



# United States Department of the Interior

## BUREAU OF LAND MANAGEMENT

Elko District Office

3900 Idaho Street

Elko, Nevada 89801

[http://www.blm.gov/nv/st/en/fo/elko\\_field\\_office.html](http://www.blm.gov/nv/st/en/fo/elko_field_office.html)



In Reply Refer To:  
3809 (NVE0300)  
NVN-082445

MAY 12 2010

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Dear Interested Party:

DEPARTMENT OF ADMINISTRATION  
OFFICE OF THE DIRECTOR  
BUDGET AND PLANNING DIVISION

Fronteer Development (USA) Inc. (Fronteer) submitted a plan of operations amendment to their Long Canyon Exploration Project located on the east side of the Pequop Mountains, currently within sections 20, 21, 28, 29, and 32, T. 36 N., R. 66 E. Fronteer proposes to expand their current plan of operations boundary to include sections 17, 19, 30, and 31, T. 36 N., R. 66 E., and sections 4, 5, and 6, T. 35 N., R. 66 E. Fronteer has proposed an additional 69.43 acres of new surface disturbance to cut drill roads, build drill pads, construct exploration trenches, and drill exploration holes within the expanded plan of operations boundary.

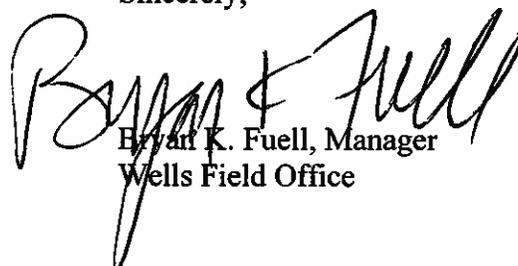
Currently, Fronteer is authorized for 44.93 acres of surface disturbance within the plan of operations boundary, which includes public, private, and split estate lands. The Long Canyon project is permitted through both the BLM and the Nevada Division of Environmental Protection (NDEP). The plan of operations amendment can be viewed on the BLM website under "Links of Interest:" [http://www.blm.gov/nv/st/en/fo/elko\\_field\\_office.html](http://www.blm.gov/nv/st/en/fo/elko_field_office.html)

The BLM is seeking comments on the plan amendment and is also soliciting input on potential issues, impacts, and alternatives that the commentor thinks should be addressed in an environmental analysis. Comments and input should be submitted to the BLM as described below by June 11, 2010.

Written comments on the Long Canyon Exploration Plan Amendment should be mailed to: BLM Elko District, Attn: Whitney Wirthlin, 3900 E. Idaho Street, Elko, NV 89801, or via email to: [whitney\\_wirthlin@blm.gov](mailto:whitney_wirthlin@blm.gov). Upon completion, the environmental analysis for this amendment will be posted to the BLM website noted above for review and comment for 15-30 days before a decision on the proposed amendment will be completed.

If you have questions, please contact Whitney Wirthlin, Wells Field Office Geologist, at (775) 753-0342, or via email: [whitney\\_wirthlin@blm.gov](mailto:whitney_wirthlin@blm.gov).

Sincerely,

  
Bryan K. Fuell, Manager  
Wells Field Office

**FRONTEER DEVELOPMENT (USA), INC.  
LONG CANYON EXPLORATION PROJECT  
PLAN OF OPERATIONS (NVN-82445)  
AND  
NDEP RECLAMATION PERMIT (NO. 0284)**

**2010 AMENDMENT  
Expanded Exploration and Groundwater Monitoring Well Drilling  
March 2010**

*Submitted by*

Fronteer Development (USA) Inc.  
1031 Railroad Street Suite 110  
Elko, NV 89801

*Submitted to*

Bureau of Land Management  
Elko Field Office  
3900 East Idaho Street  
Elko, Nevada 89801

and

Nevada Division of Environmental Protection  
Bureau of Mining Regulation and Reclamation  
901 South Stewart Street, Suite 4001  
Carson City, Nevada 89701-5249

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## INTRODUCTION

As shown in Figure 1, the Long Canyon Project is located in the eastern Pequop Mountains approximately 28 miles east-southeast of the town of Wells, in Elko County, Nevada. (All figures are located in Appendix A). Fronteer Development (USA), Inc. (Fronteer), operator of the Long Canyon Joint Venture, a joint venture between Fronteer and AuEx, Inc., is submitting this amendment to Plan of Operations NVN-82445 and to Reclamation Permit No. 0284 (hereinafter referred to as the 2010 Amendment) to the Bureau of Land Management, Elko District Office (BLM), and the Nevada Division of Environmental Protection/Bureau of Mining Regulation and Reclamation (NDEP/BMRR) for the Long Canyon Exploration Project. The purpose of the 2010 Amendment is to expand the Plan of Operations boundary and to drill additional exploration holes and groundwater monitoring wells. The proposed activities would create 69.43 acres of new surface disturbance on public lands for a total authorized and proposed surface disturbance on public lands regulated by the 43 CFR 3809 regulations of 114.36 acres.

The 2010 Amendment is submitted in accordance with BLM's Surface Management Regulations at 43 C.F.R. Subpart 3809, ("3809 regulations") and Nevada reclamation regulations at Nevada Administrative Code (NAC) 519A. The format for the 2010 Amendment is consistent with the BLM, NDEP/BMRR, and the United States Forest Service Memorandum of Understanding which establishes that BLM and NDEP will use a joint Plan form acceptable to both agencies.

### Project Area and Plan of Operations Boundary

As shown in Figure 2, the existing Plan of Operations boundary is located in portions of Section 20, 29, 28 and 32 in Township 36 North, Range 66 East (T36N, R66E), Mount Diablo Base & Meridian (MDB&M), Elko County, Nevada. The 2010 Amendment adds the following sections of public land to the Plan of Operations boundary:

#### T36N, R66E:

Section 17, Section 19, the remainder of Section 20, Section 30, Section 31, and the remainder of Section 32

#### T35N, R66E:

Sections 4, 5, and 6

The expanded Plan of Operations boundary is comprised of 5,348 acres of public land governed by BLM's 3809 regulations. Together, the existing and expanded Plan of Operations boundary covers 6,779 acres. The Long Canyon Joint Venture controls the unpatented mining claims on the public lands within the Plan of Operations boundary. Appendix B is a list of the mining claims included in the 2010 Amendment.

Figure 2 also shows that the Long Canyon project area includes split estate lands in Section 21 and in the NE/4 of Section 29, T36N, R66E on which Fronteer owns the minerals. Fronteer's

ownership of the private mineral estate in Section 21 and NE/4 Section 29, T36N, R66E includes a broad right to use the surface of the land for exploration and mineral development purposes pursuant to the Grant, Bargain and Sale Deed to Joint Tenants dated October 18, 1946. Section 2 presents more information about the mineral and surface use rights granted by this deed.

In 2006, NDEP/BMRR issued Reclamation Permit No. 0256 for the mineral exploration activities on the private mineral lands. NDEP Reclamation Permit No. 0256 currently authorizes 54.93 acres of surface disturbance on the split estate lands as shown on Figure 2. Fronteer has provided NDEP/BMRR with financial assurance in the amount of \$223,125 to guarantee reclamation of these lands. Fronteer is not proposing to expand or modify NDEP Reclamation Permit No. 0256 at this time.

Although the 3809 regulations do not apply to these split estate lands because the minerals are privately owned, Fronteer has nonetheless made a commitment to BLM that the company will conduct all exploration activities on these split estate lands in a manner that is substantially consistent with the environmental performance standards in the 3809 regulations at 43 CFR 3809.420. This commitment is specified in the application for NDEP Reclamation Permit No. 0256 and is included as one of the Environmental Protection Measures described in Section 2.1.11 of the July 2008 Environmental Assessment that BLM prepared for the Long Canyon Project. In this manner, BLM has fulfilled its requirement to ensure that the activities on public lands – including those lands not subject to the 3809 regulations – comply with the FLPMA mandate to prevent unnecessary or undue degradation.

#### Long Canyon Notice and Plan of Operations History

Fronteer's joint venture partner, AuEx, Inc., started exploration in the S1/2, Section 29, T36N, R66E under a BLM Notice (#N-79949) which authorized 4.93 acres of surface disturbance. In 2007, Fronteer's predecessor company, NewWest Gold USA Inc., submitted a Plan of Operations/Reclamation Permit application to expand the exploration activities on its mining claims beyond the 5 acres of surface disturbance authorized under a Notice. NDEP/BMRR approved Reclamation Permit No. 0284 in August 2008. BLM Elko District Office approved the Plan of Operations (NVN-82445) in September 2008. The Plan of Operations and NDEP/BMRR Reclamation Permit No. 0284 authorize 44.93 acres of surface disturbance on public lands open to location under the Mining Law. In July 2009, BLM and NDEP/BMRR approved Amendment 2009-1 to expand the project boundary to include 40 acres in the SE1/4 of SE1/4, Section 20, T36N, R66E. Amendment 2009-1 did not propose an increase in the authorized surface disturbance. In September 2009, Fronteer submitted Amendment 2009-2 to drill nine groundwater monitoring wells. However, in November 2009, Fronteer withdrew Amendment 2009-2.

As approved, Plan NVN-82445 also includes two staging areas and ancillary facilities that require authorization under BLM's surface occupancy regulations at 43 CFR 3715 regulations. The staging areas are used to store drilling materials such as drilling fluids, sample bags, core

boxes, etc. These materials are stored in trailers and/or temporary metal storage facilities. A Sani-Hut facility is located on the lower staging area during the field season. A student working as a summer field assistant may from time to time camp in the project area during the course of conducting field investigations. Camping will entail either car camping or the use of a tent or a trailer. Any on-site camping will comply with BLM fire-prevention guidelines and the camper will be equipped with suitable and necessary fire suppression equipment, such as fire extinguishers and hand tools. Camping will not occur in the winter or during other periods of extended inclement weather.

Because this is an exploration project, exact locations for each of the exploration roads, drill sites, groundwater monitoring wells, trenches, and bulk sample sites to be constructed are not known at this time. Future drilling areas, groundwater monitoring well locations, and trenching and bulk sampling areas will be selected in response to the results obtained from subsequent exploration efforts.

In order to provide BLM and NDEP/BMRR relevant data concerning surface disturbance and financial assurance requirements associated with the future phases, Fronteer will provide BLM and NDEP/BMRR with annual documentation of surface disturbance locations and any completed concurrent reclamation as required by Nevada Revised Statute (NRS) 519A and NAC 519A before April 15<sup>th</sup> of the following year. Table 1 shows the currently authorized surface disturbance and the proposed surface disturbance.

**Table 1**  
**Long Canyon Project Area**  
**Authorized and Proposed Surface Disturbance and Governing Permits**

Exploration Activity	Mineral Estate Land Status	Authorized and Proposed Disturbance Acres and Governing Permits				
		NDEP Permit 0256	Notice	Current Plan NVN82445 NDEP Permit No 0284	2010 Proposed Amendment	Total Acres
Roads	Private	35.76	0.00	0.00	0.00	<b>35.76</b>
	Public	0.00	4.24	26.55	59.02	<b>89.81</b>
Drill Sites <sup>1</sup>	Private	16.60	0.00	0.00	0.00	<b>16.60</b>
	Public	0.00	0.69	12.73	9.24	<b>22.66</b>
Overland Travel	Private	2.13	0.00	0.00	0.00	<b>2.13</b>
	Public	0.00	0.00	0.00	0.00	<b>0.00</b>
Overland Sites & Staging Areas <sup>2</sup>	Private	0.44	0.00	0.00	0.00	<b>0.44</b>
	Public	0.00	0.00	0.40	0.23	<b>0.63</b>
Trenches & Bulk Sample Sites	Private	0.00	0.00	0.00	0.00	<b>0.00</b>
	Public	0.00	0.00	0.32	0.94	<b>1.26</b>
<b>Total Disturbance</b>	<b>Private</b>	<b>54.93</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>54.93</b>
	<b>Public</b>	<b>0.00</b>	<b>4.93</b>	<b>40.00</b>	<b>69.43</b>	<b>114.36</b>
<b>Total Combined Authorized Disturbance Acres (Public and Private)</b>						<b>169.29</b>

- 1 The acreage for drill sites includes the disturbance associated with the sumps and the drill sites that will be used for groundwater monitoring wells.
- 2 For purposes of calculating reclamation costs, the overland sites and staging areas are included in the "Yard" category on the attached RCE.

## **1. OPERATOR/CLAIM INFORMATION**

### **1.1 Operator Information**

Applicant: Fronteer Development (USA), Inc.  
1031 Railroad Street Suite 110  
Elko, NV 89801

Contact: Dan Anderson

Telephone: (775) 777-2900  
Fax: (775) 777-2901  
Cell: (775) 750-4506

### **1.2 Individual Completing Application**

Dan Anderson  
Fronteer Development (USA), Inc.  
1031 Railroad Street Suite 110  
Elko, NV 89801

Application Date: May 2007, Revised August 2008, Amended May 2009,  
Amended January 2010

### **1.3 Business Address of Individual Completing Application**

Fronteer Development (USA), Inc.  
1031 Railroad Street Suite 110  
Elko, NV 89801

### **1.4 Telephone Number of Individual Completing Application**

Telephone: (775) 777-2900  
Fax: (775) 777-2901  
Cell: (775) 750-4506

### **1.5 Corporate Information**

President: Jim Lincoln  
Fronteer Development (USA), Inc.  
1031 Railroad Street Suite 110  
Elko, NV 89801

Chief Financial Officer:

None

Secretary: Judd Merrill  
1031 Railroad Street Suite 110  
Elko, NV 89801

Nevada Registered Agent:

The Corporation Trust Company of Nevada  
6100 Neil Road, Suite 500  
Reno, Nevada 89511  
Telephone: 775-688-3061

Taxpayer Identification Number: Provided separately

## 1.6 Partnership Information

Not Applicable.

## 1.7 Authorized Field Representative Information

Fronteer personnel, or their agents, will be onsite during all Project related activities and will be responsible for implementing and ensuring that all activities are completed in accordance with this Amended Plan.

### Emergency Contact Information:

Dan Anderson, Environmental Manager	Kent Samuelson, Project Manager
Telephone: (775) 777-2900	Telephone: (775) 777-2900
Fax: (775) 777-2901	Fax: (775) 777-2901
Cell: (775) 750-4506	Cell: (775) 530-0434

## 1.8 Claimant/Claim Information (if different than operator information)

Claimant(s) Name: **Pittston Nevada Gold Company, Ltd. and AuEx, Inc.**

Claim Owners Address: 940 Matley Lane, Suite 17  
Reno, Nevada 89502

Claim Lessor: N/A

Claim Lessor Address: N/A

Primary Commodity: Gold

Claim Name(s): See Appendix B

BLM Serial Number of Mining Claim(s) where disturbance will occur:  
See Appendix B

Claim Type(s): Unpatented lode mining claims.

## **2. DESCRIPTION OF PROJECT**

### **2.1 Legal Description**

The following is a list of the public lands in the existing Plan of Operations boundary and the sections that the 2010 Amendment is adding to the Plan of Operations boundary.

#### T36N, R66E:

Existing Plan of Operations Boundary:  
Portions of Sections 20, 28, 29, and 32

Additions to Plan of Operations Boundary in the 2010 Amendment  
Sections 17 and 19, the remainder of Section 20, Sections 30 and 31, and the remainder of Section 32

#### T35N, R66E

Sections 4, 5, and 6

The expanded Plan of Operations boundary for the 2010 Amendment covers approximately 5,348 acres of public land governed by BLM's 3809 regulations for hardrock minerals on lands open to location under the U.S. Mining Law.

### **2.2 Surface Ownership of the Land Within the Area of Operation**

The surface ownership is shown on Figures 1 and 2.

#### **2.2.1 Private Lands**

There are no private lands in the Plan of Operations boundary, but there are private lands in the project area. The surface of the private lands in the project area is owned by Big Spring Ranch LLC. As shown on Figure 2, Fronteer owns the mineral estate in the project area (i.e., in Section 21 and NE1/4 Section 29, T36N, R66E).

Surface Owner: Big Spring Ranch, LLC  
P.O. Box 81624  
Las Vegas, NV 89180-1624

## **2.2.2 Public Lands - BLM Administered**

The NE1/4 of Section 29 and the W1/2 of Section 21, T36N, R66E are split estate lands where Fronteer owns the mineral estate and BLM manages the surface estate. Together, these parcels comprise approximately 480 acres. BLM acquired the surface estate on these two parcels through a land exchange in 1999 subject to a mineral reservation in a 1946 deed which gives the owner of the mineral estate broad rights to use the surface for mineral purposes. Fronteer, as the owner of the mineral estate has surface rights that include “all right, title and interest, to coal, oil, gas and other minerals of every kind and within said lands, including the right to the use of so much of the surface thereof as may be required in prospecting for, in locating, developing, producing and transporting said coal, oil, gas or minerals and any of their by products thereof”. Copies of the 1946 Deed that describes the mineral ownership and surface use rights and the 1999 Warranty Deed that describes the land exchange and the exclusion of the mineral ownership are included as Appendix C.

The remainder of the public land in the project area is public land on which BLM manages both the surface and mineral estates. BLM’s 3809 surface management regulations for hardrock mining govern mineral activities on these lands.

## **2.2.3 National Forest System Lands - USFS Administered**

None

## **2.2.4 State Lands**

None

## **2.3 Description of Operations**

The 2010 Amendment proposes to expand the location of Fronteer’s mineral activities as shown in Figure 3. Fronteer’s authorized mineral exploration activities include access road maintenance, road building including water bars, drill pad construction, exploration drilling, constructing one groundwater-level monitoring well, trench construction and the collection of bulk samples for metallurgical testing, and reclamation. The 2010 Amendment proposes to expand the area in which these activities will take place as illustrated in Figure 3, increase the amount of surface disturbance associated with these activities, obtain samples from three bulk sample sites, and drill additional mineral exploration and groundwater monitoring wells. The following sections describe general operating procedures, construction techniques, and equipment that Fronteer anticipates using. Project activities will be implemented using the appropriate Best Management Practices (BMPs) established by the NDEP and the Nevada Division of Conservation Districts, 1994, *Handbook of Best Management Practices*, adopted by the State Environmental Commission December 7, 1994.

### **2.3.1 Topographic Maps**

The topographic maps showing the locations of the proposed groundwater monitoring wells are the 1968 Independence Valley NE 7.5' USGS quadrangle and the 1971/1982 Hardy Creek 7.5' USGS quadrangle.

### 2.3.2 Equipment

Project personnel will access the site in four-wheel drive vehicles. One or more truck-mounted, track mounted, or articulated buggy-mounted reverse circulation or core drill rigs will be used for drilling in the expanded Plan of Operations boundary. Generally, a Cat D7 or D8H bulldozer or equivalent will be used to construct the roads and drill sites where needed. Roads and drill sites will be reclaimed using a bulldozer and/or a Cat 325 L or Cat 350 front-end excavator or equivalent. The following vehicles and equipment could be used in conjunction with Project activities:

- Two reverse-circulation truck-mounted, track-mounted, or articulated buggy-mounted rotary drill rigs;
- Three truck-mounted, track-mounted, or articulated buggy-mounted core rigs;
- Two or more 2,000 to 3,500 gallon water trucks;
- Four or more all-terrain vehicles;
- Two or more pipe trucks;
- Up to two booster trucks;
- One D-7, D-8 or equivalent bulldozer for road construction;
- One or more excavator with pneumatic hammer;
- Two or more auxiliary air compressors; and
- Two or more portable light plant/generators.

Fronteer will take steps to prevent fires by ensuring that each field vehicle carries hand tools and a fire extinguisher. Water trucks at the Amended Project Area will be used in the event of a fire. All portable equipment, including drill rigs, support vehicles, and drilling supplies, will be removed from the Amended Project Area during extended periods of non-operation.

The current Plan of Operations authorizes the establishment and use of two staging areas on flat terrain within the Plan of Operations boundary. These staging areas are used to store drilling supplies and samples and may also be used as a temporary logging facility to examine drill cuttings and core. Equipment and facilities at the staging areas also include temporary trailers and storage containers. If one of the trailers is used as a logging facility, a portable propane generator would be used to supply electricity to this facility. Fronteer would obtain all necessary permits for this facility including but not limited to any air quality permits required by NDEP/BMRR and any building permits required by Elko County.

The 2010 Amendment includes establishing an additional staging area within the expanded Plan of Operations boundary at a location to be determined based on the focus of future drilling activities in the areas being added to the Plan of Operations. In order to minimize surface disturbance, the staging area will be located on a previously built drill pad which will be increased in size to accommodate its future use as a staging area. The new staging area will be approximately 100 feet wide and 100 feet long and will create roughly 0.23 acres of surface disturbance. For purposes of calculating reclamation costs, the staging areas are included in the "Yard" category in the attached RCE.

One or more Sani-Hut facilities will be used to support the drilling activities. The Sani Huts will be situated in locations near the sites being actively drilled and thus the locations will change several times during any given field season.

### **2.3.3 Access and Road Construction**

Because of the topography, overland travel is not practical in most of the Plan of Operations project boundary. Therefore, most of the project activities must occur on constructed roads and drill pads. New roads will have an average running surface of approximately 12 feet. The total disturbance width of the roads (i.e., the road width plus the adjacent sidecast material) will depend on slope steepness. The reclamation cost estimate provided in Appendix D uses total disturbance widths that account for the steepness of the slope.

The proposed acres of disturbance shown in Table 1 represent a preliminary estimate of the surface disturbance associated with each disturbance type (i.e., roads, pads, trenches, etc.) In order to verify that the surface disturbance due to project roads and other features remain within the cumulative surface disturbance authorized by BLM and NDEP for the 2010 Amendment, Fronteer will conduct GPS mapping at the end of every field season and submit the resulting disturbance calculations in conjunction with the annual reclamation report that will be provided to NDEP/BMRR and BLM by April 15 of each subsequent year.

While every effort will be made to keep grades at ten percent or less, there may be short spurs where such grades will be exceeded. Balanced cut and fill construction will be used to the extent possible to minimize the exposed cut slopes and the volume of fill material. Since the depth of cut will be kept to a minimum, growth media removed during construction will be stockpiled in the fill slope to be used during reclamation.

Road construction within drainages will be avoided whenever possible. When drainages must be crossed with a road, BMPs will be followed to minimize the surface disturbance and erosion potential. Culverts will be installed where necessary to maintain proper drainage on the exploration roads.

Road construction will be performed with a Cat D-7, D-8 or equivalent and will occur intermittently throughout the life of the Project. Approximately 95,574 feet (18.1 miles) of road are proposed to be constructed in the 2010 Amendment. Specific road locations will be determined in the field based on geologic information collected during the exploration program.

The 2010 Amendment also includes maintenance of existing roads on an as-needed basis. Road maintenance activities will include minor seasonal re-grading and re-establishment of water bars as necessary, and smoothing rutted surfaces and holes on existing access and drill roads, as necessary. Erosion control items such as water bars will be monitored in the spring and fall.

The currently authorized Plan of Operations includes upgrading existing drill roads in Sections 28 and 29 into an all-weather road with a 16-foot running surface and armoring the surface with crushed rock that is suitable for use as road metal.

### **2.3.4 Trenching and Bulk Sampling**

Three new trenches are included in the 2010 Amendment for the purpose of obtaining bulk samples. The trenches will be a maximum of 30 feet long, 30 feet wide, and 20 feet deep. Bulk

samples will be collected immediately following excavation of the trenches. The trenches will then be immediately backfilled before the excavation equipment leaves the trench site. The approximate locations of the trenches are shown in Figure 3. The trench sites will avoid any identified cultural resources site that has not been evaluated for eligibility or eligible sites for which data recovery has not yet been completed. Additionally, trench construction will comply with all required biological survey requirements and seasonal operating constraints for migratory bird nesting sites and mule deer winter habitat considerations. An as-built of the actual trench construction locations will be provided with the annual April 15<sup>th</sup> updates. Although the trenches will be reclaimed immediately, the cost associated with reclaiming the three trenches is included in the RCE. For the purposes of calculating the RCE, it was assumed that the material excavated from the trench would cover 50 feet on either side of the trench and 75-foot downslope of the trench for a total trench footprint of approximately 130-foot wide and 105-ft long. Each trench will create about 0.31 acres.

### **2.3.5 Drilling**

New drill pad disturbance will be kept to the minimum necessary for safe access and a safe working area for equipment and crews. Drill pads typically require a working area of approximately 70 feet long by 30 feet wide. As presently planned, the 2010 Amendment will construct approximately 126 drill sites. More than one hole will be drilled from many of these sites. The surface disturbance shown in Table 1 for the drill pads and used in the reclamation cost estimate provided in Appendix D accounts for the steepness of the topography at each proposed drill pad. Sediment traps (sumps) will be constructed at each drill site to collect drill cuttings and manage drill hole water. Sumps will be closed at the end of each field season. The exploration program will consist of drilling exploration holes utilizing truck-mounted, track-mounted, or articulated buggy-mounted reverse circulation or core drill rigs and support equipment. Holes will be both vertical and angled. Drill site construction within drainages will be avoided.

Reverse-circulation rotary drilling equipment may be used to drill pre-collars for some of the core holes which will be drilled to test deeper targets. A maximum of five rotary holes may be left open at any time prior to resuming drilling with core-drilling equipment. The reclamation cost estimate in Appendix D includes the costs for properly plugging the five rotary pre-collar holes, including the cost to remove 600 feet of casing from each pre-collar hole. As shown in the spreadsheet, the reclamation cost estimate also provides funds to plug two standard reverse-circulation holes and three core holes to reflect the number of drill rigs to be used for project activities (i.e., two reverse-circulation rigs and three core rigs.)

Water or non-toxic approved drilling fluids may be utilized during drilling. Fronteer will obtain water for drilling from a well at the Oasis Truck Stop located 4 miles north of the project. Fronteer has an agreement with the owner of the Truck Stop to use water from the well to support the exploration activities. Fronteer has obtained a temporary waiver from the Nevada Division of Water Resources (Waiver MM-159) authorizing the use of water from the Oasis well for mineral exploration drilling and dust control at the Long Canyon Project. Fronteer may also purchase water from the Cities of Wendover and West Wendover.

Standard drilling procedures typically require a geologist to be involved with all drilling activities. The duties of the geologist normally include monitoring the progress of the drilling activities, logging each hole according to the geologic features encountered, determining the

maximum depth of each hole, and advising the drill operator as needed. The geologist normally travels to and from the drill site in a separate four-wheel drive pickup truck.

Standard drill rig crews normally consist of a drill operator and one or two helpers. The helpers normally remove and box the recovered core or rotary samples, mix drilling fluids in the portable mud tank, operate the water truck and assist with drilling operations, and conduct maintenance as necessary. The crew is normally transported to and from the drill site in a four-wheel drive vehicle. Depending on the number of drill rigs in operation at a given time, as many as 30 people (the drill crew, project geologists, road-building crew, etc.) may be working on the Project. Drilling activities may occur on a 24-hour per day schedule for some drill rigs.

All equipment will be properly muffled and equipped with suitable and necessary fire suppression equipment, such as fire extinguishers and hand tools. All Project-related traffic will observe prudent speed limits to enhance public safety, protect wildlife and livestock, and minimize dust emissions. All activities will be conducted in conformance with applicable federal and state health and safety requirements.

All Project-related refuse will be disposed of on a daily basis consistent with applicable regulations. No refuse will be disposed of onsite. In the event that hazardous or regulated materials such as diesel fuel are spilled, the measures outlined in the Spill Contingency Plan (Appendix E) will be taken to control the spill. NDEP will be notified if a petroleum product spill exceeds the Reportable Quantity of 25 gallons or 3 cubic yards of contaminated material. Any spill of a hazardous material would also be reported. All drill holes will be plugged according to federal and state specifications as set forth in this Reclamation Plan (Section 3).

### **2.3.5.1 Groundwater Monitoring Well Drilling**

In late 2008, an authorized groundwater-level monitoring well, MW-4, was drilled on a pre-existing drill site in the southeast quarter of Section 29 to determine and monitor the depth to the water table. Figure 4 shows the location of MW-4. This monitoring well was drilled and completed by a Nevada-licensed water well driller. Fronteer obtained the necessary waiver, referenced as M/O 1508, from the Nevada Division of Water Resources granting permission to install this well. The cost to abandon this monitoring well is included in the reclamation cost estimate in Appendix D.

The 2010 Amendment includes drilling additional groundwater monitoring wells in the Plan of Operations boundary. The locations for three of the monitoring wells within the mineralized area have already been identified and are shown in Figure 4. Table 2 shows the tentative well completion methods, collar elevation, and UTM coordinates for these three monitoring wells. Up to eight additional groundwater monitoring wells may be drilled at locations to be determined at a future date within the Plan of Operations boundary. All groundwater monitoring wells will be drilled on sites previously used for mineral exploration drilling so no new drill sites or roads will need to be constructed for the monitoring wells.

In compliance with Nevada Division of Water Resources (NDWR) requirements, each well will be equipped with a steel surface casing, and a locking cap. The elevation of the top of casing will

be surveyed. Additionally, each borehole will be surveyed with a downhole directional survey prior to installation of the PVC casing.

<b>Monitoring Well Number</b>	<b>Collar Elevation (ft AMSL)</b>	<b>UTM Coordinate (X)</b>	<b>UTM Coordinate (Y)</b>	<b>Completion Method</b>
PMW-05	6,135	708254.09	4539094.89	8" RC hole, dual completion: 725' of 2" sch 80 PVC, and 505' of 2" sch 80 PVC, each incl 40 feet of screen
PMW-07	5,895	708384.34	4538283.84	6" RC hole, 320' of 2" schedule 80 PVC, incl 40' of screen
PMW-08	6,855	707015.06	4537832.39	6" RC hole, 270' of 2" schedule 80 PVC, incl 40' of screen

The groundwater monitoring wells will be drilled and completed by a Nevada-licensed water well driller using truck-mounted, track-mounted, or articulated buggy-mounted reverse circulation drill rigs and support equipment. Because these are monitoring wells, all of the holes will be vertical. Drill site construction within drainages will be avoided. Sediment traps (sumps) will be constructed at each drill site to collect drill cuttings and manage drill hole water. The surface disturbance attributable to the sump is included in the drill site disturbance acreage.

Each of the groundwater monitoring wells will require a monitor well waiver from NDWR. Fronteer will provide BLM and NDEP with copies of the NDWR waivers when they become available.

The reclamation cost estimate provided in Appendix D includes the costs for properly plugging and abandoning the three monitoring wells for which well completion information is available. This cost estimate includes future equipment and crew mobilization costs. The RCE will be adjusted in the future to include the plugging and abandonment costs for any additional groundwater monitoring wells. Because all of the project groundwater monitoring wells will be plugged and abandoned at that same time, the RCE in Appendix D includes costs for one mobilization – demobilization event.

It is anticipated that the monitoring wells will be actively monitored for a minimum of four years.

### **2.3.6 Water Management Plan**

Fronteer will use water management measures that are typical for an exploration drilling project. These measures include installing water bars in appropriate locations to control runoff and erosion, using sumps to manage drilling fluids, installing silt fences, hay bales or other sediment

control structures at appropriate locations, having suitable spill control and cleanup equipment and supplies readily available, and implementing concurrent reclamation measures.

### **2.3.7 Rock Characterization and Handling Plan**

Not applicable as this is an exploration project.

### **2.3.8 Quality Assurance Plan**

Not applicable as this is an exploration project. However, quality assurance for reclamation will be addressed under the Reclamation Plan (Section 3).

### **2.3.9 Spill Contingency Plan**

Fronteer will adhere to the Spill Contingency Plan that is included as Appendix E.

### **2.3.10 Other Plans**

Not applicable.

### **2.3.11 General Schedule of Operations from Start through Closure**

Fronteer will commence the activities included in this plan amendment as soon as BLM approves the 2010 Amendment and as site conditions allow. Fronteer anticipates that the groundwater monitoring wells will be actively monitored for a minimum of four years. They will be plugged and abandoned and the drill sites and roads will be reclaimed when the wells are no longer needed to support project activities.

The 2010 Amendment does not modify the reclamation activities authorized for the mineral exploration activities. Reclamation activities will be conducted concurrently with mineral exploration activities when disturbance is no longer needed. Reclamation will begin within exploration areas considered inactive, without potential, or completed, at the earliest practicable time. Reclamation activities will be coordinated with BLM and NDEP/BMRR, to meet regulatory requirements. The proposed reclamation is expected to take up to one year from the time of commencement of final reclamation and will be initiated within one year after the completion of exploration activities. Revegetation is anticipated to take three years after the time of seeding to achieve success.

## **2.4 Geographic Status and Disturbance Information**

### **2.4.1 Areas Previously Disturbed by Previous Operator and Inactive**

None.

### **2.4.2 Areas Disturbed by Current Operator Prior to January 1, 1981, and Inactive**

None.

### **2.4.3 Areas Disturbed by Current Operator Prior to January 1, 1981, and Still Active**

None.

### **2.4.4 Areas Disturbed by Current and Previous Operators After January 1, 1981, but Prior to October 1, 1990, and Inactive**

None.

### **2.4.5 Areas Disturbed by Current Operator After January 1, 1981, but Prior to October 1, 1990, and Active**

None.

### **2.4.6 Areas Which Are Active On or After October 1, 1990**

The existing mineral exploration surface disturbance within the boundary of the Amended Project Area was created after October 1, 1990 and is outlined in Table 1.

### **2.4.7 Location of Access Roads Existing Prior to January 1, 1981**

All of the access roads are pre-1981 as shown on Figure 2. This was determined by looking at the Independence Valley NE 7-1/2 USGS Quadrangle, which was published in 1968. Any of these access roads could be used to conduct the activities under the 2010 Amendment.

### **2.4.8 Location of Any Surface Water Bodies within One-half (1/2) Mile Downgradient of the Disturbance**

The target drilling area is approximately 3/4 of a mile upgradient from Johnson Springs which consists of numerous springs that combine and flow into Hardy Creek as shown on Figure 2. The principal discharge point of Johnson Springs is known as Big Springs and is the feature labeled on most maps of the area. The springs are located in portions of Sections 22, 27, 28, 33 and 34 of T36N, R66E, MDB&M. There are no springs in SE1/4 of SE1/4 of Section 20, T36N, R66E. All of the drainage channels in SE1/4 of SE1/4 of Section 20, T36N, R66E are ephemeral.

## **2.5 Environmental Protection Measures**

Fronteer will implement the environmental protection measures described in Section 2.1.11 of the July 2008 Environmental Assessment that BLM prepared for the Long Canyon Exploration Project. BLM's September 15, 2008 Decision Letter approving Plan of Operations NVN 82445 includes these environmental protection measures as Conditions of Approval. These environmental protection measures are included as Appendix F.

Fronteer will also adhere to the Trigger Notification Protocol shown in Table 3 that Fronteer and the Cities of West Wendover and Wendover have developed. This protocol governs the steps the Cities and Fronteer would follow in the event that:

- 1) Any hole within a one-mile radius of Johnson Springs encounters water flows that are artesian to the surface;
- 2) The Johnson Springs flow meter measures an increase in turbidity of 1 NTU for a period greater than 90 seconds; or
- 3) The Johnson Springs flow meter measures a reduction in flow that meets or exceeds the agreed-upon flow reduction trigger.

<b>Table 3</b>	
<b>Long Canyon Drilling Notification and Response Protocol</b>	
<b>Event</b>	<b>Response</b>
Any exploration drill hole within the one-mile Distance Buffer Zone that encounters water that is artesian to the surface.	Fronteer immediately takes appropriate measures to plug and abandon the hole or otherwise control the artesian flow. Fronteer notifies BLM and the Cities as soon as possible but no later than within 24 hours.
Telemetry data indicate a reduction in spring flow and/or an increase in turbidity that exceed trigger levels.	West Wendover City Manager or Director of Public Works notifies at least one of the following Fronteer personnel: <ol style="list-style-type: none"> <li>1. Dan Anderson, Environmental Manager (775-777-2900); or</li> <li>2. Kent Samuelson, Project Manager (775/777-2900); or</li> <li>3. Jim Lincoln (775/856-3000)</li> </ol> The cities will immediately send staff to Johnson Springs to evaluate field conditions.
Fronteer provides drilling data for all holes being drilled or recently drilled within the Distance Buffer Zone to Cities and BLM and schedules a conference call or a meeting.	Within 24 hours: <ol style="list-style-type: none"> <li>1. Fronteer provides Cities and BLM with information on location, depth, hydrologic characteristics of current and recent drill holes within the one-mile Distance Buffer Zone, and other information requested by Cities</li> <li>2. Fronteer, the cities, and BLM schedule a conference call or a meeting to discuss monitoring and drilling data and to determine appropriate response to the trigger event.</li> </ol>
Meeting or conference call to discuss monitoring data and develop action plan.	As soon as possible, but no later than within 24 hours, Fronteer, the Cities and BLM meet or have a conference call to evaluate the monitoring data to determine whether the observed changes in spring flow or turbidity may be due to the exploration drilling. An appropriate Action Plan is developed in response to this evaluation. At this point, the Cities

<b>Table 3</b>	
<b>Long Canyon Drilling Notification and Response Protocol</b>	
<b>Event</b>	<b>Response</b>
	will have the right to require cessation of drilling below the Depth Buffer Zone (e.g., below 5,700 ft) within the one-mile radius Distance Buffer Zone until the reason the trigger threshold was exceeded is resolved to the satisfaction of the Cities.
Fronteer implements Action Plan	Fronteer immediately takes steps to implement the agreed upon Action Plan.

Fronteer has retained a BLM-approved archaeologist to prepare a treatment plan and to perform data recovery in conformance with the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716) on eligible sites located within the main drilling areas. It is anticipated that the data recovery work would be performed in the 2010 field season or as soon as BLM and the SHPO approve the treatment plan and site conditions allow.

