Planning Commission on May 16, 2007, do hereby recommend to the Uintah County Commission APPROVAL of this Conditional Use Permit, for Applicant **Earth Energy Resources** to use the property currently known as or described as **Sections 35 & 36, Township 15 South, Range 23 East, Uintah County,** for the following purpose: **to operate a tar sands mining and processing facility.**

Due to the unique characteristics of the use of the property or the potential impact on the county, surrounding neighbors or adjacent land, to mitigate or eliminate the detrimental impacts and for protection of adjacent properties and the public welfare (see Sections 17.76.010, 17.76.040, and 17.76.050 of the Uintah County Planning and Zoning Ordinance), we hereby find it necessary to and do hereby impose the following conditions, which must be complied with to establish and continue the use:

1. All tar and mining agency regulations and applicable laws and reclamation regulations imposed by DOGAM must be followed.

UINTAH COUNTY PLANNING COMMISSION

****

IN THE MATTER OF:
EARTH ENERGY RESOURCES, INC.
APPLICATION FOR: CUP FOR A TAR SANDS MINING AND PROCESSING FACILITY ON PROPERTY LOCATED AT SECTIONS 35&36 TOWNSHIP 15 South RANGE 23 EAST, Uintah County.

FINDINGS OF FACT, STATEMENT OF LAW AND RECOMMENDATION

****

Applicable Law

17.76.060 Determination.

A. The planning commission may deny or permit a conditional use to be located within any zone in which the particular conditional use is listed. In authorizing any conditional use, the planning commission shall impose such requirements and conditions necessary for the protection of adjacent properties and the public welfare.
B. The Uintah County zoning administrator may permit or deny applications for home occupations in accordance with the regulations contained herein. The zoning administrator may forward any application to the planning commission for a decision.

Decision

On May 16, 2007, in light of the Finding of Fact and Statement of Law, the Uintah County Planning Commission recommended APPROVAL of the CUP, with the above mentioned stipulations, to the Uintah County Commission.

We, the Uintah County Commission on May 21, 2007, do hereby APPROVE this Conditional Use Permit, for Applicant Earth Energy Resources with the above mentioned stipulations.

Chair, Uintah County Planning Commission

Chair, Uintah County Commission

Attest, Clerk-Auditor, Uintah County

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SEP 19 2009
DIV. OIL GAS & MINING

Division of Water Quality Correspondence

APPROVED

SEP 19 2009

DIV. OIL GAS & MINING

IR - 000251

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

State of Utah

Department of
Environmental Quality

Richard W. Sprott
Executive Director

DIVISION OF WATER QUALITY
Walter L. Baker, P.E.
Director

March 4, 2008

Mr. Barclay Cuthbert
Earth Energy Resources, Inc.
Suite 740, 404 – 6th Avenue SW
Calgary, Alberta, Canada T2P 0R9

Subject: PR Spring Tar Sands Project, Uintah and Grand Counties, Utah
Ground Water Discharge Permit-By-Rule

Dear Mr. Cuthbert:

The Division of Water Quality (DWQ) has reviewed the information submitted by JBR Environmental Consultants, Inc. on February 22, 2008 requesting ground water discharge permit-by-rule for the proposed Earth Energy Resources, Inc. PR Spring tar sands project. The proposed operation consists of open-pit mining of tar sands, extraction of bitumen, and disposal of tailings and waste rock.

Below are several relevant factors for determining whether the proposed operation will have a *de minimis* effect on ground water quality or beneficial uses of ground water resources.

1. Based on Material Safety Data Sheets and other information that you sent to DWQ in January 2007, the reagent to be used for bitumen extraction is generally non-toxic and volatile, and most of it will be recovered and recycled in the extraction process. (Because the extraction process is proprietary at this time, this reagent will not be identified in public documents.)

2. Bitumen extraction will be done using tanks and equipment at the processing facility located at the mine site, and no impoundments or process water ponds are planned. Most of the water used in the process will be recovered and recycled.

3. Processed tailings will not be free-draining and will have moisture content in the 10 to 20 percent range. The tailings will not contain any added constituents that are not present naturally in the rock, other than trace amounts of the reagent used for bitumen extraction. Analysis of processed tailings using the Synthetic Precipitation Leachate Procedure indicates that leachate derived from the tailings by natural precipitation would have non-detectable levels of volatile and semi-volatile organic compounds. Unprocessed tar sands and processed tailings were analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) with an extraction process that uses a much lower pH than is likely to occur at the mine site. Analytical results indicate that TCLP metals would not be leached from the tailings at detectable levels except for barium, which was detected at levels below the Utah ground water quality standard of 2.0 milligrams per liter (Table 1 of UAC 317-6). Based on these data, the tailings will be disposed by backfilling into the mine pit.

288 North 1460 West • PO Box 144870 • Salt Lake City, UT 84114-4870 • phone (801) 538-6146 • fax (801) 538-6016
T.D.D. (801) 536-4414 • www.deq.utah.gov

4. The uppermost geologic formations at the site are the Parachute Creek and Douglas Creek Members of the Green River Formation, which consist of fluvial-deltaic and lacustrine-deltaic deposits of claystone, siltstone, fine-grained sandstone, and limestone. The Parachute Creek Member outcrops over most of the Earth Energy lease and is the 0 to 50-foot thick overburden above the tar sand deposits of the Douglas Creek Member. Shallow ground water at the site is not part of a regional aquifer but occurs in localized laterally discontinuous perched sandstone lenses of the Douglas Creek Member. Exploration drilling did not encounter ground water within 150 feet of the land surface. Based on records from the Division of Oil, Gas, and Mining, the closest major aquifer is the Mesa Verde Formation, which occurs approximately 2000 feet below ground surface in the area of the proposed mine. The topography of the project area is characterized by mesas incised by deep, narrow canyons, and limited shallow ground water discharges as springs in the canyon bottoms. There are no springs in the Earth Energy leased area and the nearest spring is PR Spring located slightly less than a mile east of the project site.

Considering the factors described above, the proposed mining and bitumen extraction operation should have a *de minimis* potential effect on ground water quality and qualifies for permit-by-rule status under UAC R317-6-6.2.A(25). If any of these factors change because of changes in your operation or from additional knowledge of site conditions, this permit-by-rule determination may not apply and you should inform the DWQ of the changes. If future project knowledge or experience indicates that ground water quality is threatened by this operation, the Executive Secretary may require that you apply for a ground water discharge permit in accordance with UAC R317-6-6.2.C.

This operation may require a storm water permit under the Utah Pollutant Discharge Elimination System (UPDES). Please contact Mike George of this office at (801) 538-9325 to determine if a storm water permit is required.

Disposal of domestic wastewater from the operation should be done in a manner approved by the appropriate local health department; Tri-County Health Department for Uintah County or Southeastern Utah Health Department for Grand County.

If you have any questions about this letter, please contact Mark Novak at (801) 538-6518.

Sincerely,

Robert F. Herbert

Rob Herbert, P.G., Manager
Ground Water Protection Section

cc: Robert Bayer, JBR
Paul Baker, DOGM
Carl Adams, DWQ-TMDL
Mike George, DWQ-UPDES Storm Water
Dave Ariotti, Southeastern Utah District Engineer
Scott Hacking, Tri-County District Engineer
Southeastern Utah Health Department
Tri-County Health Department

F:/MNovak/WP/EarthEnResPBR Ltr

APPROVED

SEP 19 2009

DIV. OIL GAS & MINING

IR - 000253

Earth Energy
DWQ
Submittal.

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

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

APPROVED
SEP 19 2009
DIV. OIL GAS & MINING

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

Subject: FW: sampling plan

-----Original Message-----
From: Barclay Cuthbert
[mailto:barclay.cuthbert@earthenergyresources.com]
Sent: Thursday, April 05, 2007 3:46 PM
To: Bob Bayer; Linda Matthews
Subject: FW: sampling plan

Copy of response from Mark Novak.

Regards,

Barclay

Best regards,
Earth Energy Resources Inc.

Barclay Cuthbert
Vice President, Operations
Tel: + 1.403.233.9366
Cell: + 1.403.619.4230
Fax: + 1.403.668.5097
E-mail: barclay.cuthbert@earthenergyresources.com
Suite # 740, 404 - 6 Avenue SW
Calgary, Alberta T2P 0R9

-----Original Message-----
From: Mark Novak [mailto:mnovak@utah.gov]
Sent: March 30, 2007 4:41 PM
To: Barclay Cuthbert
Cc: Jodi Gardberg; Paul Baker
Subject: sampling plan

Using Crown Ridge samples for the testing would be acceptable for the permit application, but you should mention the sample source in the application, and any known differences between it and the PR Spring tar sand. (for example, stratigraphic position) Once the operation is up and running, I would like similar tests run on the PR Spring tailings, and the proposed tailings management plan modified if the results are any different from the Crown Ridge samples.

I am also concerned with salinity, and would like the SPLP leachate analyzed for TDS and major ions (Na, Ca, Mg, K, Cl, SO4 and alkalinity).

I should be in the office all next week if you would like to call (801 538 6518).

Thank you for this information.

Mark

>>> Barclay Cuthbert <barclay.cuthbert@earthenergyresources.com>
>>> 3/30/2007

10:34 AM >>>
Hi Mark,

I've put together a proposal for the SPLP and Oil & Grease testing required for our permit application and I'd like to discuss this proposal with you.
Once you've had a chance to review the attachment, please let me know of a good time to call and we can discuss.

Hope you have a good weekend.

Regards,

Barclay

Best regards,

Earth Energy Resources Inc.

Barclay Cuthbert

Vice President, Operations

Tel: + 1.403.233.9366

Cell: + 1.403.619.4230

Fax: + 1.403.668.5097

E-mail: barclay.cuthbert@earthenergyresources.com

Suite # 740, 404 - 6 Avenue SW

Calgary, Alberta T2P 0R9

-----Original Message-----
From: Mark Novak [mailto:mnovak@utah.gov]
Sent: January 31, 2007 8:43 AM
To: barclay.cuthbert@earthenergyresources.com
Cc: Jodi Gardberg
Subject: RE: MSDS received

Because the material is an oil, your management plan for the spent tailings should prevent it from being released to surface water. This should include covering the tailings with topsoil for final disposal and establishing a vegetative cover, and preventing runoff from the tailings from discharging into surface water while the tailings are exposed before final burial.
(Berms around the temporary storage area should take care of this.) When you characterize the tailings leachate (from Synthetic Precip. Leaching
Procedure) for the permit application, you should analyze it for the parameter Oil & Grease (EPA Method 1664A).

Thank you for sending in this information, and please contact me if you have any questions about other material needed for the permit application.

Best Wishes,

Mark

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

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 [illegible] #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 min[illegible]

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.

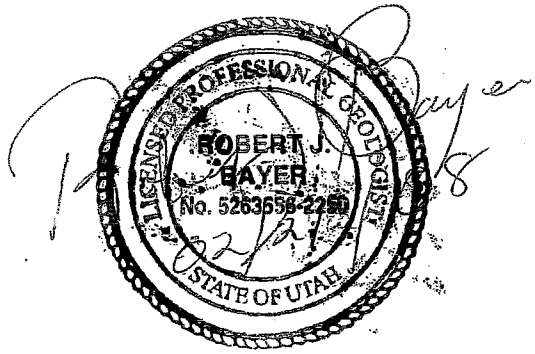
To analyze the potential for precipitation falling on the disposed processed residual material to migrate through the depository to native materials at the bottom of the pit excavation, the following factors need to be considered. The processed sand will be dry (10-20 percent moisture content), and because 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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DIV. OIL GAS & MINING

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www.earthenergyresources.com

To: Mark Novak
State of Utah, Division of Water Quality
Via e-mail: mnovak@utah.gov

From: Barclay Cuthbert

Date: 30 March 2007

Subject: Testing of processed and unprocessed tar sand

Pages: 2

Mark,

In the time since our correspondence concerning testing methods for the chemical we use in our bitumen extraction process, we have completed modifications to our shop demonstration unit in Grande Prairie, Canada. We have commenced run testing with our shop unit and are in position to conduct SPLP testing on both raw tar sand and the solids generated from the process.

The tar sand that we are using for our tests was obtained from the pit at the Crown Asphalt Ridge facility in Vernal. This tar sand is similar in composition to the ore at our leased acreage in PR Spring; we chose to use this sand for our tests because of its availability in the existing pit and the comparatively easier logistics of moving equipment into the pit near Vernal and subsequently trucking the tar sand to Canada.

For our testing program for the Disision of Water Quality, I propose that we conduct the SPLP (metals) testing on solids samples from two different runs our our equipment. Testing will include:

- Both SPLP (metals) and Oil & Grease (EPA Method 1664A) on each of the samples

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- Tests on the raw ore sample (no processing) and on the solids produced from the extraction process, which are recovered separately as sands and fines.
- Representative samples of the sands and fines produced over the course of each run – typically about one hour in duration, processing about one and a half tons of tar sand
- The SPLP and Oil & Grease testing will be conducted by American West Analytical Laboratories and I have discussed proper sample handling and shipping procedures with the laboratory.

I would like to review this proposal with you and ensure that it meets the requirements for our permit application; once you have had a chance to review this information, please let me know of a convenient time to call you.

Best regards,

Barclay

Suite #740, 404 – 6 Avenue S.W., Calgary, AB T2P 0R9 Canada Office 403.233.9366 Fax 403.668.5097

Miscellaneous Correspondence

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SEP 19 2009

DIV. OIL GAS & MINING

IR - 000275

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Wildlife Resources

JAMES F. KARPOWITZ
Division Director

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

October 16, 2006

Linda Matthews
JBR Environmental Consultants, Inc.
8160 South Highland Drive
Sandy, Utah 84093

Dear Linda Matthews:

I am writing in response to your email dated October 10, 2006 regarding information on species of special concern proximal to the Earth Energy Resources' project area for development of tar sand deposits located in Sections 26, 35, and 36 of T 15S, R 23E, Sections 31 and 32 of T 15 ½ S, R 24E, and Sections 5 and 6 of T 16S, R 24E, SLB&M (Uintah and Grand Counties).

The Utah Division of Wildlife Resources (UDWR) has records of occurrence for spotted owl and greater sage-grouse within the project area noted above. The aforementioned species are included on the *Utah Sensitive Species List.*

The information provided in this letter is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, and because data requests are evaluated for the specific type of proposed action, any given response is only appropriate for its respective request.

In addition to the information you requested, other significant wildlife values might also be present on the designated site. Please contact UDWR's acting habitat manager for the northeastern region, Miles Hanberg, at (435) 781-6707 if you have any questions.

Please contact our office at (801) 538-4759 if you require further assistance.

Sincerely,

Sarah Lindsey

Sarah Lindsey
Information Manager
Utah Natural Heritage Program

cc: Miles Hanberg, NER

1594 West North Temple, Suite 2110, PO Box 146301, Salt Lake City, UT 84114-6301
telephone (801) 538-4700 • facsimile (801) 538-4709 • TTY (801) 538-7458 • *www.wildlife.utah.gov*

Water Rights Information

JON M. HUNTSMAN, JR.
Governor
GARY R. HERBERT
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES
Division of Water Rights

MICHAEL R. STYLER
Executive Director
JERRY D. OLDS
State Engineer/Division Director

EARTH ENERGY RESOURCES, INC. - USER
SUITE 740, 404 - 6TH AVENUE SW
CALGARY, ALBERTA, CANADA T2P 0R9

November 29, 2007

Dear Applicant:

RE: 49-2274 (a33805)

This letter is in response to your request to drill a well BEFORE the underlying application has been formally Approved by the State Engineer. This well is located at:

North 750 feet, East 500 feet, from the SW Corner, Sec 31, Town 15S, Range 24E, SLB&M.

PERMISSION IS HEREBY GRANTED to proceed with the drilling of this well. The purpose of this well is to determine the quality and availability of an adequate water supply to support the beneficial uses requested in 49-2274 (a33805). While this letter grants you permission to proceed with the construction of the well, IT DOES NOT GRANT ANY PERMISSION OR APPROVAL TO DIVERT OR USE THE WATER FOR ANY PURPOSE WHATSOEVER, other than the minimal amount required for quality/quantity testing, UNTIL THE UNDERLYING APPLICATION HAS BEEN FORMALLY APPROVED BY THE STATE ENGINEER.

If the well will be deeper than 30 feet, you must contract with a licensed Utah water well driller, and the well must be constructed in accordance with the State of Utah Administrative Rules for Water Well Drillers.

