DECISION RECORD

EA LOG #:	DOI-BLM-OR-LO50-2012-0009-EA
Project Name:	Tucker Hill Quarry Plan of Operations Amendment
Applicant:	Cornerstone Industrial Minerals, Inc.
Address:	Highway 395 North Lakeview, OR 97630
County:	Lake
BLM Office:	Lakeview District

Decision:

The following is the decision of the Bureau of Land Management: approve Cornerstone Industrial Minerals, Inc. proposed amendment to their existing plan of operations (POO) for the expansion of their existing quarry disturbance from 21 acres to 70 acres, as described for the Proposed Action in the environmental (EA, pages 2-3 to 2-20). The PoO amendment was initially submitted on September 1, 2011. Based upon the analysis contained in the EA, the PoO amendment was revised and resubmitted for approval on January 18 2013.

Forty-seven of the new acres would be for expansion of the quarry and 2 acres would be needed for additional growth media stockpiles. This expansion could possibly extend the mine life of the project an additional 15 years. Blasting operations would continue at the site and would occur three to four times per year. No changes are proposed in the existing haul road or other facilities including the waste perlite storage area within the Lake County Narrows Mineral Material Site Area (Free Use Permit).

Reclamation of the quarry would consist of redistributing waste perlite, waste rock, and salvaged growth media over the quarry floor and filling the excavated open pit as much as possible with the material available and seeded. If after operations are completed, there are safety concerns with the reclaimed quarry, a safety berm would be constructed along high-wall areas of the pit. If visual concerns remain after operations, rock staining of visible high walls would be completed to reduce long-term visual impacts. The main haul road, secondary access road, and waste perlite storage areas would be completely recontoured and seeded if the BLM determines that they are not needed for other administrative purposes.

The project area is located in Sections 23 through 26, 34, and 35, Township 34 South, Range 19 East. (see Figures 1.1.1 and 1.1.2 in the EA).

Those mitigation measures identified on pages 2-6 to 2-8 of the plan amendment and pages 2-19 to 2-20 of the Environmental Assessment would be implemented as appropriate.

Rationale:

Public Review and Comments

The potential impacts of the project were evaluated within an environmental assessment (EA) which resulted in a finding of no significant impact (FONSI). The EA and FONSI were made available for a 30-day comment period. During that time period five comment letters were received.

Three of the comment letters from the Lake County Board of Commissioners, the Lake County Resource Initiative (LCRI) and the Oregon Department of Geology and Mineral Industries (DOGAMI) were supportive of the proposed expansion.

The Burns Piute Tribe expressed concern with protection of two cultural sites within the vicinity of the proposed expansion. Cultural resource mitigation from the plan of operations (page 2-7) adequately addresses these concerns.

Oregon Wild had several concerns with soil, hydrology, groundwater, site stability, and reclamation. These concerns were discussed in detail within the EA and mitigation was included within the PoO amendment which addressed these concerns. A separate letter to Oregon Wild has been prepared addressing their comments.

None of the comments were substantive, required changes to the EA, or led to the need to reconsider or otherwise modify the FONSI.

Conformance with the Land Use Plan

Approval of the proposed POO amendment is consistent with the mineral management goals in the *Lakeview Resource Management Plan and Record of Decision* (RMP/ROD; 2003). Specifically, the *Energy and Mineral Resources* section of the RMP/ROD states that, "within legal constraints, all federal mineral estate locatable, leasable, and salable mineral will be available for exploration, development, and production, subject to existing regulations and standard requirements and stipulations" (pages 88 to 89).

Mineral management goal 1 of the RMP/ROD is to "provide opportunity for the exploration, location, development, and production of locatable minerals in an environmentally sound manner" (page 89).

Map M-10 shows Tucker Hill and lands located immediately to the northeast are open to locatable mineral activity, but are subject to certain restrictions.

Appendix N-3, Attachment 1, further describes the guidelines and restrictions that would be applied to locatable mineral development activities (pages A-177 to A-179).

Perlite is a locatable mineral resource. Providing for expansion of the existing quarry will extend the mine-life of the existing perlite mine at Tucker Hill and is consistent with the locatable mineral goals and management direction described above.

Thomas E. Rasmussen, Manager
Lakeview Resource Area

1/25/13
Date

FINDING OF NO SIGNICANT IMPACT

CORNERSTONE INDUSTRIAL MINERALS, INC.
TUCKER HILL QUARRY PLAN AMENDMENT
DOI-BLM-OR-L050-2012-0009-EA

Background

The Bureau of Land Management, Lakeview Resource Area, has analyzed a proposal and one alternative to authorize the expansion of the existing perlite quarry at Tucker Hill. The BLM initially approved a mining Plan of Operations (PoO) for the quarry, based upon an analysis of about 23 acres of surface disturbance described within an Environmental Impact Statement (EIS) that was completed in April of 1996.

The EA contains an analysis the effects of approving an amendment to the PoO which would authorize expanding the existing perlite quarry to include an additional estimated 47 acres of surface disturbance over a 15-year period of time. The quarry is located approximately 39 miles northwest of Lakeview in central Lake County, Oregon (Figure 1.1.1 of the EA).

Cornerstone Industrial Minerals, Inc. currently operates the perlite quarry. The current operation consists of mining perlite from the quarry, crushing the ore on-site, and then transporting the ore to a plant in Lakeview for further processing and shipping. Over the years of operation, waste rock has been placed in three separate disposal sites including: an old county gravel pit at the base of Tucker Hill, a second abandoned borrow pit located in Sections 23-26, 34, and 35 of Township 34 South, Range 19 East, and a third borrow site located on private land at Fisk Hill.

Context and Intensity of Impacts

The Council on Environmental Quality (CEQ) regulations state that the significance of impacts must be determined in terms of both context and intensity (40 CFR 1508.27). The proposed project is located within the Chewacan Basin. For this reason, the analysis of most impacts in the attached Environmental Assessment (EA) is described within the context of the Project area and the surrounding Chewacan Basin. However, the cumulative effects analysis also considers the impacts of the minerals program at the resource area scale.

The CEQ regulations also include the following ten considerations for evaluating the intensity of impacts:

1) Would any of the alternatives have significant beneficial or adverse impacts (40 CFR 1508.27(b)(1)? ( ) Yes (X) No

Rationale: Based on the analysis contained in the EA, none of the alternatives would have either significant beneficial or adverse impacts on the human environment. There are no areas of critical environmental concern, research natural areas, wilderness study areas, designated wilderness areas, areas with wilderness characteristics, wild and scenic rivers, prime and unique farmlands, floodplains, special status plants, forest or woodlands, wetlands or riparian areas, fisheries or aquatic habitats, wild horses, or paleontological resources, or livestock grazing use in the project area (Tables 3.1-1 and 3.1-2 in the EA).

Impacts to other resource values or issues, including air quality, climate, soils, water quality, vegetation, noxious weeds, wildlife (including migratory birds and special status species), cultural resources and native American traditional values, geology and minerals, socio-economic conditions, recreation, and visual quality, anticipated by the alternatives have been analyzed within the EA, have been found not to be significant, and have been mitigated to extent practical (Tables 3.1-1 and 3.1-2 and pages 4-1 to 4-32 of the EA).

2) Would any of the alternatives have significant adverse impacts on public health and safety (40 CFR 1508.27(b)(2)? ( ) Yes (X) No

Rationale: None of the alternatives analyzed in detail would have significant impacts on public health or safety. The proposed mine expansion area is not located near any populated urban area. Further, there are no known hazardous waste sites in the Project area. Wastes would be managed through the development and implementation of the Spill Contingency Plan located in the Plan of Operations (Appendix C). Air quality impacts would be minimal (pages 4-1 to 4-3 of the EA). There are no perennial streams or surface drinking water sources located in the immediate Project area (Table 3.1-1, and pages 3-12 of EA) and little or no impacts expected to water resources (pages 4-9 to 4-10 of the EA). Further, none of the alternatives would have disproportionate impacts to low income or minority populations (Table 3.1-1 of the EA).

3) Would any of the alternatives have significant adverse impacts on unique geographic characteristics (cultural or historic resources, park lands, prime and unique farmlands, wetlands, wild and scenic rivers, designated wilderness or wilderness study areas, or ecologically critical areas (*ACECs, RNAs, significant caves*)) (40 CFR 1508.27(b)(3)? ( ) Yes (X) No

Rationale: There are no park lands, prime or unique farmlands, wetlands or riparian areas, wild and scenic rivers, significant caves, designated wilderness areas, WSAs, or ACEC/RNAs located in the project area (area (Tables 3.1-1 and 3.1-2 in the EA). Impacts on cultural resources have been analyzed, mitigated to the extent practical, and were not found to be significant (pages 2-2 to 2-3, 2-19 to 2-20, 3-3 to 3-6, 4-3 to 4-4, and 4-31).

4) Would any of the alternatives have highly controversial effects (40 CFR 1508.27(b)(4)? ( ) Yes (X) No

Rationale: The BLM has extensive expertise reviewing and analyzing impacts of proposed mineral development actions such as those proposed by the alternatives addressed in the EA. The potential impacts of these actions on air quality, climate, soils, water quality, vegetation, noxious weeds, wildlife (including migratory birds and special status species), cultural resources and native American traditional values, geology and minerals, socio-economic conditions, recreation, and visual quality can be reasonably predicted based on existing science and professional expertise. Further, the EA analyzed these impacts (pages 4-1 to 4-32 of the EA).

While BLM acknowledges there is controversy related to the nature of the cultural and native American traditional value impacts from the perspective of some native American interests, they do not rise to the level of being "highly controversial", as there is no substantial dispute within the scientific community regarding the nature of these effects (pages 3-3 to 3-6, 4-3 to 4-4, and 4-31 of EA).

The BLM is not aware of any other potential highly controversial effects, as defined under 40 CFR 1508.27(b)(4). The public and interested tribes have been given an opportunity to review and comment on the analysis of effects contained in the EA. No substantive comments were received.

5) Would any of the alternatives have highly uncertain effects or involve unique or unknown risks (40 CFR 1508.27(b)(5)? ( ) Yes (X) No

Rationale: The BLM has extensive expertise reviewing and analyzing impacts of proposed mineral development actions such as those proposed by the alternatives addressed in the EA. The potential impacts of these actions on air quality, climate, soils, water quality, vegetation, noxious weeds, wildlife (including migratory birds and special status species), cultural resources and native American traditional values, geology and minerals, socio-economic conditions, recreation, and visual quality can be reasonably predicted based on existing science and professional expertise. Further, the EA analyzed these impacts (pages 4-1 to 4-32 of the EA). The nature of these impacts is not highly uncertain, nor does it involve unique or unknown risks.

6) Would any of the alternatives establish a precedent for future actions with significant impacts (40 CFR 1508.27(b)(6)? ( ) Yes (X) No

Rationale: The BLM has extensive expertise reviewing and analyzing impacts of proposed mineral development actions such as those proposed by the alternatives addressed in the EA. None of the alternative actions represents a new, precedent-setting mineral development technique or would establish a precedent for future similar actions with potentially significant effects.

7) Are any of the alternatives related to other actions with potentially significant cumulative impacts (40 CFR 1508.27(b)(7)? ( ) Yes (X) No

Rationale: Based on the analysis contained within the Cumulative Effects section of the EA, none of the alternatives would have significant cumulative effects within the project area, even when added to the effects of other past, present, and reasonably foreseeable future actions (pages 4-28 to 4-31).

8) Would any of the alternatives have significant adverse impacts on scientific, cultural, or historic resources, including those listed or eligible for listing on the National Register of Historic Places (40 CFR 1508.27(b)(8)? ( ) Yes (X) No

Rationale: Potential impacts to cultural resources and native American traditional values have been analyzed in the EA and found not to be significant. The three sites in the area would be either avoided or mitigated in accordance with an approved Historic Properties Treatment Plan (pages 2-2, 2-19 to 2-20, 3-4 to 3-6, 4-3 to 4-4, and Appendix B). Only one site would be directly impacted and it is not eligible for listing on the NRHP (pages 3-3 to 3-6, 4-3 to 4-4, and 4-31 of EA). The Oregon SHPO has been consulted and concurs with this finding (page 3-4). No other resources of scientific interest exist in the Project area.

9) Would any of the alternatives have significant adverse impacts on threatened or endangered species or their critical habitat (40 CFR 1508.27(b)(9)? ( ) Yes (X) No

Rationale: There are no threatened or endangered plant or animal species or designated critical habitat within the project area (Table 3.1-1, and page 3-7 of the EA).

10) Would any of the alternatives have effects that threaten to violate Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10)? ( ) Yes (X) No

Rationale: The alternatives analyzed in the EA comply with all Federal, State, and local environmental laws or other environmental requirements, including the requirements of the National Environmental Policy Act. Compliance with cultural resource protection laws is addressed under item number 8 above.

The Federal Land Policy and Management Act requires that any action that BLM approves must conform with the current land use plan and other applicable plans and policies. Conformance with Existing Plans The proposed project is consistent with the mineral and other resource management goals in the BLM's Lakeview Resource Management Plan and Record of Decision (RMP/ROD; BLM 2003a). Conformance with this plan is detailed further in Section 1.3 of the EA.

The proposed project is not consistent with the approved PoO (as currently amended) for the Tucker Hill Quarry. Approval of the proposed expansion would amend the PoO to allow the mining of additional perlite material.

Finding

On the basis of the analysis contained in the EA, the consideration of intensity factors described above, and all other available information, my determination is that none of the alternatives analyzed would constitute a major federal action which would have significant adverse or beneficial impacts on the quality of the human environment. Therefore, an Environmental Impact Statement (EIS) is unnecessary and will not be prepared.

Thomas E. Rasmussen, Field Manager
Lakeview Resource Area

1/25/13
Date

TUCKER HILL PERLITE PROJECT
LAKEVIEW DISTRICT, OREGON

AMENDED PLAN OF OPERATIONS

RECORD NUMBER _____

August 2011
Revised January 2013

Submitted by

Cornerstone Industrial Minerals, Corporation, U.S.A.
P.O. Box 1287
Lakeview, Oregon 97630

Submitted to

Bureau of Land Management
Lakeview District
1301 South G Street
Lakeview, Oregon 97630

Prepared by

Enviroscientists, Inc.
1650 Meadow Wood Lane
Reno, Nevada 89502
Phone: (775) 826-8822 • Fax: (775) 826-8857

TUCKER HILL PERLITE PROJECT
LAKE COUNTY, OREGON
AMENDED PLAN OF OPERATIONS

TABLE OF CONTENTS

LIST OF TABLES

APPENDIX

TUCKER HILL PERLITE PROJECT
LAKE COUNTY, OREGON
AMENDED PLAN OF OPERATIONS

INTRODUCTION

Cornerstone Industrial Minerals, Inc. (Cornerstone) currently operates a perlite quarry on top of Tucker Hill. The BLM originally approved a mining Plan of Operations (Plan) for the Tucker Hill Quarry Project (Project) in April of 1996 (BLM 1996a), based upon analysis contained in an Environmental Impact Statement (EIS) (BLM 1995; 1996b). Since that time, the Plan has been amended four times. Previous amendments dealt with the use of a portable, on-site crusher in 1999, minor changes to pit development design, including a blasting schedule revision in 2001, a haul road modification in 2005, and the use of a new waste rock disposal site located in Lake County, Oregon, approximately 39 miles northwest of Lakeview (BLM 2008).

This Plan Amendment describes the expansion of the existing Tucker Hill quarry in accordance with BLM Surface Management Regulations 43 Code of Federal Regulations (CFR) 3809, as amended, and the Oregon Department of Geology and Mineral Industries' (DOGAMI's) Mineral Land Regulation and Reclamation Program State of Oregon Revised Statutes (ORS) 517. This Plan is submitted as an amendment to the 1996 Plan and is located within the 862 acre boundary permitted by the DOGAMI. The format for this Plan is consistent with the plan of operations for a mining project described in 43 CFR 3809.401.

In 1987, Atlas Corporation (Atlas) acquired the Tucker Hill perlite property located in south-central Oregon approximately 50 miles north of the California state line (Figure 1). The deposit is located roughly 35 miles northwest of Lakeview, Oregon, and reached by traveling north 22 miles on Highway 395, then 11 miles north on State Highway 31 to the junction of the Tucker Hill Haul Road, which leads to the active quarry. The Project is located entirely on public lands administered by the BLM, Lakeview District in parts or all of Sections 26 and 35, Township 34 South, Range 19 East (T34S, R19E), Willamette Baseline and Meridian, in Lake County, Oregon (Project Area). Figure 1 shows the general location of the Project Area and the proposed expansion (all figures are located in Appendix A).

A small portion of the Tucker Hill perlite deposit was originally discovered and staked in 1949. Compiled expansion test data and geologic mapping indicate a reserve potential in excess of 100 million tons of commercial grade perlite. Ongoing commercial sales of Tucker Hill perlite demonstrate that the ores commercially perform as well as and/or better than other perlite products currently being produced elsewhere in the world. It excels beyond all other commercial perlites mined in the U.S. in some of the large horticultural end-use markets. Tucker Hill perlite is of the universal variety suitable for a wide variety of expanded perlite products.

1 OPERATOR/CLAIM INFORMATION

1.1 Operator Information

Operator Name: Cornerstone Industrial Minerals, Corp.

Mailing Address: P.O. Box 2540
Lakeview, Oregon 97630

Phone Number: (859) 619-5226

Tax Payer Identification Number: 84-1293159

Resident Agent: Bruce Addington
4422 Byron Station Rd.
Lexington, Kentucky 40516

1.2 Authorized Field Representative

Emergency Contact Information: Bruce Addington
4422 Byron Station Rd.
Lexington, Kentucky 40516
Phone: (859) 619-5226

1.3 Parent Corporation Information

Corporate Office: Cornerstone Industrial Minerals, Corp.
P.O. Box 2540
Lakeview, Oregon 97630
Phone: (541) 947-5755

President: Bruce Addington
4422 Byron Station Rd.
Lexington, Kentucky 40516
Phone: (859) 619-5226

Secretary: Bruce Addington
4422 Byron Station Rd.
Lexington, Kentucky 40516

1.4 Claimant/Claim Information (if different than operator information)

Same as Section 1.1.

Primary Commodity: The primary commodity is perlite.

Claim Type: Lode.

Claim Names and BLM Serial Number of Mining Claim(s) where disturbance will occur:

Claim Name	BLM Serial Number
EDR 10	147400
EDR 10 (Amd.)	
ED 11	47556
ED 12	47557
ED 13	47558
ED 14	47559
ED 25	47570
ED 26	47571
ED 27	47572
ED 41	47586
ED 42	47587
ED 48	47593
ED 49	47594
ED 50	47595
ED 51	47596
ED 52	47597
ED 53	47598
ED 54	47599
ED 55	47600
ED 56	47601
ED 64	47607
ED 65	47608
ED 66	47609
ED 67	47610
ED 68	47611

2 DESCRIPTION OF PROJECT

2.1 Legal Description

The Project is located in parts of or all of Sections 26 and 35, T34S, R19E, Willamette Baseline and Meridian.

2.2 Surface Ownership of the Land within the Area of Operation

2.2.1 Private Lands

None

2.2.2 Public Lands – BLM Administered

The operations in this Plan Amendment are those conducted on public lands within the existing DOGAMI permit boundary, which encompasses approximately 862 acres.

2.2.3 National Forest System Lands – USFS Administered

None

2.2.4 State Lands

None

2.3 Description of the Area

Tucker Hill is located within the rain shadow of the Cascade Mountains. The area has a semi-arid climate. Mean daily maximum temperatures are in the mid 80 degrees, with mean minimum temperatures in the low 20 degrees. Annual precipitation ranges from seven to 15 inches, with a mean of 10.25 inches. Most precipitation comes as winter snow or spring rain. Summers are typically hot and dry. Following a recent fire, vegetation in the area consists of bunch grasses and other annual plant species.

2.4 Description of the Operations

Cornerstone is currently mining the Tucker Hill Quarry and is reaching the limit of the currently permitted area at Tucker Hill. Cornerstone has prepared this Plan Amendment to expand their existing quarry from its current size of approximately 23 acres to 70 acres over a 15 year period. Mining activities, including blasting and in-pit crushing, will occur on a year-round basis. Based on available drilling information, the existing depth of the pit is approximately 100 feet from the top of Tucker Hill and approximately 80 feet from the peak. Blasting operations to expand the pit will occur three or four times a year. The quarried material will be stockpiled in place on the quarry floor for hauling. The stockpiled ore will be hauled each day by trucks from pit to processors via the existing upgraded access road to Highway 31 and then south to the town of Lakeview for processing. Hauling will occur year around. Trucks will depart from the quarry at a rate of one truck load every thirty minutes between 5:00 am and 10:00 pm. Each haul will be approximately 32 tons at a rate of 40 loads per day. Processed perlite product will then be

shipped in bulk to manufactures or end users by rail or truck, with an average of six to seven truckloads or two rail cars being shipped per day.

Cornerstone has been in communication with the BLM concerning this amendment to their Plan and need to avoid known cultural resources in the area. Cornerstone has created a Project boundary that avoids any impact to sensitive resources. Due to the sensitive nature of cultural sites, the boundary of the cultural site is not shown on any of the Figures included with this Plan. Figure 1 shows the Project boundary in green and the extent of the open pit expansion in a red dashed line. All Figures are located in Appendix A.

Based on available drilling information, Cornerstone expects that the depth of the expanded quarry will range from 40 to 100 feet.

Table 1 lists the approximate acreage of disturbance, both existing and proposed, for each component associated with the quarry in the Project Area. There will be a total of 70 acres of surface disturbance.