### 3. RECLAMATION PLAN

This amended Reclamation Plan is being submitted to the NDEP/BMRR by Fronteer for the Amended Project, in accordance with BLM regulations at 43 C.F.R. Section 3809.400 and Nevada reclamation regulations NAC 519A.

#### 3.1 Schedule of Reclamation

The 2010 Amendment does not modify the previously proposed and authorized reclamation activities for the mineral exploration project. Reclamation activities will be conducted concurrently with exploration activities when the disturbance is no longer needed. Reclamation will begin within exploration areas considered inactive, without potential, or completed, at the earliest practicable time. Earthwork and revegetation activities are limited by the time of year during which they can be effectively implemented. Table 4 outlines the anticipated reclamation schedule on a monthly basis. Site conditions and/or yearly climatic variations may require that this schedule be modified to achieve revegetation success. Reclamation activities will be coordinated with the BLM and NDEP/BMRR whenever necessary. The proposed reclamation is expected to have a duration of up to four years from the time of commencement of final reclamation and will be initiated within two one years after the completion of exploration activities. Revegetation is anticipated to take three years after the time of seeding to achieve success.

**Table 4**  
**Anticipated Exploration Reclamation Schedule**

TECHNIQUES	Quarter				Year(s)
	1 <sup>st</sup> Jan- Mar	2 <sup>nd</sup> April- June	3 <sup>rd</sup> Jul- Sept	4 <sup>th</sup> Oct- Dec	
Re-grading					Within 1 year of Project completion
Seeding					Within 1 year of Project completion
Monitoring					3 years beyond re-grading and reseeded

Note: Re-grading activities could occur year-round.

#### 3.2 Drill Hole Plugging

The 2010 Amendment does not change the drill hole plugging protocol described for the mineral exploration holes. All of the project groundwater monitoring wells will be plugged and abandoned according to NDWR requirements at some time in the future when they are no longer needed for environmental baseline data collection. Fronteer anticipates that monitoring and data collection will continue for a minimum of four years following completion of the monitoring wells. All of the project monitoring wells will be plugged and abandoned at the same time. Thus,

the RCE included in Appendix D includes costs for one mobilization – demobilization event as well as the other costs associated with plugging and abandoning the wells in the future.

The authorized drill hole plugging protocol for the mineral exploration holes is as follows:

Except for the reverse-circulation rotary holes that may be drilled as pre-collars for some of the core holes as discussed in Section 2.3.5, all drill holes (i.e., boreholes) will be plugged prior to the drill rig moving from the drill site in accordance with NRS 534 and NAC 534.4369 and NAC 534.4371. All core holes will be plugged prior to the core rig moving from the drill site. If any drill hole produces artesian flow, the drill hole will be contained pursuant to NRS 534.060 and NAC 534.378 and will be sealed by the method described in Subsection 2 of NAC 534.4371. If the casings are set in a drill hole, either the drill hole must be completed as a well and plugged pursuant to NAC 534.420 or the casings will be completely removed from the drill hole and then be plugged according to NAC 534.4369 and NAC 534.4371.

### **3.3 Re-grading and Reshaping**

Re-grading and reshaping of all constructed drill sites and exploration roads will be completed to approximate the original topography. Fill material, enhanced with growth media, will be pulled onto the roadbeds to fill the road cuts and restore the slope to natural contours. Roads and drills sites will be re-graded and reshaped with a front-end excavator or bulldozer. For overland travel roads, upgraded roads or pads that do not require replacement of sidecast material, reclamation will be accomplished with an excavator bucket/ripper or a dozer to knock down and smooth any berms and relieve road compaction. Tire tracks (trails created by overland travel) will be lightly scarified and left in a rough state as necessary to relieve compaction, inhibit soil loss from runoff, and prepare the seed bed.

Should any drainage be disturbed, they will be reshaped to approach the pre-construction contours. The resulting channels will be of the same capacity as up and downstream reaches and will be made non-erosive by use of surface stabilization techniques (rip-rap) where necessary, and ultimately revegetated. Following completion of earthwork, all disturbed areas will be broadcast seeded.

### **3.4 Mine Reclamation**

Not applicable, this is an exploration project.

### **3.5 Riparian Mitigation**

A riparian scrub community is found in the Johnson Springs/Hardy Creek drainage. The groundwater monitoring wells will not be located in this area and thus will not create any impacts to this area. However, the data collected from the groundwater monitoring wells will contribute to the understanding of the hydrology of the area, including the wetlands area in which the riparian scrub community is located.

### **3.6 Wildlife and Fisheries Habitat**

The wildlife species that inhabit the Amended Project Area are typical of the arid/semi-arid environment in the central Great Basin were identified by Envirosientists during a biological

survey conducted in July 2006, and include mammals such as mule deer, coyote, desert cottontail, black-tailed jackrabbit, woodrat, chipmunk, long-tailed weasel, pygmy rabbit, golden-mantled ground squirrel, deer mouse, kangaroo rat, and least chipmunk; reptiles such as the fence and sagebrush lizards; and avi-fauna such as the red-tailed hawk, mountain bluebird, sage sparrow, lark sparrow, piñon jay, common nighthawk, loggerhead shrike, mountain chickadee, plain titmouse, sage thrasher, cliff swallow, Brewer's blackbird, common raven, northern flicker, chipping sparrow, turkey vulture, mourning dove, and chukar. Impacts to wildlife will consist of temporary habitat loss, displacement, and disturbance from human activity and noise. Wildlife could tend to avoid active drilling sites and move temporarily into adjacent habitat, which could increase populations in those areas. Impacts to animals could be lessened by reclaiming access and drill roads as quickly as possible; therefore, impacts will be temporary and will not eliminate individual territories or populations.

The Amended Project Area lies within the wild horse Spruce-Pequop Herd Management Area (HMA) (BLM 1993). Impacts to wild horses could result from existing and proposed surface disturbance within the Amended Project Area. Wild horses may be temporarily displaced as a result of the Project activities. Construction of roads and drill pads and the operation of drilling equipment may disturb the horses due to the presence of humans and by creating noise and dust. Any conflicts with wild horses will be reported to the BLM Wild Horse Specialist, in addition to reports of unusual or problem situations such as observations of lame or injured animals or orphan foals.

The Sheep Complex, Big Springs, and Owyhee Grazing Allotments, Draft Environmental Impact Statement, Sensitive Bird Species, prepared by the BLM, Elko Field Office, Nevada, December 2005, noted that greater sage-grouse could utilize part of the Amended Project Area. The nearest greater sage-grouse leks and strutting grounds are approximately four miles south of the Amended Project Area. The Amended Project Area lies between lower elevation and upper elevation summer greater sage-grouse habitat and is located in BLM and NDOW designated crucial winter habitat. Winter and nesting greater sage-grouse habitat overlap the southeast edge of the Amended Project Area (part of the SE 1/4 SW 1/4 of Section 21, T36N, R66E, MDB&M). However, the NDOW indicates that this area is probably not used (Personal communication with Jeff Moore, BLM, March 14, 2006). Winter and nesting habitat for greater sage-grouse is located immediately east of the Amended Project Area. Existing access roads will be used by Fronteer to travel through greater sage-grouse habitat to reach the Amended Project Area.

To avoid impacts to greater sage-grouse, annual surveys would be conducted by a qualified biologist in areas that will be disturbed after October 31st. If greater sage-grouse are encountered in the proposed area of disturbance, Fronteer will notify the BLM concerning the presence or absence of greater sage-grouse. No greater sage-grouse individuals, leks, or strutting grounds will be disturbed by Project activities.

The biological survey that Enviroscientists conducted in July 2006 did not observe sensitive species identified by BLM as potentially occurring in the project area except for pygmy rabbits. Suitable pygmy rabbit habitat is present along both sides of the main access road into the Big Springs Ranch. Raptors were observed in the project area, but no raptor nests were found. Enviroscientists has provided BLM with a report detailing the results of the survey.

Fronteer will not conduct surface disturbing activities when snow conditions result in mule deer using the area as winter habitat. Surface disturbing activities will not take place until snow conditions allow. These seasonal restrictions on creating new surface disturbance will be implemented in coordination with BLM wildlife specialists in response to site-specific, on-the-ground conditions.

### **3.7 Threatened, Endangered and Special Status Species**

Information from the Nevada National Heritage Program (NNHP) on March 9, 2006 indicated that the relict dace (*Relictus solitarius*) a fish species protected under Nevada State Protected Species under NRS 501 occurs in the Johnson Springs area east of the Amended Project Area. This fish species is also listed as a species of concern by the U.S. Fish and Wildlife Service (USFWS) and is listed as a BLM Sensitive Species. An existing road that avoids Johnson Springs will be used to access the Amended Project Area.

No other state or federal threatened, endangered, or candidate plant or animal species (as defined by the Endangered Species Act of 1973, as amended) are known to occur within the Amended Project Area.

### **3.8 Handling and Application of Topsoil**

The depth of the cut for newly constructed exploration roads will be minimal. Soils capable of serving as a growth media are salvaged and stockpiled in the fill slope. In addition to the soils, soil organic matter will be salvaged to the extent practical to minimize compaction and promote aeration. Amendments are not considered necessary in those areas where sufficient growth media is available.

### **3.9 Revegetation**

Generally, seedbed preparation and seeding will take place in the fall after re-grading of disturbed areas. All reclaimed areas will be broadcast seeded with a cyclone-type bucket spreader or a mechanical blower. Broadcast seed will be covered by harrowing, raking, or other site-specific appropriate methods as necessary to provide seed cover and enhance germination. Reclaimed surfaces will be left in a textured or rough condition (small humps, pits, etc.) to enhance moisture retention and revegetative success while minimizing erosion potential.

The seed list, provided by the BLM as listed in Table 5, is based on known soil and climatic conditions and was selected to establish a plant community, which will support the post-exploration land use. The mix is designed to provide species that can exist in the environment of northeastern Nevada, are proven species for revegetation, and/or are native species found in the plant communities prior to disturbance. As requested by BLM, broadcast seeding will be at a rate of approximately 14.75 pounds per acre. Changes and/or adjustments to the reclamation plant list and/or application rate will be completed in consultation with and approval by the BLM and BMRR.

Timing of revegetation activities is critically important to the overall success of the program. Seeding activities will be timed to take advantage of optimal climatic windows and will be coordinated with other reclamation activities. In general, earthwork and drainage control will be completed in the summer or early fall. In general, seedbed preparation will be completed in the

fall, either concurrent with or immediately prior to seeding. Seeds will be sown in late fall to take advantage of winter and spring precipitation and optimum spring germination. Early spring seeding may be utilized for areas not seeded in the fall. In either case, seeding will not be done when the ground is frozen or snow covered.

**Table 5**  
**BLM-Requested Revegetation Seed Mixture**

Common Name	Pure Live Seed (lb/acre)
Bluebunch wheatgrass	5.50
Canby bluegrass	2.00
Thickspike wheatgrass	4.50
Small burnet	0.25
Western yarrow	0.25
Blue flax	0.25
Prostrate kochia	2.00
<b>Total Application Rate</b>	<b>14.75</b>

Per BLM’s request, the seed mix for areas that will be re-seeded without adding topsoil (i.e., the overland travel and staging areas) will include sagebrush, rabbitbrush, spiny hopsage, prostrate kochia, and crested wheatgrass.

**3.10 Isolation, Removal, and/or Control of Acid-Forming, Toxic, or Deleterious Materials**

Not applicable, this is an exploration project.

**3.11 Removal or Stabilization of Building, Structures, and Support Facilities**

No permanent buildings or structures will be built. The trailers and storage containers that may be placed on the staging areas will be removed when the exploration activities have been completed. All equipment and supplies will be removed following completion of the Project. Other materials, including scrap, trash, and unusable equipment will be removed on a daily or weekly basis and disposed of in accordance with federal and state regulations and laws.

**3.12 Post-Closure Management**

Post-closure management will commence on any reclaimed area following completion of the reclamation work for the area. Post-closure management will extend until the reclamation of the site or component has been accepted by the BLM and NDEP. For bonding purposes, a three-year post-closure management period is assumed following completion of reclamation construction on any site. For sites reclaimed early in the operations, management of the reclaimed sites will occur concurrently with operational site management. Annual reports showing reclamation progress will be submitted to the BLM and NDEP.

#### 4. MONITORING PLAN

Monitoring of the drill sumps includes periodic visual inspections during drill operations to ensure that the drill cuttings are contained. Should the observed condition indicate that the sump containment is inadequate, additional sump capacity will be built and/or incorporated into the drilling fluid management system. Monitoring associated with reclamation activities is addressed in the Reclamation Plan (Section 3).

##### 4.1 **Demonstrate Compliance with the Approved Plan of Operations and Other Federal and State Environmental Laws and Regulations**

The current operations in the Project Area are authorized under NDEP Reclamation Permit No. 0256 and No. 0284 and BLM Plan NVN-82455. Fronteer is in full compliance with the provisions stipulated in these permits. The proposed activities outlined in this Amended Plan will be conducted pending BLM and NDEP approval of this Amended Plan.

##### 4.2 **Provide Early Detection of Potential Problems**

Supervision during drilling activities and reclamation monitoring will provide early warning of potential problems such as the need for additional sump capacity or areas that require additional revegetation or erosion control measures.

##### 4.3 **Supply Information That Will Assist in Directing Corrective Actions Should They Become Necessary**

Not applicable as this is an exploration project.

## 5. INTERIM MANAGEMENT PLAN

The following discussion includes those topics that are pertinent to the planned exploration activities.

### 5.1 Measures to Stabilize Excavations and Workings

The planned exploration activities do not include mine excavations or workings. The constructed exploration drill roads, pads, and sumps will be maintained in operating condition until reclamation to prevent washouts and containment breaches.

### 5.2 Measures to Isolate or Control Toxic or Deleterious Materials

All refuse generated by the Project would be disposed of at an authorized landfill facility offsite, consistent with applicable regulations. No refuse would be disposed of onsite. Water and/or nontoxic drilling fluids, such as Abandonite, Alcomer 120L, bentonite, EZ-mud, Polyplus, and Super Plug, would be utilized as necessary during drilling and would be stored at the Amended Project Area.

Hazardous materials employed at the Amended Project Area would include diesel fuel, gasoline, and lubricating grease. Approximately 500 gallons of diesel fuel would be stored in fuel delivery systems on vehicles and drill rigs. Approximately 100 gallons of gasoline would be stored in fuel delivery systems for light vehicles. Approximately 100 pounds of lubricating grease would be stored on the drill rigs or transported by drill trucks. All containers of hazardous substances would be labeled and handled in accordance with Nevada Department of Transportation (NDOT) and Mining Safety and Health Administration (MSHA). In the event hazardous or regulated materials, such as diesel fuel, were spilled, measures would be taken to control the spill, and the BLM, NDEP, and/or the Emergency Response Hotline would be notified, as required. If any oil, hazardous material, or chemicals are spilled during operations, they would be cleaned up as soon as Fronteer becomes aware that a spill has occurred. After clean up, the oil, toxic fluids, or chemicals and any contaminated material would be removed from the site and disposed of at an approved disposal facility.

Self-contained, portable, chemical toilets would be used for human waste. The human waste and toilet chemicals would not be buried onsite.

### 5.3 Provisions for the Storage or Removal of Equipment, Supplies and Structures

During extended periods of non-operation or seasonal closure of the exploration activities, all motorized exploration equipment will be removed from the Amended Project Area. Fronteer may place trailers on the staging areas for storing drilling supplies and drill samples. One of these trailers may also be used by project geologists as a logging facility at which the drill cuttings and core will be examined.

### 5.4 Measures to Maintain the Project Area in a Safe and Clean Condition

Fronteer will conduct regular, periodic, visual inspections of the exploration areas and activities.

### **5.5 Plans for Monitoring Site Conditions During Periods of Non-operation**

The measures outlined in Section 5.4 will be conducted during periods of non-operation, except as limited by weather and ground conditions.

### **5.6 A Schedule of Anticipated Periods of Temporary Closure During Which You Would Implement the Interim Management Plan, Including Provisions for Notifying BLM and NDEP of Unplanned or Extended Temporary Closures**

Periods of non-operation are anticipated between drilling phases and during the winter months. After the drills have vacated the Amended Project Area, sumps will be marked by stakes and flags. Once the sumps have dried out, those that pose a safety hazard will be backfilled.

As presently planned, Fronteer anticipates there will be drilling and exploration activities during each field season covered by this Amended Plan. However, BLM and NDEP will be notified in writing if Fronteer decides a period of extended non-operation or temporary closure as defined at NAC 519A.090 is necessary. The notice will state the nature and the reason for the suspension; the anticipated duration of the suspension; and any event which would reasonably be expected to result in either the resumption of activities or the abandonment of the operation. Fronteer will not be required to notify the BLM or NDEP of a temporary closure caused by weather conditions.

No other issues related to periods of non-operation are evident. As a matter of normal practice, all trash will be hauled off site on a regular basis. All drill sites will be patrolled at the end of each drill period to ensure that all refuse and trash has been disposed of properly. In the event that fines are evident below the drill sumps, the area will be scarified using a hand rake.

### **5.7 In Cases of Temporary or Seasonal Closure, You must Provide Adequate Maintenance, Monitoring, Security, and Financial Guarantee, and BLM May Require You to Detoxify Process Solutions**

Not applicable as this is an exploration project.

## **6. STATEMENT OF ASSUMPTION OF RECLAMATION RESPONSIBILITY**

Fronteer agrees to accept the responsibility for reclamation of all surface disturbance associated with the Project detailed under this Amended Plan. Fronteer has obtained a reclamation performance bond for the activities outlined in this Plan, as per NAC519A.350 and 43 C.F.R. 3809.500 - 599 to cover a total of 114.36 acres of disturbance on public lands, comprised of 44.93 previously authorized disturbance and the 69.43 acres of new surface disturbance proposed in the 2010 Amendment.

The RCE include in Appendix D includes reclamation costs for the entire 114.36 acres of surface disturbance plus the costs associated with plugging and abandoning open exploration holes and all of the groundwater monitoring wells on public lands. Fronteer has provided NDEP with separate financial assurance in the amount of \$223,125 for the surface disturbance authorized in NDEP Reclamation Permit No. 0256.

## 7. RECLAMATION COST ESTIMATE

Reclamation of the Project is designed to return the site to a safe, stable, and productive condition capable of supporting wildlife habitat, mineral exploration, livestock grazing, and recreation. The commitment to successfully complete this task is expressed in initial designs that facilitate ease of implementation of the Amended Plan, the planned construction and reclamation design, which minimizes surface disturbance and implementation of concurrent reclamation where appropriate.

Fronteer has calculated the reclamation cost estimate using NDEP's Standard Reclamation Cost Estimator Software Version 1.1.12. (Appendix D) This reclamation cost estimate takes into account the steepness of the terrain where applicable.

Fronteer has calculated the reclamation cost estimate to include the 4.93 acres of surface disturbance previously authorized under Notice #N-79949, the 19.60 acres of approved surface disturbance as Phase I, the 20.40 acres associated with Phase 2 and the 65.47 acres associated with the 2010 Amendment. As shown in Appendix D, the total reclamation cost estimate for both the authorized and proposed surface disturbance is \$397,443. Fronteer has provided financial assurance in an instrument acceptable to BLM and NDEP to cover this reclamation obligation.

## **8. PERMIT APPLICATION FEE**

NAC 519A.225 establishes a fee structure for NDEP Reclamation Permit applications. Because the 2010 Amendment is an application for a permit on public land, the fee provision of \$1.50 per acre of affected land as outlined in NAC 519A.225.1(a) applies to this application.  $\$1.50 \times 69.43$  acres = \$104.15

In addition to the per acre fee, the modification fee for the 2010 Amendment is \$1,000 as mandated in NAC 519A.227(2). This application thus includes a check for \$1,104.15.

## **9. EFFECT OF PROPOSED RECLAMATION ON PUBLIC SAFETY**

No unnatural hazards will exist during or after reclamation in the disturbed/reclaimed areas.

## 10. ACKNOWLEDGMENTS

It is understood that should the nature of the operation change, a modified or supplemental plan of operations and reclamation may be required.

It is understood that approval of this Amended Plan of Operations and Reclamation Permit Application does not constitute: (1) Certification of ownership to any person named herein; and (2) Recognition of the validity of any mining claim herein.

It is understood that a bond equivalent to the actual cost of performing the agreed upon reclamation measures will be required before this Application can be approved. Bonding and any bond reduction amounts will be set on a site-specific basis by the lead agency in coordination with the cooperating agencies.

It is understood that approval of this Application does not relieve the undersigned of responsibility to comply with any other applicable state or federal laws, rules or regulations.

It is understood that any information provided with this Application that is marked confidential will be treated by the agency in accordance with that agency's laws, rules, and regulations.

On behalf of Fronteer Development (USA) Inc., I have reviewed and agree to comply with all conditions in the plan of reclamation and operations, including the recommended changes and the reclamation requirements. I understand that the bond will not be released until the BLM or the state agency in charge gives written approval of the reclamation work. I further understand that all fees required to be paid annually to the State of Nevada are to be paid until such time as written approval of the reclamation work has either been provided to the state or the state has given its own approval.

By \_\_\_\_\_

Date: \_\_\_\_\_

Jim Lincoln  
President  
Fronteer Development (USA), Inc.

## 11. REFERENCES

Bureau of Land Management (BLM). 1989. *Surface Management of Mining Operations (NSO) Handbook H-3809-1*.

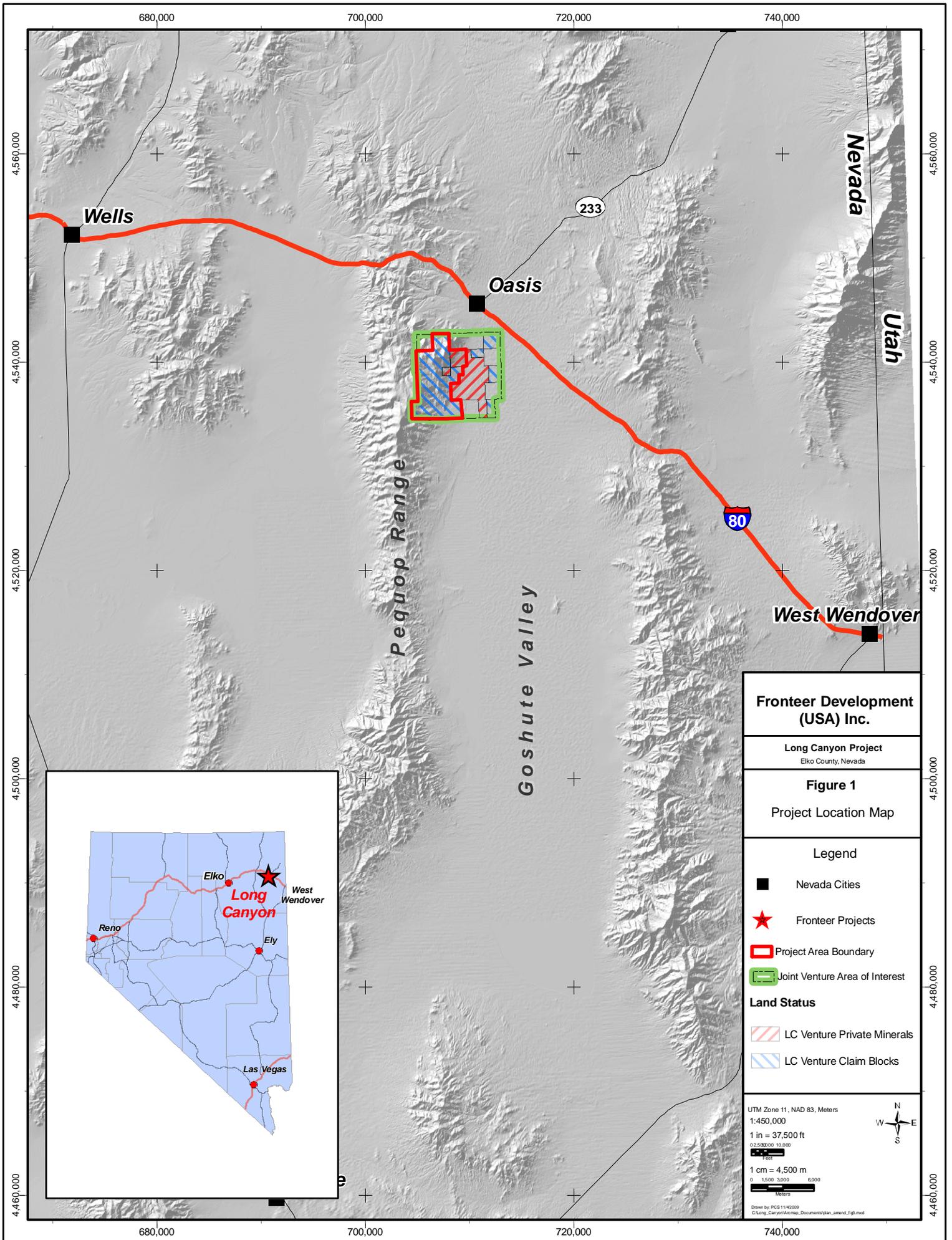
\_\_\_\_\_. 1992. *Solid Minerals Reclamation Handbook #H-3042-1*.

\_\_\_\_\_. 1999. *Revised Guidelines for Successful Mining and Exploration Revegetation*.

Nevada Division of Environmental Protection and the Nevada Division of Conservation Districts. 1994. *Handbook of Best Management Practices*. Adopted by the State Environmental Commission. December 7, 1994.

Nevada Standardized Reclamation Cost Estimator (SRCE) software developed in accordance with the Nevada Standardized Unit Cost Project, a cooperative effort between the NDEP, the BLM, and the Nevada Mining Association (NvMA). 2006.

**APPENDIX A**  
**FIGURES**



**Frontier Development (USA) Inc.**

**Long Canyon Project**  
Elko County, Nevada

**Figure 1**  
Project Location Map

**Legend**

- Nevada Cities
- ★ Frontier Projects
- ▭ Project Area Boundary
- ▭ Joint Venture Area of Interest

**Land Status**

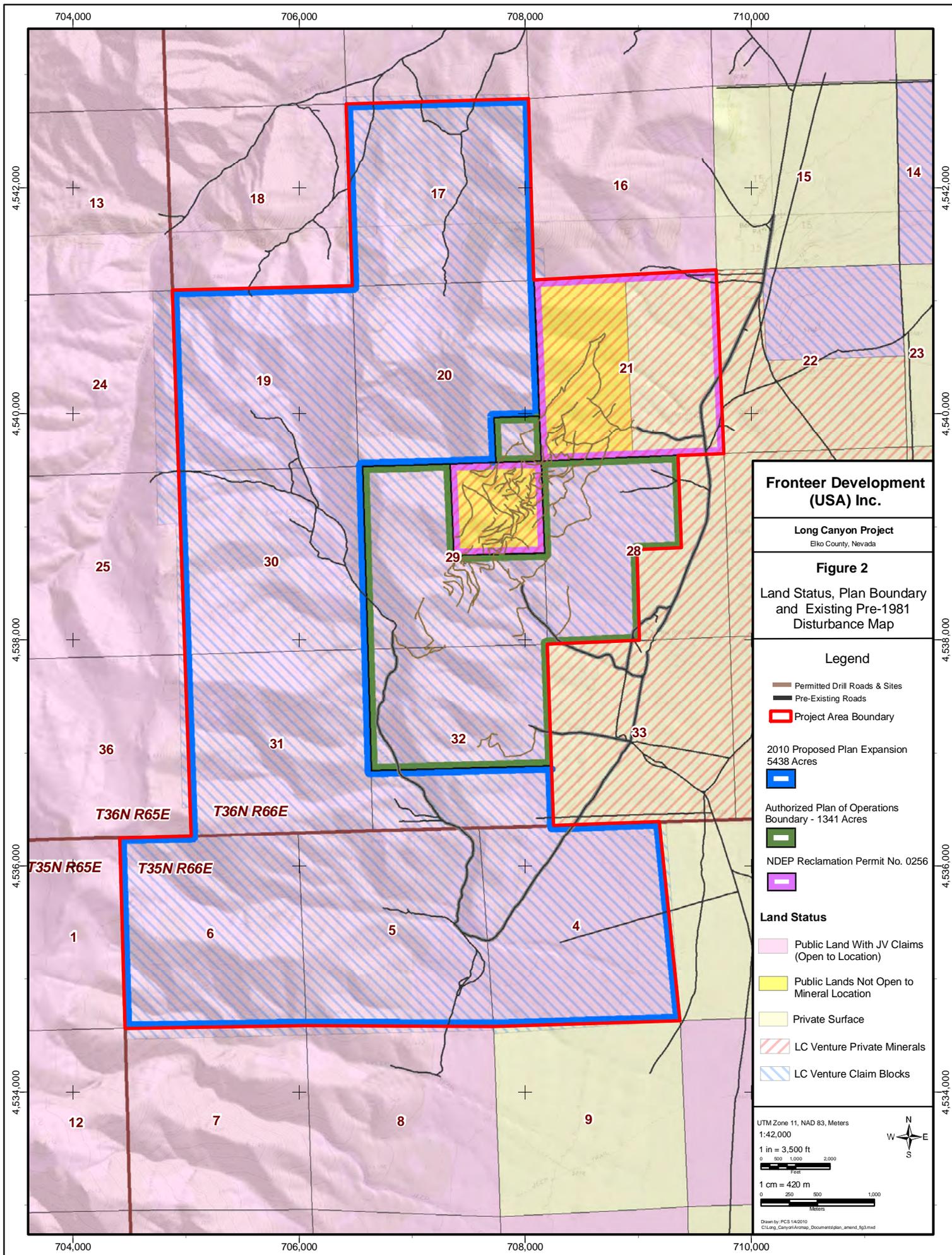
- ▨ LC Venture Private Minerals
- ▨ LC Venture Claim Blocks

UTM Zone 11, NAD 83, Meters  
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1 in = 37,500 ft  
0 2,500 5,000 10,000  
Meters

1 cm = 4,500 m  
0 1,500 3,000 6,000  
Meters

Drawn by: PCS 11/4/2009  
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**Frontier Development  
(USA) Inc.**

**Long Canyon Project**  
Elko County, Nevada

**Figure 2**  
Land Status, Plan Boundary  
and Existing Pre-1981  
Disturbance Map

**Legend**

- Permitted Drill Roads & Sites
- Pre-Existing Roads
- Project Area Boundary
- 2010 Proposed Plan Expansion  
5438 Acres
- Authorized Plan of Operations  
Boundary - 1341 Acres
- NDEP Reclamation Permit No. 0256

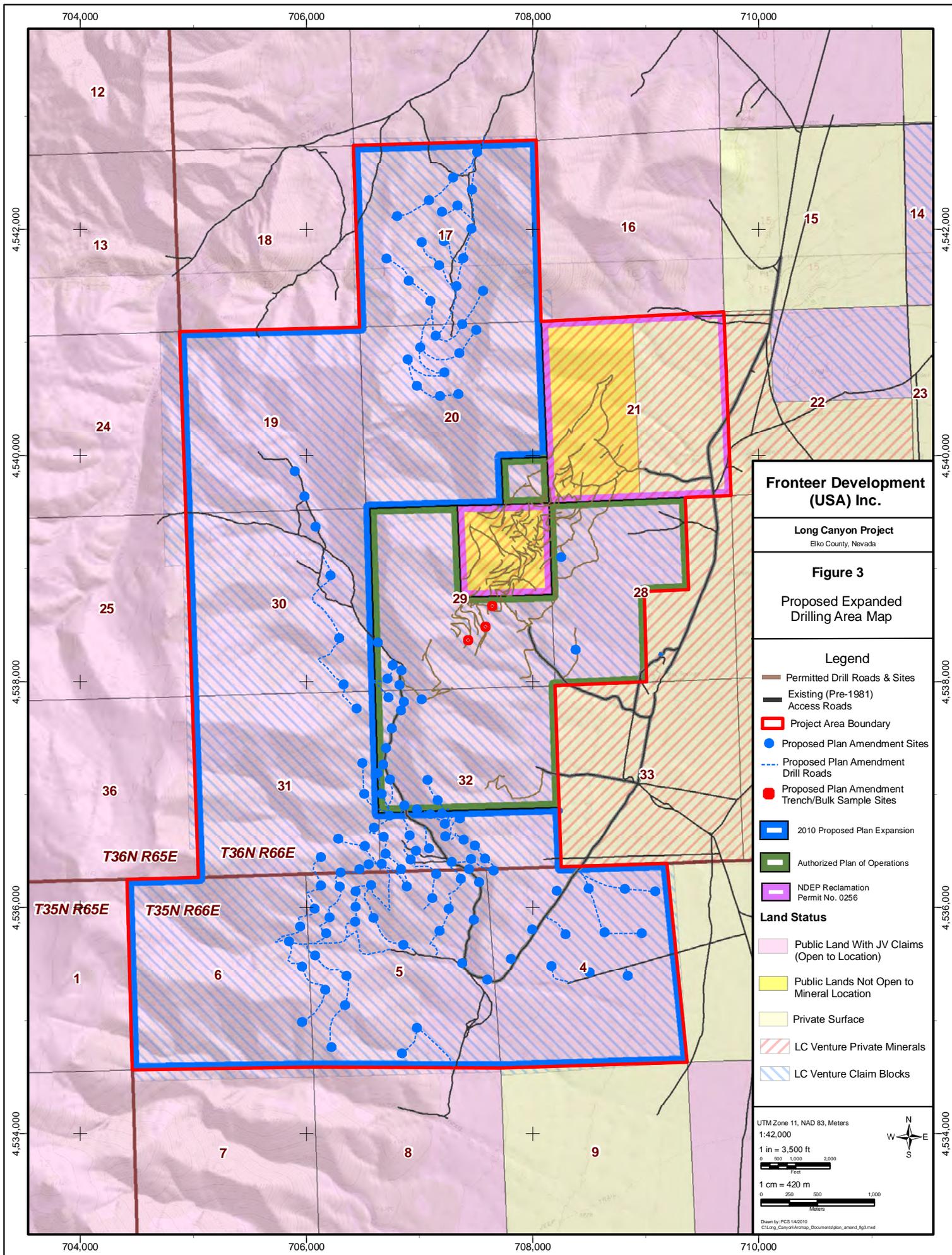
**Land Status**

- Public Land With JV Claims  
(Open to Location)
- Public Lands Not Open to  
Mineral Location
- Private Surface
- LC Venture Private Minerals
- LC Venture Claim Blocks

UTM Zone 11, NAD 83, Meters  
1:42,000  
1 in = 3,500 ft

1 cm = 420 m

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**Fronteer Development  
(USA) Inc.**

**Long Canyon Project**  
Elko County, Nevada

**Figure 3**  
Proposed Expanded  
Drilling Area Map

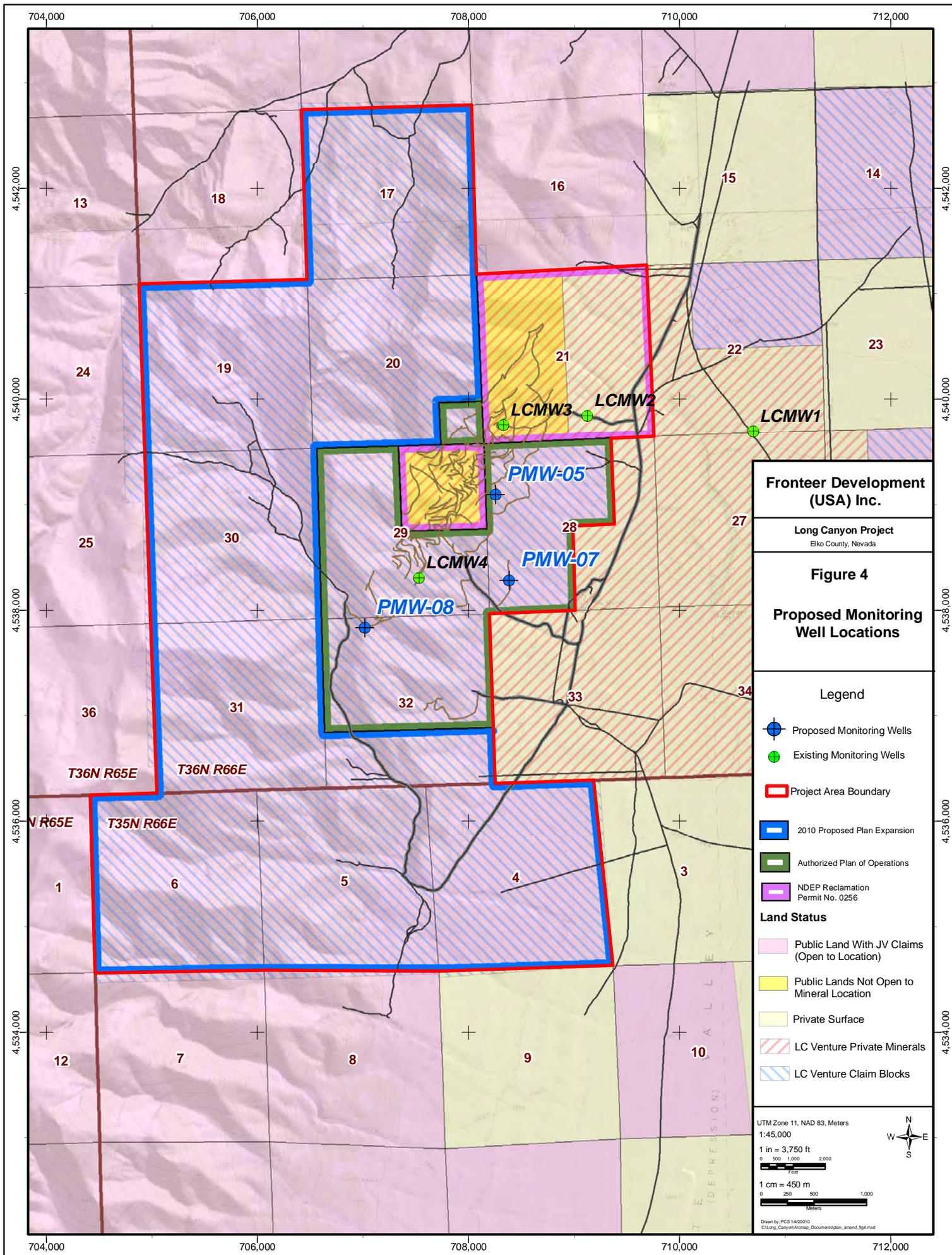
**Legend**

- Permitted Drill Roads & Sites
  - Existing (Pre-1981) Access Roads
  - Project Area Boundary
  - Proposed Plan Amendment Sites
  - Proposed Plan Amendment Drill Roads
  - Proposed Plan Amendment Trench/Bulk Sample Sites
  - 2010 Proposed Plan Expansion
  - Authorized Plan of Operations
  - NDEP Reclamation Permit No. 0256
- Land Status**
- Public Land With JV Claims (Open to Location)
  - Public Lands Not Open to Mineral Location
  - Private Surface
  - LC Venture Private Minerals
  - LC Venture Claim Blocks