Following completion and testing, the well casing must be sealed with a tamper-resistant, water-tight cap. This well must remain sealed and, again, NO water is to be diverted or used for any beneficial purpose UNTIL application 49-2274 (a33805). has been Approved by the State Engineer. If in the event that this application is Rejected or otherwise denied, then the well must be properly abandoned by a licensed Utah water well driller.

Enclosed you will find two postage-paid forms. One is the Driller (START) Card form, which you MUST give to the licensed driller with whom you contract to drill the well. The other is the Applicant Card form. It is YOUR RESPONSIBILITY to sign and return this form to this office immediately upon well completion. Your submittal of the APPLICANT Card form will be notice to our office that the work has been completed and will begin the 30-day period in which the driller is to submit a report as required herein. The driller cannot legally commence drilling of the well until you provide him with the Driller (START) Card form, which will then be submitted to our office for verification. You should review the contents of this letter with the driller to be certain that the instructions and conditions are thoroughly understood by all parties.

Please note that this permission to proceed with the drilling of this well expires May 29, 2008.

Sincerely,

Robert Leake, P.E.
Regional Engineer

1594 West North Temple, Suite 220, PO Box 146300, Salt Lake City, UT 84114-6300
telephone (801) 538-7240 • facsimile (801) 538-7467 • *www.waterrights.utah.gov*

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SEP 19 2009

DIV. OIL GAS & MINING

IR - 000278

AGREEMENT TO ALLOCATE A PORTION OF WATER RIGHT NUMBER 41-3523 FROM THE UINTAH WATER CONSERVANCY DISTRICT TO EARTH ENERGY RESOURCES, INC.

This Agreement is made this 26th day of July. 2006 by and between the Uintah Water Conservancy District ("District"). and Earth Energy Resources, Inc. ("Earth").

WHEREAS. on March 12. 1996. the United States. Department of Interior. Bureau of Reclamation. assigned Water Right No. 41-3479 to the Utah Board of Water Resources. and on March 9. 2000. the Utah Board of Water Resources assigned 43.400 acre feet of said water right to the Uintah Water Conservancy District. The quantity of said undeveloped water right is up to 43.400 acre feet annually diverted from the Colorado River System subject to the terms of that assignment (copy of the assignment is attached hereto). and

WHEREAS. the 43.400 acre feet of water has been segregated from the original water right and now carries water right number 41-3523.

WHEREAS. the District finds that it is in the best interest of certain water users that portions of that Water Right No. 41-3523 be developed. diverted. and perfected by contracting with them for a portions of said water right. and

WHEREAS. Earth has applied to the District for and has demonstrated an imminent need for water from the Colorado River System and the ability to put such water to beneficial use and has expressed the desire for to have assigned to them 360 acre feet of water they have applied for from the Uintah Water Conservancy District subject to the conditions expressed herein. and

WHEREAS. it is the desire of the parties that Earth obtain a water right from the District upon fulfilling all of the requirements imposed by the law and required by the assignment of the water right from the Utah Board of Water Resources to the District. and.

WHEREAS. the parties have agreed to contract to allow Earth to proceed to help the District to secure a Certificate of Appropriation from the Utah State Engineer for certain water and once that Certificate is obtained and other requirements met that the District will assign the water right to Earth.

NOW THEREFORE. by execution of this Agreement, and in consideration of the mutual covenants and agreements expressed herein. the District and Earth enter into this agreement as follows:

1. Authorization to Proceed. The District hereby authorizes Earth. to prepare for the District. at Earth's expense, change applications and such other documents as are reasonably necessary to obtain a certificate of appropriation for a portion of the

District's water right amounting to three hundred sixty (360) acre-feet of water in the Colorado River System. represented by Water Right No. 41-3523.

2. Performance of Work and Payment of all Expenses. Earth shall prepare for approval and signature of the District a change application or a temporary application for water in accordance with state law for the use of said water. Said Change Application shall be filed in the name of the District and Earth shall bear any and all costs associated with the filing of the change application and any and all costs relating to or associated with the use and development of the water described herein. including. but not limited to. any federal depletion charge associated with its use. development, or storage.

3. Assignment of Water Right. Upon Earth processing the matter and obtaining a Certificate of Appropriation for the District for the water covered by this Agreement. the District agrees to assign the water right to Earth. The water right described herein is subject to the condition that Earth files Proof of Appropriation with the State Engineer by August 31, 2008.

4. Payment of Application fees. The District reserves the right to refuse to assign the water right if agreed upon application fees of $15 per Acre Foot or $5,400 to the District is not paid in a timely manner.

5. Default. In the event of default in performing the obligations under this agreement by either party the defaulting party agrees to pay all costs of enforcement including a reasonable attorneys' fee.

6. Notices. Any notices regarding this agreement are to be forwarded to the following:

Manager
Uintah Water Conservancy District
78 W 3325 N
Vernal, UT 84078

Page van Loben Sels
Earth Energy Resources. Inc.
One Beechwood Dr.
Oakland. CA 94618

IN WITNESS WHEREOF, the Uintah Water Conservancy District. has caused its presents to be signed by the President of said District by authority of a resolution of said District.

UINTAH WATER CONSERVANCY DIST:

Herb Snyder. President

EARTH ENERGY RESOURCES, INC.:

By: Page van Loben Sels

Page van Loben Sels. President

www.earthenergyresources.com

October 13, 2006

UINTAH WATER CONSERVANCY DISTRICT
78 West 3325 North
Vernal, Utah 84078
Telephone: (435) 789-1651
Via facsimile: (435) 789-1670

For the attention of: ***Herb Snyder, President***

REFERENCE: Change of address request for Earth Energy Resources, Inc.

Dear Mr. Snyder:

With reference to the Agreement to Allocate A Portion of Water Right Number 41-3523 from the Uintah Water Conservancy District to Earth Energy Resources, Inc., we hereby request that the contact and address for Earth Energy Resources, Inc. be changed to:

Barclay Cuthbert
Earth Energy Resources, Inc.
Suite 740, 404 – 6th Avenue SW
Calgary, Alberta, Canada T2P 0R9
Telephone: (403) 233-9366
Facsimile: (403) 668-5097
E-mail: barclay.cuthbert@earthenergyresources.com

If you require anything further in relation to this matter, please contact me at your convenience.

Yours truly,
Earth Energy Resources, Inc.

Barclay Cuthbert
Vice President

Air Quality Correspondence

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref: 8ENF-AT

MAR 10 2010

Barclay Cuthbert
Vice President
Earth Energy Resources
Suite #740
404 – 6 Avenue S.W.
Calgary, AB T2P 0R9 Canada

Subject: Subpart Ja Applicability Determination Request – Earth Energy Resources, Inc., Oil Sand Mining and Processing – PR Spring Mine

Dear Mr. Cuthbert:

I am responding to your May 29, 2009, letter requesting an applicability determination for the Earth Energy Resources, Inc. (Earth Energy) PR Spring Mine with regards to New Source Performance Standard (NSPS) Subpart Ja.[1] Earth Energy proposes to operate an oil sand mine and processing facility (i.e., mill) in eastern Utah. The operation will include mining of the naturally occurring oil sands and extraction of the bitumen from these sands. As discussed below, EPA does not believe that the Earth Energy PR Spring Mine is subject to NSPS Subpart Ja.

Your May 29, 2009, letter explains that the Earth Energy PR Spring Mine extraction process will be as follows: (1) mined and conditioned oil sand ore is sent through a crusher/delumper and reduced to 2 inch-minus aggregate size; (2) crushed ore is augured or conveyed to a heated slurry mixer where the cleaning emulsion is introduced and the ore slurried to the consistency of a thick gritty milkshake; (3) oil sand slurry is then moved by screw conveyor to the slurry tank where primary separation of the bitumen from the sand occurs; (4) produced sand with residual bitumen is pumped through a series of separation towers where the last traces of bitumen are removed; (5) all the liberated bitumen is captured, polished with cyclones and/or centrifuges, and pumped to a storage tank; (6) the cleaning chemical is then

[1] Subpart Ja, 40 C.F.R. §§60.100a et seq., is entitled "Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007."

removed from the bitumen by distillation and recycled to the front of the process[2]; and (7) produced bitumen is pumped to a product (sales) tank for heated storage prior to transport.[3]

NSPS Subpart Ja applies to certain affected facilities in petroleum refineries. The definition of "petroleum refinery in 40 C.F.R. 60.101a reads: "Petroleum refinery means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives." Even though the Earth Energy PR Spring Mine will be producing bitumen, the operation will not be producing the bitumen "through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives." Although distillation will be occurring at the Earth Energy PR Spring Mine, it will be for the purpose of recovering the cleaning chemical from the bitumen and not to upgrade the bitumen to a refined product. Additionally, the produced bitumen will be sent off-site to a petroleum refinery for further processing. Therefore, EPA does not believe the Earth Energy PR Spring Mine would be considered a "petroleum refinery" and subject to NSPS Subpart Ja.

The above discussion is consistent with EPA's December 22, 2008 proposed revision to the definition of "petroleum refinery" in NSPS Subpart Ja (73 FR 78522). In the December 22, 2008 proposal notice (at 78526), EPA indicated that "Facilities that only produce oil shale or tar sands-derived crude oil for further processing using only solvent extraction and/or distillation to recover diluent that is then sent to a petroleum refinery are not themselves petroleum refineries. This is because they are only producing feed to a petroleum refinery as a product and not refined products. Facilities that produce oil shale or tar sands-derived crude oil and then upgrade these materials and produce refined products would be a petroleum refinery." The revised definition of "petroleum refinery" proposed on December 22, 2008, reads:

> Petroleum refinery means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives. A facility that produces only oil shale or tar sands-derived crude oil for further processing at a petroleum refinery using only solvent extraction and/or distillation to recover diluent is not a petroleum refinery.

---

[2] Electronic communication (email) on November 2, 2009, from Mr. Erin Hallenburg, JBR Environmental, to Carol Smith, EPA, indicates that "any light ends from the bitumen that may accumulate in the TAI [cleaning chemical] would be recovered through a second stage distillation process. This process would distill any light boiling fractions from the TAI and these recovered fractions would be blended into our sales bitumen tank."

[3] In the email referenced in footnote 2, Mr. Hallenberg also indicated that "no further processing is performed on site. The final product, bitumen, will be headed to an oil refinery for further processing."

If you have any questions or concerns regarding this letter, please contact Laurie Ostrand of my staff at (303) 312-6437 or by email at ostrand.laurie@epa.gov.

Sincerely,

Cynthia J. Reynolds, Director
Technical Enforcement Program

cc: Donald Law, EPA Region 8

Mr. Erin Hallenburg, QEP, P.E.
JBR Environmental Consultants, Inc.
8160 S. Highland Dr.
Sandy, UT 84093

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EARTH ENERGY RESOURCES

www.earthenergyresources.com

May 29, 2009

Ms. Cynthia Reynolds
USEPA REGION 8
1595 Wynkoop St., 8ENF-AT
Denver, CO 80202

Re: Subpart Ja Applicability Determination Request – Earth Energy Resources, Inc., Oil Sand Mining and Processing – PR Spring Mine

Earth Energy Resources, Inc. (Earth Energy) is requesting an applicability determination for the Earth Energy PR Spring Mine with regards to CFR 40 Part 60 Subpart Ja - Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced after May 14, 2007.

Earth Energy has proposed to operate an oil sand mine and processing facility (i.e. mill) in eastern Utah. The operation will include mining of the naturally occurring oil sands and extraction of the bitumen from these sands. Earth Energy originally submitted a Notice of Intent (NOI) to the Utah Division of Air Quality (UDAQ) for a Permit to Construct (PTC) in October of 2007. After several months, the UDAQ informed Earth Energy in January of 2008 that the facility location was on Indian Jurisdictional lands and thus the EPA would be the permitting authority. There have been extensive conversations with the EPA, and several consultant-based determinations submitted, as well as a face-to-face meeting (July 15, 2008) at the EPA Region 8 offices, initiated by Earth Energy.

At the July meeting in Denver, Earth Energy and their consultant representatives were told that a determination would be made in regard to Subpart Ja and other issues in October 2008. Earth Energy and their consultants pressed for an answer from EPA in October 2008. As a result, Earth Energy was informed by the EPA Region 8 that a "determination request" in regards to the applicability of Subpart Ja would be need to be submitted to the EPA's Compliance Division. The following information is being provided to EPA Compliance Division, in response to this request for a compliance determination on the applicability for 40 CFR Part 60 Subpart Ja.

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Process Description

The extraction process begins when the mined and conditioned oil sand ore is sent through a crusher/ delumper and reduced to a 2 inch-minus aggregate size. From there, the crushed ore is augured or conveyed to a heated slurry mixer where the cleaning emulsion is introduced and the ore slurried to the consistency of a thick gritty milkshake. The oil sand slurry is then moved by screw conveyor to

Suite #740, 404 – 6 Avenue S.W., Calgary, AB T2P 0R9 Canada Office: 403.233.9366 Fax: 403.668.5097

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 pumped to a storage tank. The cleaning chemical is then removed from the bitumen by distillation and recycled to the front of the process. Produced bitumen is pumped to a product (sales) tank for heated storage prior to transport.

The clean 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 clay fines are then conveyed to a stockpile for loading and backhaul to the mine pit. At this point, the discharged sand and clay fines contain between 10 and 20% water.

When the cleaning emulsion contacts the bitumen in the oil sand, the [redacted] and emulsifier partition into the hydrocarbon phase to promote the stripping and extraction of the bitumen from the solids matrix of the ore. Once the hydrocarbon phase is separated from the water phase and solids (both coarse sand and clays and fines), it is distilled to recover the [redacted]. The [redacted] is re-used in the process, while the emulsifier remains in the bitumen, which exits the process as the residual from the distillation step.

The composition of the cleaning emulsion is:

Component	Weight percent
[redacted]	35.82%
Water	63.97%
Emulsifier	0.21%
Anti-foam	0.00%
Total	100.00%

The emulsifier is an alkylbenzenesulphonate, branched and straight chain and the anti-foam is a silicone based antifoam (such as those used in Jacuzzi spas).

Earth Energy has examined the applicability requirements and associated definitions in Subpart Ja and provided comments about the facility in italics.

60.100a Applicability, designation of affected facility, and reconstruction.

(a) The provisions of this subpart apply to the following affected facilities in petroleum refineries: fluid catalytic cracking units (FCCU), fluid coking units (FCU), delayed coking units, fuel gas combustion devices, including flares and process heaters, and sulfur recovery plants. The sulfur recovery plant need not be physically located within the boundaries of a petroleum refinery to be an affected facility, provided it processes gases produced within a petroleum refinery.

The PR Springs Mine does not have FCCU or FCU, or a delayed coking unit. In addition, the processes at the facility including process heaters are not fueled by gases produced at the plant and the plant will not be involved in sulfur recovery. As such, there are no sources at the PR Spring Mine to which Ja is applicable.

§ 60.101a Definitions

Petroleum refinery means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives.

The process does not produce gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation or redistillation of petroleum. The only distillation process involved is recovery of the [redacted] *which does not result in a petroleum product.*

There have been concerns raised about data that suggested that 3% of the bitumen light ends might be fractionated off during the solvent distillation. Earth Energy performed an assay on a sample of bitumen from the PR Spring mine site. The initial boiling point of the bitumen is 213°C/415°F [ASTM D2892/D5236], which is well above the distillation temperature used to recover the [redacted] *The data from the assay show good agreement with physical properties of PR Spring bitumen measured by the Utah Heavy Oil Center, University of Utah, where volatiles distilling below 204°C/399°F is less than 0.4%.*

Fuel gas means any gas which is generated at a petroleum refinery and which is combusted. Fuel gas includes natural gas when the natural gas is combined and combusted in any proportion with a gas generated at a refinery. Fuel gas does not include gases generated by catalytic cracking unit catalyst regenerators and fluid coking burners, but does include gases from flexicoking unit gasifiers. Fuel gas does not include vapors that are collected and combusted to comply with the wastewater provisions in §60.692, 40 CFR 61.343 through 61.348, 40 CFR 63.647, or the marine tank vessel loading provisions in 40 CFR 63.562 or 40 CFR 63.651.

The process does not involve the use of gas produced at the facility to operate any equipment.

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Earth Energy has been working with the EPA for over 2 1/2 years to determine the permitting requirements for this facility. Based on previous communications with the EPA, the Subpart Ja applicability determination can only be performed by EPA and requires a formal request. It was our impression that EPA Region 8 Task Force was in the process of making the determination after our July 15, 2008 meeting and would decide by October, 2008. Since all future permitting and project feasibility is dependant on this determination, we respectfully request the EPA Compliance Division to inform us of the requirements for the PR Spring oil sand mine and processing facility in the very near future. Additional information on the process, permitting and/or timeline can be found either in your files, by contacting JBR Environmental (801-943-4144) or by contacting me directly.

