

HERMOSA TAYLOR DEPOSIT DRILLING PROJECT PLAN OF OPERATIONS

Arizona Minerals, Inc.



Prepared for:

United States Department
of Agriculture Forest Service
Coronado National Forest
300 West Congress Street
Tucson, Arizona 85701

April 1, 2016
(Revised July 27, 2016)

TABLE OF CONTENTS

1.	GENERAL INFORMATION	1
1.1.	Name of Project.....	1
1.2.	Type of Operation	1
1.3.	Status of Operation	1
1.4.	Proposed Start-up Date of Operation	2
1.5.	Expected Total Duration of this Operation	2
1.6.	Expected Date for Completion of All Required Reclamation	2
2.	PRINCIPALS.....	2
2.1.	Operator.....	2
2.2.	Field Representative	3
2.3.	Owners of the Claim	3
2.4.	Lessees, Assigns, and Agent(s).....	3
3.	PROPERTY OR AREA	3
4.	DESCRIPTION OF THE OPERATION.....	4
4.1.	Access.....	4
4.1.1.	Primary Access to the Project	4
4.1.2.	Access to Exploration Drill Pads within the Project Area	4
4.2.	Maps and Drawings.....	5
4.2.1.	Location and Layout of the Operation.....	5
4.2.2.	Project Area Streams	5
4.3.	Project Description.....	5
4.3.1.	General	5
4.3.2.	Mineral Exploration Drilling Methods	7
4.3.3.	Drill Pad Layout	8
4.3.4.	Workforce/Personnel	8
4.3.5.	Work Schedule	9
4.3.6.	Vehicles and Equipment.....	10
4.3.7.	Water Supply during Drilling	10
4.3.8.	Completion, Closure, and Reclamation	10
4.4.	Structures	12
5.	ENVIRONMENTAL PROTECTION MEASURES.....	12
5.1.	Air Quality	12
5.2.	Water Quality	13
5.3.	Solid Wastes.....	14
5.4.	Scenic Values	15
5.5.	Fish and Wildlife.....	15
5.6.	Cultural Resources	17
5.7.	Hazardous Substances.....	18
5.7.1.	General	18
5.7.2.	Spill Prevention, Control, and Reporting	20
5.8.	Health and Safety.....	20
5.8.1.	Crew Health, Safety, and Emergency Services	20
5.8.2.	Fire Prevention and Control	21
5.9.	Reclamation and Noxious Weed Control	21
5.10.	Interim Shutdown Procedures	21
5.11.	Inspections.....	22

6.	FOREST SERVICE EVALUATION OF PLAN OF OPERATIONS.....	23
6.1.	Required Changes/Modifications/Special Mitigation for Plan of Operations.....	23
6.1.1.	Bond.....	23
7.	TERMS AND CONDITIONS	24
8.	OPERATING PLAN ACCEPTANCE.....	25
9.	OPERATING PLAN APPROVAL	26

TABLES

Table 1.	Unpatented claims	3
Table 2.	Drill site locations and project surface disturbance	6
Table 3.	Approximate number of trees to be removed at each location	7
Table 4.	Vehicles and equipment.....	11
Table 5.	Seed mix for reclamation	12

FIGURES

(follow text)

Figure 1.	Vicinity Map
Figure 2.	Claims Map
Figure 3.	Project Area
Figure 4.	Access Route
Figure 5.	Representative Drill Pad Layout

APPENDICES

Appendix A.	Temporary Low-standard Access Road and Pad Plans
Appendix B.	Safety Data Sheets
Appendix C.	Spill Response Procedures

ACRONYMS

AAC	Arizona Administrative Code
ADWR	Arizona Department of Water Resources
AMC	Arizona Mining Claim
AMI	Arizona Minerals, Inc.
ANSI	American National Standards Institute
ARS	Arizona Revised Statutes
AZPDES	Arizona Pollutant Discharge Elimination System
BLM	Bureau of Land Management
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CNF	Coronado National Forest
dbh	diameter at breast height
DPS	Distinct Population Segment
EMT	Emergency Medical Technician
FR	Forest Road
FSM	Forest Service Manual
HDPE	High-density Polyethylene
MSDS	Material Safety Data Sheet
MSGP	Multi-sector General Permit
NAGPRA	Native American Graves Protection and Repatriation Act
NFPA	National Fire Protection Agency
PAC	Protected Activity Center
PPE	Personal Protective Equipment
RQ	Reportable Quantity
SDS	Safety Data Sheet
SPCC	Spill Prevention, Control, and Countermeasures
SR	Arizona State Route
SWPPP	Stormwater Pollution Prevention Plan
USFS	US Forest Service

I. GENERAL INFORMATION

The Hermosa Taylor Deposit Drilling Project (the Project) is proposed by Arizona Minerals, Inc. (AMI), a Nevada Corporation. AMI is a subsidiary of Arizona Mining, Inc., a publicly traded company with headquarters in Vancouver, Canada.

AMI is submitting this Plan of Operations (the Plan) for proposed mineral exploration activities that will extend AMI's current Hermosa mineral deposit exploration program from portions of AMI's patented claims to AMI's unpatented claims. The unpatented claims are located within the Sierra Vista Ranger District of the Coronado National Forest (CNF) where surface use is administered by the US Forest Service (USFS). The Project Area, which includes all proposed drilling pads and temporary low-standard access roads on CNF lands, is located approximately 50 miles southeast of Tucson, Arizona, in Santa Cruz County, Arizona (**Figure 1**).

The Project, pursuant to 36 CFR Part 220.6(e)(8), is a short-term mineral exploration investigation drilling program that will be complete in less than 1 year (**Section 4.3.5**). The Project consists of exploration drilling at three locations on CNF-administered lands, construction of less than 1 mile of temporary low-standard access roads, and less than 1 acre of disturbance for drill pads. The total area of CNF-administered lands that will be disturbed by drill pads is 0.92 acre. The total length of temporary low-standard access roads to be constructed or improved is 0.32 mile. The drill pad and temporary low-standard access road locations were chosen to avoid and minimize disturbance through the selection of previously disturbed land, where possible, and the location of the drill pads to reduce the cut and fill required. The drilling of multiple exploration holes from the same drill pad using directional drilling techniques will minimize the number of drill pads and associated low-standard access roads required for the Project and thus minimize surface disturbance.

I.1. NAME OF PROJECT

Hermosa Taylor Deposit Drilling Project
United States Forest Service, Coronado National Forest, Sierra Vista Ranger District
Santa Cruz County, Arizona

I.2. TYPE OF OPERATION

The proposed Project involves exploration drilling for mineral resources on unpatented claims held by AMI on the CNF. The proposed Project will require the limited construction of three drill pads and temporary low-standard access roads to provide access to the site locations. See **Section 4.3** for more detail on the proposed construction, operations, and closure of this Project.

I.3. STATUS OF OPERATION

The proposed Project is a new operation.

I.4. PROPOSED START-UP DATE OF OPERATION

The Project is expected to commence October 1, 2016, to coincide with the anticipated completion of USFS review and approval of the Plan, including funding of the required reclamation bonds, and the end of the breeding season of the yellow-billed cuckoo (*Coccyzus americanus*).

I.5. EXPECTED TOTAL DURATION OF THIS OPERATION

The Project, including tree removal, drilling, and reclamation will be completed in 5 months and is designed such that activities will not be conducted during the breeding season of the yellow-billed cuckoo (*Coccyzus americanus*) (assumed to be June 1–September 30) while also including a 3-month contingency period. Based on the biological studies completed to date^{1,2} AMI believes that additional seasonal restrictions are not warranted. Given the potential seasonal restriction of 4 months, there will be 3 months of contingency in addition to the 5 months required for tree removal, drilling, and reclamation. All Project activities are short-term and would be completed within one year or less. The Project schedule is provided in greater detail in **Section 4.3.5**.

I.6. EXPECTED DATE FOR COMPLETION OF ALL REQUIRED RECLAMATION

The Project will entail the concurrent reclamation of drill pads and temporary low-standard access roads. Upon completion of drilling activities at a site, reclamation of the drill pad and associated temporary low-standard access road will occur concurrently with drilling activities at other locations. Upon completion of all reclamation work at drill sites, the temporary low-standard access roads included in the Plan will be reclaimed and made inaccessible to vehicular traffic. Reclamation activities are planned to be complete within 5 months from the start of operations. Should seasonal restrictions be required reclamation activities will be completed within one year or less. The 3-month contingency period for the Project is more than one-third of the expected duration of all activities. A detailed Project schedule is provided in **Section 4.3.5**.

2. PRINCIPALS

2.1. OPERATOR

The operator of the Project is AMI. The primary point of contact is:

Mr. Don Taylor, Chief Operating Officer
3845 North Business Center Drive, Suite 115
Tucson, Arizona 85705
Phone: (520) 485-1300

¹ WestLand Resources, Inc. 2013. 2012 Survey for Mexican spotted owl (*Strix occidentalis lucida*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. April.

² WestLand Resources, Inc. 2013. Summary of 2013 Survey for Mexican spotted owl (*Strix occidentalis lucida*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. December.

2.2. FIELD REPRESENTATIVE

The AMI Field Representative is:

Mr. Johnny Pappas, Director of Environmental and Permitting
3845 North Business Center Drive, Suite 115
Tucson, Arizona 85705
Phone: (520) 485-1300

2.3. OWNERS OF THE CLAIM

The Project would be located on five unpatented claims owned by AMI: Shell 2A, Shell 2B, Shell No. 2, Shell No. 3, and Shell-36. Detailed claim information on the exploration sites proposed under this Plan is provided in **Table 1**. Unpatented claims associated with this Project total 92.34 acres (0.14 square mile) (**Figure 2**). The proposed Project disturbance associated with these unpatented claims totals 1.54 acres.

Table 1. Unpatented claims

Name of Claim	Date Located or Amended	BLM Serial AMC Number	Acreage	Section	Township	Range
Shell 2A	05/09/2008	AMC392436	20.03	4	T23S	R16E
Shell 2B	05/12/2008	AMC392437	10.32	4	T23S	R16E
Shell No. 2	01/29/1965	AMC51410	20.68	4	T23S	R16E
Shell No. 3	01/29/1965	AMC51411	20.68	4	T23S	R16E
Shell-36	12/21/2006	AMC377011	20.63	4/5	T23S	R16E

The staging area for the Project will be located on AMI private land: Alta Lot No. 38A (19.87 acres; 01/03/1877; Patent No. 8635; Sections 3 and 4 of Township 23 South, Range 16 East) (**Figures 2 and 3**).

Water will be supplied from an existing well and storage tank on AMI private land: Camden No. 2 claim (20.66 acres; 11/05/1958; Patent No. 121192; Sections 3 and 4 of Township 23 South, Range 16 East) (**Figure 2**).

2.4. LESSEES, ASSIGNS, AND AGENT(S)

None.

3. PROPERTY OR AREA

The Project Area is located approximately 50 miles southeast of Tucson, Arizona, in Santa Cruz County (**Figure 1**). Surface disturbance associated with the Project will occur on lands managed by the CNF. The USFS lands within and surrounding the Project Area are administered by the Sierra Vista Ranger District of the CNF. The general vicinity of the Project Area is shown in **Figure 1** and the proposed exploration sites and associated temporary low-standard access roads within the Project Area are shown in **Figure 3**.

Detailed information (name of claim, date located or amended, BLM Serial AMC number, and legal land description) of all the unpatented claims within the Project Area is provided in **Table 1**.

4. DESCRIPTION OF THE OPERATION

The proposed Project includes drilling and access for mineral exploration. Three mineral exploration drill pads will be developed (**Figure 2**). The following sections provide detailed descriptions of the Project access, maps and drawings, project description, support equipment and vehicles, and structures.

4.1. ACCESS

4.1.1. Primary Access to the Project

Primary access to the proposed Project will be gained from Harshaw Road (a county road), which connects to Arizona State Route (SR) 82 in the town of Patagonia (**Figure 4**). To access the Project, traffic will proceed from SR 82 in Patagonia onto Taylor Avenue and then easterly onto McKeown Avenue, which becomes Harshaw Road after approximately 0.10 mile. Harshaw Road proceeds approximately 2.7 miles to the CNF boundary. From the CNF boundary, it continues approximately 3.3 miles to its intersection with Forest Road (FR) 58. At this point, Harshaw Road proceeds southerly for approximately 2.0 miles before intersecting FR 4686 and heading west. As Harshaw Road heads west, it continues in a roughly semi-circular counterclockwise arc around the western side of the Project. During the course of the Project, equipment, materials, and personnel will be initially directed to a staging area located on private land owned by AMI approximately 1 mile southwest of the intersection of Harshaw Road and FR 4686.

4.1.2. Access to Exploration Drill Pads within the Project Area

Based on reconnaissance surveys conducted within the proposed Project Area, access route alignments were identified to minimize disturbance to CNF lands and resources. Consideration was given to the location of the proposed drill pads, the nature of the surrounding terrain and topography, the state of existing access provided to the area, and the constraints of the equipment required for conducting work at the site. Initial routes of travel to the proposed drill locations from the staging area will use existing roads that have been developed by AMI on their private land. Once on CNF lands, the proposed drill sites will be accessed using temporary low-standard access roads that will be developed on (1) previously disturbed land and (2) undisturbed land (**Figure 3**).

The temporary low-standard access roads will only be used by track-mounted drill rigs and support vehicles, and will not be open for motorized public use; the roads will only be accessible from AMI's private land, which is gated to restrict public access. Access road construction and maintenance will be conducted to ensure road stability and safety, and to reduce environmental impacts. Details of environmental protection measures are described in **Section 5**.

4.2. MAPS AND DRAWINGS

4.2.1. Location and Layout of the Operation

The general vicinity of the Project Area is shown in **Figure 1**. The claims boundaries in and around the Project Area are shown in **Figure 2**. The proposed exploration drill sites and access routes are depicted in **Figures 3 and 4**. A representative schematic of a drill pad layout is depicted in **Figure 5**. The planned layout and cross-sections of the proposed low-standard temporary access roads and drill pads are depicted in **Appendix A**.

4.2.2. Project Area Streams

One portion of an ephemeral tributary of Harshaw Creek is in the Project Area; however, AMI is not proposing the construction of any drainage crossings or discharges of fill material to drainages of this tributary (**Figure 3**).

4.3. PROJECT DESCRIPTION

4.3.1. General

The purpose of the Project is to conduct mineral exploration drilling in support of AMI's ongoing exploration of the Hermosa Taylor mineral deposit. The general order of operations proposed during drilling and reclamation for this Project is as follows:

- Install sediment controls;
- Cut, trim, and remove trees and brush using chainsaws;
- Construct low-standard access roads;
- Construct drill sites, transport equipment and supplies to the sites, and set up equipment;
- Drill, sample, and log the drill holes;
- Conduct data collection;
- Complete/abandon the drill holes as described herein;
- Reclaim concurrently each drill pad and related temporary low-standard access roads as exploration at each drill site is completed. Revegetation will be completed using a CNF-approved seed mix and by scattering slash from the removal of trees and brush; and
- Remove equipment from the Project Area.

Drill pads will be constructed to accommodate equipment for directional drilling. Two holes will be drilled at Pad 706, two holes will be drilled at Pad 712, and four holes will be drilled at Pad 722, each with a separate entry point (**Figure 2**). **Table 2** shows the location, dimensions of, and surface disturbance associated with the proposed drill pads. Surface disturbance calculations include estimates of the cut and fill limits. While the dimensions of the drill pads may vary slightly from those shown in **Table 2**, the surface disturbance associated with the drill pads will not exceed 0.92 acre.

Table 2. Drill site locations and project surface disturbance

Project Feature	Location (UTM NAD83)	Pad Dimensions	Disturbance Dimensions ^a	Surface Disturbance (ac)
Pad 706	526443 E, 3480631 N	80' × 80'	160' × 100'	0.37
Pad 712	526566 E, 3480653 N	80' × 80'	120' × 100'	0.28
Pad 722	526691 E, 3480523 N	80' × 80'	120' × 100'	0.27
Total Pad Disturbance				0.92
Temporary Low-standard Roads (undisturbed land)	—	—	16' × 1,320'	0.48
Temporary Low-standard Roads (previously disturbed land)	—	—	16' × 370'	0.14
Total Road Disturbance				0.62
Total Disturbance (Pads and Roads)				1.54

^a Disturbance dimensions for pads are calculated based on pad dimensions and estimates of additional surface disturbance resulting from cut and fill. Road disturbance dimensions are calculated based on a maximum disturbance width of 16', which includes estimates of surface disturbance resulting from cut and fill.

Road disturbance dimensions are calculated based on 16 feet of total surface disturbance resulting from the roadbed and associated cut and fill. Cut and fill slopes will be constructed at the maximum practicable slope ratio to minimize potential erosion while concurrently minimizing the area of new surface disturbance (see **Appendix A** for temporary low-standard access road and pad plans, including cross-sections and grades). Where the access road can be located on previously disturbed land, construction will consist of vegetative clearing and cutting of trees flush to the ground, but little to no earthen excavation or fill. Surface disturbance associated with temporary low-standard access roads will not exceed 0.62 acre.

Approximately 5,532 cubic yards of cut material (**Appendix A**) will be stockpiled on nearby private land. Brush and trees that are removed will also be stored on private land. All stockpiled materials will be stored on private land in the staging area and will not generate any surface disturbance on CNF lands (**Figure 3**). Erosion-control methods are described in **Section 5.2**. Straw wattles or silt fences will be the primary erosion-control method and will be installed prior to any earth-moving activity.

The total lengths of the temporary low-standard access roads will be 0.07 mile on previously disturbed land and 0.25 mile on undisturbed land (**Table 2**). The 0.07 mile of disturbed land is largely revegetated, but has stable road prisms, road cuts, and road fills.

An existing previously disturbed area on land within AMI's Alta Lot No. 38A will be used as a staging area for the Project. Two additional existing previously disturbed areas on land within AMI's Alta Lot No. 38A will be used for the stockpiling of materials (**Figure 3**). Existing roads on AMI land connect the staging area to the proposed temporary low-standard access roads.

The total area of CNF lands that will be disturbed for proposed mineral exploration activities is 1.54 acres. Approximately 220 trees greater than 4 inches and less than 12 inches in diameter at breast height (dbh) will be removed prior to the construction of the temporary low-standard access roads and pads. Approximately 14 trees with 12 inches dbh or greater will also be removed (**Table 3**).

Table 3. Approximate number of trees to be removed at each location

Location	Tree Count Greater than 4 and Less than 12 Inches (dbh)	Tree Count 12 Inches or Greater (dbh)
Pad 706	36	3
Temporary Low-standard Access Road to Pad 706	32	3
Pad 712	43	1
Temporary Low-standard Access Road to Pad 712	16	0
Pad 722	43	2
Temporary Low-standard Access Road to Pad 722	50	5
Total	220	14

Note: Removal of trees with 12 inches dbh or greater will be avoided to the extent practicable.

The total number of trees listed here represents the maximum expected number of trees to be removed. The final number removed may be lower. Trees will be cut only to the extent necessary to ensure the timely completion of exploration activities. Final disposition of the felled trees will be per CNF direction.

Expected impacts from the Project on CNF-administered lands have been minimized to the greatest extent practicable through site and access route selection, using existing disturbed areas whenever possible, using private land for staging, soil stockpiling, placement of cut trees and brush per Forest Service direction, and through the implementation of environmental protection measures during development, operation, and reclamation of the Project (see **Section 5**).

4.3.2. Mineral Exploration Drilling Methods

A total of eight exploration holes will be drilled using diamond core drilling. Two drill rigs will operate concurrently (see **Section 4.3.5**). Each of the exploration holes will be drilled to a depth of approximately 4,500 feet. All boreholes will be drilled by a drilling contractor licensed by the Arizona Department of Water Resources (ADWR). Directional drilling will be used whereby multiple holes will be drilled from the same drill pad at various angles in order to minimize surface disturbance.

Diamond core drilling involves advancing a diamond-impregnated steel bit into the earth vertically or at an angle and retrieving the intact drilled core at regular intervals by retrieving the core barrel (or tube) via wire-line (5-foot intervals for 5-foot core barrels, 10-foot interval for 10-foot core barrels). This type of drilling will be performed using a Boart-Longyear LFTM 90 (or equivalent) diamond core drilling rig. Hole sizes will range nominally from 3 to 4 inches in diameter. The diamond-impregnated core bit spins at a high rate of speed and requires a continuous supply of water to cool and lubricate the core bit and to flush cuttings (ground-up rock chips and dust) from the drill hole. At regular intervals, the core barrel is removed from the hole and the rock core is removed and examined (logged) by a geologist or engineer. Once the desired depth is reached, the steel drill rods are removed from the hole and the hole is abandoned in adherence to ADWR standards.

Proper drill hole abandonment using bentonite seals and professional drilling practices will minimize potential impacts of the drilling program to the existing groundwater aquifer system. In addition, no land application of wastewater will occur during the Project.

For each exploration drill hole, cores are expected to range from 2 to 3 inches in diameter. Drill cores from the exploration drill sites will be boxed and moved to a processing area on AMI-owned land for further evaluation. The drilling supplies and equipment associated with exploration drilling will be stored at the staging area.

Excess cuttings and drilling mud (bentonite) generated during drilling activities will be temporarily stored in a mud pit lined with a 6 millimeter thick black polyfilm visqueen. They will then be collected and removed from CNF lands. Drilling mud and associated water will be removed via hydro-vac at the completion of drilling activities at each pad and the liner will be removed. These materials will be disposed of in accordance with applicable Arizona law. The pits will then be backfilled with the previously excavated material.

4.3.3. Drill Pad Layout

A representative drill pad layout for the proposed mineral exploration is shown in **Figure 5**. Dimensions and equipment layouts may vary depending on the terrain and other surface requirements, as illustrated in **Figure 3**; however, the total surface disturbance, including cut and fill slopes required for drill pad construction, will not exceed that shown in **Table 2**. The drill pad locations have been selected to minimize cut and fill.

Each drill site will include the borehole locations, a drill rig, a pipe/drill rod trailer, pad access and parking areas for support vehicles, a sump or mud pit, a 5,000-gallon water storage tank, drilling mud bags and additives, spill supplies, personal supplies and gear, spare parts, tools, and a rental portable toilet. The mud pits will measure approximately 8 feet wide, 12 to 15 feet long, and approximately 5 feet deep (average). In AMI's experience, mud pits of this size are optimal for the type and depth of drilling proposed. The hydro-vac will be used to remove materials from the mud pit, as needed.

No external power sources will be required; light plants with internal power sources will be used on the pads (**Figure 5**).

4.3.4. Workforce/Personnel

The following provides an estimate of the number of onsite personnel who will be involved at any given time based on the work type:

- **Construction of Road and Drill Pads:** Up to four workers, including heavy equipment operators for excavators, loaders, and water truck; laborers (manual work for stormwater controls, backfilling, raking/grading, tree trimming, etc.); and support personnel (for pickup trucks/trailers to haul tree trimmings, periodic equipment fueling, and/or other materials);

- **24/7 Exploration Drilling:** Up to five workers per drill rig, including one drill crew of three and one field geologist and one assistant;
- **Periodic Support for 24/7 Exploration Drilling:** One worker to deliver portable toilets, roll-off bins, drilling supplies, well construction materials, and other supplies and materials, as needed.

Based on the above information, the total number of onsite personnel involved in the Project at a given time is estimated to be up to 15 workers. Six crews will be working on the Project such that shift changes will allow for adequate time off.


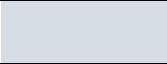

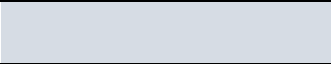


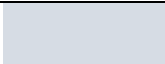

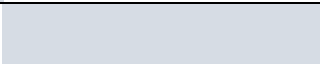
No campsites on CNF lands will be used by personnel. All personnel will be required to use accommodations located on private lands.

4.3.5. Work Schedule

Initially, approximately 21 days will be spent cutting and removing trees, installing sediment-control measures, and developing the roads and drill pads for Pad 706 and Pad 722 (**Figure 3**). Drilling activities at Pad 706 will occur over 53 days. Drilling activities at Pad 722 will occur over 108 days. Drilling activities are scheduled to include mobilization, drilling, and abandonment. Concurrent with drilling at Pad 706, Pad 712 will be constructed. When drilling is complete at Pad 706, drilling equipment will be mobilized over the course of 2 days to Pad 712, and drilling at Pad 712 will occur over 53 days. Concurrent with drilling at Pads 712 and 722, reclamation at Pad 706 and the temporary low-standard access road between Pads 712 and 706 will take place. When drilling is complete at Pads 712 and 722, reclamation activities will be completed over 21 days for the pads and temporary low-standard access roads. Based on this schedule, the Project will last for 5 months with a contingency of 3 months. The schedule includes additional days for holidays, but the contingency can also be applied to holidays as well as equipment breakdowns. Drilling of exploration boreholes will be conducted up to 7 days per week for 24 hours per day.

AMI was provided data by Boart-Longyear for current drilling activities on private land owned by AMI adjacent to the location of activities proposed in the Plan. These data were collected from drilling activities in similar geologic conditions and to depths similar to those proposed for this Project. These data indicate that drilling is being completed at a rate of approximately 184 feet per day. Two (2) drill rigs will be operating concurrently in order to drill 8 holes to a depth of approximately 4,500 feet each. Therefore, a total of approximately 36,000 feet will be drilled. Given a rate of 184 feet per day, drilling is estimated to require 98 days for completion. As the Project Schedule below shows, 108 days have been allotted to drilling of the 8 holes, which is 10 days more than the estimated 98 days needed for drilling. The 3-month contingency period is in addition to these 108 days.

Project Schedule

Activity	Days	
Construct Pads and Roads to 706 and 712	21	
Drilling on Pad 706	53	
Reclamation of Pad 706 and Access Road between 712 and 706	21	
Drilling on Pad 722	108	
Reclamation of Pad 722 and Access Road to 722	21	
Construct Pad 712	7	
Drilling on Pad 712	53	
Reclamation of Pad 712 and Access Road to 712	21	
Contingency	92	

4.3.6. Vehicles and Equipment

A list of vehicles and equipment to be used during the course of the Project is provided in **Table 4** below along with the size, capacity, use-frequency, and schedule for the specific equipment types. The equipment to be stationed for use at the drill pads is graphically shown in a typical site layout in **Figure 5**.

4.3.7. Water Supply during Drilling

Water needed for use in drilling the exploration drill holes will be obtained from an existing water well located on AMI's private land (**Figure 3**). Water will be stored in existing distribution tanks on AMI's private land and supplied by gravity to the exploration drill sites via 2-inch-diameter high-density polyethylene (HDPE) pipe that will be laid along AMI private lands, FR 5521, and temporary low-standard access roads (**Figure 3**). Water will be stored on the drill pad in a 5,000-gallon tank (**Figure 5**).

Approximately 20,000 gallons of water per week will be used for the Project (10,000 gallons per rig per week). This is within the range of water use for drilling programs that AMI has completed on their private land over the past 8 years and, as such, would not constitute a substantial change from existing conditions. Water is recirculated between the mud pit and the drill rig when drilling conditions dictated by the geologic formation allow.

4.3.8. Completion, Closure, and Reclamation

Drilling and drill hole abandonment will be conducted in accordance with Arizona Administrative Code (AAC) R12-15 and Arizona Revised Statutes (ARS) Title 45, Chapter 2, Article 10, as administered by the ADWR.

Table 4. Vehicles and equipment

Vehicles/Equipment	Size/ Capacity	No. of Units	Use-rate	Schedule
DRILLING RIGS				
Boart Longyear LF TM 90 Diamond Drill or equivalent	–	2	24/7	All drilling activities
PERSONAL VEHICLES (PERSONNEL)				
4WD pickups/Jeeps	½ ton to 1 ton	3	2 trips per truck per day	All Project activities
SPECIALTY TRUCKS				
Water trucks	2,500 gallon	1	As needed	All Project activities
Dump trucks	8 to 12 yards	3	As needed	Road and pad construction. Reclamation.
Service truck with fuel tank	¾ ton	1	One trip per day	All Project activities
TRAILERS				
Flatbed trailers	–	1	Infrequent; will be used to move to each pad	Construction of pads or at the start of the drilling phase at a new pad
EARTHWORK EQUIPMENT				
John Deere Excavator 230cllc	50,000 lbs	2	As needed during pad construc- tion and pad reclamation	Road and pad construction. Reclamation.
John Deere 950 C Dozer	–	1	Daily – 8 hours per day during road and pad construction, then no trips until reclamation	Road and pad construction. Reclamation.
Loader 544H	2.5 yards	3	As needed for removal of fill during pad construction, return of fill during reclamation	As needed during pad construction and during reclamation
2006 John Deere 210 LE with Gannon attachment	–	1	One trip per week	All drilling activities
Hydro-vac	–	1	As needed for mud control. Approximately one trip per week.	All drilling activities
OTHER EQUIPMENT				
Chainsaws	–	6	As needed during construction	Construction activities
Light plant	–	2	One per operating drill pad	All drilling activities

Note: Fuel is currently delivered to AMI private land via fuel truck. No additional trips to the staging area would be required for fuel delivery for the Project.

In accordance with 36 CFR (Code of Federal Regulations) §228 and the policies of Forest Service Manual (FSM) 2840, AMI will stabilize and reseed temporarily disturbed areas to prevent erosion and to promote vegetation growth. AMI will conduct concurrent reclamation by reclaiming drill sites and temporary low-standard access roads as associated activities are completed.

Following the completion of drilling activities at drill sites, all materials, including equipment, pipe, water tank, lubricants and other products, tanks, cores, plastic sheeting, and any other supplies, will be removed from the site. Drilling mud and associated water will be removed via hydro-vac at the completion of drilling activities at each pad. The liner will also be removed. The pits will then be backfilled with the previously excavated material. Each drill pad will be regraded and re-contoured to match approximately the surrounding topography and seeded in accordance with CNF guidelines

using approved seed mixes of certified native weed-free species. **Table 5** shows the existing CNF-approved seed mix; either this mix, or another CNF-approved mix will be used, as recommended by CNF. Soil on areas to be seeded will be left in a roughened, de-compacted condition favorable to the retention and germination of the seed. As concurrent reclamation proceeds, temporary waterlines to each of the drill sites will be salvaged and removed from CNF lands.

Table 5. Seed mix for reclamation

Species	Lbs/Pure Live Seed/Acre
Sideoats grama (<i>Bouteloua curtipendula</i>)	4
Hairy grama (<i>Bouteloua Hirsuta</i>) or Blue grama (<i>Bouteloua gracilis</i>)	2
Plains bristlegrass (<i>Setaria vulpiseta</i>)	1
Cane beardgrass (<i>Bothriochloa barbinodis</i>)	1
Green sprangletop (<i>Leptochloa dubia</i>)	2
Plains lovegrass (<i>Erograstis intermedia</i>)	3

Temporary low-standard access roads will be regraded and re-contoured to match approximately the surrounding topography and seeded with a CNF-approved seed mix. Soil on areas to be seeded will be left in a roughened, de-compacted condition favorable to the retention and germination of the seed. Onsite certified weed-free straw wattles used to reduce runoff will be broken up and used as mulching material. If approved by the CNF, slash stockpiled from original construction will be scattered in the area after seeding. Slash will be spread especially thickly over areas on which erosion is most likely to occur, such as steep slopes. Other stormwater Best Management Practices (BMPs), such as water bars, culverts, and erosion-control features, will be repaired or removed, as necessary. Temporary low-standard access roads will be blocked with an earthen berm or boulders at each access point.