UTM Zone 11, NAD 83, Meters  
1:42,000  
1 in = 3,500 ft

1 cm = 420 m

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**Frontier Development  
(USA) Inc.**

**Long Canyon Project**  
Elko County, Nevada

**Figure 4**  
**Proposed Monitoring  
Well Locations**

- Legend**
- Proposed Monitoring Wells
  - Existing Monitoring Wells
  - Project Area Boundary
  - 2010 Proposed Plan Expansion
  - Authorized Plan of Operations
  - NDEP Reclamation Permit No. 0256
- Land Status**
- Public Land With JV Claims (Open to Location)
  - Public Lands Not Open to Mineral Location
  - Private Surface
  - LC Venture Private Minerals
  - LC Venture Claim Blocks

UTM Zone 11, NAD 83, Meters  
1:45,000  
1 in = 3,750 ft

1 cm = 450 m

Drawn by: PCS 14/20010  
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## **APPENDIX B**

### **MINING CLAIMS WITHIN THE PLAN OF OPERATIONS BOUNDARY**

CLAIMNAME	OWNER	SERIAL_NUM
PQ 121	AUEX INC	NMC917841
PQ 119	PITTSTON NV GOLD CO LTD	NMC917839
PQ 117	PITTSTON NV GOLD CO LTD	NMC917837
PQ 115	PITTSTON NV GOLD CO LTD	NMC917835
PQ 113	PITTSTON NV GOLD CO LTD	NMC917833
PQ 120	PITTSTON NV GOLD CO LTD	NMC917840
PQ 118	PITTSTON NV GOLD CO LTD	NMC917838
PQ 116	PITTSTON NV GOLD CO LTD	NMC917836
PQ 114	PITTSTON NV GOLD CO LTD	NMC917834
PQ 112	PITTSTON NV GOLD CO LTD	NMC917832
PQ 253	PITTSTON NV GOLD CO LTD	NMC920855
PNG-311	PITTSTON NV GOLD CO LTD	NMC757031
PNG-313	PITTSTON NV GOLD CO LTD	NMC757033
PQ 251	PITTSTON NV GOLD CO LTD	NMC920853
PQ 249	PITTSTON NV GOLD CO LTD	NMC920851
PQ 247	PITTSTON NV GOLD CO LTD	NMC920849
PQ 245	PITTSTON NV GOLD CO LTD	NMC920847
PQ 243	PITTSTON NV GOLD CO LTD	NMC920845
PQ 241	PITTSTON NV GOLD CO LTD	NMC920843
PQ 239	PITTSTON NV GOLD CO LTD	NMC920841
PQ 237	PITTSTON NV GOLD CO LTD	NMC920839
PQ 235	PITTSTON NV GOLD CO LTD	NMC920837
PQ 233	PITTSTON NV GOLD CO LTD	NMC920835
PQ 254	PITTSTON NV GOLD CO LTD	NMC920856
PNG-315	PITTSTON NV GOLD CO LTD	NMC757035
PNG-317	PITTSTON NV GOLD CO LTD	NMC757037
PQ 252	PITTSTON NV GOLD CO LTD	NMC920854
PQ 250	PITTSTON NV GOLD CO LTD	NMC920852
PQ 248	PITTSTON NV GOLD CO LTD	NMC920850
PQ 246	PITTSTON NV GOLD CO LTD	NMC920848
PQ 244	PITTSTON NV GOLD CO LTD	NMC920846
PQ 242	PITTSTON NV GOLD CO LTD	NMC920844
PQ 240	PITTSTON NV GOLD CO LTD	NMC920842
PQ 238	PITTSTON NV GOLD CO LTD	NMC920840
PQ 236	PITTSTON NV GOLD CO LTD	NMC920838
PQ 234	PITTSTON NV GOLD CO LTD	NMC920836
PQ 285	PITTSTON NV GOLD CO LTD	NMC920887
PNG-319	PITTSTON NV GOLD CO LTD	NMC757039
PNG-321	PITTSTON NV GOLD CO LTD	NMC757041
PNG-323	PITTSTON NV GOLD CO LTD	NMC757043
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PQ 279	PITTSTON NV GOLD CO LTD	NMC920881
PQ 277	PITTSTON NV GOLD CO LTD	NMC920879
PQ 275	PITTSTON NV GOLD CO LTD	NMC920877
PQ 273	PITTSTON NV GOLD CO LTD	NMC920875
PQ 271	PITTSTON NV GOLD CO LTD	NMC920873
PQ 269	PITTSTON NV GOLD CO LTD	NMC920871
PQ 267	PITTSTON NV GOLD CO LTD	NMC920869
PQ 265	PITTSTON NV GOLD CO LTD	NMC920867
PQ 286	PITTSTON NV GOLD CO LTD	NMC920888

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PQ 525	PITTSTON NV GOLD CO LTD	NMC923362
PQ 527	PITTSTON NV GOLD CO LTD	NMC923364
PQ 529	PITTSTON NV GOLD CO LTD	NMC923366
PQ 531	PITTSTON NV GOLD CO LTD	NMC923368
PQ 533	PITTSTON NV GOLD CO LTD	NMC923370
PQ 535	PITTSTON NV GOLD CO LTD	NMC923372
PQ 122	PITTSTON NV GOLD CO LTD	NMC917844
PQ 124	PITTSTON NV GOLD CO LTD	NMC917846
PQ 126	PITTSTON NV GOLD CO LTD	NMC917848
PQ 128	PITTSTON NV GOLD CO LTD	NMC917850
PQ 130	PITTSTON NV GOLD CO LTD	NMC917852
PQ 132	PITTSTON NV GOLD CO LTD	NMC917854
PQ 134	PITTSTON NV GOLD CO LTD	NMC917856
PQ 136	PITTSTON NV GOLD CO LTD	NMC917858
PQ 138	PITTSTON NV GOLD CO LTD	NMC917860
PQ 123	PITTSTON NV GOLD CO LTD	NMC917845
PQ 125	PITTSTON NV GOLD CO LTD	NMC917847
PQ 127	PITTSTON NV GOLD CO LTD	NMC917849
PQ 129	PITTSTON NV GOLD CO LTD	NMC917851
PQ 131	PITTSTON NV GOLD CO LTD	NMC917853
PQ 133	PITTSTON NV GOLD CO LTD	NMC917855
PQ 135	PITTSTON NV GOLD CO LTD	NMC917857

PQ 137	PITTSTON NV GOLD CO LTD	NMC917859
PQ 139	PITTSTON NV GOLD CO LTD	NMC917861
PQ 140	PITTSTON NV GOLD CO LTD	NMC917862
PQ 142	PITTSTON NV GOLD CO LTD	NMC917864
PQ 144	PITTSTON NV GOLD CO LTD	NMC917866
PQ 146	PITTSTON NV GOLD CO LTD	NMC917868
PQ 158	AUEX INC	NMC946317
PQ 150	PITTSTON NV GOLD CO LTD	NMC917872
PQ 152	PITTSTON NV GOLD CO LTD	NMC917874
PQ 154	PITTSTON NV GOLD CO LTD	NMC917876
PQ 156	PITTSTON NV GOLD CO LTD	NMC917878
PQ 141	PITTSTON NV GOLD CO LTD	NMC917863
PQ 143	PITTSTON NV GOLD CO LTD	NMC917865
PQ 145	PITTSTON NV GOLD CO LTD	NMC917867
PQ 147	PITTSTON NV GOLD CO LTD	NMC917869
PQ 159	AUEX INC	NMC946318
PQ 151	PITTSTON NV GOLD CO LTD	NMC917873
PQ 153	PITTSTON NV GOLD CO LTD	NMC917875
PQ 155	PITTSTON NV GOLD CO LTD	NMC917877
PQ 157	PITTSTON NV GOLD CO LTD	NMC917879
PQ 500	PITTSTON NV GOLD CO LTD	NMC932047
PQ 501	PITTSTON NV GOLD CO LTD	NMC932048
PQ 502	PITTSTON NV GOLD CO LTD	NMC932049
PQ 503	PITTSTON NV GOLD CO LTD	NMC932050
PQ 504	PITTSTON NV GOLD CO LTD	NMC932051
PQ 505	PITTSTON NV GOLD CO LTD	NMC932052
PQ 506	PITTSTON NV GOLD CO LTD	NMC932053
PQ 507	PITTSTON NV GOLD CO LTD	NMC932054
PQ 508	PITTSTON NV GOLD CO LTD	NMC932055
PQ 516A	PITTSTON NV GOLD CO LTD	NMC932063
PQ 514	PITTSTON NV GOLD CO LTD	NMC932061
PQ 513	PITTSTON NV GOLD CO LTD	NMC932060
PQ 515	PITTSTON NV GOLD CO LTD	NMC932062
PQ 510	PITTSTON NV GOLD CO LTD	NMC932057
PQ 509	PITTSTON NV GOLD CO LTD	NMC932056
PQ 511	PITTSTON NV GOLD CO LTD	NMC932058
PQ 517A	PITTSTON NV GOLD CO LTD	NMC932064
PQ 518A	PITTSTON NV GOLD CO LTD	NMC932065
PQ 521A	PITTSTON NV GOLD CO LTD	NMC932068
PQ 519A	PITTSTON NV GOLD CO LTD	NMC932066
PQ 520A	PITTSTON NV GOLD CO LTD	NMC932067
PQ 523A	PITTSTON NV GOLD CO LTD	NMC932070
PQ 524A	PITTSTON NV GOLD CO LTD	NMC932071
PQ 522A	PITTSTON NV GOLD CO LTD	NMC932069
PQ 512	PITTSTON NV GOLD CO LTD	NMC932059

**APPENDIX C**  
**WARRANTY DEEDS**

Elko Co, NV - Deeds - Bk 55 / Pg 63

FILE NO. 92946

RUSSELL WILKINS, ET UX, ET AL

TO

FRED D. WEST, ET UX

GRANT, BARGAIN & SALE DEED TO JOINT TENANTS

THIS INDENTURE, made and executed this 18th day of October, 1946, by and between RUSSELL WILKINS and MONA F. WILKINS, his wife, both of Contact, County of Elko, State of Nevada; MARTIN WUNDERLICH and E. MORIELLE WUNDERLICH, his wife, both of the City and County of Denver, State of Colorado; and WILKINS & WUNDERLICH, a co-partnership composed of RUSSELL WILKINS and MARTIN WUNDERLICH, first parties, and FRED D. WEST and EDITH R. WEST, his wife, of Wendover, County of Elko, State of Nevada, second parties.

W I T N E S S E T H:

THAT THE first parties for and in consideration of the sum of TEN DOLLARS (\$10.00) lawful money of the United States of America, to them in hand paid by the second parties and other good and valuable consideration, the receipt whereof is hereby acknowledged, do by these presents grant, bargain, sell and convey unto the second parties as joint tenants with rights of survivorship and not as tenants in common, and to the assigns of second parties and to the survivor of them, and to the heirs, administrators, executors and assigns of the survivor of them, all that certain real property located in Elko County, Nevada, Mt. Diablo Base & Meridian, and particularly described as follows, to-wit:

T. 34 N., R. 67 E.

- Sec. 1 All
3 All
5 All
7 E 1/2; that part of the W 1/2 lying east of the Nevada Northern Railroad as now constructed.
9 All
11 All
13 All
15 All
17 All
19 N 1/2; (except 4.60 A.)
21 N 1/2
23 N 1/2

T. 34 N., R. 68 E.

- Sec. 5 All
7 All
9 All
17 All
19 N 1/2

T. 35 N., R. 66 E.

- Sec. 2 Lots 3 & 4; S 1/2 NW 1/4; SW 1/4
10 E 1/2 E 1/2
14 W 1/2 W 1/2
22 NE 1/4; SE 1/4 NW 1/4; N 1/2 SE 1/4; SW 1/4 SE 1/4; SE 1/4 SW 1/4
27 N 1/2
28 SE 1/4; SE 1/4 NE 1/4

T. 35 N., R. 67 E.

- Sec. 1 All
3 All
5 All
7 All (except 12.17 A. right-of-way)
9 All
11 N 1/4 SW 1/4; N 1/2 SE 1/4; SW 1/4 SE 1/4; SE 1/4 SW 1/4

64

13 All (except 14.72 A. right-of-way)  
 15 All (except 15.66 A. right-of-way)  
 17 All  
 19 All (except 13 A. right-of-way)  
 21 All (except 11.57 A. right-of-way)  
 23 All  
 25 All  
 27 All  
 29 All (except 18.96 A. right-of-way)  
 31 All (except 17.98 A. right-of-way)  
 33 All  
 35 All

T. 35 N., R. 65 E.

Sec. 5 All  
 7 All (except 21.28 A. right-of-way)  
 17 All (except 111.13 A. right-of-way)  
 19 All  
 29 All  
 31 All  
 33 All

T. 36 N., R. 66 E.

Sec. 3 NE  
 21 All  
 22 NW $\frac{1}{4}$ ; SE $\frac{1}{4}$ SW $\frac{1}{4}$ ; S $\frac{1}{2}$ SE $\frac{1}{4}$ ; NE $\frac{1}{4}$ SE $\frac{1}{4}$ ; NE $\frac{1}{4}$ SW $\frac{1}{4}$   
 26 NW $\frac{1}{4}$   
 27 All  
 28 SE $\frac{1}{4}$ ; W $\frac{1}{2}$ SE $\frac{1}{4}$   
 29 NE  
 33 All  
 34 All

T. 36 N., R. 67 E.

Sec. 1 All  
 3 All  
 5 All (except 6.89 A. right-of-way)  
 7 All (except 12.70 A. right-of-way)  
 9 All  
 11 All  
 13 All  
 15 All  
 17 All  
 19 All (except 12.05 A. right-of-way)  
 21 All  
 23 All  
 25 All  
 27 All  
 29 All  
 31 All (except 12.14 A. right-of-way)  
 33 All  
 35 All

T. 36 N., R. 68 E.

Sec. 5 All  
 7 All  
 17 All  
 19 All  
 29 All  
 31 All

T. 37 N., R. 66 E.

Sec. 8 NE $\frac{1}{4}$ ; SW $\frac{1}{4}$ NE $\frac{1}{4}$   
 10 SE  
 11 All  
 14 NE $\frac{1}{4}$ ; NW $\frac{1}{4}$ NE $\frac{1}{4}$ ; SE $\frac{1}{4}$ NW $\frac{1}{4}$   
 15 All  
 28 SW $\frac{1}{4}$ SW $\frac{1}{4}$   
 32 SE $\frac{1}{4}$ NW $\frac{1}{4}$ ; SW $\frac{1}{4}$ NE $\frac{1}{4}$ ; NW $\frac{1}{4}$ SE $\frac{1}{4}$

T. 37 N., R. 67 E.

Sec. 1 All (except that part lying North of S.P.R.R. right-of-way)  
 5 All (except that part lying North of S.P.R.R. right-of-way)  
 7 All  
 9 NW $\frac{1}{4}$ ; SE (except 6.70 A. right-of-way)  
 11 All (except that part lying North of S.P.R.R. right-of-way)  
 13 All  
 15 All  
 17 All  
 19 All  
 21 All (except 12.40 A. right-of-way)  
 23 All  
 25 All  
 27 All  
 29 All (except 11.31 A. right-of-way)  
 31 All  
 33 All  
 35 All

T. 37 N., R. 60 E.

Sec. 5 All

T. 37 N., R. 68 E. (Cont.)

Sec. 7 All
9 NW1/4; N1/2SW1/4; N1/2S1/2SW1/4; E1/4
15 All
17 All
19 All
21 All
29 All
31 All

T. 38 N., R. 67 E.

Sec. 31 All that part South of S.P.R.R. R'wy.

T. 38 N., R. 68 E.

Sec. 31 All that part South S.P.R.R. R'wy.

All of the above described lands containing 65,745.16 acres, more or less

TOGETHER WITH all waters, water rights, rights to the use of water, dams, ditches, canals, reservoirs, pipes, pipe lines and any other means for the diversion and/or use of water appurtenant to and/or now or heretofore used or enjoyed in connection with said lands, or any part thereof.

AND TOGETHER WITH all range rights based upon or attached to said land, or any part thereof.

AND TOGETHER WITH the tenements, hereditaments and appurtenances thereunto belonging, or in anywise appertaining, the reversion and reversions, remainder and remainders, rents, issues and profits thereof.

RESERVING HOWEVER to the grantors, their heirs, administrators, executors, assigns or successors all right, title and interest to coal, oil, gas and other minerals of every kind and nature whatsoever existing upon, beneath the surface of, or within said lands, including the right to the use of so much of the surface thereof as may be required in prospecting for, in locating, developing, producing and transporting said coal, oil, gas or minerals and any of their by-products thereof.

AND FURTHER RESERVING unto the grantors, their heirs, administrators, executors, assigns or successors for five (5) years from the date hereof the right by their agents or otherwise at any time and without restriction, to enter freely upon and to pass over said lands, or any part thereof, for the purpose of searching for, identifying and removing therefrom any live-stock owned by or under the control of grantors, their heirs, administrators, executors, assigns or successors.

THIS CONVEYANCE is subject to any and all reservation, easements, licenses, and right-of-way lawfully established or now existing.

TO HAVE AND TO HOLD, all and singular, the said premises with the appurtenances unto the second parties as joint tenants with rights of survivorship, and not as tenants in common, unto the assigns of second parties, and to the survivor of them, and to the heirs, administrators, executors and assigns of the survivor of them forever.

IN WITNESS WHEREOF, the first parties have hereunto set their hands the day and year first above written.

RUSSELL WILKINS
Russell Wilkins.

MONA P. WILKINS
Mona P. Wilkins

MARTIN WUNDERLICH
Martin Wunderlich

E. MURIELLE WUNDERLICH
E. Murielle Wunderlich

WILKINS & WUNDERLICH, a co-partnership

By RUSSELL WILKINS
Russell Wilkins

STATE OF NEVADA
COUNTY OF ELKO

On this 18th day of October, 1946, personally appeared before me, a Notary Public in and for said County and State, RUSSELL WILKINS and MONA P. WILKINS, his wife, and MARTIN WUNDERLICH and E. MURIELLE WUNDERLICH, his wife, known to me to be the persons described in, and who executed the foregoing instrument, and acknowledged to me that they executed the same freely and voluntarily and for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

GEORGE H. ...
Notary Public

My Commission Expires NOV 25, 1949

66

\$138.60 Internal Revenue Stamps attached and cancelled RW MFW MW EMS RW 12/10/46

Filed for record at request of Nevada Bank of Commerce on the 10 day of Dec. 1946 at 1:00 o'clock P.M.

Gertrude Williams Eager, County Recorder

FILE NO. 92948

INDEXED

MARIAN L. LeBARON

TO

WILLIAM E. TATUM, ET UX

INDEXED

THIS INDENTURE, made and executed the 24th day of Dec. A.D. 1945, by and between Marian L. LeBaron, a single woman, of the City and County of Elko, State of Nevada, the part of the first part, and William E. Tatum and Anna Tatum, his wife, of the City and County of Elko, State of Nevada, the part of the second part,

W I T N E S S E T H :

That the said party of the first part, in consideration of the sum of Ten (\$10.00) Dollars, current, lawful money of the United States of America, to her in hand paid by the said party of the second part, the receipt whereof is hereby acknowledged, does by these presents, grant, bargain, and sell unto the said party of the second part, and to their heirs and assigns forever, those certain lots, pieces and parcels of land situate, lying and being in the County of Elko, State of Nevada, particularly described as follows, to-wit:

Lot Five (5) and the East twelve and one-half (12 1/2) feet of Lot Six (6) of Block 00 of the Western Addition to the City of Elko, formerly the Town of Elko, as laid down and delineated in the official plat of said town now said City, on file in the office of the County Recorder of said County of Elko, State of Nevada, together with all buildings and improvements.

TOGETHER WITH the tenements, hereditaments and appurtenances thereunto belonging, or in anywise appertaining, the remainder and remainders, reversion and reversions, rents, issues and profits thereof.

TO HAVE AND TO HOLD the said premises, together with the appurtenances, unto the said party of the second part, their heirs and assigns forever.

IN WITNESS WHEREOF, the said party of the first part has hereunto set her hand the day and year first above written.

MARIAN L. LeBARON

STATE OF NEVADA )
COUNTY OF ELKO ) ss.

On this 24th day of Dec. 1945, personally appeared before me, a Notary Public in and for said County and State, Marian L. LeBaron, known to me to be the person described in and who executed the foregoing instrument, who acknowledged to me that she executed the same freely, voluntarily and for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal at my office in said County and State the day and year in this certificate above written.

DORA B. KATZBERG
NOTARY PUBLIC

S E A L

\$.55 Internal Revenue Stamps attached and cancelled 12/24/45 W.E.T.

Filed for record at request of William E. Tatum on the 10 day of Dec. 1946 at 1:55 o'clock P.M.

Gertrude Williams Eager, County Recorder

FILE NO. 92948

INDEXED

JULES PATTANI, ET UX

TO

LUCIANO ALACANO, ET UX

INDEXED

THIS INDENTURE, made this 4th day of December, 1946, by and between JULES PATTANI and

Warranty Deed

445326

RECEIVED  
BUR. OF LAND MANAGEMENT  
NEVADA STATE OFFICE

99 JUL -9 AM 8:00

RECORDING REQUESTED BY:  
First American Title Company  
Escrow No. 1999-12997SEE  
Exchange No. N-60262

WHEN RECORDED, PLEASE MAIL TO:  
Bureau of Land Management  
Attn: Land Team  
P.O. Box 12000  
Reno, Nevada 89502-7147

EXEMPT NRS 375.090 #2

WARRANTY DEED

THIS WARRANTY DEED, made this 20<sup>th</sup> day of May, 1999, between BIG SPRINGS ASSOCIATES, a Nevada general partnership, authorized to do business in the State of Nevada, Grantor, and THE UNITED STATES OF AMERICA, Grantee.

WITNESSETH: THAT the said Grantor, for and in consideration of the exchange of certain land and interests as authorized by the Federal Land Policy and Management Act of 1976 (90 Stat. 2743), as amended by the Federal Land Exchange Facilitation Act of 1988 (102 Stat. 1086), does by these presence grant, bargain, sell, convey and warrant unto the said Grantee, and its assigns, forever, all that certain lot, piece or parcel of land situate, lying and being in the County of Elko, State of Nevada, as more particularly described on Exhibit "A", together with those certain water rights described in Exhibit "B", which exhibits are attached hereto and by this reference incorporated herein.

SUBJECT TO:

All of those rights and interests, reservations, restrictions and conditions; rights-of-way and easements either of record or actually existing on the property contained on Exhibit "C" attached hereto and by this reference made a part hereof.

TOGETHER WITH all and singular the tenements, hereditaments, improvements, and appurtenances thereunto belonging, or in any wise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof.

TO HAVE AND TO HOLD all and singular the above mentioned and described premises, together with the appurtenances, unto the said Grantee and to its successors and assigns forever.

The acquiring agency is the Bureau of Land Management, United States Department of Interior.

BOOK 1100 PAGE 601



AFFIDAVIT

Pursuant to Section 328.110 of the Nevada Revised Statutes, the United States hereby acknowledges that it does not seek exclusive jurisdiction of the property described in the enclosed warranty deed.

UNITED STATES OF AMERICA  
BUREAU OF LAND MANAGEMENT

By: *Dennis Samuelson*  
Dennis Samuelson  
Acting Lands Team Lead

STATE OF NEVADA        )  
                                  ) SS  
COUNTY OF Washoe    )

Signed and sworn to before me on May 20, 1999 by

*Denise A. Watson*  
Notary Public

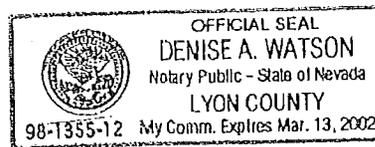


EXHIBIT A  
LEGAL DESCRIPTION

OFFERED LANDS

All that certain lot, piece or parcel of land situate in the County of Elko, State of Nevada, described as follows:

PARCEL I:

TOWNSHIP 34 NORTH, RANGE 68 EAST, MDB&M

Section 5: All  
Section 7: All  
Section 9: All  
Section 17: All  
Section 19: NE $\frac{1}{4}$ ; Lots 1, 2, 3, 4, 5 and 6 of the NW $\frac{1}{4}$ ; (N $\frac{1}{2}$ )

PARCEL II:

TOWNSHIP 35 NORTH, RANGE 68 EAST, MDB&M

Section 5: All  
Section 19: All

PARCEL III:

TOWNSHIP 36 NORTH, RANGE 66 EAST, MDB&M

Section 21: W $\frac{1}{2}$   
Section 29: NE $\frac{1}{4}$

PARCEL IV:

TOWNSHIP 36 NORTH, RANGE 68 EAST, MDB&M

Section 5: All  
Section 7: All  
Section 17: All  
Section 19: All  
Section 29: All  
Section 31: All

PARCEL V:

TOWNSHIP 37 NORTH, RANGE 66 EAST, MDB&M

Section 8: N $\frac{1}{2}$ SE $\frac{1}{4}$ ; SW $\frac{1}{4}$ NE $\frac{1}{4}$   
Section 10: S $\frac{1}{2}$   
Section 11: All  
Section 14: N $\frac{1}{2}$ SE $\frac{1}{4}$ ; NW $\frac{1}{4}$ NW $\frac{1}{4}$ ; SE $\frac{1}{4}$ NW $\frac{1}{4}$   
Section 15: All  
Section 28: SW $\frac{1}{4}$ SW $\frac{1}{4}$   
Section 32: S $\frac{1}{2}$ NW $\frac{1}{4}$ ; SW $\frac{1}{4}$ NE $\frac{1}{4}$ ; NW $\frac{1}{4}$ SE $\frac{1}{4}$

PARCEL VI:

TOWNSHIP 37 NORTH, RANGE 67 EAST, MDB&M

Section 7: All  
Section 13: All  
Section 15: All  
Section 23: All  
Section 25: All  
Section 27: All  
Section 35: All

TOWNSHIP 37 NORTH, RANGE 68 EAST, MDB&M

Section 5: All  
Section 7: All  
Section 9:  $E\frac{1}{2}$ ;  $N\frac{1}{2}SW\frac{1}{4}$ ;  $N\frac{1}{2}S\frac{1}{2}SW\frac{1}{4}$ ;  $NW\frac{1}{4}$   
Section 15: All  
Section 17: All  
Section 19: All  
Section 21: All  
Section 29: All  
Section 31: All

PARCEL VII:

TOWNSHIP 38 NORTH, RANGE 68 EAST, MDB&M

Section 31: That portion lying Southerly of a line 200 feet Southerly and parallel with the centerline of CENTRAL PACIFIC RAILROAD COMPANY'S railroad, as now constructed.

EXCEPTING FROM all of Parcels I thru VII, all right, title and interest to coal, oil, gas and other minerals of every kind and nature whatsoever existing upon, beneath the surface of, or within said lands, including the right to the use of so much of the surface thereof as may be required in prospecting for, in locating, developing, producing and transporting said coal, oil, gas or minerals and any of their by products thereof, as reserved by WILKINS and WUNDERLICH, et al, in Deed recorded December 10, 1946 in Book 55, Page 63 of Deed Records, Elko County, Nevada.

PARCEL VIII:

TOWNSHIP 34 NORTH, RANGE 65 EAST, MDB&M

Section 1: All  
Section 3: All  
Section 5: All  
Section 7: All  
Section 9: All  
Section 11: All  
Section 17: All

PARCEL IX:

TOWNSHIP 35 NORTH, RANGE 65 EAST, MDB&M

Section 1: All  
Section 3: All  
Section 7: All  
Section 9: All  
Section 11: All  
Section 13: All  
Section 15: All  
Section 17: All  
Section 19: All  
Section 21: All  
Section 23: All  
Section 25: All  
Section 27: All  
Section 29: All  
Section 31: All  
Section 33: All  
Section 35: All

PARCEL X:

TOWNSHIP 36 NORTH, RANGE 65 EAST, MDB&M

Section 1: All  
Section 3: All  
Section 11: All  
Section 13: All  
Section 15: All  
Section 23: All  
Section 25: All  
Section 27: All  
Section 35: All

PARCEL XI:

TOWNSHIP 37 NORTH, RANGE 65 EAST, MDB&M

Section 13: All  
Section 23: All, EXCEPTING THEREFROM any portion of said land conveyed to the State of Nevada for highway purposes.  
  
Section 25: All  
Section 35: All

PARCEL XII:

TOWNSHIP 38 NORTH, RANGE 65 EAST, MDB&M

Section 1: ALL EXCEPT a strip of land 400 feet wide, containing 14.73 acres lying equally on each side of the centerline of CENTRAL PACIFIC RAILROAD COMPANY'S railroad, as now constructed.  
Section 13: All

PARCEL XIII:

TOWNSHIP 36 NORTH, RANGE 66 EAST, MDB&M

Section 7: Lots 2, 3 and 4;  $E\frac{1}{2}W\frac{1}{2}$ ;  $E\frac{1}{2}$   
Section 29: Lots 1, 2, 3, 4 and 5;  $SE\frac{1}{4}NW\frac{1}{4}$ ;  $SE\frac{1}{4}$ ;  $E\frac{1}{2}SW\frac{1}{4}$   
Section 31: All

PARCEL XIV:

TOWNSHIP 37 NORTH, RANGE 66 EAST, MDB&M

Section 1: All  
Section 3: All  
Section 5: All  
Section 7: All  
Section 9: All  
Section 13: All  
Section 17: All  
Section 19: All, EXCEPTING THEREFROM those portions of said land Condemned to the State of Nevada by Final Order of Condemnation recorded August 22, 1973, in Book 182, Page 625 of Official Records, Elko County, Nevada.  
Section 21: All  
Section 23: All  
Section 27:  $N\frac{1}{2}$ ;  $SW\frac{1}{4}$ ;  $N\frac{1}{2}SE\frac{1}{4}$ ;  $SW\frac{1}{4}SE\frac{1}{4}$   
Section 29: All EXCEPT the following:

Beginning at a point located in the  $SW\frac{1}{4}NE\frac{1}{4}$  of Section 29, T. 37 N., R. 66 E., MDB&M., which point bears N.  $27^{\circ}58'29''$  W. a distance of 3134.02 feet from the Southeast corner of said Section 29;

Thence N.  $60^{\circ}38'$  W. along a line of 40 feet Northeasterly of and parallel to the old centerline of State Highway Route 1, a distance of 411.41 feet to a point;

Thence N.  $22^{\circ}49'32''$  E., a distance of 374.63 feet to a point;

Thence S.  $67^{\circ}10'28''$  E., a distance of 408.72 feet to a point;

Thence S.  $22^{\circ}49'32''$  W. a distance of 261.50 feet to a point;

Thence S.  $67^{\circ}10'28''$  E. a distance of 100.00 feet to a point;

Thence S.  $22^{\circ}49'32''$  W. a distance of 100.00 feet to a point;

Thence N.  $67^{\circ}10'28''$  W. a distance of 100.00 feet to a point;

Thence S. 22°49'32" W. a distance of 60.00 feet to the point of beginning, containing a total area of 3.968 acres, more or less.

ALSO EXCEPTING, a parcel containing 1 acre, more or less, conveyed to the STATE OF NEVADA by Deed recorded August 27, 1929 in Book 45 of Deeds at Pages 128 and 129, Elko County, Nevada.

FURTHER EXCEPTING from Section 29, those portions of said land Condemned to the State of Nevada by Final Order of Condemnation recorded August 22, 1973, in Book 182, Page 625 of Official Records, Elko County, Nevada.

Section 31: All  
Section 33: All, EXCEPTING THEREFROM those portions of said land condemned to the State of Nevada by Final Order of Condemnation recorded August 22, 1973, in Book 182, Page 625 of Official Records, Elko County, Nevada.

PARCEL XV:

TOWNSHIP 38 NORTH, RANGE 66 EAST, MDB&M

Section 5: That part Southerly of a line parallel with and 200 feet distance Southerly of Centerline of CENTRAL PACIFIC RAILWAY COMPANY'S railroad, as now constructed  
Section 7: All  
Section 9: That part Southwesterly of a line parallel with and 200 feet distance Southwesterly of Centerline of CENTRAL PACIFIC RAILWAY COMPANY'S railroad, as now constructed  
Section 15: That part Southwesterly of a line parallel with and 200 feet distant Southwesterly of Centerline of CENTRAL PACIFIC RAILWAY COMPANY'S railroad, as now constructed  
Section 17: All  
Section 19: All  
Section 21: All  
Section 27: All  
Section 29: All  
Section 31: All  
Section 33: All  
Section 35: All

PARCEL XVI:

TOWNSHIP 34 NORTH, RANGE 66 EAST, MDB&M

Section 7: All

PARCEL XVII:

TOWNSHIP 35 NORTH, RANGE 66 EAST, MDB&M

Section 5: All  
Section 7: All  
Section 17: All  
Section 19: All  
Section 29: All  
Section 31: All

PARCEL XVIII:

TOWNSHIP 36 NORTH, RANGE 66 EAST, MDB&M

Section 5: All  
Section 9: All  
Section 17: All  
Section 19: All

EXCEPTING FROM all of Parcels VIII thru XVIII, all petroleum, oil, natural gas, and products derived therefrom, within or underlying said land or that may be produced therefrom, and all rights thereto, together with the exclusive right at all times to enter upon or in said land to prospect for and to drill, bore, recover and remove the same, as reserved by SOUTHERN PACIFIC LAND COMPANY in a Deed recorded August 1, 1949 in Book 57, Page 126 of Deed records, Elko County, Nevada.

APN 009-310-001  
009-320-001  
009-340-001  
009-350-001  
010-310-001  
010-330-001

Portion 009-560-001  
Portion 009-570-001

EXHIBIT B

WATER RIGHTS

Permit #38997, Certificate #12439  
Permit #38995, Certificate #14577  
Permit #49213, Certificate #14198  
Proof of Vested Right V03234 (supplemental to Permit #4555,  
Certificate #510)  
Permit #38989, Certificate #11365  
Proof of Vested Right V03237 (supplemental to Permit #5421,  
Certificate #978)  
Permit #38982, Certificate #12029  
Permit #45260, Certificate #15042  
Permit #45261, Certificate #15043  
Permit #45263, Certificate #15044  
Proof of Vested Right V03236 (supplemental to Permit #4561,  
Certificate #515)  
Proof of Vested Right V03235 (supplemental to Permit #7452,  
Certificate #1616)  
Proof of Vested Right V03238 (supplemental to Permit #7462,  
Certificate #1617)  
Proof of Vested Right V03239 (supplemental to Permit #4560,  
Certificate #514)  
Permit #45265, Certificate #15045  
Proof of Vested Right V03241 (supplemental to Permit #4557,  
Certificate #511)  
Proof of Vested Right 08970

## EXHIBIT C

1. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
2. Easements, claims of easement or encumbrances which are not shown by the public records.
3. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
4. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.
5. Lack of a right of access to and from said land, except for those portions of said land which abut a properly dedicated street or highway (not including freeways).
6. Rights incidental to the ownership and development of the mineral interests excepted from the land described herein.
7. Reservation contained in various Patents from the STATE OF NEVADA reading as follows:

"Provided, that all mines of gold, silver, copper, lead, cinnabar and other valuable minerals which may exist in said tract are hereby expressly reserved."

Affects the following described property:

SW $\frac{1}{4}$ NE $\frac{1}{4}$  of Section 8, T. 37 N., R. 66 E.;  
S $\frac{1}{2}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$  of Section 32, T. 37 N., R. 66 E.;  
N $\frac{1}{2}$ SE $\frac{1}{4}$  of Section 14, T. 37 N., R. 66 E.;  
N $\frac{1}{2}$ SE $\frac{1}{4}$  of Section 8, SW $\frac{1}{4}$ NE $\frac{1}{4}$  of Section 32, T. 37 N., R. 66 E.;  
SW $\frac{1}{4}$ SW $\frac{1}{4}$  of Section 28, T. 37 N., R. 66 E.;  
SE $\frac{1}{4}$ NW $\frac{1}{4}$  of Section 14, T. 37 N., R. 66 E.;
8. Conditions, Stipulation and Exceptions as contained in Deeds from CENTRAL PACIFIC RAILROAD COMPANY, recorded September 8, 1917 in Book 37, Pages 105 and 106 of Deed Records, Elko County, Nevada, reading as follows:

"Excepting from the foregoing conveyance a right of way of lawful width for any and all county roads heretofore lawfully established and now in public use upon and across the said land."

Affects the following described property:

All of Section 11 and all of Section 15, T. 37 N., R. 66 E.

9 Conditions, Stipulation and Exceptions as contained in Deed from CENTRAL PACIFIC RAILROAD COMPANY, recorded September 8, 1917 in Book 37, Page 107 of Deed Records, Elko County, Nevada, reading as follows:

"Excepting from the foregoing conveyance a right of way of lawful width for any and all county roads heretofore lawfully established and now in public use upon and across the said land."