Yours truly,
Earth Energy Resources, Inc.

Barclay Cuthbert

Barclay Cuthbert
Vice President

Enclosures (2)

cc: Tim Wall, Earth Energy Resources, Inc.
File

Suite #740, 404 – 6 Avenue S.W., Calgary, AB T2P 0R9 Canada Office: [illegible] Fax: [illegible]

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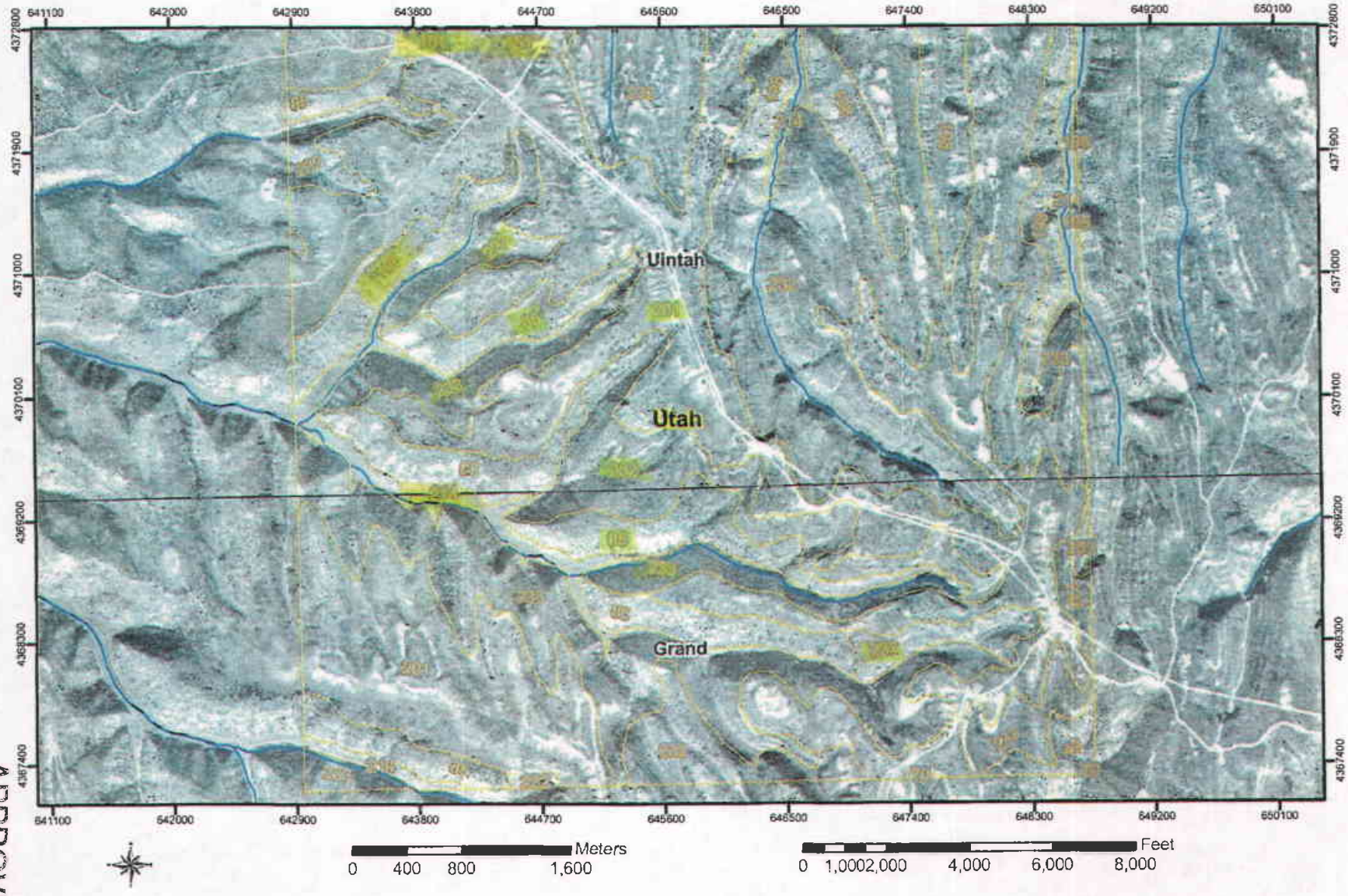
Appendix C
Soils Descriptions & Vegetation Data

SOIL SURVEY OF GRAND COUNTY, UTAH - CENTRAL PART; UINTAH AREA, UTAH - PARTS OF DAGGETT, GRAND AND UINTAH COUNTIES

EER Soils for Entire Permit Area 05.18.07



USDA Natural Resources Conservation Service

Web Soil Survey 1.1
National Cooperative Soil Survey

5/18/2007
Page 1 of 3

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EER Soils for Entire Permit Area 05.18.07

MAP LEGEND

- Soil Map Units
- Cities
- Detailed Counties
- Detailed States
- Interstate Highways
- Roads
- Rails
- Water
- Hydrography
- Oceans
- Escarpment, bedrock
- Escarpment, non-bedrock
- Gulley
- Levee
- Slope
- Blowout
- Borrow Pit
- Clay Spot
- Depression, closed
- Eroded Spot
- Gravel Pit
- Gravelly Spot
- Gulley
- Lava Flow
- Landfill
- Marsh or Swamp
- Miscellaneous Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Slide or Slip
- Sinkhole
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Perennial Water
- Wet Spot

MAP INFORMATION

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov

Coordinate System: UTM Zone 12

Soil Survey Area: Grand County, Utah - Central Part
Spatial Version of Data: 1
Soil Map Compilation Scale: 1:24000

Soil Survey Area: Uintah Area, Utah - Parts of Daggett, Grand and Uintah Counties
Spatial Version of Data: 4
Soil Map Compilation Scale: 1:24000

Map comprised of aerial images photographed on these dates:
7/3/1997

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend Summary

Grand County, Utah - Central Part

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
49	Reva-Falcon families-Rock outcrop complex	49.5	0.6
70	Sula-Razorba families complex	4.1	0.1

Uintah Area, Utah - Parts of Daggett, Grand and Uintah Counties

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
85	Gompers-Rock outcrop complex, 50 to 80 percent slopes	680.7	8.4
151	Moonset-Whetrock association, 8 to 50 percent slopes	10.2	0.1
198	Saddlehorse-Rock outcrop-Pathead association, 50 to 80 percent slopes	640.1	7.9
201	Seeprid-Utso complex, 4 to 25 percent slopes	2,859.1	35.2
214	Soward sandy loam, 3 to 15 percent slopes	239.3	2.9
232	Tosca gravelly sandy loam, 25 to 40 percent slopes	2,394.0	29.5
233	Tosca gravelly sandy loam, 40 to 80 percent slopes	1,234.6	15.2

Map Unit Description (Brief, Generated)

Uintah Area, Utah - Parts of Daggett, Grand and Uintah Counties

Map unit: 85 - Gompers-Rock outcrop complex, 50 to 80 percent slopes

Component: Gompers (55%)

The Gompers component makes up 55 percent of the map unit. Slopes are 50 to 80 percent. This component is on hills. The parent material consists of colluvium over residuum derived from shale. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R034XY342UT Upland Very Steep Shallow Loam (pinyon-Utah Juniper) ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 23 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

Component: Rock outcrop (40%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map unit: 151 - Moonset-Whetrock association, 8 to 50 percent slopes

Component: Moonset (45%)

The Moonset component makes up 45 percent of the map unit. Slopes are 8 to 50 percent. This component is on hills. The parent material consists of slope alluvium and colluvium derived from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R034XY322UT Upland Shallow Loam (pinyon-Utah Juniper) ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Component: Whetrock (45%)

The Whetrock component makes up 45 percent of the map unit. Slopes are 8 to 50 percent. This component is on hills. The parent material consists of slope alluvium and colluvium over residuum derived from sandstone and shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R034XY330UT Upland Stony Loam (pinyon-Utah Juniper) ecological site. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 23 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

Map unit: 198 - Saddlehorse-Rock outcrop-Pathead association, 50 to 80 percent slopes

Component: Saddlehorse (35%)

The Saddlehorse component makes up 35 percent of the map unit. Slopes are 50 to 80 percent. This component is on mountain slopes. The parent material consists of colluvium over residuum derived from sandstone and shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY475UT Mountain Very Steep Stony Loam (douglas Fir) ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 23 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

Component: Rock outcrop (30%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map Unit Description (Brief, Generated)

Uintah Area, Utah - Parts of Daggett, Grand and Uintah Counties

Map unit: 198 - Saddlehorse-Rock outcrop-Pathead association, 50 to 80 percent slopes

Component: Pathead (20%)

The Pathead component makes up 20 percent of the map unit. Slopes are 50 to 80 percent. This component is on mountain slopes. The parent material consists of colluvium derived from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY475UT Mountain Very Steep Stony Loam (douglas Fir) ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent.

Map unit: 201 - Seeprid-Utso complex, 4 to 25 percent slopes

Component: Seeprid (45%)

The Seeprid component makes up 45 percent of the map unit. Slopes are 4 to 25 percent. This component is on hills. The parent material consists of eolian deposits over residuum derived from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 6 percent. This component is in the R048AY451UT Mountain Stony Loam (browse) ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 40 percent.

Component: Utso (40%)

The Utso component makes up 40 percent of the map unit. Slopes are 4 to 25 percent. This component is on mountains. The parent material consists of eolian deposits and slope alluvium over residuum derived from shale and sandstone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This component is in the R048AY448UT Mountain Stony Loam (mountain Big Sagebrush) ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent.

Map unit: 214 - Soward sandy loam, 3 to 15 percent slopes

Component: Soward (85%)

The Soward component makes up 85 percent of the map unit. Slopes are 3 to 15 percent. This component is on drainageways. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is rarely flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This component is in the R048AY410UT Mountain Loamy Bottom (basin Wildrye) ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 7 percent.

Map unit: 232 - Tosca gravelly sandy loam, 25 to 40 percent slopes

Component: Tosca (90%)

The Tosca component makes up 90 percent of the map unit. Slopes are 25 to 40 percent. This component is on mountains. The parent material consists of slope alluvium derived from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 85 percent. This component is in the R048AY451UT Mountain Stony Loam (browse) ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 30 percent.

VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 1 Date: 08/16/07

Location: SO. 15° Slope
Mixed Tall Shrub Community

Observers: JS, MS

Shrubs & Trees	Percent
Mountain mahogany	20%
Douglas rabbitbrush	3%
Wyoming big sage	2%
Total	
Forbs	**Percent**
Snowberry	5%
Pussy toes	Trace
Total	
Grasses	**Percent**
Western wheatgrass	6%
Bottlebrush squirreltail	2%
Indian ricegrass	2%
Total	
Other	**Percent**
Litter	10%
Rock	10%
Bare Ground	35%
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 2 Date: 08/16/07

Location: SW. 10° Slope
Mixed Tall Shrub Community

Observers: JS, MS

Shrubs & Trees	Percent
Wyoming big sage	25%
Snowberry	5%
Gambel aak	5%
Serviceberry	2%
Total	
Forbs	**Percent**
Globe Mallow	1%
Total	
Grasses	**Percent**
Undifferentiated bunchgrasses	17%
Total	
Other	**Percent**
Litter	25%
Rock	10%
Bare Ground	10%
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 3 Date: 08/16/07

Location: NW 15° Slope
Sagebrush-Grass Community

Observers: JS, MS

Shrubs & Trees		Percent
Wyoming big sagebrush		25%
Snowberry		3%
Douglas rabbitbrush		2%
	Total	
Forbs		**Percent**
Lupine		1%
Dandilion		Trace
	Total	
Grasses		**Percent**
Undifferentiated bunchgrasses		55%
Bluegrass	20%	
Western wheatgrass	20%	
Needle-and-thread grass	15%	
	Total	
Other		**Percent**
Litter		9%
Rock		
Bare Ground		5%
	Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 4 Date: 08/16/07

Location: SW 2% Slope
Mixed Tall Shrub Community

Observers: JS, MS

Shrubs & Trees	Percent
Mountain mahogany	20%
Snowberry	5%
Utah juniper	20%
Gambel oak	2%
Total	
Forbs	**Percent**
Total	
Grasses	**Percent**
Western wheatgrass	5%
Bluegrasses	8%
Needle-and-thread Grass	7%
Total	
Other	**Percent**
Litter	13%
Rock	10%
Bare Ground	10%
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 5 Date: 08/16/07

Location: SW 1% Slope
Sage Brush-Grass Community

Observers: JS, MS

Shrubs & Trees	Percent
Snakeweed	5%
Total	
Forbs	**Percent**
Pussy toes	2%
Marsh sowthistle	5%
Unknown Forb	1%
Arenaria	2%
Total	
Grasses	**Percent**
Western wheatgrass	20%
Total	
Other	**Percent**
Litter	5%
Rock	30%
Bare Ground	30%
Total Cover (should equal 100%)	100%

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Property: Earth Energy Resources

Quadrat #: 6 Date: 08/16/07

Location: WSW 7% Slope Observers: JS, MS
Sagebrush-grass Community

Shrubs & Trees	Percent
Wyoming big sagebrush	30%
Douglas rabbitbrush	
Total	
Forbs	**Percent**
Agoseris Glauca	Trace
Total	
Grasses	**Percent**
Undifferentiated bucnhgrasses	25%
Total	
Other	**Percent**
Litter	35%
Rock	5%
Bare ground	
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 7 Date: 08/16/07

Location: Observers: JS, MS

Shrubs & Trees	Percent
Gambel oak	90%
Serviceberry	5%
Total	
Forbs	Percent
Total	
Grasses	Percent
Bluegrasses	1%
Total	
Other	Percent
Litter	4%
Rock	
Bare Ground	
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 8 Date: 08/16/07

Location: W 3% Slope Observers: JS, MS
Sagebrush-grass Community

Shrubs & Trees	Percent
Sagebrush	20%
Snowberry	Trace
Total	
Forbs	**Percent**
Pussy toes	15%
Total	
Grasses	**Percent**
Koeleria sp.	5%
Needle-and-thread grass	10%
Total	
Other	**Percent**
Litter	10%
Rock	
Bare Ground	40%
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 9 Date: 08/16/07

Location: NW 5% Slope Observers: JS, MS

Shrubs & Trees	Percent
Wyoming big sagebrush	80%
Snowberry	8%
Total	
Forbs	**Percent**
Hedesarum Boreale	Trace
Total	
Grasses	**Percent**
Bottlebrush squirreltail	3%
Total	
Other	**Percent**
Litter	9%
Rock	
Bare Ground	
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 10 Date: 08/16/07

Location: NNW 3% Slope
Mixed Tall Shrub Community

Observers: JS, MS

Shrubs & Trees	Percent
Serviceberry	30%
Coyote willow	50%
Gambel oak	5%
Mountain mahogany	5%
Total	
Forbs	**Percent**
Total	
Grasses	**Percent**
Total	
Other	**Percent**
Litter	10%
Rock	
Bare Ground	
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 11 Date: 08/16/07

Location: SW 2% Slope Observers: JS, MS

Sage Brush-grass grading to P/J/Doug Fir Community

Shrubs & Trees	Percent
Wyoming big sagebrush	5%
Total	
Forbs	**Percent**
Water leaf	1%
Arenaria sp.	1%
Total	
Grasses	**Percent**
Bottlebrush squirreltail	5%
Bluegrasses	3%
Total	
Other	**Percent**
Litter	15%
Rock	35%
Bare Ground	35%
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 12 Date: 08/16/07

Location: W 2% Slope
P/J/Doug Fir Community

Observers: JS, MS

Shrubs & Trees	Percent
Pinyon pine	100%
Total	
Forbs	**Percent**
Total	
Grasses	**Percent**
Total	
Other	**Percent**
Litter	
Rock	
Bare Ground	
Total Cover (should equal 100%)	100%

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VEGETATION SURVEY FORM

Property: Earth Energy Resources

Quadrat #: 13 Date: 08/16/07

Location: NW 3% Slope Observers: JS, MS
P/J/Doug Fir grading to sagebrush-grass Community

Shrubs & Trees	Percent
Wyoming big sagebrush	25%
Bitterbrush	30%
Pinyon pine	15%
Total	
Forbs	**Percent**
Pussy toes	3%
Figwort	3%
Total	
Grasses	**Percent**
Western wheatgrass	4%
Bluegrasses	5%
Stipa Comata	5%
Total	
Other	**Percent**
Litter	7%
Rock	
Bare Ground	3%
Total Cover (should equal 100%)	100%