4.4. STRUCTURES

No permanent structures will be built. A portable toilet will be placed at active drill sites and will be serviced weekly by a contractor. Up to two portable toilets will be located on drill pads in the Project Area during drilling activities. All temporary structures will be removed upon completion of work.

5. ENVIRONMENTAL PROTECTION MEASURES

5.1. AIR QUALITY

Minimal impacts to air quality are expected due to light travel along the existing and newly constructed dirt roads and slow travel speeds. The following environmental protection measures will be implemented to avoid impacts to air quality:

- Diamond core drilling is a wet drilling method and does not generate dust.

- Slash will not be burned. When available, and if approved by the CNF, slash stockpiled from original construction will be scattered in the area after seeding and used as mulch to stabilize disturbed soil and promote vegetation growth. Slash will be spread especially thickly over areas on which erosion is most likely to occur, such as steep slopes.
- One water truck with up to a 2,500-gallon capacity will be used in watering access roads, as needed, on operating days to control dust being generated by vehicular traffic related to the Project.
- Drilling vehicle traffic will be limited to the required access roads relevant to active drilling locations and related activities.
- The speed limit will be 10 mph on all CNF roads and as signed on other roads, such as county roads.
- All engines used in the operations will be equipped with the pollution-control equipment provided by the manufacturer (i.e., catalytic converters, mufflers, and/or spark arrestors).
- Equipment will not be left idling for significant periods of time when not in use.

5.2. WATER QUALITY

AMI will operate the proposed Project in accordance with the requirements of an AZPDES General Permit for Stormwater Discharges Associated with Industrial Activity – Mineral Industry (MSGP). Per the Arizona Department of Environmental Quality’s MSGP program, AMI will implement a Stormwater Pollution Prevention Plan (SWPPP) to minimize and manage stormwater within the Project Area. The SWPPP will describe the BMPs to be implemented by AMI, including sediment/erosion control, good housekeeping, maintenance, inspections, and any required monitoring. SWPPP requirements will be incorporated into all phases of the Project and a copy of the SWPPP will be maintained at the staging area on AMI’s private land.

The environmental protection measures that will be implemented to avoid impacts to water quality are:

- Minimize drill pad size and number of drill pads.
- Minimize exposure of disturbed areas to rainfall by building drill pads only prior to scheduled drilling activity. Regrading and reseeded will be scheduled to commence following completion of drilling to stabilize the site. Concurrent reclamation will reduce the amount of material exposed at any given time and will reduce the possibility of sedimentation or siltation issues.
- Road banks will be sloped toward the uphill bank to discourage sediment from escaping the road prism.
- Retain and preserve existing vegetation, where practicable.
- When available, use branches as wood mulch to stabilize disturbed soil and promote vegetation growth, if approved by the CNF.

- If approved by the CNF, slash stockpiled from original construction will be scattered in the area after seeding. Slash will be spread especially thickly over areas on which erosion is most likely to occur, such as steep slopes.
- Install sediment-control devices prior to surface-disturbing activity. These will include straw wattles or silt fences that will be installed prior to operations on the downhill side of all drill sites and access roads.
- Inspect sediment-control devices on a weekly basis.
- Use water bars to direct runoff to the inner hillsides of roads where velocity-dissipation devices and/or slope drains will be constructed, where practicable.
- Place straw wattles and silt fences perpendicular to the slope at the toe and on the face of the slope to intercept runoff and reduce its flow velocity, release the runoff as sheetflow, and remove sediment from the runoff.
- Should it become evident that an erosion-control component is not performing in the manner necessary to minimize erosion and runoff, corrective measures will be initiated to mitigate the situation.
- Visually inspect waterlines on a daily basis for evidence of damage and leaking.

Seasonal closures due to weather are not expected. However, should short-term cessation of operations due to weather or other actions outside of AMI control occur, implementation of the BMPs outlined above will ensure site stability and minimize erosion during short-term temporary closure periods. Monitoring and inspections will continue on a weekly basis during temporary short-term cessation of operations until the Project resumes. The sump will be filled to 80 percent or less of maximum capacity at any time in case of heavy precipitation events.

5.3. SOLID WASTES

AMI will minimize the solid waste generated during all Project activities. Good housekeeping practices, such as daily removal of waste and unused materials, maintenance of all equipment and vehicles, and immediate cleanup of any spills, will be required of all AMI staff and contractors working on the Project.

General trash, including the remains of food waste, packaging, and empty containers, will be accumulated in 30-cubic-yard roll-off boxes that are staged at the staging area for disposal by Waste Management at the Los Reales Landfill. A portable toilet will be placed at each active drill site and at the staging area, and will be serviced weekly by a contractor. Up to two portable toilets will be used on CNF lands during drilling activities.

Drilling mud and associated water will be removed via hydro-vac at the completion of drilling activities at each pad and the liner will be removed. The pits will then be backfilled with the previously excavated material and the area regraded prior to seeding.

5.4. SCENIC VALUES

The proposed drill sites and temporary low-standard access roads are not located in the viewshed of any nearby (i.e., within 5 miles) CNF trailheads, campsites, natural areas, or wilderness areas. Drilling equipment on all three drill pads and the road connecting those pads to private land may be visible from a short segment (approximately 1 mile) of Harshaw Road adjacent to drilling activities, but these activities will be temporary and of short duration. Historical and recent mining activity on adjacent private lands is part of the landscape within which the Project will occur, so the addition of the three drill sites for approximately 5 months will not be a drastic change to the landscape. Visual impacts from the Project will be reduced by minimizing disturbance for development of the temporary low-standard access roads and drill sites, requirements for good housekeeping practices, implementation of timely reclamation, and limiting public access to the temporary low-standard access roads constructed for the Project.

Specific activities to minimize the visual impacts of the Project include:

- Slash will not be burned. When available, and if approved by the CNF, it will be used as mulch to stabilize disturbed soil and promote vegetation growth. Upon approval by the CNF, slash stockpiled from original construction will be scattered in the area after seeding. Slash will be spread especially thickly over areas on which erosion is most likely to occur, such as steep slopes.
- The dust-control measures discussed above will prevent the generation of dust.
- The BMPs implemented for stormwater control will reduce erosion and sedimentation, and minimize dust generation.
- Lights used for night work and safety will be directed or shielded to minimize nightlight effects to surrounding areas. All lighting will comply with Article 28 of the Santa Cruz County Zoning and Development Code, which limits the total light output requirements for outdoor lighting and sets shielding standards for such lighting (Ordinance No. 2008-04).
- Reclamation activities will be implemented in a timely and concurrent manner as described in **Section 4.3.8.**

5.5. FISH AND WILDLIFE

The Project is not expected to harm or harass any threatened or endangered species, and impacts to wildlife habitat have been minimized to the greatest extent practicable by establishing seasonal restrictions for Project development, by using existing disturbed lands for access wherever possible, and by keeping the overall footprint of disturbance to no more than 1.54 acres.

Biological studies and species surveys for threatened, endangered, and Forest Sensitive Species and/or habitat in the Project Area were initiated in 2012 and are ongoing. These include surveys for:

- 1) Aquatic species, including:
 - a. The threatened Chiricahua leopard frog (*Lithobates chiricahuensis*)^{3,4},
 - b. The endangered Sonora tiger salamander (*Ambystoma movortium stebbinsi*)^{5,6},
 - c. The threatened northern Mexican gartersnake (*Thamnophis eques megalops*)^{1,2},
 - d. The endangered Huachuca water umbel (*Lilaeopsis schaffneriana* ssp. *Recurva*)^{1,2},
 - e. The Huachuca/Canelo Distinct Population Segment (DPS) of the Arizona tree frog (*Hyla wrightorum*)^{1,2}, a candidate for listing under the Endangered Species Act, and
 - f. Springsnail species^{1,2}.
- 2) The threatened western DPS of the yellow-billed cuckoo (*Coccyzus americanus*)^{7,8},
- 3) The threatened Mexican spotted owl (*Strix occidentalis lucida*)^{9,10},
- 4) The northern goshawk (*Accipiter gentilis*)¹¹, a species considered as sensitive by the CNF, and
- 5) The endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)¹².
- 6) Noxious weeds and Forest Service Sensitive plant species that flower before the monsoon season along temporary low-standard access roads and within drill pad locations (WestLand, unpublished data).

No perennial aquatic habitat occurs in the immediate vicinity of the proposed activities. The Sonora tiger salamander was observed more than approximately 2.5 miles from the proposed activities. Yellow-

³ WestLand Resources, Inc. 2013. 2012 Surveys for the Chiricahua leopard frog (*Lithobates chiricahuensis*) and other special-status aquatic species in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. April.

⁴ WestLand Resources, Inc. 2013. Summary of 2013 Surveys for Chiricahua leopard frog (*Lithobates chiricahuensis*) and other special-status aquatic species in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. December.

⁵ WestLand Resources, Inc. 2013. 2012 Surveys for the Sonora tiger salamander (*Ambystoma movortium stebbinsi*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. April.

⁶ WestLand Resources, Inc. 2013. 2013 Surveys for the Sonora tiger salamander (*Ambystoma movortium stebbinsi*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. December.

⁷ WestLand Resources, Inc. 2013. Revised 2012 Survey for yellow-billed cuckoo (*Coccyzus americanus*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. April.

⁸ WestLand Resources, Inc. 2013. 2013 Survey for yellow-billed cuckoo (*Coccyzus americanus*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. December.

⁹ WestLand Resources, Inc. 2013. 2012 Survey for Mexican spotted owl (*Strix occidentalis lucida*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. April.

¹⁰ WestLand Resources, Inc. 2013. Summary of 2013 Survey for Mexican spotted owl (*Strix occidentalis lucida*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. December.

¹¹ WestLand Resources, Inc. 2013. Summary of 2013 Survey for northern goshawk (*Accipiter gentilis*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. December.

¹² WestLand Resources, Inc. 2013. 2012 Surveys for lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) in the Patagonia Mountains, near Harshaw, Arizona. Prepared for Arizona Minerals, Inc. April.

billed cuckoos have been detected along drainages within 0.25 mile of the Project Area. However, Project activities will occur outside the breeding season of the species, and thus the species will not be present during Project activities. No impacts to yellow-billed cuckoos are anticipated. Lesser long-nosed bats are known to forage in the vicinity of the proposed activities, but no roosts occupied by lesser long-nosed bats are known from the area immediately surrounding the proposed activities.

No Mexican spotted owls (MSO) or northern goshawks were observed during surveys in the Project Area or its vicinity in 2012 or 2013, and none have been detected in the Project Area. Ongoing MSO surveys in 2016 have identified an MSO pair within a Protected Activity Center (PAC) approximately 0.7 mile from the Project Area (WestLand, unpublished data). Noise analyses indicate that predicted noise levels at this PAC boundary will be less than 47 dBA (WestLand, unpublished data), well below the 69 dBA threshold identified by the U.S. Fish and Wildlife Service as the level above which MSO might be impacted by noise¹³. Analysis of nighttime light levels indicates that the highest lighting levels will be restricted to those areas adjacent to drilling activities and that the level of light will attenuate with distance from the light source. The location where the MSO pair has been recently observed in the closest PAC to the Project Area will not be affected by nighttime lighting from drilling activities, as this area is within an incised canyon (Alum Gulch); horizontal lighting from drilling activities will not reach this canyon (WestLand, unpublished data).

No Forest Service Sensitive species have been detected along the temporary low-standard access roads and drill pads (WestLand, unpublished data).

The proposed Project will be conducted in a manner that minimizes disturbance to habitat and wildlife species to the extent practicable while allowing for safe access and completion of drilling operations in accordance with the Project purpose.

The environmental protection measures that will be implemented to avoid and minimize potential adverse impacts to wildlife include:

- Open mud pits at occupied and unoccupied drill sites will be enclosed to minimize wildlife ingress.
- The removal of trees 12 inches dbh or greater will be minimized to the extent practicable.
- Agaves encountered during the construction of roads and drill pads will be relocated above the cut slopes.
- Project activities will occur outside the yellow-billed cuckoo breeding season (June 1–September 30).

5.6. CULTURAL RESOURCES

The Project is not expected to adversely impact any cultural resources that would be considered eligible for inclusion in the National Register of Historic Places. Class I and Class III cultural resources surveys to determine the presence and/or absence of cultural resources (prehistoric, historical, and

¹³ U.S. Fish and Wildlife Service. 2012. Final Recovery Plan for the Mexican Spotted Owl (*Strix occidentalis lucida*), First Revision. U.S. Fish and Wildlife Service. Albuquerque, New Mexico, USA. 413 pp.

tribal considerations) within the proposed drill pads and temporary low-standard access roads, as well as an area of 160 acres surrounding proposed activities, have been completed.¹⁴ The cultural resource survey report is currently in review by the CNF. Based on these surveys, all cultural resources in the vicinity of the Project will be avoided and thus no impacts to cultural resources will result from the proposed activities.

All personnel involved in any surface disturbance operations will be instructed on site-avoidance requirements and procedures. This training will be conducted for all personnel prior to initial site mobilization and will be provided to new personnel on their first day of work.

Should previously unidentified cultural resources be identified during the course of the proposed activities, AMI will cease operations in the area of the remains and immediately notify the CNF Archaeologist. AMI and their contractors will also be reminded that all ground-disturbing activities have the potential to result in the inadvertent discovery of human remains and other cultural items. Pursuant to the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (Public Law 101-601; 25 U.S.C. 3001-3013), if Native American human remains, associated funerary objects, unassociated funerary objects, objects of cultural patrimony, or sacred objects are encountered anywhere in the Project Area during ground-disturbing activities, all activity shall cease in the area of the discovery and the CNF Archaeologist shall be immediately notified. All ground-disturbing activities in the immediate vicinity of the discovery shall cease until a qualified archaeologist assesses the significance of the remains. Work in and around the area shall not resume until so directed by CNF personnel.

5.7. HAZARDOUS SUBSTANCES

5.7.1. General

The Safety Data Sheets (SDSs), formerly known as Material Safety Data Sheets (MSDSs), for the materials planned for use in the proposed Project will be kept on site at all times during Project activities. These are attached to this Plan in **Appendix B**. All downhole additives, well construction materials, and hazardous substances, including petroleum products (diesel fuels, oil/lubricants), cleaning chemicals, contingency welding supplies, and other materials to be used in the drilling program, are identified in **Appendix B**. Note that very few of these materials have Reportable Quantities (RQs) as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in Title 40 Code of Federal Regulations Parts 116–117 because the materials are either exempt as petroleum products or they do not meet the hazard criteria.

The drill rigs and support vehicles use several petroleum products, including diesel fuel or gasoline, motor oil, hydraulic oil, and deck engine oil. Many of the sealants used for downhole equipment and tooling will be bentonite-based products, and the liquid oils or lubricants such as fish oil are considered “environmentally friendly.” Thus, while some of the materials may contain components that, under

¹⁴ Stone, B. W. et al. 2016. A Cultural Resources Inventory of Approximately 160 Acres of Coronado National Forest Land for Possible Mineral Exploration Activities in Santa Cruz County, Arizona. Prepared by WestLand Resources, Inc., for Arizona Minerals, Inc.

special circumstances, may be hazardous to human health, no materials—other than petroleum products—pose a significant threat to the natural environment. Drill fluid additives will be used to thicken and condition the drilling water. Some of these products (such as bentonite gel) are in powder form and come in plastic-lined paper bags weighing approximately 50 pounds. Other drill fluid additives, including EZ Mud Plus and Quik Gel Gold, as well as similar products, are commonly used in the drilling industry and are essential to core drilling in the geological formations under the Project Area. (See **Appendix B** for additional information on these and other materials that will be used.)

A limited amount of fuel will be contained in the fuel tanks of the equipment used on the Project Area. No more than a total of 5 gallons of fuel will be stored in the gear boxes of the equipment on the drill pads. The total estimated volume of fuel contained in the tanks and gear boxes of the equipment on the Project Area at one time is outlined below and will be less than 825 gallons:

- Drill truck (2) – 60 gallons; 120 gallons
- Water truck – 90 gallons
- Service truck – 30 gallons
- Excavator (2) – 100 gallons; 200 gallons
- Dozer – 90 gallons
- Loader (2) – 100 gallons; 200 gallons
- John Deere 210 LE with Gannon attachment – 18 gallons
- Hydro-vac – 15 gallons
- Chainsaws (6) – 0.25 gallon each; 1.5 gallons
- Light plants (2) – 30 gallons each; 60 gallons

Diesel fuel will continue to be supplied by tanker truck to a contractor-furnished storage tank located at the staging area on AMI-owned property; AMI has an existing Spill Prevention, Control, and Countermeasures (SPCC) Plan for the storage of petroleum-based materials. To prevent any spills from leaving AMI property, AMI will implement the spill contingency plan procedures documented in **Appendix C – Spill Response Procedures**. The spill contingency plan starts with potential spill anticipation and cognizance, with a focus on prevention.

Drilling contractors will be provided with diesel fuel from the contractor-furnished storage tank, which is equipped with a spill-containment barrier of sufficient capacity to contain a volume of fluid equivalent to the capacity of the tank plus the quantity of rainfall resulting from a 100-year, 24-hour rainfall event. Fuel will be brought to the fuel rigs via service truck with a fuel tank. The drill rigs consume approximately 120 gallons per day of diesel fuel each.

As a priority, and to the extent that it is practicable to do so, all heavy equipment and support vehicles will be fueled at the staging area on AMI property. The fueling of drill rigs, support vehicles, and portable field equipment involved in dedicated work away from the staging area will be accomplished using National Fire Protection Agency (NFPA) 1192, American National Standards Institute (ANSI) 119.2-rated pickup-born fuel tanks of limited capacity that are equipped with electric fuel pumps. These portable tanks are typically used by construction and contracting personnel. Actual fueling will

take place over a portable containment vessel of sufficient size to capture any spillage. Spill kits containing leak pans, rags, granular sorbents, and/or blotters will be maintained at the staging area and on fueling pickup trucks to be used to clean any leaks, spillage, or drips. Any used absorbent material will be contained within a lidded barrel for proper disposal off site.

Hydraulic oil and motor oil will be delivered to and stored at the staging area. The fluids will arrive in 5-gallon containers and will be stored on wooden pallets in a secure enclosure to prevent theft, vandalism, and accidental spillage. The enclosure will be equipped with a secondary containment curb or berm such that the volume of containment is equivalent to the capacity of the largest container plus the quantity of rainfall resulting from a 100-year, 24-hour rainfall event. These measures will prevent any spilled material from leaving AMI's property. Immediate cleanup will prevent the contamination of any runoff that may exit private land and enter CNF lands.

All petroleum products will be stored on AMI private land. Lubricating grease will be delivered in point-of-use containers such as grease cartridges. These materials will be stored in the same secure area that holds the hydraulic and motor oils. Drill fluid additives will be used to thicken and condition the drilling water in both liquid and powder forms. These and other similar products are commonly used in the drilling industry and are essential to core drilling in the geological formations under the Project Area.

Onsite storage of drill consumables, including drill fluid products, will be held to a minimum. Bagged items will be stored on wooden pallets and protected from weather using plastic sheeting. Liquids contained in plastic containers will be stored on wooden pallets or equivalent.

All refuse and debris generated by the use of these products will be disposed of as general trash as presented in **Section 5.3**.

5.7.2. Spill Prevention, Control, and Reporting

Diesel fuel will continue to be supplied by tanker truck to a contractor-furnished storage tank located at the staging area on AMI-owned property; AMI has an existing SPCC Plan for this tank.

AMI has developed Spill Response Procedures in order to address spill prevention, containment, notification, and cleanup measures. Details of these procedures are provided in **Appendix C – Spill Response Procedures**.

5.8. HEALTH AND SAFETY

5.8.1. Crew Health, Safety, and Emergency Services

Vehicles and rigs are equipped with first aid kits. A small family medical facility is located in the town of Patagonia, but is only available during normal business hours. The Patagonia Fire Department includes emergency medical technician (EMT) service and helicopter landing facilities. The nearest

hospital facilities are located in Nogales. Serious cases are transported to one of Tucson's large hospitals by ambulance or helicopter. The U.S. Border Patrol, which has major stations in Sonoita and Nogales, heavily patrols the region by land and air, and assists local law enforcement and emergency medical services.

5.8.2. Fire Prevention and Control

AMI will implement the following measures for the prevention and control of fires during the course of the Project:

- All combustion engine equipment, including chainsaws, will be equipped with spark arrestors installed by the manufacturer.
- Welding, cutting, and other hot work activities that create sparks will be done in the staging area and must be done in clear areas that are free of combustible materials. These activities require the presence of fire-suppression equipment.
- All vehicles will be equipped with a working fire extinguisher and a shovel. Drill rigs will be equipped with a filled water tank during periods of operation.
- Campfires or uncontained fires of any kind will be prohibited.
- The crew contingency plan will include a fire communications protocol for contacting firefighting personnel.
- The Project will comply with fire restrictions and/or red flag warning day guidelines.

5.9. NOXIOUS WEED CONTROL

Timely and concurrent reclamation will be conducted for all drill sites and associated access routes within the Project Area as described in **Section 4.3.8**. Surveys conducted by WestLand in 2016 along proposed temporary low-standard access roads and drill pads did not detect any noxious weeds (WestLand, unpublished data).

AMI will also implement BMPs to eliminate or minimize the introduction and spread of noxious weeds and invasive species during the Project. These include:

- All straw wattles used on site to reduce soil erosion will be composed of non-invasive plant species.
- All drill and excavator rigs and equipment will be rinsed and inspected for noxious or invasive species before they enter the CNF to begin the Project.

5.10. INTERIM SHUTDOWN PROCEDURES

No extended interim shutdown periods are anticipated. If such a period occurs due to inclement weather or seasonal restrictions, the following requirements will be observed:

- All pieces of motorized equipment will be underlain by absorbent spill pads.
- Installed sediment-control measures such as straw wattles and silt fences will be inspected prior to the shutdown and weekly during the shutdown.
- Fuel and other chemicals will be removed from the site and taken to the staging area.

The determination to temporarily suspend exploration and implement a shutdown will be based on the proper functioning of BMPs. Exploration will remain suspended until surface runoff and erosion risks return to manageable conditions and all BMPs are functioning within their design capacities or until the end of seasonal restrictions.

5.11. INSPECTIONS

The Forest Service and the operator will agree on a schedule and logistics of inspections designed to ensure that the provisions of the Plan are followed.

6. FOREST SERVICE EVALUATION OF PLAN OF OPERATIONS

6.1. REQUIRED CHANGES/MODIFICATIONS/SPECIAL MITIGATION FOR PLAN OF OPERATIONS

6.1.1. Bond

Reclamation of all disturbances connected with this Plan of Operations is covered by Reclamation Performance Bond No. _____, dated (mm/dd/yy), signed by (Principal) and (Surety), for the penal sum of _____. This Reclamation Performance Bond is a guarantee of faithful performance with the terms and conditions listed below, and with the reclamation requirements agreed upon in the Plan of Operations. This Reclamation Performance Bond also extends to and includes any unauthorized activities conducted in connection with this operation.

The bond amount for this Reclamation Performance Bond was based on a bond calculation worksheet. The bond amount may be adjusted during the term of this proposed Plan of Operations in response to changes in the operations or changes in the economy. Both the Reclamation Performance Bond and the bond calculation worksheet are attached to and made part of this Plan of Operations.

Acceptable bond securities (subject to change) include:

Negotiable Treasury bills and notes which are unconditionally guaranteed as to both principle and interest in the amount equal at their par value to the penal sum of the bond; or

Certified or cashier's check, bank draft, Post Office money order, cash, assigned certificate of deposit, assigned savings account, blanket bond, or an irrevocable letter of credit equal to the penal sum of the bond.

7. TERMS AND CONDITIONS

If a bond is required, it must be furnished before approval of the Plan of Operations.

Information provided with this Plan marked confidential will be treated in accordance with the agency's laws, rules, and regulations.

Approval of this Plan does not constitute certification of ownership to any person named herein and/or recognition of the validity of any claim named herein.

Approval of this Plan does not relieve Arizona Minerals, Inc., of their responsibility to comply with other applicable state or federal laws, rules, or regulations.

If previously undiscovered cultural resources (historical or prehistoric objects, artifacts, or sites) are exposed as a result of operations, those operations will not proceed until notification is received from the Authorized Officer that provisions for mitigating unforeseen impacts as required by 36 CFR 228.4(e) and 36 CFR 800 have been complied with.

This Plan of Operations has been approved for a period of _____ or until (mm/dd/yy). A new or revised plan must be submitted in accordance with 36 CFR part 228, subpart A if operations are to be continued after that time period.

8. OPERATING PLAN ACCEPTANCE

I/We have reviewed and agreed to comply with all conditions in this Plan of Operations, including the required changes, modifications, special mitigation, and reclamation requirements.

I/We understand that the bond will not be released until the Authorized Officer in charge gives written approval.

Operator (or Authorized Representative)

Date

9. OPERATING PLAN APPROVAL

Name

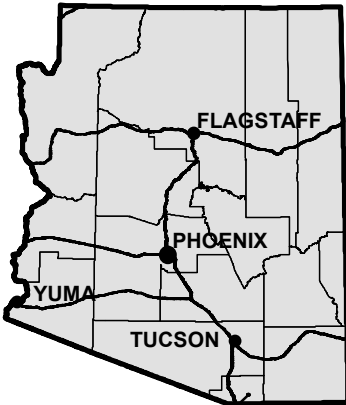
Title

Authorized Officer

Date

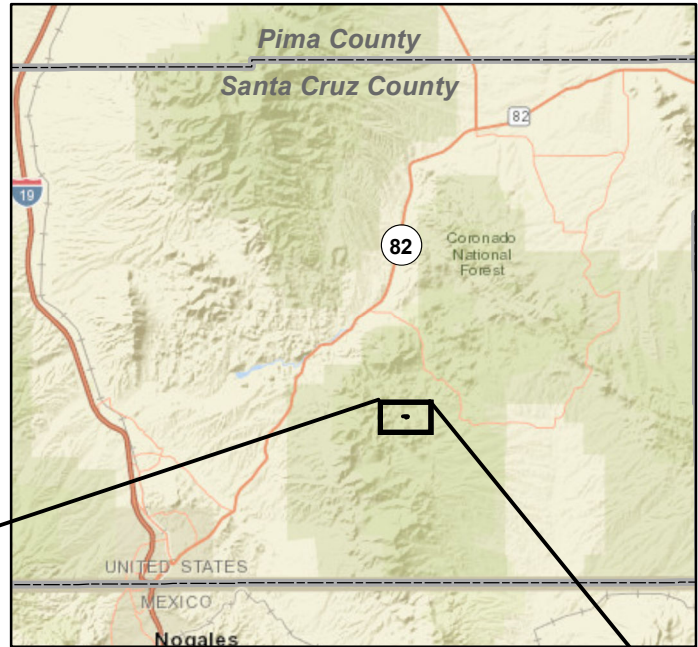
FIGURES

ARIZONA

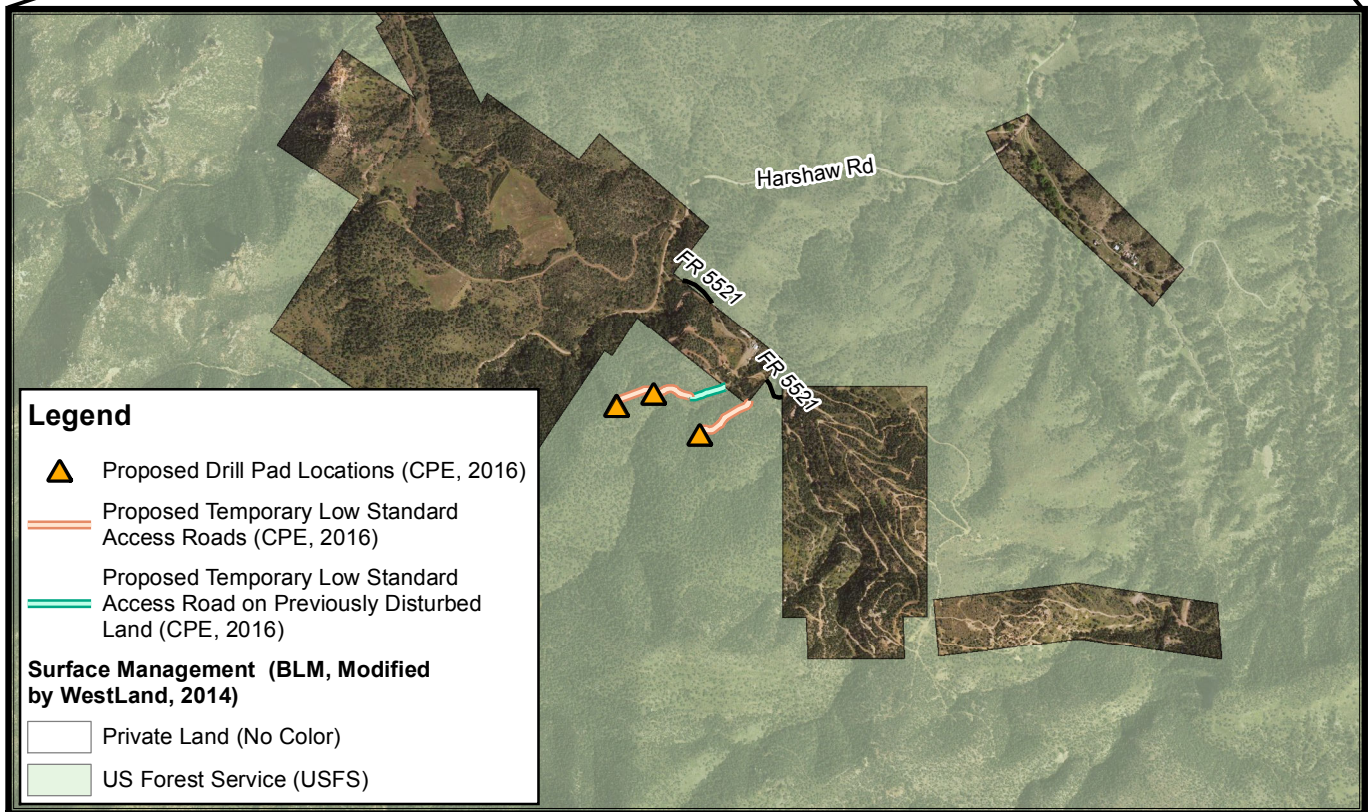


PROJECT
LOCATION

SANTA CRUZ COUNTY

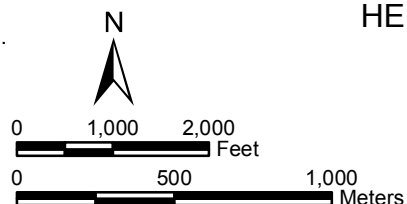


Approximate Scale 1 Inch = 10 Miles



T23S, R16E, Portion of Section 4, (Unsurveyed, Protracted)
 Santa Cruz County, Arizona,
 Harshaw (2014) USGS 7.5' Quadrangle
 Image Source: ArcGIS Online, Street Map and NAIP 2015.