Affects the following described property:

West  $\frac{1}{2}$  of Section 21; NE $\frac{1}{4}$  of Section 29; T. 36 N., R. 66 E.;

10. An Easement as set forth in various instruments of record  
For : highway and incidental purposes  
Granted to: STATE OF NEVADA in the following documents:

Book 41, Page 314 and 414 of Deeds; Affects Sections 19, 28, 29 and 33, Township 37 North, Range 66 East

Book 46, Pages 163 and 236, Deed Records; Affects Sections 19, 28, 29 and 33, Township 37 North, Range 66 East

Book 9, Page 305, Official Records; all Elko County, Nevada. Affects Section 31, Township 38 North, Range 68 East

In addition, Easement grant from Utah Construction Company, recorded in Book 41, Page 314 of Deed Records, Elko County, Nevada, contains the following reservation:

RESERVING unto itself all oil and mineral rights...

11. An Easement as set forth in various instruments of record  
For : telephone and telegraph lines and/or underground conduits and cables and incidental purposes  
Granted to: BELL TELEPHONE COMPANY OF NEVADA, by the following documents:

Book 35, Page 512 of Deed Records; Affects Township 34 North, Range 66 East, Section 7, and Township 34 North, Range 65 East, Sections 7 and 17

(CONTINUED ON NEXT PAGE)

Book 44, Page 515 of Deed Records; Affects Township 37  
North, Range 66 East, Sections 29 and 33, Township  
37 North, Range 65 East, Section 25

Book 51, Page 485, Deed Records; Affects Township 37  
North, Range 65 East, Section 25, Township 37 North, Range  
66 East, Sections 29 and 33

Book 60, Page 71, Deed Records; Affects Township 37  
North, Range 65 East, Section 13, Township 37 North, Range  
66 East, Section 7

Book 18, Page 33, Official Records; Affects Township 37  
North, Range 65 East, Section 13, Township 37 North, Range  
66 East, Section 7

Book 19, Page 599, Official Records; Affects Township 37  
North, Range 66 East, Section 13, Township 37 North, Range  
66 East, Section 7

12. Conditions, Stipulations and Exceptions contained in Deed from  
MARCUS RUDNICK and SAMUEL RUDNICK to LEELAND U. GRIEVE, et al,  
recorded October 11, 1953 in Book 64, Page 221 of Deed records,  
Elko County, Nevada. Reading as follows:

EXCEPTING AND RESERVING to the parties entitled thereto, and  
excluding therefrom, all oil, gas, hydrocarbon substances  
and minerals within and underlying each and every parcel of  
land above described, together with the right to enter upon  
the same to prospect for, drill for, mine, mill, remove and  
market such substances, and the rights to use such portions  
of the surface thereof and for other purposes as such rights  
have been excepted and reserved by the predecessors in  
interest to

the Parties of the first part in deeds and conveyances of  
record. Such right, title and interest, if any, the parties  
of the first part may have in the oil, gas, hydrocarbon  
substances and minerals within and underlying said lands or  
any portion thereof, is not included within this exception  
and reservation.

(Affects all except Parcel XIII, XIV, XVI, XVII and XVIII)

13. An Easement over Section 35, T. 37 N., R. 65 E., MDB&M., as set  
forth in an instrument recorded February 13, 1963, in Book 33,  
Page 674, Official Records, Elko County, Nevada.  
For : microwave radio relay site and incidental purposes  
Granted to: WESTERN UNION TELEGRAPH

a) The effect of a Grant of Easement and Agreement and terms  
and conditions therein contained, by and between MICRONET, INC.,  
a Delaware corporation and THE ULTAMAX GROUP, a California  
corporation, recorded February 5, 1991, in Book 745, Page 495,  
Official Records, Elko County, Nevada. (Affects a portion of  
Section 35, Township 37 N., Range 65 E.)

(CONTINUED ON NEXT PAGE)

- b) An unrecorded Lease dated August 6, 1992, executed by PRIME COMMUNICATIONS SITES, a Nevada corporation as Lessor and by NEVADA 2 CELLULAR CORP., a Delaware corporation as Lessee, for the period and upon the terms, covenants and conditions therein contained, disclosed by Leasehold Deed of Trust recorded September 15, 1993, in Book 830, Page 812, Official Records, Elko County, Nevada. (Affects a portion of Section 35, Township 37 N., Range 65 E.)
- c) The effect of a Grant of Easement and Agreement and the terms and conditions therein contained, by and between PRIME COMMUNICATIONS SITES OF CALIFORNIA, INC., a California Corporation, formerly known as THE ULTAMAX GROUP, a California Corporation and PRIME COMMUNICATIONS SITES, INC., a Nevada Corporation, recorded July 19, 1993 in Book 823, Page 942, Official Records, Elko County, Nevada. (Affects a portion of Section 35, Township 37 N., Range 65 E.)
14. An easement over Sections 25 and 35, T. 37 N., R. 65 E., MDB&M., Sections 19, 29 and 33, T. 37 N., R. 66 E., MDB&M., as set forth in an instrument recorded August 4, 1964 in Book 47 of Official Records at Page 263, Elko County, Nevada.  
for : pole lines, conduits and incidental purposes  
Granted to: WELLS RURAL ELECTRIC COMPANY
15. An Easement over the  $W\frac{1}{2}NW\frac{1}{4}$  of Section 33, T. 37 N., R. 66 E., MDB&M., as set forth in an instrument recorded June 16, 1969, in Book 110, Page 555, Official Records, Elko County, Nevada.  
For : electric transmission line and incidental purposes  
Granted to: WELLS RURAL ELECTRIC COMPANY
16. An easement for utility purposes as described in said Order of Condemnation recorded August 22, 1973 in Book 182, Page 625, Official Records, Elko County, Nevada.  
(Affects Section 19, T. 37 N., R. 66 E.)
17. The relinquishment of any and all Abutter's Rights in and to Interstate 80, which may adjoin said lands, as disclosed in deeds of record to the State of Nevada.
18. An Easement over Sections 28, 29 and 33, T. 37 N., R. 66 E., MDB&M., as set forth in an instrument recorded August 19, 1988, in Book 637, Page 23, Official Records, Elko County, Nevada.  
For : communication system and incidental purposes  
Granted to: AMERICAN TELEPHONE AND TELEGRAPH COMPANY

INDEXED  
145326  
N/C  
First American Title Co. Of Nev  
99 MAY 26 PM 3:39

1100 601

BOOK 1100 PAGE 614

**APPENDIX D**  
**RECLAMATION COST ESTIMATE**

## STANDARDIZED RECLAMATION COST ESTIMATOR

Version 1.1.2 (updated 03 February, 2008)

### COST DATA FILE INFORMATION

File Name: Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls  
Cost Data File: cost\_data-std-nv2009.xls  
Cost Data Date: August 1, 2009  
Cost Data Basis: Standardized Data  
Author/Source: Nevada Division of Environmental Protection (NDEP) & NV BLM

### PROJECT INFORMATION

Project Name: Fronteer Development (USA) Inc., Long Canyon Exploration Project  
Date of Submittal: February 26, 2010  
Select One:  Notice or Sm Exploration  Lg Exploration Plan  Mine Plan of Operations  
Select One:  Private Land  Public or Public/Private  
Cost Basis Category: Northern Nevada  
Cost Basis Description: Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, Washoe, and White Pine Counties

This version has been validated and verified by the NDEP and BLM for use in Nevada as of 04 February 2008.

NEVADA STANDARDIZED RECLAMATION BOND CALCULATION - SUMMARY

Project Name: Fronteer Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update

Project Date: February 26, 2010

Model Version: Version 1.1.2 (updated 03 February, 2008)

File Name: Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls

<b>A. Earthwork/Recontouring</b>				
	<b>Labor <sup>(1)</sup></b>	<b>Equipment <sup>(2)</sup></b>	<b>Materials</b>	<b>Total</b>
Exploration	\$9,917	\$17,450	\$331	\$27,698
Exploration Roads & Drill Pads	\$45,383	\$52,012	\$0	\$97,395
Roads	\$0	\$0	\$0	\$0
Well Abandonment*	\$14,428	\$31,935	\$1,597	\$47,960
Pits			N/A	\$0
Underground Openings	\$0	\$0	\$0	\$0
Process Ponds	\$0	\$0	\$0	\$0
Heaps	\$0	\$0	\$0	\$0
Waste Rock Dumps	\$0	\$0	\$0	\$0
Landfills	\$0	\$0	\$0	\$0
Tailings	\$0	\$0	\$0	\$0
Foundation & Buildings Areas	\$0	\$0	\$0	\$0
Yards, Etc.	\$1,468	\$3,608	\$0	\$5,076
Drainage & Sediment Control	\$0	\$0	\$0	\$0
Other**				\$0
<b>Subtotal</b>	\$71,196	\$105,005	\$1,928	\$178,129
Mob/Demob* <i>small dozer, med excavator, drill rig, Backhoe</i>	\$2,758	\$2,759		\$5,517
<b>Subtotal "A"</b>	<b>\$73,954</b>	<b>\$107,764</b>	<b>\$1,928</b>	<b>\$183,646</b>
<b>B. Revegetation/Stabilization</b>				
	<b>Labor <sup>(1)</sup></b>	<b>Equipment <sup>(2)</sup></b>	<b>Materials</b>	<b>Total</b>
Exploration	\$546	\$469	\$326	\$1,341
Exploration Roads & Drill Pads	\$9,567	\$8,215	\$40,826	\$58,608
Roads				\$0
Well Abandonment				N/A
Pits				\$0
Underground Openings				N/A
Process Ponds				\$0
Heaps				\$0
Waste Rock Dumps				\$0
Landfills				\$0
Tailings				\$0
Foundation & Buildings Areas				\$0
Yards, Etc.	\$234	\$201	\$228	\$663
Drainage & Sediment Control	\$0	\$0	\$0	\$0
Other**				\$0
<b>Subtotal "B"</b>	<b>\$10,347</b>	<b>\$8,885</b>	<b>\$41,380</b>	<b>\$60,612</b>
<b>C. Detoxification/Water Treatment/Disposal of Wastes**</b>				
	<b>Labor <sup>(1)</sup></b>	<b>Equipment <sup>(2)</sup></b>	<b>Materials</b>	<b>Total</b>
Process Ponds/Sludge*				\$0
Heaps*				\$0
Dumps (Waste & Landfill)*				\$0
Tailings*				\$0
Surplus Water Disposal*				\$0
Monitoring*				\$0
Miscellaneous*				\$0
Solid Waste - On Site	\$0	\$0	N/A	\$0
Solid Waste - Off Site				\$0
Hazardous Materials				\$0
Hydrocarbon Contaminated Soils	\$0	\$0	\$0	\$0
Other**				\$0
<b>Subtotal "C"</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>D. Structure, Equipment and Facility Removal</b>				
	<b>Labor <sup>(1)</sup></b>	<b>Equipment <sup>(2)</sup></b>	<b>Materials</b>	<b>Total</b>
Foundation & Buildings Areas	\$0	\$0	\$0	\$0
Other Demolition	\$0	\$0	\$0	\$0
Equipment Removal	\$0	\$0	\$0	\$0
Fence Removal				\$0
Fence Installation				\$0
Pipe & Culvert Removal				\$0
Powerline Removal				\$0
Transformer Removal				\$0
Rip-rap, rock lining, gabions				\$0
Other Misc. Costs	\$500			\$500
Other**				\$0
<b>Subtotal "D"</b>	<b>\$500</b>	<b>\$0</b>	<b>\$0</b>	<b>\$500</b>
<b>E. Monitoring</b>				
	<b>Labor <sup>(1)</sup></b>	<b>Equipment <sup>(2)</sup></b>	<b>Materials</b>	<b>Total</b>
Reclamation Monitoring and Maintenance	\$8,783	\$2,655	\$6,229	\$17,667
Ground and Surface Water Monitoring				\$0
<b>Subtotal "E"</b>	<b>\$8,783</b>	<b>\$2,655</b>	<b>\$6,229</b>	<b>\$17,667</b>
<b>F. Construction Management &amp; Support</b>				
	<b>Labor</b>	<b>Equipment <sup>(2)</sup></b>	<b>Materials</b>	<b>Total</b>
Construction Management	\$11,095	\$3,121	N/A	\$14,216
Construction Support	\$0	\$0	\$0	\$0
Road Maintenance	\$0	\$0		\$0
Other**				\$0
<b>Subtotal "F"</b>	<b>\$11,095</b>	<b>\$3,121</b>	<b>\$0</b>	<b>\$14,216</b>
<b>G. Operational &amp; Maintenance Costs</b>				
	<b>Labor <sup>(1)</sup></b>	<b>Equipment <sup>(2)</sup></b>	<b>Materials <sup>(3)</sup></b>	<b>Total</b>
<b>Subtotal A through F</b>	<b>\$104,679</b>	<b>\$122,425</b>	<b>\$49,537</b>	<b>\$276,641</b>

\* Costs estimated outside of standardized model - additional documentation required.

\*\* Other Operator supplied costs - additional documentation required.

**NEVADA STANDARDIZED RECLAMATION BOND CALCULATION - SUMMARY**

Project Name: Fronteer Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update

Project Date: February 26, 2010

Model Version: Version 1.1.2 (updated 03 February, 2008)

File Name: Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls

Indirect Costs	Include?	Total
1. Engineering, Design and Construction (ED&C) Plan (7)		\$22,131
2. Contingency (8)		\$27,664
3. Insurance (9)	\$1,570	\$1,570
4. Performance Bond (10)		\$8,299
5. Contractor Profit (11)		\$27,664
6. Contract Administration (12)		\$27,664
7. BLM Indirect Cost (13)		\$5,809
<b>Subtotal Add-On Costs</b>		<b>\$120,802</b>
<b>Grand Total</b>		<b>\$397,443</b>

Administrative Cost Rates (%)	Cost Ranges for Indirect Cost Percentages				Notice Level
	<=	<=	<=	>	
1. Engineering, Design and Construction (ED&C) Plan (7)	\$1,000,000	\$25,000,000		\$25,000,000	Notice Level
Variable Rate	8%	6%		4%	0%
2. Contingency (8)	\$500,000	\$5,000,000	\$50,000,000	\$50,000,000	Notice Level
Variable Rate	10%	8%	6%	4%	0%
3. Insurance (9)	1.5% of labor costs				
4. Bond (10)	3.0% of the O&M costs if O&M costs are >\$100,000				
5. Contractor Profit (11)	10% of the O&M costs				
6. Contract Administration (12)	\$1,000,000	\$25,000,000		\$25,000,000	
Variable Rate	10%	8%		6%	
7. BLM Indirect Cost (13)	21% of Contract Administration				

**RECLAMATION COST ESTIMATION SUMMARY SHEET FOOTNOTES**

- Federal construction contracts require Davis-Bacon wage rates for contracts over \$2,000. Wage rate estimates may include base pay, payroll loading, overhead and profit. To avoid double counting of any of the identified administrative costs the operator must itemize the components of their labor cost estimates or provide BLM with a signed statement, under penalty of USC 1001, that identifies what specific administrative costs are included in the quoted hourly rate.
- The reclamation cost estimate must include the estimated plugging cost of at least one drill hole for each active drill rig in the project area. Where the submitted Notice or approved Plan of Operations calls for drill holes to be plugged, but doesn't specifically require the drill holes be plugged before the drill rig has been moved from the drill pad, the reclamation cost estimate must include the plugging cost for those drill holes. For all drill holes and wells scheduled to be left open, the estimated plugging cost must be included in the reclamation cost estimate. Where the approved Plan of Operations proposes immediate mining through an area where the drilling is to occur, and the cost of the post-mining reclamation is included in the reclamation cost estimate, the cost estimate does not need to include the plugging costs for those drill holes.
- Miscellaneous items should be itemized on accompanying worksheets.
- Fluid management should be calculated only when mineral processing activities are involved. Fluid management represents the costs of maintaining proper fluid management to prevent overflow of solution ponds through premature cessation or abandonment of operations. Calculate a minimum six month direct cost estimate which includes power, supplies, equipment, labor and maintenance.
- Handling of hazardous materials includes the cost of decontaminating, neutralizing, disposing, treating and/or isolating all hazardous materials used, produced, or stored on the site.
- Any mitigation measures required in the Plan of Operations must be included in the reclamation cost estimate. Mitigation may include measures to avoid, minimize, rectify and reduce or eliminate the impact, or compensate for the impact.
- Engineering, design and construction (ED&C) plans are often necessary to provide details on the reclamation needed to contract for the required work. To estimate the cost to develop an ED&C plan use 4-8% of the O&M cost. Calculate the ED&C cost as a percentage of the O&M cost as follows: up to and including \$1 million, use 8%; over \$1 million to \$25 million, use 6%; and over \$25 million, use 4%. Inclusion of a line item for the development of an ED&C plan may not be necessary for small operations, such as notice-level exploration. With small, uncomplicated reclamation efforts contracting may be able to proceed without developing an ED&C plan. [ED&C is automatically eliminated if "Notice" is selected on the Property Information Sheet]
- A contingency cost is included in the reclamation cost estimation to cover unforeseen cost elements. Calculate the contingency cost as a percentage of the O&M cost as follows: up to and including \$500,000, use 10%; over \$500,000 to \$5 million, use 8%; over \$5 million to \$50 million, use 6%; and greater than \$50 million, use 4%. As with the ED&C cost, inclusion of a contingency cost may not be necessary for small operations, such as notice-level exploration.
- Insurance premiums are calculated at 1.5% of the total labor costs. Enter the premium amount if liability insurance is not included in the itemized unit costs.
- Federal construction contracts exceeding \$100,000 require both a performance and a payment bond (Miller Act, 40 USC 270et seq.). Each bond premium is figured at 1.5% of the O&M cost. Enter the sum of both premium costs on this line.
- For Federal construction contracts, use 10% of estimated O&M cost for the contractor's profit.
- To estimate the contract administration cost, use 6 to 10% of the operational and maintenance (O&M) cost. Calculate the contract administration cost as a percentage of the O&M cost as follows: up to and including \$1 million, use 10%; over \$1 million to \$25 million, use 8%; and greater than \$25 million use 6%.
- BLM's indirect cost rate is 21% of BLM's contract administration costs.

# Bond Calculation Exploration

Project Name: Frontier Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan of Operations  
 Date of Submittal: February 26, 2010  
 File Name: Long Canyon ReccostEst v1 Mar12\_2010Amendment.xls  
 Model Version: Version 1.1.2 (updated 03 February, 2008)  
 Cost Data: Standardized Data  
 Cost Data File: cost\_data-std-nv2009.xls

Exploration - Cost Summary			
	Labor	Equipment	Materials
Hole Abandonment Costs	\$7,038	\$13,609	\$331
Trench Backfilling Costs	\$2,979	\$3,841	\$6,720
Subtotal Earthworks	\$9,917	\$17,450	\$3,971
Trench Revegetation costs	\$546	\$469	\$326
Subtotal Revegetation	\$546	\$469	\$326
<b>TOTALS</b>	<b>\$10,463</b>	<b>\$17,919</b>	<b>\$657</b>

Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

Exploration hole surface seal thickness: 20.0 ft  
 Minimum seal above groundwater table: 50.0 ft

Exploration Drillhole Abandonment - User Input									
Description	Hole Type (select)	Diameter in	Total Number of Holes	Hole Plugging		Average Depth of Hole(1) ft bgs	Depth to Water (select)	Hole Plug Method (select)	Hole
				Max Holes Open at One Time	Casing to Remove ft				
1. Exploration Drill Hole - Pre Core	Reverse Circ	6.5	5	600	0	600	GROUT + BACKFILL	GROUT + BACKFILL	
2. Exploration Drill Hole	Core	3.78	1	0	0	400	GROUT + BACKFILL	GROUT + BACKFILL	
3. Exploration Drill Hole	Reverse Circ	6.5	2	0	0	600	GROUT + BACKFILL	GROUT + BACKFILL	

Notes:  
 1. If core holes are pre-drilled, use length of hole below pre-drilled length

Exploration Trenches - User Input										
Description (required)	Trench Parameters			Additional Hrs for Walk-in (1)	Backfill			Revegetation		
	Trench Length ft	Trench Depth ft	Trench Bottom Width		Backfill Material (select)	Cut Material Type (select)	Backfilling Fleet (select)	Seed Mix (select)	Mulch (select)	Fertilizer (select)
1. Trench 1	100	8	15	7	1.2	LS - broken	Small Dozer	Mix 3	None	None
2. Trench 2	100	8	15	90	1.2	LS - broken	Small Dozer	Mix 3	None	None
3. Trench 3	100	8	15	90	1.2	LS - broken	Small Dozer	Mix 3	None	None
4. Trench 4	100	8	15	90	1.2	LS - broken	Small Dozer	Mix 3	None	None
5. Bulk Sample Trench #1	130	20	45	45	1.2	LS - broken	Small Dozer	Mix 3	None	None
6. Bulk Sample Trench #2	130	20	45	45	1.2	LS - broken	Small Dozer	Mix 3	None	None
7. Bulk Sample Trench #3	130	20	45	45	1.2	LS - broken	Small Dozer	Mix 3	None	None

1. Include one-way hours necessary to walk equipment in from drop-off point to work area

Exploration Drillhole Abandonment													
Description	Vol/foot of depth ft3	Hole Plugging Material (1)	Total GROUT Volume (2) cy	Total Cuttings Volume (3) cy	Total Top Seal Volume (4) cy	Total Drillhole Abandon. Hours (5)	Casing Removal Labor Cost (6)	Casing Removal Equipment Cost (7)	Plugging Labor Cost (8)	Plugging Equipment Cost (9)	Plugging Material Cost (10)	Top Seal Material Cost (11)	Total Cost (12)
1. Exploration Drill Hole - Pre Core	0.23	Cuttings	0.00	5.03	0.11	10.4	\$4,809	\$12,164	\$1,363	\$453	\$94	\$161	\$18,950
2. Exploration Drill Hole	0.08	GROUT	1.44	5.03	0.04	2.5	\$321	\$811	\$321	\$811	\$94	\$12	\$1,238
3. Exploration Drill Hole	0.23	Cuttings	0.00	5.03	0.11	2.9	\$545	\$181	\$545	\$181	\$64	\$64	\$790
<b>TOTALS</b>			<b>1.44</b>	<b>10.06</b>	<b>0.26</b>	<b>15.8</b>	<b>\$4,809</b>	<b>\$12,164</b>	<b>\$2,229</b>	<b>\$1,445</b>	<b>\$94</b>	<b>\$237</b>	<b>\$20,978</b>

Notes:  
 1. Assumes grout backfill from bottom of hole to 50' (15.24m) above static water level, up to distance from top of hole as set above.  
 2. Assumes 25% loss to formation for grout backfill  
 3. If "Top Plug" hole plug method is used, assumes physical plug installed without backfill, grout or cement. Not available option for Nevada projects  
 4. Assumes top 10' (3 m) of hole is plugged with cement if "Grout Only", "Backfill + Grout", or "Cement Plug" hole plug method are chosen.  
 5. Assumes that a) casing is not cemented entire length, b) does not include temporary surface casing

# Bond Calculation Exploration

Project Name: Frontier Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan of Operations

Date of Submittal: February 26, 2010

File Name: Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls

Model Version: Version 1.1.2 (updated 03 February, 2008)

Cost Data: Standardized Data

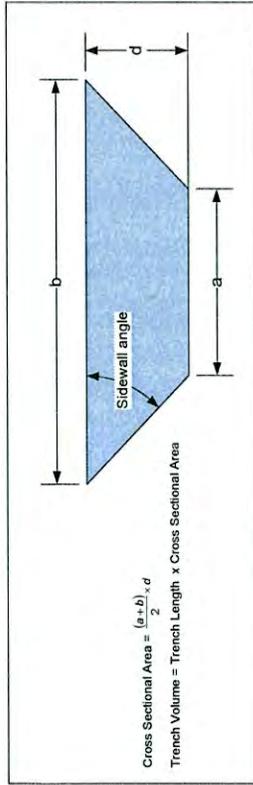
Cost Data File: cost\_data-std-nv2009.xls

6. Assumes minimum 1 hr per hole for abandonment (excluding move-to and casing removal)

7. Assumes fixed hours per hole for setup & tear-down and moving between holes (see Productivity Sheet) per drill hole (includes rig time if grouting required, labor crew only if cuttings backfill only)

## Exploration Trenches - Calculations

### Exploration Trench Volume Calculation



### Dozing & Ripping/Scarifying Calculations

**Dozing:** Dozing distance = 1/2 trench length or 400 ft (max push) whichever is less  
Assumes flat push (grade correction factor = 1)

**Revegetation:** 10 ft (3 m) added to trench width to account for revegetation under spoil pile

## Exploration Trenches - Backfill/Regrading Costs

Description (required)	Backfill Volume LCV (BCV*30%)	Dozer Push Distance ft	Equipment Productivity yd <sup>3</sup> /hr	Dozing Material	Density Correction	Backfilling Fleet	Corrected Hourly Productivity yd <sup>3</sup> /hr	Total Dozer Hours hr	Trench Backfill		Total Trench Backfill Cost \$
									Equipment Cost \$	Material Cost \$	
1 Trench 1	577	50	1,121	1.20	0.88	D6R	737	1.0	\$59	\$79	\$138
2 Trench 2	577	50	1,121	1.20	0.88	D6R	737	1.0	\$59	\$79	\$138
3 Trench 3	577	50	1,121	1.20	0.88	D6R	737	1.0	\$59	\$79	\$138
4 Trench 4	577	50	1,121	1.20	0.88	D6R	737	1.0	\$59	\$79	\$138
5 Bulk Sample Trench #1	8,137	65	829	1.20	0.88	D6R	545	14.9	\$881	\$1,175	\$2,056
6 Bulk Sample Trench #2	8,137	65	829	1.20	0.88	D6R	545	14.9	\$881	\$1,175	\$2,056
7 Bulk Sample Trench #3	8,137	65	829	1.20	0.88	D6R	545	14.9	\$881	\$1,175	\$2,056
								48.7	\$2,879	\$3,841	\$6,720

## Exploration Trenches - Revegetation Costs

Description (required)	Surface Area acres	Revegetation Labor		Revegetation Equipment		Revegetation Material		Total Revegetation Cost \$
		Cost \$	Cost \$	Cost \$	Cost \$	Cost \$	Cost \$	
1 Trench 1	0.1	\$78	\$67	\$36	\$181			\$181
2 Trench 2	0.1	\$78	\$67	\$36	\$181			\$181
3 Trench 3	0.1	\$78	\$67	\$36	\$181			\$181
4 Trench 4	0.1	\$78	\$67	\$36	\$145			\$145
5 Bulk Sample Trench #1	0.3	\$78	\$67	\$109	\$254			\$254
6 Bulk Sample Trench #2	0.3	\$78	\$67	\$109	\$254			\$254
7 Bulk Sample Trench #3	0.3	\$78	\$67	\$109	\$254			\$254
	1.30	\$546	\$469	\$326	\$1,341			\$1,341

# Bond Calculation Expl. Roads & Pads

Project Name: Frontier Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan of Operations  
 Date of Submittal: February 26, 2010  
 File Name: Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls  
 Model Version: Version 1.1.2 (updated 03 February, 2008)  
 Cost Data: Standardized Data  
 Cost Data File: cost\_data-std-nv2009.xls

Exploration Roads & Pads - Cost Summary			
	Labor	Equipment	Materials
Grading Costs	\$45,383	\$52,012	N/A
Cover Placement Cost			N/A
Ripping Cost			\$0
Subtotal Earthworks	\$45,383	\$52,012	\$0
Revegetation Cost	\$9,567	\$40,826	\$40,826
<b>TOTALS</b>	<b>\$54,950</b>	<b>\$60,227</b>	<b>\$156,003</b>

Color Code Key	User Input - Direct Input	Program Constant (can override)	Locked Cell - Formula or Reference
	User Input - Direct Input	Pull Down Selection	
	User Input - Pull Down List	Alternate Input	
	Program Calculated Value		

Maximum grade allowed for dozer:  %  
 Original slope cutoff to include extra sump volume:  %

Exploration Roads & Pads - User Input																
Description (required)	ID Code	Underlying Ground Slope % grade	Ungraded Slope -1:1V	Cut Slope Degrees	Road + Drill Pad Length	Road Width	Number of Drill Pads	Individual Sump Volume	Drill Pad Width	Drill Pad Length	Slope Replacement Percent %	User Overrides			Growth Media	
												Regrade Volume (if calculated elsewhere)	Disturbed Area (if calculated elsewhere)	Growth Media Thickness	Distance to Growth Media Stockpile	Slope from Stockpile % grade
1 Existing Roads (Type 1) - 10%		10.0	1.4	53	350	16	0	0	0	0	100%					
2 Existing Roads (Type 2) - 25%		25.0	1.4	53	660	16	0	0	0	0	100%					
3 Existing Roads (Type 3) - 37%		37.0	1.4	53	1,930	16	0	0	0	0	100%					
4 Existing Roads (Type 4) - 40%		40.0	1.3	50	1,300	16	0	0	0	0	100%					
5 Existing Roads (Type 5) - 54%		54.0	1.1	53	1,150	16	0	0	0	0	100%					
6 Existing Pad - Type 1 - 14%		14.0	1.2	50	60	0	2	20	35	30	100%					
7 Existing Pad - Type 2 - 25%		25.0	1.4	53	70	0	2	20	32	30	100%					
8 Existing Pad - Type 3 - 30%		30.0	1.5	53	30	0	1	20	36	30	100%					
9 Existing Pad - Type 4 - 33%		33.0	1.4	53	200	0	2	20	37	100	100%					
10 Existing Pad - Type 5 - 41%		41.0	1.2	65	20	0	1	20	35	20	100%					
11 Existing Pad - Type 6 - 45%		45.0	1.2	85	240	0	4	20	34	60	100%					
12 Existing Pad - Type 7 - 54%		54.0	1.1	85	100	0	2	20	31	50	100%					
13 Proposed Drill Road Type 2 (Notice 12/06) - 25%		25.0	1.3	53	70	15	0	0	0	0	100%					
14 Proposed Drill Road Type 3 (Notice 12/06) - 34%		34.0	1.3	53	70	16	0	0	0	0	100%					
15 Proposed Drill Road Type 5 (Notice 12/06) - 50%		50.0	1.3	53	405	16	0	0	0	0	100%					
16 Proposed Pads Type 2 (Notice 12/06) - 25%		25.0	1.3	53	210	0	3	20	35	70	100%					
17 Proposed Pads Type 4 (Notice 12/06) - 34%		34.0	1.3	53	75	0	1	20	35	75	100%					
18 Proposed Drill Road Type 1 - 12%		12.0	1.3	53	48,518	16	0	0	0	0	100%					
19 Proposed Drill Road Type 2 - 23%		23.0	1.3	53	28,721	16	0	0	0	0	100%					
20 Proposed Drill Road Type 3 - 33%		33.0	1.3	53	32,372	16	0	0	0	0	100%					
21 Proposed Drill Road Type 4 - 43%		43.0	1.3	53	28,865	16	0	0	0	0	100%					
22 Proposed Drill Road Type 5 - 62%		62.0	1.3	53	9,323	16	0	0	0	0	100%					
23 Proposed Drill Road Type 6 - 63%		63.0	1.3	53	6,930	16	0	0	0	0	100%					
24 Proposed Drill Pad Type 1 - 12%		12.0	1.3	53	0	0	99	20	30	70	100%					
25 Proposed Drill Pad Type 2 - 23%		23.0	1.3	53	0	0	62	20	30	70	100%					
26 Proposed Drill Pad Type 3 - 33%		33.0	1.3	53	0	0	50	20	30	70	100%					
27 Proposed Drill Pad Type 4 - 43%		43.0	1.3	53	0	0	46	20	30	70	100%					
28 Proposed Drill Pad Type 5 - 52%		52.0	1.3	53	0	0	19	20	30	70	100%					
29 Proposed Drill Pad Type 6 - 63%		63.0	1.3	53	0	0	4	20	30	70	100%					

You must fill in ALL green cells and relevant blue cells in this section for each road

1. All Physical parameters must be input even if manual overrides for volume or area are used.  
 2. Sump volume will be applied to all roads on slopes less than show above. On slopes greater than shown above pad width (i.e. cut volume) should be adequate to account for sump volume.

Exploration Roads & Pads - User Input (cont.)												
Description (required)	Regrade Material (select)	Grading			Cover			Revegetation				
		Cut Material Type (select)	Recontouring Equipment Fleet (select)	Additional Hrs. for Walk-in (1)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Additional Hrs. for Walk-in (1)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarifying/Ripping? (select)	Ripping Fleet (select)
1 Existing Roads (Type 1) - 10%	1, 2	LS - broken	Med Excavator	7			Mix 3	None	None	None	No	No

# Bond Calculation Expl. Roads & Pads

Project Name: Frontier Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan of Operations

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2	Existing Roads (Type 2) - 25%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
3	Existing Roads (Type 3) - 32%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
4	Existing Roads (Type 4) - 40%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
5	Existing Roads (Type 5) - 54%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
6	Existing Pad - Type 1 - 14%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
7	Existing Pad - Type 2 - 25%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
8	Existing Pad - Type 3 - 30%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
9	Existing Pad - Type 4 - 33%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
10	Existing Pad - Type 5 - 41%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
11	Existing Pad - Type 6 - 45%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
12	Existing Pad - Type 7 - 54%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
13	Proposed Drill Road Type 2 (Notice 12/09) - 25%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
14	Proposed Drill Road Type 3 (Notice 12/09) - 34%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
15	Proposed Drill Road Type 5 (Notice 12/09) - 59%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
16	Proposed Pads Type 2 (Notice 12/09) - 25%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
17	Proposed Pads Type 4 (Notice 12/09) - 34%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
18	Proposed Drill Road Type 1 - 12%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
19	Proposed Drill Road Type 2 - 23%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
20	Proposed Drill Road Type 3 - 33%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
21	Proposed Drill Road Type 4 - 43%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
22	Proposed Drill Road Type 5 - 52%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
23	Proposed Drill Road Type 6 - 63%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
24	Proposed Drill Pad Type 1 - 12%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
25	Proposed Drill Pad Type 2 - 23%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
26	Proposed Drill Pad Type 3 - 33%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
27	Proposed Drill Pad Type 4 - 43%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
28	Proposed Drill Pad Type 5 - 52%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
29	Proposed Drill Pad Type 6 - 63%	1.2	LS - broken	Med Excavator	None	Mix 3	None	None	No
30									

1. Include one-way hours necessary to walk equipment in from drop-off point to work area

## Exploration Roads & Pads - Calculations

### Regrading Volume and Footprint Volume

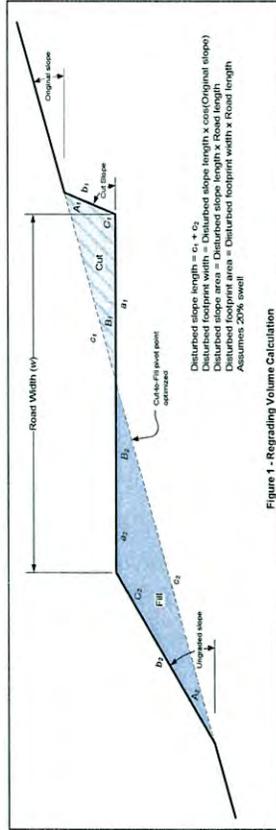


Figure 1 - Regrading Volume Calculation

Will not allow dozer for slopes greater than 30%  
For dozer regrading push distance = road width  
Assumes dozer push is uphill  
Assumes minimum push distance of 100 ft

### Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per area  
Number of passes = Final slope length + Grader width  
Travel distance = Number of passes x Road length  
Total hours = (Travel distance + Grader productivity) + (Number of passes x Grader maneuver time)

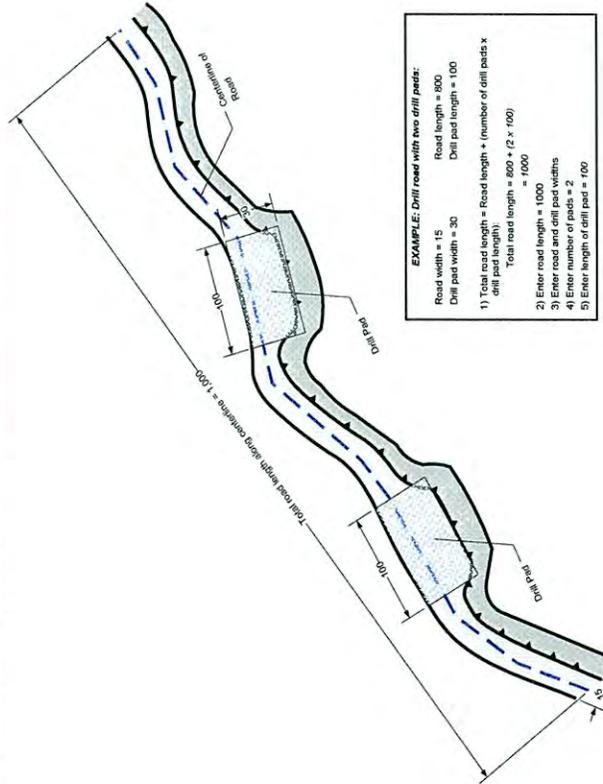
# Bond Calculation Expl. Roads & Pads

Project Name: Frontier Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan of Operations  
 Date of Submittal: February 26, 2010  
 File Name: Long Canyon RecCostEst v1 Marr12\_2010Amendment.xls  
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 Cost Data: Standardized Data  
 Cost Data File: cost\_data-std-nv2009.xls  
 For dozer regrading assumes push distance = 3 x road width