Table 1: Existing and Proposed Disturbance

Disturbance Component	Land Status	Existing/ Authorized acres	Final/ Proposed acres	Total Disturbance acres
Quarry Area	Public	22.0	45.0	67.0
Growth Media Stockpile	Public	1.0	2.0	3.0
	Total	**23.0**	**47.0**	**70.0**

*Existing surface disturbance associated with previously authorized Project-related activities includes 7.7 acres for the main haul road, 1.7 acres for the Fisk Hill private land haul road, 6.0 acres for the waste rock dump, and 9.2 acres associated with the waste area (County Pit).

2.4.1 Quarry Development

The existing Tucker Hill mine will be expanded using the same conventional methods that consist of drilling, blasting, loading, and hauling. Drilling will be conducted with diesel-powered drills using ten- to 12-foot drill hole centers, depending on material type. The holes will be loaded with a blasting agent composed of a mixture of ammonium nitrate (fertilizer) and fuel oil (ANFO), and blasted in accordance with the regulations of the Federal Mine Safety and Health Administration (MSHA).

During blasting activity, flammable material storage and rolling equipment will be removed from the blast area, a water truck will be standing by, and the pit area will be cleared and closed by mine personnel. The ANFO will be brought on site immediately prior to the blasting periods and will be stored in sealed containers. Blasting will occur three or four times per year. Bench heights will range from 20 to 25 feet high during active mining. Blasting operations will be controlled to minimize flyrock by utilizing drill cuttings known as stemming that is calculated to ensure the blast does not exceed the intended shot area.

The Lakeview Interagency Fire Center will be notified of the Tucker Hill blasting schedule a minimum of two days prior to any blasting. The blasted rock will be loaded with front-end loaders into haul trucks (22- to 25-ton capacity). Quarried material will be stockpiled in the pit.

Shallow development and production drilling will be completed, as needed, prior to mining in portions of the expanded pit area. Drilling will also be used to determine optimum mine bench designs and to better define the lower boundary of minable reserves in areas where they are currently poorly defined for sampling in ore zones being mined, and for quality assurance/quality control (QA/QC) sampling and testing prior to mining. Drill holes not consumed by the pit will be abandoned in accordance with Oregon Water Resources Department (OWRD) regulations and standards for well abandonment.

Mining, blasting, and in-pit crushing is conducted on a year round basis. Broken material from the mine benches will then transported from the active mining area, using mechanized loaders, to the portable crusher/screening plant on site, where the material is crushed and screened to a top size of 1 ½ inches. Crushed and sized ore is then stockpiled in a staging area in the mine pit per the 1998 Plan Amendment. Crushed ore will continue to be hauled approximately 43.3 miles to Cornerstone's mill in Lakeview, Oregon, via the existing access road to State Highway 31 and then south to the town of Lakeview for further processing, classification and shipment to customers.

2.4.2 Waste Rock Disposal

Waste rock consists of perlite that does not meet specifications for market demand. Waste rock will be dumped in the northwest corner of the existing Lake County gravel pit, as approved in 2008 by the BLM. The estimated mine life of the Lake County gravel pit (shown on Figure 1.1.1) for exaction of mineral materials is approximately 1.5 years. Additionally, Cornerstone will continue to utilize the Fisk Hill disposal site located on private land northeast of Lakeview, Oregon. As the life of the mine progresses, unused post-process waste will be transported back to the mine and used as backfill to reclaim mined out portions in the pit area. Mine waste will be mixed with finer mill tailings to add coarse size rock to finer grained material returned to the mine for use in reclamation, to meet reclamation objectives set for the 1996 EIS and approved reclamation plan (BLM 1996a). The backhauling of the waste materials from the Lakeview processing plant was approved in the 1996 Plan of Operations and the 2008 amendment (BLM 1996a; BLM 2007).

2.4.3 Mining Scenario and Cross Sections

Conceptual drawings and cross sections have been prepared for the Project; however, the exact layout could change based on development drilling and avoidance of the sensitive cultural resource. Figure 2 shows the site topography, location of existing drill holes, and surface sample sites that form the basis for delineating the commercial perlite reserves. Figures 3 through 5 are cross sections that show the perlite deposit. Figure 6 shows the potential thickness of the perlite and Figure 7 shows the four potential phases of mining. The number of years that the mine will be in operation will depend on the amount of material that is mined each year and this will be determined by market demand. Detailed mine design will be finalized following further development drilling. Table 2 shows the estimate of net recoverable commercial grade perlite

based on the current understanding of the geology at the mine site, and dependent on the depth of the overburden.

Table 2: Estimate of Net Recoverable Commercial Grade Perlite

Gross Tonnage	Soil/Growth Media (yds/tons)	Overburden (cubic yds/tons)	Internal Waste Rock (20%) (cubic yds/tons)	Estimated Net Tonnage
1,043,600	96,600/**57,844**	231,513/**138,631** Minimum 5' thick	348,562/**208,720**	**638,405 Maximum**
1,043,600	96,600/**57,844**	463,026/**277,261** Minimum 10' thick	348,562/**208,720**	**499,775 Minimum**

2.4.4 Topographic Maps

The topographic maps for the Project Area are the Tucker Hill and Clover Flat 7.5' United States Geological Society quadrangles. Figure 1 utilizes the topographic maps as a base.

2.4.5 Equipment

The following types of equipment could be utilized for the Project:

- Four 25-ton dump trucks;
- One D9 or equivalent dozer;
- One 980 or equivalent front end loader;
- One drill rig (Cat MD5090 Hydraulic Rock Drill);
- One 3,000-gallon water truck;
- One 2,000-gallon fuel tank;
- Up to four light vehicles (pick-up trucks);
- One office trailer;
- One generator (V12 Detroit);
- Four conveyors;
- One jaw crusher unit;
- One cone crusher unit; and
- Two road graders.

2.4.6 Work Force

The proposed work force will consist of a maximum of four people in the quarry four or five days a week. There will be up to four trucks averaging ten trips per day per truck working a daily shift from approximately 5:00 a.m. to 10:00 p.m. daily. The hauling will be done year round. Weather shutdowns are possible mostly due to precipitation events softening the road, which could deteriorate the haul road with heavy truck use. Snow removal will occur if necessary.

2.4.7 Growth Media Management

Prior to expansion of the quarry, the available growth media of limited loose soil, gravely material and overburden that can feasibly be obtained with standard equipment will be removed separately and stockpiled. Stockpiles may be placed along the pit expansion area. Stockpiles will be re-handled

when necessary along the boundary of the pit expansion area. Growth media will be removed from the expansion area by a bulldozer and stockpiled as a berm around the perimeter of the open pit, as shown in Figure 1, to provide visual screening of mining activity and to stockpile all available growth media for later use for mine reclamation. Growth media removed during the quarry expansion will be salvaged to cover the reclaimed pit areas and pit floor. Growth media will be stored on stable slopes adjacent to the pit. Because of the location, two archaeological sites on the north and south sides of the proposed project, a buffer zone of 100 feet will be clearly delineated between the two sites and the berm of stockpiled growth materials. The sites and buffer zone will be permanently marked "avoidance area". No vehicle traffic within this buffer zone will be allowed. The stockpiled material will be stabilized during the operational phase by seeding with the seed mix determined by the BLM. The application of seed will occur at a time conducive to seed germination. The growth media stockpile surface disturbance will increase from the existing one acre to three acres.

Monitoring of growth media stockpiles will include the detection and appropriate removal of any invasive or noxious weed species. Weed control will be determined by consultation with representatives of the Lakeview BLM.

2.4.8 Haul Road Access

The Project will continue to be accessed using the existing 3.3-mile haul road. The road has been resurfaced with crushed stone or gravel, where necessary, to provide for an all weather travel surface. Turn-outs have been constructed where appropriate to provide for safety. During operations, the road will be graded and watered by Cornerstone to maintain the surface and control fugitive dust. The existing road has been expanded to an approximate running width of 18 feet and the total disturbance width has not exceeded 32 feet. There is a maximum cutbank height of approximately six feet. An existing two-track road has been upgraded on the private lands directly south of Highway 31.

2.4.9 Access Control

Public access to the quarry area is restricted as the haul road entrance is located on private land that is gated. Cornerstone is provided access by a right-of-way easement lease allowing Cornerstone to cross the private ranch property and is subject to renewability on a five-year basis. Warning signs are posted at strategic locations, advising of the danger associated with the operations. Access is provided to individuals or groups requiring access to or through the quarry area for such purposes as education, research or cultural/religious practices. However, there is no legal public access on that portion of the haul road that crosses private land. The quarry may potentially be accessed by cross-country All-Terrian Vehicles or by foot. An old exploration road northwest of the Project Area may provide access on foot or by motorized vehicles to the haul road. During periods of mining, Cornerstone will control access to the mine during blasting and ensure security in the pit expansion area by utilizing a gate closure. During periods of non-operation, Cornerstone will post appropriate signage.

2.4.10 General Schedule of Operations

Cornerstone will continue to conduct mining activities under the existing approved plan of operations. Following BLM approval, Cornerstone will commence work to expand the pit as

outlined in this Plan amendment. The proposed mining activities under this Plan will last over the life of the mine (estimated at 15 years), but will depend upon market conditions and the delineation of additional reserves.

2.4.11 Surface Occupancy

Occupancy is defined as full or part-time residence on the public lands (43 CFR 3715.0-5). Activities that involve residency include: the construction, presence, or maintenance of temporary or permanent structures that may be used for such purposes; or the use of a watchman or caretaker for the purpose of monitoring activities. Residence or structures include, but are not limited to barriers to access, fences, tents, motor homes, trailers, cabins, houses, buildings, and storage of equipment or supplies. No additional structures to the Project site are proposed under this Plan amendment.

2.4.12 Water Management Plan

The Project does not require a water management plan because there are no surface water bodies located in the arid Project Area. The nearest surface water is in the Chewaucan Marsh, located approximately one mile east of the base of Tucker Hill. There are no perennial drainages or springs located on Tucker Hill, and ground water is reported in water wells at a depth greater than 300 feet below surface of the playa lake surface, some 600 feet below the summit of Tucker Hill. No ground water has been found in exploration drill holes, which have been drilled to a depth of 100 feet along the upper surfaces of Tucker hill.

2.4.13 Rock Characterization and Handling Plan

No rock handling plan is required for this perlite operation based on the analysis contained in the 1996 EIS that was prepared for the mine since there are no sulfides present in the ore or waste rock to contribute to acid rock drainage in the event of standing impounded water.

2.4.14 Quality Assurance Plan

Quality assurance for reclamation will be addressed under the Reclamation Plan (Section 3).

2.4.15 Spill Contingency Plan

The Spill Contingency Plan is located in Appendix C. Additionally, a plastic-lined pit is utilized for secondary containment and storage of fuel and oil.

2.4.16 Other Plans

No other Plans are required.

2.5 Environmental Protection Measures based on 43 CFR 3809 Regulations and Mitigation Measures Established in the 1996 EIS

Cornerstone commits to the following environmental protection measures to prevent unnecessary or undue degradation during construction, operation, and reclamation of the Project. The

measures are derived from the general requirements established in BLM Surface Management Regulations at 43 CFR 3809, as well as other water, air quality, and environmental protection regulations.

Air Quality/Visual Resources

- Sufficient water for dust abatement will be provided on the haul road to reduce any dust plumes and minimize impacts on air quality and visual quality; and

- If visual impacts associated with the highwall of the quarry results in a sharp color contrast with the surrounding vegetation, consideration will be given to using a desert varnish or staining material to reduce the visual impacts.

Cultural Resources

- Implementation of the Project will be in accordance with provisions of the Historic Properties Treatment Plan (HPTP) to mitigate, to the extent possible, impacts to cultural resources. This plan was developed during environmental analysis of potential impact from development of the original mine at Tucker Hill;

- If Native American Tribes or individuals express a desire for a tribal monitor to help prevent unnecessary site disturbance, then the BLM will work with Cornerstone to review the need for, and possibly obtain an archaeological monitor. BLM does not require a monitor nor does BLM pay for monitors. The obligation of the BLM is to provide an opportunity for Tribes to provide monitors if they so desire. This does not prevent Cornerstone from paying for monitors if they wish;

- If the Native American Tribes or individuals wish to use Tucker Hill for cultural activities, and if they can provide specific periods when they will like to use the area along with sufficient advance notice, the BLM will work with the mining company to avoid blasting on those days;

- If Native American Tribes or individuals wish the BLM to pursue acquisition of legal access to the site (via an easement across private lands on an existing private road), the BLM will initiate an easement acquisition, but cannot guarantee the outcome of that process;

- Should any additional archaeological discoveries be encountered during ground disturbing activities, all such activities will halt within a 50 meter radius of the discovery, and the BLM will be contacted to determine the nature of the find, evaluate its significance, and if necessary, suggest preservation or mitigation measures; and

- Cornerstone will coordinate with the BLM to construct a permanent barrier for the 100-foot buffer. Coordination efforts will consider appropriate fence reflectors, spacing between stakes, and suitable fencing material (i.e. steel posts).

Wildlife/Special Status Species

- Cornerstone will remove 47 acres of young invasive juniper trees south of Tucker Hill to benefit greater sage-grouse habitat.

General

- Long-term management of the Tucker Hill access road will be determined as a component of the Reclamation Plan;

- Cornerstone will follow the Spill Contingency Plan in Appendix C; and

- Rock pit, quarry, and road maintenance best management practices (BMPs) (#R067 to #R081) found in Instructional Memorandum No. OR-2011-074 and surface disturbing activities, mining, and noxious weed BMPs listed in Appendix D (pages A-4 to A-7) of the Lakeview RMP/ROD will be applied where appropriate.

3 RECLAMATION PLAN

Reclamation will begin within the mine areas when mining is complete or the disturbance is no longer needed for mining or development activities. Reclamation will continue as approved in the 1996 Plan, and will include the following: recontouring; redistribution of stockpiled growth media; reseeding; use of drainage control ditches, installation of water bars and culverts, as necessary; and rock armor for erosion control. Reclamation will be completed for haul and access roads and will include recontouring and seeding. The pit floor will be reclaimed through growth media and then seeded (drill seeding where possible). In coordination with the BLM, Cornerstone will evaluate the need to rip the pit floor where areas of compaction have occurred. Seeded areas will be monitored for stability and revegetation success, during the spring or fall, for three years or until revegetation is determined successful by the BLM and DOGAMI. Reclamation activities will be coordinated with the BLM, as necessary.

In addition, perlite mill waste from the processing plant may be backhauled to the Tucker Hill pit. Revegetation of exploration roads and pads not located within the mining component boundary will take place during the mining of the Project. The BLM and DOGAMI will consider reclamation successful when the disturbed sites are stabilized, secondary plant succession is established, and the conditions are met to realize the land use objectives. This finer material will be interbedded with the mine waste to reduce fugitive dust. Once the quarry has been filled with waste material and growth media, the surface of the reclaimed area will be regraded and seeded. The processed perlite has the same chemistry as the mined mineral, and no chemicals are added during processing, which makes it suitable for reclamation use. The proposed reclamation will be initiated as soon as practicable.

3.1 Prevention of Unnecessary or Undue Degradation

The Reclamation Plan has been developed in accordance with BLM Handbook 3042-1, "Solid Minerals Reclamation Handbook." Details of the Reclamation Plan will be monitored and administered by the DOGAMI as well as the BLM. Design and construction of the project facilities will incorporate performance standards per 43 CRF 3809.420 to prevent unnecessary or undue degradation of the environment.

3.2 Project Schedule

The Project activities will last over the life of the mine and will depend on market conditions. The schedule could be affected if conditions change. As a result of the modest size and nature of the project, concurrent reclamation for the waste rock dumps and haul road is not practicable. Reclamation will be performed upon termination of operations. Reclamation of existing exploration/development-related disturbances outside of the proposed quarry area will be reclaimed during the life of the proposed quarry operations.

Timing of revegetation activities is critically important to the overall success of the program. Seeding activities will be timed to take advantage of optimal climatic windows and will be coordinated with other reclamation activities. In general, seedbed preparation will be completed in the fall, either concurrently with or immediately prior to seeding, after regrading of disturbed areas. Seeding will be completed in late fall to take advantage of winter and spring precipitation and optimum spring germination. Early spring seeding may be utilized for areas not completed in the fall. In either case, seeding will be avoided when the ground is frozen or snow covered.

3.3 Post Operational Land Uses

The objectives of the Reclamation Plan include preventing or minimizing safety hazards, stabilizing disturbed areas, and providing for a post operation surface condition that will be consistent with the long-term multiple uses of surrounding lands managed by the BLM.

3.4 Reclamation of Waste Rock Dump (County Gravel Pit)

The County will reclaim this gravel pit in accordance with BLM permit stipulations and DOGAMI requirements upon its closure. Cornerstone will be responsible for the reclamation of the gravel pit approved in the 2008 Tucker Hill Quarry Plan of Operations Amendment that lies adjacent to the County Gravel Pit (BLM 2008).

3.5 Haul Road Reclamation

Long-term management of the haul road after mining operations have ceased and reclamation has been completed at the mine will be determined part of the reclamation process. Possible options include the following:

- Permanently close the road, bring the road bed back to the original contour as closely as possible, and revegetate the road corridor. Fill material, enhanced with available growth medium, will be pulled onto the roadbed to fill against new road cuts and restore the slope to its existing contour as needed. Compaction will be relieved during excavation by ripping and smoothing the surface with the excavator bucket. This process will help inhibit soil loss from runoff and provide a suitable seedbed. Revegetation of the regraded area will be consistent with methods described under Revegetation; or

- Regrading and recontouring of the haul road could be done to return the road bed to approximately its existing configuration;

For the purposes of the reclamation cost estimate, the most costly option (completely reclaiming the road) was used to determine a reclamation bond.

3.5.1 Two-track Material Storage Access Road Reclamation

Final reclamation will include the reclamation of the two-track material storage access road along Highway 31. The reclamation process will be similar to those options provided for the haul road in Section 2.4.5.

3.6 Drainage and Sediment Control Plan

The goal of the Drainage and Sediment Control Plan is to convey runoff from reclaimed areas and upgradient undisturbed areas through the Project site in a manner which will protect the reclaimed areas and prevent degradation of down-gradient water quality. The Drainage and Sediment Control Plan is designed to require no maintenance.

The main method of drainage and sediment control at the project site will be revegetating all disturbed areas, with the exception of the quarry. Roads will be maintained by Cornerstone to prevent degradation from erosion. Drainage on roads will be by ditching, installation of waterbars and, where appropriate, culverts. If any of these activities go outside of areas of existing disturbance, an archaeological/cultural survey/evaluation will be required. Running surfaces of the road will be rocked to reduce sediment runoff. Drainage facilities will be designed to accepted road engineering standards. Reclamation will be considered acceptable if there are no rills over six inches in depth and/or width after three years.

During operation, the quarry will be a topographic depression and all precipitation falling onto the quarry surface area will be contained on-site. Construction by this method will help control potential erosion from site runoff. Since the quarry is located on the top of Tucker Hill, no watershed exists upgradient of the quarry, and only the precipitation directly falling onto the quarry area could be impounded. However, the site is arid, annual evaporation exceeds precipitation, and the perlite is fractured allowing infiltration of the water. These factors will lead to rapid infiltration or evaporation of precipitation. Consequently, it is highly unlikely that any water will be impounded. The Tucker hill quarry lies within a 2.6- to 2.8-inch isopluvials of a 100-year 24-hour precipitation event. Impoundment under the circumstance of a 100-year event will be short term.

3.6.1 Rock Characterization and Handling Plan

No rock handling plan is required for this perlite operation based on the analysis contained in the 1996 EIS that was prepared for the mine since there are no sulfides present in the ore or waste rock to contribute to acid rock drainage in the event of standing impounded water.

3.7 Revegetation

The revegetation methods described at this time are generally based on common industry practices. Seeds from a native seed bank, if possible, will be obtained for reclamation. The seed mix utilized from the seed bank for reclamation of this Project will be based on known soil and climatic conditions and was selected to establish a plant community which will support post-mining land uses such as recreational activities and wildlife habitat as prescribed by the BLM. The seed mix will be designed to provide species that are able to become established in the environment of south central Oregon, are proven species for vegetation, and/or are native species found in the plant communities prior to disturbance. Potential seed mixes are included in Appendix L of the RMP/ROD (BLM 2003).

The seed source to be used for final reclamation will be certified weed free and approved by the BLM prior to the seeding operation. A monitoring program will be established for noxious weed invasion, which will include inventory every year during the life of the Project for three years after closure of the Project. If noxious weeds are found, the preferred treatment will be physical or manual extermination with selective chemical treatment as the least preferred method of eradication. This will take place in accordance with the Oregon BLM's 2010 ROD for Vegetation Treatments Using Herbicides on BLM lands in Oregon and other more site-specific weed plan/EA (BLM 2004).

Timing of revegetation activities is critically important to the overall success of the program. Seeding activities will be timed to take advantage of optimal climatic periods and will be coordinated with other reclamation activities. In general, earthwork and drainage control will be completed in the summer or early fall. Seedbed preparation will generally be completed in the fall, either concurrently with or immediately prior to seeding. Seeds will be sown in late fall to take advantage of winter and spring precipitation and optimum spring germination. Early spring seeding (drill seeding where possible) may be utilized for areas not seeded in the fall. In either case, seeding will be avoided when the ground is frozen or snow covered.

3.8 Reclamation of Quarry

The quarry walls will be left with overall slopes with benches approximately 20 to 25 feet vertical by approximately 20 to 25 feet horizontal. This will provide a very stable final slope.

There will be no surface discharge from the quarry. The relatively small amount of runoff from the surrounding land surfaces and precipitation directly into the quarry will either evaporate or percolate into the exposed bedrock in the quarry bottom.

The proposed operation involves the quarrying of a uniformly high-grade perlite deposit. The geologic setting of the deposit allows for the extraction of ore from a single open pit quarrying operation. In addition, mill tailings from the processing plant may be backhauled to the Tucker Hill pit. Mail tailings material will be interbedded with the mine waste to reduce fugitive dust. Once the quarry has been filled with mill waste material and waste (perlite material that does not meet specifications for market demand), the area will be covered with growth media and seeded. Figures 4 and 5 show the topography of two different backfill options for the quarry.