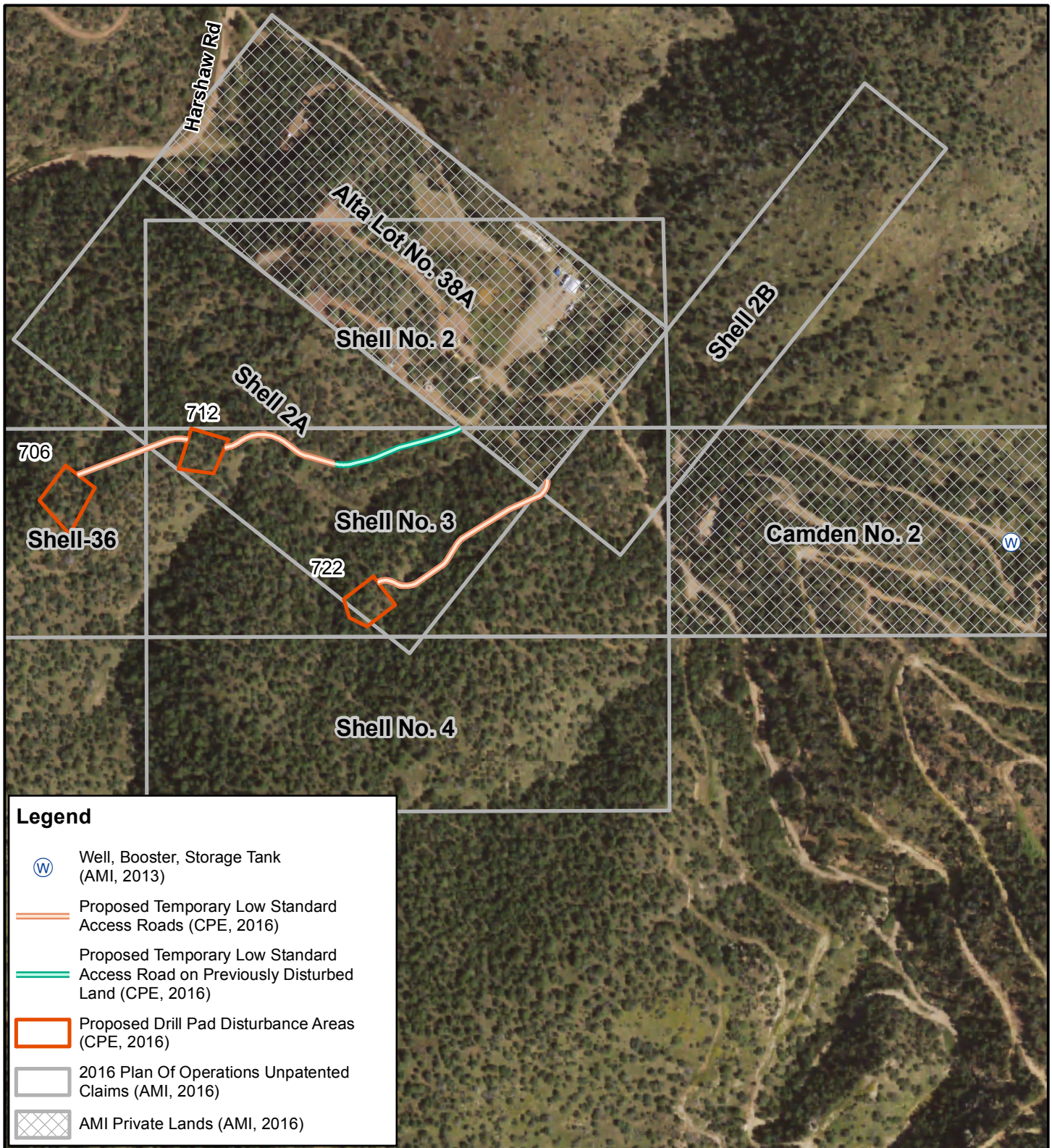
Note: Symbol size for drill pads and line width for temporary low standard roads are for illustration purposes and not representative of the actual area of disturbance.



ARIZONA MINERALS, INC. HERMOSA TAYLOR DEPOSIT DRILLING PROJECT

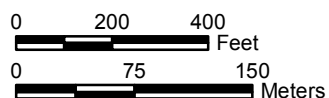
Plan of Operations

VICINITY MAP
 Figure 1



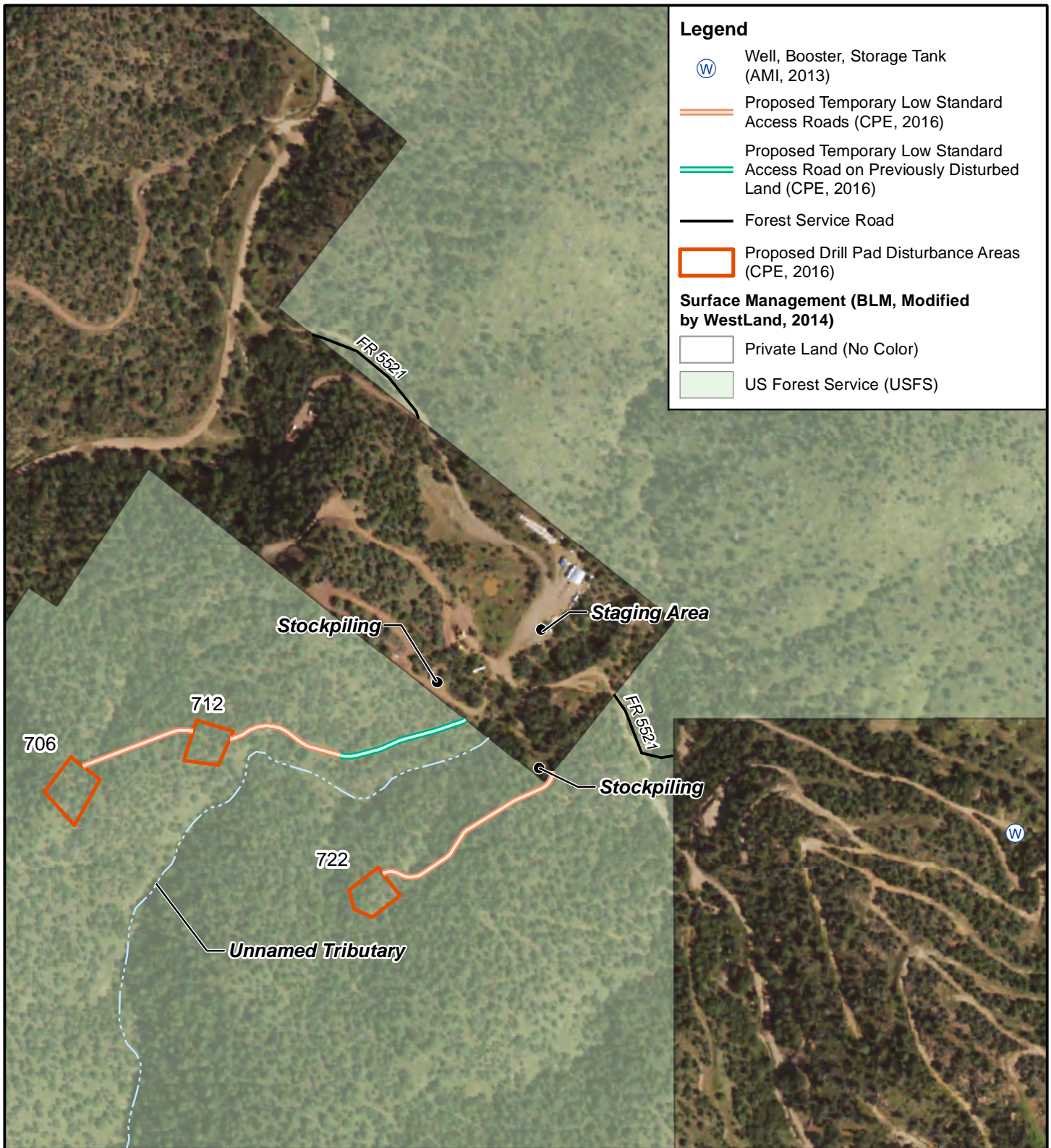
T23S, R16E, Portion of Section 4, (Unsurveyed, Protracted)
 Santa Cruz County, Arizona,
 Image Source: NAIP 2015.

Note: Line width for temporary low standard roads
 are for illustration purposes and not representative
 of the actual area of disturbance.



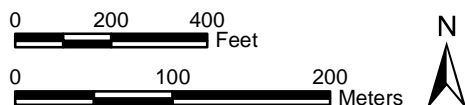
ARIZONA MINERALS, INC.
 HERMOSA TAYLOR DEPOSIT
 DRILLING PROJECT
 Plan of Operations

CLAIMS MAP
 Figure 2



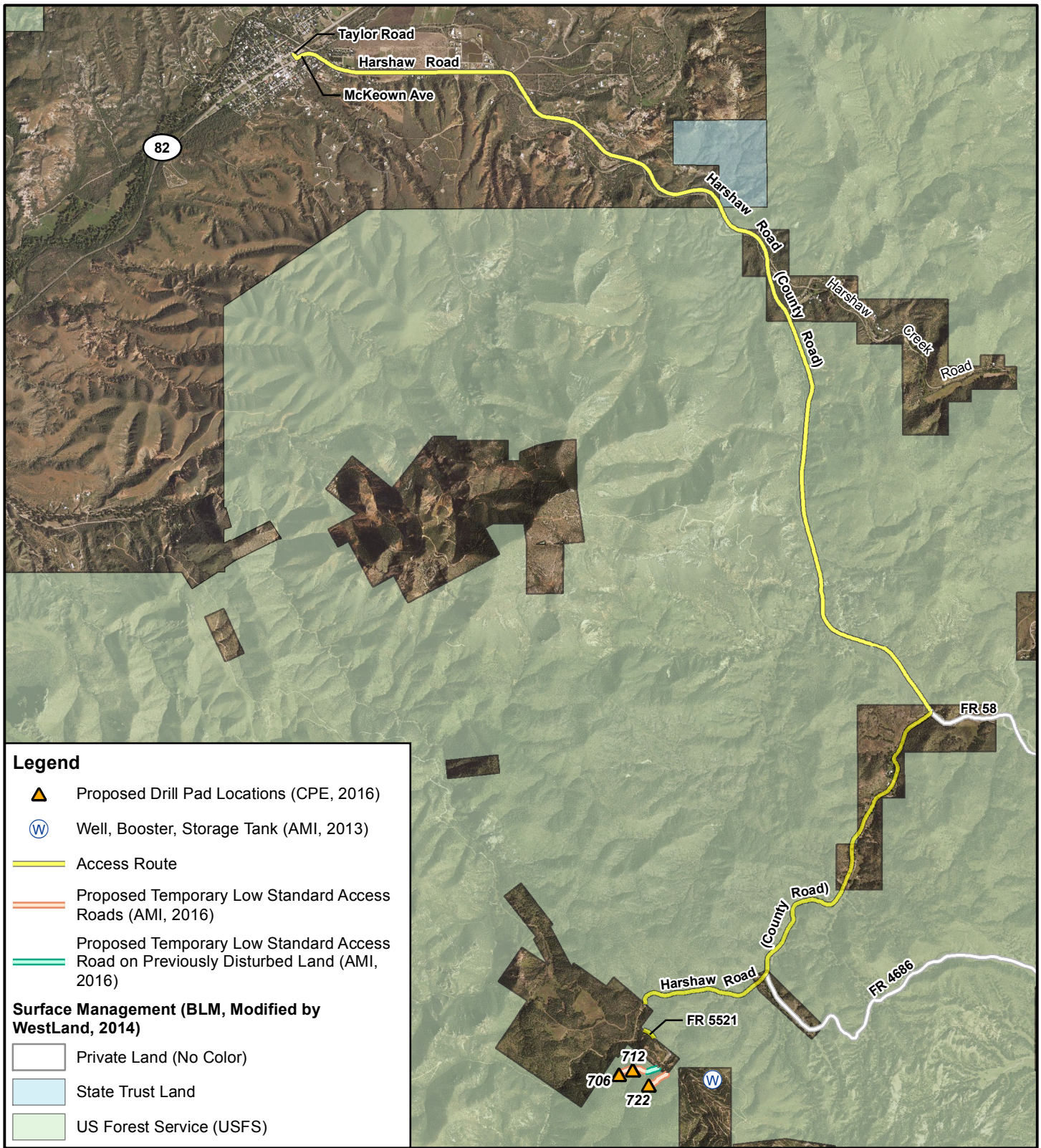
T23S, R16E, Portion of Section 4, (Unsurveyed, Protracted)
 Santa Cruz County, Arizona,
 Image Source: NAIP 2015.

Note: Line width for temporary low standard roads are for illustration purposes and not representative of the actual area of disturbance.



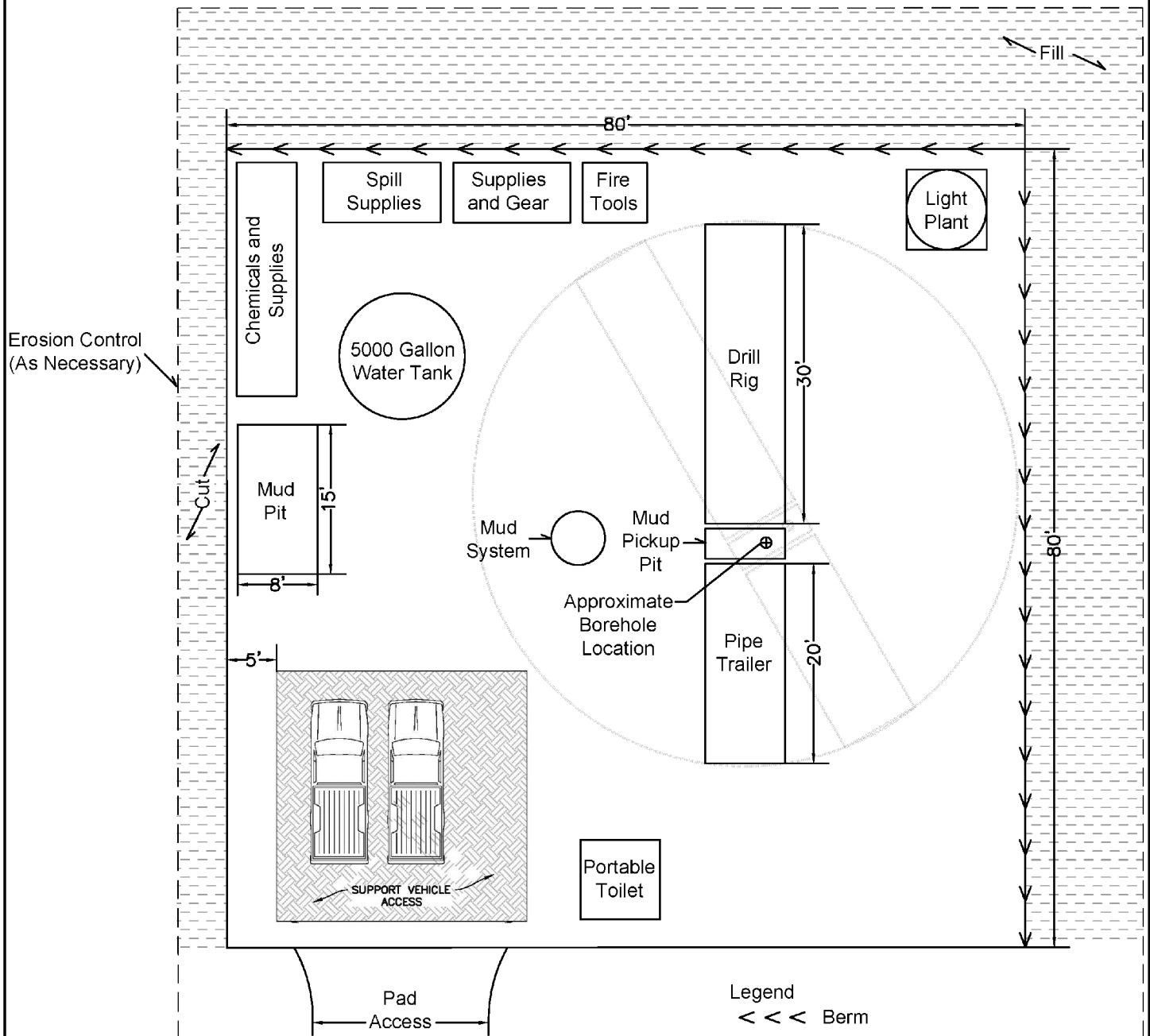
ARIZONA MINERALS, INC. HERMOSA TAYLOR DEPOSIT DRILLING PROJECT Plan of Operations

PROJECT AREA
 Figure 3



ARIZONA MINERALS, INC.
 HERMOSA TAYLOR DEPOSIT
 DRILLING PROJECT
 Plan of Operations

ACCESS ROUTE
 Figure 4



NOTES:

1. Size of equipment and materials are approximate.
2. Orientation of equipment and materials will be adjusted onsite within the pad area.
3. Erosion control measures to be placed on the downgradient side(s) of the pad in accordance with the SWPPP.
4. Location of cut/fill slopes depending on terrain.
5. Mud Pit typically located on cut side.
6. Drill Rig will be repositioned to drill multiple holes on each pad. As needed, supplies will be repositioned to accommodate this movement and is why an 80' x 80' working area is needed.
7. A safety berm is constructed on the pad where necessary.

ARIZONA MINERALS, INC. HERMOSA TAYLOR DEPOSIT DRILLING PROJECT Plan Of Operations

REPRESENTATIVE DRILL PAD LAYOUT

Figure 5

APPENDIX A
Temporary
Low-standard
Access Road and
Pad Plans

**HERMOSA TAYLOR DEPOSIT DRILLING PROJECT
PLAN OF OPERATIONS**

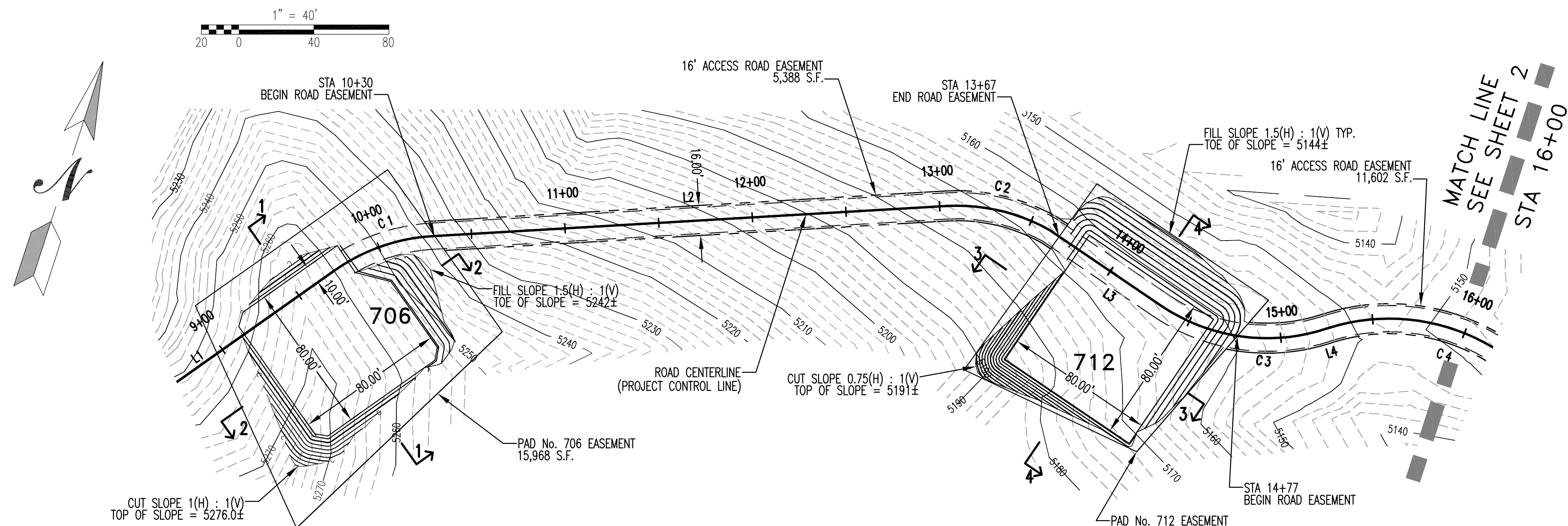
**Appendix A – Temporary Low-standard Access Road
and Pad Plans**

Arizona Minerals, Inc.

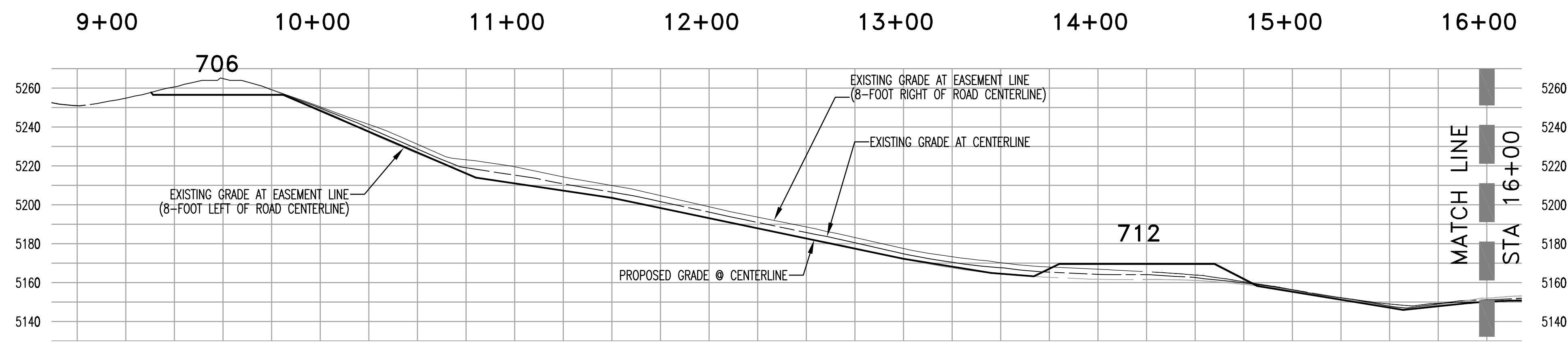
Prepared for:

United States Department
of Agriculture Forest Service
Coronado National Forest
300 West Congress Street
Tucson, Arizona 85701

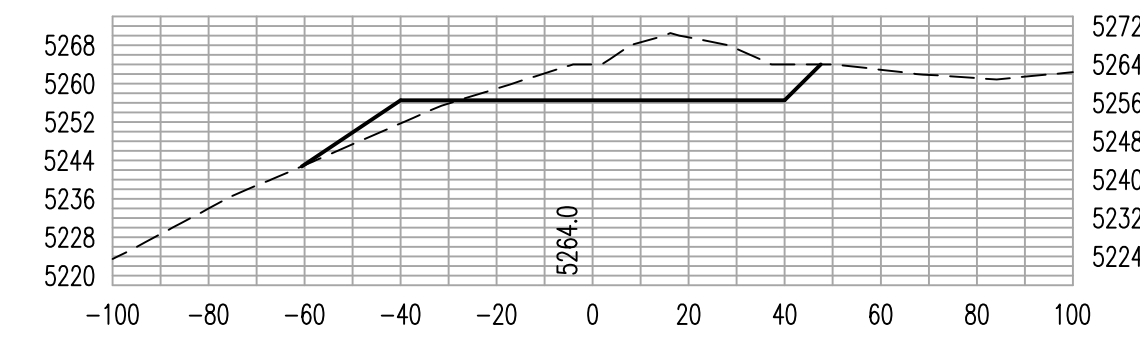
April 1, 2016
(Revised July 27, 2016)



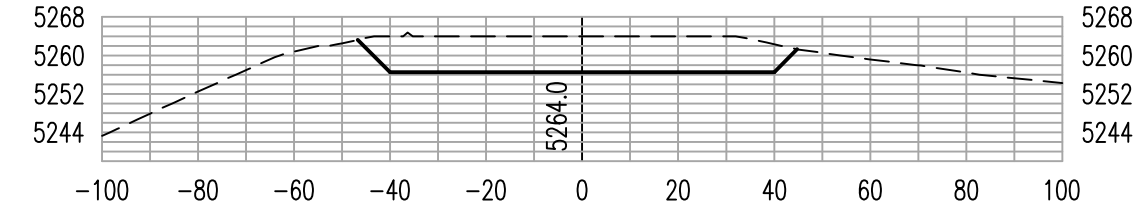
PLAN AND PROFILE STA 9+00 TO STA 16+00



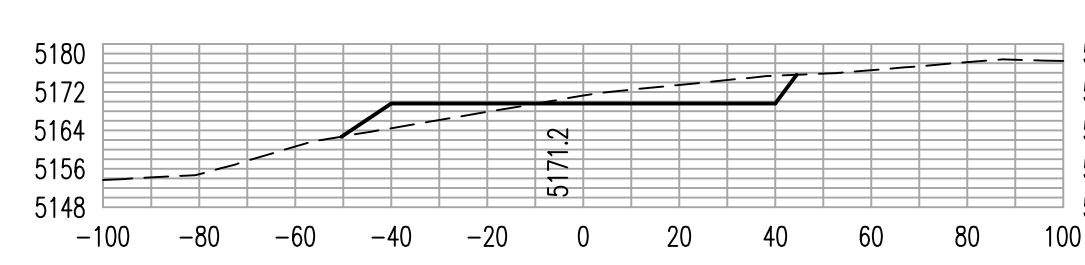
PAD 706 SECTION 2 - 2



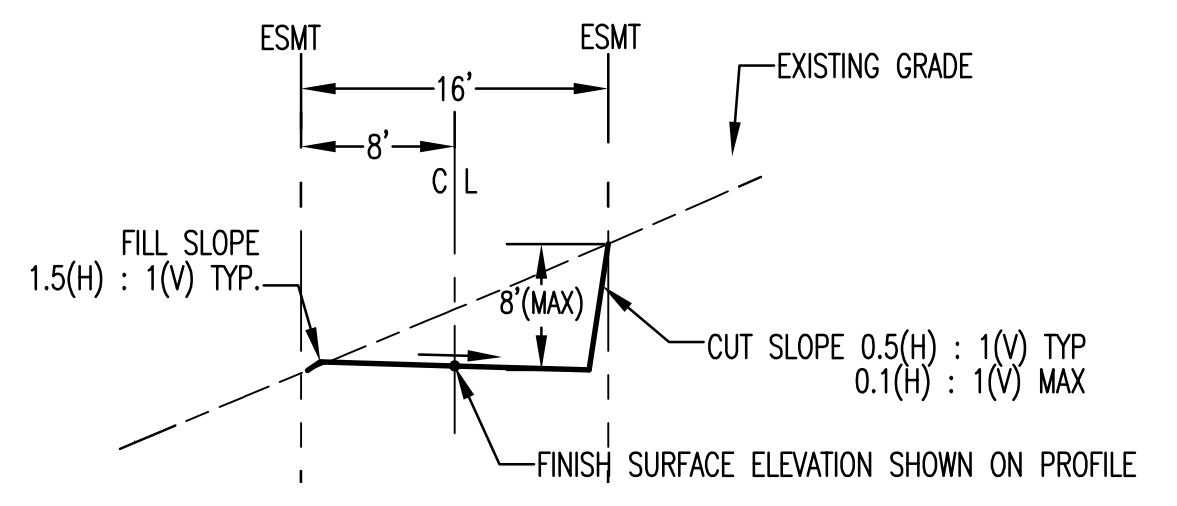
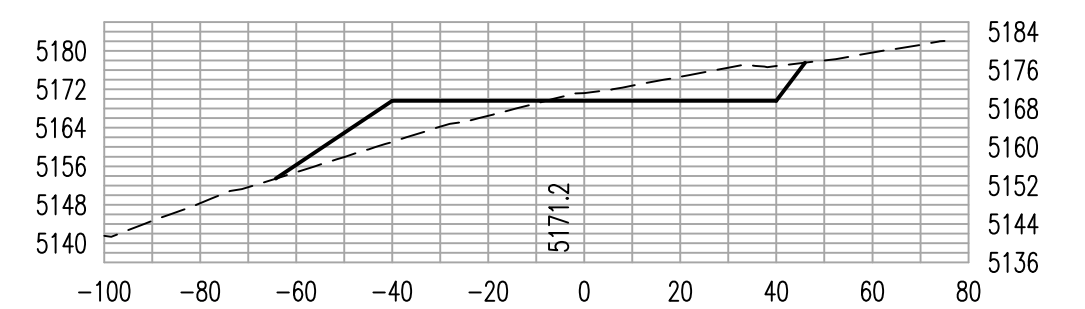
PAD 706 SECTION 1 - 1



PAD 712 SECTION 3 - 3



PAD 712 SECTION 4 - 4



TYPICAL ROAD SECTION

* EARTHWORK QUANTITY TABLE

	DISTURBANCE AREA (S.F.)	CUT (C.Y.)	FILL (C.Y.)	NET (C.Y.)
PAD No. 706	15,968	1,800	118	1682 (CUT)
PAD No. 712	11,987	900	900	0
ACCESS ROAD	16,990	1,220	14	1,206 (CUT)

* APPROXIMATE QUANTITIES, MAY VARY DUE TO ACTUAL CONDITIONS

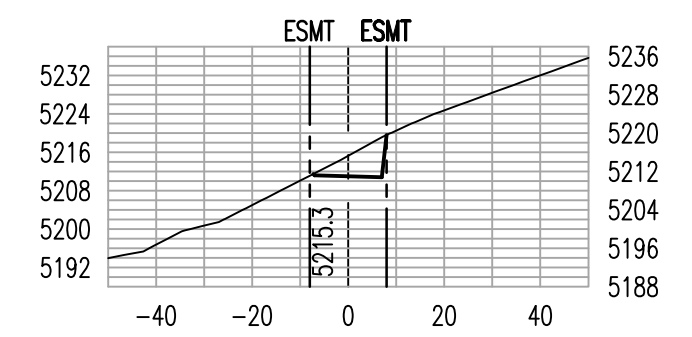
CENTERLINE LINE TABLE		
LINE	LENGTH	BEARING
L1	173.33'	N36°42'56"E
L2	274.94'	N68°38'10"E
L3	71.99'	S73°50'02"E
L4	2.06'	N54°13'00"E

CENTERLINE CURVE TABLE			
CURVE	LENGTH	RADIUS	DELTA
C1	55.71'	100.00'	31°55'14"
C2	57.05'	100.00'	32°41'19"
C3	91.58'	100.74'	52°04'56"
C4	32.48'	107.21'	70°48'03"

NOTES

1. ACCESS ROAD HORIZONTAL ALIGNMENT MAY REQUIRE FIELD ADJUSTMENT.
2. PAD ELEVATIONS MAY VARY BASED ON LOCAL SOIL CUT/FILL SLOPE STABILITY.