### Revegetation Calculations

Minimum of 1 acre crew time per area

### Inputting Exploration Roads and Drill Pads



### Exploration Roads & Pads - Regrading Costs

Description (required)	Total Road Length ft.	Total Drill Pad Length ft.	Regrading Volume	Recounting Fleet	Equipment Productivity (cph)	Total Equipment Hours (H)	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
1 Existing Roads (Type 1) - 10%	350	0	51	Med Excavator	187	3.0	\$181	\$208	\$389
2 Existing Roads (Type 2) - 25%	650	0	295	Med Excavator	187	6.6	\$607	\$111	\$718
3 Existing Roads (Type 3) - 32%	1,930	0	1,236	Med Excavator	187	6.6	\$366	\$457	\$823
4 Existing Roads (Type 4) - 40%	1,300	0	1,194	Med Excavator	187	6.4	\$397	\$443	\$840
5 Existing Roads (Type 5) - 54%	1,150	0	1,639	Med Excavator	187	8.8	\$252	\$810	\$1,062
6 Existing Pad - Type 1 - 14%	0	60	101	Med Excavator	187	1.0	\$90	\$69	\$159
7 Existing Pad - Type 2 - 25%	0	70	165	Med Excavator	187	1.0	\$90	\$69	\$159
8 Existing Pad - Type 3 - 30%	0	30	111	Med Excavator	187	1.0	\$90	\$69	\$159
9 Existing Pad - Type 4 - 33%	0	200	720	Med Excavator	187	3.9	\$236	\$270	\$506
10 Existing Pad - Type 5 - 41%	0	20	79	Med Excavator	187	1.0	\$90	\$69	\$159
11 Existing Pad - Type 6 - 45%	0	240	934	Med Excavator	187	5.0	\$302	\$346	\$648

## Bond Calculation Expl. Roads & Pads

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Line	Item	0	100	411	187	2.2	\$133	\$152	\$285
12	Existing Pad - Type 7 - 54%	70	0	27	187	1.0	\$60	\$69	\$129
13	Proposed Drill Road Type 2 (Notice 12/06) - 25%	70	0	48	187	1.0	\$60	\$69	\$129
14	Proposed Drill Road Type 3 (Notice 12/09) - 34%	405	0	557	187	3.0	\$181	\$208	\$389
15	Proposed Drill Road Type 5 (Notice 12/06) - 50%	0	210	501	187	2.7	\$163	\$187	\$350
16	Proposed Pads Type 2 (Notice 12/06) - 25%	0	75	246	187	1.3	\$79	\$90	\$169
17	Proposed Pads Type 4 (Notice 12/06) - 34%	48,518	0	8,616	187	46.1	\$2,766	\$3,193	\$5,979
18	Proposed Drill Road Type 1 - 12%	28,721	0	11,267	187	60.3	\$3,645	\$4,177	\$7,822
19	Proposed Drill Road Type 2 - 23%	32,372	0	21,168	187	113.2	\$6,842	\$7,841	\$14,683
20	Proposed Drill Road Type 3 - 33%	28,865	0	29,405	187	157.2	\$9,501	\$10,889	\$20,390
21	Proposed Drill Road Type 4 - 43%	9,323	0	14,003	187	74.9	\$4,527	\$5,188	\$9,715
22	Proposed Drill Road Type 5 - 52%	1,540	0	3,892	187	20.8	\$1,257	\$1,441	\$2,698
23	Proposed Drill Pad Type 6 - 63%	0	6,930	6,309	187	33.7	\$2,037	\$2,334	\$4,371
24	Proposed Drill Pad Type 1 - 12%	0	4,340	7,225	187	36.6	\$2,333	\$2,674	\$5,007
25	Proposed Drill Pad Type 2 - 23%	0	3,500	8,044	187	43.0	\$2,599	\$2,978	\$5,578
26	Proposed Drill Pad Type 3 - 33%	0	3,220	11,532	187	61.7	\$3,729	\$4,274	\$8,003
27	Proposed Drill Pad Type 4 - 43%	0	1,530	7,023	187	37.6	\$2,273	\$2,605	\$4,878
28	Proposed Drill Pad Type 5 - 52%	0	260	2,488	187	13.3	\$804	\$921	\$1,725
29	Proposed Drill Pad Type 6 - 63%	0	20,605	139,289	187	750.9	\$45,383	\$52,012	\$97,395
30		155,274	20,605	139,289		750.9	\$45,383	\$52,012	\$97,395

(1) Includes walk-in time based on distance and travel speed (see Productivity sheet for speeds)

### Exploration Roads & Pads - Growth Media Costs

Line	Description (required)	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity LCY/yr	Number of Trucks/Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
0									
1	Existing Roads (Type 1) - 10%								
2	Existing Roads (Type 2) - 25%								
3	Existing Roads (Type 3) - 32%								
4	Existing Roads (Type 4) - 40%								
5	Existing Roads (Type 5) - 54%								
6	Existing Pad - Type 1 - 14%								
7	Existing Pad - Type 2 - 25%								
8	Existing Pad - Type 3 - 30%								
9	Existing Pad - Type 4 - 33%								
10	Existing Pad - Type 5 - 41%								
11	Existing Pad - Type 6 - 45%								
12	Existing Pad - Type 7 - 54%								
13	Proposed Drill Road Type 2 (Notice 12/06) - 25%								
14	Proposed Drill Road Type 3 (Notice 12/09) - 34%								
15	Proposed Drill Road Type 5 (Notice 12/06) - 50%								
16	Proposed Pads Type 2 (Notice 12/06) - 25%								
17	Proposed Pads Type 4 (Notice 12/06) - 34%								
18	Proposed Drill Road Type 1 - 12%								
19	Proposed Drill Road Type 2 - 23%								
20	Proposed Drill Road Type 3 - 33%								
21	Proposed Drill Road Type 4 - 43%								
22	Proposed Drill Road Type 5 - 52%								
23	Proposed Drill Pad Type 6 - 63%								
24	Proposed Drill Pad Type 1 - 12%								
25	Proposed Drill Pad Type 2 - 23%								
26	Proposed Drill Pad Type 3 - 33%								
27	Proposed Drill Pad Type 4 - 43%								
28	Proposed Drill Pad Type 5 - 52%								
29	Proposed Drill Pad Type 6 - 63%								
30									

### Exploration Roads & Pads - Scarfing/Revegetation Costs

Line	Description (required)	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity LCY/yr	Number of Trucks/Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
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# Bond Calculation Expl. Roads & Pads

Project Name: Frontier Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan of Operations

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Cost Data: Standardized Data

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	Description (required)	Surface Area acres	Ripping Hours hrs	Ripping Equipment Cost \$	Ripping Labor Costs \$	Total Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
1	Existing Roads (Type 1) - 10%	0.14					\$78	\$67	\$51	\$196
2	Existing Roads (Type 2) - 25%	0.35					\$78	\$67	\$127	\$272
3	Existing Roads (Type 3) - 32%	1.15					\$90	\$77	\$417	\$584
4	Existing Roads (Type 4) - 40%	0.93					\$78	\$67	\$338	\$483
5	Existing Roads (Type 5) - 54%	0.98					\$78	\$67	\$356	\$501
6	Existing Pad - Type 1 - 14%	0.10					\$78	\$67	\$36	\$181
7	Existing Pad - Type 2 - 25%	0.10					\$78	\$67	\$36	\$181
8	Existing Pad - Type 3 - 30%	0.00								
9	Existing Pad - Type 4 - 33%	0.00								
10	Existing Pad - Type 5 - 41%	0.00								
11	Existing Pad - Type 6 - 45%	0.30					\$78	\$67	\$109	\$254
12	Existing Pad - Type 7 - 54%	0.10					\$78	\$67	\$109	\$254
13	Proposed Drill Road Type 2 (Notice 12/08) - 25%	0.03					\$78	\$67	\$36	\$181
14	Proposed Drill Road Type 3 (Notice 12/08) - 34%	0.04					\$78	\$67	\$11	\$156
15	Proposed Drill Road Type 4 (Notice 12/08) - 50%	0.26					\$78	\$67	\$15	\$160
16	Proposed Pads Type 2 (Notice 12/08) - 25%	0.20					\$78	\$67	\$131	\$276
17	Proposed Pads Type 4 (Notice 12/08) - 34%	0.10					\$78	\$67	\$73	\$218
18	Proposed Drill Road Type 1 - 12%	20.05					\$1,564	\$1,343	\$7,278	\$10,185
19	Proposed Drill Road Type 2 - 23%	4.51					\$1,132	\$972	\$5,267	\$7,371
20	Proposed Drill Road Type 3 - 33%	19.32					\$1,507	\$1,294	\$7,013	\$9,814
21	Proposed Drill Road Type 4 - 43%	21.20					\$1,654	\$1,420	\$7,666	\$10,770
22	Proposed Drill Road Type 5 - 52%	6.76					\$955	\$868	\$3,187	\$4,460
23	Proposed Drill Road Type 6 - 63%	2.23					\$174	\$149	\$609	\$1,132
24	Proposed Drill Pad Type 1 - 12%	5.60					\$437	\$375	\$2,033	\$2,845
25	Proposed Drill Pad Type 2 - 23%	4.10					\$320	\$275	\$1,488	\$2,083
26	Proposed Drill Pad Type 3 - 33%	3.90					\$304	\$261	\$1,416	\$1,981
27	Proposed Drill Pad Type 4 - 43%	4.40					\$343	\$295	\$1,597	\$2,235
28	Proposed Drill Pad Type 5 - 52%	2.40					\$187	\$161	\$671	\$1,219
29	Proposed Drill Pad Type 6 - 63%	0.80					\$78	\$67	\$290	\$435
30		112.47					\$9,567	\$8,215	\$40,826	\$58,608

# Bond Calculation Yards, Etc.

Project Name: Fronteers Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan of Operations  
 Date of Submittal: February 26, 2010  
 File Name: Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls  
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Yards, Etc. - Cost Summary			
	Labor	Equipment	Materials
Regrading Cost	\$295	\$878	N/A
Cover Placement Cost	\$498	\$1,203	N/A
Growth Media Placement Cost	\$498	\$1,203	N/A
Ripping Cost	\$177	\$324	N/A
Subtotal Earthworks	\$1,468	\$3,608	\$5,076
Revegetation Cost	\$234	\$201	\$228
TOTALS	\$1,702	\$3,809	\$228

Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

Yards, Etc. - User Input									
You must fill in ALL green cells and relevant blue cells in this section for each building or facility									
Description (required)	ID Code	Cover (lower layer)				Growth Media (upper layer)			
		Area acres	Cover Thickness in	Distance from Borrow Area ft	Slope from Facility to Borrow Area % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade	
1 Staging Area #1		0.18	6	50	4	6	50	4	
2 Staging Area #2		0.22	6	50	4	6	50	4	
3 Staging Area #3		0.23	6	50	4	6	50	4	

Notes:

Yards, Etc. - User Input (cont.)												
You must fill in ALL green cells and relevant blue cells in this section for each building or facility												
Description (required)	Grading			Cover			Growth Media			Revegetation		
	Dozing Material (select)	Dozing Material Type (select)	Grading Equipment Fleet (select)	Cover Material Type (select)	Cover Placement Fleet (select)	Growth Media Type (select)	Growth Media Placement Equipment Fleet (select)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/Rip? (select)	Ripping Fleet (select)
1 Staging Area #1	1	LS - broken	Medium	LS - broken	optimize	Topsoil	optimize	Mix 3	None	None	Yes	Small Dozer
2 Staging Area #2	1	LS - broken	Medium	LS - broken	optimize	Topsoil	optimize	Mix 3	None	None	Yes	Small Dozer
3 Staging Area #3	1	LS - broken	Medium	LS - broken	optimize	Topsoil	optimize	Mix 3	None	None	Yes	Small Dozer

## Yards, Etc. - Calculations

### Grading Calculations

Average push distance assumed to be 2/3 of the 600 feet maximum from Caterpillar Handbook or 400 feet  
 Material assumed to be loose stockpile (1.2 productivity factor)  
 Slope assumed to be 0 to 5% (1.0 productivity factor)

### Cover Volume Calculation

Yard area x cover thickness

### Ripping/Scarifying Calculations

Flat area width = Final flat area + Average long dimensions  
 $Narrower Passes = Flat\ area\ width + Grader\ width$

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# Bond Calculation Yards, Etc.

Project Name: Fronteer Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan of Operations  
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Travel distance = Number of passes x Average long dimensions  
 Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)  
 Minimum 1 hr ripping/scarifying per area

### Revegetation

Minimum 1 acre revegetation crew time per area

### Yards, Etc. - Regrading Costs

Description (required)	Regrading Volume (cy)	Dozing Distance (see above) (ft)	Uncorrected Dozer Productivity (cy/hr)	Grade Correction	Dozing Material	Density Correction	Total Hourly Productivity (cy/hr)	Total Dozer Hours (hr)	Total Labor Cost (\$)	Total Equipment Cost (\$)	Total Regrading Cost (\$)
1 Staging Area #1	290	400	317	1.00	1.20	0.88	208	1.0	\$59	\$176	\$235
2 Staging Area #2	355	400	317	1.00	1.20	0.88	208	2.0	\$118	\$351	\$469
3 Staging Area #3	370	400	317	1.00	1.20	0.88	208	2.0	\$118	\$351	\$469
	1,015							5.0	\$295	\$878	\$1,173

### Yards, Etc. - Cover and Growth Media Costs

Description (required)	Cover Volume (cy)	Topsoil Replacement Fleet	Fleet Productivity (LCY/hr)	Number of Trucks/Scrapers	Total Fleet Hours	Total Labor Cost (\$)	Total Equipment Cost (\$)	Total Cover Cost (\$)	Topsoil Volume (cy)	Topsoil Replacement Fleet	Fleet Productivity (LCY/hr)	Number of Trucks/Scrapers	Total Fleet Hours	Total Labor Cost (\$)	Total Equipment Cost (\$)	Total Topsoiling Cost (\$)
1 Staging Area #1	161	Small Truck	321	1	1.0	\$166	\$401	\$567	161	Small Truck	321	1	1.0	\$166	\$401	\$567
2 Staging Area #2	161	Small Truck	321	1	1.0	\$166	\$401	\$567	161	Small Truck	321	1	1.0	\$166	\$401	\$567
3 Staging Area #3	161	Small Truck	321	1	1.0	\$166	\$401	\$567	161	Small Truck	321	1	1.0	\$166	\$401	\$567
	483				3.0	\$498	\$1,203	\$1,701	483				3.0	\$498	\$1,203	\$1,701

### Yards, Etc. - Scarifying/Revegetation Costs

Description (required)	Flat Area (acres)	Area Long Dimension (ft)	Scarifying/Ripping Hours	Scarifying/Ripping Labor Costs (\$)	Scarifying/Ripping Equipment Cost (\$)	Total Scarifying/Ripping Costs (\$)	Revegetation Labor Cost (\$)	Revegetation Equipment Cost (\$)	Revegetation Material Cost (\$)	Total Revegetation Cost (\$)
1 Staging Area #1	0.2	100	1.0	\$59	\$108	\$167	\$78	\$67	\$65	\$210
2 Staging Area #2	0.2	100	1.0	\$59	\$108	\$167	\$78	\$67	\$80	\$225
3 Staging Area #3	0.2	110	1.0	\$59	\$108	\$167	\$78	\$67	\$83	\$228
	0.6		3.0	\$177	\$324	\$501	\$234	\$201	\$228	\$663

## Bond Calculation Misc. Costs

Project Name: Fronteer Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update  
 Date of Submittal: February 26, 2010  
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Miscellaneous Cost Summary				
	Labor	Equipment	Materials	Totals
Fence Removal			N/A	
Fence Installation			N/A	
Pipe & Culvert Removal			N/A	
Powerlines		N/A	N/A	
Substations/Transformers		N/A	N/A	
Rip-rap, rock lining, gabions				
Other Costs	\$500			\$500
<b>TOTALS</b>	<b>\$500</b>	<b>\$0</b>	<b>\$0</b>	<b>\$500</b>

Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

Fence Removal					
You must fill in ALL green and blue cells					
Description (required)	Input		Costs		
	Length ft	Type (select type)	Labor Cost \$	Equipment Cost \$	Total Cost \$
1					

Notes:

Fence Installation						
You must fill in ALL green and blue cells						
Description (required)	Input		Costs			
	Length ft	Type (select type)	Labor Cost \$	Equipment Cost \$	Material Cost (\$)	Total Cost \$
1						

Notes:

Pipe and Culvert Removal					
You must fill in ALL green and blue cells					
Description (required)	Input		Costs		
	Length ft	Type (select type)	Labor Cost \$	Equipment Cost \$	Total Cost \$
1					

Notes:

Powerline and Substation Removal						
You must fill in ALL green and blue cells						
Description (required)	Input			Costs		
	Powerline Length miles	Powerline Type (select)	Number of Substations #	Powerline Removal \$	Substation Removal \$	Total Cost \$
1						

Notes: If substation owned by operator, use Other Demo & Equipment Removal sheet  
 User may need to add line items in Foundations & Buildings for substation slab demolition and fence removal

Rip-Rap & Rock Lining						
You must fill in ALL green and blue cells						
Description (required)	Input		Costs			
	Area S.Y.	Type (select type)	Labor Cost \$	Equipment Cost \$	Material Cost \$	Total Cost \$
1						

Notes:

Other Costs						
Description (required)	Quantity	Units	Labor Unit Cost (\$)	Equipment Unit Cost (\$)	Material Unit Cost (\$)	Total Cost \$
1 Portable Restroom	2	2	\$250.00			\$500
			\$500			\$500

Notes:



## Bond Calculation Constr. Mgmt

Project Name: Fronteer Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan o  
 Date of Submittal: February 26, 2010  
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 Model Version: Version 1.1.2 (updated 03 February, 2008)  
 Cost Data: Standardized Data  
 Cost Data File: cost\_data-std-nv2009.xls

Construction Management & Road Maintenance - Cost Summary				
	Labor	Equipment	Materials	Totals
Construction Management	\$11,095	\$3,121	N/A	\$14,216
Construction Support		\$0		
Road Maintenance	\$0	\$0		
<b>TOTAL CONSTRUCTION MANAGEMENT</b>	<b>\$11,095</b>	<b>\$3,121</b>		<b>\$14,216</b>

Construction Management							
Construction Management Staff							
Description	Duration mo.	Hours/ Month hr.	Number of Supervisors	Supervisor Rate \$/hr	Labor Cost \$	Equipment Cost <sup>(1)</sup> \$	Totals \$
Active Reclamation	3.00	60	1	\$62	\$11,095	\$3,121	\$14,216
Monitoring & Maintenance							
<b>Total Staff</b>					<b>\$11,095</b>	<b>\$3,121</b>	<b>\$14,216</b>

Construction Management Support							
Description	Duration mo.	Number of Units	Rental Rate \$/mo	Generator Cost \$/mo	Equipment Cost <sup>(1)</sup> \$	Totals \$	
Temporary Office Rental			\$149				
Temporary Toilets			\$176				
<b>Total Support</b>							
Notes: Office rental assumes only 1 generator required for every 4 trailers							
<b>Total Construction Management</b>						<b>\$14,216</b>	

Road Maintenance							
Description	Fleet Size (select)	Number	Duration mo.	Hours/ Month hr.	Labor Cost \$	Equipment Cost \$	Totals \$
<b>Active Reclamation</b>							
Water Truck							
Grader							
<b>Monitoring &amp; Maintenance</b>							
Water Truck							
Grader							
Description	Gallons/ Day (select)	Days/ Month	Duration mo.	Cost/ Gallon \$			Totals \$
<b>Water Fees</b>							
Water Fees							
<b>Total Project Maintenance</b>					<b>\$0</b>	<b>\$0</b>	
Notes: 1) Supervisor equipment = pickup truck							

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Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Standardized Data (imported from data file)	Standardized Data
Program Calculated Value	Locked Cell - Formula or Reference

ZONE ADJUSTMENTS		
Cost Basis/Project Region	Northern Nevada	Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, Washoe, and White Pine Counties
Power Equipment Operators	> 300 miles	\$4.00
Truck Drivers	> 300 miles	\$4.00
Laborers	> 300 miles	\$0.00

INDIRECT COSTS	
FICA/Medicare (%)	7.65%
Unemployment (%)	3.00%
Workman's Compensation (%)	9.77%

HOURLY LABOR RATE TABLE									
EQUIPMENT TYPE <sup>(1)</sup> OR JOB DESCRIPTION	Davis-Bacon Group	Base Rate (\$/hr)	Fringe (\$/hr)	Zone Adjustment (\$/hr)	Hourly Wage (\$/hr)	FICA/Medicare (\$/hr)	Unemployment (\$/hr)	Workman's Comp (\$/hr)	Total (\$/hr)
<b>EQUIPMENT OPERATORS (\$/hr) <sup>(2)</sup></b>									
<b>Bulldozers</b>									
D6R	Group 8	\$29.55	\$15.54	\$4.00	\$49.09	\$3.76	\$1.47	\$4.80	\$59.11
D7R	Group 8	\$29.55	\$15.54	\$4.00	\$49.09	\$3.76	\$1.47	\$4.80	\$59.11
D8R	Group 8	\$29.55	\$15.54	\$4.00	\$49.09	\$3.76	\$1.47	\$4.80	\$59.11
D9R	Group 8	\$29.55	\$15.54	\$4.00	\$49.09	\$3.76	\$1.47	\$4.80	\$59.11
D10R	Group 8	\$29.55	\$15.54	\$4.00	\$49.09	\$3.76	\$1.47	\$4.80	\$59.11
D11R	Group 8	\$29.55	\$15.54	\$4.00	\$49.09	\$3.76	\$1.47	\$4.80	\$59.11
<b>Motor Graders</b>									
14G/H	Group 10A	\$30.41	\$15.54	\$4.00	\$49.95	\$3.82	\$1.50	\$4.88	\$60.15
16G/H	Group 10A	\$30.41	\$15.54	\$4.00	\$49.95	\$3.82	\$1.50	\$4.88	\$60.15
<b>Track Excavators</b>									
320C	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44
325C	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44
345B	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44
385BL	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44
<b>Scrapers</b>									
631G	Group 10	\$30.22	\$15.54	\$4.00	\$49.76	\$3.81	\$1.49	\$4.86	\$59.92
637G PP	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44
<b>Wheeled Loaders</b>									
928G	Group 10	\$30.22	\$15.54	\$4.00	\$49.76	\$3.81	\$1.49	\$4.86	\$59.92
966G	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44
972G	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44
988G	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44
992G	Group 11A	\$32.29	\$15.54	\$4.00	\$51.83	\$3.96	\$1.55	\$5.06	\$62.41
<b>Hydraulic Hammers</b>									
H-120 (fits 325)									
H-160 (fits 345)									
H-180 (fits 365/385)									

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ZONE ADJUSTMENTS		
Cost Basis/Project Region	Northern Nevada	Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, Washoe, and White Pine Counties
Power Equipment Operators	> 300 miles	\$4.00
Truck Drivers	> 300 miles	\$4.00
Laborers	> 300 miles	\$0.00
INDIRECT COSTS		
FICA/Medicare (%)	7.65%	
Unemployment (%)	3.00%	
Workman's Compensation (%)	9.77%	

Other Equipment									
420D 4WD Backhoe	Group 10A	\$30.41	\$15.54	\$4.00	\$49.95	\$3.82	\$1.50	\$4.88	\$60.15
CS563E Vibratory Roller	Group 6	\$28.71	\$15.54	\$4.00	\$48.25	\$3.69	\$1.45	\$4.71	\$58.10
Light Truck - 1.5 Ton									
Supervisor's Truck									
Air Compressor + tools	Group 3	\$27.50	\$15.54	\$4.00	\$47.04	\$3.60	\$1.41	\$4.60	\$56.65
Welding Equipment	Group 9	\$29.87	\$15.54	\$4.00	\$49.41	\$3.78	\$1.48	\$4.83	\$59.50
Heavy Duty Drill Rig	Group 10	\$30.22	\$15.54	\$4.00	\$49.76	\$3.81	\$1.49	\$4.86	\$59.92
Pump (plugging) Drill Rig	Group 10	\$30.22	\$15.54	\$4.00	\$49.76	\$3.81	\$1.49	\$4.86	\$59.92
Concrete Pump									
Gas Engine Vibrator	Group 6	\$28.71	\$15.54	\$4.00	\$48.25	\$3.69	\$1.45	\$4.71	\$58.10
Generator 5KW									
HDEP Welder (pipe or liner)									
5 Ton Crane Truck	Group 10A	\$30.41	\$15.54	\$4.00	\$49.95	\$3.82	\$1.50	\$4.88	\$60.15
25 Ton Crane	Group 11	\$30.65	\$15.54	\$4.00	\$50.19	\$3.84	\$1.51	\$4.90	\$60.44

**NOTES:**

- (1) Equipment Type: Caterpillar model or equivalent
- (2) Equipment Operator Source: D-B ENG10003-35 07/01/2008
- (3) Zone Basis: From Washoe Co. Courthouse

**TRUCK DRIVERS (\$/hr) (4)**

769D	Truck Driver > 25 yds	\$22.85	\$11.94	\$4.00	\$38.79	\$2.97	\$1.16	\$3.79	\$46.71
777D	Truck Driver > 60 yds	\$24.29	\$11.94	\$4.00	\$40.23	\$3.08	\$1.21	\$3.93	\$48.44
613E (5,000 gal) Water Wagon	Water Truck > 2,500 gal	\$22.26	\$11.94	\$4.00	\$38.20	\$2.92	\$1.15	\$3.73	\$46.00
621E (8,000 gal) Water Wagon	Water Truck > 2,500 gal	\$22.26	\$11.94	\$4.00	\$38.20	\$2.92	\$1.15	\$3.73	\$46.00
Dump Truck (10-12 yd <sup>3</sup> )	Truck Driver > 8 yds <	\$22.26	\$11.94	\$4.00	\$38.20	\$2.92	\$1.15	\$3.73	\$46.00

**NOTES:**

- (4) Truck Driver Source: D-B TEAM0533-002 12/01/2007
- (5) Zone Basis: From Washoe Co. Courthouse

**LABORERS (\$/hr) (6,7)**

General Laborer	Group 1	\$21.25	\$6.87	\$0.00	\$28.12	\$2.15	\$0.84	\$2.75	\$33.86
Skilled Laborer	Group 4	\$21.75	\$6.87	\$0.00	\$28.62	\$2.19	\$0.86	\$2.80	\$34.46
Driller's Helper	Group 3	\$21.50	\$6.87	\$0.00	\$28.37	\$2.17	\$0.85	\$2.77	\$34.16
Rodmen (reinforcing concrete)	Group 2	\$21.35	\$6.87	\$0.00	\$28.22	\$2.16	\$0.85	\$2.76	\$33.98
Cement finisher	Group 3	\$21.50	\$6.87	\$0.00	\$28.37	\$2.17	\$0.85	\$2.77	\$34.16
Carpenter		\$27.54	\$6.87	\$0.00	\$34.41	\$2.63	\$1.03	\$3.36	\$41.44

**NOTES:**

- (6) Laborer Source: D-B LAB00169-021 10/01/2006
- (7) Carpenter Source: D-B CARP0971-010 07/01/2009
- (8) Zone Basis: From Washoe Co. Courthouse



Project Name: Fronteer Development (USA) Inc., Long Canyon Exploration Project - @010 Am

Date of Submittal: February 26, 2010

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Model Version: Version 1.1.2 (updated 03 February, 2008)

Cost Data: Standardized Data

Cost Data File: cost\_data-std-nv2009.xls

Monthly Rental Basis: 176 hrs month

<b>EQUIPMENT RENTAL RATE TABLE</b>				
<b>EQUIPMENT TYPE <sup>(1)</sup></b>	<b>Monthly Rental Rate</b>	<b>Equipment Hourly Rate</b>	<b>Fuel/Lube/Wear</b>	<b>Total Rate</b>
<b>Bulldozers</b>				
D6R	\$9,895	\$56.22	\$22.64	\$78.86
D7R	\$13,855	\$78.72	\$28.80	\$107.52
D8R	\$17,820	\$101.25	\$36.31	\$137.56
D9R	\$21,725	\$123.44	\$52.25	\$175.69
D10R	\$28,050	\$159.38	\$67.54	\$226.92
D11R	\$54,000	\$306.82	\$97.58	\$404.40
<b>Motor Graders</b>				
14G/H	\$12,430	\$70.63	\$40.90	\$111.52
16G/H	\$18,425	\$104.69	\$49.93	\$154.62
<b>Track Excavators</b>				
320C	\$7,240	\$41.14	\$19.45	\$60.59
325C	\$7,885	\$44.80	\$24.47	\$69.27
345B	\$10,800	\$61.36	\$36.37	\$97.73
385BL	\$22,140	\$125.80	\$58.77	\$184.57
<b>Scrapers</b>				
631G	\$23,460	\$133.30	\$62.18	\$195.47
637G PP	\$32,140	\$182.61	\$87.40	\$270.01
<b>Wheeled Loaders</b>				
928G	\$5,495	\$31.22	\$19.87	\$51.09
966G	\$10,890	\$61.88	\$35.56	\$97.43
972G	\$11,990	\$68.13	\$37.33	\$105.45
988G	\$20,350	\$115.63	\$60.76	\$176.38
992G	\$42,300	\$240.34	\$121.50	\$361.85
<b>Hydraulic Hammers</b>				
H-120 (fits 325)	\$4,840	\$27.50	\$3.11	\$30.61
H-160 (fits 345)	\$8,100	\$46.02	\$6.85	\$52.87
H-180 (fits 365/385)	\$10,100	\$57.39	\$8.11	\$65.50
<b>Other Equipment</b>				
420D 4WD Backhoe	\$3,045	\$17.30	\$13.90	\$31.21
CS563E Vibratory Roller	\$9,618	\$54.65	\$8.26	\$62.91
Light Truck - 1.5 Ton	\$4,000	\$22.73	\$2.36	\$25.09
Supervisor's Truck	\$2,636	\$14.98	\$2.36	\$17.34
Air Compressor + tools	\$3,935	\$22.36	\$0.00	\$22.36
Welding Equipment	\$2,761	\$15.69	\$0.00	\$15.69
Heavy Duty Drill Rig	\$57,090	\$324.38	\$0.00	\$324.38
Pump (plugging) Drill Rig	\$57,090	\$324.38	\$0.00	\$324.38
Concrete Pump	\$15,224	\$86.50	\$4.72	\$91.22
Gas Engine Vibrator	\$534	\$3.04	\$4.72	\$7.76
Generator 5KW	\$825	\$4.69	\$4.72	\$9.41
HDEP Welder (pipe or liner)	\$4,110	\$23.35	\$0.00	\$23.35
5 Ton Crane Truck	\$3,986	\$22.65	\$7.08	\$29.73

**Project Name:** Fronteer Development (USA) Inc., Long Canyon Exploration Project - @010 Am  
**Date of Submittal:** February 26, 2010  
**File Name:** Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls  
**Model Version:** Version 1.1.2 (updated 03 February, 2008)  
**Cost Data:** Standardized Data  
**Cost Data File:** cost\_data-std-nv2009.xls

25 Ton Crane	\$16,236	\$92.25	\$7.08	\$99.33
<b>Trucks</b>				
769D	\$14,000	\$79.55	\$37.74	\$117.29
777D	\$28,000	\$159.09	\$70.38	\$229.47
613E (5,000 gal) Water Wagon	\$9,235	\$52.47	\$32.17	\$84.65
621E (8,000 gal) Water Wagon	\$14,575	\$82.81	\$32.53	\$115.34
Dump Truck (10-12 yd <sup>3</sup> )	\$10,978	\$62.38	\$37.74	\$100.12

**NOTES:**  
 (1) Power Equipment Source: Cashman Equipment Company (July 2009) unless noted  
 (2) Power Equipment Type: Caterpillar model or equivalent  
 (3) Drilling Equipment Source: Means Heavy Construction (2009)  
 (4) Other Equipment Source: Means Heavy Construction (2009)  
 (5) Drill rig includes support (pipe) truck

Project Name: Frontier Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan  
 Date of Submittal: February 26, 2010  
 File Name: Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls  
 Model Version: Version 1.1.2 (updated 03 February, 2008)  
 Cost Data: Standardized Data  
 Cost Data File: cost\_data-std-nv2009.xls

<b>FUEL, LUBE AND WEAR CALCULATIONS</b>						
<b>EQUIPMENT TYPE</b>	<b>PM Cost Per Hour<sup>(1)</sup></b>	<b>Under carriage or Tires<sup>(2)</sup></b>	<b>G.E.T Consumption</b>	<b>Fuel Use Rate gal/hr</b>	<b>Cost@ \$2.36/gal</b>	<b>Total Hourly Equipment</b>
<b>Bulldozers</b>						
D6R	\$4.98		\$4.09	5.75	\$13.57	\$22.64
D7R	\$5.03		\$6.07	7.50	\$17.70	\$28.80
D8R	\$5.48		\$7.82	9.75	\$23.01	\$36.31
D9R	\$6.46		\$12.16	14.25	\$33.63	\$52.25
D10R	\$8.08		\$16.98	18.00	\$42.48	\$67.54
D11R	\$9.80		\$25.24	26.50	\$62.54	\$97.58
<b>Motor Graders</b>						
14G/H	\$5.24	\$8.74	\$12.17	6.25	\$14.75	\$40.90
16G/H	\$5.09	\$10.51	\$16.63	7.50	\$17.70	\$49.93
<b>Track Excavators</b>						
320C	\$4.18		\$3.71	4.90	\$11.56	\$19.45
325C	\$4.22		\$4.67	6.60	\$15.58	\$24.47
345B	\$5.44		\$5.91	10.60	\$25.02	\$36.37
385 BL	\$6.70		\$10.77	17.50	\$41.30	\$58.77
<b>Scrapers</b>						
631G	\$6.24	\$13.83	\$6.71	15.00	\$35.40	\$62.18
637G PP	\$9.10	\$13.83	\$8.42	23.75	\$56.05	\$87.40
<b>Wheeled Loaders</b>						
928G	\$3.92	\$4.05	\$3.64	3.50	\$8.26	\$19.87
966G	\$4.95	\$8.54	\$8.50	5.75	\$13.57	\$35.56
972G	\$4.71	\$8.54	\$9.33	6.25	\$14.75	\$37.33
988G	\$7.65	\$14.47	\$11.50	11.50	\$27.14	\$60.76
992G	\$11.09	\$28.90	\$27.23	23.00	\$54.28	\$121.50
<b>Hydraulic Hammers</b>						
H-120 (fits 325)	N/A		\$3.11		\$0.00	\$3.11
H-160 (fits 345)	N/A		\$6.85		\$0.00	\$6.85
H-180 (fits 365/385)	N/A		\$8.11		\$0.00	\$8.11
<b>Other Equipment</b>						
420D 4WD Backhoe	\$2.88	\$1.08	\$2.86	3.00	\$7.08	\$13.90
CS563E Vibratory Roller			N/A	3.50	\$8.26	\$8.26
Light Truck - 1.5 Ton	N/A		N/A	1.00	\$2.36	\$2.36
Supervisor's Truck	N/A		N/A	1.00	\$2.36	\$2.36
Air Compressor + tools	N/A		N/A		\$0.00	\$0.00
Welding Equipment	N/A	\$0.00	N/A		\$0.00	\$0.00
Heavy Duty Drill Rig	N/A		N/A		\$0.00	\$0.00
Pump (plugging) Drill Rig	N/A		N/A		\$0.00	\$0.00
Concrete Pump	N/A		N/A	2.00	\$4.72	\$4.72
Gas Engine Vibrator	N/A		N/A	2.00	\$4.72	\$4.72
Generator 5KW	N/A	\$0.00	N/A	2.00	\$4.72	\$4.72
HDEP Welder (pipe or liner)	N/A	\$0.00	N/A		\$0.00	\$0.00
5 Ton Crane Truck			N/A	3.00	\$7.08	\$7.08
25 Ton Crane			N/A	3.00	\$7.08	\$7.08
<b>Trucks</b>						
769D	\$6.79	\$6.45	\$2.67	9.25	\$21.83	\$37.74
777D	\$10.42	\$16.28	\$3.56	17.00	\$40.12	\$70.38
613E (5,000 gal) Water Wagon	\$4.16	\$2.64	N/A	10.75	\$25.37	\$32.17
621E (8,000 gal) Water Wagon	\$5.47	\$5.23	N/A	9.25	\$21.83	\$32.53
Dump Truck (10-12 yd <sup>3</sup> )	\$6.79	\$6.45	\$2.67	9.25	\$21.83	\$37.74
<b>Notes:</b> (1) PM Source: July 2009 Cashman Equipment Rental Rate, Elko, NV (except as noted) (2) Undercarriage Source: Purcell Tire. 07/16/2009 (3) G.E.T. Source: CAT Historical Data (4) Fuel Use Source: Caterpillar Handbook, Edition 35, Ch. 20; or estimated average for smaller vehicles						

Project Name: Fronteer Development (USA) Inc., Long Canyon Exploration Project - @010 Amendment (Total) Update - Plan  
 Date of Submittal: February 26, 2010  
 File Name: Long Canyon RecCostEst v1 Mar12\_2010Amendment.xls  
 Model Version: Version 1.1.2 (updated 03 February, 2008)  
 Cost Data: Standardized Data  
 Cost Data File: cost\_data-std-nv2009.xls