Prior to final reclamation, public safety concerns will be evaluated with the BLM and the DOGAMI. If determined to be necessary by the agencies, Cornerstone will construct a safety berm using mostly rock or waste material approximately five feet high with a one-foot top and 1.5 Horizontal: 1 Vertical (1.5H:1V) side slopes along the margin of the pit approximately 25 feet back from the highwall edge (Figure 2). Growth media will also be incorporated into sections of the berm in order to be utilized during reclamation of the pit areas and pit floor. The safety berm will be constructed with a dozer and a loader when highwalls are established. This berm will be posted with warning signs located in front of the berm and spaced every 200 feet. The permanent waste material berm or weather resistant metal signs will provide for public safety for many years following mining. Safety berms will be seeded with the approved seed mix to reduce visual impacts of the quarry due to color contrasts.

3.9 Monitoring and Maintenance of Reclaimed Areas

Environmental monitoring of the Project Area will consist of both operational and post-reclamation monitoring. Operational monitoring will extend for the duration of operations and will cease when operations are terminated. Post-reclamation monitoring will commence on any reclaimed area following completion of the reclamation work for the area and will occur along with, or following, operational monitoring until reclamation has been determined by the BLM and DOGAMI to be completed and permanent vegetation has been established. Once reclamation has been determined complete, including vegetation, the Project's reclamation bond

will be released to Cornerstone. Annual reports on the progress of the reclamation will be submitted to BLM and DOGAMI.

The BLM and DOGAMI will consider reclamation successful when the disturbed areas are stabilized, secondary plant succession is established, and the conditions are set to realize the land use objectives. The type and frequency of monitoring applicable to the Project is found in Table 3.

Table 3: Monitoring Program and Schedule

Type of Monitoring*	Operational Frequency	Post-Operational Frequency
Condition of drainage and sediment control	Monthly	Annually until released
Condition of reclaimed areas	Annually	Annually until released

*The Project will be monitored for noxious weed invasions throughout the life of the mine operation and reclamation activities.

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

There are no natural occurring acid-forming, toxic or deleterious materials associated with perlite. Mining operations are conducted 12 months per year; however, should there be a temporary shutdown, all fuel, lubrication oil, and waste oil tanks located within the Project Area will be emptied. All valves in the fuel and lube island containment structures will be left in the closed positions. All chemical agents, such as WD-40, or Brake Kleen will be secured inside the flammable containers cabinet located inside the trailer that remains locked when the mine area is not occupied. Grease and other lubricants will be stored either inside the locked storage container or the locked trailer. No other toxic chemicals or deleterious materials are kept on site.

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

Several structures will be utilized during the life of the Project. All equipment and supplies will be decommissioned and removed following completion of the Project. Other materials, including scrap, trash, and unusable equipment, will be removed on a daily or weekly basis and disposed of in accordance with federal and state regulations and laws.

3.12 Drill Hole Plugging

Drill holes will be abandoned in accordance with established OWRD standards and regulations.

3.13 Processing Site

The processing site for the perlite ore is on the north end of Lakeview in an existing industrial site on private property. The processing site will continue to be used under this Plan as in current operations. The site is located just west of U.S. Highway 395 and adjacent to the Goose Lake Lumber Company to the south. Access to the property is provided by County Road 2-18c and the Dusenbury Logging Road. The ore will continue to be stockpiled on the site where it will be

crushed and then loaded on either railroad cars or trucks for delivery to markets in the northwest. Fugitive dust emissions at the processing plant will be controlled by water sprays, cyclones, and a baghouse.

4 STATEMENT OF ASSUMPTION OF RECLAMATION RESPONSIBILITY

Cornerstone agrees to accept the responsibility for reclamation of all surface disturbance associated with the Project detailed under this Application. Cornerstone currently has a bond of $50,000.

5 RECLAMATION COST ESTIMATE

Reclamation of the Project is designed to return the site to a safe, stable, and productive condition capable of supporting wildlife habitat, mineral exploration, livestock grazing, and recreation. The commitment to successful completion of this task is expressed in initial designs that facilitate ease of implementation of the Reclamation Plan; planned construction and reclamation design, which minimizes surface disturbance, and implementation of concurrent reclamation where appropriate. The reclamation tasks are set forth in both the Reclamation Plan (Section 3) and Reclamation Cost Estimate (Appendix B), for both existing activities and proposed Application activities, to follow the bond release criteria established by the BLM and DOGAMI. Cornerstone will seek bond release in accordance with BLM and DOGAMI requirements.

Cornerstone has projected that the total surface disturbance for the Project will equal approximately 70 acres. The bond calculation also includes reclamation of the haul road as well as disturbance associated with the quarry. The bond has been calculated at $158,709.00. The cost calculations are included in Appendix B.

6 REFERENCES

Bureau of Land Management (BLM). 1995. Draft Environmental Impact Statement (DEIS). Atlas Perlite, Inc. Tucker Hill Perlite Project. Lakeview District Office.

_____. 1996a. Record of Decision and Plan of Operations Approval for Atlas Perlite, Inc. Lakeview District Office.

_____. 1996b. Final Environmental Impact Statement (FEIS). Atlas Perlite, Inc. Tucker Hill Perlite Project. Lakeview District Office.

_____. 2003. Lakeview Resource Management Plan and Record of Decision. 2 volumes. Lakeview District Office.

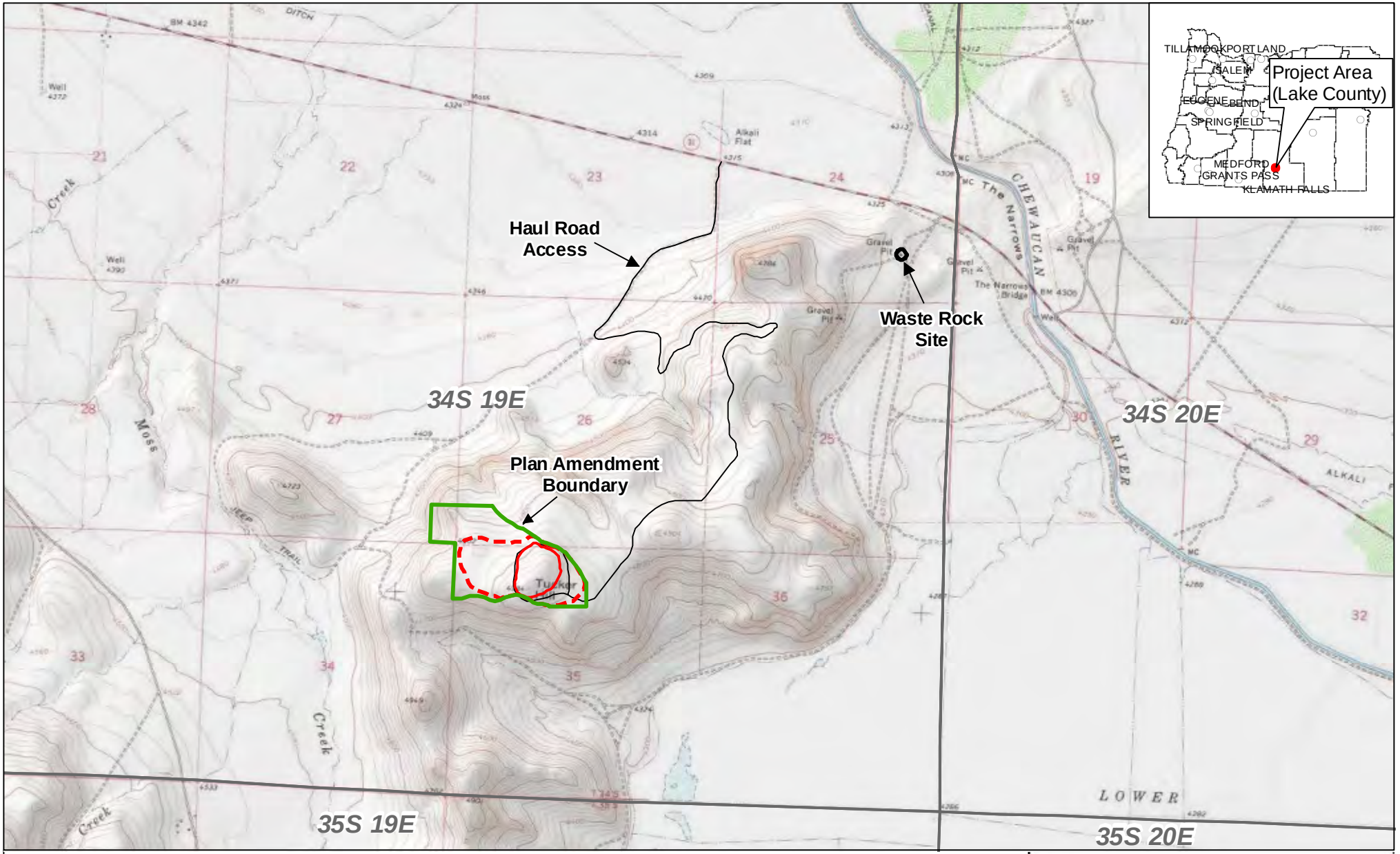
_____. 2004. Integrated Noxious Weed Management Program. Environmental Assessment #OR-OR-010-2004-03.

_____. 2007. Standard Operating Procedures from the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States PEIS and ROD – Appendix B, Herbicide Treatment Standard Operating Procedures. September 2007.

_____. 2008. Cornerstone Industrial Minerals, Inc. Tucker Hill Quarry Plan of Operations Amendment.

APPENDIX A

FIGURES



Explanation

- Plan Amendment Boundary
- Proposed Pit Expansion
- Existing Pit
- Existing Roads

1:34,000

0 1,000 2,000 3,000 4,000 Feet

Projection: UTM Zone 11 North, NAD83

N

CORNERSTONE INDUSTRIAL MINERALS CORP.

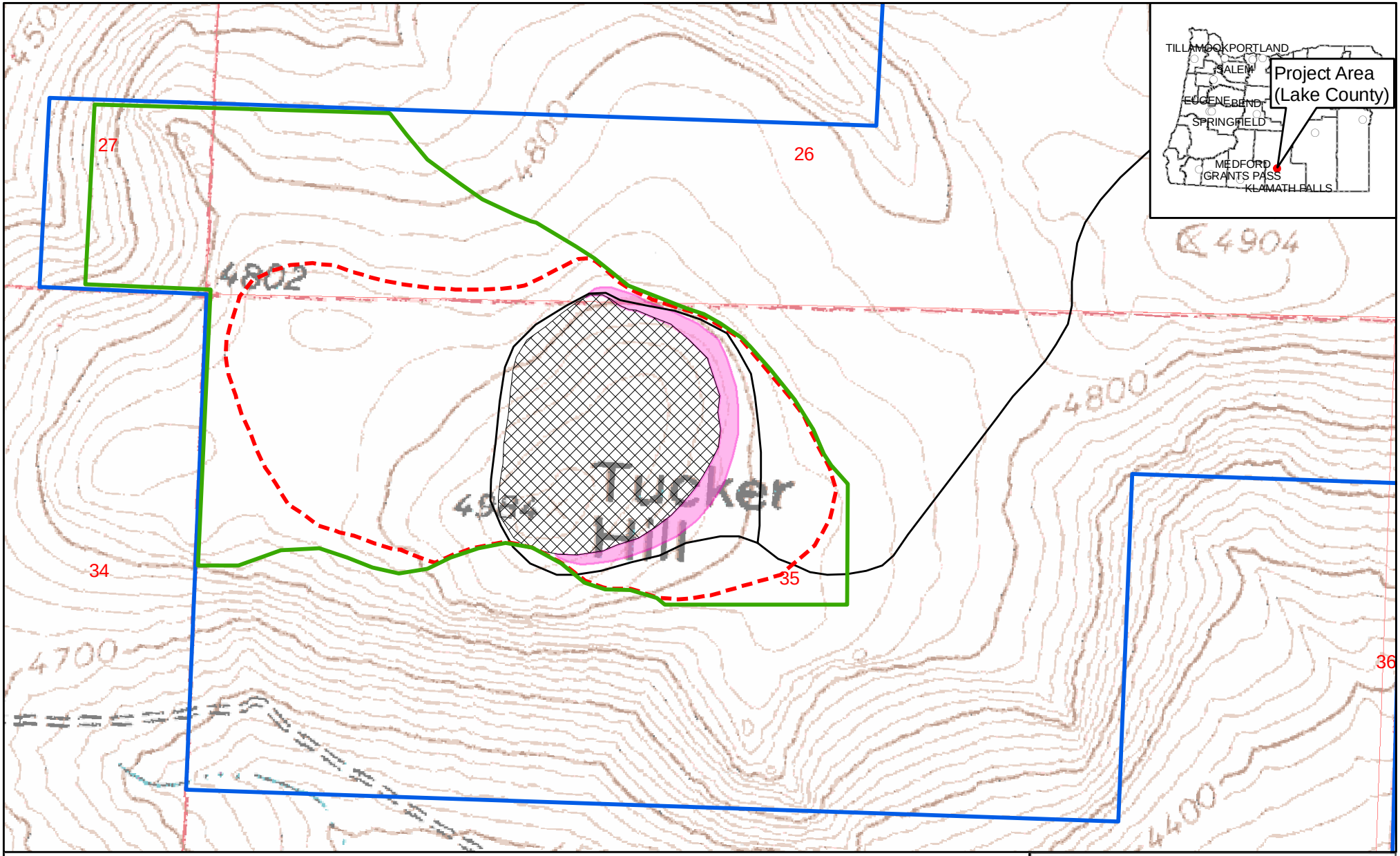
TUCKER HILL PROJECT

Existing and Proposed Mine Activities

Figure 1

Date: 08/18/2011	Drawn By: GSL
Revised:	Project No.: 2540
Base Map: USGS 7.5' quad: Tucker Hill	
File Name: 2540X_TuckerHill_Figure01_ExistingProposedActivities.mxd	

Enviroscientists, Inc.



Explanation

- Plan Amendment Boundary
- Existing Permit Area
- Proposed Pit Expansion
- Growth Media Berms
- Existing Pit
- Existing Roads

T34S R19E

1:7,000

0 250 500 750 1,000 Feet

Projection: UTM Zone 11 North, NAD83

N

CORNERSTONE INDUSTRIAL MINERALS CORP.

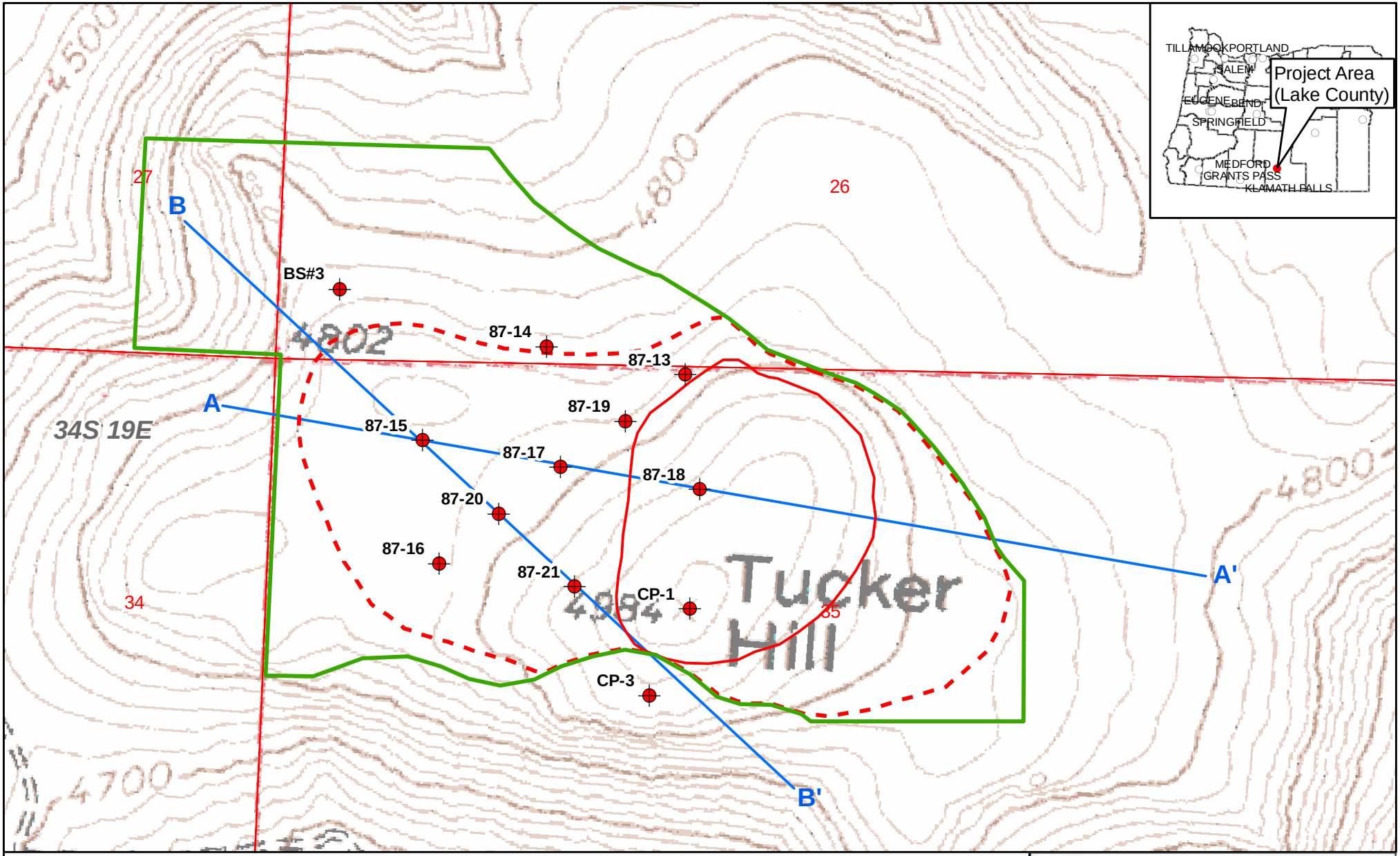
TUCKER HILL PROJECT

Proposed Expansion Activities

Figure 2

Date: 08/18/2011	Drawn By: GSL
Revised:	Project No.: 2540
Base Map: USGS 7.5' quad: Tucker Hill	
File Name: 2540X_TuckerHill_Fiigure02_ProposedExpansionActivities.mxd	

Enviroscientists, Inc.



Explanation

- Plan Amendment Boundary
- Proposed Pit Expansion
- Existing Pit
- Cross Section Line
- Sites

1:6,000

0 250 500 750 1,000 Feet

Projection: UTM Zone 11 North, NAD83

N

CORNERSTONE INDUSTRIAL MINERALS CORP.

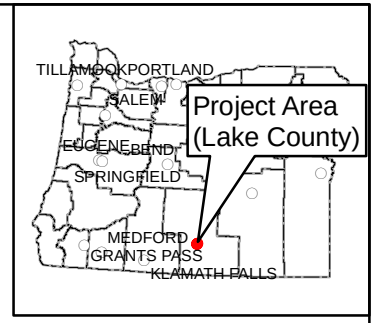
TUCKER HILL PROJECT

Sample and Cross Section Locations

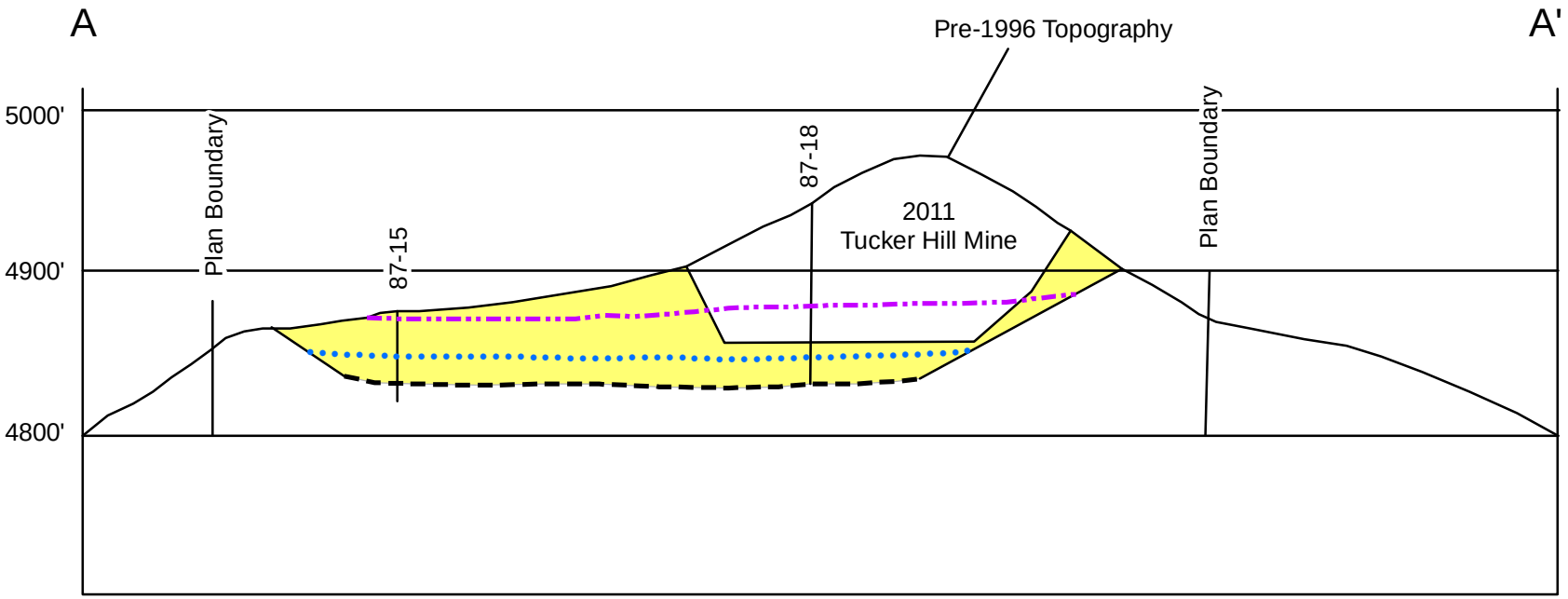
Figure 3

Date: 08/23/2011	Drawn By: GSL
Revised:	Project No.: 2540
Base Map: USGS 7.5' quad: Tucker Hill	
File Name: 2540X_TuckerHill_Figure03_SampleCrossSectionLocs.mxd	

Environscientists, Inc.