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Appendix D
Equipment List & Process Flow Sheet

Earth Energy Resources Inc. - PR Spring Oil Sand Mine

List of Equipment for Utah DAQ Emissions Inventory - Rev.6

Mining Equipment

Item No.	Quantity	Description	Power (hp / kW)		Service Factor[1]	Total Power[2] (hp / kW)	
1	1	Wirtgen 2200SM Surface Miner	900	672	0.50	450	336
2	2	Mine truck (20 ton cap)	260	194	0.70	364	272
3	1	Tracked Excavator (Cat 345 or equiv.)	290	216	0.50	145	108
4	2	Dozer (Cat D8R c/w ripper))	305	228	0.50	305	228
5	1	Grader (Cat 14H or equiv.)	215	160	0.30	65	48
6	1	Wheel Loader (Cat 950G or equiv.)	180	134	1.00	180	134
7	2	Cat 325-mounted Rock Drill (diesel air comp.)	168	125	0.50	168	125
8	1	Water Truck (100 bbl)	250	186	0.30	75	56
9	1	Equip. Service truck (5 ton)	150	112	0.40	60	45
10	4	Pick-up trucks	150	112	0.40	240	179
11	1	Crew van	200	149	0.25	50	37
12	1	Plant Generator (natural gas, 0.5 MW)	670	500	1.00	670	500
13	1	Plant Generator (diesel back-up, 0.25 MW)	335	250	0.05	17	13
14	1	Camp Generator (diesel, 0.25 MW)	335	250	1.00	335	250
15	4	Light Towers (diesel, 100 kW)	134	100	0.20	107	80
16	1	Electric Welder (diesel, 45 kW)	60	45	0.10	6	5
17	1	Submersible Water Pump (diesel/electric)	120	90	0.90	108	81
18	1	Water Pipeline Delivery Pump (diesel)	50	37	0.90	45	33
19	3	Water Pumps (3 inch, gas)	5	4	0.10	2	1

Process Equipment (single train operation to start)

Item No.	Quantity	Description	Energy (MMBtu / kWh)		Service Factor	Total Energy (MMBtu / kWh)	
1	1	Process Heater (gas fired, 10MM Btu)	10	2930	0.95	9.5	2784
2	1	Process Water Heater (gas fired, 10MM Btu)	10	2930	0.95	9.5	2784
3	1	TAI Distillation boiler (gas fired, 10MM Btu)	10	2930	0.95	9.5	2784

NOTES:

1. Service Factor is defined as operating fraction of a 24 hr day
2. Total power expended by piece of equipment in a 24 hr day

Compiled by: TJW
Date: Sept 6/07

Earth Energy Resources Inc.
PR Spring Oil Sand Mine
List of tankage and buildings located within the processing site
Date prepared: 17 May 2007

Tankage

Item Number	Description	Required Capacity (bbl)	Tank Size (bbl)	Tanks Required	Notes
1	Bitumen (sales oil) storage	2,000	500	4	2 days storage @ 1,000 bbl/day
2	Hydrocarbon storage (distillation feed tanks)	1,000	500	2	0.75 day storage @1,000 bbl/day
3	Process water	4,000	1,000	4	Water to oil sand ratio of 5:1, 2 hour recycle time
4	Chemical active ingredient	1,000	400	3	Estimated usage 300 bbl/day
5	Cleaning emulsion storage	1,000	400	3	Estimated usage 1,000 bbl/day
6	Fuel (diesel)	400	400	1	Based on fuel delivered in 100 bbl loads
7	Make up water (pond)	10,000	10,000	1	Water from well stored on site in pond

Buildings

Item Number	Description	Size (ft^2)		Number	Notes:
1	Process trains	-		2	Process trains not enclosed, skid mounted
2	Distillation unit	-		1	Skid mounted
3	Sand dewatering equipment	-		1	Skid mounted
4	Power plant	2,500		1	1 gas generator, 1 diesel backup, 1 boiler
5	Maintenance structure	10,000		1	Sprung structure on concrete pad
6	Warehouse	10,000		1	Sprung structure on concrete pad
7	Plant office & buildings	2,500		1	Portable housing (3-5 units, on gravel pad)
8	Truck loading area (bermed & lined)	7,500		1	50' x 150' contained with sufficient leak containment
	Camp	10,000		1	Remote camp for mine & process plant personnel (20)

Appendix E
Surety Calculation

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Earth Energy Resources Bond Summary Worksheet

Please see attached sheets ("Equipment", "Rates", and "Building Calcs") for backup information

CRG = Cost Reference Guide, 2008 | Means 2008 = 629 RS Means Heavy Construction Cost Data, 2008

1 Clean up and Removal of Structures (Removing crushers, conveyors, etc.)

This entails removing the equipment listed below by dismantling, loading on dump trucks and flat-bed trailers with a crane and four laborers, and hauling to the Uintah County Landfill for disposal. Costs for the crane, laborers, hauling by truck, dump fees, and use of a water truck to suppress dust during demo activities are included below each category.

Dump fees are $30/load for a 10-12 yard dump truck, $50/ton for a 30-50 yard dump truck, $15/ton for loads on flatbeds, $20/ton for petroleum contaminated soils. No liquid wastes are accepted, according to Greg Jensen, Uintah County Landfill, April 2008.

The Landfill is 88 miles from the mine site.

Items to be Removed	
Tanks	22 tanks (7 400 bbl, 15 1,000 bbl, total volume 98,960 cu. ft., will be cut into pieces, lifted onto a trailer, and hauled to the Uintah County Landfill.
Maintenance Shop and Warehouse	These are "Sprung" aluminum structures. Easily dismantled using hand power tools and crane. Removal of both 10,000 ft2 buildings will require 5 days and will fill 4 trailer loads. Weight is 35,525 pounds each, (personal communication, April 1, 2008, Jared Heaton of Sprung Instant Structures, website at: http://www.sprung.com/en/index.php.) The mine office is a portable structure and will be removed from the site.
Mine Office	The mine office will be removed by ATCO and all costs will be born by them. They will do any and all prep work related to this task and bear those costs as well. Prep work will generally just entail disconnecting hoses. The building will not be gutted as it may be used elsewhere by others off site. No costs are included here for the office building because non will be incurred by Earth Energy.
Power plant	Size is approximately 2,500 ft^2, weighs 20 tons, and consists of 1 gas generator, 1 diesel back-up, 1 boiler. Removal using a crane, loader, and laborers will take one day and 2 trailers.
Process train	One process train. Each includes piping, hoses, etc. and is skid-mounted. Each is approximately 480 ft. long by 75 ft. wide by 20 ft. high. The train would be drained of all process materials, disconnected to individual skids and hauled away. Once cut up, the volume would be roughly 2,000 CY.
Distillation unit	The distillation unit weighs approximately 20 tons and will require a crane to load on a trailer. It will fill 90% of one trailer load to remove.
Sand dewater unit	The sand dewater unit weighs approximately 20 tons and will require a crane to load on a trailer. It will fill 90% of one trailer load to remove.
Sand remaining in process unit	Assume a 2 day retention time in the process unit. Total sand processed is 3,944,228 CY.With a bulk factor of 1.3, this produces 5,127,496 CY. 5,127,496 CY /((6 yr)(350 day/yr)) = 2450 CY/ day or 4900 CY to be removed to the mine waste area. Liquids in the process train will be minimal and the costs of hauling that material off site are within the costs associated with draining tanks.
Water Storage Pond Liner	The 60-mil liner will be removed with the crane and 4 laborers, and placed on a partially loaded trailer load. Because it will be part of another load, no transport fees are included.
Items to be Buried in Place	
Gravel from Parking Area next to maintenance shop	The gravel parking area is approximately 2.6 acres in size, covered with 4 inches of gravel, making 1,396 CY to be disposed. Gravel will be pushed to the cleaned-out water storage pond location to partially fill this void.
Rip and Bury Sprung Structure Foundations	Concrete foundations of Sprung Structures will be ripped with a dozer and buried in place.
Reserve Ore, Sand and fine tails, and Reject Materials	Reserve ore, sand and fine tails, and reject ore stockpiles (approximately 60,000 CY, total) from the plant area will be loaded into trucks and hauled to the pit area (prior to final grading and reclaiming) where an opening will be made to place the ore. The excavated overburden will be used to cover these materials.

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	Crane					Subtotal		
	(assume 4 hours to load one truck)							
		total hours	equip	labor				
	item	hours	$/hr	$/hr				
	item							
	tanks (22)	12.00	$141.72	$61.75		$2,441.64		
	maint/whse	16.00	$141.72	$61.75		$3,255.52		
	power plant	2.40	$141.72	$61.75		$488.33		
	process train	228.00	$141.72	$61.75		$46,391.16		
	distillation unit	4.00	$141.72	$61.75		$813.88		
	sand dewater unit	3.60	$141.72	$61.75		$732.49		
	water storage pond liner	8.00	$141.72	$61.75		$1,627.76		
	tank farm liner	40.00	$171.82	$61.75		$9,342.80		
							Subcategory total	$65,094
		See Rates sheet: Crane, 65 ton. From Cost Reference Guide (CRG) and Means 2008 data.						
	Laborers			4 laborer hrs		Subtotal		
				for ea crane				
				hour*				
	assumes 4 laborers per crane hour			labor				
	item	total hours		$/hr				
	tanks (22)	48.00		$47.05		$2,258.40		
	maint/whse	64.00		$47.05		$3,011.20		
	power plant	9.60		$47.05		$451.68		
	process train	912.00		$47.05		$42,909.60		
	distillation unit	16.00		$47.05		$752.80		
	sand dewater unit	14.40		$47.05		$677.52		
	water storage pond liner	32.00		$47.05		$1,505.60		
	tank farm liner	160.00		$47.05		$7,528.00		
							Subcategory total	$59,095
		See Rates sheet: Laborers. From Means 2008 data.						
		*Basis for relationship is best professional judgement and past experience.						
	Trucking to dump	(Assumes 35 ton load/truck)				Subtotal		
	item	tons	no. of trucks	# miles (round trip)	$/mile			
	tanks (22)	107	3.0	176	2.04	$1,077.12		
	maint/whse	35	4.0	176	2.04	$1,436.16		
	power plant	20	0.6	176	2.04	$215.42		
	process train	1,995	57.0	176	2.04	$20,465.28		
	distillation unit	30	1.0	176	2.04	$359.04		
	sand dewater unit	30	0.9	176	2.04	$323.14		
							Subcategory total	$23,876
		$/mile from Means 2008 Heavy Construction Cost Data 31 23-23.18- 4700						
	Dump Fees					Subtotal		
	item	tons			$/ton			
	tanks (22)	107			15.00	$1,605.00		
	maint/whse	35			15.00	$525.00		
	power plant	20			15.00	$300.00		
	process train	1,995			15.00	$29,925.00		
	distillation unit	30			15.00	$450.00		
	sand dewater unit	30			15.00	$450.00		
							Subcategory total	$33,255
		Per Greg Jensen, Uintah County Landfill, April, 2008						

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	Push gravel from parking area to storage pond					Subtotal		
		Production		equip	labor			
	Quantity (CY)	(lcy/hr)	total hours	$/hr	$/hr			
	1,396.00	62.25	22.43	$108.89	61.75	$3,827.46		
							Subcategory total	$3,827
		See Equipment: Scrapers; and Rates Sheet: Cat 631 Scraper						
	Move ore-related piles to pit backfill					Subtotal		
		Production		equip	labor			
	Material/quantity	(lcy/hr)	total hours	$/hr	$/hr			
	Reserve Ore - 40,000	255	156.86	$171.82	60.10	$36,378.97		
	Sand-Fine Tails - 10,000	255	39.22	$171.82	60.10	$9,095.90		
	Reject Pile - 10,000	255	39.22	$171.82	60.10	$9,095.90		
	Sand in Process - 4900	255	19.22	$171.82	60.10	$4,457.50	Subcategory total	$59,028
		See Equipment: Dozer, Regrading Dumps; and Rates Sheet: D8 Dozer						
	Rip Concrete foundations* - maintenance/warehouse buildings (20,000 sq ft)					Subtotal		
		Production	total hours	equip	labor			
	area (acres)	(ac/hr)	hours	$/hr	$/hr			
	0.5	0.60	3.33	$108.89	61.75	$568.23		
							Subcategory total	$568
		See Equipment: Dozer, Ripping & pulling; and Rates Sheet: D8 Dozer						
		*Assumption is that concrete is 6 inches thick with standard rebar.						
						1 TOTAL		$244,744
2	Backfilling, grading, and contouring							
	The mine pit will be backfilled to 50-60% of the original volume as part of the mining process using produced sand and cast-back overburden and interburden. The final cut during mining will create a 3:1 slope to blend with surroundings (see cross-sections), thus no backfilling will be required in any area during reclamation.							
	The rough backfilled North and West pit surfaces (93 ac), perimeter road and haul roads segments not integral to oversburden/interburden storage areas (17 ac), and overburden/interburden storage areas (70 ac) will all be finish-graded (minor cut and fill) with a Cat 14 grader to assure the land blends with surroundings. A water truck will be available to suppress dust.							
	Grading/Contouring							
		production		equip	labor	Subtotal		
	area (ac)	ac/hr	total hrs	$/hr	$/hr			
	180.00	3.15	57.14	$68.85	$60.10	$7,368.20		
		See Equipment: Grading; and Rates sheet: Cat 14 Grader						
	Water Truck					Subtotal		
		total	equip	labor				
		hours	$/hr	$/hr				
		57.14	138.91	$60.10		$11,371.43		
		See Rates Sheet: 100,000 gal Water Truck						
						2 TOTAL		$18,740

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3	**Soil Material redistribution and stabilization**							
	Approximately 132,250 cubic yards of topsoil and vegetative debris will be redistributed to about a five-inch depth with a scraper and dozer assist, over approximately 195 acres of the mine. Average haul is 600 ft. The 18 acres of topsoil storage areas will not be topsoiled because they will not be stripped of topsoil.							
	Topsoil Replacement	**production**	**Total**	**equip**	**labor**	**Subtotal**		
	Total CY	**cy/hr**	**hours**	**$/hr**	**$/hr**			
	132250	255	518.63	171.82	60.1	$120,280.67		
		Assumes a self-propelled scraper with 1/4 dozer assist. From Means 2008 31 23-16.50-2000						
						3 TOTAL		**$120,281**
4	**Revegetation (preparation, seeding, mulching)**							
	Soil stabilization in preparation for seeding is addressed in No. 3 above. No mulch or fertilizer will be used. All 213 acres affected at the mine area will be seeded with a D6 tractor-pulled broadcast seeder. Seed price quote is from Granite Seed; Lehi, Utah; March, 2008.							
	Revegetation - 213 ac					**Subtotal**		
		area (ac)	**production**	**equip**	**labor**			
			ac/hr	**$/hr**	**$/hr**			
	seed application	213.00	0.75	$61.12	$60.10	$25,819.86		
			cost per acre					
	seed cost ($/ac)	213.00	697.50			$148,567.50		
		See Equipment: Dozing, Seeding; and Rates Sheet: D6 Dozer						
						4 TOTAL		**$174,387**
5	**Safety gates, berms, barriers, signs, etc.**							
	A highwall safety berm, extending up to 2,000 linear feet, 4 feet high and 12 feet wide, may be in place on the side of the backfilled pit when reclamation commences. It will be blended into the regraded pit with a D8 dozer.							
	Approximately 4,000 feet of fence with a wooden top rail (as per DWR request) will be in place between the mine and Seep Ridge Road, as well as two metal safety gates, and safety signs. These will be removed once reclamation is completed and vegetation is growing.							
	Safety fences					**Subtotal**		
		# feet removed	**$/lin feet**					
		4,000.00	$2.69			$10,760.00		
		From Means 2008 02 41 13.60 1650						
	Highwall safety berm							
			production	**equip**	**labor**	**Subtotal**		
		CY material	**CY/hr**	**$/hr**	**$/hr**			
		1,778	62.5	61.12	60.10	$3,448.47		
		From Equipment: Dozing, Regrading Dumps; and Rates Sheet: D8 Dozer						
						5 TOTAL		**$14,208**
6	**Demolition, removal and disposal of facilities/structures, regrading/ripping of facilities areas**							
	Buildings to be demolished			**volume**	**demolition**		**Subtotal**	
		area (sq ft)	**height (ft)**	**(cu ft)**	**$/cu ft^**			
	warehouse	10,000.00	20.00	200,000.00				
	maint. Shop	10,000.00	20.00	200,000.00				
		Total Volume (cu ft)		400,000.00	0.31		$124,000.00	
		Demolition $/ cu ft from Means 2008 02 41-16.13-0100						