TIRE COST TABLES						
Equipment	Tire Size	# of Tires Per	Cost	Tire Cos <sup>1</sup>	Life	Tire Cost per
<b>Bulldozers</b>						
D6R			N/A			
D7R			N/A			
D8R			N/A			
D9R			N/A			
D10R			N/A			
D11R			N/A			
<b>Motor Graders</b>						
14G/H	20.5R25	6	\$5,095.71	\$30,574.29	3,500	\$8.74
16G/H	23.5R25	6	\$6,131.43	\$36,788.57	3,500	\$10.51
<b>Track Excavators</b>						
320C			N/A			
325C			N/A			
345B			N/A			
385 BL			N/A			
<b>Scrapers</b>						
631G	37.25R35	4	\$13,825.71	\$55,302.86	4,000	\$13.83
637G PP	37.25R35	4	\$13,825.71	\$55,302.86	4,000	\$13.83
<b>Wheeled Loaders</b>						
928G	17.5R25	4	\$4,554.29	\$18,217.16	4,500	\$4.05
966G	26.5R25	4	\$9,607.14	\$38,428.56	4,500	\$8.54
972G	26.5R25	4	\$9,607.14	\$38,428.56	4,500	\$8.54
988G	35/65-33	4	\$16,275.71	\$65,102.84	4,500	\$14.47
992G	45/65R45	4	\$32,517.14	\$130,068.56	4,500	\$28.90
<b>Hydraulic Hammers</b>						
H-120 (fits 325)			N/A			
H-160 (fits 345)			N/A			
H-180 (fits 365/385)			N/A			
<b>Other Equipment</b>						
420D 4WD Backhoe	340/80R18-195LR24	2 + 2	\$1,627.14	\$3,254.28	3,000	\$1.08
CS563E Vibratory Roller			N/A			
Light Truck - 1.5 Ton			N/A			
Supervisor's Truck			N/A			
Air Compressor + tools			N/A			
Welding Equipment			N/A			
Heavy Duty Drill Rig			N/A			
Pump (plugging) Drill Rig			N/A			
Concrete Pump			N/A			
Gas Engine Vibrator			N/A			
Generator 5KW			N/A			
HDEP Welder (pipe or liner)			N/A			
5 Ton Crane Truck			N/A			
25 Ton Crane			N/A			
<b>Trucks</b>						
769D	18.00R33	6	\$6,452.86	\$38,717.16	6,000	\$6.45
777D	27.00R49	6	\$13,565.71	\$81,394.26	5,000	\$16.28
613E (5,000 gal) Water Wagon	23.5R25	4	\$3,967.14	\$15,868.56	6,000	\$2.64
621E (8,000 gal) Water Wagon	33.25R29	4	\$10,452.86	\$41,811.44	8,000	\$5.23
Dump Truck (10-12 yd3 )		6	\$6,452.86	\$38,717.16	6,000	\$6.45
Notes:						
(1) Unit Cost Basis: Cost per set						
(2) Cost Basis: Total cost for all required tires.						
(3) Tire Cost Source: Purcell Tire. 07/16/2009						
(4) Tire Wear Source: Caterpillar Handbook, Edition 35; Ch. 20						



**2009 MOB/DEMOB using R.S. MEANS and SRCE equipment and DAVIS-BACON wages**

blue font is for project specific user input

Miles one way from Washoe County Courthouse	397
Miles to project, one way	90
Hours travel time @ 55 MPH	1.64

Equipment	Mobilization \$/hour (1)	\$ Flat Rate load & unload (2)	\$/hour Deadhead (empty return cost) (3)	Disassembly and assembly (4)	Permit cost \$ (5)	Pilot car costs	# of units	One Way Mob Cost	Total Mob and Demob Cost
<b>Bulldozers</b>									
D6R	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
D7R	\$ 104	\$ 104	\$ 104	\$ -	\$ 25	\$ 93	1	\$ 561	\$ 1,122
D8R	\$ 144	\$ 144	\$ 144	\$ -	\$ 25	\$ 185		\$ -	\$ -
D9R	\$ 144	\$ 144	\$ 144	\$ 5,000	\$ 25	\$ 185		\$ -	\$ -
D10R	\$ 144	\$ 144	\$ 144	\$ 5,000	\$ 25	\$ 278		\$ -	\$ -
D11R (two transports) (7)	\$ 144	\$ 144	\$ 144	\$ 5,000	\$ 25	\$ 185		\$ -	\$ -
<b>Motor Graders</b>									
14G/H	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
16G/H	\$ 104	\$ 104	\$ 104	\$ -	\$ 25	\$ 93		\$ -	\$ -
<b>Track Excavators</b>									
320C	\$ 104	\$ 104	\$ 104	\$ -	\$ -	\$ -		\$ -	\$ -
325C	\$ 104	\$ 104	\$ 104	\$ -	\$ -	\$ -		\$ -	\$ -
345B	\$ 144	\$ 144	\$ 144	\$ -	\$ 25	\$ 185	1	\$ 589	\$ 1,177
385BL	\$ 144	\$ 144	\$ 144	\$ 13,000	\$ 25	\$ 185		\$ -	\$ -
<b>Scrapers</b>									
631G	\$ 144	\$ 144	\$ 144	\$ -	\$ 25	\$ 185		\$ -	\$ -
637G PP	\$ 144	\$ 144	\$ 144	\$ -	\$ 25	\$ 185		\$ -	\$ -
<b>Wheeled Loaders</b>									
928G	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
966G	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
972G	\$ 104	\$ 104	\$ 104	\$ -	\$ -	\$ -		\$ -	\$ -
988G	\$ 104	\$ 104	\$ 104	\$ 5,000	\$ 25	\$ 93		\$ -	\$ -
992G (two transports) (7)	\$ 144	\$ 144	\$ 144	\$ 20,000	\$ 25	\$ 185		\$ -	\$ -
<b>Hydraulic Hammers</b>									
H-120 (fits 325) no charge, mobilize with rr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -
H-160 (fits 345) no charge, mobilize with rr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -
H-180 (fits 365/385) no charge, mobilize w	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -
<b>Other Equipment</b>									
420D 4WD Backhoe	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
CS563E Vibratory Roller	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
Light Truck - 1.5 Ton	\$ 57	\$ 57	\$ 57	\$ -	\$ -	\$ -		\$ -	\$ -
Supervisor's Truck	\$ 49	\$ 49	\$ 49	\$ -	\$ -	\$ -		\$ -	\$ -
Air Compressor + tools	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
Welding Equipment	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
Heavy Duty Drill Rig	\$ 393	\$ 393	\$ 393	\$ -	\$ -	\$ -	1	\$ 1,035	\$ 2,070
Pump (plugging) Drill Rig	\$ 393	\$ 393	\$ 393	\$ -	\$ -	\$ -		\$ -	\$ -
Concrete Pump	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
Gas Engine Vibrator	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
Generator 5KW	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
HDEP Welder (pipe or liner)	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
5 Ton Crane Truck	\$ 98	\$ 98	\$ 98	\$ -	\$ -	\$ -		\$ -	\$ -
25 Ton Crane	\$ 153	\$ 153	\$ 153	\$ -	\$ -	\$ -		\$ -	\$ -
<b>Trucks</b>									
769D	\$ 104	\$ 104	\$ 104	\$ -	\$ 25	\$ 185		\$ -	\$ -
777D (two transports) (8)	\$ 144	\$ 144	\$ 144	\$ 20,000	\$ 25	\$ 278		\$ -	\$ -
613E (5,000 gal) Water Wagon	\$ 144	\$ 144	\$ 144	\$ -	\$ -	\$ -	1	\$ 378	\$ 757
621E (8,000 gal) Water Wagon	\$ 144	\$ 144	\$ 144	\$ -	\$ 25	\$ 185		\$ -	\$ -
Dump Truck (10-12 yd <sup>3</sup> )	\$ 113	\$ 113	\$ 113	\$ -	\$ -	\$ -		\$ -	\$ -
<b>Miscellaneous</b>									
Equipment for dry hole abandonment (420D 4	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -	1	\$ 196	\$ 392
Pilot car (Light Truck)	\$ 50	\$ 50	\$ 50	\$ -	\$ -	\$ -		\$ -	\$ -
Truck Tractor + Lowbed Trailer 75 ton	\$ 144	\$ 144	\$ 144	\$ -	\$ -	\$ -		\$ -	\$ -
Truck Tractor + Flatbed Trailer 40 ton	\$ 104	\$ 104	\$ 104	\$ -	\$ -	\$ -		\$ -	\$ -
Light Truck + Flatbed Trailer 25 ton	\$ 74	\$ 74	\$ 74	\$ -	\$ -	\$ -		\$ -	\$ -
<b>5</b>								<b>\$</b>	<b>5,517</b>

**Footnotes and explanations of assumptions**

- (1) The sum of the cost of equipment from either the SRCE or RSM equipment tab plus Davis-Bacon labor tab
- (2) Assumes minimum of 30 minutes load and secure and 30 minutes unsecure and unload machine.
- (3) No "Deadhead" (empty) charge for Mob up to 50 miles. More than 50 miles the cost of deadhead same rate as loaded miles.
- (4) Only large equipment requires disassembly for transport. Includes cost of mechanic + mechanic's truck + crane operator + crane.
- (5) Nevada Dept of Transportation overdimensional permits are \$25 per trip or \$60 per year.
- (6) Sum of mobilization plus all ancillary costs for one way loaded and return empty.
- (7) Two transports are required but the second transport does not need pilot cars or permits or a heavy duty trailer.
- (8) Two transports required with both requiring full complement of pilot cars and permits.
- (9) Pilot Car costs based on SRCE light truck costs and Davis-Bacon wages
- (10) SRCE costs based on July 2009 vendor quotes.
- (11) RS Means costs based on R.S. Means Heavy Construction Cost Data, 2009
- (12) Davis\_Bacon wages based on July 3, 2009 determination.

DAVIS BACON WAGE RATES FOR THE OPERATORS TRANSPORTING HEAVY EQUIPMENT

LABOR DESCRIPTOR	Operating Weight, tons	Group #	BASE WAGE	Area pay	FRINGES	BASE WAGE +	UNEMPLOYMENT	FICA	WORKMANS COMP. (1)	TOTAL
			(12/01/2007) July 3, 2009 determination			FRINGES				
<b>Bulldozers</b>										
D6R	23	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
D7R	30	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
D8R	42	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
D9R	55	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
D10R	73	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
D11R (two transports) (7)	124	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
<b>Motor Graders</b>										
14G/H	21	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
16G/H	27	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
<b>Track Excavators</b>										
320C	25	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
325C	32	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
345B	54	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
385BL	98	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
<b>Scrapers</b>										
631G	51	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
637G PP	57	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
<b>Wheeled Loaders</b>										
928G	13	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
966G	25	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
972G	28	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
988G	56	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
992G (two transports) (7)	110	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
<b>Hydraulic Hammers</b>										
H-120 (fits 325) no charge, mobilize with machine	mob with machine	with machine	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
H-160 (fits 345) no charge, mobilize with machine	mob with machine	with machine	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
H-180 (fits 365/385) no charge, mobilize with machine	mob with machine	with machine	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
<b>Other Equipment</b>										
420D 4WD Backhoe	8	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
CS563E Vibratory Roller	12	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Light Truck - 1.5 Ton	self mobilization @ SRCE cost	Labor 1	\$21.25	\$0.00	6.87	\$28.12	\$0.84	\$2.15	\$2.75	\$33.86
Supervisor's Truck	self mobilization @ SRCE cost	Labor 1	\$21.25	\$0.00	6.87	\$28.12	\$0.84	\$2.15	\$2.75	\$33.86
Air Compressor + tools	towed behind light truck	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Welding Equipment	towed behind light truck	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Heavy Duty Drill Rig	self mobilization @ SRCE cost	Equip Oper	\$30.22	\$4.00	22.43	\$56.65	\$1.70	\$4.33	\$5.53	\$68.22
Pump (plugging) Drill Rig	self mobilization @ SRCE cost	Equip Oper	\$30.22	\$4.00	22.43	\$56.65	\$1.70	\$4.33	\$5.53	\$68.22
Concrete Pump	towed behind light truck	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Gas Engine Vibrator	towed behind light truck	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Generator 5KW	towed behind light truck	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
HDEP Welder (pipe or liner)	towed behind light truck	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
5 Ton Crane Truck	self mobilization @ RSM cost	Equip Oper	\$30.41	\$4.00	22.43	\$56.84	\$1.71	\$4.35	\$5.55	\$68.45
25 Ton Crane	self mobilization @ RSM cost	Equip Oper	\$30.65	\$4.00	22.43	\$57.08	\$1.71	\$4.37	\$5.58	\$68.74
<b>Trucks</b>										
769D	39	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
777D (two transports) (8)	80	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
613E (5,000 gal) Water Wagon	16	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
621E (8,000 gal) Water Wagon	40	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Dump Truck (10-12 yd <sup>3</sup> )	self mobilization @ SRCE cost	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
<b>Miscellaneous</b>										
Equipment for dry hole abandonment (420D 4WD Backhoe)	8	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Pilot car (Light Truck)	self mobilization @ SRCE cost	Labor 1	\$21.25	\$0.00	6.87	\$28.12	\$0.84	\$2.15	\$2.75	\$33.86
Truck Tractor + Lowbed Trailer 75 ton	self mobilization @ SRCE cost	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Truck Tractor + Flatbed Trailer 40 ton	self mobilization @ SRCE cost	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48
Light Truck + Flatbed Trailer 25 ton	self mobilization @ SRCE cost	Teamster	\$21.83	\$4.00	11.94	\$37.77	\$1.13	\$2.89	\$3.69	\$45.48

**APPENDIX E**

**SPILL CONTINGENCY PLAN,  
MATERIAL DATA SAFETY SHEETS,  
AND BEST MANAGEMENT PRACTICES**

**LONG CANYON EXPLORATION PROJECT  
ELKO COUNTY, NEVADA  
SPILL CONTINGENCY PLAN**

**OBJECTIVES**

The purpose of this Spill Contingency Plan (Plan) is as follows:

- To identify all pollutant sources that may exist within the Spring Valley Exploration Project Area.
- To identify Best Management Practices (BMPs) to prevent or reduce the quantity of potential pollutants discharged to the ground or surface water in order to minimize environmental impacts during and after the exploration project.

**AVAILABILITY**

A copy of this Plan shall be attached to the Project's Exploration Operating Plan, along with the Material Safety Data Sheets (MSDS) (Attachment 1) of all products used onsite for vehicle maintenance or the exploration program and identified BMPs (Attachment 2). All contractors are responsible for familiarizing their personnel with the information pertaining to BMPs and spill prevention.

**PREVENTIVE MAINTENANCE**

Good housekeeping practices will be followed onsite during the exploration project:

- An effort will be made to store only enough product required to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The Project Manager will inspect daily to insure proper use and disposal of materials onsite.

The contractor shall have a vehicle preventive maintenance program to insure that all vehicles are operating under optimum conditions and all hoses and fittings are in good condition and leak free. It is the responsibility of the operator, mechanic, tool pusher or other designee, to execute the repairs or preventive maintenance and complete any reporting required. Assignment for repair when equipment is in a remote location may be issued verbally by field superintendent or district manager.

## **SOURCE IDENTIFICATION**

### **Pollutants**

Potential sources of pollutants from drilling rigs, service vehicles, and other equipment includes oil, fuel, and lubricating grease. Additional sources of pollutants may include drilling fluids (mud and foam), borehole plugging materials, solvents, trash and other debris. These pollutants are not expected to come into contact with on-site soils or surface waters; however, BMPs shall be employed to prevent potential release of contaminants.

### **Construction Debris**

To minimize impacts during precipitation events, trash bins shall be regularly inspected for leaks.

### **Spill Contingency Plan (GM-6)<sup>1</sup>**

Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, sorbent materials, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

Well-maintained equipment will be used to perform the work, and when practicable, equipment maintenance will be performed offsite. In the event of oil, fuel, and lubricating grease leaks, clean-up will be conducted as soon as possible. If the leak is on pavement or a compacted surface, an oil absorbing product such as Absorb<sup>®</sup> will be applied. Once the clean up product has absorbed the leak, it will be swept up into watertight drums or bins, and disposed of according to federal, state, or local regulations. If the leak occurs on soil, the contaminated soil will be removed and disposed of according to federal, state, or local regulations. In the event of a major spill the following actions should be taken, in addition to any federal, state, and local health and safety regulations:

1. Contain the spread or migration of the spill, using on-hand supply of erosion control structures and/or by creating dirt berms, as feasible and necessary. Also utilize the materials and equipment stored onsite to control the spill.
2. Notify the environmental or project manager immediately.
3. Within 24 hours of an identified spill, the site manager or a designated representative will notify the following local and state agencies:

BLM, Winnemucca Field Office - (775) 753-0200  
Nevada Division of Environmental Protection - (775) 687-4670  
Emergency Response Hotline - (888) 331-6337

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<sup>1</sup> Specific BMPs are located in Attachment 2.

In case of an emergency, relevant phone numbers are provided below:

<b>All Emergency calls:</b>	<b>911</b>
Elko Fire Department:	(775) 771-7345
Wells Fire Department:	(775) 752-3333
West Wendover Fire Department:	(775) 664-2274
Northeastern Nevada Regional Hospital:	(775) 738-5151
Bureau of Land Management Fire Station:	(775) 752-3183

4. This Plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.

### **BEST MANAGEMENT PRACTICES**

- During construction, water will be used for dust control, mixing of grout, and cleanup. Water used for dust control will be sprayed over the ground at a rate which will moisten the soil but not cause runoff.
- It is the responsibility of the contractor to define construction staging areas to minimize footprint impacts, and to prevent impacts to water courses and other sensitive areas.
- The contractor is responsible for maintaining water-tight trash bins or dumpsters on the project site to minimize leakage to ground surface. Contractors will be responsible for maintaining contained areas for concrete wash-out and properly disposing of concrete, if used.
- The Project supervisor shall at all times properly operate and maintain any facilities and systems of treatment and control (and related appurtenances).
- The following BMPs will be utilized as appropriate, and copies of each BMP are included in Attachment 2:
  - Spill Prevention and Control (GM-6)
  - Vehicle and Equipment Maintenance and Fueling (GM-8)
  - Material Delivery, Handling, Storage and Use (GM-10)
  - Liquid Waste Management (GM-13)
  - Hazardous Waste Management (GM-17)



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**ATTACHMENT 1**

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**MATERIAL SAFETY DATA SHEETS**



# Material Safety Data Sheet

## SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

### CHEVRON and TEXACO REGULAR UNLEADED GASOLINES

**Product Use:** Fuel

**Product Number(s):** CPS201000 [See Section 16 for Additional Product Numbers]

**Synonyms:** Calco Regular Unleaded Gasoline, Chevron Regular Unleaded Gasoline, Texaco Unleaded Gasoline

#### Company Identification

Chevron Products Company  
Marketing, MSDS Coordinator  
6001 Bollinger Canyon Road  
San Ramon, CA 94583  
United States of America

#### Transportation Emergency Response

CHEMTREC: (800) 424-9300 or (703) 527-3887

#### Health Emergency

ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623

#### Product Information

Technical Information: (510) 242-5357

SPECIAL NOTES: This MSDS applies to: all motor gasoline.

## SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Gasoline	86290-81-5	100 %vol/vol
Benzene	71-43-2	0.1 - 4.9 %vol/vol
Toluene (methylbenzene)	108-88-3	1 - 17 %vol/vol
Ethyl benzene	100-41-4	0.1 - 3 %vol/vol
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	1330-20-7	1 - 15 %vol/vol
Butane	106-97-8	1 - 12 %vol/vol
Heptane	142-82-5	1 - 4 %vol/vol
Hexane	110-54-3	1 - 5 %vol/vol
Cyclohexane	110-82-7	1 - 3 %vol/vol
Methylcyclohexane	108-87-2	1 - 2 %vol/vol
Pentane, 2,2,4-trimethyl- (Isooctane)	540-84-1	1 - 13 %vol/vol
Naphthalene	91-20-3	0.1 - 2 %vol/vol

Ethanol	64-17-5	0 - 10 %vol/vol
Methyl tert-butyl ether (MTBE)	1634-04-4	0 - 15 %vol/vol
Tertiary amyl methyl ether (TAME)	994-05-8	0 - 17 %vol/vol
Ethyl tert-butyl ether (ETBE)	637-92-3	0 - 18 %vol/vol

Information on ingredients that are considered Controlled Products and/or that appear on the WHMIS Ingredient Disclosure List (IDL) is provided as required by the Canadian Hazardous Products Act (HPA, Sections 13 and 14). Ingredients considered hazardous under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, are also listed. See Section 15 for additional regulatory information.

<b>SECTION 3 HAZARDS IDENTIFICATION</b>
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**EMERGENCY OVERVIEW**

- EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE
- HARMFUL OR FATAL IF SWALLOWED - MAY CAUSE LUNG DAMAGE IF SWALLOWED
- VAPOR HARMFUL
- CAUSES EYE AND SKIN IRRITATION
- LONG-TERM EXPOSURE TO VAPOR HAS CAUSED CANCER IN LABORATORY ANIMALS
- KEEP OUT OF REACH OF CHILDREN
- TOXIC TO AQUATIC ORGANISMS

\*\*\*\*\*

**IMMEDIATE HEALTH EFFECTS**

**Eye:** Contact with the eyes causes irritation. Symptoms may include pain, tearing, reddening, swelling and impaired vision.

**Skin:** Contact with the skin causes irritation. Skin contact may cause drying or defatting of the skin. Symptoms may include pain, itching, discoloration, swelling, and blistering. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.

**Ingestion:** Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death.

**Inhalation:** The vapor or fumes from this material may cause respiratory irritation. Symptoms of respiratory irritation may include coughing and difficulty breathing. Breathing this material at concentrations above the recommended exposure limits may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death.

**DELAYED OR OTHER HEALTH EFFECTS:**

**Reproduction and Birth Defects:** This material is not expected to cause birth defects or other harm to the developing fetus based on animal data.

**Cancer:** Prolonged or repeated exposure to this material may cause cancer. Gasoline has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Whole gasoline exhaust has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Contains benzene, which has been classified as a carcinogen by the National Toxicology Program (NTP) and a Group 1 carcinogen (carcinogenic to humans) by the International Agency for Research on Cancer (IARC). Contains ethylbenzene which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC). Contains benzene, which has been classified as an A1 Group Confirmed Human Carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH).

See Section 11 for additional information. Risk depends on duration and level of exposure.

#### SECTION 4 FIRST AID MEASURES

**Eye:** Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.

**Skin:** Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

**Ingestion:** If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.

**Inhalation:** Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.

**Note to Physicians:** Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

#### SECTION 5 FIRE FIGHTING MEASURES

See Section 7 for proper handling and storage.

##### FLAMMABLE PROPERTIES:

**Flashpoint:** (Tagliabue Closed Cup ASTM D56) < -45 °C (< -49 °F)

**Autoignition:** > 280 °C (> 536 °F)

**Flammability (Explosive) Limits (% by volume in air):** Lower: 1.4 Upper: 7.6 (Typical)

**EXTINGUISHING MEDIA:** Dry Chemical, CO<sub>2</sub>, AFFF Foam or alcohol resistant foam if >15% volume polar solvents (oxygenates).

##### PROTECTION OF FIRE FIGHTERS:

**Fire Fighting Instructions:** Use water spray to cool fire-exposed containers and to protect personnel. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

**Combustion Products:** Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

#### SECTION 6 ACCIDENTAL RELEASE MEASURES

**Protective Measures:** Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator.

**Spill Management:** Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

**Reporting:** Report spills to local authorities as appropriate or required.

#### SECTION 7 HANDLING AND STORAGE

**Precautionary Measures:** READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL. This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Do not store in open or unlabeled containers. Use only as a motor fuel. Do not use for cleaning, pressure appliance fuel, or any other such use. Never siphon gasoline by mouth.

Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe vapor or fumes. Wash thoroughly after handling. Keep out of the reach of children.

**Unusual Handling Hazards:** WARNING! Do not use as portable heater or appliance fuel. Toxic fumes may accumulate and cause death.

**General Handling Information:** Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

**Static Hazard:** Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'. Improper filling of portable gasoline containers creates danger of fire. Only dispense gasoline into approved and properly labeled gasoline containers. Always place portable containers on the ground. Be sure pump nozzle is in contact with the container while filling. Do not use a nozzle's lock-open device. Do not fill portable containers that are inside a vehicle or truck/trailer bed.

**General Storage Information:** DO NOT USE OR STORE near heat, sparks, flames, or hot surfaces . USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use.

**Container Warnings:** Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

## SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

### GENERAL CONSIDERATIONS:

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

### ENGINEERING CONTROLS:

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits.

### PERSONAL PROTECTIVE EQUIPMENT

**Eye/Face Protection:** No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

**Skin Protection:** No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Chlorinated Polyethylene (or Chlorosulfonated Polyethylene), Nitrile Rubber, Polyurethane, Viton.

**Respiratory Protection:** Determine if airborne concentrations are below the recommended occupational exposure limits for jurisdiction of use. If airborne concentrations are above the acceptable limits, wear an approved respirator that provides adequate protection from this material, such as: Air-Purifying Respirator for Organic Vapors.

When used as a fuel, this material can produce carbon monoxide in the exhaust. Determine if airborne concentrations are below the occupational exposure limit for carbon monoxide. If not, wear an approved positive-pressure air-supplying respirator.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

### Occupational Exposure Limits:

Component	Country/ Agency	TWA	STEL	Ceiling	Notation
Benzene	ACGIH	.5 ppm (weight)	2.5 ppm (weight)	--	Skin A1
Butane	ACGIH	800 ppm	--	--	--

		(weight)			
Cyclohexane	ACGIH	100 ppm (weight)	--	--	--
Ethanol	ACGIH	1000 ppm (weight)	--	--	A4
Ethyl benzene	ACGIH	100 ppm (weight)	125 ppm (weight)	--	A3
Ethyl tert-butyl ether (ETBE)	ACGIH	5 ppm (weight)	--	--	--
Gasoline	ACGIH	300 ppm (weight)	500 ppm (weight)	--	A3
Heptane	ACGIH	400 ppm (weight)	500 ppm (weight)	--	--
Hexane	ACGIH	50 ppm (weight)	--	--	Skin
Methyl tert-butyl ether (MTBE)	ACGIH	50 ppm (weight)	--	--	A3
Methyl tert-butyl ether (MTBE)	CVX	--	50 ppm	--	--
Methylcyclohexane	ACGIH	400 ppm (weight)	--	--	--
Naphthalene	ACGIH	10 ppm (weight)	15 ppm (weight)	--	Skin A4
Pentane, 2,2,4-trimethyl- (Isooctane)	ACGIH	300 ppm (weight)	--	--	--
Tertiary amyl methyl ether (TAME)	ACGIH	20 ppm (weight)	--	--	--
Tertiary amyl methyl ether (TAME)	CVX	--	50 ppm	--	--
Toluene (methylbenzene)	ACGIH	50 ppm (weight)	--	--	Skin A4
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	ACGIH	100 ppm (weight)	150 ppm (weight)	--	A4

NOTE ON OCCUPATIONAL EXPOSURE LIMITS: Consult local authorities for acceptable provincial values in Canada. Consult the Canadian Standards Association Standard 94.4-2002 Selection, Use and Care of Respirators.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

**Attention: the data below are typical values and do not constitute a specification.**

**Color:** Colorless to yellow

**Physical State:** Liquid

**Odor:** Petroleum odor

**pH:** Not Applicable

**Vapor Pressure:** 5 psi - 15 psi (Typical) @ 37.8 °C (100 °F)

**Vapor Density (Air = 1):** 3 - 4 (Typical)

**Boiling Point:** 37.8°C (100°F) - 204.4°C (400°F) (Typical)

**Solubility:** Insoluble in water; miscible with most organic solvents.

**Freezing Point:** Not Applicable

**Melting Point:** Not Applicable

**Specific Gravity:** 0.7 g/ml - 0.8 g/ml @ 15.6°C (60.1°F) (Typical)

**Viscosity:** <1 SUS @ 37.8°C (100°F)

**Evaporation Rate:** No Data Available

**Odor Threshold:** No Data Available

**Coefficient of Water/Oil Distribution:** No Data Available

## SECTION 10 STABILITY AND REACTIVITY

**Chemical Stability:** This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Incompatibility With Other Materials:** May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**Hazardous Decomposition Products:** None known (None expected)

**Hazardous Polymerization:** Hazardous polymerization will not occur.

**Sensitivity to Mechanical Impact:** No.

## SECTION 11 TOXICOLOGICAL INFORMATION

### IMMEDIATE HEALTH EFFECTS

**Eye Irritation:** The Draize eye irritation mean score in rabbits for a 24-hour exposure was: 0/110.

**Skin Irritation:** For a 4-hour exposure, the Primary Irritation Index (PII) in rabbits is: 4.8/8.0.

**Skin Sensitization:** This material did not cause skin sensitization reactions in a Buehler guinea pig test.

**Acute Dermal Toxicity:** LD50: >3.75g/kg (rabbit).

**Acute Oral Toxicity:** LD50: >5 ml/kg (rat)

**Acute Inhalation Toxicity:** 4 hour(s) LD50: >20000mg/m<sup>3</sup> (rat).

For additional information on the acute toxicity of the components, call the technical information center.

**Subchronic Effects:** Exposure of rats for 13 weeks (6 hr/day for 5 days/week) to the light ends of gasoline (up to 20,000 mg/m<sup>3</sup>) resulted in minimal responses of toxicity. There were no indications of neurotoxicity based morphological, functional and biochemical indices. There was also no evidence of immunotoxicity in the rats. However, when rats were exposed to gasoline vapor containing ethanol up to 20,000 mg/m<sup>3</sup> there was evidence of both humoral immune suppression and mild astrogliosis.

**Reproduction and Birth Defects:** Exposure of rats to the light ends of gasoline at up to 20,000 mg/m<sup>3</sup> had generally no impact upon reproductive abilities and did not cause birth defects.

**Genetic Toxicity:** Gasoline was not mutagenic, with or without activation, in the Ames assay (*Salmonella typhimurium*), *Saccharomyces cerevisiae*, or mouse lymphoma assays. In addition, point mutations were not induced in human lymphocytes. Gasoline was not mutagenic when tested in the mouse dominant lethal assay. Administration of gasoline to rats did not cause chromosomal aberrations in their bone marrow cells. Inhalation exposure of rats to the light ends of gasoline caused increased sister chromatid exchange in their peripheral white blood cells but did not cause an increase in micronucleated red blood cells in their bone marrow.

### ADDITIONAL TOXICOLOGY INFORMATION:

Gasolines are highly volatile and can produce significant concentrations of vapor at ambient temperatures. Gasoline vapor is heavier than air and at high concentrations may accumulate in confined spaces to present both safety and health hazards. When vapor exposures are low, or short duration and infrequent, such as during refueling and tanker loading/unloading, neither total hydrocarbon nor components such as benzene are likely to result in any adverse health effects. In situations such as accidents or spills where exposure to gasoline vapor is potentially high, attention should be paid to potential toxic effects of specific components. Information about specific components in gasoline can be found in Sections 2, 8 and 15 of this MSDS. More detailed information on the health hazard of specific gasoline components can be obtained calling the ChevronTexaco Emergency Information Center (see Section 1 for phone numbers).

Pathological misuse of solvents and gasoline, involving repeated and prolonged exposure to high concentrations of vapor is a significant exposure on which there are many reports in the medical literature. As with other solvents, persistent abuse involving repeated and prolonged exposures to high concentrations of vapor has been reported to result in central nervous system damage and eventually, death. In a study in which ten human volunteers were exposed for 30 minutes to approximately 200, 500 or 1000 ppm concentrations of gasoline vapor, irritation of the eyes was the only significant effect observed, based on both subjective and objective assessments.

Lifetime inhalation of wholly vaporized unleaded gasoline at 2056 ppm has caused increased liver tumors in female mice and kidney cancer in male rats. In their 1988 review of carcinogenic risk from gasoline, The International Agency for Research on Cancer (IARC) noted that, because published epidemiology studies did not include any exposure data, only occupations where gasoline exposure may have occurred were reviewed. These included gasoline service station attendants and automobile mechanics. IARC also noted that there was no opportunity to separate effects of combustion products from those of gasoline itself. Although IARC allocated

gasoline a final overall classification of Group 2B, i.e. possibly carcinogenic to humans, this was based on limited evidence in experimental animals plus supporting evidence including the presence in gasoline of benzene. The actual evidence for carcinogenicity in humans was considered inadequate.

To explore the health effects of workers potentially exposed to gasoline vapors in the marketing and distribution sectors of the petroleum industry, the American Petroleum Institute sponsored a cohort mortality study (Publication 4555), a nested case-control study (Publication 4551), and an exposure assessment study (Publication 4552). Histories of exposure to gasoline were reconstructed for cohort of more than 18,000 employees from four companies for the time period between 1946 and 1985. The results of the cohort mortality study indicated that there was no increased mortality from either kidney cancer or leukemia among marketing and marine distribution employees who were exposed to gasoline in the petroleum industry, when compared to the general population. More importantly, based on internal comparisons, there was no association between mortality from kidney cancer or leukemia and various indices of gasoline exposure. In particular, neither duration of employment, duration of exposure, age at first exposure, year of first exposure, job category, cumulative exposure, frequency of peak exposure, nor average intensity of exposure had any effect on kidney cancer or leukemia mortality. The results of the nested case-control study confirmed the findings of the original cohort study. That is, exposure to gasoline at the levels experienced by this cohort of distribution workers is not a significant risk factor for leukemia (all cell types), acute myeloid leukemia, kidney cancer or multiple myeloma.

## SECTION 12 ECOLOGICAL INFORMATION

### ECOTOXICITY

96 hour(s) LC50: 8.3 mg/l (Cyprinodon variegatus)

96 hour(s) LC50: 1.8 mg/l (Mysidopsis bahia)

48 hour(s) LC50: 3.0 mg/l (Daphnia magna)

96 hour(s) LC50: 2.7 mg/l (Oncorhynchus mykiss)

This material is expected to be toxic to aquatic organisms. Gasoline studies have been conducted in the laboratory under a variety of test conditions with a range of fish and invertebrate species. An even more extensive database is available on the aquatic toxicity of individual aromatic constituents. The majority of published studies do not identify the type of gasoline evaluated, or even provide distinguishing characteristics such as aromatic content or presence of lead alkyls. As a result, comparison of results among studies using open and closed vessels, different ages and species of test animals and different gasoline types, is difficult.

The bulk of the available literature on gasoline relates to the environmental impact of monoaromatic (BTEX) and diaromatic (naphthalene, methylnaphthalenes) constituents. In general, non-oxygenated gasoline exhibits some short-term toxicity to freshwater and marine organisms, especially under closed vessel or flow-through exposure conditions in the laboratory. The components which are the most prominent in the water soluble fraction and cause aquatic toxicity, are also highly volatile and can be readily biodegraded by microorganisms.

### ENVIRONMENTAL FATE

This material is expected to be readily biodegradable. Following spillage, the more volatile components of gasoline will be rapidly lost, with concurrent dissolution of these and other constituents into the water. Factors such as local environmental conditions (temperature, wind, mixing or wave action, soil type, etc), photo-oxidation, biodegradation and adsorption onto suspended sediments, can contribute to the weathering of spilled gasoline.

The aqueous solubility of non-oxygenated unleaded gasoline, based on analysis of benzene, toluene, ethylbenzene+xylenes and naphthalene, is reported to be 112 mg/l. Solubility data on individual gasoline constituents also available.

## SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by USEPA under RCRA (40CFR261), Environment Canada, or other State, Provincial, and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

## SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

TC Shipping Description: GASOLINE//3//UN1203//II

DOT Shipping Description: GASOLINE,3,UN1203,II

<b>SECTION 15 REGULATORY INFORMATION</b>
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**REGULATORY LISTS SEARCHED:**

01-1=IARC Group 1  
01-2A=IARC Group 2A  
01-2B=IARC Group 2B  
35=WHMIS IDL

The following components of this material are found on the regulatory lists indicated.

Benzene	01-1, 35
Butane	35
Cyclohexane	35
Ethanol	01-1, 35
Ethyl benzene	01-2B, 35
Gasoline	01-2B
Heptane	35
Hexane	35
Methylcyclohexane	35
Naphthalene	01-2B, 35
Pentane, 2,2,4-trimethyl- (Isooctane)	35
Toluene (methylbenzene)	35
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	35

**CHEMICAL INVENTORIES:**

All components comply with the following chemical inventory requirements: DSL (Canada), EINECS (European Union), KECI (Korea), TSCA (United States).

One or more components does not comply with the following chemical inventory requirements: AICS (Australia), ENCS (Japan), IECSC (China), PICCS (Philippines).

**WHMIS CLASSIFICATION:**

Class B, Division 2: Flammable Liquids  
Class D, Division 2, Subdivision A: Very Toxic Material - Carcinogenicity  
Class D, Division 2, Subdivision B: Toxic Material - Skin or Eye Irritation

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations. (See Hazardous Products Act (HPA), R.S.C. 1985, c.H-3,s.2).

**MSDS PREPARATION:**

This Material Safety Data Sheet has been prepared by the Toxicology and Health Risk Assessment Unit, ERTC, P.O. Box 1627, Richmond, CA 94804, (888)676-6183.