LOOKING NORTH



Explanation

- Pit Backfill Alternative
- Partial Backfill Alternative
- Perlite Deposit

100 Feet

400 Feet

CORNERSTONE INDUSTRIAL MINERALS CORP.

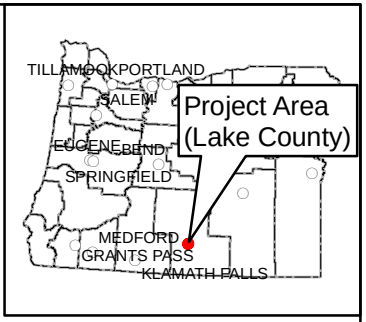
TUCKER HILL PROJECT

Cross Section A-A'

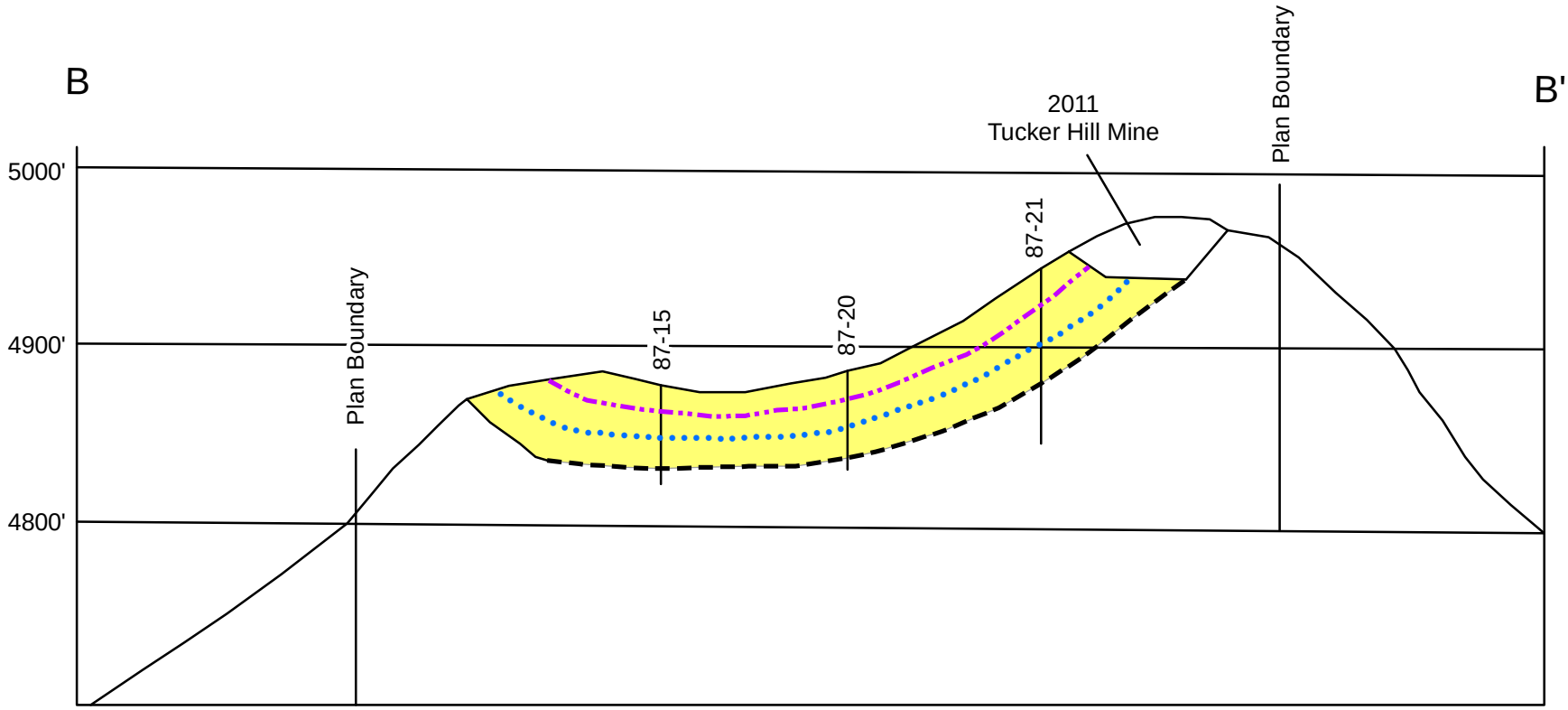
Figure 4

Date: 10/17/2011	Drawn By: GSL
Revised:	Project No.: 2540
Base Map:	
File Name: 2540X_TuckerHill_Figure04_CrossSectionA.mxd	

Environscientists, Inc.



LOOKING NORTHEAST



Explanation

- Pit Backfill Alternative
- Partial Backfill Alternative
- Perlite Deposit

100 Feet

400 Feet

CORNERSTONE INDUSTRIAL MINERALS CORP.

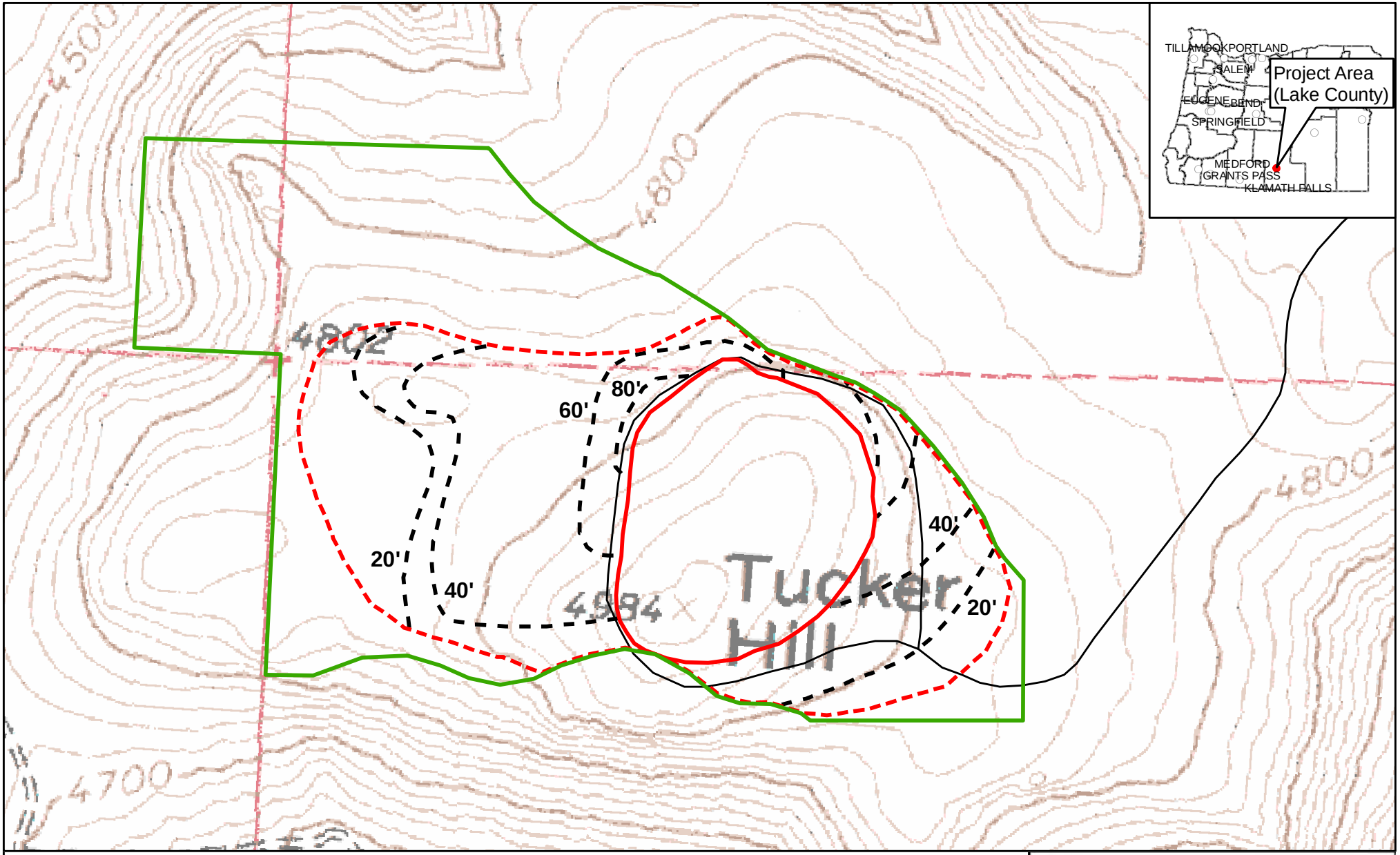
TUCKER HILL PROJECT

Cross Section B-B'

Figure 5

Date: 10/17/2011	Drawn By: GSL
Revised:	Project No.: 2540
Base Map:	
File Name: 2540X_TuckerHill_Figure05_CrossSectionB.mxd	

Environscientists, Inc.



Explanation

- Plan Amendment Boundary
- Proposed Pit Expansion
- Existing Pit
- Thickness Contour
- Existing Roads

T34S R19E

1:6,000

0 250 500 750 1,000 Feet

Projection: UTM Zone 11 North, NAD83

N

CORNERSTONE INDUSTRIAL MINERALS CORP.

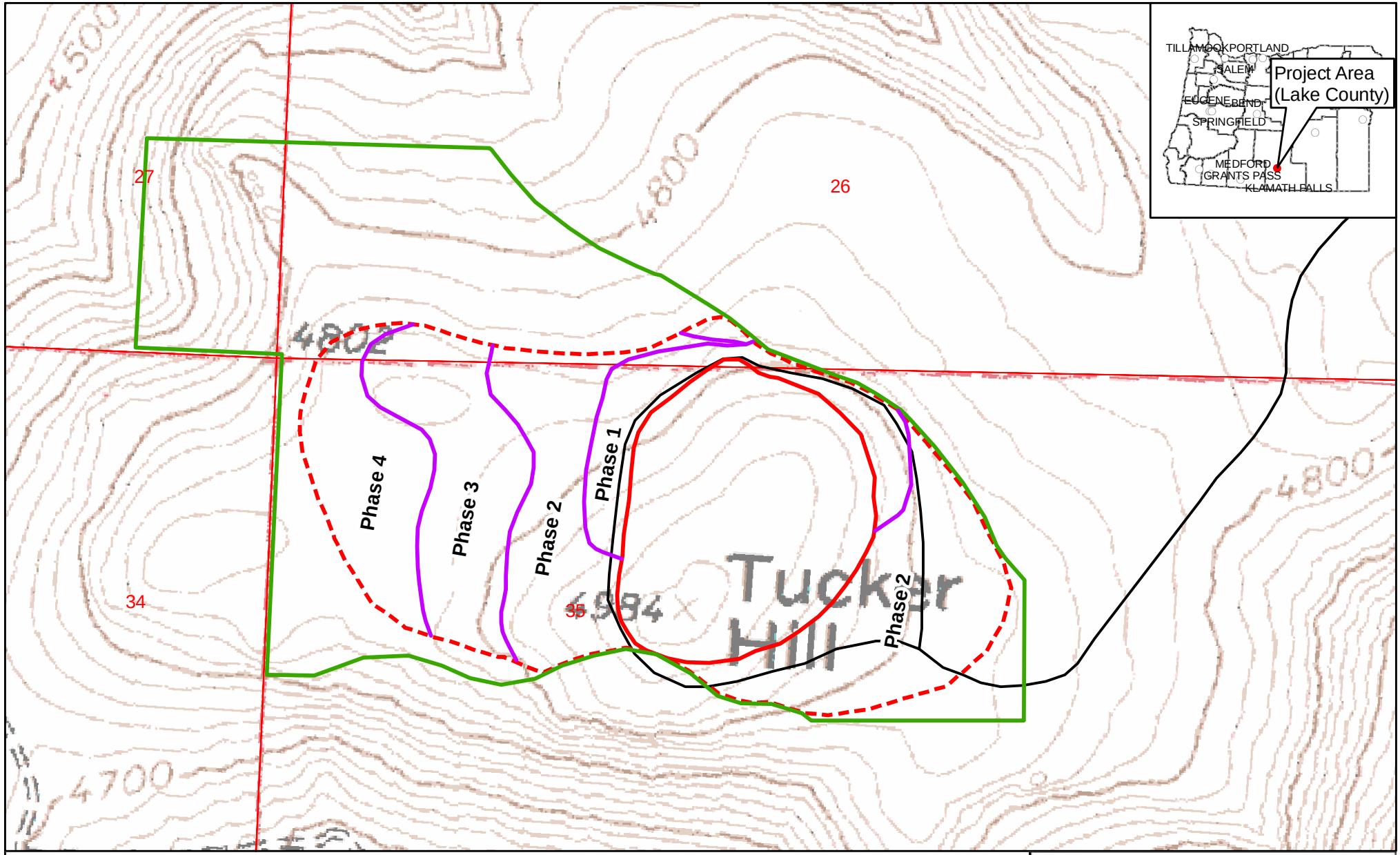
TUCKER HILL PROJECT

Estimated Limits Subsurface
Potential Thickness of
Commercial Grade Perlite Ores

Figure 6

Date: 08/23/2011	Drawn By: GSL
Revised:	Project No.: 2540
Base Map: USGS 7.5' quad: Tucker Hill	
File Name: 2540X_TuckerHill_Figure06_PotentialThickness.mxd	

Environscientists, Inc.



Explanation

- Plan Amendment Boundary
- Proposed Pit Expansion
- Existing Pit
- Phases
- Existing Haul and Access Roads

T34S R19E

1:6,000

0 250 500 750 1,000 Feet

Projection: UTM Zone 11 North, NAD83

N

CORNERSTONE INDUSTRIAL MINERALS CORP.

TUCKER HILL PROJECT

Mining Phases

Figure 7

Date: 08/23/2011	Drawn By: GSL
Revised:	Project No.: 2540
Base Map: USGS 7.5' quad: Tucker Hill	
File Name: 2540X_TuckerHill_Figure07_MiningPhases.mxd	

Environscientists, Inc.

APPENDIX B

RECLAMATION COST ESTIMATE

TUCKER HILL QUARRY PLAN OF OPERATIONS

Reclamation Cost Estimate By Component

Component/Activity	Labor ($)	Equipment ($)	Materials ($)	Total ($)
Haul Road Reclamation				
Steep Portion				
Regrading	$1,799.00	$5,244.00		$7,043.00
Flat Portion				
Regrading	$332.00	$637.00		$969.00
Ripping	$521.00	$1,001.00		$1,522.00
Entire Road				
Seedbed Preparation	$189	$364		$553
Seeding	$610		$1,078	$1,688
Culvert Removal	$47	$338		$385
Growth Medium Stockpile				
Recontouring	$379	$728		$1,107
Scarifying	$66	$127		$193
Seeding	$238		$420	$658
Waste Storage Area				
Recontouring and Growth Media Replacement	$949	$1,820		$2,769
Seeding	$634		$1,120	$1,754
Respreading of Growth Media	$19,125	$55,752		$74,877
Pit Perimeter Berm Construction	$189	$552		$741
Pit Highwall Staining	$10,625			$10,625
Crusher and Other Equipment Removal	$3,340	$2,184		$5,524
Additional Seeding (Two)	$984		$2,296	$3,280
Mob/Demob		$1,200		$1,200
Post-Reclamation Monitoring	$6,893	$2,632		$9,525
Reclamation Subtotal	$46,920	$72,579	$4,914	$124,413
Add-On Items				
Engineering, Design, and Construction				$3,732
Contingency				$3,732
Insurance (1.5% of total labor)				$704
Contract Administration (12% of total)				$14,930
Bond Performance (1.5% of total)				$1,866
Bond Payment (1.5% of total)				$1,866
Contractor Profit (6% of total)				$7,465
Add-On Subtotal				$34,295
Grand Total	**$46,920**	**$72,579**	**$4,914**	**$158,709**

I. Hourly Costs for Equipment and Labor

Hourly equipment operating rates were taken from Means Heavy Construction Cost Data, 2011.
Hourly labor rates are from U.S. Department of Labor, General Wage Determinations (http://www.wdol/scafiles/davisbacon/OR94.dvb).

Equipment

Cat D9 Bulldozer	$91/hour
Cat 235C Hydraulic Excavator	$138/hour
Chisel Tooth Harrow & Seed Drill (pulled by a Terex 82-30B tractor)	$72/hour

General Laborer (Group No. 1, Zone 5)

Base Salary	$25.52
Fringe	$12.25
SIIS, FICA, and Unemployment	$1.87
Total	**$39.64**

Equipment Operator (Group No. 2, Zone 3)

Base Salary	$32.60
Fringe	$12.35
SIIS, FICA, and Unemployment	$2.39
Total	**$47.34**

Truck Driver (off the road truck)

Base Salary	$31.81
Fringe	$6.33
SIIS, FICA, and Unemployment	$2.33
Total	**$40.47**

BLM Reclamation Technician (GS 7, Step 1)

Base Salary	$17.82
Benefits (32%)	$5.70
Leave Surcharge (18%)	$3.20
Total	**$26.72**

Seed Cost

Per Pound	**$7.00**
Per Acre (20.0 lbs/acre)	**$140.00**

II. Reclamation Costs - Haul Road

Road Length - Flat Terrain:	12,714 feet	- knock down side berms, rip, scarify, mulch, and reseed
Road Length - Steep Terrain:	4,710 feet	- regrade, scarify, mulch, and reseed
Road Length - Total:	17,424 feet	(3.3 miles)

II. A. Regrading Cost - Flat Portion of Haul Road

Reclamation Treatment:	Knock down berm on flat portion of haul road. Push growth medium along haul road length.	
Assumptions:	Three-foot high berm on both sides of road 100-foot dozing distance 12,714 feet x 9ft^2 = 4,238 cubic yards of material moved Decrease average operator correction factor from 0.75 to 0.50 to account for placing growth medium while regrading road.	
Equipment:	Cat D9 @	$91.00 per hour
Labor:	Operator @	$47.34 per hour
Average Production:	1,200 LCY/hr (100 feet dozing distance)	
Correction Factors:	Average operator	0.5
	Loose material	1.2
	Maneuverability	1
	Job Efficiency	0.83
	Grade (average)	1
Average production (corrected)	1,200 LCY/hr x 0.5 x 0.83 x 1.2 = 600 LCY/hr	
Hours and Cost	4,238 CY/600 LCY/hr = 7 hrs 7 hrs x $91.00/hr = $637 7 hrs x $47.34/hr = $332	

Regrading Flat portion of haul road	Total	**$969**

II. B. Ripping Cost - Flat Portion of Haul Road

Reclamation Treatment:	Rip exposed flat road bottom surface to relieve compaction.	
Assumptions:	Flat terrain, 18-foot width that will require ripping	
	Ripping to a depth of 18 inches	
	12,714 cubic yards of material	
Equipment:	Cat D9 @ $91.00 per hour	
Labor:	Operator @ $47.34 per hour	
Average Production:	1,500 LCY/hr (Cat book Seismic Velocity Charts)	
Correction Factors:	Job Efficiency 0.83	
Average Production (Corrected):	1,500 LCY/hr x 0.83 = 1,245 LCY/hr	
Hours:	12,714 CY/1,245 CY/hr = 11 hrs	
Cost:	11 hrs x $91.00/hr =	$1,001
	11 hrs x $47.34/hr =	$521
Ripping Flat portion of haul road	Total	**$1,522**

II. C. Seedbed Preparation Cost - Entire Length of Haul Road

Reclamation Treatment:	Scarify loose material to six inches deep.	
Assumptions:	5,808 LCY of material	
Equipment:	Cat D9 @ $91.00 per hour	
Labor:	Operator @ $47.34 per hour	
Average Production:	2,050 CY/hr	
Correction Factors:	Job Efficiency 0.83	
Average Production (Corrected):	2,050 CY/hr x 0.83 = 1,702 CY/hr	
Hours and Cost:	5,808 CY/1,702 CY/hr = 4 hrs	
	4 hrs x $91.00/hr =	$364
	4 hrs x $47.34/hr =	$189
Seedbed preparation for entire haul road	Total	**$553**

II. D. Regrading Cost - Steep Portion of Haul Road

Reclamation Treatment:	Pulling up fill material onto roadbed surface.	
Assumptions:	Four-foot by 18-foot average fill area, 1.5 cubic yard per linear foot of road.	
	4,710 x 1.5 = 7,065 cubic feet of material	
Equipment:	Cat 235C @ $138.00 per hour	
Labor:	Operator @ $47.34 per hour	
Fill Factor:	57.50%	
Heaped Capacity:	2.75 cubic yards x 57.5% = 1.58 LCY	
Average Production:	225 LCY/hr (Cat book)	
Correction Factors:	Job Efficiency 0.83	
Average production (corrected):	225 LCY x 0.83 = 187 LCY/hr	
Hours and Cost:	7,065 CY/187 LCY/hr = 38 hrs	
	38 hrs x $138.00/hr =	$5,244
	38 hrs x $47.34/hr =	$1,799
Regrading Steep portion of haul road	Total	**$7,043**

II. E. Seed and Application Cost

Reclamation Treatment:	Distribution of seed mix by hand broadcasting.	
Assumptions:	7.7 acres of road disturbance.	
	Broadcast application of seed by hand.	
Material Cost:	Seed Mix @ $140/acre (hand broadcasting)	
Average Production:	Assume one manlabor crew	
	Seed mix dispersal of 0.5 acre per hour per laborer	
Labor:	General Laborer @ $39.64 per hour	
Materials and Cost:	7.7 acres x $140/acre =	$1,078
	7.7 acres x $79.28/acre =	$610
Seed application costs for the haul road	Total	**$1,688**

II. F. Culvert Removal Cost

Reclamation Treatment:	Remove culverts to re-establish natural drainage	
	Two (21-inch diameter x 20-feet long) shallow fill culverts	

Assumptions:	18-foot road segment width (average)		
	3-foot road fill height (average)		
	20-foot road top surface length (average)		
	40 cubic yard of material per culvert		
	2 x 40 CY = 80 CY		
Equipment:	Cat 235C @	$138.00	per hour
Labor:	Operator @	$47.34	per hour
Fill Factor:	57.50%		
Heaped Capacity:	2.75 CY x 57.5% = 1.58 LCY		
Average Production:	225 LCY/hr (Cat book)		
Correction Factors:	Job Efficiency		0.83
Average production (corrected)	225 LCY/hr x 0.83 = 187 LCY/hr		
Hours:	80 CY/187 LCY/hr = 1 hr		
Cost:	1 hr x $138/hr =		$138
	1 hr x $47.34/hr =		$47

Additional Cost to Haul to Lakeview dump: $200

Culvert Removal and Regrade Total **$385**

III. Reclamation Cost - Topsoil Stockpile Locations

Assumptions: Estiamted 3 acres of disturbance. Rip and regrade surface area.
Application of seed by hand.