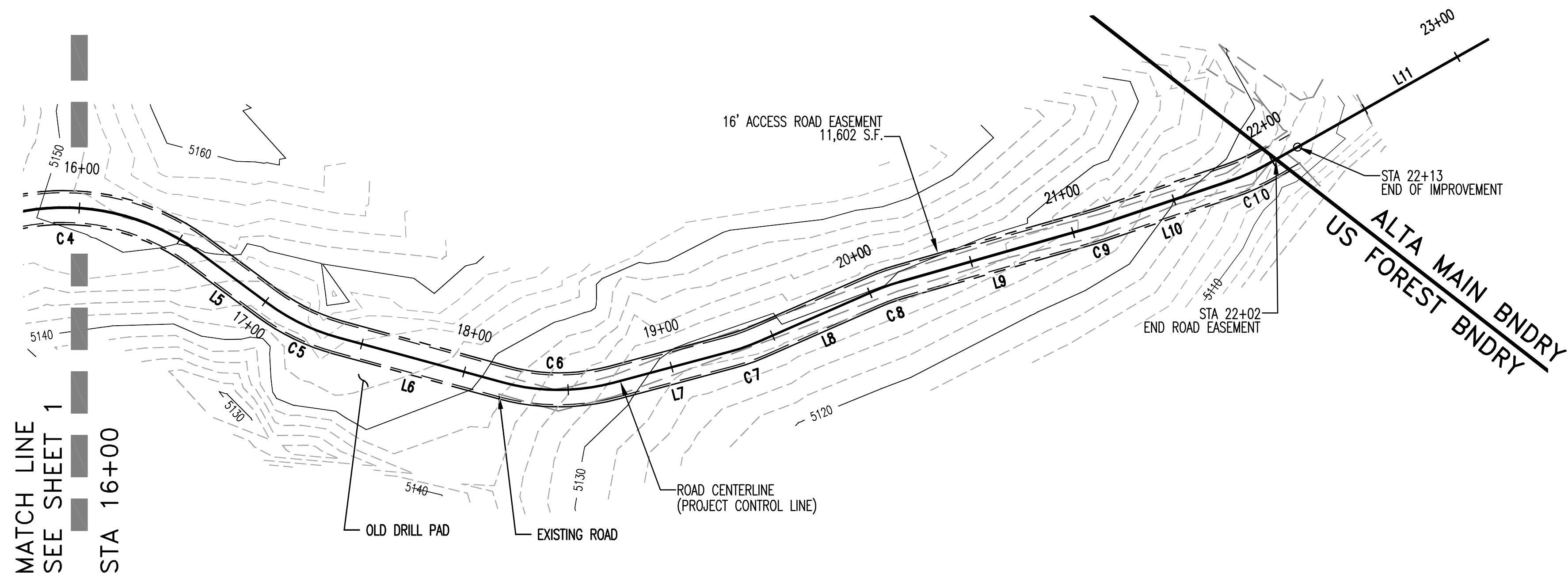
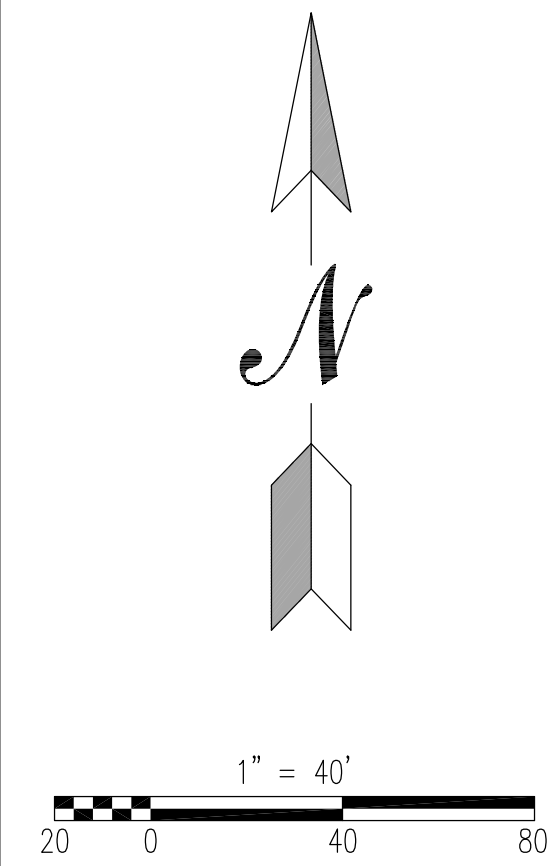
ACCESS ROAD CROSS SECTION AT STA 11+00



DATE	05/20/16
DESIGNED BY	MC
DRAWN BY	MC
CHECKED BY	JLF
PROJ. ENGR.	RFP

US FOREST EXPLORATION ROADS
PADS No. 706, 712, AND 722
ACCESS ROAD TO PADS No. 706 AND 712.
PLAN, PROFILE, PAD AND ROAD SECTIONS
EARTHWORK QUANTITIES

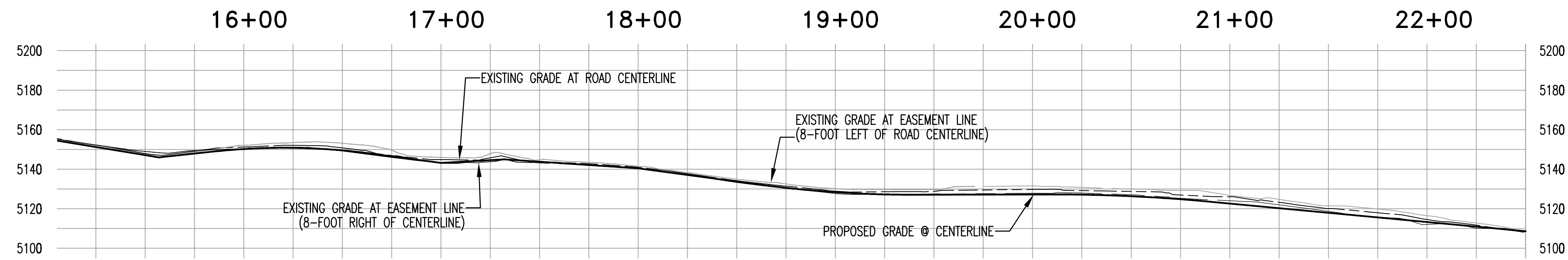
NO.	REVISION DESCRIPTION	DIV - SECT. ENGR.	DATE



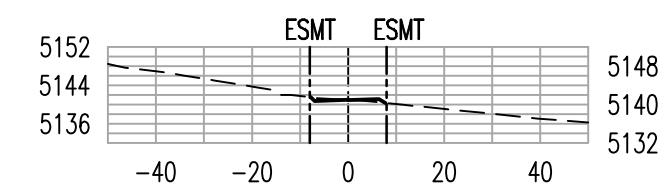
CENTERLINE CURVE TABLE			
CURVE	LENGTH	RADIUS	DELTA
C4	32.48'	107.21'	70°48'03"
C5	37.27'	100.00'	21°21'18"
C6	52.61'	100.00'	30°08'26"
C7	15.34'	100.00'	8°47'13"
C8	13.64'	100.00'	7°48'50"
C9	4.73'	100.00'	2°42'39"
C10	19.02'	100.00'	10°54'02"

CENTERLINE LINE TABLE		
LINE	LENGTH	BEARING
L5	42.09'	S53°24'14"E
L6	80.40'	S74°45'33"E
L7	56.58'	N75°06'01"E
L8	58.26'	N66°18'49"E
L9	92.98'	N74°07'39"E
L10	64.85'	N71°25'00"E
L11	152.45'	N60°30'58"E

PLAN AND PROFILE STA 16+00 TO STA 22+13



ACCESS ROAD CROSS SECTION AT STA 18+00

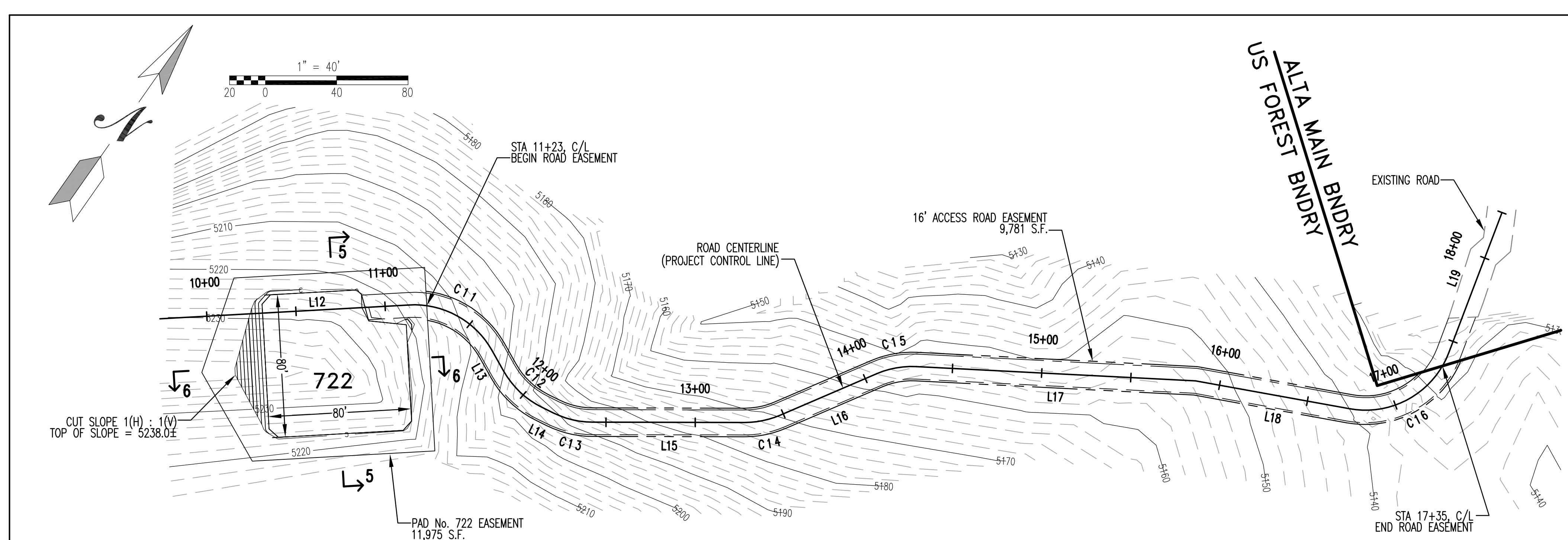


DATE	05/2016
DESIGNED BY	MC
DRAWN BY	MC
CHECKED BY	JLF
PROJ. ENGR.	REP

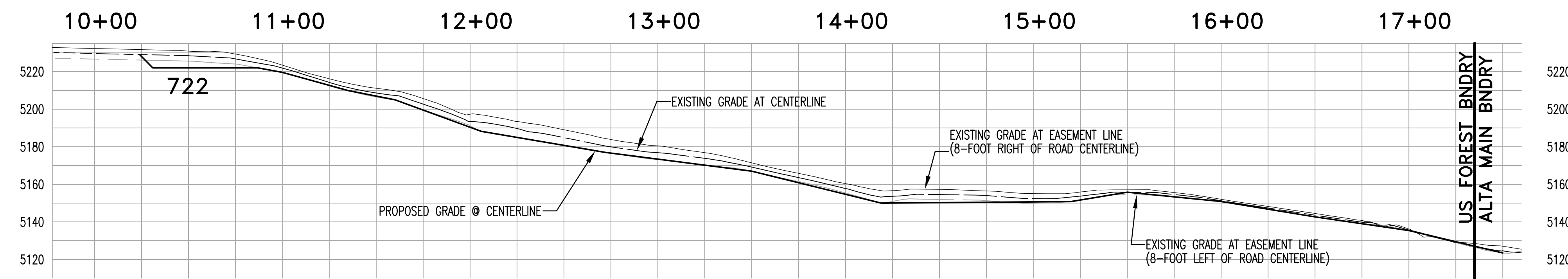
US FOREST EXPLORATION ROADS
PADS No. 706, 712, AND 722
ACCESS ROAD TO PADS No. 706 AND 712.
PLAN AND PROFILE, ROAD CROSS SECTION

NO.	REVISION DESCRIPTION	DIV - SECT. ENGR.	DATE

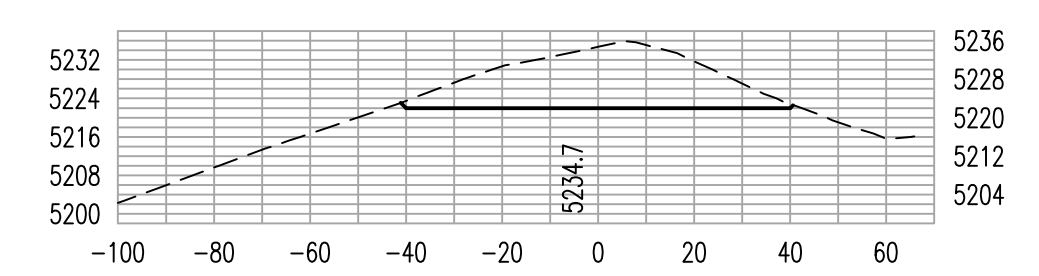
CPE JOB NO. 375
CONSULTANTS
3895 N. Business Center Drive, Suite 115
Bozeman, MT 59706
520.546.7001



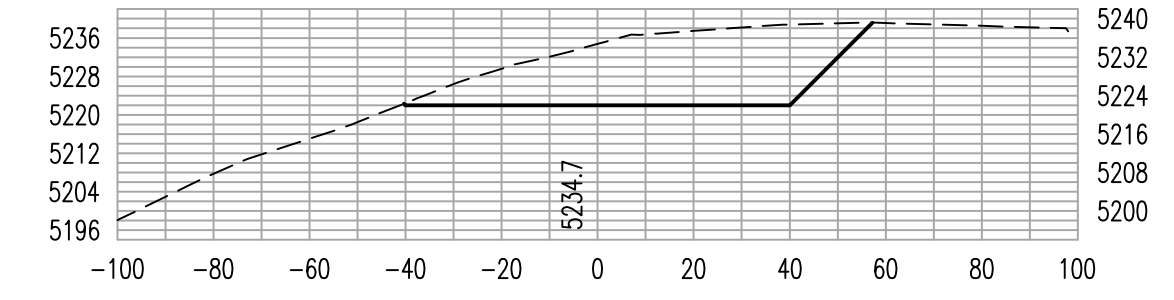
PLAN AND PROFILE STA 9+00 TO STA 16+00



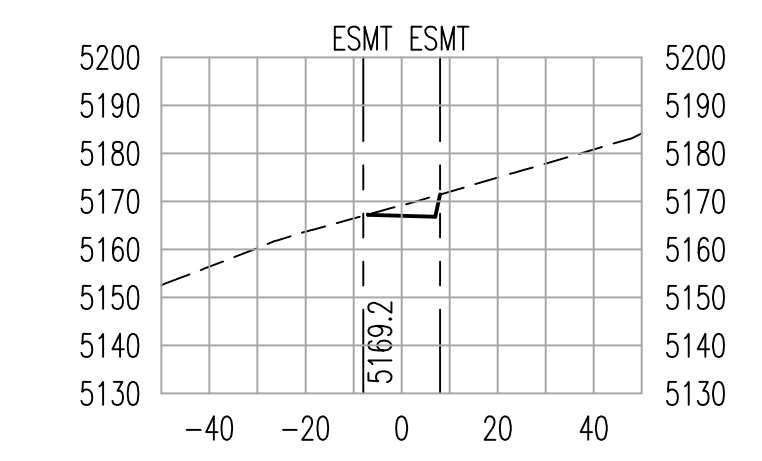
PAD 722 SECTION 5 - 5



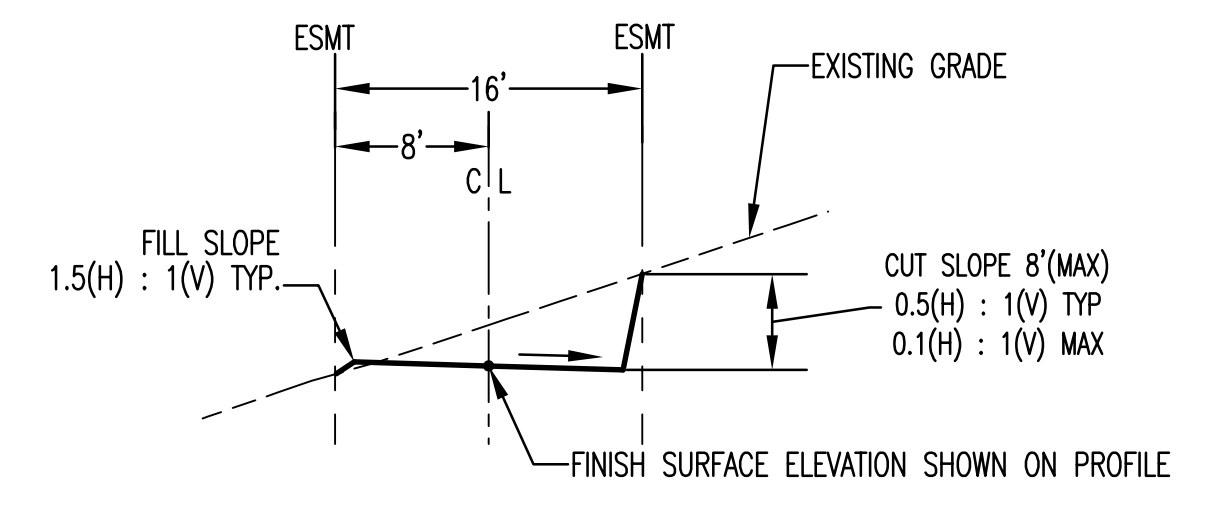
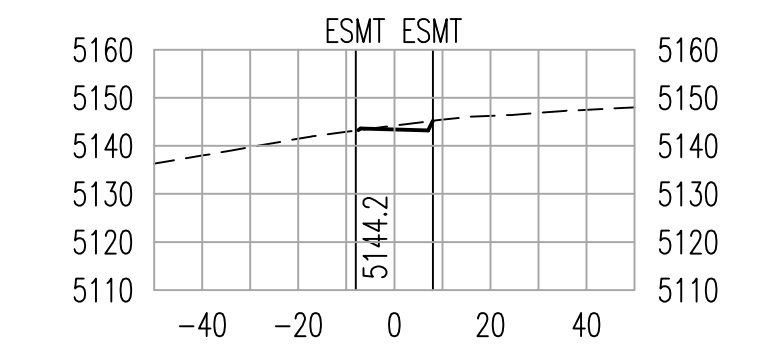
PAD 722 SECTION 6 - 6



ACCESS ROAD CROSS SECTION AT STA 13+50



ACCESS ROAD CROSS SECTION AT STA 13+50



TYPICAL ROAD SECTION

* EARTHWORK QUANTITY TABLE

	DISTURBANCE AREA (S.F.)	CUT (C.Y.)	FILL (C.Y.)	NET (C.Y.)
PAD No. 722	11,975	1,883	1	1,882 (CUT)
ACCESS ROAD	9,781	762	43	762

* APPROXIMATE QUANTITIES, MAY VARY DUE TO ACTUAL CONDITIONS

CENTERLINE LINE TABLE		
LINE	LENGTH	BEARING
L12	213.53'	N51°48'45"E
L13	13.45'	S64°24'07"E
L14	7.14'	N81°16'13"E
L15	84.94'	N55°05'50"E
L16	58.83'	N31°44'33"E
L17	156.56'	N57°55'02"E
L18	87.56'	N65°17'59"E
L19	83.97'	N14°13'41"W

CENTERLINE CURVE TABLE		
CURVE	LENGTH	RADIUS
C11	55.66'	50.00'
C12	29.96'	50.00'
C13	23.07'	50.00'
C14	20.35'	50.00'
C15	22.84'	50.00'
C16	69.40'	50.00'

NOTES

1. ACCESS ROAD HORIZONTAL ALIGNMENT MAY REQUIRE FIELD ADJUSTMENT.
2. PAD ELEVATIONS MAY VARY BASED ON LOCAL SOIL CUT/FILL SLOPE STABILITY.

DATE: 05/2016
DESIGNED BY: MC
DRAWN BY: MC
CHECKED BY: JLF
PROJ. ENGR: RFP

US FOREST EXPLORATION ROADS
PADS NO. 706, 712, AND 722
ACCESS ROAD TO PAD NO. 722
PLAN, PROFILE, PAD AND ROAD SECTIONS
EARTHWORK QUANTITIES

DATE:
DIV - SECT. ENGR.
REVISION DESCRIPTION
NO.
CPE JOB NO. 375
3895 N. Business Center Drive, Suite 115
Bozeman, MT 59706
520.546.7001

APPENDIX B
Safety
Data Sheets

HERMOSA TAYLOR DEPOSIT DRILLING PROJECT PLAN OF OPERATIONS

Appendix B –Safety Data Sheets

Arizona Minerals, Inc.

Prepared for:

United States Department
of Agriculture Forest Service
Coronado National Forest
300 West Congress Street
Tucson, Arizona 85701

April 1, 2016
(Revised July 27, 2016)

ANSUL SENTRY FIRE EXTINGUISHER MODEL AA20
CHEVRON DELO 400
CHEVRON H HYDRAULIC OIL AWISO 46
EXCALIBUR 7018 H4R
EZ MUD GOLD
EZ MUD PLUS
JETLUBE KOV'R-KOTE
MYSTICK JT-6 MULTIPURPOSE GREASE, NO. 2
NO. 2 DIESEL
NXS LUBE
QUIK GEL GOLD
SODA ASH
TEXACO PREDILUTED 50/50 COOLANT/ANTIFREEZE
UNLEADED GASOLINE
WD-40

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1. Identification of the preparation

Product Name: "ABC Multipurpose"
Chemical Name: N/A – This is a mixture/preparation.
CAS No.: N/A – This is a mixture/preparation.
Chemical Formula: N/A – This is a mixture/preparation.
EINECS Number: N/A – This is a mixture/preparation.

1.2. Use of the preparation

The intended or recommended use of this preparation is as a FIRE EXTINGUISHING AGENT.

1.3. Company identification

Manufacturer/Supplier: ANSUL INCORPORATED
Address: One Stanton Street, Marinette, WI 54143-2542
Prepared by: Safety and Health Department
Phone: 715-735-7411
Internet/Home Page: <http://www.ansul.com>
Date of Issue: October, 2007

1.4. Emergency telephone

CHEMTREC 800-424-9300 or 703-527-3887

2. COMPOSITION/INFORMATION ON INGREDIENTS

2.1. Ingredient Name: Monoammonium Phosphate.

Chemical Formula: $\text{NH}_4\text{H}_2\text{PO}_4$.
CAS No.: 7722-76-1.
EINECS Number: 231-764-5.
Concentration, Wt %: 80-95 %.
Hazard Identification: See Heading 3.

Ingredient Name: Calcium Carbonate
Chemical Formula: CaCO_3 .
CAS No.: 471-34-1.
EINECS Number: 207-439-9.
Concentration, Wt %: 1-4 %.
Hazard Identification: See Heading 3.

Ingredient Name: Magnesium Aluminum Silicate (Attapulgite Clay or Fuller's Earth).
Chemical Formula: $\text{Mg}_x\text{Al}_y(\text{SiO}_4)_z$.
CAS No.: 8031-18-3.
EINECS Number: (b).
Concentration, Wt %: 1-4 %.
Hazard Identification: See Heading 3.

Ingredient Name: Mica, Muscovite.
Chemical Formula: Mixture/preparation.
CAS No.: 12001-26-2.
EINECS Number: (b).
Concentration, Wt %: 1-4 %.
Hazard Identification: See Heading 3.

Ingredient Name: Methyl Hydrogen Polysiloxane.
Chemical Formula: Mixture/preparation.
CAS No.: 63148-57-2.
EINECS Number: (a).
Concentration, Wt %: 0.3-1.5 %.
Hazard Identification: See Heading 3.

Ingredient Name: Amorphous Silica.
Chemical Formula: $(\text{SiO}_2)_x$.
CAS No.: 7631-86-9.
EINECS Number: 231-545-4.
Concentration, Wt %: 0.2-1.5 %.
Hazard Identification: See Heading 3.

(a) EINECS does not include synthetic polymers (these are registered in EINECS under their building blocks, monomers). See: 67/548/EEC, article 13; 79/831/EC; and 81/437/EC.

(b) EINECS does not include most naturally occurring raw materials. See: 67/548/EEC, article 13; 79/831/EC; and 81/437/EC.

NOTE: Unless a component presents a severe hazard, it does not need to be considered in the MSDS if the concentration is less than 1%. [According to Directive 1999/45/EC.]

3. HAZARDS IDENTIFICATION

FOR HUMANS:

Product:

EU Classification:		Harmful.
R Phrases:	22	Harmful if swallowed.
	36/37/38	Irritating to eyes, respiratory system, and skin.
S Phrases:	26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	36	Wear suitable protective clothing.

Components:

Monoammonium Phosphate:

EU Classification:		Harmful.
R Phrases:	22	Harmful if swallowed.
	36/37/38	Irritating to eyes, respiratory system, and skin.
S Phrases:	26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	36	Wear suitable protective clothing.

Ammonium sulfate:

EU Classification:		Irritant.
R Phrases:	36/37/38	Irritating to eyes, respiratory system, and skin.
S Phrases:	26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	36	Wear suitable protective clothing.

Limit Values for Exposure:

Nuisance dust limit:

OSHA TWA:	15 mg/m ³
ACGIH TLV-TWA:	10 mg/m ³ .

Neither this preparation nor the substances contained in it have been listed as carcinogenic by National Toxicology Program, I.A.R.C., or OSHA.

AS PART OF GOOD INDUSTRIAL AND PERSONAL HYGIENE AND SAFETY PROCEDURE, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes, and clothing.

SIGNS AND SYMPTOMS:

Acute Exposure:

Eye Contact:	Mildly irritating for short periods of time.
Skin Contact:	May be mildly irritating.
Inhalation:	Treat as a mineral dust. Irritant to the respiratory tract. Transient cough, shortness of breath.
Ingestion:	Not an expected route of entry.

Chronic Overexposure:

Inhalation:	Chronic fibrosis of the lung, pneumoconiosis.
-------------	---

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None known.

FOR ENVIRONMENT:

No data available.

4. FIRST AID MEASURES

Eye Contact:	Wash with water for a minimum of 15 minutes. If irritation persists seek medical attention.
Skin Contact:	Wash affected area with soap and water. If irritation persists seek medical attention.
Inhalation:	Remove from exposure. If irritation persists seek medical attention.
Ingestion:	If patient is conscious, give large amounts of water and induce vomiting. Seek medical help.

5. FIRE-FIGHTING MEASURES

This preparation is an extinguishing media.

There are NO extinguishing media which must not be used for safety reasons.

NO special protective equipment is needed for fire-fighters. Wear protective equipment appropriate for the fire conditions.

6. ACCIDENTAL RELEASE MEASURES

For personal protection: Prevent skin and eye contact, see Heading 8.

Clean up: Sweep up and recover for use or place in closed container for disposal, see Heading 13.

NO harm to the environment is expected from an accidental release of this preparation.

7. HANDLING AND STORAGE

7.1. Handling

Care should be taken in handling all chemical substances and preparations.

See incompatibility information in Heading 10.

7.2. Storage

NO special conditions are needed for safe storage.

See incompatibility information in Heading 10.

Store in original container or ANSUL fire extinguisher. Keep tightly closed until used.

There is minimal danger to the environment from a storage release.

7.3. Specific use

The intended or recommended use of this preparation is as a FIRE EXTINGUISHING AGENT.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure limit values

Nuisance dust limit:

OSHA TWA: 15 mg/m³

ACGIH TLV-TWA: 10 mg/m³

8.2. Exposure controls**8.2.1. Occupational exposure controls****8.2.1.1. Respiratory protection**

Use local ventilation to minimize exposure to the substance.

Use mechanical ventilation for general area control.

Dust mask where dustiness is prevalent, or TLV is exceeded. Use mechanical filter respirator if exposure is prolonged.

8.2.1.2. Hand protection

None normally needed. Use chemical resistant gloves when handling the preparation.

8.2.1.3. Eye protection

Use safety glasses with side shields or safety goggles.

8.2.1.4. Skin protection

No special equipment is needed.

8.2.2. Environmental exposure controls

No special controls are needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information

Appearance: Fine Yellow Powder.

Odor: None.

9.2. Important health, safety, and environmental information

pH: Not determined.

Boiling point/boiling range: Not applicable.

Flash point: None.

Flammability (solid/gas): Not flammable.

Explosive properties: Not explosive.

Oxidizing properties: Not an oxidizer.

Vapor Pressure: Not applicable.

Relative Density: Not applicable.

Solubility:

– Water solubility: Slight.

– Fat solubility: Not soluble.

Partition coefficient, n-octanol/water: Not determined.

Viscosity:	Not applicable.
Vapor density (Air = 1):	Not applicable.
Evaporation rate (Butyl Acetate):	Not applicable.

9.3. Other information

Auto-ignition temperature:	Does not ignite.
----------------------------	------------------

10. STABILITY AND REACTIVITY

10.1. Conditions to avoid

There are NO known conditions such as temperature, pressure, light, shock, etc., which may cause a dangerous reaction.

10.2. Materials to avoid

Strong alkalis, magnesium, oxidizers that can release chlorine per NFPA 43A.

10.3. Hazardous decomposition products

Normally stable.

Hazardous polymerization will NOT occur.

Ammonia and/or phosphorous oxides can be evolved at very high temperatures.

11. TOXICOLOGICAL INFORMATION

This product has not been tested for toxicological effects. Product is treated as a nuisance dust.

Components:

Monoammonium Phosphate:

Material is irritating.

Harmful if swallowed.

Ammonium sulfate:

Toxicity Data:	Oral (rat) LD ₅₀	2840 mg/kg.
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Target Organs:	Lungs and gastrointestinal.
----------------	-----------------------------

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Not determined.

12.2. Mobility

Not determined.

12.3. Persistence and degradability

Not determined.

12.4. Bioaccumulative potential

Not determined.

12.5. Other adverse effects

Ozone depletion potential:	None.
----------------------------	-------

Photochemical ozone creation potential:	None
---	------

Global warming potential:	None
---------------------------	------

13. DISPOSAL CONSIDERATIONS

No harm to the environment is expected from this preparation.

Dispose of in compliance with national, regional, and local provisions that may be in force.

14. TRANSPORT INFORMATION

Hazard Class or Division: Not a hazardous substance.

For additional transport information, contact ANSUL.

No harm to the environment is expected from this preparation.

15. REGULATORY INFORMATION

Product:
EU Classification: Harmful.
R Phrases: 22 Harmful if swallowed.
36/37/38 Irritating to eyes, respiratory system, and skin.
S Phrases: 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36 Wear suitable protective clothing.

Limit Values for Exposure:
Nuisance dust limit:
OSHA TWA: 15 mg/m³
ACGIH TLV-TWA: 10 mg/m³

EINECS Status: All components are included in EINECS inventories or are exempt from listing.
EPA TSCA Status: All components are included in TSCA inventories or are exempt from listing.
Canadian DSL (Domestic Substances List): All components are included in the DSL or are exempt from listing.

Environmental Restrictions: None are known.
Restrictions on Marketing and Use: None are known.
Refer to any other national measures that may be relevant.

16. OTHER INFORMATION

(HMIS) HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS:

HEALTH:	<u>1</u>	4. Severe Hazard
FLAMMABILITY:	<u>0</u>	3. Serious Hazard
REACTIVITY:	<u>0</u>	2. Moderate Hazard
		1. Slight Hazard
		0. Minimal Hazard

(WHMIS) CANADIAN WORKPLACE HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS:

This product is rated **Not hazardous**.