**Revision Date:** 08/30/2005

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**SECTION 16 OTHER INFORMATION**

**Additional Product Number(s):** CPS201023, CPS201054, CPS201055, CPS201075, CPS201090, CPS201105, CPS201106, CPS201120, CPS201121, CPS201122, CPS201126, CPS201128, CPS201131, CPS201136, CPS201141, CPS201142, CPS201148, CPS201153, CPS201158, CPS201161, CPS201162, CPS201168, CPS201181, CPS201185, CPS201186, CPS201188, CPS201216, CPS201217, CPS201218, CPS201236, CPS201237, CPS201238, CPS201266, CPS201267, CPS201268, CPS201277, CPS201278, CPS201279, CPS201286, CPS201287, CPS201289, CPS201296, CPS201297, CPS201298, CPS201849, CPS201850, CPS201855, CPS201856, CPS201857, CPS204000, CPS204001, CPS204002, CPS204003, CPS204010, CPS204011, CPS204022, CPS204023, CPS204046, CPS204047, CPS204070, CPS204071, CPS204088, CPS204089, CPS204104, CPS204105, CPS204116, CPS204117, CPS204140, CPS204141, CPS204164, CPS204165, CPS204188, CPS204189, CPS204200, CPS204201, CPS204212, CPS204213, CPS204224, CPS204225, CPS204248, CPS204249, CPS204272, CPS204273, CPS204290, CPS204291, CPS204322, CPS204323, CPS204324, CPS204350, CPS204352, CPS204354, CPS204356, CPS204358, CPS204359, CPS204364, CPS204365, CPS204370, CPS204371, CPS204376, CPS204377, CPS204382, CPS204383, CPS204388, CPS204389, CPS204394, CPS204395, CPS204400, CPS204401, CPS204406, CPS204407, CPS204412, CPS204413, CPS204418, CPS204419, CPS204424, CPS204425, CPS204430, CPS204431, CPS204436, CPS204437, CPS204442, CPS204446, CPS204450, CPS204454, CPS204458, CPS204462, CPS204466, CPS204467, CPS204484, CPS204485, CPS204502, CPS204503, CPS204520, CPS204521, CPS204538, CPS204539, CPS204556, CPS204557, CPS204574, CPS204575, CPS204592, CPS204593, CPS204610, CPS204611, CPS204628, CPS204629, CPS204646, CPS204647, CPS204664, CPS204665, CPS204682, CPS204690, CPS204691, CPS204696, CPS204697, CPS204702, CPS204703, CPS204708, CPS204709, CPS204721, CPS204722, CPS204727, CPS204728, CPS241765

**REVISION STATEMENT:** This is a new Material Safety Data Sheet.

**ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:**

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Government Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	MSDS - Material Safety Data Sheet
CVX - ChevronTexaco	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration

**The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.**

COASTAL CORP

-- DIESEL FUEL NO. 2

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MSDS Safety Information  
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FSC: 9140  
NIIN: 00-000-0184  
MSDS Date: 03/22/2000  
MSDS Num: BRZXD  
Product ID: DIESEL FUEL NO. 2  
MFN: 01  
Responsible Party  
Cage: 46684  
Name: COASTAL CORP  
Address: 9 GREENWAY PLAZA  
City: HOUSTON TX 77046  
Info Phone Number: 713-877-6732 / FAX 713-877-6754  
Emergency Phone Number: 713-877-1400  
Resp. Party Other MSDS No.: MSDS NUMBER: A0006.MSD  
Preparer's Name: DELNO D. MALZAHN, CIH  
Chemtrec IND/Phone: (800)424-9300  
Published: Y

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Contractor Summary  
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Cage: 46684  
Name: COASTAL CORP  
Address: 9 GREENWAY PLAZA  
City: HOUSTON TX 77046  
Phone: 713-877-6732

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Item Description Information  
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Item Name: USED TO BE 26648  
Specification Number: VV-F-800  
Type/Grade/Class: DF2,LOW SULFUR  
Unit of Issue: GL  
UI Container Qty: X  
Type of Container: UNKNOWN

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Ingredients  
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Cas: 68476-34-6  
Name: PETROLEUM MID-DISTILLATE  
Percent by Wt: 100.  
Other REC Limits: NONE RECOMMENDED  
OSHA PEL: NOT ESTABLISHED  
ACGIH TLV: NOT ESTABLISHED

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Health Hazards Data  
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LD50 LC50 Mixture: NONE PROVIDED BY MFR  
Carcinogenicity Inds - NTP: NO  
IARC: NO  
OSHA: NO  
Effects of Exposure: ACUTE: EYE: SLIGHT TO MODERATE EYE IRRITATION. SKIN:  
MODERATELY TO EXTREMELY IRRITATING. INHALATION: INHALATION CAN BE IRRITATING  
TO THE MUCOUS MEMBRANE AND RESPIRATORY TRACT. INGESTION: GASTRIC IRRITATION.  
ASPIRATION HAZARD IF VOMITING OCCURS. CHRONIC: PROLONGED AND REPEATED SKIN  
CONTACT MAY CAUSE DERMATITIS.  
Explanation Of Carcinogenicity: NONE PROVIDED BY MFR

Signs And Symptions Of Overexposure: SKIN: REDNESS, DRYING TO BURNS OR BLISTERING OF SKIN. INHALATION: WILL PRODUCE SYMPTOMS OF INTOXICATION SUCH AS HEADACHE, DIZZINESS, NAUSEA, VOMITING, LOSS OF COORDINATION. INGESTION: ABDOMINAL PAIN, MILD EXCITATION, LOSS OF CONSCIOUSNESS, CONVULSION, CYANOSIS, CONGESTION AND CAPILLARY HEMORRHAGING OF THE LUNG AND INGERNAL ORGANS.

Medical Cond Aggravated By Exposure: MAY AGGRAVATE PRE-EXISTING DERMATITIS.

First Aid: EYE: IMMEDIATELY FLUSH WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES, INCLUDING UNDER THE EYELIDS. CONTACT A PHYSICIAN IMMEDIATELY, PREFERABLY AN OPHTHALMOLOGIST. SKIN: COOL THE EXPOSED AREA IMM EDIATELY. REMOVE CONTAMINATED CLOTHING. WASH AFFECTED AREAS WITH SOAP AND WATER. INHALATION: REMOVE TO FREAH AIR. IF BREATHING HAS STOPPED, APPPLY ARTIFICIAL RESPIRATION. GET MEDICAL ATTENTION. INGEST ION: DO NOT INDUCE VOMITING. IF SPONTANEOUS VOMITING OCCURS, HOLD THE VICTIMS HEAD LOWER THAN THEIR HIPS TO PREVENT ASPIRATION.

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 Handling and Disposal  
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Spill Release Procedures: REMOVE SOURCES OF HEAT OR IGNITION INCLUDING INTERNAL COMBUSTION ENGINES AND POWER TOOLS. REMOVE SPILL WITH VACUUM TRUCKS OR PUMP AND SOAK UP RESIDUE WITH AN INERT ABSORBENT. DO NOT FLUSH TO SEWERS OR SURFACE WATER. VENTILATE AREA AND AVOID BREATHING VAPORS OR MISTS.

Neutralizing Agent: NONE PROVIDED BY MFR

Waste Disposal Methods: DISPOSE THROUGH A LICENSED WASTE DISPOSAL COMPANY. FOLLOW FEDERAL, STATE AND LOCAL REGULATIONS.

Handling And Storage Precautions: STORE IN TIGHTLY CLOSED CONTAINERS IN A DRY, COOL PLACE, AWAY FROM INCOMPATIBLE SUBSTANCES OR SOURCES OF HEAT OR IGNITION. GROUND AND BOND ALL TRANSFER AND STORAGE EQUIPMENT TO PREVENT STATIC SPARKS A ND EQUIP WITH SELF-CLOSING VALVES, PRESSURE VACUUM BUNGS AND FLAME ARRESTORS.

Other Precautions: EMPTY CONTAINERS CAN CONTAIN RESIDUE AND CAN BE DANGEROUS. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS OR OTHER SOURCES OF IGNITION; THE Y MAY EXPLODE AND CUASE INJURY OR DEATH.

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 Fire and Explosion Hazard Information  
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Flash Point Method: PMCC

Flash Point: =51.7C, 125.F

Autoignition Temp: =257.2C, 495.F

Lower Limits: 0.6

Upper Limits: 7.5

Extinguishing Media: DRY CHEMICAL, FORM CARBON DIOXIDE, AND WATER.

Fire Fighting Procedures: USE A WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS. USE A SMOTHERING TECHNIQUE FOR EXTINGUISHING FIRES OF THIS COMBUSTIBLE LIQUID. DO NOT USE A FORCE WATER STREAM DIRECTLY ON OIL FIRES AS THIS WILL TEN D TO SCATTER THE FIRE. FIREFIGHTERS SHOULD WEAR SELF CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

Unusual Fire/Explosion Hazard: FLOWING OIL CAN BE IGNITED BY SELF GENERATED STATIC ELECTRICITY.

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 Control Measures  
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Respiratory Protection: USE APPROVED RESPIRATORY PROTECTIVE EQUIPMENT FOR CLEANING LARGE SPILLS OR ENTRY INTO LARGE TANKS, VESSELS OR OTHER CONFINED SPACES.

Ventilation: PROVIDE ADEQUATE GENERAL AND LOCAL VENTILATION TO MAINTAIN AIRBORNE CHEMICAL CONCENTRATIONS BELOW APPLICABLE EXPOSURE LIMITS.

Protective Gloves: IMPERVIOUS GLOVES

Eye Protection: REMOVE CONTACT LENS, WEAR CHEMICAL SAFETY GLASSES OR GOGGLES

Other Protective Equipment: HAVE EMERGENCY EYE WASH AND SAFETY SHOWER

AVAILABLE.

Work Hygienic Practices: LAUNDRY CONTAMINATED CLOTHING PRIOR TO REUSE. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING OR SMOKING.  
Supplemental Safety and Health: NONE PROVIDED BY MFR

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Physical/Chemical Properties

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HCC: F4  
B.P. Text: 300F-675F  
Decomp Text: NONE PROVIDED BY MFR  
Vapor Pres: < 0.5 MMGH @ 20 DEG C  
Vapor Density: 8(AIR=1)  
Spec Gravity: 0.87 @ 60/60F  
Viscosity: 1.9-4.1 CST @ 40 DEG C  
Evaporation Rate & Reference: 0.01(BUTYL ACETATE=1)  
Solubility in Water: INSOLUBLE.  
Appearance and Odor: CLEAR TO AMBER, BLUE OR RED LIQUID, MILD PETROLEUM ODOR  
Corrosion Rate: NONE PROVIDED BY MFR

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Reactivity Data

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Stability Indicator: YES  
Stability Condition To Avoid: STABLE UNDER NORMAL CONDITIONS OF USE. AVOID HEAT, SPARKS, FLAMES AND BUILD-UP OF STATIC ELECTRICITY.  
Materials To Avoid: STRONG OXIDIZING AGENTS  
Hazardous Decomposition Products: CO, CO2, SO2, HYDROCARBONS  
Hazardous Polymerization Indicator: NO  
Conditions To Avoid Polymerization: WILL NOT OCCUR

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Toxicological Information

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Ecological Information

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MSDS Transport Information

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Transport Information: DOMESTIC: DIESEL FUEL, 3, NA1993, PACKING GROUP III.  
INTERNATIONAL: PETROLEUM DISTILLATES, NOS, 3, UN1268, PACKING GROUP III.

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Regulatory Information

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Sara Title III Information: SECTION 302 EPCRA EXTREMELY HAZARDOUS SUBSTANCES (EHS): NONE. SECTION 304 CERCLA HAZARDOUS SUBSTANCES: BENZENE, CAS# 71-43-2, 0-5.0 %, RQ 10 LB; TOLUENE CAS# 108-88-3, 0-25.0%, RQ 1000 LB; XYLENE, CAS# 1330-20-7, 0-25.0%, RQ 100 LB; ETHYL BENZENE, 100-41-4, 0-5.0%, RQ 1000 LB; N-HEXANE, 110-54-3, <3.5, RQ 5000 LB; HEXANE (OTHER ISOMERS), <9.0%, RQ 5000 LB; CUMENE, CAS# 98-82-8, 0-2.0%, 5000 LB; M ETHYL T-BUTYL ETHER, CAS# 1634-04-4, 0-15.0%, RQ 1000 LB. SECTION 311/312 HAZARD CATEGORIZATION: ACUTE, CHRONIC, & FIRE. SECTION 313 EPCRA TOXIC SUBSTANCES: SEE OTHER INFORMATION SECTION.

State Regulatory Information: CALIFORNIA PROPOSITION 65 WARNING- CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS, OR OTHER REPRODUCTIVE HARM MAY BE FOUND IN CRUDE OIL AND PETROLEUM PRODUCTS. ALTHOUGH IT IS POSSIBLE TO SUFFICIENTLY REFINE A CRUDE OIL OR ITS END PRODUCTS TO REMOVE THE POTENTIAL FOR CANCER, WE ARE ADVISING THAT ONE OR MORE OF THE LISTED CHEMICALS MAY BE PRESENT IN SOME DETECTABLE QUANTITIES. READ AND FOLLOW DIRECTIONS AND USE CARE WHEN HANDLING CRUDE OIL AND PETROLEUM PRODUCTS.

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## Other Information

Other Information: SARA CON'T- SECTION 313 EPCRA TOXIC SUBSTANCES: BENZENE, CAS# 71-43-2, 0-5.0 %; TOLUENE CAS# 108-88-3, 0-25.0%; XYLENE, CAS# 1330-20-7, 0-25.0%; ETHYL BENZENE, 100-41-4, 0-5.0%; N-HEXANE, 110-54-3, < 3.5; HEXANE (OTHER ISOMERS), <9.0%; CUMENE, CAS# 98-82-8, 0-2.0%; T-BUTYL ALCOHOL, CAS# 75-65-0, 0-10.0%; METHYL T-BUTYL ETHER, CAS# 1634-04-4, 0-15.0%. SECTION 302 EPCRA EXTREMELY HAZARDOUS SUBSTANCES (EHS): NONE. SECTION 304 CERCLA HAZARDOUS SUBSTANCES: NONE. SECTION 311/312 HAZARD CATEGORIZATION: ACUTE, CHRONIC, & FIRE. SECTION 313 EPCRA TOXIC SUBSTANCES: NONE.

## Transportation Information

Responsible Party Cage: 46684  
 Trans ID NO: 43110  
 Product ID: DIESEL FUEL NO. 2  
 MSDS Prepared Date: 03/22/2000  
 Review Date: 05/08/2001  
 MFN: 1  
 Tech Entry NOS Shipping Nm: DIESEL FUEL NO. 2  
 Net Unit Weight: UNKNOWN  
 Multiple KIT Number: 0  
 Review IND: Y  
 Unit Of Issue: GL  
 Container QTY: X  
 Type Of Container: UNKNOWN

## Detail DOT Information

DOT PSN Code: EXF  
 Symbols: D  
 DOT Proper Shipping Name: DIESEL FUEL  
 Hazard Class: 3  
 UN ID Num: NA1993  
 DOT Packaging Group: III  
 Label: NONE  
 Special Provision: B1  
 Non Bulk Pack: 203  
 Bulk Pack: 242  
 Max Qty Pass: 60 L  
 Max Qty Cargo: 220 L  
 Vessel Stow Req: A

## Detail IMO Information

IMO PSN Code: LMH  
 IMO Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S. o  
 IMDG Page Number: 3375  
 UN Number: 1268  
 UN Hazard Class: 3.3  
 IMO Packaging Group: III  
 Subsidiary Risk Label: -  
 EMS Number: 3-07  
 MED First Aid Guide NUM: 311

## Detail IATA Information

IATA PSN Code: TJB  
 IATA UN ID Num: 1268

IATA Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S.  
IATA UN Class: 3  
IATA Label: FLAMMABLE LIQUID  
UN Packing Group: III  
Packing Note Passenger: 309  
Max Quant Pass: 60L  
Max Quant Cargo: 220L  
Packaging Note Cargo: 310

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Detail AFI Information  
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AFI PSN Code: TJB  
AFI Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S.  
AFI Hazard Class: 3  
AFI UN ID NUM: UN1268  
AFI Packing Group: III  
Special Provisions: P5  
Back Pack Reference: A7.3

=====  
HAZCOM Label  
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Product ID: DIESEL FUEL NO. 2  
Cage: 46684  
Company Name: COASTAL CORP  
Street: 9 GREENWAY PLAZA  
City: HOUSTON TX  
Zipcode: 77046  
Health Emergency Phone: 713-877-1400  
Label Required IND: Y  
Date Of Label Review: 05/08/2001  
Status Code: C  
Label Date: 11/08/1993  
Origination Code: F  
Chronic Hazard IND: Y  
Eye Protection IND: YES  
Skin Protection IND: YES  
Signal Word: WARNING  
Health Hazard: Moderate  
Contact Hazard: Moderate  
Fire Hazard: Slight  
Reactivity Hazard: None  
Hazard And Precautions: ACUTE: CONTACT MAY CAUSE MILD TO MODERATE IRRITATION  
AND DRYING. INHALATION MAY CAUSE RESPIRATORY TRACT IRRITATION AND CENTRAL  
NERVOUS SYSTEM EFFECTS. INGESTION MAY CAUSE STOMACH IRRITATION, GASTRITIS  
AND CENTRAL NERVOUS SYSTEM EFFECTS. ASPIRATION HAZARD

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nor any person or persons contracting with any instrumentality of the United  
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utilizing this instruction who is not a military or civilian employee of the  
United States of America should seek competent professional advice to verify  
and assume responsibility for the suitability of this information to their  
particular situation regardless of similarity to a corresponding Department  
of Defense or other government situation.

# Material Safety Data Sheet

## SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

### Chevron Ultra-Duty Grease EP

**Product Number(s):** CPS238011, CPS238012, CPS238013

**Synonyms:** Chevron Ultra-Duty Grease EP NLGI 2, Chevron Ultra-Duty Grease EP NLGI 1, Chevron Ultra-Duty Grease EP NLGI 0

#### Company Identification

ChevronTexaco Global Lubricants  
6001 Bollinger Canyon Rd.  
San Ramon, CA 94583  
United States of America  
www.chevron-lubricants.com

#### Transportation Emergency Response

CHEMTREC: (800) 424-9300 or (703) 527-3887

#### Health Emergency

ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623

#### Product Information

email : lubemsds@chevron.com  
Product Information: (800) LUBE TEK  
MSDS Requests: (800) 414-6737

## SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	65 - 80 %weight
Lithium thickener	Mixture	5 - 15 %weight
Additives including	Mixture	10 - 20 %weight
Zinc dialkyldithiophosphate	68649-42-3	1 - 5 %weight

## SECTION 3 HAZARDS IDENTIFICATION

### IMMEDIATE HEALTH EFFECTS

**Eye:** Not expected to cause prolonged or significant eye irritation.

**Skin:** Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.

**Ingestion:** Not expected to be harmful if swallowed.

**Inhalation:** Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

## SECTION 4 FIRST AID MEASURES

**Eye:** No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

**Skin:** No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, apply a waterless hand cleaner, mineral oil, or petroleum jelly. Then wash with soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

**Ingestion:** No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

**Inhalation:** No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

**Note to Physicians:** In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

## SECTION 5 FIRE FIGHTING MEASURES

### FIRE CLASSIFICATION:

OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

**NFPA RATINGS:** Health: 0 Flammability: 1 Reactivity: 0

### FLAMMABLE PROPERTIES:

**Flashpoint:** 274 °C (525 °F) (Min)

**Autoignition:** NDA

**Flammability (Explosive) Limits (% by volume in air):** Lower: NA Upper: NA

**EXTINGUISHING MEDIA:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

### PROTECTION OF FIRE FIGHTERS:

**Fire Fighting Instructions:** This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

**Combustion Products:** Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion. Combustion may form oxides of: Phosphorus, Sulfur, Zinc, Lithium.

## SECTION 6 ACCIDENTAL RELEASE MEASURES

**Protective Measures:** Eliminate all sources of ignition in vicinity of spilled material.

**Spill Management:** Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Clean up spills immediately, observing precautions in Exposure Controls/Personal Protection section.

**Reporting:** Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

## SECTION 7 HANDLING AND STORAGE

**Precautionary Measures:** Keep out of the reach of children.

**General Handling Information:** Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

**Static Hazard:** Electrostatic charge may accumulate and create a hazardous condition when handling this

material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

**Container Warnings:** Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

## SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

### GENERAL CONSIDERATIONS:

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

### ENGINEERING CONTROLS:

Use in a well-ventilated area.

### PERSONAL PROTECTIVE EQUIPMENT

**Eye/Face Protection:** No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

**Skin Protection:** No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Neoprene, Nitrile Rubber, Silver Shield, Viton.

**Respiratory Protection:** No respiratory protection is normally required.

If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

### Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH_TLV	5 mg/m3	10 mg/m3		
Highly refined mineral oil (C15 - C50)	OSHA_PEL	5 mg/m3			

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

**Attention: the data below are typical values and do not constitute a specification.**

**Color:** Red

**Physical State:** Semi-solid

**Odor:** Petroleum odor

**pH:** NA

**Vapor Pressure:** <0.01 mmHg @ 100°C (212°F)

**Vapor Density (Air = 1):** >1

**Boiling Point:** >260°C (500°F)  
**Solubility:** Soluble in hydrocarbon solvents; insoluble in water.

**Melting Point:** 165°C (329°F) (Min)  
**Specific Gravity:** 0.9 @ 15.6°C (60.1°F) / 15.6°C (60.1°F)  
**Density:** @ 15°C (59°F)  
**Viscosity:** 18 cSt @ 100°C (212°F) (Min)  
**Evaporation Rate:** NDA

## SECTION 10 STABILITY AND REACTIVITY

**Chemical Stability:** This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Incompatibility With Other Materials:** May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**Hazardous Decomposition Products:** Hydrogen Sulfide (Temperatures >149 °F (65 °C))

**Hazardous Polymerization:** Hazardous polymerization will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

### IMMEDIATE HEALTH EFFECTS

**Eye Irritation:** The Draize eye irritation mean score in rabbits for a 24-hour exposure was: 6.7/110.

**Skin Irritation:** For a 24-hour exposure, the Primary Irritation Score (PIS) in rabbits is: 0.6/8.0.

**Skin Sensitization:** No product toxicology data available.

**Acute Dermal Toxicity:** 24 hour(s) LD50: >2g/kg (rat).

**Acute Oral Toxicity:** The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.

**Acute Inhalation Toxicity:** The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

### ADDITIONAL TOXICOLOGY INFORMATION:

This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B).

## SECTION 12 ECOLOGICAL INFORMATION

### ECOTOXICITY

The toxicity of this material to aquatic organisms has not been evaluated. Consequently, this material should be kept out of sewage and drainage systems and all bodies of water.

### ENVIRONMENTAL FATE

This material is not expected to be readily biodegradable.

## SECTION 13 DISPOSAL CONSIDERATIONS

Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

## SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

**DOT Shipping Name:** NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR

**DOT Hazard Class:** NOT APPLICABLE

**DOT Identification Number:** NOT APPLICABLE

**DOT Packing Group:** NOT APPLICABLE

**Additional Information:** NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

**IMO/IMDG Shipping Name:** NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE IMDG CODE

**IMO/IMDG Hazard Class:** NOT APPLICABLE

**IMO/IMDG Identification Number:** NOT APPLICABLE

**IMO/IMDG Packing Group:** NOT APPLICABLE

## SECTION 15 REGULATORY INFORMATION

**SARA 311/312 CATEGORIES:** 1. Immediate (Acute) Health Effects: NO

2. Delayed (Chronic) Health Effects: NO

3. Fire Hazard: NO

4. Sudden Release of Pressure Hazard: NO

5. Reactivity Hazard: NO

### REGULATORY LISTS SEARCHED:

4_1=IARC Group 1	15=SARA Section 313
4_2A=IARC Group 2A	16=CA Proposition 65
4_2B=IARC Group 2B	17=MA RTK
05=NTP Carcinogen	18=NJ RTK
06=OSHA Carcinogen	19=DOT Marine Pollutant
09=TSCA 12(b)	20=PA RTK

No components of this material were found on the regulatory lists above.

Zinc dialkyldithiophosphate

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### CHEMICAL INVENTORIES:

**AUSTRALIA:** All the components of this material are listed on the Australian Inventory of Chemical Substances (AICS).

**CANADA:** All the components of this material are on the Canadian DSL or have been notified under the New Substance Notification Regulations, but have not yet been published in the Canada Gazette.

**EUROPEAN UNION:** All the components of this material are in compliance with the EU Seventh Amendment Directive 92/32/EEC.

**JAPAN:** All the components of this product are on the Existing & New Chemical Substances (ENCS) inventory in Japan, or have an exemption from listing.

**KOREA:** This material contains components that require notification before sale or importation into Korea.

**PHILIPPINES:** All the components of this product are listed on the Philippine Inventory of Chemicals and Chemical Substances (PICCS).

**UNITED STATES:** All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

### NEW JERSEY RTK CLASSIFICATION:

Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Grease)

### WHMIS CLASSIFICATION:

This product is not considered a controlled product according to the criteria of the Canadian Controlled Products Regulations.

## SECTION 16 OTHER INFORMATION

**NFPA RATINGS:** Health: 0 Flammability: 1 Reactivity: 0

**HMIS RATINGS:** Health: 1 Flammability: 1 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, \*- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

**REVISION STATEMENT:** This revision updates the following sections of this Material Safety Data Sheet: 1-16

**ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:**

TLV	-	Threshold Limit Value	TWA	-	Time Weighted Average
STEL	-	Short-term Exposure Limit	PEL	-	Permissible Exposure Limit
			CAS	-	Chemical Abstract Service Number
NDA	-	No Data Available	NA	-	Not Applicable
<=	-	Less Than or Equal To	>=	-	Greater Than or Equal To

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the ChevronTexaco Energy Research & Technology Company, 100 Chevron Way, Richmond, California 94802.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.



# MATERIAL SAFETY DATA SHEET

## Conoco Gear Oil (All Grades)

### 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Conoco Gear Oil (All Grades)  
**Synonyms:** Conoco Gear Oil 68  
 Conoco Gear Oil 100  
 Conoco Gear Oil 150  
 Conoco Gear Oil 220  
 Conoco Gear Oil 320  
 Conoco Gear Oil 460  
 Conoco Gear Oil 680  
 Conoco Gear Oil 1000  
 Conoco Gear Oil 1500  
**Intended Use:** Industrial Gear Lubricant  
**Chemical Family:** Petroleum Hydrocarbon  
**Responsible Party:** ConocoPhillips Lubricants  
 600 N. Dairy Ashford  
 Houston, Texas 77079-1175  
**Customer Service:** 800-640-1956  
**Technical Information:** 800-255-9556

### Emergency Overview

#### 24 Hour Emergency Telephone Numbers:

Spill, Leak, Fire or Accident Call CHEMTREC:

North America: (800) 424-9300

Others: (703) 527-3887 (collect)

California Poison Control System: (800) 356-3219

**Health Hazards/Precautionary Measures:** Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

**Physical Hazards/Precautionary Measures:** Keep away from all sources of ignition.

**Appearance:** Clear and bright  
**Physical Form:** Liquid  
**Odor:** Characteristic petroleum

#### NFPA 704 Hazard Class:

**Health:** 1 (Slight)  
**Flammability:** 1 (Slight)  
**Instability:** 0 (Least)

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

NON-HAZARDOUS COMPONENTS					
Component / CAS No:	Percent (%)	ACGIH:	OSHA:	NIOSH:	Other:
Lubricant Base Oil (Petroleum) VARIOUS	66 - 99	5mg/m <sup>3</sup> TWA 10 mg/m <sup>3</sup> STEL	5 mg/m <sup>3</sup> TWA	2500 mg/m <sup>3</sup> IDLH	as Oil Mist, if Generated  5 mg/m <sup>3</sup> NOHSC TWA
Additives PROPRIETARY	2 - 3	NE	NE	NE	NE

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

1%=10,000 PPM.

NE=Not Established

## 3. HAZARDS IDENTIFICATION

### Potential Health Effects

**Eye:** Contact may cause mild eye irritation including stinging, watering, and redness.

**Skin:** Contact may cause mild skin irritation including redness, and a burning sensation. Prolonged or repeated contact can worsen irritation by causing drying and cracking of the skin leading to dermatitis (inflammation). No harmful effects from skin absorption are expected.

**Inhalation (Breathing):** No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

**Ingestion (Swallowing):** No harmful effects expected from ingestion.

**Signs and Symptoms:** Effects of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea. Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

**Cancer:** There is inadequate information to evaluate the cancer hazard of this material. See Section 11 for information on the individual components, if any.

**Target Organs:** No data available for this material.

**Developmental:** No data available for this material.

**Other Comments:** None Known

**Pre-Existing Medical Conditions:** Conditions aggravated by exposure may include skin disorders, respiratory (asthma-like) disorders.

## 4. FIRST AID MEASURES

**Eye:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

**Skin:** Wipe material from skin and remove contaminated shoes and clothing. Cleanse affected area(s) thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops and persists, seek medical attention.

**Inhalation (Breathing):** If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

**Ingestion (Swallowing):** Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

**Notes to Physician:** High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. Often these injuries require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury.

Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

## 5. FIRE-FIGHTING MEASURES

### Flammable Properties:

<b>Flash Point:</b>	> 399°F / 204°C
<b>Test Method:</b>	Cleveland Open Cup (COC), ASTM D92
<b>OSHA Flammability Class:</b>	Not applicable
<b>LEL%:</b>	No data
<b>UEL%:</b>	No data
<b>Autoignition Temperature:</b>	No data

**Unusual Fire & Explosion Hazards:** This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire. Vapors are heavier than air and can accumulate in low areas.

**Extinguishing Media:** Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

**Fire Fighting Instructions:** For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

## 6. ACCIDENTAL RELEASE MEASURES

This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

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## 7. HANDLING AND STORAGE

**Handling:** Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Use good personal hygiene practices.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

**Storage:** Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional engineering controls may be required.

### Personal Protective Equipment (PPE):

**Respiratory:** A NIOSH certified air purifying respirator with a Type 95 (R or P) particulate filter may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a NIOSH approved self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode if there is potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

**Skin:** The use of gloves impervious to the specific material handled is advised to prevent skin contact and possible irritation (see manufacturers literature for information on permeability).

**Eye/Face:** Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

**Other Protective Equipment:** A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

Suggestions for the use of specific protective materials are based on readily available published data. Users should check with specific manufacturers to confirm the performance of their products.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

<b>Appearance:</b>	Clear and bright
<b>Physical Form:</b>	Liquid
<b>Odor:</b>	Characteristic petroleum
<b>Odor Threshold:</b>	No data

pH:	Not applicable
Vapor Pressure (mm Hg):	<1
Vapor Density (air=1):	>1
Boiling Point:	No data
Melting/Freezing Point:	< 32°F / 0°C
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity:	0.87-0.91
Bulk Density:	7.3 - 7.6 lbs/gal
Viscosity cSt @ 100°C:	8.8 - 70
Viscosity cSt @ 40°C:	60 - 1600
Percent Volatile:	Negligible
Evaporation Rate (nBuAc=1):	<1
Flash Point:	> 399°F / 204°C
Test Method:	Cleveland Open Cup (COC), ASTM D92
LEL%:	No data
UEL%:	No data
Autoignition Temperature:	No data
Decomposition Temperature:	No data

## 10. STABILITY AND REACTIVITY

**Stability:** Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Conditions to Avoid:** Extended exposure to high temperatures can cause decomposition.

**Materials to Avoid (Incompatible Materials):** Avoid contact with strong oxidizing agents, strong acids, strong bases.

**Hazardous Decomposition Products:** Combustion can yield carbon, nitrogen and sulfur oxides.

**Hazardous Polymerization:** Will not occur.

## 11. TOXICOLOGICAL INFORMATION

### Chronic Data:

#### Lubricant Base Oil (Petroleum) - CAS: VARIOUS

**Carcinogenicity:** The petroleum base oils contained in this product have been highly refined by a variety of processes including solvent extraction, hydrotreating, and/or dewaxing to remove aromatics and improve performance characteristics. All of the oils meet the IP-346 criteria of less than 3 percent PAH's and are not considered carcinogens by NTP, IARC, or OSHA.

### Acute Data:

#### Lubricant Base Oil (Petroleum) - CAS: VARIOUS

Dermal LD50 = >2 g/kg

LC50 = No information available

Oral LD50 = >5 g/kg

#### Additives - CAS: PROPRIETARY

Dermal LD50 = No information available

LC50 = No information available

Oral LD50 = No information available

## 12. ECOLOGICAL INFORMATION

Lubricant oil basestocks are complex mixtures of hydrocarbons (primarily branched chain alkanes and cycloalkanes) ranging in carbon number from C15 to C50. The aromatic hydrocarbon content of these mixtures varies with the severity of the refining process. White oils have negligible levels of aromatic hydrocarbons, whereas significant proportions are found in unrefined basestocks. Olefins are found only at very low concentrations. Volatilization is not significant after release of lubricating oil basestocks to the environment due to the very low vapor pressure of the hydrocarbon constituents. In water, lubricating oil basestocks will float and will spread at a rate that is viscosity dependent. Water solubilities are very low and dispersion occurs mainly from water movement with adsorption by sediment being the major fate process. In soil, lubricating oil basestocks show little mobility and adsorption is the predominant physical process.

Both acute and chronic ecotoxicity studies have been conducted on lubricant base oils. Results indicate that the acute aquatic toxicities to fish, Daphnia, Ceriodaphnia and algal species are above 1000 mg/l using either water accommodated fractions or oil in water dispersions. Since lubricant base oils mainly contain hydrocarbons having carbon numbers in the range C15 to C50, it is predicted that acute toxicity would not be observed with these substances due to low water solubility. Results from chronic toxicity tests show that the no observed effect level (NOEL) usually exceeds 1000 mg/l for lubricant base oils with the overall weight of experimental evidence leading to the conclusion that lubricant base oils do not cause chronic toxicity to fish and invertebrates.

Large volumes spills of lubricant base oils into water will produce a layer of undissolved oil on the water surface that will cause direct physical fouling of organisms and may interfere with surface air exchange resulting in lower levels of dissolved oxygen. Petroleum products have also been associated with causing taint in fish even when the latter are caught in lightly contaminated environments. Highly refined base oils sprayed onto the surface of eggs will result in a failure to hatch.

Extensive experience from laboratory and field trials in a wide range of crops has confirmed that little or no damage is produced as a result of either aerosol exposure or direct application of oil emulsion to the leaves of crop plants. Base oils incorporated into soil have resulted in little or no adverse effects on seed germination and plant growth at contamination rates up to 4%.

## 13. DISPOSAL CONSIDERATIONS

This material under most intended uses would become used oil due to contamination by physical or chemical impurities. RECYCLE ALL USED OIL. While being recycled, used oil is regulated by 40 CFR 279. Use resulting in chemical or physical change or contamination may also subject it to regulation as hazardous waste. Under federal regulations, used oil is a solid waste managed under 40 CFR 279. However, in California, used oil is managed as hazardous waste until tested to show it is not hazardous. Consult state and local regulations regarding the proper handling of used oil. In the case of used oil, the intent to discard it may cause the used oil to be regulated as hazardous waste.

Contents should be completely used and containers emptied prior to discard. Rinsate may be considered a RCRA hazardous waste and must be disposed of with care and in compliance with federal, state and local regulations. Large empty containers, such as drums, should be returned to the distributor or a drum reconditioner. To assure proper disposal of small empty containers, consult with state and local regulations and disposal authorities.

## 14. TRANSPORTATION INFORMATION

### DOT

Shipping Description: Not Regulated

Note: Material is unregulated unless in container of 3500 gallons or more, then provisions of 49 CFR Part 130 apply for land shipment.

### IMDG

Shipping Description: Not regulated

### ICAO/IATA

Shipping Description: Not regulated

## 15. REGULATORY INFORMATION

### U.S. Regulations:

EPA SARA 311/312 (Title III Hazard Categories)

Acute Health: No  
Chronic Health: No  
Fire Hazard: No  
Pressure Hazard: No  
Reactive Hazard: No

**SARA - Section 313 and 40 CFR 372:**

This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:  
--None Known--

**EPA (CERCLA) Reportable Quantity (in pounds):**

--None Known--

**CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):**

This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:  
-- None Known --

**California Proposition 65:**

Warning: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):  
-- None Known --

**Carcinogen Identification:**

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any.

**TSCA:**

All components are listed on the TSCA inventory.

**16. OTHER INFORMATION**

Issue Date:	13-Oct-2005
Previous Issue Date:	07-Sep-2004
Product Code:	47620-47625, 47607-47609
Revised Sections or Basis for Revision:	Product name (Section 1)
MSDS Code:	787305

**Disclaimer of Expressed and implied Warranties:**

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

# Material Safety Data Sheet

## SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

### Chevron Delo® 400

**Product Number(s):** CPS235101, CPS235109, CPS235117, CPS235118, CPS235119, CPS235120, CPS235200

**Synonyms:** Chevron Delo® 400 Multigrade SAE 15W-40, Chevron Delo® 400 SAE 10W, Chevron Delo® 400 SAE 10W-30, Chevron Delo® 400 SAE 20, Chevron Delo® 400 SAE 30, Chevron Delo® 400 SAE 40, Chevron Delo® 400 SAE 50

#### Company Identification

ChevronTexaco Global Lubricants  
6001 Bollinger Canyon Rd.  
San Ramon, CA 94583  
United States of America  
www.chevron-lubricants.com

#### Transportation Emergency Response

CHEMTREC: (800) 424-9300 or (703) 527-3887

#### Health Emergency

ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623

#### Product Information

email : lubemsds@chevrontexaco.com  
Product Information: (800) LUBE TEK  
MSDS Requests: (800) 414-6737

## SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	70 - 95 %weight
Zinc alkyl dithiophosphate	68649-42-3	1 - 5 %weight

## SECTION 3 HAZARDS IDENTIFICATION

#### IMMEDIATE HEALTH EFFECTS

**Eye:** Not expected to cause prolonged or significant eye irritation.

**Skin:** Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin.

**Ingestion:** Not expected to be harmful if swallowed.

**Inhalation:** Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

## SECTION 4 FIRST AID MEASURES

**Eye:** No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

**Skin:** No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To

remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

**Ingestion:** No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

**Inhalation:** No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

## SECTION 5 FIRE FIGHTING MEASURES

### FIRE CLASSIFICATION:

OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

**NFPA RATINGS:** Health: 0 Flammability: 1 Reactivity: 0

### FLAMMABLE PROPERTIES:

**Flashpoint:** (Cleveland Open Cup) 200 °C (392 °F) (Min)

**Autoignition:** No Data Available

**Flammability (Explosive) Limits (% by volume in air):** Lower: Not Applicable Upper: Not Applicable

**EXTINGUISHING MEDIA:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

### PROTECTION OF FIRE FIGHTERS:

**Fire Fighting Instructions:** This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

**Combustion Products:** Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

## SECTION 6 ACCIDENTAL RELEASE MEASURES

**Protective Measures:** Eliminate all sources of ignition in vicinity of spilled material.

**Spill Management:** Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

**Reporting:** Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

## SECTION 7 HANDLING AND STORAGE

**Precautionary Measures:** Keep out of the reach of children.

**General Handling Information:** Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

**Static Hazard:** Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

**Container Warnings:** Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

## SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

**GENERAL CONSIDERATIONS:**

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

**ENGINEERING CONTROLS:**

Use in a well-ventilated area.