III. A. Recontouring Cost

Reclamation Treatment: Rip stockpile area.

Assumptions:	3 acres of disturbance.		
	Ripping depth of 18 inches		
Equipment:	Cat D9 @	$91.00	per hour
Labor:	Operator @	$47.34	per hour
Average Production:	1,085 CY/hr (Cat Seismic Velocity Charts)		
Correction Factors:	Job Efficiency		0.83
Average Production (corrected):	1,085 CY/hr x 0.83 = 901 CY/hr		
Hours:	7,260 CY/901 CY/hr = 8 hrs		
Cost:	8 hrs x $91.00/hr =		$728
	8 hrs x $47.34/hr =		$379

Rip/Regrade costs for the topsoil stockpile areas **$1,107**

III. B. Scarify and Seed Cost

Reclamation Treatment: Scarify loose material to six inches depth.
Hand broadcast seed.

III. B. 1. Seedbed Preparation

Assumptions:	3 acres of disturbance.		
	Ripping depth of 18 inches		
Equipment:	Cat D9 @	$91.00	per hour
Labor:	Operator @	$47.34	per hour
Average Production:	2,050 CY/hr (Cat Book)		
Correction Factors:	Job Efficiency		0.83
Average Production (corrected):	2,050 CY/hr x 0.83 = 1,702 CY/hr		
Hours:	2,420 CY/1,702 CY/hr = 1.4 hrs		
Cost:	1.4 hrs x $91.00/hr =		$127
	1.4 hrs x $47.34/hr =		$66

Seedbed preparation for the stockpile **Total** **$194**

III. B. 2. Seeding

Material Cost:	Seed Mix @ $140/acre (hand broadcasting)		
Average Production:	Assume one manlabor crew		
	Seed mix dispersal of 0.5 acre per hour per laborer		
Labor:	General Laborer @	$39.64	per hour
Materials and Cost:	3 acres x $140/acre =		$420
	3 acres x $79.28/acre =		$238

Seed application costs for the Stockpile **Total** **$658**

IV. Reclamation of Waste Storage Area

IV. A. Recontouring and Growth Medium Replacement

Assumptions:	Recontour and reseed surface disturbance.		
	Approximately 8 acres of surface disturbance.		
	8 acres x 1ft = 12,000 cubic yards of required growth medium.		
Equipment:	Cat D9 @	$91.00	per hour
Labor:	Operator @	$47.34	per hour
Average Production:	1,200 LCY/hr (100 feet dozing distance)		
Correction Factors:	Average operator	0.5	
	Loose material	1.2	
	Maneuverability	1	
	Job Efficiency	0.83	
	Grade (average)	1	
Average production (corrected)	1,200 LCY/hr x 0.5 x 0.83 x 1.2 = 600 LCY/hr		
Hours and Cost	12,000 CY/600 LCY/hr =	20	hrs
	20 hrs x $91.00/hr =	$1,820	
	20 hrs x $47.34/hr =	$949	

Regrading and distributing of growth medium	Total	$2,769

IV. B. Reseeding

Material Cost:	Seed Mix @ $140/acre (hand broadcasting)	
Average Production:	Assume one manlabor crew	
	Seed mix dispersal of 0.5 acre per hour per laborer	
Labor:	General Laborer @	$39.64
Materials and Cost:	8 acres x $140/acre =	$1,120
	8 acres x $79.28/acre =	$634

Seed application costs for the Stockpile	Total	$1,754

Reclamation of Growth Medium Stockpile	**Total**	**$4,523**

V. Respreading of Growth Media - Recontoured Area

Assumptions:	47 acres of disturbance requiring growth medium x 1-foot deep		
	2,047,320 ft^3 required growth medium.		
Equipment:	Cat 235C @	$138.00	per hour
Labor:	Operator @	$47.34	per hour
Fill Factor:	57.50%		
Heaped Capacity:	2.75 cubic yards x 57.5% = 1.58 LCY		
Average Production:	225 LCY/hr (Cat book)		
Correction Factors:	Job Efficiency	0.83	
Average production (corrected):	225 LCY x 0.83 = 187 LCY/hr		
Hours and Cost:	75,548 CY/187 LCY/hr = 404 hrs		
	404 hrs x $138.00/hr =	$55,752	
	404 hrs x $47.34/hr =	$19,125	

Respreading of Growth Medium - Recontoured Area	Total	**$74,877**

VI. Pit Perimeter Berm Construction

Assumptions:	Berm dimensions: five feet high by 15 feet wide by 500 feet long.		
	694 CY		
Equipment:	Cat 235C @	$138.00	per hour
Labor:	Operator @	$47.34	per hour
Fill Factor:	57.50%		
Heaped Capacity:	2.75 cubic yards x 57.5% = 1.58 LCY		
Average Production:	225 LCY/hr (Cat book)		
Correction Factors:	Job Efficiency	0.83	
Average production (corrected):	225 LCY x 0.83 = 187 LCY/hr		
Hours and Cost:	694 CY/187 LCY/hr = 4 hrs		
	4 hrs x $138.00/hr =	$552	
	4 hrs x $47.34/hr =	$189	

Pit Area Berm Construction	**Total**	**$741**

VII. Reclamation Costs - Pit Highwall Staining

Perimeter Requiring Staining:	3,400 feet
Reclamation Treatment:	Apply stain to portions of the pit highwall visable from key observation points.
Assumptions:	One-half of pit perimeter will be visible, of which upper 25 feet of highwall will require staining.
	1,700 feet x 25 feet = 42,500 $feet^2$

	$0.25 per square foot cost estimate from 1996 Plan was used		
Cost:	42,500 feet^2 x $0.25 =	$10,625	
Pit Highwall Staining	**Total**	**$10,625**	

VIII. Dismantling and Removal of Crusher and Other Equipment

Assumptions:	Three (8-hr) days will be required to dismantle and remove equipment.			
	4 round-trips from Lakeview, OR to Project via semi-trailer, three hours per trip			
Equipment:	Cat D9 @	$91.00 per hour		
	Semi-truck @	$91.00 per hour		
Labor:	Truck driver @	$40.47 per hour		
	General Laborer @	$39.64 per hour		
Hours:	8 hrs/day x 3 days x 3 laborers = 72 hours			
	D9: 12 hrs			
	Semi-truck: 4 trips @ 3 hrs/trip = 12 hrs			
Cost:	12 hrs x $91.00/hr =	$1,092	2184	
	13 hrs x $91.00/hr =	$1,092		
	12 hrs x $40.47/hr =	$486	$3,340	
	72 hrs x $39.64/hr =	$2,854		

Dismantling and Removal of Crusher and Other Equipment	**Total**	**$5,524**	

IX. Additional Seeding

Assumptions:	Haul road and growth medium stockpile will require two additional seeding to meet vegetation objectives.		
Labor:	$984		
Materials:	$2,296		
Additional Seeding	**Total**	**$3,280**	

X. Mob and Demob of Equipment

Assumptions:	2 hours required for mobilization from Lakeview, 4 hours total (mob + demob)		
	$100/hr for each piece of equipment		
	3 pieces of equipment @ $400/mob-dem	$1,200	
Mob-Demob Costs	**Total**	**$1,200**	

XI. Post-Reclamation Monitoring Costs

Assumptions:	Semi-annual inspections for five years	
	10-hr work days for the first three years; 5-hour work days for the last 2 years	
	Approximately 80 mile round trip from Project to Lakeview, OR.	
Equipment:	4-wheel drive pick-up truck @ $50/day + $0.55/mile	
Labor:	Reclamation technician @ $26.72/hr	
Cost:	28 days x ($50/day +(80 miles x $0.55/mile)) =	$2,632
	24 days x 10 hrs/day x $26.72/hr =	$6,413
	4 days x 5 hrs/day x $24/hr =	$480
Post-Reclamation Monitoring Cost Estimate		**$9,525**

APPENDIX C

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

TUCKER HILL PERLITE PROJECT
LAKE COUNTY, OREGON
SPILL PREVENTION PLAN

OBJECTIVES

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

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

AVAILABILITY

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

PREVENTIVE MAINTENANCE

Good housekeeping practices will be followed on site during the exploration project:

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

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

SOURCE IDENTIFICATION

Pollutants

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

Construction Debris

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

Spill Contingency Plan (GM-6)[1]

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

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

1. Contain the spread or migration of the spill, using on-hand supply of erosion control structures and/or by creating dirt berms, as feasible and necessary. Also utilize the materials and equipment stored onsite the control the spill.

2. Notify the environmental or project manager immediately.

3. Within 24 hours of an identified spill, the site manager or a designated representative will notify the following local and state agencies:

    - Oregon Department of Environmental Quality - 503-229-5693, 800-452-4011 (in Oregon)

    - Lake County Health Department - 541-576-2176

[1] Specific BMPs are located in Attachment 2.

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

Emergency calls: 911 / 541-947-6027 (Lake County Sheriff)

Fire: 911

Hospital 541-947-2114 (Lake Health District Hospital, Lakeview)

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

BEST MANAGEMENT PRACTICES

- During construction, water will be used for dust control, mixing of grout, and cleanup. Water used for dust control will be sprayed over the ground at a rate which will moisten the soil but not cause runoff.

- It is the responsibility of the contractor to define construction staging areas to minimize footprint impacts, and to prevent impacts to water courses and other sensitive areas.

- The contractor is responsible for maintaining water-tight trash bins or dumpsters on the project site to minimize leakage to ground surface. Contractors will be responsible for maintaining contained areas for concrete wash-out and properly disposing of concrete, if used.

- The Project supervisor shall at all times properly operate and maintain any facilities and systems of treatment and control (and related appurtenances).

- The following BMPs will be utilized as appropriate, and copies of each BMP are included in Attachment 2:

    - Spill Prevention and Control (GM-6)

    - Vehicle and Equipment Maintenance and Fueling (GM-8)

    - Material Delivery, Handling, Storage and Use (GM-10)

    - Liquid Waste Management (GM-13)

    - Hazardous Waste Management (GM-17)

MATERIAL SAFETY DATA SHEETS
HYDROCARBONS

ATTACHMENT 1

MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

CHEVRON and TEXACO REGULAR UNLEADED GASOLINES

Product Use: Fuel
Product Number(s): CPS201000 [See Section 16 for Additional Product Numbers]
Synonyms: Calco Regular Unleaded Gasoline, Chevron Regular Unleaded Gasoline, Texaco Unleaded Gasoline
Company Identification
Chevron Products Company
Marketing, MSDS Coordinator
6001 Bollinger Canyon Road
San Ramon, CA 94583
United States of America

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
Technical Information: (510) 242-5357

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

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

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

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

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

SECTION 3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

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

****

IMMEDIATE HEALTH EFFECTS
Eye: Contact with the eyes causes irritation. Symptoms may include pain, tearing, reddening, swelling and impaired vision.
Skin: Contact with the skin causes irritation. Skin contact may cause drying or defatting of the skin. Symptoms may include pain, itching, discoloration, swelling, and blistering. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death.
Inhalation: The vapor or fumes from this material may cause respiratory irritation. Symptoms of respiratory irritation may include coughing and difficulty breathing. Breathing this material at concentrations above the recommended exposure limits may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: This material is not expected to cause birth defects or other harm to the developing fetus based on animal data.
Cancer: Prolonged or repeated exposure to this material may cause cancer. Gasoline has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

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

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

Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC). Contains benzene, which has been classified as an A1 Group Confirmed Human Carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH).
See Section 11 for additional information. Risk depends on duration and level of exposure.

SECTION 4 FIRST AID MEASURES

Eye: Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.
Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.
Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.
Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

See Section 7 for proper handling and storage.

FLAMMABLE PROPERTIES:
Flashpoint: (Tagliabue Closed Cup ASTM D56) < -45 °C (< -49 °F)
Autoignition: > 280 °C (> 536 °F)
Flammability (Explosive) Limits (% by volume in air): Lower: 1.4 Upper: 7.6 (Typical)

EXTINGUISHING MEDIA: Dry Chemical, CO2, AFFF Foam or alcohol resistant foam if >15% volume polar solvents (oxygenates).
PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: Use water spray to cool fire-exposed containers and to protect personnel. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities as appropriate or required.

SECTION 7 HANDLING AND STORAGE

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

Unusual Handling Hazards: WARNING! Do not use as portable heater or appliance fuel. Toxic fumes may accumulate and cause death.
General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'. Improper filling of portable gasoline containers creates danger of fire. Only dispense gasoline into approved and properly labeled gasoline containers. Always place portable containers on the ground. Be sure pump nozzle is in contact with the container while filling. Do not use a nozzle's lock-open device. Do not fill portable containers that are inside a vehicle or truck/trailer bed.
General Storage Information: DO NOT USE OR STORE near heat, sparks, flames, or hot surfaces . USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

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

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

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Chlorinated Polyethylene (or Chlorosulfonated Polyethylene), Nitrile Rubber, Polyurethane, Viton.
Respiratory Protection: Determine if airborne concentrations are below the recommended occupational exposure limits for jurisdiction of use. If airborne concentrations are above the acceptable limits, wear an approved respirator that provides adequate protection from this material, such as: Air-Purifying Respirator for Organic Vapors.
When used as a fuel, this material can produce carbon monoxide in the exhaust. Determine if airborne concentrations are below the occupational exposure limit for carbon monoxide. If not, wear an approved positive-pressure air-supplying respirator.
Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.
Occupational Exposure Limits:

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

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

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

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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

Color: Colorless to yellow
Physical State: Liquid
Odor: Petroleum odor
pH: Not Applicable
Vapor Pressure: 5 psi - 15 psi (Typical) @ 37.8 °C (100 °F)
Vapor Density (Air = 1): 3 - 4 (Typical)
Boiling Point: 37.8°C (100°F) - 204.4°C (400°F) (Typical)
Solubility: Insoluble in water; miscible with most organic solvents.
Freezing Point: Not Applicable
Melting Point: Not Applicable
Specific Gravity: 0.7 g/ml - 0.8 g/ml @ 15.6°C (60.1°F) (Typical)
Viscosity: <1 SUS @ 37.8°C (100°F)
Evaporation Rate: No Data Available
Odor Threshold: No Data Available
Coefficient of Water/Oil Distribution: No Data Available

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.
Sensitivity to Mechanical Impact: No.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The Draize eye irritation mean score in rabbits for a 24-hour exposure was: 0/110.
Skin Irritation: For a 4-hour exposure, the Primary Irritation Index (PII) in rabbits is: 4.8/8.0.
Skin Sensitization: This material did not cause skin sensitization reactions in a Buehler guinea pig test.
Acute Dermal Toxicity: LD50: >3.75g/kg (rabbit).
Acute Oral Toxicity: LD50: >5 ml/kg (rat)
Acute Inhalation Toxicity: 4 hour(s) LD50: >20000mg/m3 (rat).

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

Subchronic Effects: Exposure of rats for 13 weeks (6 hr/day for 5 days/week) to the light ends of gasoline (up to 20,000 mg/m3) resulted in minimal responses of toxicity. There were no indications of neurotoxicity based morphological, functional and biochemical indices. There was also no evidence of immunotoxicity in the rats. However, when rats were exposed to gasoline vapor containing ethanol up to 20,000 mg/m3 there was evidence of both humoral immune suppression and mild astrogliosis.

Reproduction and Birth Defects: Exposure of rats to the light ends of gasoline at up to 20,000 mg/m3 had generally no impact upon reproductive abilities and did not cause birth defects.

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

ADDITIONAL TOXICOLOGY INFORMATION:
Gasolines are highly volatile and can produce significant concentrations of vapor at ambient temperatures. Gasoline vapor is heavier than air and at high concentrations may accumulate in confined spaces to present both safety and heath hazards. When vapor exposures are low, or short duration and infrequent, such as during refueling and tanker loading/unloading, neither total hydrocarbon nor components such as benzene are likely to result in any adverse health effects. In situations such as accidents or spills where exposure to gasoline vapor is potentially high, attention should be paid to potential toxic effects of specific components. Information about specific components in gasoline can be found in Sections 2, 8 and 15 of this MSDS. More detailed information on the health hazard of specific gasoline components can be obtained calling the ChevronTexaco Emergency Information Center (see Section 1 for phone numbers).
Pathological misuse of solvents and gasoline, involving repeated and prolonged exposure to high concentrations of vapor is a significant exposure on which there are many reports in the medical literature. As with other solvents, persistent abuse involving repeated and prolonged exposures to high concentrations of vapor has been reported to result in central nervous system damage and eventually, death. In a study in which ten human volunteers were exposed for 30 minutes to approximately 200, 500 or 1000 ppm concentrations of gasoline vapor, irritation of the eyes was the only significant effect observed, based on both subjective and objective assessments.
Lifetime inhalation of wholly vaporized unleaded gasoline at 2056 ppm has caused increased liver tumors in female mice and kidney cancer in male rats. In their 1988 review of carcinogenic risk from gasoline, The International Agency for Research on Cancer (IARC) noted that, because published epidemiology studies did not include any exposure data, only occupations where gasoline exposure may have occurred were reviewed. These included gasoline service station attendants and automobile mechanics. IARC also noted that there was no opportunity to separate effects of combustion products from those of gasoline itself. Although IARC allocated

gasoline a final overall classification of Group 2B, i.e. possibly carcinogenic to humans, this was based on limited evidence in experimental animals plus supporting evidence including the presence in gasoline of benzene. The actual evidence for carcinogenicity in humans was considered inadequate.
To explore the health effects of workers potentially exposed to gasoline vapors in the marketing and distribution sectors of the petroleum industry, the American Petroleum Institute sponsored a cohort mortality study (Publication 4555), a nested case-control study (Publication 4551), and an exposure assessment study (Publication 4552). Histories of exposure to gasoline were reconstructed for cohort of more than 18,000 employees from four companies for the time period between 1946 and 1985. The results of the cohort mortality study indicated that there was no increased mortality from either kidney cancer or leukemia among marketing and marine distribution employees who were exposed to gasoline in the petroleum industry, when compared to the general population. More importantly, based on internal comparisons, there was no association between mortality from kidney cancer or leukemia and various indices of gasoline exposure. In particular, neither duration of employment, duration of exposure, age at first exposure, year of first exposure, job category, cumulative exposure, frequency of peak exposure, nor average intensity of exposure had any effect on kidney cancer or leukemia mortality. The results of the nested case-control study confirmed the findings of the original cohort study. That is, exposure to gasoline at the levels experienced by this cohort of distribution workers is not a significant risk factor for leukemia (all cell types), acute myeloid leukemia, kidney cancer or multiple myeloma.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
96 hour(s) LC50: 8.3 mg/l (Cyprinodon variegatus)
96 hour(s) LC50: 1.8 mg/l (Mysidopsis bahia)
48 hour(s) LC50: 3.0 mg/l (Daphnia magna)
96 hour(s) LC50: 2.7 mg/l (Oncorhynchus mykiss)
This material is expected to be toxic to aquatic organisms. Gasoline studies have been conducted in the laboratory under a variety of test conditions with a range of fish and invertebrate species. An even more extensive database is available on the aquatic toxicity of individual aromatic constituents. The majority of published studies do not identify the type of gasoline evaluated, or even provide distinguishing characteristics such as aromatic content or presence of lead alkyls. As a result, comparison of results among studies using open and closed vessels, different ages and species of test animals and different gasoline types, is difficult.