Format is from directive 2001/58/EC.

EINECS data is from <http://exb.jrc.it/existing-chemicals/>

Data used to compile the data sheet is from Ansul Material Safety Data Sheet, January, 2002.

17. DISCLAIMER

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT, BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ANSUL INCORPORATED SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT.

MSDS available at <http://www.ansul.com>

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Material Safety Data Sheet

Chevron Delo® 400

MSDS: 6711 Revision #: 2 Revision Date: 11/08/00

[Click here to search the product data sheet database](#)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

CHEVRON DELO 400

PRODUCT NUMBER(S): CPS235101 CPS235109 CPS235117 CPS235118
CPS235119 CPS235120 CPS235200 CPS235246

SYNONYM: CHEVRON DELO 400 ESI Multigrade SAE 15W-40
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

Chevron Products Company
Lubricants and Specialty Products
6001 Bollinger Canyon Rd., T3325/B10
San Ramon, CA 94583
www.chevron-lubricants.com

EMERGENCY TELEPHONE NUMBERS

HEALTH (24 hr): (800)231-0623 or
(510)231-0623 (International)
TRANSPORTATION (24 hr): CHEMTREC
(800)424-9300 or (703)527-3887
Emergency Information Centers
are located in U.S.A.
Int'l collect calls accepted

PRODUCT INFORMATION: MSDS Request: (800)414-6737 email: lubemsds@chevron.com
Environmental, Safety, & Health Info: (925) 842-5535
Product Information: (800) 582-3835

2. COMPOSITION/INFORMATION ON INGREDIENTS

100.0 % CHEVRON DELO 400

CONTAINING

COMPONENTS	AMOUNT	LIMIT/QTY	AGENCY/TYPE
LUBRICATING BASE OIL			
SEVERELY REFINED PETROLEUM DISTILLATE	> 75.00%	5 mg/m3 (mist)	ACGIH TWA
		10 mg/m3 (mist)	ACGIH STEL
		5 mg/m3 (mist)	OSHA PEL

The BASE OIL may be a mixture of any of the following: CAS 64741884, CAS 64741895, CAS 64741964, CAS 64741975, CAS 64742014, CAS 64742525, CAS 64742536, CAS 64742547, CAS 64742627, CAS 64742650, or CAS 72623837.

ADDITIVES INCLUDING THE FOLLOWING

< 25.00%

ZINC ALKYL DITHIOPHOSPHATE

Chemical Name: PHOSPHORODITHIOIC ACID, O,O-DI-C1-14-ALKYL ESTERS, ZINC SALT
CAS68649423 < 1.60% NONE NA

COMPOSITION COMMENT:

All the components of this material are on the Toxic Substances Control Act Chemical Substances Inventory.

This product fits the ACGIH definition for mineral oil mist. The ACGIH TLV is 5 mg/m³, the OSHA PEL is 5 mg/m³.

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:

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.

4. FIRST AID MEASURES

EYE:

No specific first aid measures are required because this material is not expected to cause eye irritation. As a precaution remove contact lenses, if worn, and flush eyes with water.

SKIN:

No specific first aid measures are required because this material is not expected to be harmful if it contacts the skin. As a precaution, remove clothing and shoes if contaminated. Wash skin with soap and water. Wash or clean contaminated clothing and shoes before reuse.

INGESTION:

No specific first aid measures are required because this material is not expected to be harmful if swallowed. Do not induce vomiting. As a precaution, give the person a glass of water or milk to drink and get medical advice. Never give anything by mouth to an unconscious person.

INHALATION:

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.

5. FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:

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

FLAMMABLE PROPERTIES:

FLASH POINT: (COC) 392F (200C) min.

AUTOIGNITION: NDA

FLAMMABILITY LIMITS (% by volume in air): Lower: NA Upper: NA

EXTINGUISHING MEDIA:

CO2, Dry Chemical, Foam, Water Fog

NFPA RATINGS: Health 1; Flammability 1; Reactivity 0.

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:

Normal combustion forms carbon dioxide and water vapor and may produce oxides of sulfur, nitrogen, phosphorus, and boron. Incomplete combustion can produce carbon monoxide.

6. ACCIDENTAL RELEASE MEASURES

CHEMTREC EMERGENCY NUMBER (24 hr): (800)424-9300 or (703)527-3887

International Collect Calls Accepted

ACCIDENTAL RELEASE MEASURES:

Stop the source of the leak or release. Clean up releases as soon as possible. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.

7. HANDLING AND STORAGE

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 properly disposed of. Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

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. If user operations generate an oil mist, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended mineral oil mist 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. Suggested materials for protective gloves include: <Viton> <Nitrile> <Silver Shield> <4H>

RESPIRATORY PROTECTION:

No respiratory protection is normally required. If user operations generate an oil mist, determine if airborne concentrations are below the recommended mineral oil mist exposure limits. If not wear a NIOSH approved respirator that provides adequate protection from measured concentrations of this material. Use the following elements for air-purifying respirators: particulate.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION:

Dark brown liquid.

pH:	NA
VAPOR PRESSURE:	<0.01 mm Hg at 100F
VAPOR DENSITY	
(AIR=1):	Heavier than air.
BOILING POINT:	>600F (>315C)
FREEZING POINT:	NA
MELTING POINT:	NA
SOLUBILITY:	Soluble in hydrocarbon solvents; insoluble in water.
SPECIFIC GRAVITY:	0.87 - 0.89 @ 15.6/15.6C
VOLATILE ORGANIC	
COMPOUNDS (VOC):	1.1 wt.%, 9.256 g/l
VISCOSITY:	5.9 - 18.6 cSt @ 100C (min.)

10. STABILITY AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:

H₂S may be released at high temperatures.

CHEMICAL STABILITY:

Stable.

CONDITIONS TO AVOID:

No data available.

INCOMPATIBILITY WITH OTHER MATERIALS:

May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

HAZARDOUS POLYMERIZATION:

Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS:

The eye irritation hazard is based on data for a similar material.

SKIN EFFECTS:

The skin irritation hazard is based on data for a similar material.

ACUTE ORAL EFFECTS:

The acute oral toxicity is based on data for a similar material.

ACUTE INHALATION EFFECTS:

The acute respiratory toxicity is based on data for a similar material.

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).

This product contains zinc alkyl dithiophosphates (ZDDPs). Several ZDDPs have been reported to have weak mutagenic activity in cultured mammalian cells but only at concentrations that were toxic to the test cells. We do not believe that there is any mutagenic risk to workers exposed to ZDDPs.

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. See Chevron Material Safety Data Sheet No. 1793 for additional information on used motor oil.

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.

13. DISPOSAL CONSIDERATIONS

Oil collection services and collection centers are available for used motor oil recycling or disposal. Some service stations, automotive service centers, and retailers provide motor oil collection facilities.

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.

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: NONE

DOT HAZARD CLASS: NONE

DOT IDENTIFICATION NUMBER: NONE

DOT PACKING GROUP: N/A

ADDITIONAL INFO: Petroleum Lubricating Oil - Not Hazardous by U.S. DOT.
ADR/RID Hazard class - Not applicable.

15. REGULATORY INFORMATION

SARA 311 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=SARA 313	11=NJ RTK	22=TSCA Sect 5(a)(2)
02=MASS RTK	12=CERCLA 302.4	23=TSCA Sect 6
03=NTP Carcinogen	13=MN RTK	24=TSCA Sect 12(b)
04=CA Prop 65-Carcin	14=ACGIH TWA	25=TSCA Sect 8(a)
05=CA Prop 65-Repro Tox	15=ACGIH STEL	26=TSCA Sect 8(d)
06=IARC Group 1	16=ACGIH Calc TLV	27=TSCA Sect 4(a)
07=IARC Group 2A	17=OSHA PEL	28=Canadian WHMIS
08=IARC Group 2B	18=DOT Marine Pollutant	29=OSHA CEILING
09=SARA 302/304	19=Chevron TWA	30=Chevron STEL
10=PA RTK	20=EPA Carcinogen	

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

PHOSPHORODITHIOIC ACID, O,O-DI-C1-14-ALKYL ESTERS, ZINC SALTS

is found on lists: 01, 11,

SEVERELY REFINED PETROLEUM DISTILLATE

is found on lists: 14, 15, 17,

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

WHMIS CLASSIFICATION:

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

16. OTHER INFORMATION

NFPA RATINGS: Health 1; 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 Section 4 (First Aid Measures), Section 9 (Physical and Chemical Properties), and Section 15 (Regulatory Information).

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	TPQ - Threshold Planning Quantity
RQ - Reportable Quantity	PEL - Permissible Exposure Limit
C - Ceiling Limit	CAS - Chemical Abstract Service Number
A1-5 - Appendix A Categories	() - Change Has Been Proposed
NDA - No Data Available	NA - Not Applicable

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Toxicology and Health Risk Assessment Unit, CRTC, P.O. Box 1627, Richmond, CA 94804

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 modification 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.

THIS IS THE LAST PAGE OF THIS MSDS



Material Safety Data Sheet

Chevron Hydraulic Oil AW ISO 22, 32, 46, 68

MSDS: 7457 Revision #: 3 Revision Date: 11/11/00

[Click here to search the product data sheet database](#)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

CHEVRON Hydraulic Oil AW

PRODUCT NUMBER(S): CPS255673 CPS255674 CPS255675 CPS255676

SYNONYM: CHEVRON Hydraulic Oil AW ISO 22

CHEVRON Hydraulic Oil AW ISO 32

CHEVRON Hydraulic Oil AW ISO 46

CHEVRON Hydraulic Oil AW ISO 68

COMPANY IDENTIFICATION EMERGENCY TELEPHONE NUMBERS

Chevron Products Company HEALTH (24 hr): (800)231-0623 or

Lubricants and Specialty Products (510)231-0623 (International)

6001 Bollinger Canyon Rd., T3325/B10 TRANSPORTATION (24 hr): CHEMTREC

San Ramon, CA 94583 (800)424-9300 or (703)527-3887

www.chevron-lubricants.com Emergency Information Centers

are located in U.S.A.

Int'l collect calls accepted

PRODUCT INFORMATION: MSDS Request: (800)414-6737 email: lubemsds@chevron.com

Environmental, Safety, & Health Info: (925) 842-5535

Product Information: (800) 582-3835

2. COMPOSITION/INFORMATION ON INGREDIENTS

100.0 % CHEVRON Hydraulic Oil AW

CONTAINING

COMPONENTS AMOUNT LIMIT/QTY AGENCY/TYPE

✓ LUBRICATING BASE OIL

SEVERELY REFINED PETROLEUM DISTILLATE

> 98.00% 5 mg/m³ (mist) ACGIH TWA

10 mg/m³ (mist) ACGIH STEL

5 mg/m³ (mist) OSHA PEL

The BASE OIL may be a mixture of any of the following: CAS 64741884, CAS 64741895, CAS 64741964, CAS 64741975, CAS 64742014, CAS 64742525, CAS 64742536, CAS 64742547, CAS 64742627, CAS 64742650, or CAS 72623837.

ADDITIVES INCLUDING THE FOLLOWING

< 2.00%

ZINC ALKYL DITHIOPHOSPHATE

Chemical Name: PHOSPHORODITHIOIC ACID,O,O-DI-C1-14-ALKYL ESTERS, ZINC SALT
CAS68649423 < 1.00% NONE NA

COMPOSITION COMMENT:

All the components of this material are on the Toxic Substances Control Act Chemical Substances Inventory.

✓ This product fits the ACGIH definition for mineral oil mist. The ACGIH TLV is 5 mg/m³, the OSHA PEL is 5 mg/m³.

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:

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.

4. FIRST AID MEASURES

EYE:

No specific first aid measures are required because this material is not expected to cause eye irritation. As a precaution remove contact lenses, if worn, and flush eyes with water.

SKIN:

No specific first aid measures are required because this material is not expected to be harmful if it contacts the skin. As a precaution, remove clothing and shoes if contaminated. Wash skin with soap and water. Wash or clean contaminated clothing and shoes before reuse.

INGESTION:

No specific first aid measures are required because this material is not expected to be harmful if swallowed. Do not induce vomiting. As a precaution, give the person a glass of water or milk to drink and get medical advice. Never give anything by mouth to an unconscious person.

INHALATION:

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.

5. FIRE FIGHTING MEASURES

SPECIAL NOTES: Leaks/ruptures in high pressure systems 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:

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

FLAMMABLE PROPERTIES:

FLASH POINT: (COC) 302F (150C) Min.

AUTOIGNITION: NDA

FLAMMABILITY LIMITS (% by volume in air): Lower: NA Upper: NA

EXTINGUISHING MEDIA:

CO₂, Dry Chemical, Foam, Water Fog

NFPA RATINGS: Health 0; Flammability 1; Reactivity 0.

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:

Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

6. ACCIDENTAL RELEASE MEASURES

CHEMTREC EMERGENCY NUMBER (24 hr): (800)424-9300 or (703)527-3887

International Collect Calls Accepted

ACCIDENTAL RELEASE MEASURES:

Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Exposure Controls/Personal Protection. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.

7. HANDLING AND STORAGE

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.

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 properly disposed of. Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

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. If user operations generate an oil mist, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended mineral oil mist 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. Suggested materials for protective gloves include: <Nitrile> <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 recommended mineral oil mist exposure limits. If not wear a NIOSH approved respirator that provides adequate protection from measured concentrations of this material. Use the following elements for air-purifying respirators: particulate.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION:

Pale yellow liquid.

pH: NA

VAPOR PRESSURE: <0.01 mm Hg at 100F

VAPOR DENSITY

(AIR=1): Heavier than air.

BOILING POINT: >600F (>315C)

FREEZING POINT: NA

MELTING POINT: NA

SOLUBILITY: Soluble in hydrocarbon solvents; insoluble in water.

SPECIFIC GRAVITY: 0.86 - 0.88 @ 15.6/15.6C

VOLATILE ORGANIC

COMPOUNDS (VOC): <2.2 (wt.%); 19 g/l (estimated)

VISCOSITY: 22 - 61.2 cSt @ 40C (Min.)

POUR POINT: -27C (Max.)

10. STABILITY AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:

No data available.

CHEMICAL STABILITY:

Stable.

CONDITIONS TO AVOID:

No data available.

INCOMPATIBILITY WITH OTHER MATERIALS:

May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

HAZARDOUS POLYMERIZATION:

Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS:

The eye irritation hazard is based on data for a similar material.

SKIN EFFECTS:

The skin irritation hazard is based on data for a similar material.

ACUTE ORAL EFFECTS:

The acute oral toxicity is based on data for a similar material.

ACUTE INHALATION EFFECTS:

~ The acute respiratory toxicity is based on data for a similar material.

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).

This product contains zinc alkyl dithiophosphates (ZDDPs). Several ZDDPs have been reported to have weak mutagenic activity in cultured mammalian cells but only at concentrations that were toxic to the test cells. We do not believe that there is any mutagenic risk to workers exposed to ZDDPs.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

The 48-hour EC50 for daphnia (*Daphnia magna*) is > 1000 mg/l (WAF).

ENVIRONMENTAL FATE:

This material is not expected to be readily biodegradable.

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.

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: NONE

DOT HAZARD CLASS: NONE

DOT IDENTIFICATION NUMBER: NONE

DOT PACKING GROUP: N/A

ADDITIONAL INFO: Petroleum Lubricating Oil - Not Hazardous by U.S. DOT.

ADR/RID Hazard class - Not applicable.

15. REGULATORY INFORMATION

SARA 311 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=SARA 313 11=NJ RTK 22=TSCA Sect 5(a)(2)

02=MASS RTK 12=CERCLA 302.4 23=TSCA Sect 6

03=NTP Carcinogen 13=MN RTK 24=TSCA Sect 12(b)

04=CA Prop 65-Carcin 14=ACGIH TWA 25=TSCA Sect 8(a)

05=CA Prop 65-Repro Tox 15=ACGIH STEL 26=TSCA Sect 8(d)

06=IARC Group 1 16=ACGIH Calc TLV 27=TSCA Sect 4(a)

07=IARC Group 2A 17=OSHA PEL 28=Canadian WHMIS

08=IARC Group 2B 18=DOT Marine Pollutant 29=OSHA CEILING

09=SARA 302/304 19=Chevron TWA 30=Chevron STEL

10=PA RTK 20=EPA Carcinogen

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

PHOSPHORODITHIOIC ACID,O,O-DI-C1-14-ALKYL ESTERS, ZINC SALTS

is found on lists: 01,11,

SEVERELY REFINED PETROLEUM DISTILLATE

is found on lists: 14,15,17,

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

WHMIS CLASSIFICATION:

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

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 Section 4 (First Aid Measures), Section 9
(Physical and Chemical Properties), and Section 15 (Regulatory
Information).

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value TWA - Time Weighted Average
STEL - Short-term Exposure Limit TPQ - Threshold Planning Quantity
RQ - Reportable Quantity PEL - Permissible Exposure Limit
C - Ceiling Limit CAS - Chemical Abstract Service Number
A1-5 - Appendix A Categories () - Change Has Been Proposed
NDA - No Data Available NA - Not Applicable

Prepared according to the OSHA Hazard Communication Standard
(29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Toxicology
and Health Risk Assessment Unit, CRTC, P.O. Box 1627, Richmond, CA 94804

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 modification of the information, we do not assume any responsibil-
ity 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.

THIS IS THE LAST PAGE OF THIS MSDS



Date:	6/20/2008	MSDS No.:	US-M291
Trade Name:	Excalibur 7018 MR		
Sizes:	All		
Supersedes:	6/1/07		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988

SECTION I - IDENTIFICATION

Manufacturer/
Supplier: The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, OH 44117-1199
(216) 481-8100

Product Type: Covered Electrode

Classification: AWS E7018 H4R

SECTION II - HAZARDOUS MATERIAL (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section V; see it for industrial hygiene information.

CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.

(1) The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in the Hazards Communication Standard and does not necessarily imply the existence of any hazard. All materials are listed on the TSCA inventory.

Ingredients:	CAS No.	Wt. %	TLV mg/m ³	PEL mg/m ³
Iron	7439-89-6	15	10*	10*
Limestone and/or calcium carbonate	1317-65-3	10	10	15
Titanium dioxides	13463-67-7	< 5	10	15
Fluorides (as F)	7789-75-5	< 5	2.5	2.5
Silicates and other binders	1344-09-8	< 5	10*	10*
Manganese and/or manganese alloys and compounds (as Mn)*****	7439-96-5	< 5	0.2	5 (c)
Mineral silicates	1332-58-7	< 5	5**	5**
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	1	10*	10*
Zirconium alloys and compounds (as Zr)	12004-83-0	0.5	5	5
Lithium compounds (as Li)	554-13-2	< 0.5	10*	10*
Carbon steel core wire	7439-89-6	55	10*	10*

Supplemental Information:

(*) Not listed. Nuisance value maximum is 10 milligrams per cubic meter. (c) PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(**) As respirable dust.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

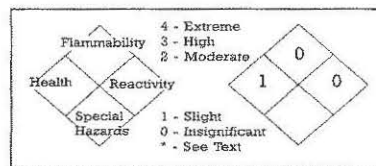
Value is for manganese fume. Present PEL is 5 milligrams per cubic meter (ceiling value). Values proposed by OSHA in 1989 were 1.0 milligrams per cubic meter TWA and 3.0 milligrams per cubic meter STEL (Short Term Exposure Limit).

SECTION III - HAZARD DATA

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See Z49.1 referenced in Section VI. Product is inert, no special handling or spill procedures required. Not regulated by DOT.

Product: Excalibur 7018 MR

Date: 6/20/2008



SECTION IV - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. ACGIH-1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:

Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death.

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash. **WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*

Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Emergency and First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques.

IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide and fluorides; secondarily complex oxides of manganese, potassium, silicon and sodium.

Maximum fume exposure guideline for this product (based on manganese content) is 4.0 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION VI AND VII

CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL, 33126 (both available for free download at <http://www.lincolnelectric.com/community/safety/>) and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1.

At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin ... or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted. No applicable ecological information available.

MATERIAL SAFETY DATA SHEET

Product Trade Name: **EZ-MUD® GOLD**

Revision Date: 01-Aug-2011

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: EZ-MUD® GOLD
Synonyms: None
Chemical Family: Anionic Polymer
Application: Additive
Manufacturer/Supplier: Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000
Prepared By: Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Contains no hazardous substances	Mixture	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and skin irritation. Airborne dust may be explosive.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMS Ratings: Health 1, Flammability 0, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust. Slippery when wet.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Slippery when wet.

Storage Information Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Personal Protective Equipment If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions

None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Granules
Color:	Off white
Odor:	Odorless
pH:	7.75 (1%)
Specific Gravity @ 20 C (Water=1):	0.8-1.0
Density @ 20 C (lbs./gallon):	6.66-8.33
Bulk Density @ 20 C (lbs/ft3):	52
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Ammonia. Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	None known.
Skin Contact	May cause mild skin irritation.
Eye Contact	May cause mild eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.

Other Information None known.

Toxicity Tests

Oral Toxicity: LD50: > 5000 mg/kg (Rat)

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect: Not determined

Carcinogenicity Not determined

Genotoxicity: Not determined

**Reproductive /
Developmental Toxicity:** Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not readily biodegradable.

Bio-accumulation Will not bio-accumulate.

Ecotoxicological Information

Acute Fish Toxicity: TLM96: >1000 mg/l (Pimephales promelas)

Acute Crustaceans Toxicity: Not determined

Acute Algae Toxicity: EC50: > 500 mg/l (Selenastrum capricornutum)

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Transportation Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory or are exempt.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

MATERIAL SAFETY DATA SHEET

Product Trade Name: **EZ-MUD® PLUS**

Revision Date: 03-Jan-2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: EZ-MUD® PLUS
Synonyms: None
Chemical Family: Blend
Application: Additive
Manufacturer/Supplier: Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000
Prepared By: Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Hydrotreated light petroleum distillate	64742-47-8	10 - 30%	200 mg/m ³	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin Wash with soap and water. Get medical attention if irritation persists. Remove contaminated shoes and discard.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Min: > 200
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Min: > 93
Autoignition Temperature (C):	PMCC
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Use water spray to cool fire exposed surfaces.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 2, Flammability 1, Reactivity 0
HMIS Ratings: Flammability 1, Reactivity 0, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

Storage Information Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 12 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls A well ventilated area to control dust levels. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator with a dust/mist filter.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	White to gray
Odor:	Mild hydrocarbon

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.0
Density @ 20 C (lbs./gallon):	8.3
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	347
Boiling Point/Range (C):	175
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	70
Evaporation Rate (Butyl Acetate=1):	< 1
Solubility in Water (g/100ml):	Partially soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from heat, sparks and flame.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Ammonia. Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions.
Aggravated Medical Conditions	Lung disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.

Other Information None known.

Toxicity Tests

Oral Toxicity: Not determined

Dermal Toxicity: Not determined

Inhalation Toxicity: Not determined

Primary Irritation Effect: Not determined

Carcinogenicity Not determined

Genotoxicity: Not determined

**Reproductive /
Developmental Toxicity:** Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: Not determined

Acute Crustaceans Toxicity: TLM48: 98 mg/l (Acartia tonsa)

Acute Algae Toxicity: EC50: 16.70 mg/l (Skeletonema costatum)

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS

Not applicable

Additional Information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****



SAFETY DATA SHEET

Issuing Date 03-Dec-2014

Revision Date 03-Dec-2014

Revision Number 0

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

GHS product identifier

Product Name KOV'R-KOTE®

Other means of identification

Product Code(s) 139

Synonyms JET-LUBE® KOV'R-KOTE®; ILEX KOV'R-KOTE®

Recommended use of the chemical and restrictions on use

Recommended Use Lubricants, Greases and Release Products, Sealant

Uses advised against No information available

Supplier's details

Manufacturer Address

Jet-Lube, Inc.
4849 Homestead Rd.
Suite 232
Houston, Texas 77028
TEL: 713-670-5700 (7:00 a.m. - 5:00 p.m.)

Emergency telephone number

Emergency Telephone Number CHEMTREC: +1-703-527-3887 (INTERNATIONAL)
1-800-424-9300 (NORTH AMERICA)

2. HAZARDS IDENTIFICATION

Classification

This chemical is not considered hazardous according to the OSHA Hazard Communication Standard 2012 (29 CFR 1910.1200).

GHS Label elements, including precautionary statements

Emergency Overview

Signal Word None

The product contains no substances which at their given concentration are considered to be hazardous to health

Appearance Black

Physical State Semi-fluid (gel).

Odor Petroleum Oil-Pungent

Precautionary Statements

Prevention

- None

General Advice

- None

Storage

- None

Disposal

- None

Hazard Not Otherwise Classified (HNOC)

Not applicable

Other information

38.85% of the mixture consists of ingredient(s) of unknown toxicity.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms

JET-LUBE® KOV'R-KOTE®; ILEX KOV'R-KOTE®

Chemical Name	CAS-No	Weight %	Trade secret
Lubricating greases A complex combination of hydrocarbons having carbon numbers predominantly in the range of C12 through C50. may contain organic salts of alkali metals, alkaline earth metals, etc.	74869-21-9	40-60	*
Graphite	7782-42-5	20-25	*
Talc	14807-96-6	5-10	*
Mica	12001-26-2	5-10	*
Calcium carbonate	471-34-1	1-2	*

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

Description of necessary first-aid measures

Eye Contact	Rinse thoroughly with plenty of water, also under the eyelids. If symptoms persist, call a physician.
Skin Contact	Wash skin with soap and water. Remove and wash contaminated clothing before re-use. If skin irritation persists, call a physician.
Inhalation	Move to fresh air. If symptoms persist, call a physician.
Ingestion	Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. Consult a physician if necessary

Most important symptoms/effects, acute and delayed

Most Important Symptoms/Effects No information available.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Dry powder. Carbon dioxide (CO₂). Foam. Water spray. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Do not use a solid water stream as it may scatter and spread fire.

Specific Hazards Arising from the Chemical

Burning produces obnoxious and toxic fumes. Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).

Explosion Data**Sensitivity to Mechanical Impact**

None.

Sensitivity to Static Discharge

None.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions Ensure adequate ventilation.

Environmental Precautions

Environmental Precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not allow material to contaminate ground water system. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Soak up with inert absorbent material. Pick up and transfer to properly labeled containers. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Wear personal protective equipment. Ensure adequate ventilation. Wash thoroughly after handling. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage Keep container tightly closed in a dry and well-ventilated place.

Incompatible Products None known based on information supplied.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters**Exposure Guidelines**

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Graphite 7782-42-5	-	TWA: 15 mg/m ³ total dust synthetic TWA: 5 mg/m ³ total dust synthetic (vacated) TWA: 2.5 mg/m ³ respirable dust natural (vacated) TWA: 10 mg/m ³ total dust synthetic (vacated) TWA: 5 mg/m ³ respirable fraction synthetic TWA: 15 mppcf natural	IDLH: 1250 mg/m ³ TWA: 2.5 mg/m ³ respirable dust

Talc 14807-96-6	TWA: 2 mg/m ³	(vacated) TWA: 2 mg/m ³	IDLH: 1000 mg/m ³ containing no asbestos and <1% quartz TWA: 2 mg/m ³
Mica 12001-26-2	TWA: 3 mg/m ³	TWA: 20 mppcf (<1% crystalline silica) 3 mg/m ³ (vacated)	IDLH: 1500 mg/m ³ containing <1% quartz TWA: 3 mg/m ³ respirable dust
Calcium carbonate 471-34-1	-	TWA: 15 mg/m ³ TWA: 5 mg/m ³ (vacated) TWA: 15 mg/m ³ (vacated) TWA: 5 mg/m ³	TWA: 10 mg/m ³ total dust TWA: 5 mg/m ³ respirable dust

Appropriate engineering controls**Engineering Measures**

Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment**Eye/Face Protection**

Safety glasses with side-shields.

Skin and Body Protection

Long sleeved clothing. Protective gloves.

Respiratory Protection

No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Semi-fluid (gel)	Appearance	Black
Odor	Petroleum Oil-Pungent	Odor Threshold	No information available

<u>Property</u>	<u>Values</u>	<u>Remarks/ - Method</u>
pH	Neutral	None known
Melting Point/Range	260 °C / 500 °F	None known
Boiling Point/Boiling Range	< 316 °C / 600.8 °F	None known
Flash Point	> 221 °C	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limits in Air		
upper flammability limit	No data available	
lower flammability limit	No data available	
Vapor Pressure	No data available	None known
Vapor Density	No data available	None known
Specific Gravity	1.24	None known
Water Solubility	Insoluble in water.	None known
Solubility in other solvents	Largely.	None known
Partition coefficient: n-octanol/water	No data available	None known
Autoignition Temperature	No data available	None known
Decomposition Temperature	No data available	None known
Viscosity	No data available	None known

Flammable Properties Not flammable

Explosive Properties No data available

Oxidizing Properties No data available

Other information

VOC Content (%) None

10. STABILITY AND REACTIVITY

Reactivity

No data available.

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

None under normal processing.

Hazardous Polymerization

Hazardous polymerization does not occur.

Conditions to avoid

None known based on information supplied.

Incompatible materials

None known based on information supplied.

Hazardous decomposition products

None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure**Product Information****Inhalation**

May be harmful if inhaled.

Eye Contact

May cause slight irritation.

Skin Contact

None known.

Ingestion

May be harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Lubricating greases A complex combination of hydrocarbons having carbon numbers predominantly in the range of C12 through C50. may contain organic salts of alkali metals, alkaline earth metals, etc.	= 2280 mg/kg (Rat)	-	-
Calcium carbonate	= 6450 mg/kg (Rat)	-	-

Symptoms related to the physical, chemical and toxicological characteristics**Symptoms**

No information available.

Delayed and immediate effects and also chronic effects from short and long term exposure**Sensitization**

No information available.

Mutagenic Effects

No information available.

Carcinogenicity

Contains no ingredients above reportable quantities listed as a carcinogen.

Reproductive Toxicity

No information available.

STOT - single exposure

No information available.

STOT - repeated exposure

No information available.

Aspiration Hazard

No information available.

Numerical measures of toxicity - Product**Acute Toxicity** 38.85% of the mixture consists of ingredient(s) of unknown toxicity.*The following values are calculated based on chapter 3.1 of the GHS document:***LD50 Oral** 2323 mg/kg; Acute toxicity estimate**12. ECOLOGICAL INFORMATION****Ecotoxicity**

The environmental impact of this product has not been fully investigated.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Lubricating greases A complex combination of hydrocarbons having carbon numbers predominantly in the range of C12 through C50. may contain organic salts of alkali metals, alkaline earth metals, etc. 74869-21-9	>1001 mg/l	LC50 96 h: > 2000 mg/L (Salmo gairdneri)		
Talc 14807-96-6		LC50 96 h: > 100 g/L semi-static (Brachydanio rerio)		

Persistence and Degradability No information available.**Bioaccumulation** No information available.**Other Adverse Effects**

No information available.

13. DISPOSAL CONSIDERATIONS**Waste Disposal Methods** Dispose of in accordance with federal, state, and local regulations**Contaminated Packaging** Do not re-use empty containers.**14. TRANSPORT INFORMATION****DOT** Not regulated**15. REGULATORY INFORMATION****International Inventories****Legend****TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory**DSL/NDL** - Canadian Domestic Substances List/Non-Domestic Substances List**U.S. Federal Regulations**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations**California Proposition 65**

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

"X" designates that the ingredients are listed on the state right to know list.