**PERSONAL PROTECTIVE EQUIPMENT**

**Eye/Face Protection:** No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

**Skin Protection:** No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: 4H (PE/EVAL), Nitrile Rubber, Silver Shield, Viton.

**Respiratory Protection:** No respiratory protection is normally required.

If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

**Occupational Exposure Limits:**

Component	Agency	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>	--	--
Highly refined mineral oil (C15 - C50)	OSHA Z-1	5 mg/m <sup>3</sup>	--	--	--

<b>SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES</b>
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Attention: the data below are typical values and do not constitute a specification.

**Color:** Brown

**Physical State:** Liquid

**Odor:** Petroleum odor

**pH:** Not Applicable

**Vapor Pressure:** <0.01 mmHg @ 37.8 °C (100 °F)

**Vapor Density (Air = 1):** >1

**Boiling Point:** >315°C (599°F)

**Solubility:** Soluble in hydrocarbons; insoluble in water

**Freezing Point:** Not Applicable

**Melting Point:** Not Applicable

**Specific Gravity:** 0.87 - 0.9 @ 15.6°C (60.1°F) / 15.6°C (60.1°F)

**Volatile Organic**

**Compounds (VOC) :** 1.1 %weight

**Viscosity:** 6.6 cSt @ 100°C (212°F) (Min)

<b>SECTION 10 STABILITY AND REACTIVITY</b>
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**Chemical Stability:** This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Incompatibility With Other Materials:** May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**Hazardous Decomposition Products:** None known (None expected)

**Hazardous Polymerization:** Hazardous polymerization will not occur.

<b>SECTION 11 TOXICOLOGICAL INFORMATION</b>
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## IMMEDIATE HEALTH EFFECTS

**Eye Irritation:** The eye irritation hazard is based on evaluation of data for similar materials or product components.

**Skin Irritation:** The skin irritation hazard is based on evaluation of data for similar materials or product components.

**Skin Sensitization:** No product toxicology data available.

**Acute Dermal Toxicity:** The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.

**Acute Oral Toxicity:** The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.

**Acute Inhalation Toxicity:** The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

## ADDITIONAL TOXICOLOGY INFORMATION:

This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B). These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

During use in engines, contamination of oil with low levels of cancer-causing combustion products occurs. Used motor oils have been shown to cause skin cancer in mice following repeated application and continuous exposure. Brief or intermittent skin contact with used motor oil is not expected to have serious effects in humans if the oil is thoroughly removed by washing with soap and water.

## SECTION 12 ECOLOGICAL INFORMATION

### ECOTOXICITY

The toxicity of this material to aquatic organisms has not been evaluated. Consequently, this material should be kept out of sewage and drainage systems and all bodies of water.

### ENVIRONMENTAL FATE

This material is not expected to be readily biodegradable.

## SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

## SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

**DOT Shipping Description:** PETROLEUM LUBRICATING OIL, NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR

**Additional Information:** NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

**IMO/IMDG Shipping Description:** PETROLEUM LUBRICATING OIL; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

**ICAO/IATA Shipping Description:** PETROLEUM LUBRICATING OIL; NOT REGULATED AS DANGEROUS

GOODS FOR TRANSPORT UNDER ICAO

**SECTION 15 REGULATORY INFORMATION**

- EPCRA 311/312 CATEGORIES:** 1. Immediate (Acute) Health Effects: NO  
2. Delayed (Chronic) Health Effects: NO  
3. Fire Hazard: NO  
4. Sudden Release of Pressure Hazard: NO  
5. Reactivity Hazard: NO

**REGULATORY LISTS SEARCHED:**

01-1=IARC Group 1	03=EPCRA 313
01-2A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

The following components of this material are found on the regulatory lists indicated.

Zinc alkyl dithiophosphate 03, 06

**CHEMICAL INVENTORIES:**

All components comply with the following chemical inventory requirements: DSL (Canada), ENCS (Japan), IECSC (China); PICCS (Philippines), TSCA (United States).

One or more components is listed on ELINCS (European Union). Secondary notification by the importer may be required.

One or more components does not comply with the following chemical inventory requirements: AICS (Australia), KECl (Korea).

**NEW JERSEY RTK CLASSIFICATION:**

Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Motor oil)

**WHMIS CLASSIFICATION:**

This product is not considered a controlled product according to the criteria of the Canadian Controlled Products Regulations.

**SECTION 16 OTHER INFORMATION**

**NFPA RATINGS:** Health: 0 Flammability: 1 Reactivity: 0

**HMIS RATINGS:** Health: 1 Flammability: 1 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, \*- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

**LABEL RECOMMENDATION:**

Label Category : ENGINE OIL 1

**REVISION STATEMENT:** This revision updates the following sections of this Material Safety Data Sheet:  
5,8,9,10,16

**Revision Date:** 09/28/2005

**ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:**

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Government Industrial Hygienists	IMO/MDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	MSDS - Material Safety Data Sheet
CVX - ChevronTexaco	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the ChevronTexaco Energy Research & Technology Company, 100 Chevron Way, Richmond, California 94802.

**The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.**

# Material Safety Data Sheet

## SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

### Chevron Drive Train Fluid HD

**Product Number(s):** CPS226601, CPS226607, CPS226608, CPS226510, CPS226627

**Synonyms:** Chevron Drive Train Fluid HD SAE 10W, Chevron Drive Train Fluid HD SAE 30, Chevron Drive Train Fluid HD SAE 50, Chevron Drive Train Fluid HD SAE 60, Chevron Drive Train Fluid HD - Dyed SAE 10W

#### Company Identification

ChevronTexaco Global Lubricants  
6001 Bollinger Canyon Rd.  
San Ramon, CA 94583  
United States of America  
www.chevron-lubricants.com

#### Transportation Emergency Response

CHEMTREC: (800) 424-9300 or (703) 527-3887

#### Health Emergency

ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623

#### Product Information

email : lubemsds@chevron.com  
Product Information: (800) LUBE TEK  
MSDS Requests: (800) 414-6737

## SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	80 - 100 %weight
Zinc alkyl dithiophosphate	68649-42-3	1 - 5 %weight

## SECTION 3 HAZARDS IDENTIFICATION

#### IMMEDIATE HEALTH EFFECTS

**Eye:** Not expected to cause prolonged or significant eye irritation.

**Skin:** Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.

**Ingestion:** Not expected to be harmful if swallowed.

**Inhalation:** Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

## SECTION 4 FIRST AID MEASURES

**Eye:** No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

**Skin:** No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

**Ingestion:** No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

**Inhalation:** No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

**Note to Physicians:** In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

## SECTION 5 FIRE FIGHTING MEASURES

Leaks/ruptures in high pressure system using materials of this type can create a fire hazard when in the vicinity of ignition sources (eg. open flame, pilot lights, sparks, or electric arcs).

### FIRE CLASSIFICATION:

OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

**NFPA RATINGS:** Health: 0 Flammability: 1 Reactivity: 0

### FLAMMABLE PROPERTIES:

**Flashpoint:** (Cleveland Open Cup) 190 °C (374 °F) (Min)

**Autoignition:** NDA

**Flammability (Explosive) Limits (% by volume in air):** Lower: NA Upper: NA

**EXTINGUISHING MEDIA:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

### PROTECTION OF FIRE FIGHTERS:

**Fire Fighting Instructions:** This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

**Combustion Products:** Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion. Combustion may form oxides of: Nitrogen, Phosphorus, Sulfur, Zinc .

## SECTION 6 ACCIDENTAL RELEASE MEASURES

**Protective Measures:** Eliminate all sources of ignition in vicinity of spilled material.

**Spill Management:** Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

**Reporting:** Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

## SECTION 7 HANDLING AND STORAGE

**Precautionary Measures:** DO NOT USE IN HIGH PRESSURE SYSTEMS in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed. Keep out of the reach of children.

**General Handling Information:** Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

**Static Hazard:** Electrostatic charge may accumulate and create a hazardous condition when handling this

material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

**Container Warnings:** Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

**SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION**

**GENERAL CONSIDERATIONS:**

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

**ENGINEERING CONTROLS:**

Use in a well-ventilated area.

**PERSONAL PROTECTIVE EQUIPMENT**

**Eye/Face Protection:** No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

**Skin Protection:** No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: 4H (PE/EVAL), Nitrile Rubber, Silver Shield, Viton.

**Respiratory Protection:** No respiratory protection is normally required.

If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

**Occupational Exposure Limits:**

Component	Limit	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH_TLV	5 mg/m3	10 mg/m3		
Highly refined mineral oil (C15 - C50)	OSHA_PEL	5 mg/m3			

**SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES**

**Attention: the data below are typical values and do not constitute a specification.**

**Color:** Varies depending on specification

**Physical State:** Liquid

**Odor:** Petroleum odor

**pH:** NA

**Vapor Pressure:** <0.01 mmHg @ 37.8°C (100°F)

**Vapor Density (Air = 1):** >1

**Boiling Point:** >315.6°C (600°F)  
**Solubility:** Soluble in hydrocarbons; insoluble in water  
**Freezing Point:** NA  
**Melting Point:** NA  
**Specific Gravity:** 0.88 - 0.91 @ 15.6°C (60.1°F) / 15.6°C (60.1°F)  
**Density:** 0.88 kg/l - 0.91 kg/l @ 15°C (59°F)  
**Viscosity:** 5.5 cSt - 24 cSt @ 100°C (212°F) (Min)  
**Evaporation Rate:** NDA

## SECTION 10 STABILITY AND REACTIVITY

**Chemical Stability:** This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Incompatibility With Other Materials:** May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**Hazardous Decomposition Products:** Hydrogen Sulfide (Temperatures >149 °F (65 °C))

**Hazardous Polymerization:** Hazardous polymerization will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

### IMMEDIATE HEALTH EFFECTS

**Eye Irritation:** The eye irritation hazard is based on evaluation of data for similar materials or product components.

**Skin Irritation:** The skin irritation hazard is based on evaluation of data for similar materials or product components.

**Skin Sensitization:** No product toxicology data available.

**Acute Dermal Toxicity:** The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.

**Acute Oral Toxicity:** The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.

**Acute Inhalation Toxicity:** The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

### ADDITIONAL TOXICOLOGY INFORMATION:

This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B).

## SECTION 12 ECOLOGICAL INFORMATION

### ECOTOXICITY

The toxicity of this material to aquatic organisms has not been evaluated. Consequently, this material should be kept out of sewage and drainage systems and all bodies of water.

### ENVIRONMENTAL FATE

This material is not expected to be readily biodegradable.

## SECTION 13 DISPOSAL CONSIDERATIONS

Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

## SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

**DOT Shipping Name:** NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR

**DOT Hazard Class:** NOT APPLICABLE

**DOT Identification Number:** NOT APPLICABLE

**DOT Packing Group:** NOT APPLICABLE

**Additional Information:** NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

**IMO/IMDG Shipping Name:** NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE IMDG CODE

**IMO/IMDG Hazard Class:** NOT APPLICABLE

**IMO/IMDG Identification Number:** NOT APPLICABLE

**IMO/IMDG Packing Group:** NOT APPLICABLE

<b>SECTION 15 REGULATORY INFORMATION</b>
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**SARA 311/312 CATEGORIES:** 1. Immediate (Acute) Health Effects: NO

2. Delayed (Chronic) Health Effects: NO

3. Fire Hazard: NO

4. Sudden Release of Pressure Hazard: NO

5. Reactivity Hazard: NO

**REGULATORY LISTS SEARCHED:**

4_1=IARC Group 1	15=SARA Section 313
4_12A=IARC Group 2A	16=CA Proposition 65
4_12B=IARC Group 2B	17=MA RTK
05=NTP Carcinogen	18=NJ RTK
06=OSHA Carcinogen	19=DOT Marine Pollutant
09=TSCA 12(b)	20=PA RTK

The following components of this material are found on the regulatory lists indicated.

Zinc alkyl dithiophosphate 15, 18

**CHEMICAL INVENTORIES:**

**AUSTRALIA:** All the components of this material are listed on the Australian Inventory of Chemical Substances (AICS).

**CANADA:** All the components of this material are on the Canadian DSL or have been notified under the New Substance Notification Regulations, but have not yet been published in the Canada Gazette.

**EUROPEAN UNION:** All the components of this material are in compliance with the EU Seventh Amendment Directive 92/32/EEC.

**JAPAN:** All the components of this product are on the Existing & New Chemical Substances (ENCS) inventory in Japan, or have an exemption from listing.

**KOREA:** All the components of this product are on the Existing Chemicals List (ECL) in Korea.

**PHILIPPINES:** All the components of this product are listed on the Philippine Inventory of Chemicals and Chemical Substances (PICCS).

**UNITED STATES:** All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

**NEW JERSEY RTK CLASSIFICATION:**

Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Transmission fluid)

**WHMIS CLASSIFICATION:**

This product is not considered a controlled product according to the criteria of the Canadian Controlled Products Regulations.

## SECTION 16 OTHER INFORMATION

**NFPA RATINGS:** Health: 0 Flammability: 1 Reactivity: 0

**HMIS RATINGS:** Health: 1 Flammability: 1 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, \*- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

**REVISION STATEMENT:** This revision updates the following sections of this Material Safety Data Sheet: 1-16

### ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV	-	Threshold Limit Value	TWA	-	Time Weighted Average
STEL	-	Short-term Exposure Limit	PEL	-	Permissible Exposure Limit
NDA	-	No Data Available	CAS	-	Chemical Abstract Service Number
<=	-	Less Than or Equal To	NA	-	Not Applicable
			>=	-	Greater Than or Equal To

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the ChevronTexaco Energy Research & Technology Company, 100 Chevron Way, Richmond, California 94802.

**The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.**

**ATTACHMENT 2**

**CONSTRUCTION SITE BEST MANAGEMENT PRACTICES**



# SPILL PREVENTION AND CONTROL

## GM-6

- Keep waste storage areas clean, well organized, and well equipped.
- Information on proper storage, clean up and spill reports should be posted at a visible and accessible location at all times.
- Educate employees and subcontractors about what a “significant” and “insignificant” spill is for each chemical used on-site and train in spill prevention and cleanup.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Locate chemical storage and handling areas away from storm drains, waterways, or reservoirs.
- Do not store chemicals in areas where they may be susceptible to rain.
- Provide a secondary containment structure in case of leaks or spills.
- Always use a secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent material under paving equipment when not in use.
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal.
- Store cracked batteries in a non-leaking secondary container.
- If vehicles will be fueled on site:
  - Discourage “topping off”.
  - Use designated areas located away from waterways and drainages.
  - Use a secondary containment to catch drips or spills.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Clean up spills immediately and dispose of contaminated soils and clean up materials properly.
  - Sweep up dry spills. Do not wash or hose down the area.
  - Wet spills on impermeable surfaces should be absorbed.
  - Wet spills on soils require digging up and disposing of the contaminated soil.

# SPILL PREVENTION AND CONTROL

## GM-6

- A secondary containment with enough capacity to contain a spill is required for fueling areas.
- Report significant spills to local and state agencies, such as the Fire Department or NDEP, who may assist in the cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).
- Only a reputable, licensed company should be used to clean up large spills and dispose of contaminated materials.

### Inspection and Maintenance:

- On a weekly basis, ensure that an adequate supply of spill control cleanup materials are located close to storage, fueling, and unloading areas.
- Inspect containment structures in fueling and storage areas.
- Spill prevention plans should be updated when the types of chemicals stored on site changes.
- Regularly inspect on-site vehicles and equipment for leaks, and repair them immediately.

# VEHICLE AND EQUIPMENT MAINTENANCE AND FUELING

**GM-8**

- When a vehicle is located over a water body (dock, barge) and is planned to be idle for more than one hour, a drip pan or sheet should be placed under the vehicle.
- Fueling areas should be:
  - Located at least 100 feet from waterways, channels and storm drains.
  - Protected from run-on or runoff.
  - Located on a level-graded area.
  - Attended at all times during fueling.
- Fueling equipment should be equipped with an automatic shut-off nozzle to contain drips.
- Fuel tanks should not be “topped-off”.
- Avoid mobile fueling.
- Observe federal, state, and local requirements relating to any stationary aboveground storage tanks.
- Do not dump fuels and lubricants on the ground.
- Do not bury used tires.
- Do not dispose of oil in a dumpster or pour it down the storm drain.
- Properly dispose of used batteries.
- Conduct washing, fueling, and major maintenance offsite whenever possible.
- Inspect vehicles for leaky hoses, gaskets, or other problems.
- Locate vehicle services areas away from waterways, storm drains, gutters, and curbs.
- Use berms, sandbags, or other barriers to contain areas.
- Do not use detergents, solvents, degreasers, or other chemical products to do on-site cleaning.
- Use a drip pan or drip cloth if fluids will be drained and replaced on-site.
- Collect all used fluids, store in separate labeled containers, and either recycle or dispose of properly.

# VEHICLE AND EQUIPMENT MAINTENANCE AND FUELING

**GM-8**

## **Inspection and Maintenance:**

- Inspect on all containment structures.
- Maintain waste fluid containers in a leak proof condition.
- Service sumps associated with wash areas regularly.
- Inspect daily for leaks on vehicles and equipment.
- Keep an ample supply of spill cleanup materials available onsite.
- Clean up spills immediately and dispose of waste properly.
- Prevent boil-overs by regularly cleaning equipment radiators.

# MATERIAL DELIVERY, HANDLING, STORAGE AND USE

## GM-10

### Standards and Specifications:

- Designate a storage area that is not near a storm drain or watercourse.
- All contractors and subcontractors must train employees in proper materials handling, storage, application and delivery procedures.
- Follow manufacturers' instructions on application, storage and disposal of materials.
- Store onsite only the amount of material necessary for the job.
- Use non-hazardous and environmentally friendly products.
- Provide indoor storage or cover stockpiled materials and wastes with a tarp.
- Provide covered storage for secondary containment of hazardous materials.
- Use secondary storage to prevent soil contamination.
- Monitor employees and subcontractors to ensure that proper practices are being implemented.
- Keep all material in original containers.
- Label all stored materials according to state, local and federal regulations.
- Do not store incompatible materials together.
- Keep adequate supply of cleanup materials on site at all times.
- Report all spills.
- Do not apply hazardous chemicals during wet or windy conditions.

### Inspection and Maintenance:

- Inspect storage areas weekly to ensure neatness.
- Post proper storage instructions and Material Safety Data Sheets (MSDS) for all currently stored materials.
- Repair and replace damaged secondary containment facilities.
- Remove all empty containers and packaging from site.
- Store materials with adequate clearances for access and emergency response.

# LIQUID WASTE MANAGEMENT

## GM-13

### Standards and Specifications:

- Protect drainage ways with earth dikes, filter fabric, sand bags etc. to divert or capture run off from operations. Gather and dispose of trapped material properly.
- Educate workers on how to identify a non-hazardous from a hazardous liquid waste.
- Educate workers that it is unacceptable to have any liquid waste enter storm drains, gutters or watercourses and drainage channels. Incorporate in safety meetings.
- Store and contain wastes in pits or portable tanks that are large enough to completely contain wastes. Locate where accidental discharge will not follow to storm drains, gutters, watercourses and drainage channels.
- If necessary, treat wastes by filtrations, sedimentation or chemical neutralization before disposal.

### Inspection and Maintenance:

- Monitor employees and subcontractors to ensure that proper practices are being implemented
- Remove deposited solids from containment areas and capturing devices. Dispose of offsite according to all local, state and federal regulations.
- Inspect containment areas and capturing devices for damages and leaks. Repair or replace as needed.

- Contractor is required to follow all federal, state and local laws regarding handling, storing, and transporting waste materials.

## **Standards and Specifications:**

- Contact Washoe County Environmental Health (775) 328-2436 regarding local hazardous waste management policies and procedures.
- Waste containers shall be constructed of a suitable material and properly labeled according to regulations. Labels must include type of material, time of collection and site location.
- Temporary containment for stored materials should be sized at 1.5 times the volume of the stored material. Materials must be stored in sealed drums.
- Temporary containment areas shall be free of accumulated stormwater and spills.
- Temporary containment areas shall have room between containers for emergency response and cleanup.
- Incompatible materials shall be stored separately.
- Do not store different materials in the same container.
- Do not locate temporary containment areas near storm drains, gutters, watercourses or drainage channels.
- Provide adequate access to temporary containment areas.
- Store containers on pallets under a covered, protected area unless containers are water tight.
- Do not dispose of liquid waste in dumpsters or other solid waste containers.
- Collect water from decontamination procedures, treat it and dispose of it at an appropriate disposal site.
- Educate employees and subcontractors in waste storage and disposal. Ensure that proper procedures are followed.
- Train employees in newest procedures for handling materials. Update when new information is available.
- Immediately repair all dikes and liners used for storage or containment.
- Recycle materials if appropriate.

# HAZARDOUS WASTE MANAGEMENT

GM-17

## Inspection and Maintenance:

- Ensure that all wastes are properly labeled and stored.
- Verify that all hazardous wastes are disposed of properly.
- Hazardous wastes must be collected, labeled and disposed of at authorized disposal sites.
- Keep supplies on site for cleanup of spills.
- Post MSDS sheets for all materials stored on site.
- Immediately repair all dikes and liners used for storage or containment.

## **APPENDIX F**

### **ENVIRONMENTAL PROTECTION MEASURES**

**(From: Section 2.1.11 of the July 2008 Environmental Assessment and BLM's September 15, 2008 Decision Letter approving Plan of Operations NVN 82445)**

Fronteer commits to the following environmental protection measures to prevent unnecessary or undue degradation during construction, operation, and reclamation of the Proposed Action. The measures are derived from the general requirements established in the BLM's Surface Management Regulations at 43 CFR 3809 and BMRR mining reclamation regulations, as well as other water and air quality regulations. Additionally, Fronteer has volunteered to use environmental protections measures for the exploration activities on the private minerals estate land that are in substantial compliance with the 43 CFR 3809 performance standards.

### *Reclamation*

- On a yearly basis, on or before April 15th, Fronteer will submit to the BLM and BMRR a summary of exploration activities for the previous year, and a reclamation cost estimate for existing surface disturbance to ensure consistency with the current bond amount. Fronteer will provide a GPS map of the disturbance and a summary of exploration activities from the previous year and they will also provide a map and bond calculation for the next year's proposed work.
- Reseeding will be consistent with all BLM recommendations for mix constituents, application rate, and seeding methods.
- Drill roads, pads, and sumps not needed for future exploration will be reclaimed as soon as practicable after completion of exploration activities.
- The trenches will be reclaimed at the end of the field season in the year in which they were built.

### *Safety*

- Public safety will be maintained throughout the life of the Proposed Action. All equipment and other facilities will be maintained in a safe and orderly manner.
- All trenches, sumps, and other small excavations that pose a hazard or nuisance to the public, wildlife, or livestock will be adequately fenced to preclude access.
- All applicable state and federal fire laws and regulations will be complied with, and all reasonable measures will be taken to prevent and suppress fires in the Plan Boundary.

### *Air*

- Emissions of fugitive dust from disturbed surfaces will be minimized by utilizing appropriate control measures such as prudent speed limits (i.e., 15 miles per hour) and spraying roads with a water truck, if necessary.

### *Wastes*

- Pursuant to 43 CFR 8365.1-1(b)(3), no sewage, petroleum products, or refuse will be dumped from any trailer or vehicle.
- Portable chemical toilets will be utilized and all human waste will be hauled off site.
- Only nontoxic fluids will be used in the drilling process.
- Drill cuttings and fluids will be contained on site utilizing appropriate control measures. Sediment traps will be used, as necessary, and filled following completion of exploration activities.
- Regulated wastes will be removed from the Plan Boundary and disposed of in a state, federally, or locally designated area.
- Fronteer will follow the Spill Prevention Plan as specified in Appendix E.

### *Water Resources*

Fronteer will implement the following measures to ensure that Project activities do not reduce the flow of Johnson Springs, nor reduce the production capacity of any West Wendover City (City) wells, nor impair the quality of the water of Johnson Springs or any City wells. To enhance the immediate understanding of the hydrology of the area and to ensure that the Proposed Action does not damage Johnson Springs or any City wells, Fronteer will implement the measures outlined below. These measures have been developed in consultation with West Wendover city officials.

- Fronteer will construct a replacement water well at a site to be designated by the City and according to specifications developed by the City which can serve as a backup water supply in the event the Long Canyon mineral exploration drilling activities affect Johnson Springs.
- Prior to constructing the replacement water well, Fronteer will not drill mineral exploration holes below the elevation of Johnson Springs.
- Fronteer will construct four water-level monitoring wells as described in the proposed work scope submitted to the City and as approved by the City's Water Authority on July 8, 2008. Most of the mineral exploration holes are not expected to extend below the water table; however, if a mineral exploration hole encounters a significant amount of water, Fronteer will notify the City and use cement to plug any such hole.
- To the extent permitted by disclosure laws applicable to publicly-held companies, Fronteer will gather hydrologic data from the drilling program and provide it to the City. In particular, Fronteer will advise the City as soon as practical of any hydrologically unusual drilling results such as large cavities, major lost circulation, and artesian water flows.

- Fronteer will advise the City, and other appropriate authorities, of all reportable spills. The NDEP's threshold for a reportable spill of a petroleum product is 25 gallons or three cubic yards of contaminated soil. In addition to this, Fronteer will also advise the City of any spill of a petroleum product exceeding ten gallons.
- Fronteer will purchase a turbidity meter and provide it to the City to connect to the existing telemetry system. In return, Fronteer will require access to the real-time data collected by the City from Johnson Springs.
- Fronteer will, for one year, increase the quarterly water-quality monitoring data to monthly data collection and pay for the City's hydrologic consultant to collect the sample and for the analytical costs.
- In coordination with the City's hydrologic consultants, Fronteer will conduct Part I of a Hydrology Study of Johnson Springs described in the proposed work scope submitted to the City on May 16, 2008 with the goals of:
  1. Establishing what has localized Johnson Springs;
  2. Assessing the relationship of the nearby smaller springs to Johnson Springs; and
  3. Understanding the general nature of the source(s) of the water to Johnson Springs.
- Fronteer will also propose to coordinate with the City's hydrologic consultants to conduct a general hydrologic study of the northern part of Goshute valley with a goal of assessing the adequacy of the valley aquifer to supply water to the City's Shafter wells.
- Upon completion of the Part I Hydrologic Study of Johnson Springs, and the northern Goshute Valley generalized hydrologic study, Fronteer will work with the City to develop contingency plans for assuring that adequate water is available to the City.

In addition to the above measures, all drill holes (except those proposed to be completed as monitoring wells) will be plugged prior to the drill rig moving from the drill site in accordance with NRS 534 and NAC 534.4369 and NAC 534.4371 with the exception of drill holes collared with a reverse-circulation drill rig and completed with a core rig, which will be plugged prior to the core rig moving from the drill site. If any drill hole encounters artesian flow, the drill hole would be contained pursuant to NRS 534.060 and NAC 534.378 and would be sealed by the method described in Subsection 2 of NAC 534.4371. If casings are set in a drill hole, either the drill hole must be completed as a well and plugged pursuant to NAC 534.420 or the casings would be completely removed from the drill hole and then the hole would be plugged according to NAC 534.4369 and NAC 534.4371.

### *Cultural Resources*

A finding of no adverse effects to cultural resources for the Long Canyon Project is contingent upon adherence to the following mitigation measures. Since the entire Long Canyon Exploration

Project has been determined to constitute a single federal undertaking under the National Historic Preservation Act, these environmental protection measures apply to the entire 2,154 acre Project Area.

- Exploration will occur in phases that will be outlined by work plans and maps for activities that will occur anywhere within the Plan Boundary. These work plans will be submitted to the BLM and BMRR for processing prior to commencement of activities. The maps will show the location of the planned surface disturbance. The BLM will inform Fronteer if their planned activities would be conducted in or near eligible or unevaluated cultural properties. Fronteer will avoid or mitigate disturbance to eligible or unevaluated properties. If the work plan proposes exploration activities next to or in unevaluated site areas and if Fronteer does not wish to relocate the drill pad then the BLM would insure that Fronteer tested these sites, and BLM would make a final determination of eligibility;
- A 50-meter buffer zone will be established around eligible and unevaluated cultural resource sites near the Project Area to provide protection to the sites during construction and exploration. Equipment, other vehicles and earth disturbing activities will be prohibited within the buffer zone unless authorized in writing by the BLM authorized officer;
- If avoidance is not practical or adverse effects cannot be effectively mitigated through avoidance, BLM would insure that Fronteer conducts data recovery in conformance with the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716) or undertake other appropriate mitigation;
- Pursuant to 43 CFR §10.4(g), Fronteer will notify the BLM authorized officer, by telephone and with written confirmation, immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony (as defined in 43 CFR § 10.2), and any previously undocumented archaeological, historic or paleontological sites. All Fronteer-related activities within 100 meters of the discovery would cease immediately and Fronteer or its authorized representative would secure the location to prevent vandalism or other damage. Activity at the location shall be suspended until after the discovery has been evaluated, any necessary mitigation measures completed and BLM authorized officer has issued a written Notice to Proceed. Human remains, funerary objects, sacred objects, or objects of cultural patrimony found on Federal land will be handled according to the provisions of NAGPRA and its implementing regulations (43 CFR § 10). Human remains and funerary objects found on state or private land will be handled according to the provisions of Nevada statute NRS 383.150 to 383.190;
- Fronteer will insure that measures are in place to protect cultural resources from runoff, drilling mud or effluent emitting from drill pads or new/upgraded roads;
- An archaeological monitor, funded by Fronteer, could be required during active construction at eligible or unevaluated cultural resource sites located within close

proximity to the project. BLM would make determinations regarding monitoring needs case by case;

- Given the long term nature of the Proposed Action and the potential for Project-related deterioration of historic properties, BLM could require periodic site monitoring by a Fronteer-funded archaeologist. BLM would determine the need and frequency of monitoring based on condition of the resources and the nature of ongoing activities within the Project Area;
- Fronteer will train project workers, contractors and any other Project personnel regarding the potential to encounter historic or prehistoric sites and objects, the proper procedures in the event that cultural items are encountered, prohibitions against artifact collection, and prohibitions against disclosing the location of culturally sensitive areas. Due to the potential for increased public access via exploration roads, Fronteer will be responsible for reporting to the BLM, actions of the public (such as artifact collecting or driving ATVs through historic properties) within the Project Area that could impact cultural resources;
- Fronteer will not disturb, alter, injure or destroy any scientifically important paleontological remains; or any historical or archaeological site, structure, building, object or artifact within the Project Area, cumulative effects areas or on public lands. Fronteer will be responsible for ensuring that its employees, contractors or any others associated with the Project do not collect artifacts, or damage or vandalize archaeological, historical or paleontological sites or the artifacts within them. Should damage to cultural resources occur during the period of construction, operation, maintenance or rehabilitation due to the unauthorized, inadvertent or negligent actions of the proponent or any other project personnel, the proponent shall be responsible for costs of rehabilitation or mitigation. Individuals involved in illegal activities would be subject to penalties under the Archaeological Resources Protection Act (16 U.S.C 470ii), the FLPMA (43 U.S.C 1701), the Native American Graves and Repatriation Act (16 U.S.C. 1170) and other applicable statutes;
- Any survey monuments, witness corners, or reference monuments would be protected.

#### *Invasive, Nonnative Species*

- Noxious weeds will be controlled through implementation of preventive BMPs, which will include, but not be limited to the following: (a) any heavy equipment moving in to the Project Area from another project site will have wheel wells, wheels and tires, bumpers, undercarriage, etc., cleaned with high pressure water or air to remove any weed seeds prior to moving onto the site; (b) only certified weed-free seed would be used for reclamation seeding; and (c) all reclamation will be monitored for infestations of noxious weeds.
- Eradication measures would be implemented if noxious weeds were found.

- The reclamation bond will not be released until any infestations are controlled.

#### *Special Status Species and Wildlife*

- Fronteer will not conduct surface disturbing activities when snow conditions result in mule deer (*Odocoileus hemionus*) using the lands within the Plan Boundary as winter habitat. Surface disturbing activities will not take place until snow conditions allow. These seasonal restrictions on creating new surface disturbance will be implemented in coordination with BLM wildlife specialists in response to site-specific, on-the ground conditions.

#### *Soils and Access*

- An existing road that avoids Big Springs Ranch will be used to access the Plan Boundary.
- Sediment control structures will be used and could include, but not be limited to, fabric and/or straw bale (certified weed-free) filter fences, siltation or filter berms, mud pits, and downgradient drainage channels in order to prevent unnecessary or undue degradation to the environment.
- Sediment traps, constructed as necessary on drill pads, will be used to settle drill cuttings and prevent their release.
- In the event that any existing roads are severely damaged as a result of Fronteer activities, Fronteer will return the roads to their original condition.

#### *Vegetation*

- If a unique plant community cannot be avoided, vegetation would be replaced on a one to one basis with plantings of similar tree species and seeding of similar shrub species.

#### *Migratory Birds*

- Prior to surface disturbance being conducted during the avian breeding season (April 1 through July 31), Fronteer will conduct an annual migratory bird nest survey within the Plan Boundary. The nest survey will be conducted by a qualified biologist within potential breeding habitat prior to Fronteer conducting any surface disturbing activities during the avian breeding season. If nests are located, or if other evidence of nesting (i.e., mated pairs, territorial defense, carrying nest material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) would be delineated and the buffer area avoided to prevent destruction or disturbance to nests until they are no longer active.

2010 APR -8 PM 10: 21

**Hand Delivered**

April 8, 2010

Ms. Whitney Wirthlin  
Wells Field Office Geologist  
Bureau of Land Management  
3900 East Idaho Street  
Elko, Nevada 89801

**RE: Response to Comments, Long Canyon Exploration Project 2010 Plan of Operations  
Amendment, NVN-082445**

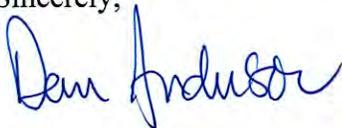
Dear Ms. Wirthlin:

Thank you for your prompt review of the Long Canyon Exploration Expansion Plan of Operations Amendment. Attached herewith is an Errata Sheet addressing your request for additional information to complete the content requirements outlined in 43 CFR 3809.401(b).

The Taxpayer Identification Number (TIN) is included on a separate attached page. Please consider this as proprietary/confidential information and file it accordingly.

Fronteer looks forward to further discuss this and other information regarding the Long Canyon Project at the Environmental Assessment kick off meeting on April 19 at 2 PM. If you have any questions regarding this information, please don't hesitate to contact me at 775-777-2900.

Sincerely,



Dan Anderson  
Environmental/Permitting Manager  
Fronteer USA

cc: Shane Martin, NDEP-BMRR

Plan of Operation 2010 Amendment NVN-82445  
 Long Canyon Exploration Project  
 Expanded Exploration and Groundwater Monitoring Well Drilling

ERRATA

1. Taxpayer Identification Number

Included under separate cover.

2. Total expansion acreage reconciliation

The proposed acreage affected by the 2010 amendment is 69.43 acres. The reference used in the cover letter is not accurate. The current authorized acreage is 44.93 acres. The total authorized and proposed surface disturbance on public lands regulated by 43 CFR 3809 regulations is 114.36 acres.

The proposed Plan Expansion area is 5,438 acres. The authorized Plan of Operations Boundary is 1,341 acres. The total Plan of Operations boundary including existing authorized and proposed is 6,779 acres.

These acreages are summarized in the following Table 1.

Errata Table 1 Long Canyon Exploration Project Plan of Operations Acreage Summary		
Area	Plan Surface Disturbance (acres)	Plan Boundary (acres)
Proposed Plan Expansion Area Surface Disturbance	69.43	
Authorized Plan of Operations Disturbance	44.93	
Proposed Plan Expansion Boundary		5,438
Authorized Plan of Operations Boundary		1,341
<b>TOTAL</b>	<b>114.36</b>	<b>6,779</b>

3. Under the “Trenching and Bulk Sampling” section of the “Description of Operations”, the following information regarding blasting is submitted as an option to collect the bulk sample.

**Blasting Operations**

The nature of the ore and host rock is such that blasting may be required to provide a suitable sample for metallurgical testwork. Industry standards will be used when blasting is employed. A qualified, federally licensed and insured contractor, certified to conduct such operations, will be retained to plan, specify, organize and implement the blasting activities.

The contractor will drill blast holes of approximately 3 to 4-inch diameter with small diesel powered crawler mounted drills. On the scheduled blast day, the blasting contractor will bring the explosives to the site in Department of Transportation (DOT) and Bureau of Alcohol Tobacco, Firearms and Explosives (ATFE) approved vehicles. The contractor will load the holes, fire the shot and remove unused explosives, if any, with them when they leave. Explosives will be in the control of a certified Blast Safety Officer at all times. There will be no overnight explosives storage at the site.

The contractor will use non-electric detonators with explosive boosters and packaged ANFO for dry holes and emulsion blasting agents for wet holes, if any. The blast holes will be connected with non-electric surface delays in a sequence engineered to minimize fly rock and vibration. Use of non-electric detonators and delays will allow the safe use of 2-way radio communications during the blasting process.

The safe blasting process will begin with notifying all neighbors in advance. On the blast day, warning signs will be posted at all entrances to the blast site. The contractor's qualified blaster and crew will load the holes, tie in the shot, and run a lead line to a safe distance from the shot. Blast Guards, under the direction of the Blast Safety Officer, will clear the blast safety zone in a coordinated manner so no one could be left behind, and will then retreat to a safe distance; guarding the entrances to the blast site assuring no accidental access. The Blast Safety Officer will order the blaster to sound warning sirens. The Blast Safety Officer will make a final confirmation via 2-way radio with the Blast Guards that the blast site is secure and then give the blaster the order to sound the final warning siren and to fire the shot. After the shot has detonated, the blaster will inspect the shot to ensure all explosives have fired and will then give an all-clear signal and radio call.