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

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

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

SECTION 13 DISPOSAL CONSIDERATIONS

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

SECTION 14 TRANSPORT INFORMATION

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

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

DOT Shipping Description: GASOLINE,3,UN1203,II

SECTION 15 REGULATORY INFORMATION

REGULATORY LISTS SEARCHED:

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

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

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

CHEMICAL INVENTORIES:

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

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

WHMIS CLASSIFICATION:

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

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

MSDS PREPARATION:

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

Revision Date: 08/30/2005

SECTION 16 OTHER INFORMATION

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

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

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

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

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

COASTAL CORP -- DIESEL FUEL NO. 2

MSDS Safety Information

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

Contractor Summary

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

Item Description Information

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

Ingredients

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

Health Hazards Data

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

Signs And Symptions Of Overexposure: SKIN: REDNESS, DRYING TO BURNS OR BLISTERING OF SKIN. INHALATION: WILL PRODUCE SYMPTOMS OF INTOXICATION SUCH AS HEADACHE, DIZZINESS, NAUSEA, VOMITING, LOSS OF COORDINATION. INGESTION: ABDOMINAL PAIN, MILD EXCITATION, LOSS OF CONSCIOUSNESS, CONVULSION, CYANOSIS, CONGESTION AND CAPILLARY HEMORRHAGING OF THE LUNG AND INGERNAL ORGANS.
Medical Cond Aggravated By Exposure: MAY AGGRAVATE PRE-EXISTING DERMATITIS.
First Aid: EYE: IMMEDIATELY FLUSH WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES, INCLUDING UNDER THE EYELIDS. CONTACT A PHYSICIAN IMMEDIATELY, PREFERABLY AN OPHTHALMOLOGIST. SKIN: COOL THE EXPOSED AREA IMM EDIATELY. REMOVE CONTAMINATED CLOTHING. WASH AFFECTED AREAS WITH SOAP AND WATER. INHALATION: REMOVE TO FREAH AIR. IF BREATHING HAS STOPPED, APPPLY ARTIFICIAL RESPIRATION. GET MEDICAL ATTENTION. INGEST ION: DO NOT INDUCE VOMITING. IF SPONTANEOUS VOMITING OCCURS, HOLD THE VICTIMS HEAD LOWER THAN THEIR HIPS TO PREVENT ASPIRATION.

Handling and Disposal

Spill Release Procedures: REMOVE SOURCES OF HEAT OR IGNITION INCLUDING INTERNAL COMBUSTION ENGINES AND POWER TOOLS. REMOVE SPILL WITH VACUUM TRUCKS OR PUMP AND SOAK UP RESIDUE WITH AN INERT ABSORBENT. DO NOT FLUSH TO SEWERS OR SURFACE WATER. VENTILATE AREA AND AVOID BREATHING VAPORS OR MISTS.
Neutralizing Agent: NONE PROVIDED BY MFR
Waste Disposal Methods: DISPOSE THROUGH A LICENSED WASTE DISPOSAL COMPANY. FOLLOW FEDERAL, STATE AND LOCAL REGULATIONS.
Handling And Storage Precautions: STORE IN TIGHTLY CLOSED CONTAINERS IN A DRY, COOL PLACE, AWAY FROM INCOMPATIBLE SUBSTANCES OR SOURCES OF HEAT OR IGNITION. GROUND AND BOND ALL TRANSFER AND STORAGE EQUIPMENT TO PREVENT STATIC SPARKS A ND EQUIP WITH SELF-CLOSING VALVES, PRESSURE VACUUM BUNGS AND FLAME ARRESTORS.
Other Precautions: EMPTY CONTAINERS CAN CONTAIN RESIDUE AND CAN BE DANGEROUS. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS OR OTHER SOURCES OF IGNITION; THE Y MAY EXPLODE AND CUASE INJURY OR DEATH.

Fire and Explosion Hazard Information

Flash Point Method: PMCC
Flash Point: =51.7C, 125.F
Autoignition Temp: =257.2C, 495.F
Lower Limits: 0.6
Upper Limits: 7.5
Extinguishing Media: DRY CHEMICAL, FORM CARBON DIOXIDE, AND WATER.
Fire Fighting Procedures: USE A WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS. USE A SMOTHERING TECHNIQUE FOR EXTINGUISHING FIRES OF THIS COMBUSTIBLE LIQUID. DO NOT USE A FORCE WATER STREAM DIRECTLY ON OIL FIRES AS THIS WILL TEN D TO SCATTER THE FIRE. FIREFIGHTERS SHOULD WEAR SELF CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
Unusual Fire/Explosion Hazard: FLOWING OIL CAN BE IGNITED BY SELF GENERATED STATIC ELECTRICITY.

Control Measures

Respiratory Protection: USE APPROVED RESPIRATORY PROTECTIVE EQUIPMENT FOR CLEANING LARGE SPILLS OR ENTRY INTO LARGE TANKS, VESSELS OR OTHER CONFINED SPACES.
Ventilation: PROVIDE ADEQUATE GENERAL AND LOCAL VENTILATION TO MAINTAIN AIRBORNE CHEMICAL CONCENTRATIONS BELOW APPLICABLE EXPOSURE LIMITS.
Protective Gloves: IMPERVIOUS GLOVES
Eye Protection: REMOVE CONTACT LENS, WEAR CHEMICAL SAFETY GLASSES OR GOGGLES
Other Protective Equipment: HAVE EMERGENCY EYE WASH AND SAFETY SHOWER

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

Physical/Chemical Properties

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

Reactivity Data

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

Toxicological Information

Ecological Information

MSDS Transport Information

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

Regulatory Information

Sara Title III Information: SECTION 302 EPCRA EXTREMELY HAZARDOUS SUBSTANCES (EHS): NONE. SECTION 304 CERCLA HAZARDOUS SUBSTANCES: BENZENE, CAS# 71-43-2, 0-5.0 %, RQ 10 LB; TOLUENE CAS# 108-88-3, 0-25.0%, RQ 1000 LB; XYLENE, CA S# 1330-20-7, 0-25.0%, RQ 100 LB; ETHYL BENZENE, 100-41-4, 0-5.0%, RQ 1000 LB; N-HEXANE, 110-54-3, <3.5, RQ 5000 LB; HEXANE (OTHER ISOMERS), <9.0%, RQ 5000 LB; CUMENE, CAS# 98-82-8, 0-2.0%, 5000 LB; M ETHYL T-BUTYL ETHER, CAS# 1634-04-4, 0-15.0%, RQ 1000 LB. SECTION 311/312 HAZARD CATEGORIZATION: ACUTE, CHRONIC, & FIRE. SECTION 313 EPCRA TOXIC SUBSTANCES: SEE OTHER INFORMATION SECTION.
State Regulatory Information: CALIFORNIA PROPOSITION 65 WARNING- CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS, OR OTHER REPRODUCTIVE HARM MAY BE FOUND IN CRUDE OIL AND PETROLEUM PRODUCTS. ALTHOUGH IT I S POSSIBLE TO SUFFICIENTLY REFINE A CRUDE OIL OR ITS END PRODUCTS TO REMOVE THE POTENTIAL FOR CANCER, WE ARE ADVISING THAT ONE OR MORE OF THE LISTED CHEMICALS MAY BE PRESENT IN SOME DETECTABLE QUANTIT IES. READ AND FOLLOW DIRECTIONS AND USE CARE WHEN HANDLING CRUDE OIL AND PETROLEUM PRODUCTS.

Other Information
==========
Other Information: SARA CON'T- SECTION 313 EPCRA TOXIC SUBSTANCES: BENZENE, CAS# 71-43-2, 0-5.0 %; TOLUENE CAS# 108-88-3, 0-25.0%; XYLENE, CAS# 1330-20-7, 0-25.0%; ETHYL BENZENE, 100-41-4, 0-5.0%; N-HEXANE, 110-54-3, < 3.5; HEXANE (OTHER ISOMERS), <9.0%; CUMENE, CAS# 98-82-8, 0-2.0%; T-BUTYL ALCOHOL, CAS# 75-65-0, 0-10.0%; METHYL T-BUTYL ETHER, CAS# 1634-04-4, 0-15.0%. SECTION 302 EPCRA EXTREMELY HAZARDOUS SUBSTANC ES (EHS): NONE. SECTION 304 CERCLA HAZARDOUS SUBSTANCES: NONE. SECTION 311/312 HAZARD CATEGORIZATION: ACUTE, CHRONIC, & FIRE. SECTION 313 EPCRA TOXIC SUBSTANCES: NONE.
==========
Transportation Information
==========
Responsible Party Cage: 46684
Trans ID NO: 43110
Product ID: DIESEL FUEL NO. 2
MSDS Prepared Date: 03/22/2000
Review Date: 05/08/2001
MFN: 1
Tech Entry NOS Shipping Nm: DIESEL FUEL NO. 2
Net Unit Weight: UNKNOWN
Multiple KIT Number: 0
Review IND: Y
Unit Of Issue: GL
Container QTY: X
Type Of Container: UNKNOWN
==========
Detail DOT Information
==========
DOT PSN Code: EXF
Symbols: D
DOT Proper Shipping Name: DIESEL FUEL
Hazard Class: 3
UN ID Num: NA1993
DOT Packaging Group: III
Label: NONE
Special Provision: B1
Non Bulk Pack: 203
Bulk Pack: 242
Max Qty Pass: 60 L
Max Qty Cargo: 220 L
Vessel Stow Req: A
==========
Detail IMO Information
==========
IMO PSN Code: LMH
IMO Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S. o
IMDG Page Number: 3375
UN Number: 1268
UN Hazard Class: 3.3
IMO Packaging Group: III
Subsidiary Risk Label: -
EMS Number: 3-07
MED First Aid Guide NUM: 311
==========
Detail IATA Information
==========
IATA PSN Code: TJB
IATA UN ID Num: 1268

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

==========

Detail AFI Information

==========

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

==========

HAZCOM Label

==========

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

==========

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Chevron Ultra-Duty Grease EP

Product Number(s): CPS238011, CPS238012, CPS238013
Synonyms: Chevron Ultra-Duty Grease EP NLGI 2, Chevron Ultra-Duty Grease EP NLGI 1, Chevron Ultra-Duty Grease EP NLGI 0

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

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevron.com
Product Information: (800) LUBE TEK
MSDS Requests: (800) 414-6737

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

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

SECTION 3 HAZARDS IDENTIFICATION

IMMEDIATE HEALTH EFFECTS
Eye: Not expected to cause prolonged or significant eye irritation.
Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to Internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.
Ingestion: Not expected to be harmful if swallowed.
Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

SECTION 4 FIRST AID MEASURES

Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, apply a waterless hand cleaner, mineral oil, or petroleum jelly. Then wash with soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.
Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.
Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

SECTION 5 FIRE FIGHTING MEASURES

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

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

FLAMMABLE PROPERTIES:
Flashpoint: 274 °C (525 °F) (Min)
Autoignition: NDA
Flammability (Explosive) Limits (% by volume in air): Lower: NA Upper: NA

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.
PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion. Combustion may form oxides of: Phosphorus, Sulfur, Zinc, Lithium .

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Clean up spills immediately, observing precautions in Exposure Controls/Personal Protection section.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: Keep out of the reach of children.
General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this

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

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

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:

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

ENGINEERING CONTROLS:

Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT

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

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

Respiratory Protection: No respiratory protection is normally required.

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

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

Occupational Exposure Limits:

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

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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

Color: Red
Physical State: Semi-solid
Odor: Petroleum odor
pH: NA
Vapor Pressure: <0.01 mmHg @ 100°C (212°F)
Vapor Density (Air = 1): >1

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

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

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products: Hydrogen Sulfide (Temperatures >149 °F (65 °C))
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The Draize eye irritation mean score in rabbits for a 24-hour exposure was: 6.7/110.
Skin Irritation: For a 24-hour exposure, the Primary Irritation Score (PIS) in rabbits is: 0.6/8.0.
Skin Sensitization: No product toxicology data available.
Acute Dermal Toxicity: 24 hour(s) LD50: >2g/kg (rat).
Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

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

SECTION 12 ECOLOGICAL INFORMATION

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

ENVIRONMENTAL FATE
This material is not expected to be readily biodegradable.

SECTION 13 DISPOSAL CONSIDERATIONS

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

SECTION 14 TRANSPORT INFORMATION

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

DOT Shipping Name: NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR
DOT Hazard Class: NOT APPLICABLE
DOT Identification Number: NOT APPLICABLE
DOT Packing Group: NOT APPLICABLE
Additional Information: NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

IMO/IMDG Shipping Name: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE IMDG CODE
IMO/IMDG Hazard Class: NOT APPLICABLE
IMO/IMDG Identification Number: NOT APPLICABLE
IMO/IMDG Packing Group: NOT APPLICABLE

SECTION 15 REGULATORY INFORMATION

SARA 311/312 CATEGORIES: 1. Immediate (Acute) Health Effects: NO
2. Delayed (Chronic) Health Effects: NO
3. Fire Hazard: NO
4. Sudden Release of Pressure Hazard: NO
5. Reactivity Hazard: NO

REGULATORY LISTS SEARCHED:

4_I1=IARC Group 1	15=SARA Section 313
4_I2A=IARC Group 2A	16=CA Proposition 65
4_I2B=IARC Group 2B	17=MA RTK
05=NTP Carcinogen	18=NJ RTK
06=OSHA Carcinogen	19=DOT Marine Pollutant
09=TSCA 12(b)	20=PA RTK

No components of this material were found on the regulatory lists above.
Zinc dialkyldithiophosphate 15

CHEMICAL INVENTORIES:
AUSTRALIA: All the components of this material are listed on the Australian Inventory of Chemical Substances (AICS).
CANADA: All the components of this material are on the Canadian DSL or have been notified under the New Substance Notification Regulations, but have not yet been published in the Canada Gazette.
EUROPEAN UNION: All the components of this material are in compliance with the EU Seventh Amendment Directive 92/32/EEC.
JAPAN: All the components of this product are on the Existing & New Chemical Substances (ENCS) inventory in Japan, or have an exemption from listing.
KOREA: This material contains components that require notification before sale or importation into Korea.
PHILIPPINES: All the components of this product are listed on the Philippine Inventory of Chemicals and Chemical Substances (PICCS).
UNITED STATES: All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

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

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

SECTION 16 OTHER INFORMATION

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

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

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

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

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

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

MATERIAL SAFETY DATA SHEET

Conoco Gear Oil (All Grades)

1. PRODUCT AND COMPANY IDENTIFICATION

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

Emergency Overview

24 Hour Emergency Telephone Numbers:
Spill, Leak, Fire or Accident Call CHEMTREC:
North America: (800) 424-9300
Others: (703) 527-3887 (collect)

California Poison Control System: (800) 356-3219

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

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

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

NFPA 704 Hazard Class:

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

2. COMPOSITION / INFORMATION ON INGREDIENTS

NON-HAZARDOUS COMPONENTS					
Component / CAS No:	**Percent (%)**	**ACGIH:**	**OSHA:**	**NIOSH:**	**Other:**
Lubricant Base Oil (Petroleum) VARIOUS	66 - 99	5mg/m³ TWA 10 mg/m³ STEL	5 mg/m³ TWA	2500 mg/m³ IDLH	as Oil Mist, if Generated 5 mg/m³ NOHSC TWA
Additives PROPRIETARY	2 - 3	NE	NE	NE	NE

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

1%=10,000 PPM.
NE=Not Established

3. HAZARDS IDENTIFICATION

Potential Health Effects

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

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

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

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

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

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

Target Organs: No data available for this material.

Developmental: No data available for this material.

Other Comments: None Known

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

4. FIRST AID MEASURES

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

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

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

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

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

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

5. FIRE-FIGHTING MEASURES

Flammable Properties:

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

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

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

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

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

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

6. ACCIDENTAL RELEASE MEASURES

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

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

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

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

7. HANDLING AND STORAGE

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

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

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

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

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

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

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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

Personal Protective Equipment (PPE):

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

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

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

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

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

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

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

9. PHYSICAL AND CHEMICAL PROPERTIES

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

Appearance:	Clear and bright
Physical Form:	Liquid
Odor:	Characteristic petroleum
Odor Threshold:	No data

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

10. STABILITY AND REACTIVITY

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

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

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

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

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Chronic Data:

Lubricant Base Oil (Petroleum) - CAS: VARIOUS

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

Acute Data:

Lubricant Base Oil (Petroleum) - CAS: VARIOUS
Dermal LD50 = >2 g/kg
LC50 = No information available
Oral LD50 = >5 g/kg

Additives - CAS: PROPRIETARY
Dermal LD50 = No information available
LC50 = No information available
Oral LD50 = No information available

12. ECOLOGICAL INFORMATION

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

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

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

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

13. DISPOSAL CONSIDERATIONS

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

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

14. TRANSPORTATION INFORMATION

DOT

Shipping Description: Not Regulated
Note: Material is unregulated unless in container of 3500 gallons or more, then provisions of 49 CFR Part 130 apply for land shipment.

IMDG

Shipping Description: Not regulated

ICAO/IATA

Shipping Description: Not regulated

15. REGULATORY INFORMATION

U.S. Regulations:

EPA SARA 311/312 (Title III Hazard Categories)

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

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

EPA (CERCLA) Reportable Quantity (in pounds):
--None Known--

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:
-- None Known --

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

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

TSCA:
All components are listed on the TSCA inventory.

16. OTHER INFORMATION

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

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

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Chevron Delo® 400

Product Number(s): CPS235101, CPS235109, CPS235117, CPS235118, CPS235119, CPS235120, CPS235200
Synonyms: Chevron Delo® 400 Multigrade SAE 15W-40, Chevron Delo® 400 SAE 10W, Chevron Delo® 400 SAE 10W-30, Chevron Delo® 400 SAE 20, Chevron Delo® 400 SAE 30, Chevron Delo® 400 SAE 40, Chevron Delo® 400 SAE 50
Company Identification
ChevronTexaco Global Lubricants
6001 Bollinger Canyon Rd.
San Ramon, CA 94583
United States of America
www.chevron-lubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevrontexaco.com
Product Information: (800) LUBE TEK
MSDS Requests: (800) 414-6737

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

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

SECTION 3 HAZARDS IDENTIFICATION

IMMEDIATE HEALTH EFFECTS
Eye: Not expected to cause prolonged or significant eye irritation.
Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Not expected to be harmful if swallowed.
Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

SECTION 4 FIRST AID MEASURES

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

remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.
Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

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

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

FLAMMABLE PROPERTIES:
Flashpoint: (Cleveland Open Cup) 200 °C (392 °F) (Min)
Autoignition: No Data Available
Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.
PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: Keep out of the reach of children.
General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

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

ENGINEERING CONTROLS:
Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: 4H (PE/EVAL), Nitrile Rubber, Silver Shield, Viton.
Respiratory Protection: No respiratory protection is normally required.
If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge.
Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.
Occupational Exposure Limits:

Component	Agency	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--
Highly refined mineral oil (C15 - C50)	OSHA Z-1	5 mg/m3	--	--	--

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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

Color: Brown
Physical State: Liquid
Odor: Petroleum odor
pH: Not Applicable
Vapor Pressure: <0.01 mmHg @ 37.8 °C (100 °F)
Vapor Density (Air = 1): >1
Boiling Point: >315°C (599°F)
Solubility: Soluble in hydrocarbons; insoluble in water
Freezing Point: Not Applicable
Melting Point: Not Applicable
Specific Gravity: 0.87 - 0.9 @ 15.6°C (60.1°F) / 15.6°C (60.1°F)
Volatile Organic Compounds (VOC) : 1.1 %weight
Viscosity: 6.6 cSt @ 100°C (212°F) (Min)

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The eye irritation hazard is based on evaluation of data for similar materials or product components.
Skin Irritation: The skin irritation hazard is based on evaluation of data for similar materials or product components.
Skin Sensitization: No product toxicology data available.
Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

ADDITIONAL TOXICOLOGY INFORMATION:
This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B). These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

During use in engines, contamination of oil with low levels of cancer-causing combustion products occurs. Used motor oils have been shown to cause skin cancer in mice following repeated application and continuous exposure. Brief or intermittent skin contact with used motor oil is not expected to have serious effects in humans if the oil is thoroughly removed by washing with soap and water.

SECTION 12 ECOLOGICAL INFORMATION

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

ENVIRONMENTAL FATE
This material is not expected to be readily biodegradable.

SECTION 13 DISPOSAL CONSIDERATIONS

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

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.
DOT Shipping Description: PETROLEUM LUBRICATING OIL, NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR
Additional Information:NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

IMO/IMDG Shipping Description: PETROLEUM LUBRICATING OIL; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: PETROLEUM LUBRICATING OIL; NOT REGULATED AS DANGEROUS

GOODS FOR TRANSPORT UNDER ICAO

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES: 1. Immediate (Acute) Health Effects: NO
2. Delayed (Chronic) Health Effects: NO
3. Fire Hazard: NO
4. Sudden Release of Pressure Hazard: NO
5. Reactivity Hazard: NO

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	03=EPCRA 313
01-2A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

The following components of this material are found on the regulatory lists indicated.
Zinc alkyl dithiophosphate 03, 06

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: DSL (Canada), ENCS (Japan), IECSC (China), PICCS (Philippines), TSCA (United States).

One or more components is listed on ELINCS (European Union). Secondary notification by the importer may be required.

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

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

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

SECTION 16 OTHER INFORMATION

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

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

LABEL RECOMMENDATION:
Label Category : ENGINE OIL 1

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet:
5,8,9,10,16
Revision Date: 09/28/2005

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

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

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

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Chevron Drive Train Fluid HD

Product Number(s): CPS226601, CPS226607, CPS226608, CPS226610, CPS226627
Synonyms: Chevron Drive Train Fluid HD SAE 10W, Chevron Drive Train Fluid HD SAE 30, Chevron Drive Train Fluid HD SAE 50, Chevron Drive Train Fluid HD SAE 60, Chevron Drive Train Fluid HD - Dyed SAE 10W

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

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
ChevronTexaco Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevron.com
Product Information: (800) LUBE TEK
MSDS Requests: (800) 414-6737

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	80 - 100 %weight
Zinc alkyl dithiophosphate	68649-42-3	1 - 5 %weight

SECTION 3 HAZARDS IDENTIFICATION

IMMEDIATE HEALTH EFFECTS
Eye: Not expected to cause prolonged or significant eye irritation.
Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.
Ingestion: Not expected to be harmful if swallowed.
Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

SECTION 4 FIRST AID MEASURES

Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.
Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.
Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

SECTION 5 FIRE FIGHTING MEASURES

Leaks/ruptures in high pressure system using materials of this type can create a fire hazard when in the vicinity of ignition sources (eg. open flame, pilot lights, sparks, or electric arcs).