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	Removal and disposal is included in item #1 above; none of these structures will be buried.							
	Ripping concrete in place, burial, and ripping remaining facilities area						Subtotal	
			production		equip	labor		
		Acres	ac/hr	total hrs	$/hr	$/hr		
		13.00	0.60	22	108.89	61.75	$3,697.20	
		See Equipment: Dozing, Ripping; and Rates Sheet: D8 Dozer						
						6 TOTAL		$127,697
7	Regrading, ripping of waste dump tops and slopes							
	Grading of overburden/interburden storage areas will entail reworking approximately 132,259 cubic yards of material to bring these areas to a 3:1 slope. These areas will not need to be ripped as they will not be compacted. A trackhoe, backhoe, and dozer will be utilized.							
	Regrading of waste dumps						Subtotal	
			production		equip	labor		
		Cubic Yards	ac/hr	total hrs	$/hr	$/hr		
		132,259	62.25	2,124.64	108.89	61.75	$362,548.57	
		See Equipment: Dozing, Regrading Dumps; and Rates Sheet: D8 Dozer						
						7 TOTAL		$362,549
8	Regrading/ripping soil stockpiles, pads and other compacted areas							
	Soil stockpile areas (18 acres) will not need to be regraded as the underlying surface has not been disturbed, but will be ripped; the 15-acre plant site will also be ripped. These total 33 acres will be ripped to relieve compaction using a Cat 14 grader. Regrading of surfaces is included in Bullet 2 above.							
	Ripping topsoil stockpile areas							
			production		equip	labor	Subtotal	
		Acres	ac/hr	total hrs	$/hr	$/hr		
		33.00	3.15	10.48	108.89	61.75	$1,788.31	
		See Equipment: Grading; and Rates Sheet: Cat 14 Grader						
						8 TOTAL		$1,788
9	Ripping roads							
	Non-integral to overburden/interburden storage areas							
	Ripping roads							
		area (ac)	production		equip	labor	Subtotal	
			ac/hr	total hrs	$/hr	$/hr		
		17.00	0.60	28.33	$108.89	$61.75	$4,834.23	
		See Equipment: Dozing, Ripping; and Rates sheet, D8 Dozer						
						9 TOTAL		$4,834
10	Drainage Reconstruction							
	The headwaters of two ephemeral drainages affected by mining will be filled with overburden/interburden storage areas. Rip-rapped and energy dissipators will be constructed during mining to protect these areas from erosion (See Erosion and Sediment Control Plan). These are permanent structures. No drainage reconstruction will be required during reclamation.							

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11	**Mulching, fertilizing and seeding the affected areas**							
	No mulch or fertilizer will be used in reclamation efforts. All 213 affected acres will be seeded. See No. 4, above.							
12	**General site clean up and removal of trash and debris**							
	Trash removal will occur after all buildings and facilities are removed; it will involve collection of all refuse, litter, stray metal, pipe, wood, insulation, and other debris. The 213-acre area will be inspected by 3 laborers with a pick up truck. All trash will be collected, loaded onto haul trucks, and transported to the Uintah County Landfill for proper disposal. Trash volumes and weight are expected to make up only a small part of another existing load, thus no cost for transport or disposal is included here.							
	Trash removal						**Subtotal**	
		# acres	**pick up 1.6ac/hr**	**labor $/hr**	**no. of laborers**			
		213.00	1.60	$47.05	3		$18,790.59	
		See Rates sheet, Laborer						
						12 TOTAL		**$18,791**
13	**Removal/disposal of hazardous materials**							
	Any fuels remaining on site would be used to fuel equipment used in reclamation work. Most fuel, oil, lubricants will be removed by Tri-State Recycling at no cost, based on quote from Tri-State, March 2008.							
	A charge to remove partial containers and small amounts of hydrocarbon wastes will be charged.							
	One trip will be required. No Hazardous materials are stored on site.							
	Removal of hydrocarbons						**Subtotal**	
		cost/mile	**miles, round trip**					
		$1.56	176				$274.56	
		Based on quote from Charles Martin, Tri- State Recycling, April 2008						
						13 TOTAL		**$275**
14	**Equipment Mobilization**							
	This bullet includes removal (demobilization only) of abandoned mining equipment from the site.							
			mob	**demob**		**Means 2008 reference number**		
	Reclamation Equipment	D8 dozer	$355.00	$355.00		01 54-36.50-0100		
		950 Loader	$355.00	$355.00		01 54-36.50-0100		
		track hoe	$217.00	$217.00		01 54-36.50 -0020		
		Cat 14 grader	$355.00	$355.00		01 54-36.50-0100		
		crane	$405.00	$405.00		01 54-36.50- 2100		
		631 scraper	$530.00	$530.00		01 54-36.50 -0700		
		Water truck	$355.00	$355.00		01 54-36.50-0100		
		D6 Dozer	$355.00	$355.00		01 54-36.50-0100		
		Seeder, Manure Spreader		(piggyback with other equipment - no addt'l cost)				
		Semi and Low-boy trailer		(used to mobilize other equipment - no addt'l cost)				
	Mining Equipment	Surface Miner		405.00		01 54-36.50- 2100		
		Rock Drill		405.00		01 54-36.50- 2100		
		D8 dozer		$355.00		01 54-36.50-0100		
		950 Loader		$355.00		01 54-36.50-0100		
		track hoe		$217.00		01 54-36.50 -0020		
		Cat14 grader		$355.00		01 54-36.50-0100		
		Water truck		$355.00		01 54-36.50-0100		
		35 Ton haul trucks(4)		1,420.00		01 54-36.50-0100		
		Total	**$2,927.00**	**$6,794.00**				
						14 TOTAL		**$9,721**

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15	RECLAMATION BASE COST							$1,098,014
15.1	Supervision during Reclamation (10% of Reclamation Base Cost)							$109,801
15.2	Revegetation Monitoring & Weed Control							
	Assume two trips per year, 3 years, 10 hours per trip							
	labor $/hr	truck/hr	hours	gas $100/trip		subtotal		
	75.00	30.00	60.00	600.00		6,900.00		
	Administrative costs equal to 15 percent of subtotal					1,035.00		
	Weed control costs equal to 25 percent of revegetation costs (in category 4)					37,141.88		
	Second seeding costs equal to 50 percent of revegetation costs (in category 4)					74,283.75		
		Total				119,360.63		
		Based on average consultant rates for technicians, and rental vehicle rates for SLC area, 2008						
						15.2 TOTAL		$119,361
16	SUBTOTAL (2)							$1,327,176
16.1	Contingency (5%)							$66,359
17	SUBTOTAL (3)							$1,393,535
17.1	Escalation (for 5 years at 3.8% per year)							$285,675
18	GRAND TOTAL							$1,679,210
	GRAND TOTAL ROUNDED							$1,679,200

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Tank Calculations

Tank Calculations to determine Dump Fee Costs							
400 bbl tanks	diameter(ft)	height (ft)	thickness(ft)	density(lb/cf)	# units	total lbs	total tons
1000 bbl tanks	12	20	0.0208	485	7	53243	27
	21	16	0.0208	485	15	159730	80
					Total tons for tanks		107

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EQUIPMENT INFORMATION

DOZING		CPH pg.
Ripping & pulling dimpler		
D-8		
Ripper width(ft)	8.0	1--57
Ripper penetration(ft)	2	1--57
speed (mi/hr)	1.0	1--60
Maximum Production(ac/hr)	0.97	
Correction Factors		
Operator	0.75	1--46
efficiency (50 min/hr)	0.83	1--46
Corrected Production	0.60	
(ac/hr)		

		CPH pg.
Seeding		
D-6		
Seeder width (ft)	10.0	MS
speed (mi/hr)	1.0	1--60
Maximum Production(ac/hr)	1.21	
Correction Factors		
Operator	0.75	1--46
efficiency (50 min/hr)	0.83	1--46
Corrected Production	0.75	
(ac/hr)		

		CPH pg.
Mulching		
D-6		
Mulcher width (ft)	8	MS
speed (mi/hr)	1.0	1--60
Maximum Production(ac/hr)	0.97	
Correction Factors		
Operator	0.75	1--46
efficiency (50 min/hr)	0.83	1--46
Corrected Production	0.60	
(ac/hr)		

DOZING Regrading dumps and		CPH pg.
Pushing into Storage pond		
D-8		
500 ft ave push		
Maximum Production(lcy/hr)	100.00	
Correction Factors		
Operator	0.75	1--46
efficiency (50 min/hr)	0.83	1--46
Corrected Production	62.25	
(lcy/hr)		

GRADING		CPH pg.
Grading		
Cat 14		
grader blade width (ft)	13.9	2--17
speed (mi/hr)	3.0	2--16
Maximum Production(ac/hr)	5.05	
Correction Factors		
Operator	0.75	1--46
efficiency (50 min/hr)	0.83	1--46
Corrected Production	3.15	
(ac/hr)		

SCRAPERS	CPH pg.	
Top Soil Replacement		
Stockpile move to pit		
Cat 631		
Capacity (cu yd)	8--2	29
Average Haul Distance		600
Cycle Time		
Loading time (min)	8--11	0.9
Spreading time (min)	8--11	0.7
Loaded Haul time (min)0% grade	8--37	1.0
Empty Haul time (min)0% grade	8--37	0.8
Cycle Time (min		3.4
Cycles per Hour		17.6
Max Production Rate (lcy/hr)		512
Correction Factors		
Operator	1--46	0.75
Job Efficiency(50 min/hr)	1--46	0.83
Load Factor		0.8
Total Correction Factor		0.50
Corrected production rate(cy/hr)		255

All cycle times and Correction factors are from Caterpillar Performance Handbook (CPH) Edition 38, January 2008

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RATES and SEED MIX

EQUIPMENT COSTS				
Hourly Rates	**Equipment Hourly Rates**	**CRG* Page No.**	**Labor Hourly Rates**	**Labor Type****
Semi-Truck & Low-boy trailer	(use rig that brings equip. in for equipment removal (Bullet # 1))			
D8 Dozer	108.89	9--53	61.75	Equip Oper - Heavy
950 Loader	55.82	9--33	61.75	Equip Oper - Heavy
Cat 330 Track hoe	93.70	10--18	60.10	Equip Oper - Medium
Cat 14 Grader	68.85	9--5	60.10	Equip Oper - Medium
Crane 65-Ton	141.72	13--11	61.75	Equip Oper - Heavy
Cat 631 Scraper	171.82	9--50	60.10	Equip Oper - Medium
10,000 gal Water truck	138.91	20--11	60.10	Equip Oper - Medium
D6 Dozer	61.12	9--53	60.10	Equip Oper - Medium
Laborer			47.05	Common bldg. Laborers

*Equipment Hourly Rates include overhead and profit from Cost Reference Guide (CRG) 2008
**Labor Hourly Rates include overhead and profit from inside back cover Means Heavy Construction Cost Data 2008

SEED MIX				
Species	**Seeds/lb**	**PLS seeds/ac**	**Cost for PLS pound**	**Total Cost**
Forbs-				
Blue flax (*Linum lewisii*)	293,000	0.5	$12.50	$6.25
Rocky Mountain penstemon var. Bandera (*Penstemon strictus*)	592,000	0.25	$40.00	$10.00
Small burnet (*Sanguisorba minor*)	55,000	1	$4.00	$4.00
Lupine (*Lupinus caudatus or L. alpestris*)	27,600	1	$70.00	$70.00
Total forbs in seed mix		**2.75**		
Grasses -				
Muttongrass (*Poa fendleriana*)	890,000	2	$65.00	$130.00
Canby bluegrass (*P. canbyi*)	926,000	1	$14.00	$14.00
Indian ricegrass (*Achnaetherum hymenoides*)	150,000	2	$31.50	$63.00
Great basin wildrye var. Magnar (*Leymus cinereus*)	130,000	2	$9.00	$18.00
Bluebunch wheatgrass (*Pseudoroegneria spicata ssp. spicata*)	140,000	3	$48.00	$144.00
Western wheatgrass (*Pascopyrum smithii*)	110,000	3	$5.25	$15.75
Total grasses in seed mix		**13**		
Shrubs -				
Sagebrush – Wyoming or Mountain (Artemisia tridentata wyomingensis or vaseyana)	2,500,000	0.25	$50.00	$12.50
Bitterbrush var. Lassen (*Purshia tridentata*)	15,000	2	$35.00	$70.00
Serviceberry (*Amelanchier alnifolia*)	25,800	1	$65.00	$65.00
Snowberry (*Symphoricarpos albus*)	75,000	1	$75.00	$75.00
Total shrubs in seed mix		**4.25**		
TOTAL COST FOR SEEDS		**20**		**$697.50**

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Appendix F
Site Photos

Looking up at north-facing sideslope in upper drainage, proposed pit area

Typical upper drainage slope, looking to northwest (southwest-facing slope)

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Slope view mid-drainage, looking up toward Seep Ridge Road

View upslope, just outside (southwest of) current 5-acre activity area; within proposed pit

Appendix G
Storm Water Pollution Prevention Plan

STORM WATER
POLLUTION PREVENTION PLAN
PR Spring Mine
Earth Energy Resources Inc.

Prepared for:

Earth Energy Resources, Inc.
Suite #740 404 – 6th Avenue SW
Calgary, Alberta T2P 0R9

Prepared by:

jbr environmental consultants, inc.

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Sandy, Utah 84093
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March 25, 2009

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1.0 INTRODUCTION

In 1972, Congress passed the Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), to restore and maintain the quality of the nation's waterways. The ultimate goal was to make sure rivers and streams were fishable, swimmable, and drinkable to their highest natural level. In 1987, the Water Quality Act added provisions to the CWA that allowed the Environmental Protection Agency (EPA) to govern storm water discharges from industrial activities through its National Pollution Discharge Elimination System (NPDES) permit program. EPA published the final notice for Phase I of the Multi-Sector General Storm Water Permit program in 1995 (Federal Register Volume 60 No. 189, September 20, 1995, page 50804). Subsequent to that date, states for which EPA had granted NPDES permitting authority adopted their own version of the storm water regulations. One of those states was Utah, with the exception of lands within the state designated as tribal lands or "Indian County", where EPA retains permitting authority. Utah's Division of Water Quality (DWQ) has developed the *General Multi-Sector Permit for Storm Water Discharges Associated With Industrial Activity* (General Permit) to closely follow the EPA program, and issues coverage under the General Permit (No. UTR000000) to applicable industrial facilities.

The General Permit includes provisions for the development of a Storm Water Pollution Prevention Plan (SWP3) by each industrial facility discharging storm water, including oil and gas extraction facilities. Oil sand mining, tar sands mining, and extracting oil from oil sands and oil shale, all fall under Major Group 13: Oil and Gas Extraction, in the Standard Industrial Code, which is used to categorize and set storm water regulatory standards for various classes of industries. The purpose of a SWP3 is to identify and prescribe storm water pollution prevention measures and best management practices (BMPs). Properly constructed and implemented, the BMPs minimize or eliminate the transport of any pollutants generated by the facility to any surface water bodies. Revisions to the SWP3 and the BMPs are made at prescribed intervals; when operational changes occur; or as site conditions warrant.

1.1 INDUSTRIAL ACTIVITY DESCRIPTION

Earth Energy Resources Inc. (Earth Energy) operates a tar sand mine and processing plant near PR Spring. The company mines tar sand deposits and extracts bitumen using a patented chemical method known as the Ophus Process, which produces clean (inert), "damp-dry" sand tailings that are backfilled into the quarry.

Although there are no treatment ponds located on the site, a retention pond is located at the lowest point of the plant site and it collects all plant site runoff and runoff-transported sediments. It is also used to store reserve make-up water (approximately 10,000 barrels, which equates to a 2.5-day supply). This pond is lined in order to preserve the availability of make-up water. Lining is not needed to prevent water quality impacts. Any sediments that collect in this pond are removed as needed to maintain design capacity.

The plant site and open-pit portions of this facility have zero discharge of storm water and/or snowmelt from the facility to off-site drainage ways or water bodies. All precipitation collected within the working mine pits and process areas is collected and used in tar sands processing or for dust suppression on mine and plant roads. On occasion, the outslopes of overburden/interburden storage piles may shed precipitation, however this runoff (and pollutants it may convey) is minimized through design features described later in this document.