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Graphite	X	X	X		X
Talc	X	X	X		X
Mica	X	X	X		X
Ptfe			X		X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

<u>NFPA</u>	Health Hazard 1	Flammability 1	Instability 0	Physical and Chemical Hazards -
<u>HMIS</u>	Health Hazard 1	Flammability 1	Physical Hazard 0	Personal Protection X

Prepared By Product Stewardship
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Issuing Date 03-Dec-2014
Revision Date 03-Dec-2014
Revision Note Initial Release.

General Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet



Mystik® JT-6® Multi-Purpose Grease, No. 2

Material Safety Data Sheet

CITGO Petroleum Corporation
P.O. Box 3758
Tulsa, OK 74102-3758

MSDS No. 665006002

Revision Date 04/15/2003

IMPORTANT: Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Emergency Overview

Physical State Semi-solid to solid (Smooth and adhesive)
Color Amber. **Odor** Mild petroleum odor

WARNING:

Injection under the skin can cause severe injury.
Most damage occurs in the first few hours.
Initial symptoms may be minimal.
Hot grease will cause thermal burns upon contact.
Spills may create a slipping hazard.

Hazard Rankings

	HMIS	NFPA
Health Hazard	1	0
Fire Hazard	1	1
Reactivity	0	0

* = Chronic Health Hazard

Protective Equipment

Minimum Recommended
See Section 8 for Details



SECTION 1: IDENTIFICATION

Trade Name	Mystik® JT-6® Multi-Purpose Grease, No. 2	Technical Contact	(800) 248-4684
Product Number	665006002	Medical Emergency	(918) 495-4700
CAS Number	Mixture.	CHEMTREC Emergency (United States Only)	(800) 424-9300
Product Family	Lubricating grease		
Synonyms	Lubricating grease; CITGO Material Code No.: 665006002, 665995002, 663996002		

SECTION 2: COMPOSITION

Component Name(s)	CAS Registry No.	Concentration (%)
Distillates, petroleum, hydrotreated light naphthenic	64742-53-6	0 - 90
Distillates, petroleum, hydrotreated heavy naphthenic	64742-52-5	0 - 90
Calcium, 12-hydroxy Stearate	3159-62-4	1 - 15
Proprietary Ingredients	Proprietary Mixture	0 - 5
Antimony and antimony compounds	Proprietary	0 - 1

SECTION 3: HAZARDS IDENTIFICATION

Also see Emergency Overview and Hazard Ratings on the top of Page 1 of this MSDS.

Major Route(s) of Entry Skin contact.

Signs and Symptoms of Acute Exposure

999-10532-0204

Mystik® JT-6® Multi-Purpose Grease, No. 2

Inhalation	No significant adverse health effects are expected to occur upon short-term exposure at ambient temperatures. At elevated temperatures, product vapor may cause respiratory tract irritation. Repeated or prolonged overexposure to product mists can result in respiratory tract inflammation and an increased risk of infection.
Eye Contact	This material can cause mild eye irritation from contact with product or product mists.
Skin Contact	This material can cause mild skin irritation from prolonged or repeated skin contact. Injection under the skin can cause inflammation and swelling. Injection of pressurized hydrocarbons can cause severe, permanent tissue damage. Initial symptoms may be minor. Injection of petroleum hydrocarbons requires immediate medical attention. Skin contact with hot material may result in severe burns.
Ingestion	This material can cause a laxative effect. If swallowed in large quantities, this material can obstruct the intestine.
Chronic Health Effects Summary	Contains a petroleum-based mineral oil. Prolonged or repeated skin contact can cause mild irritation and inflammation characterized by drying, cracking, (dermatitis) or oil acne. Repeated or prolonged inhalation of petroleum-based mineral oil mists at concentrations above applicable workplace exposure levels can cause respiratory irritation or other pulmonary effects.
Conditions Aggravated by Exposure	Medical conditions aggravated by exposure to this material may include pre-existing skin disorders.
Target Organs	This material may cause damage to the following organs: skin.
Carcinogenic Potential	This product does not contain any components at concentrations above 0.1% which are considered carcinogenic by OSHA, IARC or NTP.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OSHA Health Hazard Classification				OSHA Physical Hazard Classification					
Irritant	<input type="checkbox"/>	Toxic	<input type="checkbox"/>	Combustible	<input type="checkbox"/>	Explosive	<input type="checkbox"/>	Pyrophoric	<input type="checkbox"/>
Sensitizer	<input type="checkbox"/>	Highly Toxic	<input type="checkbox"/>	Flammable	<input type="checkbox"/>	Oxidizer	<input type="checkbox"/>	Water-reactive	<input type="checkbox"/>
Corrosive	<input type="checkbox"/>	Carcinogenic	<input type="checkbox"/>	Compressed Gas	<input type="checkbox"/>	Organic Peroxide	<input type="checkbox"/>	Unstable	<input type="checkbox"/>

SECTION 4: FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

Inhalation	Vaporization is not expected at ambient temperatures. This material is not expected to cause inhalation-related disorders under anticipated conditions of use. In case of overexposure, move the person to fresh air.
Eye Contact	Check for and remove contact lenses. Flush eyes with cool, clean, low-pressure water while occasionally lifting and lowering eyelids. Seek medical attention if excessive tearing, redness, or pain persists.
Skin Contact	If burned by hot material, cool skin by quenching with large amounts of cool water. For contact with product at ambient temperatures, remove contaminated shoes and clothing. Wipe off excess material. Wash exposed skin with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists. Thoroughly clean contaminated clothing before reuse. Discard contaminated leather goods. If material is injected under the skin, seek medical attention immediately.
Ingestion	Do not induce vomiting unless directed to by a physician. Rinse out mouth with water. Never give anything by mouth to a person who is not fully conscious. Allow small quantities to pass through the digestive system. If large amounts are swallowed or irritation or discomfort occurs, seek medical attention immediately.
Notes to Physician	In the event of injection in underlying tissue, immediate treatment should include extensive incision, debridement and saline irrigation. Inadequate treatment can result in ischemia and gangrene. Early symptoms may be minimal.

SECTION 5: FIRE FIGHTING MEASURES

NFPA Flammability Classification	NFPA Class-IIIB combustible material.		
Flash Point Method	Open cup: >150°C (>302°F) (Estimated.).		
Lower Flammable Limit	No data.	Upper Flammable Limit	No data.
Autoignition Temperature	Not available.		
Hazardous Combustion Products	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons and trace oxides of sulfur, antimony, phosphorus and/or nitrogen.		
Special Properties	Fight the fire from a safe distance in a protected location. Open any masses with a water stream to prevent reignition due to smoldering. Cool surface with water fog. Molten material can form flaming droplets if ignited. Water or foam can cause frothing. Use of water on product above 100° C (212° F) can cause product to expand with explosive force. Do not allow liquid runoff to enter sewers or public waters.		
Extinguishing Media	Use dry chemical, foam, Carbon Dioxide or water fog.		
Protection of Fire Fighters	Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies.		

SECTION 6: ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Do not touch damaged containers or spilled material unless wearing appropriate protective equipment. Slipping hazard; do not walk through spilled material. Stop leak if you can do so without risk. For small spills, absorb or cover with dry earth, sand, or other inert non-combustible absorbent material and place into waste containers for later disposal. Contain large spills to maximize product recovery or disposal. Prevent entry into waterways or sewers. In urban area, cleanup spill as soon as possible. In natural environments, seek cleanup advice from specialists to minimize physical habitat damage. This material will float on water. Absorbent pads and similar materials can be used. Comply with all laws and regulation

SECTION 7: HANDLING AND STORAGE

Handling	If this product is stored or applied in high-pressure systems such as grease guns or hydraulic lines, there is the potential for accidental injection into the skin and underlying tissues. Hydrocarbons injected into skin or underlying tissues are not readily removed by body fluids and can cause pain, swelling, chemical irritation, infection and tissue destruction. Early symptoms may be minimal. Workers must be aware of the significant hazards associated with a hydrocarbon injection injury. In the event of an injection injury, workers should seek medical treatment immediately. Avoid water contamination and elevated temperatures to minimize product degradation. Empty containers may contain product residues that can ignite with explosive force. Do not pressurize, cut, weld, braze solder, drill, grind or expose containers to flames, sparks, heat or other potential ignition sources. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers and/or waste residues of this product.
Storage	Keep container closed. Do not store with strong oxidizing agents. Do not store at elevated temperatures. Avoid storing product in direct sunlight for extended periods of time. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers or waste residues of this product.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls	Ventilation controls are not normally required under anticipated conditions of use. Provide exhaust ventilation or other engineering controls if airborne mists or vapors concentrations exceed recommended occupational exposure limits listed below. An eye wash station and safety shower should be located near the work-station.
Personal Protective Equipment	Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.



Eye Protection	Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Wear goggles and/or face shield if splashing or spraying is anticipated. Wear goggles and face shield if material is heated above 125°F (51°C). Have suitable eye wash water available.
Hand Protection	Use gloves constructed of chemical resistant materials such as neoprene or heavy nitrile rubber if frequent or prolonged contact is expected. Use heat-protective gloves when handling product at elevated temperatures.
Body Protection	Use clean and impervious protective clothing (e.g., neoprene or Tyvek®) if splashing or spraying conditions are present. Protective clothing may include long-sleeve outer garment, apron, or lab coat. If significant contact occurs, remove oil-contaminated clothing as soon as possible and promptly shower. Launder contaminated before reuse or discard. Wear heat protective boots and protective clothing when handling material at elevated temperatures.
Respiratory Protection	Vaporization is not expected at ambient temperatures. Therefore, the need for respiratory protection is not anticipated under normal use conditions and with adequate ventilation. If elevated airborne concentrations above applicable workplace exposure levels are anticipated, a NIOSH-approved organic vapor respirator equipped with a dust/mist prefilter should be used. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134).
General Comments	Use good personal hygiene practices. Wash hands and other exposed skin areas with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities, or leaving work. DO NOT use gasoline, kerosene, solvents or harsh abrasives as skin cleaners. Since specific exposure standards/control limits have not been established for this product, the "Oil Mist, Mineral" exposure limits shown below are suggested as minimum control guidelines.

Occupational Exposure Guidelines

Substance	Applicable Workplace Exposure Levels
Oil Mist, Mineral	ACGIH (United States).
	TWA: 5 mg/m ³
	STEL: 10 mg/m ³
	OSHA (United States).
	TWA: 5 mg/m ³

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES (TYPICAL)

Physical State	Semi-solid to solid (Smooth and adhesive)	Color	Amber.	Odor	Mild petroleum odor
Specific Gravity	Not available.	pH	Not Applicable.	Vapor Density	>10 (Air = 1)
Boiling Range	Not applicable.			Melting/Freezing Point	Not available.

Mystik® JT-6® Multi-Purpose Grease, No. 2

Vapor Pressure <0.001 kPa (<0.01 mmHg) (at 20°C)

Viscosity (cSt @ 40°C) 1080

Solubility in Water Insoluble in cold water.

Volatile Characteristics Negligible volatility

Additional Properties NLGI Grade: 2
Thickener: Calcium
Texture: Adhesive

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability Stable.

Hazardous Polymerization Not expected to occur.

Conditions to Avoid Keep away from extreme heat, sparks, open flame, and strongly oxidizing conditions.

Materials Incompatibility Strong oxidizers.

Hazardous Decomposition Products No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS.

SECTION 11: TOXICOLOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 and the Hazards Identification in Section 3 of this MSDS.

Toxicity Data

Distillates, petroleum, hydrotreated light naphthenic:

ORAL (LD50): Acute: >5000 mg/kg [Rat].
DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].

INHALATION (LC50) Acute: 9.6 mg/L (Female Rat).
INHALATION (LC50) Acute: 10.5 mg/L (Male Rat).
DRAIZE EYE Acute: Non-irritating (Rabbit).
DRAIZE DERMAL Acute: Mild skin irritant (Rabbit).
BUEHLER DERMAL Acute: Non-sensitizing (Guinea Pig).
28-Day DERMAL Sub-Chronic: Mild to moderate skin irritant (Rabbit & Rat).

A life-time dermal application of severely hydrotreated light naphthenic oils produced skin masses on mice which correlated with the skin irritation response levels of the test animals. Additional studies attribute these masses to a weak promotional activity. These studies indicate that light naphthenic oils are not mutagenic, tumor initiators nor complete chemical carcinogens. These materials have not been determined to be carcinogenic by IARC, NTP or OSHA.

Distillates, petroleum, hydrotreated heavy naphthenic:

ORAL (LD50): Acute: >5000 mg/kg [Rat].
DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].

Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicities in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mists well above applicable workplace exposure levels include lung inflammatory reaction, lipoid granuloma formation and lipoid pneumonia. In acute and sub-acute studies involving exposures to lower concentrations of mineral oil mists at or near current work place exposure levels produced no significant toxicological effects.

Grease:

Injection of pressurized hydrocarbons under the skin, in muscle or into the blood stream can cause irritation, inflammation, swelling, fever and mild central nervous system depression. Injection of pressurized hydrocarbons can cause severe, permanent tissue damage.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity data are not available for this product.

Environmental Fate

An environmental fate analysis has not been conducted on this specific product. Plants and animals may experience harmful or fatal effects when coated with petroleum-based products. Petroleum-based (mineral) lube oils will normally float on water. In stagnant or slow-flowing waterways, an oil layer can cover a large surface area. As a result, this oil layer might limit or eliminate natural atmospheric oxygen transport into the water. With time, if not removed, oxygen depletion in the waterway can result in a loss of marine life or create an anaerobic environment. This material contains phosphorus which is a controlled element for disposal in effluent waters in most sections of North America. Phosphorus is known to enhance the formation of algae. Severe algae growth can reduce oxygen content in the water possibly below levels necessary to support marine life.

SECTION 13: DISPOSAL CONSIDERATIONS

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Conditions of use may cause this material to become a "hazardous waste", as defined by federal or state regulations. It is the responsibility of the user to determine if the material is a "hazardous waste" at the time of disposal. Transportation, treatment, storage, and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR 260 through 40 CFR 271). State and/or local regulations may be more restrictive. Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues. Empty drums and pails retain residue. DO NOT pressurize, cut, weld, braze, solder, drill, grind, or expose this product's empty container to heat, flame, or other ignition sources. DO NOT attempt to clean it. Empty drums and pails should be drained completely, properly bunged or sealed, and promptly sent to a reconditioner.

SECTION 14: TRANSPORT INFORMATION

The shipping description below may not represent requirements for all modes of transportation, shipping methods or locations outside of the United States.

US DOT Status

Not regulated by the U.S. Department of Transportation as a hazardous material.

Proper Shipping Name

Not regulated.

Hazard Class

Not regulated.

Packing Group(s)

Not applicable.

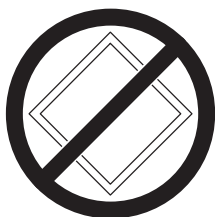
UN/NA ID

Not regulated.

Reportable Quantity

A Reportable Quantity (RQ) has not been established for this material.

Placards



Emergency Response Guide No.

Not applicable.

HAZMAT STCC No.

Not available

MARPOL III Status

Not a DOT "Marine Pollutant" per 49 CFR 171.8.

SECTION 15: REGULATORY INFORMATION

TSCA Inventory	This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.
SARA 302/304	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.
SARA 311/312	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories: No SARA 311/312 hazard categories identified.
SARA 313	This product contains the following components in concentrations above de minimis levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA: No components were identified.
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are: Antimony and Antimony Compounds, Concentration: 0 - 1%
CWA	This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.
California Proposition 65	This product is not known to contain the any components for which the State of California has found to cause cancer, birth defects or other reproductive harm.
New Jersey Right-to-Know Label	Petroleum Oil
Additional Regulatory Remarks	No additional regulatory remarks.

SECTION 16: OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

REVISION INFORMATION

Version Number	2.2
Revision Date	04/15/2003
Print Date	Printed on 04/15/2003.

ABBREVIATIONS

AP: Approximately	EQ: Equal	>: Greater Than	<: Less Than	NA: Not Applicable	ND: No Data	NE: Not Established
ACGIH: American Conference of Governmental Industrial Hygienists	AIHA: American Industrial Hygiene Association					
IARC: International Agency for Research on Cancer	NTP: National Toxicology Program					
NIOSH: National Institute of Occupational Safety and Health	OSHA: Occupational Safety and Health Administration					
NPCA: National Paint and Coating Manufacturers Association	HMIS: Hazardous Materials Information System					
NFPA: National Fire Protection Association	EPA: US Environmental Protection Agency					

DISCLAIMER OF LIABILITY

Mystik® JT-6® Multi-Purpose Grease, No. 2

THE INFORMATION IN THIS MSDS WAS OBTAINED FROM SOURCES WHICH WE BELIEVE ARE RELIABLE. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESSED OR IMPLIED REGARDING ITS CORRECTNESS. SOME INFORMATION PRESENTED AND CONCLUSIONS DRAWN HEREIN ARE FROM SOURCES OTHER THAN DIRECT TEST DATA ON THE SUBSTANCE ITSELF. THIS MSDS WAS PREPARED AND IS TO BE USED ONLY FOR THIS PRODUCT. IF THE PRODUCT IS USED AS A COMPONENT IN ANOTHER PRODUCT, THIS MSDS INFORMATION MAY NOT BE APPLICABLE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION OR PRODUCTS FOR THEIR PARTICULAR PURPOSE.

THE CONDITIONS OR METHODS OF HANDLING, STORAGE, USE, AND DISPOSAL OF THE PRODUCT ARE BEYOND OUR CONTROL AND MAY BE BEYOND OUR KNOWLEDGE. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

***** END OF MSDS *****

MATERIAL SAFETY DATA SHEET

No. 2 DIESEL FUEL (ULSD)

EMERGENCY PHONE NUMBERS:

CHEMTREC: 1-800-424-9300 (for fire, spill and emergency response information)

CHEMTREC CUSTOMER NUMBER: CCN14937

GREAT FALLS POISON CONTROL CENTER: 1-800-525-5042 (for poisoning)

SPOKANE POISON CONTROL CENTER: 1-800-732-6985 (for poisoning)

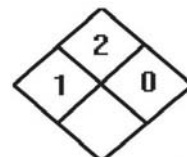
SECTION 1 - PRODUCT IDENTIFICATION

PRODUCT NAME: No. 2 DIESEL FUEL

CAS NUMBER: 68476-34-6

FORMULA: C₁₀H₂₂-C₁₆H₃₄

CHEMICAL FAMILY: Petroleum hydrocarbon



NFPA 704 SYMBOL

SYNONYMS: No.2 Ultra Low Sulfur Diesel, No. 2 Diesel Fuel - dyed, No.2 Diesel fuel oil, No.2 off road diesel - dyed, No. 2 Distillate, UN 1202

SECTION 2 - HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	CAS NO.	RETEC#	VOL%	TLV(8 Hr TWA)	PEL(8 Hr TWA)	STEL	IDLH
No.2 Diesel fuel	68476-34-6	--	>99	100 mg/m ³ (s)	--	--	--
Ethyl Benzene	100-41-4	DA0700000	<1	100 ppm ⁽²⁾	100 ppm	125 ppm ⁽²⁾	800 ppm ⁽³⁾
Naphthalene	91-20-3	QJ0525000	<1	10 ppm ⁽²⁾	10 ppm	15 ppm ⁽²⁾	250 ppm ⁽³⁾

(2)= ACGIH (3)= NIOSH (s)= skin notation

OTHER INGREDIENT INFORMATION: Sulfur content is less than 15 ppm by weight.

SECTION 3 - PHYSICAL DATA

BOILING POINT:	315-650°F
VAPOR PRESSURE:	0.40mm Hg
VAPOR DENSITY (AIR=1):	>3
SOLUBILITY IN WATER:	<0.1%
ODOR THRESHOLD:	N.A.
APPEARANCE:	Clear to yellow liquid may be dyed red
ODOR:	Petroleum
SPECIFIC GRAVITY (WATER=1):	0.8 - 0.88
AUTOIGNITION TEMP:	490-546°F
Physical Hazard:	Combustible liquid (may accumulate static charge)

No. 2 DIESEL FUEL(ULSD)

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

CLASSIFICATION: COMBUSTIBLE LIQUID

FLASH POINT: 140°F (PMCC)

FLAMMABLE LIMITS: LEL = 0.4% UEL = 8.0%

EXTINGUISHING MEDIA: Foam, dry chemical, carbon dioxide, Halon

SPECIAL FIRE FIGHTING PROCEDURES: Move container from fire area if possible. Use water to keep fire exposed containers cool. Use foam for spill control.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Evacuate a radius of 1500 feet for uncontrolled fires. Vapors are heavier than air and may travel great distances and flash back. Extinguish only if flow can be stopped.

NFPA FIRE = 2 (moderate)

SECTION 5 - REACTIVITY DATA

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID/INCOMPATIBILITY: Strong oxidizers, all possible sources of ignition.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide and sulfur oxides.

Exhaust from diesel engines have been classified as probably carcinogenic to humans.

NFPA REACTIVITY = 0 (minimal)

SECTION 6 - HEALTH HAZARD DATA

ROUTES OF ENTRY: Inhalation, ingestion, contact.

TARGET ORGANS: Eyes, skin, respiratory system, central nervous system, liver, kidneys.

HEALTH HAZARDS: Irritant\Narcotic. May cause depression of central nervous system ranging from headaches to death. Kidney and liver damage is possible. Aspiration into lungs can cause severe lung damage leading to pulmonary edema and bronchial pneumonia. Exposure to petroleum solvents/petroleum hydrocarbons by skin contact may aggravate an existing dermatitis. Petroleum middle distillates have been shown to produce skin tumors in mice following repeated skin exposure without washing or removal. Also prolonged or repeated inhalation exposure to high concentrations has caused liver tumors in mice and adverse kidney effects in male rats. This product is judged to have an acute oral LD50 (rat) greater than 5 g/kg of body weight, and an acute dermal LD50 (rabbit) greater than 3.16 g/kg of body weight.

CARCINOGENICITY: There is inadequate evidence as a human carcinogen. There is limited evidence as an animal carcinogen. Not listed by NTP, or OSHA. Diesel, light distillate is listed by IARC in group 3 under unclassifiable as to Carcinogenicity to humans. Exhaust from diesel engines have shown in recent studies to be potentially carcinogenic and is listed by IARC in group 2A as probably carcinogenic to humans. Naphthalene is listed by the IARC as possibly carcinogenic to humans under group 2B.

SIGNS AND SYMPTOMS OF EXPOSURE: Respiratory tract irritation and may cause nausea, cramping, headaches, coughing or gagging and depression of the central nervous system. High vapor contact or liquid concentration can irritate eyes. Prolonged or repeated contact with skin can cause defatting, irritation, and dermatitis.

No. 2 DIESEL FUEL(ULSD)

SECTION 6 - HEALTH HAZARD DATA (cont.)

EMERGENCY AND FIRST AID PROCEDURES:

INGESTION: Toxic if swallowed. DO NOT INDUCE VOMITING. Immediately seek medical attention.

Symptoms may include nausea, irritation, vomiting, diarrhea and depression

INHALATION: Maintain respirations, assist with artificial respiration if needed and give oxygen if available and trained to do so. Seek medical attention. If liquid is in lungs (aspirated) seek medical care.

EYES: Flush eyes with water for at least 15 minutes. Seek medical attention.

SKIN: Remove diesel soaked clothing as soon as possible launder before reuse. Wash skin thoroughly with soap and water. If irritation persists seek medical attention.

NFPA HEALTH = 1 (slight)

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Eliminate all sources of ignition. Contain spill. Use water fog to suppress vapor cloud. Use SCBA to avoid breathing vapors. Absorb liquid with dry earth, sand, clay or other noncombustible material. Do not touch or walk through spilled material.

WASTE DISPOSAL: Dispose in accordance with RCRA regulations. Do not put in sewers or any water course.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: All equipment and storage containers should be properly grounded. This material is subject to OSHA and DOT regulations. Portable metal containers should be bonded to the storage container before transferring liquid.

OTHER PRECAUTIONS: Avoid breathing vapors. Vapors may be explosive. Do not weld on containers unless properly cleaned and purged using safe work procedures. Trace amounts of hydrogen sulfide may be present in the product. Accumulation of hydrogen sulfide may occur in vapor spaces of confined spaces where this product is handled, stored or used.

SECTION 8 - ENVIRONMENTAL AND SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use NIOSH\MSHA approved respiratory protection in areas exceeding exposure limits, the type to be determined by the degree of exposure.

VENTILATION: Use in well ventilated area or provide ventilation to limit exposure to acceptable levels.

EYE/SKIN PROTECTION: Rubber gloves, face shields, goggles or safety glasses with side shields, coveralls.

WORK/HYGIENIC PRACTICES: Remove contaminated clothing as soon as possible launder before reuse. Always wash exposed area thoroughly with soap and water.

NOTICE: This product contains a toxic chemical or chemicals subject to the reporting Requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372, as listed below:

CAS-NUMBER	CHEMICAL	WEIGHT %
100-41-4	Ethyl Benzene	<1
91-20-3	Naphthalene	<1

This notice should be included in all copies or redistribution of this Material Safety Data Sheet.

No. 2 DIESEL FUEL(ULSD)**SECTION 8 - ENVIRONMENTAL AND SPECIAL PROTECTION INFORMATION (cont.)**

This product contains the following components which are considered hazardous if spilled in navigable waters.

Component	Reportable Quantity
Petroleum Hydrocarbon	Film or sheen upon the water surface or discoloration of the water or adjoining shoreline

REFER TO DEPARTMENT OF TRANSPORTATION (DOT) EMERGENCY RESPONSE GUIDEBOOK GUIDE 128 FOR ADDITIONAL EMERGENCY INFORMATION.

SECTION 9 - SHIPPING DATA**DOT**

Identification #: NA 1993
Shipping name: Diesel fuel
Hazard class/division: 3
Packing group: III
Label: not required (49CFR173.150(f)(2))
Placard required: FLAMMABLE/1993

Labels are not required for non- bulk packages (≤ 119 gal) (49CFR173.150(f)(2))
Placards are required for bulk packages (> 119 gal)

IATA

Identification #: UN 1202
Shipping name: Diesel fuel
Hazard class/division: 3
Packing group: III
Non-bulk package Marking: Diesel fuel, UN 1202
Label name: FLAMMABLE

Arrows are required on two opposite sides of the package for all non bulk packages for liquids except drums (IATA 7.1.6.1) (49 CFR 173.312)

Arrows required on two opposite sides of packages.

This information is believed to be accurate and as reliable as information available to us. We make no warranty or guarantee as to its accuracy and assume no liability from its use. Users should determine the suitability of the information for their particular purposes.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010

NXS-LUBE

Revision Date: 06-Jan-2014

Revision Number: 10

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Product Name NXS-LUBE

1.2 Relevant identified uses of the substance or mixture and uses advised against

Recommended Use	Additive
Sector of use	SU2 - Mining, (including offshore industries)
Product category	PC24 - Lubricants, Greases and Release Products
Process categories	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises

1.3 Details of the supplier of the safety data sheet

Halliburton Manufacturing Services, Ltd.
Halliburton House, Howemoss Crescent
Kirkhill Industrial Estate
Dyce
Aberdeen, AB21 0GN
United Kingdom

Emergency Phone Number: +44 1224 795277 or +1 281 575 5000

www.halliburton.com

For further information, please contact

E-Mail address: fdunexchem@halliburton.com

1.4 Emergency telephone number

+44 1224 795277 or +1 281 575 5000

Emergency telephone - §45 - (EC)1272/2008	
Europe	112
Denmark	Poison Control Hotline (DK): +45 82 12 12 12
France	ORFILA (FR): + 01 45 42 59 59
Germany	Poison Center Berlin (DE): +49 030 30686 790
Italy	Poison Center, Milan (IT): +39 02 6610 1029
Netherlands	National Poisons Information Center (NL): +31 30 274 88 88 (NB: this service is only available to health professionals)
Norway	Poisons Information (NO): + 47 22 591300
Poland	Poison Control and Information Centre, Warsaw (PL): +48 22 619 66 54; +48 22 619 08 97
Spain	Poison Information Service (ES): +34 91 562 04 20
United Kingdom	NHS Direct (UK): +44 0845 46 47

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Not classified

Classification according to EU Directives 67/548/EEC or 1999/45/EC

For the full text of the R-phrases mentioned in this Section, see Section 16

Classification Not Classified
Risk Phrases None

2.2 Label Elements

Not classified

Hazard Pictograms

Signal Word Not Hazardous

Hazard Statements
Not Classified

Precautionary Statements - EU (§28, 1272/2008)
Not Classified

Contains

Substances

Contains no hazardous substances

CAS Number

Mixture

2.3 Other Hazards

None known

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	EINECS	CAS Number	PERCENT (w/w)	EEC Classification	EU - CLP Substance Classification	REACH No.
Contains no hazardous substances	Not applicable	Mixture	60 - 100%	Not applicable	Not applicable	No data available

For the full text of the R-phrases mentioned in this Section, see Section 16

4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Skin Wash with soap and water. Get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

4.2 Most Important symptoms and effects, both acute and delayed

May cause mild eye, skin, and respiratory irritation.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons

None known.

5.2 Special hazards arising from the substance or mixture

Special Exposure Hazards

Decomposition in fire may produce toxic gases.

5.3 Advice for firefighters**Special Protective Equipment for Fire-Fighters**

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use appropriate protective equipment.

See Section 8 for additional information

6.2 Environmental precautions

Prevent from entering sewers, waterways, or low areas.

6.3 Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

6.4 Reference to other sections

See Section 8 and 13 for additional information.

7. HANDLING AND STORAGE**7.1 Precautions for Safe Handling**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice

7.2 Conditions for safe storage, including any incompatibilities

Store away from oxidizers. Keep container closed when not in use. Keep from freezing. Product has a shelf life of 36 months.

7.3 Specific End Use(s)**Exposure Scenario**

No information available

Other Guidelines

No information available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters****Exposure Limits**

Substances	CAS Number	EU	UK OEL	Netherlands	France OEL
Contains no hazardous substances	Mixture	Not applicable	Not applicable	Not applicable	Not applicable

Substances	CAS Number	Germany MAK/TRK	Spain	Portugal	Finland
Contains no hazardous substances	Mixture	Not applicable	Not applicable	Not applicable	Not applicable

Substances	CAS Number	Austria	Ireland	Switzerland	Norway
Contains no hazardous substances	Mixture	Not applicable	Not applicable	Not applicable	Not applicable

Substances	CAS Number	Italy	Poland	Hungary	Czech Republic
Contains no hazardous substances	Mixture	Not applicable	Not applicable	Not applicable	Not applicable

Substances	CAS Number	Denmark
Contains no hazardous substances	Mixture	Not applicable

Derived No Effect Level (DNEL)

No information available.

Worker**General Population**

Predicted No Effect Concentration (PNEC)

No information available.

8.2 Exposure controls**Engineering Controls**

Use in a well ventilated area.

Personal protective equipment**Respiratory Protection**

Not normally needed. But if significant exposures are possible then the following respirator is recommended:

Organic vapor respirator with a dust/mist filter. (A2P2/P3)

Hand Protection

Impervious rubber gloves.