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

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

FLAMMABLE PROPERTIES:
Flashpoint: (Cleveland Open Cup) 190 °C (374 °F) (Min)
Autoignition: NDA
Flammability (Explosive) Limits (% by volume in air): Lower: NA Upper: NA

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.
PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion. Combustion may form oxides of: Nitrogen, Phosphorus, Sulfur, Zinc .

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: DO NOT USE IN HIGH PRESSURE SYSTEMS in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed. Keep out of the reach of children.
General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this

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

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

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:

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

ENGINEERING CONTROLS:

Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT

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

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

Respiratory Protection: No respiratory protection is normally required.

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

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

Occupational Exposure Limits:

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

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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

Color: Varies depending on specification
Physical State: Liquid
Odor: Petroleum odor
pH: NA
Vapor Pressure: <0.01 mmHg @ 37.8°C (100°F)
Vapor Density (Air = 1): >1

Boiling Point: >315.6°C (600°F)
Solubility: Soluble in hydrocarbons; insoluble in water
Freezing Point: NA
Melting Point: NA
Specific Gravity: 0.88 - 0.91 @ 15.6°C (60.1°F) / 15.6°C (60.1°F)
Density: 0.88 kg/l - 0.91 kg/l @ 15°C (59°F)
Viscosity: 5.5 cSt - 24 cSt @ 100°C (212°F) (Min)
Evaporation Rate: NDA

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products: Hydrogen Sulfide (Temperatures >149 °F (65 °C))
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The eye irritation hazard is based on evaluation of data for similar materials or product components.
Skin Irritation: The skin irritation hazard is based on evaluation of data for similar materials or product components.
Skin Sensitization: No product toxicology data available.
Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

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

SECTION 12 ECOLOGICAL INFORMATION

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

ENVIRONMENTAL FATE
This material is not expected to be readily biodegradable.

SECTION 13 DISPOSAL CONSIDERATIONS

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

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.
DOT Shipping Name: NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR
DOT Hazard Class: NOT APPLICABLE
DOT Identification Number: NOT APPLICABLE
DOT Packing Group: NOT APPLICABLE
Additional Information: NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

IMO/IMDG Shipping Name: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE IMDG CODE
IMO/IMDG Hazard Class: NOT APPLICABLE
IMO/IMDG Identification Number: NOT APPLICABLE
IMO/IMDG Packing Group: NOT APPLICABLE

SECTION 15 REGULATORY INFORMATION

SARA 311/312 CATEGORIES: 1. Immediate (Acute) Health Effects: NO
2. Delayed (Chronic) Health Effects: NO
3. Fire Hazard: NO
4. Sudden Release of Pressure Hazard: NO
5. Reactivity Hazard: NO

REGULATORY LISTS SEARCHED:

4_I1=IARC Group 1	15=SARA Section 313
4_I2A=IARC Group 2A	16=CA Proposition 65
4_I2B=IARC Group 2B	17=MA RTK
05=NTP Carcinogen	18=NJ RTK
06=OSHA Carcinogen	19=DOT Marine Pollutant
09=TSCA 12(b)	20=PA RTK

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

Zinc alkyl dithiophosphate	15, 18

CHEMICAL INVENTORIES:
AUSTRALIA: All the components of this material are listed on the Australian Inventory of Chemical Substances (AICS).
CANADA: All the components of this material are on the Canadian DSL or have been notified under the New Substance Notification Regulations, but have not yet been published in the Canada Gazette.
EUROPEAN UNION: All the components of this material are in compliance with the EU Seventh Amendment Directive 92/32/EEC.
JAPAN: All the components of this product are on the Existing & New Chemical Substances (ENCS) inventory in Japan, or have an exemption from listing.
KOREA: All the components of this product are on the Existing Chemicals List (ECL) in Korea.
PHILIPPINES: All the components of this product are listed on the Philippine Inventory of Chemicals and Chemical Substances (PICCS).
UNITED STATES: All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

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

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

SECTION 16 OTHER INFORMATION

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

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

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

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

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

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

MATERIAL SAFETY DATA SHEETS
DRILLING ADDITIVES

WYO-BEN INC -- ENVIROPLUG COARSE -- 6810-00N065827

MSDS Safety Information

FSC: 6810
MSDS Date: 05/01/1994
MSDS Num: CBDBW
LIIN: 00N065827
Tech Review: 02/16/1996
Product ID: ENVIROPLUG COARSE
Responsible Party
Cage: 0JWA0
Name: WYO-BEN INC
Box: 1979
City: BILLINGS MO 59103 US
Info Phone Number: 406-652-6351
Emergency Phone Number: 406-652-6351
Review Ind: N

Contractor Summary

Cage: 0JWA0
Name: WYO-BEN INC
Box: 1979
City: BILLINGS MO 59103 US
Phone: 406-652-6351

Ingredients

Cas: 1302-78-9
RTECS #: CT9450000
Name: BENTONITE; (BENTONITE CLAY)
OSHA PEL: 5 MG/M3 (DUST)
ACGIH TLV: 5 MG/M3 (DUST)
Ozone Depleting Chemical: N

Cas: 1318-93-0
Name: ACTIVATED MONTMORILLONITE CLAY; (SODIUM MONTMORILLONITE)
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N

Cas: 14808-60-7
RTECS #: VV7330000
Name: SILICA, CRYSTALLINE - QUARTZ; (CRYSTALLINE SILICA (SIO*2) AS QUARTZ)
OSHA PEL: SEE TABLE Z-3
ACGIH TLV: 0.1 MG/M3 RDUST
Ozone Depleting Chemical: N

Health Hazards Data

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry Inds - Inhalation: YES
Skin: YES
Ingestion: NO
Carcinogenicity Inds - NTP: YES
IARC: YES
OSHA: NO
Effects of Exposure: ACUTE:SKIN:POSSIBLE DRYING RESULTING IN DERMATITIS.
EYES:MECHANICAL IRRITANT. INHAL:SHORT TERM EXPOSURE TO DUST LEVELS

EXCEEDING PEL MAY CAUSE IRRITATION OF RESPIRATORY TRACT RESULTING IN DRY COUGH. I NGEST:NO ADVERSE EFFECTS. CHRONIC:INHAL:LONG TERM EXPOSURE TO FREE SILICA CONTAINING AIRBORNE BENTONITE(EFTS OF OVEREXP)

Explanation Of Carcinogenicity: SILICA, CRYSTALLINE-QUARTZ:IARC MONOGRAPHS, SUPP, VOL 7, PG 341, 1987:GRP 2A. NTP 7TH ANNUAL RPT ON CARCINS, (SUPP DATA)

Signs And Symptions Of Overexposure: HLTH HAZ:DUST WHERE LEVELS ARE HIGHER THAN TLV'S MAY LEAD TO DEVELOPMENT OF SILICOSIS OR OTHER RESPIRATORY PROBLEMS. PERSISTENT DRY COUGH & LABORED BREATHING UPON EXERTION ARE SYMPTOMATIC.

Medical Cond Aggravated By Exposure: INHALATION MAY AGGRAVATE EXISTING RESPIRATORY ILLNESS.

First Aid: INGEST:CALL MD IMMEDIATELY (FP N). SKIN:WASH W/SOAP & WATER UNTIL CLEAN. EYES:FLUSH W/WATER UNTIL IRRITATION CEASES (FOR AT LEAST 15 MINUTES). INHAL:MOVE TO AREA FREE FROM DUST. IF SYMPTOMS OF IRRITAT ION PERSIST CONTACT MD.

==========

Handling and Disposal

==========

Spill Release Procedures: AVOID BREATHING DUST; WEAR NIOSH/MSHA APPROVED RESPIRATOR FOR SILICA BEARING DUST. VACUUM UP TO AVOID GENERATING AIRBORNE DUST. AVOID USING WATER. PRODUCT SLIPPERY WHEN WETTED.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: PRODUCT SHOULD BE DISPOSED OF I/A/W APPLICABLE LOCAL, STATE & FEDERAL REGULATIONS.

Handling And Storage Precautions: CLEAN UP SPILLS PROMPTLY TO AVOID MAKING DUST. STORAGE AREA FLOORS MAY BECOME SLIPPERY IF WETTED. AVOID PROLONGED INHALATION OF AIRBORNE DUST.

Other Precautions: NOTE:CONC LEVEL OF TOTAL FREE SILICA IN AIRBORNE DUST IS VARIABLE DEPENDING UPON ORIGIN OF BENTONITE ORE, FINENESS OF PRODUCT, MOISTURE CONTENT OF PRODUCT, LOCAL HUMIDITY & WIND CONDITIONS AT POINT OF USE.

==========

Fire and Explosion Hazard Information

==========

Extinguishing Media: MEDIA SUITABLE FOR SURROUNDING FIRE (FP N). NONE FOR PRODUCT. ANY MEDIA CAN BE USED FOR PACKAGING.

Fire Fighting Procedures: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N). PRODUCT BECOMES SLIPPERY WHEN WET.

Unusual Fire/Explosion Hazard: NONE. PRODUCT WILL NOT SUPPORT COMBUSTION.

==========

Control Measures

==========

Respiratory Protection: USE NIOSH/MSHA APPROVED RESPIRATORS APPROVED FOR SILICA BEARING DUST WHEN FREE SILICA CONTAINING AIRBORNE BENTONITE DUST LEVELS EXCEED PEL/TLV'S.

Ventilation: MECHANICAL, GENERAL ROOM VENTILATION. USE LOCAL VENTILATION TO MAINTAIN PEL'S/TLV'S.

Protective Gloves: IMPERVIOUS GLOVES (FP N).

Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).

Other Protective Equipment: EYE WASH FOUNTAIN & DELUGE SHOWER WHICH MEET ANSI DESIGN CRITERIA (FP N).

Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Supplemental Safety and Health: SPEC GRAV:2.45-2.55 (H*2O=1). PH:8-10 (5% AQUEOUS SUSPENSION). SOL IN H*2O:FORMS COLLOIDAL SUSPENSION. EXPLAN OF CARCIN:1994:ANTICIPATED TO BE CARCINOGEN.

==========

Physical/Chemical Properties

==========

M.P/F.P Text: 2642F,1450C

Spec Gravity: SUPP DATA
PH: SUPDAT
Solubility in Water: INSOLUBLE, (SUPDAT)
Appearance and Odor: BLUEGRAY TO GREEN AS MOIST SOLID, LIGHT TAN TO GRAY AS DRY POWDER; NO ODOR.

==========

Reactivity Data

==========

Stability Indicator: YES
Stability Condition To Avoid: NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: NONE.
Hazardous Decomposition Products: NONE.
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: NOT RELEVANT

==========

Toxicological Information

==========

==========

Ecological Information

==========

==========

MSDS Transport Information

==========

==========

Regulatory Information

==========

==========

Other Information

==========

==========

HAZCOM Label

==========

Product ID: ENVIROPLUG COARSE
Cage: 0JWA0
Company Name: WYO-BEN INC
PO Box: 1979
City: BILLINGS MO
Zipcode: 59103 US
Health Emergency Phone: 406-652-6351
Date Of Label Review: 02/16/1996
Label Date: 02/16/1996
Chronic Hazard IND: Y
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: WARNING
Respiratory Protection IND: YES
Health Hazard: Moderate
Contact Hazard: Moderate
Fire Hazard: None
Reactivity Hazard: None
Hazard And Precautions: ACUTE:SKIN:POSSIBLE DRYING RESULTING IN DERMATITIS. EYES:MECHANICAL IRRITANT. INHAL:SHORT TERM EXPOSURE TO DUST LEVELS EXCEEDING PEL MAY CAUSE IRRITATION OF RESPIRATORY TRACT RESULTING IN DRY COUGH. I NGESTION:NO ADVERSE EFFECTS. CHRONIC:CANCER HAZARD. CONTAINS SILICA, CRYSTALLINE-QUARTZ WHICH IS LISTED AS AN ANIMAL LUNG CARCINOGEN (FP N). INHALATION:LONG TERM EXPOSURE TO FREE SILICA CONTAINING AIR BORNE BENTONITE DUST MAY LEAD TO SILICOSIS OR OTHER RESPIRATORY PROBLEMS; DRY COUGH & LABORED BREATHING.

==========

Disclaimer (provided with this information by the compiling agencies):

This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever expressly or implied warrants, states, or intends said information to have any application, use or viability by or to any person or persons outside the Department of Defense nor any person or persons contracting with any instrumentality of the United States of America and disclaims all liability for such use. Any person utilizing this instruction who is not a military or civilian employee of the United States of America should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation regardless of similarity to a corresponding Department of Defense or other government situation.

WYO-BEN, INC.

MATERIAL SAFETY DATA SHEET

NFPA FIRE HAZARD IDENTIFICATION SYSTEM

I. PRODUCT IDENTIFICATION

Trade Name(s): ABANTONITE®

Generic Name(s): Wyoming (Western) Bentonite; Bentonite Clay (CAS No. 1302-78-9) and other proprietary ingredients

Chemical Name(s): Sodium Montmorillonite (CAS No. 1318-93-0) and other proprietary ingredients

Manufacturer: WYO-BEN, INC. Address: P.O. Box 1979 Billings, Montana 59103	Telephone Numbers: Information: (406) 652-6351 EMERGENCY: (406) 652-6351

II. HAZARDOUS INGREDIENTS

Ingredient	CAS NO.	%	Hazard
Crystalline Silica (SiO_2) as Quartz	14808-60-7	See Note	Low concentrations of crystalline silica (SiO_2) in the form of quartz may be present in airborne bentonite dust. See Section VI for discussion of health hazard.

Note 1: The specific chemical identity of this product is being withheld as a trade secret. In the event of a medical emergency it will be provided to a treating medical professional under the provisions of 29 CFR 1910.1200(i).

Note 2: Although the typical quartz content of western bentonite is in the range of 2 to 6% most of the quartz particles are larger than the 10 μ respirable threshold size. The actual respirable quartz concentration in airborne bentonite dust will depend upon bentonite source, fineness of product, moisture content of product, local humidity and wind condition at point of use and other use specific factors.

III. PHYSICAL DATA

Boiling Point (°F): NA	Specific Gravity (H_2O=1): 2.45-2.55
Vapor Pressure (mm. Hg): NA	Melting Point: Approx. 1450°C
Vapor Density (Air = 1): NA	Evaporation Rate (Butyl Acetate = 1): NA
Solubility in Water: Insoluble, forms colloidal suspension.	pH: 8-10 (3% aqueous suspension)
Density (at 20° C): 55 lbs/cu.ft. as product.	

Appearance and Odor: Blue-gray to green as moist solid, light tan to gray as dry powder. No odor.

IV. FIRE AND EXPLOSION DATA

Flash Point: NA	Flammable Limits: LEL: NA UEL: NA

Special Fire Fighting Procedures: NA

Unusual Fire and Explosion Hazards: None. Product will not support combustion.

Extinguishing Media: None for product. Any media can be used for the packaging. Product becomes slippery when wet.

V. REACTIVITY

Stability: Stable

Hazardous Polymerization: None

Incompatibility: None

Hazardous Decomposition Products: None

NA = Not Applicable ND = Not Determined

Date Prepared: March 15, 2004 Doc #: 4210-00

VI. HEALTH HAZARD INFORMATION

Routes of Exposure and Effects:

Skin: Possible drying resulting in dermatitis.

Eyes: Mechanical irritant.

Inhalation: *Acute* (short term) exposure to dust levels exceeding the PEL may cause irritation of respiratory tract resulting in a dry cough. *Chronic* (long term) exposure to airborne bentonite dust containing respirable size (≤ 10 μ) quartz particles, where respirable quartz particle levels are higher than TLV's, may lead to development of silicosis or other respiratory problems. Persistent dry cough and labored breathing upon exertion may be symptomatic.

Ingestion: No adverse effects.

Permissible Exposure Limits: (for air contaminants)	OSHA PEL (8hr. TWA)	ACGIH TLV
Bentonite as "Particulates not otherwise regulated" (formerly nuisance dust)		
Total dust	15mg/m³	ND
Respirable dust	5mg/m³	ND
Crystalline Quartz (respirable)	0.1mg/m³	0.1mg/m³

Carcinogenicity: Bentonite is not listed by ACGIH, IARC, NTP or OSHA. IARC, 1997, concludes that there is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica from occupational sources (IARC Class 1), that carcinogenicity was not detected in all industrial circumstances studied and that carcinogenicity may depend on characteristics of the crystalline silica or on external factors affecting its biological activity. NTP classifies respirable crystalline silica as "known to be a human carcinogen" (NTP 9th Report on Carcinogens – 2000). ACGIH classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

Acute Oral LD_{50}: ND	Acute Dermal LD_{50}: ND	Aquatic Toxicology LC_{50}: ND

Emergency and First Aid Procedures:

Skin: Wash with soap and water until clean.

Eyes: Flush with water until irritation ceases.

Inhalation: Move to area free from dust. If symptoms of irritation persist contact physician. Inhalation may aggravate existing respiratory illness.

VII. HANDLING AND USE PRECAUTIONS

Steps to be Taken if Material is Released or Spilled: Avoid breathing dust; wear respirator approved for silica bearing dust. Vacuum up to avoid generating airborne dust. Avoid using water. Product slippery when wetted.

Waste Disposal Methods: Product should be disposed of in accordance with applicable local, state and federal regulations.

Handling and Storage Precautions: Use NIOSH/MSHA respirators approved for silica bearing dust when free silica containing airborne bentonite dust levels exceed PEL/TLV's. Clean up spills promptly to avoid making dust. Storage area floors may become slippery if wetted.

VIII. INDUSTRIAL HYGIENE CONTROL MEASURES

Ventilation Requirements: Mechanical, general room ventilation. Use local ventilation to maintain PEL's/TLV's.

Respirator: Use respirators approved by NIOSH/MSHA for silica bearing dust.

Eye Protection: Generally not necessary. Personal preference.

Gloves: Generally not necessary. Personal preference.

Other Protective Clothing or Equipment: None

IX. SPECIAL PRECAUTIONS

Avoid prolonged inhalation of airborne dust.

DEPARTMENT OF TRANSPORTATION HAZARDOUS MATERIAL INFORMATION

Shipping Name: NA (Not Regulated)	Hazard Class: NA
Hazardous Substance: NA	Caution Labeling: NA

Date Prepared: March 15, 2004 Doc #: 4210-00

All information presented herein is believed to be accurate: however, it is the user's responsibility to determine in advance of need that the information is current and suitable for their circumstances. No warranty or guarantee, expressed or implied is made by WYO-BEN, INC. as to this information, or as to the safety, toxicity or effect of the use of this product.

Newpark Drilling Fluids, LLC
1311 Broadfield, Suite 600, Houston TX 77084

Material Safety Data Sheet
Emergency: (888) 872-0050

ALCOMER 120L

I. GENERAL INFORMATION

Chemical Name:	Partially Hydrolized Polyacrylamide	CAS#: 25083-02-03
Chemical Family:	Sodium Acrylate & Acrylamide	
Chemical Formula:	Proprietary	
Synonyms:	ASP 700, ID-Bond, New Drill	

NFPA Properties: Health: 0 Flammability: 1 Reactivity: 0 Contact:

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

	TLV's (ACGIH)					
Hazardous Components	TWAPPM	TWA MG/M^3	STEL PPM	STEL MG/M^3	CAS#	OTHER LIMITS	%
1.							

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point °F: 460
Specific Gravity: 0.95-1.09
Vapor Pressure: N/A
Percent Volatility: 1.3 @ 75°F
Vapor Density: N/A
Evaporation Rate: <1
Melting Point °F: N/A
Solubility in water: Disperses

Color: Off-white
Odor: Sweet Hydrocarbon
Appearance: Liquid
pH:
Viscosity: 1673 CST @ 60°F
Activity: 33-35 Wt%:
LC50: NDA
LD50: NDA

IV. FIRE & EXPLOSION HAZARD DATA

Extinguishing Agents: Drychemical or waterspray or waterfog or CO2 or foam or sand & earth
Flash Point : 200
Flammable Limits: N/A LEL: N/A UEL: N/A
Special Firefighting Procedures: Firefighters must be equipped to prevent breathing of vapors or products of combustion. Wear an approved self-contained breathing apparatus and protective clothing.
Unusual Fire & Explosion Hazards:

V. HEALTH HAZARD DATA

Routes of Entry: Inhalation: yes Skin: yes Ingestion: yes

Effects of Overexposure: May cause irritation to skin and eyes

Toxicological Properties: NDA

Chronic & Acute Effects of Overexposure:

Carcinogenicity: NTP: No IARC Monographs: No OSHA Regulated:

Emergency First Aid Procedures

Eyes: Immediately flush with large quantities of water for at least 15 minutes and call a physician.

Skin Contact: Flush with large amounts of water for 15 minutes.

Inhalation: Remove to fresh air, if breathing is difficult, give oxygen and call a physician

N/A = Not Applicable NDA = No Data Available

Ingestion: Call a physician.

VI. REACTIVITY DATA

Stability: Stable

Hazardous Polymerization: Will not occur

Hazardous Decomposition Products: As with any organic material, combustion will produce carbon dioxide (C)O2) and probably carbon monoxide (CO). Oxides of nitrogen

Conditions To Avoid:

Incompatibility and Materials to Avoid: Strong oxidizers such as hydrogen peroxide, bromine and chromic acid, liquid chlorine, enriched gaseous or liquid oxygen, sodium or calcium hypochlorite

VII. SPILL & DISPOSAL PROCEDURES

Steps To Be Taken in Case Material is Released or Spilled — Absorb with an inert material such as sand, soil or vermiculite and sweep ujp. Containers may contain residual product. Do not reuse containers unless properly reconditioned.