Roughly half of the land on which the facility rests is designated as "Indian Country" and falls under EPA jurisdiction. EPA does not require an NPDES storm water permit for this industrial sector (Oil and Gas Extraction Facilities) unless a facility had demonstrable previous releases. Earth Energy has not had such a release and thus EPA does not require a permit. However, the other half of the facility is not on Indian Country lands, so the DWQ has primacy. In contrast to EPA, the DWQ requires a Utah Pollution Discharge Elimination System (UPDES) storm water permit for oil and gas extraction facilities and has developed industry-specific requirements (General Permit Appendix II, Sector I) for such facilities. This SWP3 explains storm water management for the entire facility, regardless of regulatory oversight. Copies of the General Permit and General Permit Appendix II, Sector I are located in **Appendix A** of this SWP3. A copy of the Notice of Intent requesting coverage is also included in **Appendix A**.

The purpose of this SWP3 is to identify potential pollutant sources and prescribe storm water pollution prevention measures and BMPs. As constructed and implemented, the BMPs minimize or eliminate the transport of any pollutants generated by the facility to any surface water bodies. Revisions to the SWP3 and the BMPs are made at prescribed intervals; when operational changes occur; or as site conditions warrant.

Figure 1 is a location map. Figures 2 and 3 are site maps for the mine and the processing facility, respectively.

2.0 FACILITY DESCRIPTION

2.1 GENERAL FACILITY DESCRIPTION

The Earth Energy mine is located in Sections 26, 27, 28, 33, 34, 35, and 36 of Township 15 South, Range 23 East in Uintah County, Utah; and Sections 31 and 32 of Township 15.5 South, Range 24 East in Grand County, Utah,. The plant site is located in Section 35 of Township 15 South, Range 23 East. The Universal Transverse Mercator (UTM) Coordinates for the center of the mine, UTM Datum NAD27, are 4369592 km Northing, 645187 km Easting, Zone 12. Location and site maps are located in **Appendix B**.

The office address for Earth Energy is: Earth Energy Resources, Inc., Suite 740, 404-6th Avenue SW, Calgary, Alberta, T2P 0R9, Canada.

Mining is conducted using a self-contained mobile surface mining machine (e.g. Wirtgen 2200SM Surface Miner). Overburden and interburden are removed by conventional drill/blast/muck or rip/muck methods and initially stored in a waste dump southwest of the open

pit. Eventually, interburden is mixed with sand/clay fines tailings and placed back into mined-out portions of the pit.

A reserve ore pile between 30,000 to 40,000 cubic yards in size is maintained on site. Approximately 920,000–1,200,000 tons of tar sand ore is mined per year and 1,000,000–1,400,000 tons of overburden/interburden is mined per year.

The process train is designed to accommodate 3,000–3,500 tons of ore per day, producing approximately 2,000 bbl/day of bitumen. Approximately 1.5–2 barrels of water is consumed for each barrel of produced bitumen. Thus, approximately 4,000 barrels of water, or 116 gallons per minute (gpm), is used every 24-hour period for processing.

While a portion of the process water is recycled and stored in a tank for re-use, the majority of the water consumed in the process is simply returned to the environment as un-recoverable entrained moisture in the pore spaces of the sand and clay fines tailings. Some evaporates off. When returned to the open pit as part of on-going reclamation, the produced sand/fines still contain 10 to 20 percent entrained water and less than 4,000 ppm residual hydrocarbons (principally near-inert asphaltenes). Approximately 4.8 million cubic yards of overburden, interburden, and tailings (sand and fines) will eventually be placed back into the open pit as mining progresses.

2.2 SITE DESCRIPTION

The property sits atop a plateau at approximately 8,000 feet elevation. The 62-acre initial mine pit is delineated on Figure 2. It is designed with a perimeter highwall which, during operations, is higher than the highest elevation of the pit floor. All precipitation falling within the mine pit boundaries collects in the bottom of the pit, none runs off.

The processing facility is located adjacent to Uintah County Road 2810 in the area shown on Figure 3. It covers approximately 15 acres, and includes 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 water retention pond; and stockpiles of processed sand, reject materials, and ore.

The tank farm is constructed with an impermeable barrier to prevent any liquid emissions from leaving those areas of the process site. It is constructed with secondary containment sufficient to meet applicable Spill Prevention Control and Countermeasure (SPCC) Plan regulations for tank farm construction (total volume of the bermed area greater than 110% volume of the largest tank contained in the farm, for example). Although SPCC Plans by regulation are required to address only hydrocarbon materials, the Earth Energy SPCC Plan is a comprehensive liquids management plan.

3.0 POLLUTION PREVENTION TEAM

A key to implementing this SWP3 is the identification of a Pollution Prevention Team. The team is responsible for developing, implementing, maintaining, and revising the SWP3 for Earth Energy, and is comprised primarily of Earth Energy personnel with training in storm water

regulations and controls, and who have control over the facility and facility personnel. These individuals are empowered with the ability to commit company resources and to implement action items identified in and required by the SWP3. The titles and specific assignments of the main team members are listed below. Additional team members are assigned on an as-needed basis.

STORM WATER POLLUTION PREVENTION TEAM

TEAM MEMBER	TITLE	RESPONSIBILITY
Earth Energy Staff Member	Vice President, Operations	Responsible party Signatory for certifications Technical support SWP3 revisions Oversight on regulatory submittal Annual site compliance evaluation Inspection oversight On-site spill response Employee training
Earth Energy Staff Member	Site Operations Manager	Inspections Record keeping On-site spill response BMP implementation scheduling Maintenance oversight Maintenance of BMPs Contractor supervision Employee training
JBR Environmental Consultants, Inc.	Environmental Consultant	Annual site compliance evaluation SWP3 revisions Preparation of regulatory submittals Technical support

4.0 DESCRIPTION OF POTENTIAL POLLUTANT SOURCES

This section outlines the means by which various pollutants have the potential to enter storm water runoff. It also describes the activities by which those pollutants may be generated, the materials that may be the source of the pollutants, their locations at the facility (bitumen extraction facility or mine pit), and an assessment of the risk associated with various site activities. Storm water management methods are generally described in this section as well, with the detailed descriptions of storm water BMPs given in Section 5.0.

4.1 FACILITY DRAINAGE

The plant site is constructed to be self-contained with the use of perimeter berms or ditches where needed. All ditches are designed to pass the 10-year, 6-hour precipitation event. They are triangular in cross section with side slopes approximately 2H:1V; depth including freeboard is less than 2 feet or equivalent in cross section. Berms are generally 2 feet high, with a two-foot top width and 2H:1V side slopes. All precipitation falling on the plant site is collected in these ditches and flows to the water retention pond located at the low point of the plant site.

The plant site has little to no up-gradient, off-site runoff flowing onto the site, so the retention pond collects only runoff generated from precipitation falling upon the plant site itself. It is also used to store fresh make-up water. Any sediments collected in the pond are removed as needed in order to maintain its design capacity. It is designed to contain the runoff from the 10-year, 24-hour precipitation event as well as sediment storage and make-up water.

Water falling within the mine pit boundaries collects in sumps located in the bottom of the pit, thereby preventing runoff from leaving the mine site. The accumulated precipitation is removed from the pit along with the solid materials, and is processed along with the bitumen bearing sands. As needed, and if available, collected precipitation can also be pumped from the mine and used for dust suppression on mine and plant roads. The active mining area will remain a pit at all times. No pit configurations are planned where storm water will be allowed to egress the active mine workings. Further, the highwall safety berms prevent runoff from outside the pit perimeter from entering the pit.

The outslopes of overburden/interburden storage piles receive only minor amounts of precipitation and runoff. In the event that they do shed precipitation after particularly heavy rainfall, this runoff (and pollutants it may convey) is minimized due to the mixed nature of the overburden/interburden itself, and the construction of bermed storage cells that encapsulate fines, as explained in Section 5.9.2. Runoff generated from these outslopes is controlled along the sides of the dumps by placing armoring between the edge of the dump and the native slope (essentially forming a triangular channel-type feature). Runoff from the face of the dump is captured at the toe of the slope, where the coarsest materials typically settle as the dump expands. The concentration of coarse materials at the toe of the fills provides a natural energy dissipater for storm runoff from the faces of the dumps. In addition, a rip-rapped energy dissipater is constructed at the toe of the slope.

4.2 INVENTORY OF EXPOSED MATERIALS

Listed below are significant materials at the Earth Energy site that have the potential to be exposed to storm water. These materials are described in regard to the location and method of storage. Current material management practices and relevant storm water controls are also briefly described.

4.2.1 At the Mine Pit

The pit is self-contained. Materials stored within this area that could cause pollution if allowed to leave this area include:

Mobile equipment includes the Wirtgen miner, a loader, track hoe, scrapers, dozers, water trucks, and haul trucks. This equipment, except for the water truck, is used to remove overburden, mine the tar sand, transport it to the plant site, and bring the processed material (tailings) back to the mine pit for disposal. The water truck is used to water the unpaved roads and the entrance road to reduce fugitive dust emissions.

4.2.2 At the tar sands processing facility (Plant Site)

The entire plant site is fully contained using a system of berms and ditches. Materials stored within this area that could cause pollution if allowed to leave this area include:

Temporary ore piles, tailings piles, and storage piles are not covered and thus are exposed to rainwater and snowmelt. The runoff from temporary ore and tailings storage piles at the processing plant is captured by ditches and routed to the plant site retention pond. Precipitation encountering storage piles and slopes within the mine pit collects in low-lying areas within the pit and either infiltrates into the ground or evaporates, or is pumped out of the pit and used at the plant site.

Hydrocarbons include diesel fuel, solvent and various oils and lubricants. The tank farm area contains the following tanks:

- (7) 400 bbl tanks
- (15) 1,000 bbl tanks

All of the tanks are within the SPCC containment area, which is lined and designed to contain greater than 110 percent of the volume of the largest container. None of the tanks are open to the elements. Other oils, lubricants, miscellaneous chemicals are stored in the enclosed warehouse or maintenance building, located within the bermed, ditched area of the plant site. In the event of a spill, personnel follow the spill reporting guidelines located in Section 5.7. Any contaminated soil is removed and disposed of in accordance with state and federal regulations.

Process equipment includes conveyor systems, crushers, power plant (1 diesel generator, 1 gas generator, 1 boiler), and fully enclosed extraction processing equipment (e.g. process train, distillation unit, sand de-watering unit, conveyors, heated slurry mixers, slurry tanks, separation towers, cyclones, centrifuges, shakers, pumps, and other process steps). Process equipment is located within the 15-acre plant site with connecting piping between individual pieces of equipment. Process water is recycled and stored in a 4,000 barrel heated tank. Storm water coming into contact with this equipment is diverted to the retention pond on the west side of the facility, where it evaporates, is used in the extraction process, or is used for dust suppression on mine and plant roads. In order to maintain its design capacity, sediments collected in the pond are removed as needed to mined-out portions of the pit floor. All process equipment is within the plant site and containment area. No processing equipment is located in the mine pit.

Vehicle fueling occurs only in the SPCC containment area. Extreme care is taken to avoid fuel spills, however, in the event of a spill, trained staff is equipped to take all necessary actions to contain and clean up the spill quickly and safely.

The Bone yard is in the plant site area and is used to store obsolete or unused equipment. Storm water that contacts materials stored here drains to the retention pond in the plant site area.

4.2.3 Transport and storage of process solvents and surfactants

Ore is conveyed from the mine to the adjacent plant site in haul trucks, where ore is crushed and loaded into enclosed processing equipment to extract oil from the tar sands. Processing (extracting) equipment is located within the plant site, which is fully bermed and contained.

Tailings are temporarily stored near the extraction facility before they are loaded and transported back to the mine pit for permanent disposal as pit backfill in mined areas or in the overburden/interburden storage areas within bermed storage cells constructed of compacted, coarse overburden materials as described in section 5.9.2.

4.2.4 Unpaved roads and parking areas

Roads and parking areas are located throughout mine site. These roads could contribute sediment to storm water runoff if not properly maintained. Watering and grading of the unpaved roads and high traffic areas minimizes this potential. Roads are bermed and designed to drain either to the pit or to the plant site. Storm water that drains into the pit either evaporates or infiltrates into the ground. Storm water and snowmelt that runs off the roads and parking areas in the plant site drains to the retention pond where it is re-used in the plant site or re-used to water roads.

4.2.5 Ore Storage Areas

Ore is stored either within the pit or within the plant site, both of which are fully contained.

4.2.6 Overburden Storage Areas

As described in more detail under Section 4.1 above, overburden storage areas are outside of the pit and plant site containment areas, so it is possible that sediments could be released onto undisturbed lands or waters of the state. Sediment release is controlled and minimized through the natural sorting of the overburden materials that takes place as overburden is placed on the dump, creating a rough surface that captures sediment, as well as other measures as described in Section 5.9.2. The use of armoring and rip-rap around the sides and base of the dumps also ensures sediment capture, minimizing the volume of runoff and/or sediments that could reach waters of the state.

4.2.7 Topsoil Storage Areas

There are up to 18 acres devoted to topsoil storage in three areas around the pit. These storage areas are located on flat to gently sloping ground along the margins of the mining and processing areas. Erosion of the topsoil piles themselves is minimized by seeding with a fast growing cover grass, such as slender wheatgrass and/or Sandberg bluegrass at 10 PLS (pure live seed) pounds per acre. Topsoil piles are also bermed at the outer edges, using the salvaged and compacted woody vegetation that is removed prior to

topsoil salvage activities. These berms are trapezoidal in cross section: two feet high, with a two-foot wide top width and approximately 1.5H:1V sideslopes.

4.3 SIGNIFICANT SPILLS AND LEAKS

No significant/reportable spills or leaks have occurred at the Earth Energy facility in the last three-year period (since before 2006).

4.4 SAMPLING DATA

Storm water sampling data has not been collected at the Earth Energy facility, nor is any required under the terms of the General Permit and the relevant Sector I requirements. Only visual inspection of samples is required (see Section 8.1).

4.5 RISK IDENTIFICATION AND SUMMARY OF POTENTIAL POLLUTANT SOURCES

This section further describes the materials listed above, and activities occurring that could result in pollution to storm waters. They include loading and unloading operations; outdoor storage activities; outdoor drilling, mining, and processing activities; dust and particulate generating activities; on-site waste disposal practices and cleaning activities; and miscellaneous activities that could result in storm water pollution. The sources and/or activities are evaluated according to their risk of storm water contamination.

4.5.1 Loading and Unloading Operations

Materials subject to loading and unloading operations include tar sand ore, bitumen, process solvent, tailings, diesel fuel, gasoline, and oil.

Since ore loading occurs within the pit, any contact runoff collecting in low-lying areas either soaks into the ground or evaporates; any transported sediment remains in the pit. The risk of storm water runoff contamination off-site from the loading of tar sand ore is extremely low.

Processed bitumen is highly viscous and insoluble, particularly at ambient temperatures. These characteristics are largely responsible for the facility's *de minimus* impact status in regards to groundwater discharge permitting requirements. If exposed to precipitation or spilled, bitumen is unlikely to mobilize, and thus poses no threat to water resources off site. Further, as noted elsewhere, the process plant site is fully contained by berms and ditches and does not generate off-site runoff.

The process chemical, in its neat form (without additives), is transferred from the distillation unit into storage tanks noted on Figure 3, and from the storage tanks to the blending area using appropriate pumps. There are no other waste streams that might get into the solids or tailings. The chemical is stable, colorless, evaporates rapidly when exposed to air, and has negligible solubility in water. It is removed from the bitumen by distillation and recycled to the front of the process.

The cleaning emulsion's biodegradability has not been determined, but related chemicals are known to be biodegradable. In the event of a spill, the process chemical, in its neat

and/or emulsified forms, is contained by the engineered spill controls and all appropriate responses are made, as per the facility SPCC Plan.

The tailings have been deemed to have a *de minimis* effect on ground water quality by the DWQ, based on the low residual bitumen and process chemical in the tailings material, the design of the pit backfill, and the geologic setting. Storm water that has been in contact with the tailings is contained in either the mine pit or the lined retention pond for the plant site.

The transfer of diesel fuel between the storage tanks and equipment, and the transfer of various oils (motor, hydraulic, etc.) does not affect storm water runoff under normal circumstances. If a spill occurs, the proper notifications are made and the spill is cleaned up immediately. In addition, all fuel and oil transfers occur within the spill containment area of the plant site.

Since all storm water and snowmelt runoff remain in the pit or are collected in the lined retention pond, the risk of storm water contamination off-site from the transfer and storage of diesel fuel and oils is extremely low.