Skin Protection

Normal work coveralls.

Eye Protection

Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions

None known.

Environmental Exposure Controls No information available**9. PHYSICAL AND CHEMICAL PROPERTIES****9.1 Information on basic physical and chemical properties****Physical State:** Liquid**Color:** Amber**Odor:** Mild**Odor Threshold:** No information availablePropertyValuesRemarks/ - Method**pH:**

7- 8.5

Freezing Point/Range

No data available

Melting Point/Range

No data available

Boiling Point/Range

260 °C

Flash Point

150 °C Open cup

Evaporation rate

No data available

Vapor Pressure

0.001 mmHg

Vapor Density

10

Specific Gravity

0.99

Water Solubility

Insoluble in water

Solubility in other solvents

No data available

Partition coefficient: n-octanol/water

No data available

Autoignition Temperature

No data available

Decomposition Temperature

No data available

Viscosity

No data available

Explosive Properties

No information available

Oxidizing Properties

No information available

9.2 Other information**VOC Content (%)**

No data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

Not applicable

10.2 Chemical Stability

Stable

10.3 Possibility of Hazardous Reactions

Will Not Occur

10.4 Conditions to Avoid

None anticipated

10.5 Incompatible Materials

Strong oxidizers.

10.6 Hazardous Decomposition Products

Oxides of sulfur. Carbon monoxide and carbon dioxide. Hydrogen sulfide.

11. TOXICOLOGICAL INFORMATION**11.1 Information on Toxicological Effects****Acute Toxicity****Inhalation**

May cause mild respiratory irritation.

Eye Contact

May cause mild eye irritation.

Skin Contact

May cause mild skin irritation.

Ingestion

May cause abdominal pain, vomiting, nausea, and diarrhea.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 1% are chronic health hazards.

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances	Mixture	No data available	No data available	No data available

12. ECOLOGICAL INFORMATION
12.1 Toxicity
Ecotoxicity Effects

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Contains no hazardous substances	Mixture	No information available	No information available	No information available	No information available

12.2 Persistence and degradability

No information available

12.3 Bioaccumulative potential

No information available

12.4 Mobility in soil

No information available

12.5 Results of PBT and vPvB assessment

No information available.

12.6 Other adverse effects**Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Disposal Method****Contaminated Packaging**

Disposal should be made in accordance with federal, state, and local regulations.
Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION**IMDG/IMO**

UN Number: Not restricted.
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable

RID

UN Number: Not restricted.
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable

ADR

UN Number: Not restricted.
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable

IATA/ICAO

UN Number: Not restricted.
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories

All of the components in the product are on the following Inventory lists: All of the components in the product are on the following Inventory lists:.

EINECS Inventory This product does not comply with EINECS
US TSCA Inventory All components listed on inventory or are exempt.
Canadian DSL Inventory Product contains one or more components not listed on the inventory.

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

**Germany, Water Endangering
Classes (WGK)** Not determined.

15.2 Chemical Safety Assessment

No information available

16. OTHER INFORMATION

Full text of R-phrases referred to under Sections 2 and 3

None

Key literature references and sources for data

www.ChemADVISOR.com/

Revision Date: 06-Jan-2014

Revision Note

Not applicable

This safety data sheet complies with the requirements of Regulation (EC) No. 453/2010

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

End of Safety Data Sheet

MATERIAL SAFETY DATA SHEET**Product Trade Name:** **QUIK-GEL GOLD™****Revision Date:** 05-Jan-2010**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

Product Trade Name: QUIK-GEL GOLD™
Synonyms: None
Chemical Family: Mineral
Application: Viscosifier
Manufacturer/Supplier: Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000
Prepared By: Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Bentonite	1302-78-9	60 - 100%	Not applicable	Not applicable
Crystalline silica, quartz	14808-60-7	1 - 5%	0.025 mg/m ³	10 mg/m ³ %SiO ₂ + 2
Crystalline silica, cristobalite	14464-46-1	0 - 1%	0.025 mg/m ³	1/2 x 10 mg/m ³ %SiO ₂ + 2
Crystalline silica, tridymite	15468-32-3	0 - 1%	0.05 mg/m ³	1/2 x 10 mg/m ³ %SiO ₂ + 2

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD

May cause eye and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin

Wash with soap and water. Get medical attention if irritation persists.

Eyes

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion

Under normal conditions, first aid procedures are not required.

Notes to Physician

Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):

Not Determined

Flash Point/Range (C):

Not Determined

Flash Point Method:

Not Determined

Autoignition Temperature (F):

Not Determined

Autoignition Temperature (C):

Not Determined

Flammability Limits in Air - Lower (%):

Not Determined

Flammability Limits in Air - Upper (%):

Not Determined

Fire Extinguishing Media

All standard firefighting media.

Special Exposure Hazards

Not applicable.

Special Protective Equipment for Fire-Fighters

Not applicable.

NFPA Ratings:

Health 0, Flammability 0, Reactivity 0

HMIS Ratings:

Health 0*, Flammability 0, Physical Hazard 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures

None known.

Procedure for Cleaning / Absorption

Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information

Do not reuse empty container. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Keep from excessive heat. Product has a shelf life of 12 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.

Respiratory Protection

Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.

Hand Protection

Normal work gloves.

Skin Protection

Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

Eye Protection

Wear safety glasses or goggles to protect against exposure.

Other Precautions

None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:

Powder

Color:

Tan

Odor:

Mild earthy

pH:

8.5-9.5 (3%)

Specific Gravity @ 20 C (Water=1):

2.5 - 2.6

Density @ 20 C (lbs./gallon):

Not Determined

Bulk Density @ 20 C (lbs/ft3):

69-74 (comp)

Boiling Point/Range (F):

Not Determined

Boiling Point/Range (C):

Not Determined

Freezing Point/Range (F):

Not Determined

Freezing Point/Range (C):

Not Determined

Vapor Pressure @ 20 C (mmHg):

Not Determined

Vapor Density (Air=1):

Not Determined

Percent Volatiles:

Not Determined

Evaporation Rate (Butyl Acetate=1):

Not Determined

Solubility in Water (g/100ml):

Slightly soluble

Solubility in Solvents (g/100ml):

Not Determined

VOCs (lbs./gallon):

Not Determined

Viscosity, Dynamic @ 20 C (centipoise):

Not Determined

Viscosity, Kinematic @ 20 C (centistokes):

Not Determined

Partition Coefficient/n-Octanol/Water:

Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight (g/mole): Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	<p>Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).</p> <p>Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).</p>
Skin Contact	May cause mechanical skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to <u>IARC Monograph 68, Silica, Some Silicates and Organic Fibres</u> (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: 10000 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity:	Not determined

Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.

EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.
Canadian Regulations	
Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline silica

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS

Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

Date Reviewed: June 2015

Supersedes: February 2015

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazards Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

SECTION 1: Product and Company Identification


Product Name	Sodium Carbonate, Anhydrous
Alternate Product Name(s)	Soda Ash, Disodium Carbonate Also: Dense Soda Ash, Soda Ash Light, Synthetic Light Soda Ash, Soda Ash Liquid, Natural Light Soda Ash, Natural Light HA Soda Ash
Chemical Formula	Na ₂ CO ₃
Product Use	Glass manufacture, detergent manufacture, sodium chemicals and carbonate chemicals manufacture, pulp and paper, brine treatment, water hardness removal, pH adjustment in water or wastewater, flue gas desulphurization, coal treatment, ion exchange resin regeneration.
This chemical is certified to ANSI/NSF Standard 60, Drinking Water Chemicals – Health Effects (as packaged in the original, unopened container). Concentration not to exceed 100 ppm when used for corrosion control or scale control pH adjustment.	
Manufacturer	Tata Chemicals (Soda Ash) Partners 100 Enterprise Drive Rockaway, NJ 07866
Emergency Telephone Numbers	(800) 424-9300 (CHEMTREC – US) (613) 996-6666 (CANUTEC – Canada) (307) 872-3431 (Plant – Green River, WY)

SECTION 2: Hazards Identification

Emergency Overview:

White, odorless, granular solid. Product is non-combustible. Reacts with acids to release carbon dioxide gas and heat. May irritate skin and eyes. Dusts may irritate respiratory tract. Not expected to be toxic to the environment, nor to aquatic organisms. Avoid simultaneous exposure to soda ash and lime dust. In the presence of moisture (i.e. perspiration) the two materials combine to form caustic soda (NaOH), which may cause burns.

Hazard Classification:

Class	Category	Hazard Statement	Pictogram
Eye Irritant	Category 2	H319 Causes serious eye irritation	 Warning: Eye Irritate

Precautionary Statements:**Prevention**

P264 Wash skin thoroughly after handling
P280 Wear protective gloves/protective clothing/eye protection/face protection

Response

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

Hazards not otherwise identified

None identified

Potential Health Effects:

Skin	Prolonged contact may cause skin irritation (red, dry, cracked skin).
Eyes	Irritating to the eyes.
Ingestions	Although low in toxicity, ingestion may cause nausea, vomiting, stomach ache, and diarrhea.
Inhalation	Prolonged inhalation of product dusts may irritate nose, throat, and lungs.
Chronic Effects	Excessive, long term contact may produce "soda ulcers" on hands and perforation of the nasal septum. Sensitivity reactions may occur from prolonged and repeated exposure. This product does not contain any ingredient designated by IARC, NTP, ACGIH or OSHA as probable or suspected human carcinogens.

SECTION 3: Composition/Information on Ingredients

Chemical Name	CAS #	Wt%	EC No.	EC Class
Sodium Carbonate	497-19-8	99.8	207-838-8	Xi, R36

SECTION 4: First Aid Measures

Skin	Wash with plenty of soap and water. Get medical attention if irritation occurs and persists. Remove and wash contaminated clothing before re-use.
Eyes	Immediately flush with water for at least 15 minutes lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist as necessary.
Ingestions	Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. If symptoms persist, contact a doctor or poison control center
Inhalation	Remove to fresh air. If breathing difficulty or discomfort occurs and persists, obtain medical attention.
Advice to Physician	While internal toxicity is low, irritant effects of high concentrations may produce corneal opacities, and vesicular skin reactions in humans with abraded skin only. Treatment is symptomatic and supportive.

SECTION 5: Firefighting measures

Extinguishing Media	Not combustible, use extinguishing method suitable for surrounding fire.
Fire/Explosion Hazards	Not applicable.
Fire Fighting Procedures	Wear full protective clothing and self-contained breathing apparatus
Flammable Limits	Not applicable
Auto-Ignition Temperature	Not applicable
Hazardous Combustion Products	Carbon dioxide.
Sensitivity to Impact	None
Sensitivity to Static Discharge	None

SECTION 6: Accidental Release Measures

Personal Precautions	Refer to Section 8 "Exposure Controls / Personal Protection"
Containment	Prevent large quantities of this product from contacting vegetation or waterways; large spills could kill vegetation and fish.
Clean Up	This product, if spilled, can be recovered and re-used if contamination does not present a problem. Vacuum or sweep up the material and collect in a suitable container for disposal. If the spilled product is unusable due to contamination, consult state or federal environmental agencies for acceptable disposal procedures and locations. See Section 13 "Disposal Considerations".
Notification Requirements	Federal regulations do not require notification for spills of this product. State and local regulations may contain different requirements; consult local authorities.

SECTION 7: Handling and Storage

Handling	Use air conveying / mechanical systems for bulk transfer to storage. For manual handling of bulk transfer use mechanical ventilation to remove airborne dust from railcar, ship or truck. Use approved respiratory protection when ventilation systems are not available. Selection of respirators is based on the dust cloud generation. Keep material out of lakes, streams, ponds and sewer drains. Avoid eye contact or prolonged skin contact. Avoid breathing dusts. When dissolving, add to water cautiously and with stirring; solutions can get hot. Use good personal hygiene and housekeeping.
Storage	Store in a cool dry area, away from incompatible products (acids). Prolonged storage may cause product to cake from atmospheric moisture.

SECTION 8: Exposure Controls/ Personal Protection

Engineering Controls	Where possible, provide general mechanical and/or local exhaust ventilation to prevent release of airborne dust into the work environment. Eye wash facility should be provided in storage and general work area.
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Personal Protective Equipment:

Eyes and Face	For dusty or misty conditions, or when handling solutions where there is reasonable probability of eye contact, wear chemical safety goggles and hardhat. Under these conditions do not wear contact lenses. Otherwise, appropriate eye and face protection equipment (ANSI Z87 approved) should be selected for the particular use intended for this material. Safety glasses with side shields are recommended.
Respiratory	Whenever dust in the worker's breathing zone cannot be controlled with ventilation or other engineering means, workers should wear respirators or dust masks approved by NIOSH/MSHA, EU CEN or comparable certification organization to protect them against airborne dust.
Hands, Body, and Arms	Wear long-sleeve shirt and trousers, and impervious gloves for routine product use. Cotton gloves are sufficient for dry product; wear impervious (e.g., rubber, neoprene, etc.) gloves when handling solutions. Protective shoes or boots.

Exposure Guidelines:

Federal guidelines treat the ingredient(s) in this product as a nuisance dust, as no product-specific guidelines have been issued for exposure. As with all nuisance dusts, worker breathing zone concentrations should be measured by validated sampling and analytical methods. The following limits (OSHA and MSHA) apply to this material:

Particulates Not Otherwise Regulated:

OSHA (PEL / TWA): 15 mg/m³ (total dust); 5 mg/m³ (resp fraction)
MSHA (PEL / TWA): 10 mg/m³ (total dust)

SECTION 9: Physical and Chemical Properties

Appearance	White, granular solid
Odor	Odorless
Odor Threshold	Not applicable
Formula	Na ₂ CO ₃
Molecular Weight	105.99
pH	11.3
Melting point/freezing point	854°C (1569°F)
Initial boiling point/boiling range	Decomposes
Flash point	None
Evaporation rate	Not Applicable
Flammability (solid, gas)	Not combustible
Flammability in Air	
Upper flammability limit	No information available
Lower flammability limit	No information available
Vapor Pressure	Not applicable
Vapor Density	Not applicable
Bulk Density (g/l)	Dense grades: 0.9 – 1.1 Natural light grade: 0.7 – 0.9 Synthetic light grade: 0.5 – 0.7
Specific Gravity	2.533 (vs. Water)
Water Solubility(ies)	212.5 g/l @ 20°C
Partition coefficient	No information available
Auto-ignition temperature	No information available
Decomposition temperature	400°C
Viscosity	
Viscosity, dynamic	No information available
Viscosity, cinematic	No information available
Percent Volatile	0%

SECTION 10: Stability and Reactivity

Stability	Stable
Conditions to Avoid	Contract with acids will release carbon dioxide, heat. Contract with lime dust in the presence of moisture can produce corrosive sodium hydroxide.
Materials to Avoid	May react with aluminum, acids, fluorine, lithium, and 2,4,6- Trinitrotoluene.
Polymerization	Will not occur.
Hazardous Decomposition	When heated to decomposition, carbon dioxide is released.
Other Precautions	When dissolving, add to water cautiously and with stirring; solutions can get hot.

SECTION 11: Toxicological Information

Eye	Severe irritant (50 mg, rabbit).
Skin	Mild irritant (500 mg/24hr, rabbit). Minor irritation may occur on abraded skin. Not a sensitizer (tested at 0.25% solution).
Oral	LD ₅₀ , rat: 4,090 mg/kg
Inhalation	LC ₅₀ , rat, 2hr 2.3 mg/l 24 – hour LC ₅₀ : 800 mg/m ³ , 20 h exposure (guinea pig) (moderate toxicity)
Chronic	Excessive, long term contact may produce “soda ulcers” on hands and perforation of the nasal septum. Sensitivity reactions may occur from prolonged and repeated exposure.
Carcinogenicity	Not designated by IARC, NTP, ACGIH or OSHA as probable or suspected human carcinogens.

SECTION 12: Ecological Information

Acute Ecotoxicity	96 – hour LC ₅₀ : 265 – 565 mg/l (daphnia magna) (low toxicity) 300 – 320 mg/l (blue gill sunfish) (low toxicity) 96 – hour TL _m : 1200 mg/l (mosquito-fish) 48 – hour TL _m : 840 mg/l (mosquito-fish) 48 – hour EC ₅₀ : 265 mg/l (daphnia magna) 5 Day EC ₅₀ : 242 mg/l (Nitzscheria linearis)
Chronic Ecotoxicity	7 Day EC, biomass: 14 mg/l (phytoplankton)
Mobility	Air: Not Applicable Water: Considerable solubility and mobility. Soil / sediments: Non-significant adsorption
Abiotic Degradation	Water (hydrolysis): degradation's products: carbonate (pH>10) / carbonic acid / carbon dioxide (pH<6). Soil: Hydrolysis as a function of pH.
Biotic Degradation	Aerobic / anaerobic: Not applicable (inorganic compound)
Potential for Bioaccumulation	Not applicable (ionizable inorganic compound)

Observed effects are related to alkaline properties of the product. Product is not significantly hazardous for the environment

SECTION 13: Disposal Considerations

Disposal Method	When this product is discarded or disposed of, as purchased, it is neither a characteristic nor a listed hazardous waste according to US Federal RCRA regulations (40 CFR 261). As a non-hazardous waste the material may be disposed of in a landfill in accordance with government regulations; check local or state regulations for applicable requirements prior to disposal. Any processing, usage, alteration, chemical additions to, or contamination of, the product may alter the disposal requirements. Under Federal Regulations, it is the generator's responsibility to determine if a waste is a hazardous waste.
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SECTION 14: Transport Information

Proper Shipping Name	Not regulated
Primary Hazard Class/Division	Not regulated
UN/NA Number	Not applicable
Label(s), Placard(s), Marking(s)	Not applicable
Reportable Quantity (RQ)	None
49 STCC Number	Not Applicable
ADR (EU), TDG (Canada)	Not regulated
IMDG (sea), ICAO (air), IATA (air)	Not regulated

SECTION 15: Regulatory Information

SARA Title III (Superfund Amendments and Reauthorization Act)

Section 302 Extremely Hazardous Substances: 40CFR355, Appendix A	Not listed
Section 311 Hazard Class 40CFR370	Immediate (acute)
Section 312 Threshold Planning Quantity (TPQ) 40CFR370	No TPQ listed for sodium carbonate
Section 313 Reportable Ingredients 40CFR372	Not listed

CERCLA (Comprehensive Environmental Response Compensation and Liability Act):
40CFR302.4 – There is no listed RQ (reportable quantity) for this product.

TSCA (Toxic Substance Control Act)

This product is listed on the TSCA Inventory of Chemical Substances. No other TSCA rules affect this product

State Regulations:


This product does not contain any components that are regulated under California Proposition 65.

Other:

Clean Water Act (CWA) – Section 301/ 311: Not listed

Clean Air Act (CAA) – Section 112: Not regulated

CANADA:

WHMIS Classification	D2B Toxic Class E Corrosive Symbol:  This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.
WHMIS Ingredient Disclosure List	Listed
DSL Status (Domestic Substances List)	Listed on DSL

EUROPEAN UNION:

EINECS Inventory	Listed: 207-838-8
Annex I (Substances Directive)	Listed: 011-005-00-2 Xi, R-36 (See label details in Section 16)
German Water Classification	Hazard class 1, low hazard to waters
EU – Food Additives Directive (95/2/EC) – Annex I – Generally Permitted for Use in Food	E500

INTERNATIONAL:

This product is also found in the chemical inventories of Australia, China, Korea, Japan and the Philippines.

SECTION 16: Other Information

HMIS (Hazardous Material Identification System)

Health	2
Flammability	0
Physical Hazard	0
Personal Protection (PPE)	B

Protection = B (Safety glasses and gloves)

4 = Severe, 3 = Serious, 2 = Moderate, 1 = Slight, 0 = Minimal

NFPA (National Fire Protection Association System)

Health	2
Flammability	0
Reactivity	0
Special	None

4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Insignificant

Other Information:

Soda ash is produced in three principal grades: Dense, natural light and synthetic light soda ash. When these products are mixed in water they may be known as liquid soda ash. These grades differ only in physical characteristics such as bulk density and size and shape of particles, which influence flow characteristics and angle of repose. Other physical properties, as well as chemical as chemical properties of solutions, are common to each grade of soda ash.

Certified to ANSI / NSF 60

Concentration not to exceed 100 ppm when used for corrosion control or scale control pH adjustment.



The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product, which conforms to the specification, unless otherwise stated. In this case of combinations and mixtures one must make sure that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and the environment.

This Material Safety Data Sheet is offered for your information, consideration and investigation as required by Federal Hazardous Products Act and related legislation. The information is believed to be accurate but General Chemical Industrial Products provides no warranties, either expressed or implied.

Material Safety Data Sheet



SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Texaco Havoline® DEX-COOL® Extended Life Prediluted 50/50 Anti-Freeze/Coolant

Product Use: Antifreeze/Coolant

Product Number(s): CPS227995

Company Identification

Chevron Products Company
a division of Chevron U.S.A. Inc.
6001 Bollinger Canyon Road
San Ramon, CA 94583
United States of America
www.chevronlubricants.com

Transportation Emergency Response

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

Health Emergency

Chevron 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
Ethylene Glycol	107-21-1	40 - 55 %weight
Diethylene glycol	111-46-6	1 - 5 %weight
Potassium 2-ethylhexanoate	3164-85-0	1 - 5 %weight

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

- HARMFUL OR FATAL IF SWALLOWED
- CONTAINS MATERIAL THAT MAY CAUSE ADVERSE REPRODUCTIVE EFFECTS BASED ON ANIMAL DATA
- POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL THAT MAY CAUSE BIRTH DEFECTS BASED ON ANIMAL DATA

- CAUSES DAMAGE TO:
- KIDNEY

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: Toxic; may be harmful or fatal if swallowed.

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: Contains material that may cause adverse reproductive effects if swallowed based on animal data. Contains material that may cause birth defects based on animal data.

Target Organs: Contains material that causes damage to the following organ(s) if swallowed: Kidney
See Section 11 for additional information. Risk depends on duration and level of exposure.

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: 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.

SECTION 5 FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:

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

NFPA RATINGS: Health: 2 Flammability: 0 Reactivity: 0

FLAMMABLE PROPERTIES:

Flashpoint: Not Applicable

Autoignition: No Data Available

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

EXTINGUISHING MEDIA: Dry Chemical, CO2, AFFF Foam or alcohol resistant foam.

PROTECTION OF FIRE FIGHTERS:

Fire Fighting Instructions: This material will not burn.

SECTION 6 ACCIDENTAL RELEASE MEASURES

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 get in eyes, on skin, or on clothing. Do not breathe vapor or fumes. Wash thoroughly after handling.

General Handling Information: Do not taste or swallow antifreeze or solution. Keep out of the reach of children and animals.

General Storage Information: Do not store in open or unlabeled containers.

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: Natural rubber, Neoprene, Nitrile Rubber, Polyvinyl Chloride (PVC or Vinyl).

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, Dusts and Mists.

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
Ethylene Glycol	ACGIH	--	--	100 mg/m3	--

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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

Color: Orange

Physical State: Liquid

Odor: Faint or Mild

pH: 8 - 8.6

Vapor Pressure: <0.01 mmHg @ 20 °C (68 °F)

Vapor Density (Air = 1): 2.1

Boiling Point: 107.8°C (226°F) (Typical)

Solubility: Miscible

Freezing Point: -36.7°C (-34°F) (Typical)

Specific Gravity: 1.06 - 1.09 @ 15.6°C (60.1°F) / 15.6°C (60.1°F)

Viscosity: 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.

Hazardous Decomposition Products: Aldehydes (Elevated temperatures), Ketones (Elevated temperatures)

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 diethylene glycol (DEG). The estimated oral lethal dose is about 50 cc (1.6 oz) for an adult human. DEG has caused the following effects in laboratory animals: liver abnormalities, kidney damage and blood abnormalities. It has been suggested as a cause of the following effects in humans: liver abnormalities, kidney damage, lung damage and central nervous system damage.

This product contains ethylene glycol (EG). The toxicity of EG via inhalation or skin contact is expected to be slight at room temperature. The estimated oral lethal dose is about 100 cc (3.3 oz.) for an adult human. Ethylene glycol is oxidized to oxalic acid which results in the deposition of calcium oxalate crystals mainly in the brain and kidneys. Early signs and symptoms of EG poisoning may resemble those of alcohol intoxication. Later, the victim may experience nausea, vomiting, weakness, abdominal and muscle pain, difficulty in breathing and decreased urine output. When EG was heated above the boiling point of water, vapors formed which reportedly caused unconsciousness, increased lymphocyte count, and a rapid, jerky movement of the eyes in persons chronically exposed. When EG was administered orally to pregnant rats and mice, there was an increase in fetal deaths and birth defects. Some of these effects occurred at doses that had no toxic effects on the mothers. We are not aware of any reports that EG causes reproductive toxicity in human beings.

2-Ethylhexanoic acid (2-EXA) caused an increase in liver size and enzyme levels when repeatedly administered to rats via the diet. When administered to pregnant rats by gavage or in drinking water, 2-EXA caused teratogenicity (birth defects) and delayed postnatal development of the pups. Additionally, 2-EXA impaired female fertility in rats. Birth defects were seen in the offspring of mice who were administered sodium 2-ethylhexanoate via intraperitoneal injection during pregnancy.

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 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: Anti-freeze Preparations, Proprietary

Additional Information: Bulk shipments with a reportable quantity (5000 pounds) of ethylene glycol are a hazardous material. The Proper Shipping Name is: Environmentally Hazardous Substance, Liquid, N.O.S. (ethylene glycol), 9, UN3082, III, RQ (ethylene glycol).

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

ICAO/IATA Shipping Description: Anti-freeze Preparations, Proprietary; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:	1. Immediate (Acute) Health Effects:	YES
	2. Delayed (Chronic) Health Effects:	YES
	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.

Diethylene glycol	07
Ethylene Glycol	03, 05, 06, 07

CHEMICAL INVENTORIES:

All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), EINECS (European Union), IECSC (China), PICCS (Philippines), TSCA (United States).

One or more components does not comply with the following chemical inventory requirements: ENCS (Japan), KECI (Korea).

NEW JERSEY RTK CLASSIFICATION:

Refer to components listed in Section 2.

WHMIS CLASSIFICATION:

Class D, Division 1, Subdivision B: Toxic Material -
Acute Lethality
Class D, Division 2, Subdivision A: Very Toxic Material -
Teratogenicity and Embryotoxicity
Reproductive Toxicity

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 2 Flammability: 0 Reactivity: 0

HMIS RATINGS: Health: 2* Flammability: 0 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 : ANTIFREEZE/COOLANT 3 - AFC3

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet:
15

Revision Date: August 22, 2007

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 - Chevron	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 Chevron Energy 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.



UNLEADED GASOLINE (ALL GRADES)

MATERIAL SAFETY DATA SHEET

Petrocom Energy Group, LLC
1330 Post Oak Blvd., Suite 2350
Houston, Texas 77056
Phone: 713-418-3000
Fax: 713-418-3001

Revision Date: 03/05/2008

Section 1: Product Identification

Name: Unleaded Gasoline
Synonyms: Regular/Midgrade/Premium Gasoline, Motor Fuel, Reformulated Gasoline, RFG, Conventional Gasoline.
CAS No.: 86290-81-5
MSDS No.: PEG-UNL
Use: Motor fuel

Section 2: Product Composition

Component	CAS Number	Amount (%)
Gasoline	86290-81-5	0 – 100
Benzene	71-43-2	0 – 5
Toluene	108-88-3	0 – 30
Xylene (all isomers)	1330-20-7	0 – 25
Hexane (other isomers)	Mixture	5 – 25
n-Hexane	110-54-3	0 – 3
Cyclohexane	110-82-7	0 – 3
Octanes (all isomers)	Mixture	0 – 20
Heptane (all isomers)	142-82-5	0 – 15
Ethanol	64-17-5	0 – 10
Pentanes (all isomers)	Mixture	0 – 20
Trimethylbenzenes (all isomers)	95-63-6	0 – 5
Ethylbenzene	100-41-4	0 – 5
Cumene	98-82-8	0 – 5
Methyl Tertiary Butyl Ether (MTBE)	1634-04-4	0 – 16
Tertiary Amyl Methyl Ether (TAME)	994-05-8	0 – 6

Section 3: Hazards Identification**Emergency Overview****DANGER!**

Extremely Flammable liquid and vapor
Harmful if swallowed
Skin Irritant
May cause eye and respiratory irritation
Cancer Hazard – Contains material which can cause cancer

Hazard Rankings**NFPA**

Physical form: Liquid
Appearance: Clear to amber
Odor: Strong, Gasoline

Potential Health Effects

Eyes: Contact with eyes may cause irritation, redness, tearing, stinging, watering and blurred vision.

Skin: Contact with skin may cause irritation, itching, redness and skin damage. Prolonged or repeated contact may cause drying and cracking of the skin, and may also cause dermatitis and inflammation. (See also section 11).

Inhalation: Breathing high concentration can be harmful. Throat and lung irritation may occur. Central nervous system effects including nausea, euphoria, dizziness, headache, fatigue, drowsiness or unconsciousness may occur due to long term or high concentration exposure to vapors.

Ingestion: Toxic if swallowed. This product may cause nausea, vomiting, dizziness, drowsiness, diarrhea if swallowed. Central nervous system effects may be caused. Swallowing this product can result in severe lung damage and/or death.

Signs / Symptoms: When overexposed to this product effects such as nausea, vomiting, blurred vision, respiratory failure, central nervous system depression, unconsciousness, tremor, death may occur.

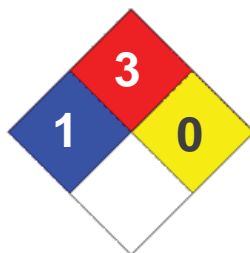
See toxicological Information (section 11)

Section 4: First Aid Measures

Eye contact:	Flush eyes immediately with fresh, cool water for at least 15 minutes. If irritation or redness or any symptoms persist, seek medical attention.
Skin contact:	Remove contaminated clothes and shoes. Flush affected area with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, wash affected area thoroughly with soap and water. If irritation or redness develops, seek medical attention.
Inhalation (Breathing):	If inhaled, immediately move person to fresh air. If there is difficulty breathing, give oxygen. If not breathing, immediately give artificial respiration. Seek medical attention.
Ingestion (Swallowing):	This product may be harmful or fatal if swallowed. This product may cause nausea, vomiting, diarrhea and restlessness. Do not induce vomiting. Do not give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is unconscious or drowsy, place on the left side with the head down. Seek immediate medical attention.
Notes to Physician:	<p>This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material.</p> <p>Inhalation overexposure can produce toxic effects. Monitor respiratory distress. If difficulty in breathing evaluate upper respiratory tract inflammation, bronchitis and pneumonitis. Administer supplemental oxygen as required.</p> <p>If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Consider activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.</p>

Section 5: Fire Fighting Measures

NFPA Hazard Class: Health = 1 ; Flammability = 3 ; Instability = 0
(0 – Minimal ; 1 – Slight ; 2 – Moderate ; 3 – Serious ; 4 – Severe)



Auto – ignition temperature : >260 °C (500 °F)

Flash point : Closed cup: -43 °C (-45 °F)

Flammable limits : Lower: approximately 1.4%
Upper: approximately 7.6%

Products of combustion : Carbon monoxide, carbon dioxide, nitrogen and sulfur oxides, smoke, fumes, unburned hydrocarbons and other products of incomplete combustion.

Special properties : Flammable liquid! This material can be ignited by heat, sparks, flames or other sources of ignition. Vapors may travel long distances to a source where they can ignite and flash back, or explode. A mixture of vapor and air can create an explosion hazard in confined spaces. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing media : Use of dry chemical, carbon dioxide, or foam is recommended to extinguish fire. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may not extinguish the fire, unless it is used by experienced fire fighters and under favorable conditions.

Protective Equipment for Fire Fighters : Fire fighters should wear appropriate protective equipment and self contained breathing apparatus (SCBA) with a full face piece operated in positive pressure mode.

Section 6: Accidental Release Measures

Personal precautions:	This material is extremely flammable. Eliminate all ignition sources. Keep all hot metal surfaces away from spill/release. All equipment used when handling this material must be grounded.
Spill precautions:	Stay upwind and away from spill. Notify persons down wind of the spill, isolate spill area and keep unauthorized personnel out. If it can be done with minimal risk, try to stop spill. Always wear protective equipment, including respiratory protection. Contact emergency personnel.
Environmental precautions:	Prevent spilled material from entering sewers, drains, soil, and natural waterways. Use foam or spills to minimize vapors (section 5). Spilled material may be absorbed into an appropriate absorbent material.
Methods for cleaning up:	Notify fire authorities and appropriate federal, state and local agencies. Immediate cleanup is recommended.

Section 7: Handling and Storage

Handling:	<p>Flammable liquid and vapor. To be used only as a motor fuel. Avoid inhalation of vapors and contact with skin. Wash hands thoroughly after handling this material. Use in a well ventilated area away from all ignition sources. Use product with caution around heat, sparks, static electricity and open flames. Static electricity may ignite vapors and cause fire.</p> <p>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 ignition sources. The may explode and cause injury and/or death. Empty drums should be completely drained, properly bunged, and returned promptly to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.</p>
Storage:	Store in approved containers only. Keep in tightly closed containers in cool, dry, well ventilated areas. Keep isolated away from heat, sources of ignition and hot metal surfaces.

Section 8: Exposure Controls / Personal Protection

Engineering controls: Provide ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below their occupational exposure limits. Eyewash stations and safety showers should be located near the work-station.

Personal Protection

Eye Protection: Keep away from eyes. Safety glasses complying with approved standards should be worn. Chemical type goggles should be worn.

Skin Protection: Keep away from skin. Skin protection should be worn. Chemical resistant, impervious gloves should be worn. Always follow good personal hygiene practices after handling the material.

Respiratory Protection: Approved respiratory equipment must be used if a risk assessment indicates it is necessary. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn.

General Protection: Use this material in well ventilated areas. Ventilation equipment should be explosion proof also.

Component	Applicable Workplace Exposure Limits
Gasoline	ACGIH – TWA: 300 ppm (8 hours) STEL: 500 ppm (15 minutes)
Benzene	ACGIH – TWA: 0.5 ppm (8 hours) STEL: 2.5 ppm (15 minutes) OSHA – TWA: 1 ppm (8 hours) STEL: 5 ppm (15 minutes)
Toluene	ACGIH – TWA: 20 ppm (8 hours) OSHA – TWA: 200 ppm (8 hours) CEIL: 300 ppm PEAK: 500 ppm (10 minutes)
Xylene (all isomers)	ACGIH – TWA: 100 ppm (8 hours) STEL: 150 ppm (15 minutes) OSHA – TWA: 100 ppm (8 hours)
Hexane (other isomers)	ACGIH – TWA: 500 ppm (8 hours) STEL: 1000 ppm (15 minutes)
n-Hexane	ACGIH – TWA: 50 ppm (8 hours) OSHA – TWA: 500 ppm (8 hours)
Cyclohexane	ACGIH – TWA: 100 ppm (8 hours) OSHA – TWA: 300 ppm (8 hours)
Octanes (all isomers)	ACGIH – TWA: 300 ppm (8 hours) OSHA – TWA: 500 ppm (8 hours)
Heptane (all isomers)	ACGIH – TWA: 400 ppm (8 hours) STEL: 5000 ppm (15 minutes) OSHA – TWA: 500 ppm (8 hours)
Ethanol	ACGIH – TWA: 1000 ppm (8 hours) OSHA – TWA: 1000 ppm (8 hours)
Pentanes (all isomers)	ACGIH – TWA: 600 ppm (8 hours) OSHA – TWA: 1000 ppm (8 hours)
Trimethylbenzenes (all isomers)	ACGIH – TWA: 25 ppm (8 hours)
Ethylbenzene	ACGIH – TWA: 100 ppm (8 hours) STEL: 125 ppm (15 minutes) OSHA – TWA: 100 ppm (8 hours)
Cumene	ACGIH – TWA: 50 ppm (8 hours) OSHA – TWA: 50 ppm (8 hours)
Methyl Tertiary Butyl Ether (MTBE)	ACGIH – TWA: 50 ppm (8 hours)
Tertiary Amyl Methyl Ether (TAME)	ACGIH – TWA: 20 ppm (8 hours)

Section 9: Physical and Chemical Properties

Physical State:	Liquid.
Color:	Transparent, clear to amber liquid.
Odor:	Strong. Characteristic gasoline odor.
pH:	Not applicable
Boiling Point:	>26 °C (>78 °F)
Melting Point:	Not applicable.
Specific gravity:	0.66 to 0.75 (Water = 1)
Vapor density:	3 to 4 (Air = 1)
Vapor pressure:	220-450 mm Hg at 20°C (68°F) / 6-15 Reid-psia at 37.8°C (100°F)
Volatility:	720 – 770 g/l VOC (w/v)
Viscosity (at 40 °C):	< 1
Flash Point:	< -45 °F / < 43°C
Bulk Density:	6.0 – 6.4 lbs/gal
Solubility in water:	Negligible

Section 10: Stability and Reactivity

Stability: Stable. Extremely flammable liquid and vapor. Vapor can cause fire.

Conditions to avoid: Keep away from heat, flame and all other possible sources of ignition.

Materials to avoid: Keep away from strong oxidizing agents such as acids, chlorine, hydrogen peroxide and oxygen.

Hazardous decomposition products: Please refer to the combustion products identified in Section 5 of this MSDS.

Hazardous Polymerization: Not expected to occur.

Section 11: Toxicological Information

Toxicology Information

Oral toxicity: Almost non-toxic. LD 50: > 2000 mg/kg (species: rats)
Dermal toxicity: Almost non-toxic. LD 50: > 2000 mg/kg (species: rabbits)
Inhalation toxicity: Almost non-toxic. LD 50: > 5 mg/l (species: rats)
Eye irritation: Almost non-irritating. Draize score: > 6 and < 15 (species: rabbits)
Skin irritation: Irritant. Primary irritation index: > 3 and < 5 (species: rabbits)

Other data: Inhalation of high concentrations of vapors or mists may cause respiratory system irritation and damage. It may also result in the damage and depression of the central nervous system and may cause death. Prolonged contact with the material may cause severe skin irritation.

Subchronic toxicity: Dermal studies resulted in significant irritation but not systematic toxicity (species: rabbits). Inhalation exposures (90 day, approximately 1500 ppm vapor) produced light hydrocarbon nephropathy but no significant systemic toxicity (species: rats).

Neurotoxicity: 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. However, no persistent neurotoxic effects were observed in subchronic inhalation studies of gasoline.

Reproductive toxicity: An inhalation study with rats exposed to 0, 400 and 1600 ppm of wholly vaporized unleaded gasoline, 6 hours per day on day 6 through 16 of gestation, showed no teratogenic effects nor indication of toxicity to either the mother or the fetus. Another inhalation study in rats exposed to 3000, 6000, or 9000 ppm of gasoline vapor, 6 hours per day on day 6 through 20 of gestation, also showed no teratogenic effects nor indications of toxicity to either the mother or the fetus.

Chronic toxicity: A lifetime mouse skin painting study of unleaded gasoline applied at 50 microliters, three time weekly, resulted in some severe skin irritation and changes, but no statistically significant increase in skin cancer or cancer to any other organ. Lifetime inhalation of wholly vaporized unleaded gasoline over 2000 ppm has caused increased liver tumors in female mice and increased kidney tumors in male rats. The EPA has concluded that mechanism by which wholly vaporized unleaded gasoline causes kidney damage is unique to the male rat. The effects in that species (kidney damage and cancer) should not be used in human risk assessment.

Other toxic effects on humans	Extremely hazardous in case of ingestion. Very hazardous in case of eye contact. Hazardous in case of skin contact. Slightly hazardous in case of inhalation.
Carcinogenic effects:	Contains material that may cause cancer depending on the level and duration of exposure.
Target organs:	Contains material that may cause damage to humans organs such as (but not limited to) blood, kidneys, lungs, liver, eye, skin, nervous system and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity:	This material may be toxic to aquatic organisms such as algae and daphnia. It has also shown to be toxic to fish.
Environmental fate:	The material is expected to be readily biodegradable. When released into the environment, some of the constituents of gasoline will volatilize and be photo degraded in the atmosphere. 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, photo-oxidation, biodegradation and adsorption onto suspended sediments, can contribute to the weathering of spilled gasoline.

Section 13: Disposal Considerations

Waste disposal:	Avoid disposal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product and any of its by products should always comply with the requirements of environmental protection and waste disposal legislation and any local authority requirements. This material would likely be identified as a federally regulated RCRA hazardous waste. See sections 7 and 8 for further information on handling, storage and personal protection. See section 9 for the material's physical and chemical properties.
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Section 14: Transportation Information

This material is U.S Department of Transportation (DOT) regulated material.

Shipping name: Gasoline, 3, UN 1203, PG II
Gasohol, 3, NA 1203, PG II (for gasoline blended with less than 20% ethanol).

Hazard class: 3 DOT Class: Flammable liquid

Packing Group: II

UN / NA Number: UN1203 / NA1203

Emergency Response Code: 128

Label:

**Section 15: Regulatory Information**

TSCA Inventory: This product and/or its components are listed on the Toxic Substances Control Act (TSCA)

**SARA 302 / 304:
Emergency planning and notification** The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and CFR 355. No components were identified.

**SARA 311 / 312:
Hazard identification** SARA Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under: Fire, Acute (immediate) Health Hazard, Chronic (Delayed) Health Hazard.

**CERCLA / SARA 313:
Toxic and chemical
notification and release
reporting**

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372

Component	CAS Number	Amount (%)
Benzene	71-43-2	0 – 5
Toluene	108-88-3	0 – 30
Xylene (o, m, p isomers)	1330-20-7	0 – 25
n-Hexane	110-54-3	0 – 3
Cyclohexane	110-82-7	0 – 3
1, 2, 4 Trimethylbenzenes	95-63-6	0 – 5
Ethylbenzene	100-41-4	0 – 5
Cumene	98-82-8	0 – 5
Methyl Tertiary Butyl Ether (MTBE)	1634-04-4	0 – 16

California Proposition 65: This material may contain detectable quantities of the following chemicals known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Benzene (CAS NO. 71-43-3)

Toluene (CAS No. 108-88-3)

Ethylbenzene (CAS No. 100-41-4)

Naphthalene (CAS No. 91-20-3)

Canadian Regulations:

WHMIS Hazard Class: B2 – Flammable Liquids
D2A – Very Toxic Material

Section 16: Other Information

Issue date: March 5, 2008
Previous issue date: No previous date
Version: 1
MSDS Code: PEG-UNL

Legend:

ACGIH = American Conference of Governmental Industrial Hygienists
CAS = Chemical Abstracts Service Registry
CEIL = Ceiling Limit
CERCLA = The Comprehensive Environmental Response, Compensation and Liability Act
EPA = Environmental Protection Agency
NFPA = National Fire Protection Association
OSHA = Occupational Safety and Health Administration
SARA = Superfund Amendments and Reauthorization Act
STEL = Short Term Exposure Limit (15 minutes)
TWA = Time Weighted Average (8 hours)
WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer:

The information presented in this Material Safety Data Sheet (MSDS) is based on data believed to be accurate as of the issuance date of this MSDS. No warranty is expressed or implied for the accuracy or completeness of the above provided information. Petrocom Energy Group, LLC does not assume any liability for any damage or injury arising out of product use by others. The end user of the product has the responsibility for evaluating the accuracy of the data, and determining the safety, toxicity and suitability of the product under any conditions.



Safety Data Sheet

1 - Chemical Product and Company Identification

Trade Name: WD-40 Multi-Use Product Bulk Liquid
NOT FOR SALE IN CALIFORNIA

Product Use: Lubricant, Penetrant, Drives Out Moisture, Removes and Protects Surfaces From Corrosion

Restrictions on Use: None identified

MSDS Date Of Preparation: 8/25/15

Manufacturer: WD-40 Company
Address: 1061 Cudahy Place (92110)
P.O. Box 80607
San Diego, California, USA
92138 -0607

Telephone:
Emergency only: 1-888-324-7596 (PROSAR)
Information: 1-888-324-7596
Chemical Spills: 1-800-424-9300 (Chemtrec)
1-703-527-3887 (International Calls)

2 – Hazards Identification

Hazcom 2012/GHS Classification:

Flammable Liquid Category 3

Aspiration Toxicity Category 1

Note: The 1 gallon size product is a consumer product and is labeled in accordance with the US Consumer Product Safety Commission regulations which take precedence over OSHA Hazard Communication labeling. The actual container label will not include the label elements below. The labeling below applies to larger containers sold for industrial/professional use.

Label Elements:



DANGER!

Flammable liquid and vapor.

May be fatal if swallowed and enters airways.

Prevention

Keep away from heat, sparks, open flames, hot surfaces – No smoking.

Keep container tightly closed.

Ground and bond containers and receiving equipment.

Use explosion-proof electrical equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Wear eye protection.

Response

IF SWALLOWED: Immediately call a POISON CENTER or physician.

Do NOT induce vomiting.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.

In case of fire: Use water fog, dry chemical, carbon dioxide or foam to extinguish.

Storage

Store locked up.

Store in a well-ventilated place. Keep cool.

Disposal

Dispose of contents and container in accordance with local and national regulations.

3 - Composition/Information on Ingredients

Ingredient	CAS #	Weight Percent	GHS Classification
Aliphatic Hydrocarbon	64742-47-8	45-50	Flammable Liquid Category 3 Aspiration Toxicity Category 1
Petroleum Base Oil	64742-56-9 64742-65-0 64742-53-6 64742-54-7 64742-71-8	<35	Not Hazardous
LVP Aliphatic Hydrocarbon	64742-47-8	12-18	Aspiration Toxicity Category 1

Note: The specific chemical identity and exact percentages are a trade secret.

4 – First Aid Measures

Ingestion (Swallowed): Aspiration Hazard. DO NOT induce vomiting. Call physician, poison control center or the WD-40 Safety Hotline at 1-888-324-7596 immediately.

Eye Contact: Flush thoroughly with water. Remove contact lenses if present after the first 5 minutes and continue flushing for several more minutes. Get medical attention if irritation persists.

Skin Contact: Wash with soap and water. If irritation develops and persists, get medical attention.

Inhalation (Breathing): If irritation is experienced, move to fresh air. Get medical attention if irritation or other symptoms develop and persist.

Signs and Symptoms of Exposure: May cause eye and respiratory irritation. Inhalation may cause coughing, headache and dizziness. Skin contact may cause drying of the skin.

Indication of Immediate Medical Attention/Special Treatment Needed: Immediate medical attention is needed for ingestion.

5 – Fire Fighting Measures

Suitable (and unsuitable) Extinguishing Media: Use water fog, dry chemical, carbon dioxide or foam. Do not use water jet or flooding amounts of water. Burning product will float on the surface and spread fire.

Specific Hazards Arising from the Chemical: Combustible liquid and vapor. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Combustion will produce oxides of carbon and hydrocarbons.

Special Protective Equipment and Precautions for Fire-Fighters: Firefighters should always wear positive pressure self-contained breathing apparatus and full protective clothing. Cool fire-exposed containers with water.

6 – Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Wear appropriate protective clothing (see Section 8). Eliminate all sources of ignition and ventilate area.

Methods and Materials for Containment/Cleanup: Contain and collect liquid with an inert absorbent and place in a container for disposal. Clean spill area thoroughly. Report spills to authorities as required.

7 – Handling and Storage

Precautions for Safe Handling: Avoid contact with eyes. Avoid prolonged contact with skin. Avoid breathing vapors or aerosols. Use with adequate ventilation. Keep away from heat, sparks, hot surfaces and open flames. Wash thoroughly with soap and water after handling. Keep containers closed when not in use. Keep out of the reach of children.

Conditions for Safe Storage: Store in a cool, well-ventilated area, away from incompatible materials. NFPA 30 Class II Liquid.

8 – Exposure Controls/Personal Protection

Chemical	Occupational Exposure Limits
Aliphatic Hydrocarbon	1200 mg/m3 TWA (manufacturer recommended)
Petroleum Base Oil	5 mg/m3 (inhalable) TWA ACGIH TLV

	5 mg/m3 TWA OSHA PEL
LVP Aliphatic Hydrocarbon	1200 mg/m3 TWA (manufacturer recommended)

The Following Controls are Recommended for Normal Consumer Use of this Product

Engineering Controls: Use in a well-ventilated area.

Personal Protection:

Eye Protection: Avoid eye contact. Safety glasses or goggles recommended.

Skin Protection: Avoid prolonged skin contact. Chemical resistant gloves recommended for operations where skin contact is likely.

Respiratory Protection: None needed for normal use with adequate ventilation.

For Bulk Processing or Workplace Use the Following Controls are Recommended

Engineering Controls: Use adequate general and local exhaust ventilation to maintain exposure levels below that occupational exposure limits.

Personal Protection:

Eye Protection: Safety goggles recommended where eye contact is possible.

Skin Protection: Wear chemical resistant gloves.

Respiratory Protection: None required if ventilation is adequate. If the occupational exposure limits are exceeded, wear a NIOSH approved respirator. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

Work/Hygiene Practices: Wash with soap and water after handling.

9 – Physical and Chemical Properties

Appearance:	Light amber liquid	Flammable Limits: (Solvent Portion)	LEL: 0.6% UEL: 8.0%
Odor:	Mild petroleum odor	Vapor Pressure:	1 psi @38°C (100°F) ASTM D323
Odor Threshold:	Not established	Vapor Density:	Greater than 1 (air=1)
pH:	Not Applicable	Relative Density:	0.8 – 0.82 @ 60°F
Melting/Freezing Point	Not established	Solubilities:	Insoluble in water
Boiling Point/Range:	361 - 369°F (183 - 187°C)	Partition Coefficient; n- octanol/water:	Not established
Flash Point:	122°F (49°C) Tag Open Cup	Autoignition Temperature:	Not established
Evaporation Rate:	Not established	Decomposition Temperature:	Not established
Flammability (solid, gas)	Not Applicable	Viscosity:	2.79-2.96 cSt @ 100°F
VOC:	412 grams/liter (49.5%)	Pour Point:	-63°C (-81.4°F) ASTM D-97

10 – Stability and Reactivity

Stability: Stable

Hazardous Polymerization: Will not occur.

Conditions to Avoid: Avoid heat, sparks, flames and other sources of ignition.

Incompatibilities: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide and carbon dioxide.

11 – Toxicological Information

Symptoms of Overexposure:

Inhalation: High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness and nausea. Intentional abuse may be harmful or fatal.

Skin Contact: Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.

Eye Contact: Contact may be irritating to eyes. May cause redness and tearing.

Ingestion: This product has low oral toxicity. Swallowing may cause gastrointestinal irritation, nausea, vomiting and diarrhea. This product is an aspiration hazard. If swallowed, can enter the lungs and may cause chemical pneumonitis, severe lung damage and death.

Chronic Effects: None expected.

Carcinogen Status: None of the components are listed as a carcinogen or suspect carcinogen by IARC, NTP, ACGIH or OSHA.

Reproductive Toxicity: None of the components is considered a reproductive hazard.

Numerical Measures of Toxicity:

Acute Toxicity Estimates: Oral > 5,000 mg/kg; Dermal >2,000 mg/kg based on an assessment of the ingredients. This product is not classified as toxic by established criteria. It is an aspiration hazard.

12 – Ecological Information

Ecotoxicity: No specific aquatic toxicity data is currently available, however components of this product are not expected to be harmful to aquatic organisms

Persistence and Degradability: Component are readily biodegradable.

Bioaccumulative Potential: Bioaccumulation is not expected based on an assessment of the ingredients.

Mobility in Soil: No data available

Other Adverse Effects: None known

13 - Disposal Considerations

If this product becomes a waste, it would be expected to meet the criteria of a RCRA ignitable hazardous waste (D001). However, it is the responsibility of the generator to determine at the time of disposal the proper classification and method of disposal. Dispose in accordance with federal, state, and local regulations.

14 – Transportation Information

DOT Surface Shipping Description: Excepted from Hazmat (49CFR 173.150 (F)) in non-bulk packagings. Bulk

Packagings: UN1268, Petroleum Distillates, n.o.s., Combustible Liquid, PG III

IMDG Shipping Description: UN1268, Petroleum Distillates, n.o.s. 3, PG III

ICAO Shipping Description: UN1268, Petroleum Distillates, n.o.s. 3, PG III NOTE: WD-40 does not test containers to assure that they meet the pressure differential and other requirements for transport by air. We do not recommend that our products be transported by air.

15 – Regulatory Information

U.S. Federal Regulations:

CERCLA 103 Reportable Quantity: This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

SARA TITLE III:

Hazard Category For Section 311/312: Acute Health, Fire Hazard

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III

Section 313 Reporting requirements: None

Section 302 Extremely Hazardous Substances (TPQ): None

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): This product does not contain chemicals regulated under California Proposition 65.

VOC Regulations: This product complies with the consumer product VOC limits of CARB, the US EPA and states adopting the OTC VOC rules.

Canadian Environmental Protection Act: One of the components is listed on the NDSL. All of the other ingredients are listed on the Canadian Domestic Substances List or exempt from notification.

Canadian WHMIS Classification: Class B-3 (Combustible Liquid)

This MSDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the MSDS contains all of the information required by the CPR.

16 – Other Information:

HMIS Hazard Rating:

Health – 1 (slight hazard), Fire Hazard – 2 (moderate hazard), Reactivity – 0 (minimal hazard)

Revision Date: August 2015

Supersedes: July 2014

Prepared by: Industrial Health & Safety Consultants, Inc. Shelton, CT, USA

Reviewed by: I. Kowalski

Regulatory Affairs Department

3069000/No.0015106

APPENDIX C

Spill Response Procedures

**HERMOSA TAYLOR DEPOSIT DRILLING PROJECT
PLAN OF OPERATIONS**

Appendix C – Spill Response Procedures

Arizona Minerals, Inc.

Prepared for:

United States Department
of Agriculture Forest Service
Coronado National Forest
300 West Congress Street
Tucson, Arizona 85701

April 1, 2016
(Revised July 27, 2016)

TABLE OF CONTENTS

1. SPILL RESPONSE PROCEDURES	1
1.1. Purpose and Goal	1
1.1.1. Specific Tasks and Procedures for Spill Prevention and Control	1
1.1.2. Equipment Fueling	1
1.1.3. Material Storage and Disposal	2
1.1.4. Preventative Maintenance	2
1.1.5. Source Identification	2
1.1.6. Spill Contingency Plan	2
1.1.7. Spill Response	3
1.1.8. Spill Reporting	4
1.1.9. Cleanup and Disposal	4

I. SPILL RESPONSE PROCEDURES

I.1. PURPOSE AND GOAL

The purpose of these procedures is to prevent or reduce discharge of materials that may be considered pollutants to the environment. These procedures will result in increased safety and awareness of personnel; elimination or reduction of the potential of releases (regardless of size); and assurance that mitigation, storage, reporting, and disposal procedures are adequate for environmental protection and regulatory compliance.

Copies of the Spill Response Procedures and of the Material Safety Data Sheets (MSDSs) are located at the project staging area on the Alta Claim owned by Arizona Minerals, Inc. (AMI). Copies of MSDSs are included in **Appendix B**. Employees and contractors are responsible for becoming familiar with the Spill Response Procedures and MSDSs, consistent with the Occupational Safety Health Administration (OSHA) Hazard Communication Standard.

The site contractor will provide a temporary diesel fuel storage tank located at the project staging area, located on the Alta Claim owned by AMI, for the storage and handling of fuel to be used during the Project. In addition, the tank will include secondary containment with sufficient capacity to hold 110 percent of the tank volume. These precautions are expected to be sufficient to prevent spills to any waterways or to Coronado National Forest (CNF) lands.

I.1.1. Specific Tasks and Procedures for Spill Prevention and Control

Specific tasks and procedures will be implemented to prevent and control spills of pollutants. Listed below are tasks and procedures to be implemented as part of this plan:

- The storage area will be maintained in a clean and well-organized manner. The storage area will be properly equipped so that maintenance and cleanup of leaks or spills of pollutants will occur in a proper and timely manner.
- Information on proper storage, cleanup procedures, and reporting protocols will be posted at a visible and accessible location at all times.
- The storage area will satisfy containment requirements such as double-walled tanks, secondary containment berms, and drum containment pans for containment and control of unforeseen leaks and spills of pollutants.
- Products and materials that are considered potential pollutants will be protected from rain.

I.1.2. Equipment Fueling

Fueling equipment will have an authorized shut-off nozzle to contain drips of fuel and to eliminate accidental overflow while fueling. The practice of “topping off” the fuel tank while filling will not be allowed. Hand-operated fuel dispensers are not subject to unattended overfilling. Operators will be

trained in proper fueling operations and procedures to make sure that they are alert to the task and will not overfill the fuel tank. On work areas on CNF lands, plastic sheets and/or absorbent pads will be used under equipment to capture and contain any potential spillage of fuels.

1.1.3. Material Storage and Disposal

Good housekeeping practices are designed to minimize amounts of materials stored and the potential release of these products. Listed below are good housekeeping practices to be followed:

- The amount of product stored on individual characterization sites will be limited to that amount required for the job at hand.
- Materials will be stored in a neat and orderly manner in appropriate containers with approved lids or sealed and enclosed by water-resistant covering, as needed.
- Products will be kept in their original containers with the original manufacturer's label.
- Manufacturer's recommendations for proper storage, use, and disposal of each product will be followed.
- An authorized field representative or designee will inspect the characterization sites daily to ensure proper use and disposal of materials on site. Inspection logs will be kept on site and available. Inspection logs will document noticeable problems and outline a time frame for the correction of the problems or issues identified.

1.1.4. Preventative Maintenance

Contractors will have preventative maintenance programs in place to ensure that vehicles and equipment are utilized under optimum operating parameters and to ensure hoses and fittings are in good condition and leak free. The operator, mechanic, tool pusher, or other designee will be responsible for executing the repairs or preventative maintenance tasks. Vehicle and equipment repair and maintenance will be documented through the use of maintenance logs. Vehicles and equipment in need of repair will not be put into service until repairs are fully completed.

1.1.5. Source Identification

Potential sources of pollutants include drill rigs, service vehicles, and other equipment. Potential pollutants include any of the substances listed in the MSDS. These materials are not expected to come into contact with soils or surface waters. Nonetheless, BMPs will be employed to prevent release of pollutants to the environment.

1.1.6. Spill Contingency Plan

Materials and equipment necessary for spill cleanup will be kept in the fuel storage area on AMI property. Equipment and materials will include, but not be limited to, shovels, brooms, dust pans,

rag, gloves, goggles, sorbent materials, and plastic/metal trash containers specifically for this purpose. Many of these materials will also be located on operational vehicles to mitigate releases or spills in the field during the characterization program.

Well-maintained equipment will be used to perform the work required during this project. When practicable, equipment maintenance will be performed off site. In the event of oil, fuel, and lubricating grease leaks, cleanup will be conducted as soon as possible. If the leak is on compacted soil, an oil-absorbing product such as Absorb® may be applied. Once the cleanup product has absorbed the leak, the product will be swept up into watertight drums or bins, labeled, stored, and disposed of according to federal, state, or local regulations. If the leak occurs on uncompacted soil, soils will be “loosened,” and soil will be removed to the depth required to capture the contaminated soils and/or materials. The Los Reales Landfill in Tucson, Arizona, will be used for disposal of contaminated soils impacted from spills.

In the case of a spill, procedures and best management practices will be adjusted to include measures that will mitigate reoccurrence and ensure that cleanup procedures are adequate. A description of the spill, cause, cleanup measures, and disposal method will be documented and reported, as appropriate.

1.1.7. Spill Response

Spills will be treated as if hazardous. Employees will refer to the MSDS and implement the appropriate human health and safety measures and spill cleanup procedures. Regardless of size, spills will be reported to the appropriate AMI supervisor.

The following actions will be taken in the event of a hazardous spill:

The AMI supervisor will be notified immediately. The supervisor will oversee the response and cleanup of materials releases.

If a hazardous material spill is suspected to be dangerous, Emergency Notification procedures provided in **Sections 1.1.7** and **1.1.8** will be implemented.

- Proper Personal Protective Equipment (PPE) will be utilized.
- As practicable, the release of the material will be stopped or minimized.
- Employees will avoid contact with the spilled material, including avoidance of gases, fumes, and smoke.
- A reputable licensed company will be used to clean up large spills and dispose of contaminated materials.
- Contaminated materials will be stored in appropriate and approved containers. Containers will be properly labeled following federal, state, and local requirements.

1.1.8. Spill Reporting

A spill report must be completed and forwarded to the AMI environmental official as quickly as possible. AMI will determine if any further notification is required to state or federal officials.

If there is a spill of any quantity of petroleum materials or a reportable quantity of a CERCLA hazardous substance off private land or into a wash, the following notifications will be completed:

Arizona Department of Environmental Quality	800-234-5677
National Response Center	800-424-8802
Sierra Vista Ranger District Office	520-378-0311
Tucson Forest Service Dispatch	520-202-2710

Information to be provided to agencies/regulators includes:

- Name and telephone number of reporter;
- Name and location of site;
- Date, time, and type of incident (e.g., release, fire);
- Name and estimated quantity of material(s) involved, to the extent known;
- Source of the discharge;
- Description of all affected media;
- Cause of the discharge;
- Extent of any damage or injuries caused by the discharge;
- Possible hazards to human health or the environment off site; and
- Cleanup activities being conducted to contain and control the release.

1.1.9. Cleanup and Disposal

AMI has the following contractor on site or available in order to respond to potential spills or discharges that occur during the drilling project:

DM Excavating of Patagonia, Arizona, at (520) 394-2435 is AMI's earth-moving contractor. They have equipment on site and the necessary training and expertise to clean up any spills.

Southwest Hazard Control is a licensed emergency response company in Tucson. Southwest Hazard Control will respond to any spill incidents that could occur at the site.

Southwest Hazard Control Inc.
Tucson, Arizona 85745
Phone: (520) 622-3607
Phone: (800) 279-5266
Fax: (520) 622-3643

Collected spill material and any contaminated soil will be properly disposed of in accordance with federal, state, and local requirements. The nearest licensed facility for disposal of petroleum-contaminated or other materials is Tucson's Los Reales Landfill:

5300 E. Los Reales Road
Tucson, Arizona
Phone: (520) 791-4183