4.5.2 Outdoor Storage Activities

Outdoor storage activities include storage of tar sand ore piles, obsolete or unused equipment, and storage tanks described in Section 4.2. To reduce the risk of contamination, materials and equipment are inspected regularly, maintained in good condition, and stored in locations that reduce the potential of a collision with mobile equipment. Storage tanks are maintained in good condition and are inspected regularly for leaks. Ore piles are kept within the bermed, self-contained plant site or within the recessed pit. Tanks are located within the SPCC containment area of the plant site. The SPCC containment area is designed to contain 110% of the capacity of the largest (highest volume) tank. Obsolete equipment is kept within the plant site, which is bermed and/or ditched to prevent off-site runoff.

The risk of storm water contamination is thus extremely low.

4.5.3 Outdoor Drilling, Mining, and Processing Activities

Drilling, mining, and processing activities include the mining of tar sand, which includes occasional blasting; the conveying, crushing, and stockpiling of the tar sand ore; and processing of ore using the Ophus process.

Overburden and or interburden are typically removed by conventional drill/blast/muck or rip/muck methods. Where blasting is required to facilitate material removal, each blast is designed to create a controlled blast, with adequate stemming to eliminate fly-rock and minimize vibration and dust, while generating aggregate size conducive for removal from the mine area. Blasting is conducted in accordance with local, state, and federal rules.

Ore is loaded and conveyed from the mine to the plant site in haul trucks, where it is crushed and loaded into enclosed processing equipment to extract oil from the tar sands.

Roads are bermed and designed to drain to contained areas. Processing (extracting) equipment is located within the plant site, which is fully bermed and contained.

Tailings are temporarily stored near the plant site before they are loaded and transported back to the mine pit for permanent disposal as pit backfill in mined areas or in the overburden/interburden storage areas within bermed storage cells constructed of compacted, coarse overburden materials, as described in Section 5.9.2. As noted above, roads are bermed and designed to drain to contained areas.

The pit is recessed; all water incident to it is captured in the pit. The maximum depth of the North Pit is approximately 140 feet. Exploratory drill hole data did not encounter any groundwater. It is highly unlikely that mining activities or precipitation gathered there will affect groundwater, and the risk of contamination to storm water runoff due to these activities is extremely low.

4.5.4 Dust/Particulate Generating Activities

The activities included in Section 4.5.3 and vehicle traffic on unpaved roads and parking areas generate dust. Crushing of the ore generates dust. Dust generated from these activities could potentially settle off-site and be carried by storm water or snowmelt. To reduce dust generation, water sprays are used routinely on crushers, roads, mining areas, and parking areas; this is also necessary as part of the facility's air quality permit compliance.

Thus, the risk of contamination to storm water runoff due to these activities is extremely low.

4.5.5 On-site Waste Disposal and Cleaning Practices

Solid waste (*i.e.*, paper trash and food wastes/wrappers) is disposed of in trashcans, located inside the office trailer and in the mine pit. Windblown debris is picked up routinely and placed in trashcans. Trash is regularly taken to a licensed landfill for proper disposal. The risk of storm water contamination from trash and windblown debris is very low.

4.5.6 Miscellaneous Liquid Sources/Activities

The risk of storm water contamination from the transfer and storage of diesel fuel and processing chemicals, and other materials was described in Sections 4.5.1 and 4.5.2. The process water stream is not exposed to precipitation. Water sprayed on the roads soaks into the ground a short distance and then evaporates. No other water or liquids are used at the facility.

The risk of storm water and snowmelt contamination off-site is extremely low.

4.6 ON-SITE CONTRACTORS

4.6.1 On-site Contractors Not Under Earth Energy's Control

From time to time there are outside contractors that arrive with tanker trucks transport processed oil to off-site markets. They do not process any materials and are on site only for the 15-30 minutes it takes to arrive on site, load the truck, report at the office, and drive away. In the unlikely event that a leak, spill, or tip-over occurs to an outside contractor's vehicle, the plant site area is self-contained with berms that prevent release of fuels, waters, or sediments. A spill kit is maintained on site and clean-up begins immediately.

4.6.2 Service Contractors

Generally, fuel trucks make deliveries every few weeks. Transfer of fuel takes place within the SPCC containment area, away from surface water collection areas.

Process chemicals are delivered approximately every month to the concrete-surfaced process equipment area within the self-contained plant site area.

Propane is delivered to the office, maintenance shop, and warehouse, and crusher which are all within the self-contained plant site area, approximately once a month.

4.6.3 On-site Contractor Performing a Service for a Third Party

There are no on-site contractors that perform services for third parties.

5.0 MEASURES AND CONTROLS

This section describes various BMPs implemented at Earth Energy that minimize the contribution of storm water pollutants from Earth Energy's industrial activities. Some of these BMPs were briefly described in Section 4.0; others are introduced and fully described below. Unless otherwise noted, all of these practices were implemented at the time operations began.

5.1 GOOD HOUSEKEEPING

Good housekeeping BMPs generally refer to ongoing or regular practices to ensure that areas of the facility with a potential to contribute pollutants to storm water are kept clean and orderly. At the Earth Energy plant site, the following good housekeeping practices are in place:

Litter is controlled through employee awareness, trash receptacle placement, and frequent cleanup. New employees are instructed in litter control as part of their initial training. Wind blown litter and other debris at the facility is routinely removed.

Major repairs to and servicing of vehicles are conducted in the maintenance building, which has a concrete floor and is located within the bermed area. Only necessary servicing of process and mobile equipment, such as replacing a belt, is conducted in the pit.

Equipment is inspected regularly for leaks. Any fluids leaking from equipment located at the Earth Energy facility are collected along with any contaminated soil, and are either processed with the ore, or disposed of in accordance with applicable state and federal regulations. All spills are cleaned up immediately and reported as outlined in Section 5.3.

During fueling of vehicles and mobile equipment, a person remains with the vehicle or equipment so fuel transfer can be stopped quickly in case of an emergency. Absorbents or other clean up materials are available to ensure that any spills are quickly cleaned up.

5.2 PREVENTIVE MAINTENANCE

Vehicles, equipment, and machinery are maintained in good working condition to minimize the likelihood of discharging fluids. They are serviced on a regular schedule as appropriate. The maintenance intervals, inspections, and work performed are specific to that piece of equipment.

Roads are maintained with an adequate crown to shed water. Berms and ditches are maintained in good condition to reduce erosion and to minimize the amount of sediment transported by storm water.

5.3 SPILL PREVENTION AND RESPONSE PROCEDURES

The use of equipment and the filling of tanks and drums on site represent the largest potential source for liquid spills at the facility. Materials and equipment that are used to contain and clean up a spill includes bulldozers, loaders, absorbent materials, and catch basins and drip pans for leaks. Each person operating equipment or responsible for transferring diesel fuel or oil from one container to another is trained on spill prevention and response.

In the event of a spill or leak, the following actions are taken, as further detailed in the SPCC Plan:

- The person who discovers the spill stops the spill or leak at the source, if it is safe to do so, and contain the spread or migration of the spill by using spill response equipment or by building dirt containment berms.
- The person then notifies their immediate supervisor.
- The Site Operations Manager reports the spill in accordance with the internal reporting procedure outlined in Section 5.7.
- When spills of any size occur, quick containment procedures are implemented followed up with appropriate and timely cleanup and notification procedures. As per R317-6-6.15(B)(1), and UC 19.5.114, spills of 25 gallons or more of hydrocarbons, or spills of any substance that could pollute waters of the state are reported to the DWQ immediately.

5.4 INSPECTIONS

All tanks, valves, piping, and other material and chemical storage and conveyance facilities are inspected at least weekly, as required by the SPCC Plan, for leaks, malfunctions, damage, or maintenance.

Earth Energy performs visual inspections of all BMPs every calendar quarter to assure they are operating as intended. Sediment control devices are inspected once per week.

During these inspections, material handling and storage areas are checked for signs of erosion and sedimentation. Process, mobile, and obsolete or unused equipment is inspected to ensure that these items are in reasonable condition and are not leaking any fluids. Maintenance areas are inspected to ensure that fluids are properly stored within the maintenance shops. Any facilities, equipment, or structures requiring maintenance are recorded on an inspection form, which is completed and signed by the inspector at the time of inspection. A blank Quarterly Visual Inspection form is located in **Appendix C**.

Any evidence of excessive erosion or sedimentation identified on the inspection form is scheduled for repair. Any new problem areas or potential pollutant sources that have not been addressed by the SWP3 are identified. Deficiencies noted during an inspection are corrected as soon as possible after the inspection, and the SWP3 is revised, as needed. A description of these revisions to the SWP3 and the corrective actions taken is documented on the inspection form and retained as part of this plan. Completed Quarterly Visual Inspection forms are maintained with this SWP3 in **Appendix D** for a minimum of three years from the date of the inspection.

5.5 EMPLOYEE TRAINING

Employees who are responsible for implementing activities identified in this SWP3, are responsible for aspects of storm water management or control, or whose activities could result in increased storm water pollution receives storm water training. Training occurs on an annual basis with each session occurring no later than 12 months after the previous year's training. These training sessions consist of:

- A description of the SWP3 and its goals;
- Employee responsibilities under the SWP3;
- Education on storm water pollution prevention including:
  - spill prevention and response
  - fueling practices
  - good housekeeping
  - truck wash out procedures and equipment wash down procedures
  - identification of potential storm water pollution-related issues
  - material management practices;
- BMPs used or considered for use at the mine;
- Spill prevention and response;
- Question and answer period; and
- Other topics considered pertinent during each session.

The training program is reviewed annually and modified as necessary to meet facility conditions. Training records are retained as indicated in Section 5.6.

5.6 RECORD KEEPING REQUIREMENTS

Many types of records and reports are required by the storm water permit and the SWP3. The required records and their storage locations are listed in the following table. All records associated with the storm water permit and the SWP3 are retained for at least 3 years from the date that the report or record was generated. Employee training records are maintained for the length of employment. A copy of this SWP3 is maintained on site at the Earth Energy facility and will be made available upon request.

RECORDS/REPORTS and STORAGE LOCATION

RECORD or REPORT	STORAGE LOCATION
Blank and Completed Quarterly Visual Inspection Forms	Appendices C & D in SWP3
Blank and Completed Annual Site Compliance Evaluations	Appendices E & F in SWP3
Blank and Completed Quarterly Visual Monitoring Forms	Appendices G & H in SWP3
Completed Spill and Spill Cleanup Reports/Summaries	Appendix I in SWP3
Spill Prevention, Control and Countermeasure Plan	Appendix J
Employee Training Records	Human Resources

5.7 INTERNAL REPORTING PROCEDURES

If a spill or storm water contamination occurs, the person who discovers the spill reports the incident to their immediate supervisor, who then reports the spill to either the Site Operations Manager or another person in the line of authority, if the Site Operations Manager cannot be reached. The Vice President of Operations reports the spill or storm water contamination to the appropriate regulatory agencies as required.

5.8 NON-STORM WATER DISCHARGES

There are no non-storm water discharges from the site; an appropriately certified non-storm water evaluation is included in Appendix D along with the first quarterly inspection record. The SPCC containment area, the retention pond in the plant site area, and the pit itself provide spill containment for non-storm water-related liquids. In the event of a spill, the spilled substance collected in the retention pond or pit is removed and disposed in an appropriate manner in accordance with regulations and the SPCC Plan.

Water is used on site for dust suppression on roads and tailings stockpiles, and in the processing of the tar sands. The source of this water is both rainfall collecting in the plant site retention pond, and a well associated with water right number 41-352, allocated to Earth Energy from the

Uintah County Water Conservancy District. This well water is piped to the Earth Energy plant site (Figure 3). All well water and intercepted rainwater is stored on site in the lined retention pond at the plant site; water is also stored in tanks, which are outfitted with manifolds and valves to allow measured flow for dust control and/or processing uses.

The amount of water used for dust suppression is not enough to infiltrate and intercept groundwater, nor is it enough to produce runoff. Water used for processing is recycled or is entrained moisture in the tailings, as described in Section 2.1. The effect of this water on ground water resources was determined to be *de minimis*, as described in Section 4.5.1. Thus, there is very little opportunity for non-storm water pollution to affect ground or surface waters of the state.

5.9 SEDIMENT AND EROSION CONTROL

5.9.1 Site description

The Earth Energy mine site, at its full development, will affect approximately 213 acres of land. The mine excavates and processes tar sand ore from a mine pit and then processes it in an extraction facility in the plant site. These activities all take place within the 213-acre area. The runoff coefficient for the plant site and the open pit area is estimated at 0.85 and the runoff coefficient for the overburden/interburden storage areas is estimated at 0.25. Drainage patterns around the site and within the mine area are shown on Figure 2, Mine Map. If storm water were to discharge from the site, the receiving water would be an intermittent drainage in Main Canyon, which drains to the White River near Ouray, Utah.

Sedimentation and erosion issues are controlled using several practices and control measures. Sediment control devices, such as silt fences, are inspected once per week. These control measures and features are outlined below.

5.9.2 Control measures

Vegetation is left in place as much as possible. Inactive and undisturbed areas of the property are covered with a variety of grasses, forbs, and shrubs. This vegetation enhances infiltration and impedes storm water and snowmelt runoff, which minimizes the potential to erode the underlying soil. In addition, vegetation filters out sediment that may be transported in the runoff so that the sediment remains on site.

Roads either drain toward the pit or toward the plant site. As needed, certain haul roads are ditched, and when the grade increases to above two percent, water turn-outs are constructed to prevent erosion of the road base.

All topsoil piles are bermed to catch eroded material and prevent run-on and run-off of storm water.

The plant site is constructed to be a self-contained area using perimeter berms or ditches as needed to direct runoff. Ditches are designed to pass the 10-year, 6-hour precipitation event. All precipitation incident to the plant site is collected in the water retention pond.

located at the low point of the site (Figure 3). This pond is cleaned of sediments as needed.

5.9.3 Mine and Overburden/Interburden storage areas

Two overburden/interburden storage areas (waste piles) are being constructed. To prevent erosion of fine material on the outslopes of these piles during mining, initially produced sand tailings is impounded within bermed storage cells constructed of compacted, coarse overburden materials in the upper reaches (flattest) areas of the overburden/interburden storage areas. Eventually, each 15-20 foot tall cell will be filled with commingled clean sand/clay fine tailings. When the first cells are filled to capacity, successive tiered levels will be constructed until the mine pit has sufficiently advanced to permit direct replacement of the tailings back into the mine. To control erosion, the top surfaces of these storage areas will be maintained with a very slight grade away from the outslope to minimize runoff away from the mine. During mining, coarser materials typically end up near the toe of expanding fills, providing a natural energy dissipater for storm runoff from the faces of the dumps catching any fines between the coarse rock.

Tailings placed in the upper reaches of the overburden/interburden storage areas will ultimately become fully encapsulated within the finished and reclaimed overburden/interburden storage areas. Upon reclamation, runoff generated from the outslopes of the overburden/interburden storage areas will be controlled by facing the steepest sections of the finished slopes with coarse overburden material and dedicated armoring placed within the contact between the pile and the native slope (essentially forming a triangular channel-type feature).

5.9.4 Off-site Vehicle Sediment Tracking

To minimize off-site vehicle sediment tracking, mining equipment is dedicated to the site and remains on site. Travel ways within the plant site are graveled or compacted to minimize sediment production. The plant site is serviced by a dirt county access road. There is no net change in the amount of sediment entering or leaving the plant area. The possibility that a measurable sediment volume would get tracked off site is too low to warrant additional controls.

5.10 RUNOFF MANAGEMENT

Most storm water and snowmelt is captured in the pit or the plant site. Roads are sloped or crowned so that water drains off the roads instead of running down the road and causing ruts to develop. The roads are also periodically bladed to minimize the development of ruts. Berms and conveyance ditches divert water to the pit, where water either evaporates or infiltrates, or to the plant site and the lined retention pond, where water evaporates or is re-used, as described in the preceding sections.

The only water that could leave the site comes from the overburden storage sites. As noted in Section 4.1 and 5.9.2, sediment release is controlled and minimized through the construction of "storage cells" and the natural sorting of the overburden materials that takes place as overburden is placed on the dump. The use of armoring and rip-rap around the sides and base of the dumps

also capture sediment, minimizing the volume of runoff and/or sediments that reaches waters of the state.

No additional management practices are necessary or recommended.

5.11 REPORTABLE QUANTITY (RQ) RELEASE

A SPCC Plan is in place. The SPCC Plan addresses response to releases as well as procedures for developing corrective measures following a release. Earth Energy complies with all federal, state, and local regulations for spill prevention and control, and the Special Conditions in Part II B of that permit.

Based on the size and content of the spill, the following agencies are contacted:

Type of Incident	Division	Office Hours Phone	After Hours Phone
Release affecting waters of the state*	Water Quality	801-536-6146	801-536-4123
Petroleum products not affecting water	Environmental Response & Remediation	801-536-4100	
Hazardous Waste spills	Solid & Hazardous Waste	801-538-6170	
CERCLA/EPCRA Hazardous Substances*	Environmental Response & Remediation	801-536-4100	

*** May also require notification of the National Response Center (1-800-424-8802)**

Table from Utah Department of Environmental Quality, Division of Environmental Response and Remediation web page. Accessed March 2009 at http://www.superfund.utah.gov/spills.htm.

5.12 VEHICLE AND EQUIPMENT STORAGE AREAS

The facility operates 24 hours per day, approximately 350 days per year, not including unscheduled shutdowns/outages. Parking areas are graveled. Process equipment is skid-mounted and located on a gravel pad. The warehouse and maintenance shop are 'Sprung-type" semi-permanent structures on concrete pads and are used for vehicle and equipment maintenance tasks. The warehouse and equipment maintenance buildings have concrete floors and containment system to capture any spills. Any spilled liquids are collected and disposed of in accordance with federal, state, and local regulations and as described in the facility SPCC Plan.

5.13 VEHICLE AND EQUIPMENT CLEANING AND MAINTENANCE AREAS

Most vehicle and equipment maintenance is performed on site. Maintenance is performed in the maintenance building as much as possible; the building has a concrete floor and containment for any spills or leaks. Equipment cleaning occurs in an on-site area with appropriate containment. All wash water goes to the storm water retention pond and is used on site (e.g. dust control).

5.14 MATERIALS AND CHEMICAL STORAGE AREAS

The major material and chemical storage area on site is the tank farm which has secondary containment and is covered by the site SPCC Plan. Chemicals and materials stored in smaller quantities are stored in the maintenance or warehouse building, and are properly labeled as to their contents and hazard. Leaking or damaged containers are replaced or repaired and any spilled material is collected and disposed in accordance with all federal, state, and local regulations.

5.15 CHEMICAL MIXING AREAS

Any chemical mixing occurs within the enclosed extraction facility, which is fully contained and controlled. The SPCC Plan fully describes the methods and procedures that are used to respond to any spill, and the steps that are taken to ensure that there are no recurrences. Any small quantity use or mixing of chemicals occurs in an area with secondary containment and full controls, such as the testing laboratory and maintenance building. Chemical transfer areas, such as the product terminal and loading/unloading facilities, are within the plant area and so are within a self-contained area. These areas are inspected on a weekly basis. See Section 5.7 above for specifics of the monitoring and inspection procedures.

6.0 COMPREHENSIVE SITE COMPLIANCE EVALUATION

Some or all of the members of the Pollution Prevention Team complete an Annual Site Compliance Evaluation. A blank Annual Site Compliance Evaluation form is located in **Appendix E**. Completed forms are maintained in **Appendix F** in order to provide a record of the evaluations. The Annual Site Compliance Evaluation is conducted to: 1) confirm the accuracy of the description of potential pollution sources contained in the plan, 2) determine the effectiveness of the plan, and 3) assess compliance with the terms and conditions of the storm water permit.

Areas that are evaluated are those that contribute, or may contribute, to storm water contamination and include, but are not limited to: process equipment areas, material storage and handling areas, storage tanks and oil drums, the warehouse and maintenance buildings, outslopes of overburden waste piles, road ditches, and the sediment retention pond. Measures to reduce pollutant loadings are evaluated to determine whether they are adequate and properly implemented or whether additional controls are needed. Storm water management measures and sediment and erosion control measures are observed to ensure that they are operating correctly. An inspection of spill control equipment, containment systems, and other equipment or structures is also made.

If an area of noncompliance is discovered during this inspection, the following steps are implemented:

- Evaluate source of noncompliance;
- Take corrective action within required time frame as outlined in the General Permit;
- Document the entire event as part of the annual inspection report;

- Revise the SWP3 as needed; and,
- File a report with the agency, if required.

Based on the results of the evaluation, the description of potential pollutant sources and pollution prevention measures and controls identified in this SWP3 are revised as appropriate within two weeks of the evaluation. Any revisions to the SWP3 are implemented by the facility within 12 weeks of the evaluation.

An annual inspection report is prepared that summarizes:

- The scope of the evaluation
- Personnel making the evaluation
- Date(s) of the evaluation
- Major observations relating to the implementation of the SWP3
- Actions taken to revise the plan.

The report identifies any incidents of noncompliance or certifies that the facility is in compliance with the SWP3 and the General Multi-Sector Permit for Storm Water Discharges. The evaluation reports are retained with this SWP3 for a period of three years from the date of the evaluation. The company owner or a duly authorized representative of the owner signs the reports. Designations as duly authorized representatives under this SWP3 are made in writing to the *Executive Secretary* of the Utah Water Quality Board.

7.0 NUMERIC EFFLUENT LIMITATIONS

There are no numeric effluent limitations or additional requirements for storm water discharges associated with industrial activity from oil and gas extraction facilities (Appendix II, Sector I) that apply to this facility.

8.0 MONITORING AND REPORTING REQUIREMENTS

Under the terms of the General Permit and the relevant Sector 1 requirements, an analytical water monitoring program is not required. The required visual monitoring is described below.

8.1 QUARTERLY VISUAL MONITORING REQUIREMENTS

In the two locations (at the toes of the two overburden/interburden storage areas, downstream of the sediment traps/energy dissipaters) where occasional storm water discharge may occur, visual monitoring occurs once per quarter every year. Guidelines for visual monitoring are listed below.

8.1.1 Visual Monitoring Periods

A visual examination of storm water discharges is performed and documented on a quarterly basis (January-March, April-June, July-September, and October-December) during daylight hours unless rainfall or snowmelt is insufficient to produce a runoff event. All observations are recorded on a Quarterly Visual Monitoring Report Form (a blank form is contained in **Appendix G**). If a sample is not taken due to insufficient rainfall or snowmelt runoff, a report form is still completed by filling in the heading and checking the box that indicates no sample was taken due to insufficient rainfall or snowmelt. Completed forms are maintained in **Appendix H**.

8.1.2 Sample and Data Collection

A minimum of one grab sample per discharge or runoff area is taken during the first 30 minutes when the runoff or snowmelt begins discharging. The sample is examined in a well-lit area. All observations are recorded on the Quarterly Visual Monitoring Report Form. Each sample is collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event.

8.1.3 Visual Discharge Examination Reports

Visual examination reports are maintained on-site in the SWP3. Each report includes the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the storm water discharge as noted in 8.1.2 above, and probable sources of any observed storm water contamination. All observations are recorded on a Quarterly Visual Monitoring Report form. A blank form is contained in **Appendix G**, and completed forms are maintained in **Appendix H**.

8.1.4 Adverse Conditions, Inactive and Unstaffed Sites

If a sample cannot be collected within a specific quarter due to adverse weather conditions, the reason is documented on the report form and placed in **Appendix H** with the other completed forms. Adverse weather conditions that may prohibit the collection of samples include dangerous weather conditions (high winds, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

9.0 SWP3 MODIFICATION

This SWP3 is amended whenever:

1. There is a significant change in the acreage disturbed; or a significant change to the design, construction, operation, or maintenance of on-site facilities that could have a significant effect on the quantity or location of discharge of pollutants to the waters of the state and which has not otherwise been addressed in the plan;

2. Inspections or investigations by site operators; or local, state, or federal officials indicate that the SWP3 is not effective in eliminating or significantly minimizing pollutants from sources identified in this plan, or the SWP3 is otherwise not achieving the general objectives of controlling pollutants in storm water discharges associated with the mine.

This SWP3 is also modified within 14 calendar days of knowledge of a release in excess of reportable quantities of hazardous substances or oil into the storm water discharge(s) from the site. The modification process includes:

- A description of the release
- The circumstances leading to the release, and the date of the release
- A SWP3 review to identify measures to prevent the reoccurrence of such releases and to respond to such releases.

The SWP3 is modified where appropriate following this review.

10.0 CERTIFICATION

In accordance with Section VI.G of the General Permit, the company owner, or a duly authorized representative of the owner, has provided the following certification:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information contained in the plan. Based on my inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information contained in this document is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for providing false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name	Signature
Title	Date

Appendix A

UPDES General Multi-Sector Industrial Storm Water Permit
Appendix II Sector I,
and
Notice of Intent

The UPDES General Permit and Notice of Intent is pending and this page will be replaced when the UPDES NOI accepted by DWQ.

Appendix B

Figures

(Location and Site Maps)

Figure 1 Location Map

Figure 2 Mine Site Map

Figure 3 Processing Plant Map

Appendix C

Blank Quarterly Visual Inspection Form

Quarterly Visual Inspection Form

Earth Energy Resources, Inc.
Suite #740 404–6th Ave. SW
Calgary, Alberta T2P 0R9

INSPECTORS NAME:	
INSPECTION DATE:	INSPECTION TIME:

Directions: Perform a walk-through of the facility when rain is not falling and check YES or NO for each item. Record any corrective actions that are needed. Review the SWP3 and complete Section 4. Describe the corrective actions that were taken in Section 5.

1. Housekeeping	**YES**	**NO**	**Corrective Actions/Maintenance Required**
• Litter is picked up?			
• Trash receptacles not overflowing?			
2. Materials and Equipment	**YES**	**NO**	**Corrective Actions/Maintenance Required**
• Tailings storage piles located within mine pit?			
• Process, mobile, and obsolete equipment positioned within mine pit?			
• Any signs of leakage from process, mobile, and obsolete equipment?			
• Preventive maintenance has been performed on mobile equipment?			
• Storage tanks and oil drums not leaking?			
• Secondary containment areas for tanks and drums in good condition?			
3. General	**YES**	**NO**	**Corrective Actions/Maintenance Required**
• Any evidence of erosion on slopes or berm along east side?			
• Unpaved roads & parking areas in good condition (*i.e.*, no erosion or ruts)?			
• Any new problem areas or potential pollutant sources?			

4. SWP3 Review

If deficiencies were noted above, are changes to the SWP3 required? YES NO
If yes, describe the revisions that were made: _____

5. Corrective Actions Taken

For the Corrective Actions/Maintenance Required that were identified above, enter the action that was taken and the date: _____

Appendix D

Completed Quarterly Visual Inspections Forms

Appendix E

Blank Annual Site Compliance Evaluations

Annual Site Compliance Evaluation Report

Earth Energy Resources, Inc.

Suite #740 404–6th Ave. SW

Calgary, Alberta T2P 0R9

INSPECTORS NAME:	
INSPECTION DATE:	INSPECTION TIME:

1. Perform a walk-through of the facility. Inspect the following areas and answer the questions.

_____	Ore storage piles	_____	Oil storage drums
_____	Diesel storage tanks	_____	Secondary containment areas for drums and tanks
_____	Process equipment (power plant, sand de-watering equipment, retorts, crushers, hoppers, screens, etc.)	_____	Unpaved roads and parking areas
		_____	Water truck fill station
_____	Mobile equipment	_____	Berm along east side
_____	Obsolete equipment	_____	Spill response equipment

• Were any substantial erosion problems on the roads or berm on east side identified during the walk-through? If yes, explain:_____	**YES**	**NO**
• Any new storm water contaminants or pollutant sources identified during the walk-through? If yes, explain:_____	**YES**	**NO**
• Secondary containment areas for tanks and oil drums in good condition? If no, explain:_____	**YES**	**NO**
• Additional measures required to reduce pollutant loadings? If yes, explain:_____	**YES**	**NO**
• Spill response equipment in place? If no explain:_____	**YES**	**NO**

2. Review the SWP3 and the Storm Water Permit.

• Have the BMPs in the SWP3 been effective at minimizing storm water runoff and contamination? If no, explain:_____	**YES**	**NO**
• Were any deficiencies in the SWP3 identified? If yes, explain:_____	**YES**	**NO**
• Any components of the SWP3 no longer apply or are incorrect? If yes, explain:_____	**YES**	**NO**

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• Are the descriptions of the potential pollutant sources accurate (Section 4.2)? If no, explain:_____	**YES**	**NO**
• Does the facility comply with the requirements in the Storm Water Permit? If no, explain:_____	**YES**	**NO**

3. Actions Required: If an explanation is required for any of the above questions, is reporting to a regulatory agency required or revisions to the SWP3 needed?	**YES**	**NO**

If yes, describe the actions taken:_____

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4. Certification:

If the evaluation does not identify any incidents of noncompliance, a responsible corporate officer* must sign the following certification:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature	Printed Name
Title	Date

* A responsible corporate officer is the president, secretary, treasurer, or vice-president of the corporation or a person who is a duly authorized representative of that person.

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Appendix F

Completed Annual Site Compliance Evaluations

Appendix G

Blank Quarterly Visual Monitoring Forms

Quarterly Visual Monitoring Report Form

Earth Energy Resources, Inc.
Suite #740 404–6th Ave. SW
Calgary, Alberta T2P 0R9

INSPECTORS NAME:	INSPECTION DATE:	INSPECTION TIME:

MONITORING PERIOD: FROM: MONTH_____ DAY_____ YEAR_____ TO: MONTH_____ DAY_____ YEAR_____
DURATION OF STORM EVENT:_____ HOURS **RAIN FALL MEASUREMENT:**_____INCHES
TIME ELAPSED BETWEEN RECORDED AND PREVIOUS STORM EVENT:_____DAYS
TYPE OF EVENT: _____ STORM WATER RUNOFF _____ SNOWMELT

IF NO SAMPLE WAS TAKEN DURING THIS MONITORING PERIOD, CHECK THE APPROPRIATE BOX:

☐ NO DISCHARGE OR RUNOFF DUE TO INSUFFICIENT RAINFALL OR SNOWMELT

☐ ADVERSE WEATHER CONDITION, LIST CONDITION:

_____

PART 1: Sample and Data Collection

1. Collect one or more storm water runoff samples during a storm event that is greater than 0.1 inches and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event or when runoff from snowmelt occurs.
2. Collect samples within the first 30 minutes (or as soon thereafter as practical, but not more than 1 hour) of when the runoff or snowmelt begins discharging.
3. Examine the sample in a well-lit area and fill in each column for each sample taken.

NOTE: No laboratory tests are required to be performed on the samples.

SAMPLE #	SAMPLE LOCATION	COLOR & INTENSITY	CLARITY	ODOR	SOLIDS	OTHER POLLUTANT INDICATORS	COMMENTS and PROBABLE SOURCES of CONTAMINANTS

COLOR:	COLOR INTENSITY:	CLARITY:	ODOR:	SOLIDS:	OTHER POLLUTANT INDICATORS:
DG = Dark Gray LG = Light Gray LB = Light Brown MB = Medium Brown DCB = Dark Chocolate Brown Other = Write in color BL =Black G =Green T = Tan Y=Yellow	VI = Very Intense P = Prominent MP = Moderately Perceptible HP = Hardly Perceptible	TO = Totally Opaque (cannot see through) ST = Slightly translucent NT = Nearly translucent TL = Translucent TP = Transparent	D = Diesel P = Petroleum M = Musty NO = No odor SU = Sulfur (Rotten Egg) Other = write in odor and explain in Comments column G = Gasoline SO = Solvent SE = Sewage NX=Noxious	NS = No solids FS = Floating solids SS = Suspended and settled solids Provide description of solids in Comments column	F = Foam OS = Oil sheen Other = write in any other indicators and explain in the Comments column

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PART 2. Site Walk-through and SWP3 Review

1. Perform a walk-through of the facility during the storm water or snowmelt runoff event.
2. Check YES or NO for each item.
3. Record any corrective action or maintenance that is needed.
4. Review the SWP3 and complete Section 2.
5. Describe the corrective actions that were taken in Section 3.

1. General	YES	NO	Corrective Actions/Maintenance Required
• Any evidence of erosion on slopes or berm on east side?			
• Is runoff leaving the property anywhere?			
• Any erosion or ruts along unpaved roads and parking areas?			
• Any oil sheen or foam on rainwater or snowmelt that are in puddles?			
• Any new problem areas or potential pollutant sources?			

2. SWP3 Review

If deficiencies were noted above, are changes to the SWP3 required? YES NO

If yes, describe the revisions that were made:_____

3. Corrective Actions Taken

For the Corrective Actions/Maintenance Required that were identified above, enter the action that was taken and the date:

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Appendix H

Completed Visual Monitoring Forms

Appendix I

Spill and Spill Cleanup Reports and Summaries

Appendix J

Spill Prevention, Control, and Countermeasure (SPCC) Plan

The SPCC Plan is being written and will be inserted when available.