Waste Disposal Method: Dispose of in accordance with federal, state and local regulations

Precautions To Be Taken In Handling & Storage: Store between 40°-120°F.

VIII. PROTECTIVE EQUIPMENT

Ventilation Type Required: Mechanical

Protective Gloves: Rubber or plastic, solvent resistant

Eye Protection: Chemical safety goggles or dust mask

Other Protective Equipment: Neoprene type apron

Respiratory protection: Use NIOSH/OSHA approved respirator with organic vapor cartridge if vapor concentration exceeds permissible exposure limit.

Comments:

IX. REGULATORY & TRANSPORTATION INFORMATION

US DOT Proper Shipping Name: "Oil-Well Treating Compound"

US DOT Hazard Class:

DOT ID Number: 2074

ID Number:

Freight Classification:

Unregulated By DOT:

Regulated by DOT:

Special Transportation Note:

Labels Required:

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, expressed or implied, and we assume no responsibility for any damage or expense.

Essroc
Italcementi Group

3251 Bath Pike
Nazareth, Pa. 18064

MATERIAL SAFETY DATA SHEET

Section 1 - IDENTIFICATION

Product Name: Portland Cements

CAS Reg. No.: 65997-15-1

Chemical Name and Synonyms: Portland Cement, Cement, Hydraulic Cement

Trade Names: Portland Cement – Types I, IA, II, III, IIIA; SAYLOR'S® Portland Types: I, IA, II, III; PRONTO®, Flamingo Brixment® White Portland Cement

MSDS Information: This MSDS supersedes prior MSDS's for the products noted above. This MSDS covers a number of products with similar applications and occupational exposure hazards. Specific constituents and methods of preparation for these products will vary. The term "Portland Cement", used in the text of this MSDS, refers to the above named products collectively.

Chemical Family: Calcium silicate compounds; calcium compounds containing iron and aluminum; and gypsum are the primary constituents of these products.

Informational Phone Numbers:
(800) 437-7762 Customer Service - Nazareth, PA
(800) 336-0366 Customer Service - Speed, IN
(800) 624-8986 Customer Service - Martinsburg, WV
(800) 386-2111 Customer Service - Mississauga, ONT

Emergency Contact Information: (800)-424-9300 Chemtrec

MSDS Prepared by: Essroc MSDS Development Committee - (610) 837-6725 – April 2006

Section 2 - COMPONENTS

Hazardous Ingredients:

Component	CAS No.	OSHA PEL (8-hour TWA)	ACGIH TLV	Other Information
Portland Cement	65997-15-1	15 mg total dust/m^3 5 mg respirable dust/m^3	10 mg/m^3	IDLH: 5000 mg/m^3 LD_{50}: No Data
Gypsum	13397-24-5	15 mg total dust/m^3 5 mg respirable dust/m^3	10 mg/m^3	IDLH: Not Determined LD_{50}: No Data
Limestone	1317-65-3	15 mg total dust/m^3 5 mg respirable dust/m^3	10 mg/m^3	IDLH: Not Determined LD_{50}: No Data
Crystalline Silica (< 0.3%)	14808-60-7	For mineral dusts containing crystalline silica: (10 mg respirable dust/m^3)/(%SiO_2 +2) (30 mg total dust/m^3) /(%SiO_2 + 2)	0.025 mg/m^3	IDLH: 50 mg/m^3 (twa) LD_{50}: ipr rat LD Lo 400 mg/kg
Notes:				

Trace Elements: Portland cement is made from materials mined from the earth and processed using energy provided by fuels. Trace amounts of naturally occurring, potentially harmful chemicals might be detected during chemical analysis. Trace constituents may include calcium oxide (also known as free lime or quick lime), free magnesium oxide, potassium and sodium sulfate compounds, chromium compounds, and nickel compounds.

Section 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Portland Cement is a powder that poses little immediate hazard. A single short-term exposure to the dry powder is not likely to cause serious harm. However, exposure of sufficient duration to wet Portland Cement can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns, including third degree burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry Portland Cement.

POTENTIAL HEALTH EFFECTS

Relevant Routes of Exposure: Eye contact, skin contact, inhalation and ingestion.

Effects resulting from eye contact: Exposure to airborne dust may cause immediate or delayed irritation or inflammation.

Eye contact by larger amounts of dry powder or splashes of wet Portland Cement may cause effects ranging from moderate eye irritation to chemical burns and blindness. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.

Effects resulting from skin contact: Discomfort or pain cannot be relied upon to alert a person to hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly contact with wet Portland Cement. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Exposure to dry Portland Cement may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Dry Portland Cement contacting wet skin or exposure to moist or wet Portland Cement may cause more severe skin effects including thickening, cracking, or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (caustic) chemical burns.

Some individuals may exhibit an allergic response upon exposure to Portland Cement, possibly due to trace amounts of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may first experience this effect after years of contact with Portland Cement products.

Effects resulting from Inhalation: Portland Cement may contain free crystalline silica. Prolonged exposure to airborne free crystalline silica may cause delayed lung injury including silicosis, a disabling and potentially fatal lung disease, and/or other diseases. (also see "Carcinogenic potential" below.)

Inhalation may also aggravate other lung conditions. Exposure to Portland Cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.

Effects resulting from Ingestion: Although ingestion of small quantities of Portland Cement is not known to be harmful, ill effects are possible especially if larger quantities are consumed. Portland Cement should not be eaten.

Carcinogenic potential: Portland Cement is not listed as a carcinogen by the National Toxicology Program (NTP), International Agency for Research (IARC) or the Occupational Safety and Health Administration (OSHA). It may, however, contain trace amounts of substances listed as carcinogens by these organizations.

Portland Cement may contain crystalline silica. Crystalline silica is classified by the IARC as a known human carcinogen. Some human studies indicate potential for lung cancer from crystalline silica exposure. Risk depends on duration and level of exposure.

Medical conditions which may be aggravated by inhalation or dermal exposure:

Pre-existing upper respiratory and lung diseases.

Unusual (hyper) sensitivity to hexavalent chromium (chromium^{+6}) salts.

Section 4 - FIRST AID

Eyes: Immediate flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes including under lids, to remove all particles. Call physician immediately.

Skin: Wash skin with cool water and pH-neutral soap or a mild detergent intended for use on skin. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

Inhalation of Airborne Dust: Remove to fresh air. Seek medical help if coughing and other symptoms do not subside. ("Inhalation" of gross amounts of Portland Cement requires immediate medical attention.)

Ingestion: Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

Section 5 - FIRE AND EXPLOSION DATA

Portland Cement is not combustible.

Flash Point:	Not applicable	Upper Explosive Limit:	Not applicable
Auto ignition temperature:	Not applicable	Lower Explosive Limit:	Not applicable
Auto ignition temperature:	Not applicable	Extinguishing media:	Not applicable
Hazardous combustion products:	Not applicable	Unusual fire and explosion hazards:	None
Special fire fighting procedures:	Portland Cement poses no fire-related hazards. Self-contained breathing apparatus is recommended to limit exposure to combustion products when fighting any fire.		

Section 6 - ACCIDENTAL RELEASE MEASURES

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment as described in Section 8.

Scrape up wet material and place in appropriate container. Allow the material to "dry" before disposal. Do not attempt to wash Portland Cement down drains.

Dispose of waste material according to local, state, and federal regulations.

Section 7 - HANDLING AND STORAGE

Keep Portland Cement dry until used. Normal temperatures and pressures do not affect the material. Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust or wet cement mixtures or fluids.

Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Skin protection: Prevention is essential to avoid potentially severe skin injury. Avoid contact with unhardened (wet) Portland Cement products. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened Portland Cement products might occur, wear impervious clothing and gloves to eliminate skin contact. Where required, wear boots that are impervious to water to eliminate foot and ankle exposure.

Do not rely on barrier creams. Barrier creams should not be used in place of gloves.

Periodically wash areas contacted by dry Portland Cement or by wet cement or fluids with a pH neutral soap. Wash again at the end of the work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet cement, it should be removed and replaced with clean dry clothing.

Respiratory protection: Avoid actions that cause dust to become airborne. Use local or general ventilation to control exposures below applicable exposure limits.

Use NIOSH/MSHA-approved (under 30 CFR 11) or NIOSH-approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation.

Ventilation: Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye protection: When engaged in activities where cement dust or wet cement could contact the eye, wear safety glasses with side shields or goggles. In extremely dusty environments and unpredictable environments, wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with Portland Cement or fresh cement products.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Grey, white powder	Odor:	No distinct odor
Physical state:	Solid (powder)	pH (in water):	12 to 13
Solubility in water:	Slightly soluble (0.1 to 1.0%)	Vapor pressure:	Not applicable
Vapor density:	Not applicable	Boiling point:	Not applicable (>1000^{O} C)
Melting point:	Not applicable	Specific gravity (H_2O=1.0):	2.80 - 3.00
Evaporation Rate:	Not applicable	Coefficient of oil to water distribution:	Not applicable

Section 10 - STABILITY AND REACTIVITY

Stability: Stable

Conditions to avoid: Unintentional contact with water.

Incompatibility: Wet Portland Cement is alkaline. As such it is incompatible with acids, ammonium salts and aluminum metal.

Hazardous decomposition: Will not spontaneously occur. Adding water results in hydration and produces (caustic) calcium hydroxide.

Hazardous polymerization: Will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

Route of Entry.....Section 3
Effects of acute exposure to product.....Section 3
Effects of chronic exposure to product.....Section 3
Exposure Limits.....Section 2
Irritancy of product.....Section 3
Sensitization to product .....Section 3
Carcinogenicity.....Section 3
Reproductive Toxicity.....Not Applicable
Teratogenicity.....Not Applicable
Mutagenicity.....Not Applicable
Toxicologically synergistic products.....Section 3, Section 16

For a description of available, more detailed toxicological information, call one of the informational phone numbers listed at the end of Section 1.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity: No recognized unusual toxicity to plants or animals.

Relevant physical and chemical properties: See sections 9 and 10.

Section 13 - DISPOSAL

Dispose of waste material according to local, state, and federal regulations. (Since Portland Cement is stable, uncontaminated material may be saved for future use.)

Dispose of bags in an approved landfill or incinerator.

Section 14 - TRANSPORTATION DATA

Hazardous materials description/proper shipping name: Portland Cement is not hazardous under U.S. Department of Transportation (DOT) regulations.

Hazard class: Not applicable.

Identification number: Not applicable

Required label text: Not applicable.

Hazardous substances/reportable quantities (RQ): Not applicable

Section 15 - OTHER REGULATORY INFORMATION

Status under USDOL-OSHA & MSHA Hazard Communication Standards (29CFR 1910.1200 & 30CFR Part 47): Portland Cement is considered a "hazardous chemical" under these regulations, and should be part of any hazard communication program.

Status under CERCLA/Superfund, 40 CFR 117 and 302: Not Listed

Hazard Category under SARA TITLE III, Sections 311- 312: Portland Cement qualifies as a "hazardous substance" with delayed health effects.

Status under SARA Title III, Section 313: This product contains NONE of the substances 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 in concentrations above deminimis levels.

Toxic Substance Control Act (TSCA): Some substances in Portland Cement are on the TSCA inventory list.

Status under the Federal Hazardous Substances Act: Portland Cement is a "hazardous substance" subject to statutes promulgated under the subject act.

Status under Canadian Environmental Protection Act: Not listed.

Status under WHMIS: Portland Cement is considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations (Class D2A – Materials causing other toxic effects and Class E - Corrosive material) and is therefore subject to the labeling and MSDS requirements of the Workplace Hazardous Materials Information System (WHMIS).

SECTION 16 - OTHER INFORMATION

Abbreviations:

ACGIH	American Conference of Government Industrial Hygienists
ASTM	American Society of Testing Materials
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
DOT	Department of Transportation
IARC	International Agency for Research
IDLH	Immediately dangerous to live and health (NIOSH).
m^3	cubic meter
mg	Milligram
mm	millimeter
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RQ	Reportable Quantities
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TWA	Time Weighted Average
URT	Upper Respiratory Tract
WHMIS	Workplace Hazardous Material Information System

Other Important Information:

Portland Cement should only be used by knowledgeable persons. A key to using the product safely requires the user to recognize that Portland Cement chemically reacts with water, and that some of the intermediate products of this reaction (that is, those present while Portland Cement is "setting") pose a far more severe hazard than does Portland Cement itself.

While the information provided in this material safety data sheet is believed to provide a useful summary of the hazards of Portland Cement as it is commonly used, the sheet cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

In particular, the data furnished in this sheet do not address hazards that may be posed by other materials mixed with Portland Cement to produce Portland Cement products. Users should review other relevant material safety data sheets before working with this Portland Cement or working on Portland Cement products, for example, Portland Cement concrete.

SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY ESSROC CEMENT CORP., except that the product shall conform to contracted specifications. The information provided herein was believed by Essroc Cement Corp. to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. Buyer's exclusive remedy shall be for damages and no claim of any kind, whether as to product delivered or for non-delivery of product, and whether based on contract, breach or warranty, negligence, or otherwise shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

Black Hills Bentonite, LLC
MATERIAL SAFETY AND TRANSPORTATION DATA SHEET

SECTION 1 **PRODUCT IDENTIFICATION**

MANUFACTURERS NAME
Black Hills Bentonite, a Limited Liability Company
Trade Name: Granular Bentonite

TELEPHONE NO.
(307) 265-3740

ADDRESS
P.O. Box 9, Mills, WY 82644

CHEMICAL NAME AND SYNONYMS
Hydrous Silicate of Alumina / Wyoming Sodium Bentonite/Sodium Montmorillonite CAS No. 1302-78-9

SECTION 2 **HAZARDOUS INGREDIENTS**

CAS #	Component	Percentage	Exposure Limit
14808-60-7	Crystalline Silica in the form of Quartz	>1%	PEL - See Below TLV - 0.05 mg/m^3 TWA (respirable fraction) MSHA - See Below

OSHA PEL and MSHA Exposure Limit for Crystaline Silica Quartz:

$$\text{(Respirable)} \quad \frac{10\text{mg/m}^3}{\%\ \text{Silica} + 2}$$

National Institute for Occupational Safety and Health (NIOSH) has recommended that the permissible exposure limit be changes to 50 micrograms respirable free silica per cubic meter of air (0.05 mg/m^3) as determined by a full shift sample up to 10 hour working day, 40 hours per week. The 1974 NIOSH Criteria for recommended Standard for Occupational Exposure to Crystalline Silica should be consulted for more detailed information.

PEL means OSHA Permissible Exposure Limit.
TLV means American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value.
MSHA means Mine Safety and Health Administration Exposure Limit.
TWA means 8 hour time weighted average.

Note: The Permissible Exposure Limits (PEL) reported above are the pre- 1989 limits that were reinstated by OSHA June 30, 1993 following a decision by the 11th Circuit Court of Appeals. Thes PELs are now being enforced by Federal OSHA. Be aware that more restrictive exposure limits may be enforced by some states, agencies or other authorities.

SECTION 3 **PHYSICAL DATA**

BOILING POINT (°F) Not Applicable	SPECIFIC GRAVITY (H_2O = 1) 2.6
VAPOR PRESSURE (mm Hg) Not Applicable	VAPOR DENSITY (AIR = 1) Not Applicable
EVAPORATION RATE Not Applicable	SOLUBILITY IN WATER Negligible
APPEARANCE AND ODOR Yellow, Blue, Brown granules or powder. Earthy odor.	DENSITY @ 20° C: UNCOMPACTED: 68 lbs/cubic foot

HAZARDOUS MATERIALS IDENTIFICATION

_1_ Health Hazard
_0_ Flammability
_0_ Reactivity

DEGREE OF HAZARD
4 = EXTREME
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

SECTION 4 **FIRE AND EXPLOSION DATA**

FLASH POINT
Not Applicable

FLAMMABLE LIMITS
Non Flammable

SECTION 5 **HEALTH HAZARD DATA**

CARCINOGENICITY - SEE ROUTES OF EXPOSURE AND EFFECTS (BELOW)

ACUTE ORAL LD_{50}	ACUTE DERMAL LD_{50}	AQUATIC TOXICITY (LC_{50})
ND	ND	10,000 mg/l

Inhalation: Breathing prolonged and excessive amounts of Bentonite dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may have the following serious chronic health effects:

Pneumoconiosis: Excessive inhalation of respirable dust may cause pneumonoconiosis, a respiratory disease, which can result in delayed, progressive, disabling and sometimes fatal lung injury. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with pneumoconiosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1 - carcinogenic to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (published in June 1997) in conjunction with the use of these materials. 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).

Other Data with Possible Relevance to Human Health:

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 fibrosis of the lungs, skin and other internal organs) and kidney disease.

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.

SKIN Potential irritant.	EYE Potential irritant.	INHALATION Irritation to lungs, nose, and throat.
EMERGENCY FIRST AID PROCEDURES		
EYES: Flush with water.	SKIN: Wash with soap and water.	
If inhaled and effects occur, move to fresh air. If breathing is irregular, administer oxygen		

SECTION 6 REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY Stable	INCOMPATIBILITY None
HAZARDOUS DECOMPOSITION PRODUCTS None	HAZARDOUS POLYMERIZATION Will not occur.

SECTION 7 SPILL OR LEAK PROCEDURES

STEPS TO TAKE IF MATERIAL IS RELEASED OR SPILLED

If uncontaminated, sweep up or collect, and reuse product. Product becomes slippery when wet.

WASTE DISPOSAL METHOD

Dispose of in accordance with all Federal, State and Local regulations.

NEUTRALIZING CHEMICALS

Not Applicable

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION

Use NIOSH approved mechanical filter respirator for nontoxic dusts if dust concentration exceeds $10mg/m^3$

VENTILATION

Sufficient to keep dust levels below the TLV for crystalline silica.

PROTECTIVE GLOVES

General duty work gloves.

EYE PROTECTION

If high dust conditions exist, tight fitting goggles are recommended.

OTHER PROTECTIVE EQUIPMENT

Eyewash

SECTION 9 SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store out of the weather. Product becomes slippery when wet. Avoid contact water in walk areas.

OTHER PRECAUTIONS

PROPER SHIPPING NAME	PLACARDS	HAZARD CLASS
Not Regulated	None	Not Nazardous
REPORTABLE QUANTITY	HAZARDOUS SUBSTANCE	ID NUMBER
None	None	None

LABEL
None Required

SECTION 10 REGULATORY INFORMATION

SARA reuires the submission of annual reports of toxic chemicals that appear in 40 CFR 372 (for SARA 313). This information must be included in all MSDS that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

Chemical: CAS #:
NONE

Toxic Substances Control Act (TSCA)
The ingrediants of this product are on teh TSCA inventory.

SECTION 11 STATE RIGHT TO KNOW

Quartz is a Canadian WHMIS (Workplace Hazardous Material Information System) Ingrediant Disclosure List, Massachusetts Substance List, New Jersey Right to Know Hazardous Substance List, and Pennsylvania Hazardous Substance List.

PREPARED BY: BLACK HILLS BENTONITE, LLC. DATE: FEBRUARY, 2001

BACK

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **EZ-MUD®**

Revision Date: 16-Feb-2004

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: EZ-MUD®
Synonyms: None
Chemical Family: Blend
Application: Shale Inhibitor

Manufacturer/Supplier

Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (800) 666-9260 or (713) 676-3000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Hydrotreated light petroleum distillate	64742-47-8	10 - 30%	Not applicable	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):	> 200**Min:** > 200
Flash Point/Range (C):	Not Determined**Min:** > 93
Flash Point Method:	PMCC
Autoignition Temperature (F):	> 392
Autoignition Temperature (C):	> 200
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.

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. In high concentrations, supplied air respirator or a self-contained breathing apparatus.
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
pH:	6-8

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):	0.002
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 (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	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 severe 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	BOD(28 Day): 40% of COD
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: >1000 mg/l (Pimephales promeias)
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	If empty container retains product residues, all label precautions must be observed. Store away from ignition sources. Transport with all closures in place. Return for reuse or disposal according to 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 For This Product	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*****

Material Safety Data Sheet

Bentonite -

C.A.S. Number: 1302-78-9 / MSDS C.A.S. Code: 0100

A BRENNTAG Company

SECTION I - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT/MATERIAL: **BENTONITE**

MANUFACTURER/DISTRIBUTOR: WHITTAKER, CLARK & DANIELS, INC.
ADDRESS: 1000 COOLIDGE STREET
SOUTH PLAINFIELD, N.J. 07080

TELEPHONE: (908) 561-6100

SECTION II - COMPOSITION, INFORMATION ON INGREDIENTS:

CHEMICAL NAME: BENTONITE
CAS NUMBER: 1302-78-9

HAZARDOUS INGREDIENTS: CRYSTALLINE SILICA (QUARTZ, 14808-60-7) IS PRESENT AT LESS THAN 1.0% AS A NATURALLY OCCURRING COMPONENT NOT REMOVED FROM THE CLAY ORE DURING PROCESSING. SEE SECTION 11 FOR FURTHER INFORMATION.

SECTION III - HAZARDS IDENTIFICATION:

HMIS RATING:

HEALTH	1	(POSSIBLE HAZARD FROM CHRONIC EXPOSURE TO DUST, SEE SECTION 11)
FLAMMABILITY	0	
REACTIVITY	0	
PERSONAL PROTECTION	E	

EMERGENCY OVERVIEW: UNDER NORMAL USAGE OR CONTAINED SPILLS THIS MATERIAL DOES NOT POSE A SIGNIFICANT EMERGENCY RISK. THIS MATERIAL IS VERY SLIPPERY WHEN WETTED WITH WATER. APPROPRIATE PRECAUTIONS SHOULD BE TAKEN TO AVOID SLIPS AND FALLS.

POTENTIAL HEALTH EFFECTS:

EYES: MAY CAUSE SLIGHT EYE IRRITATION. DIRECT CONTACT SHOULD BE AVOIDED TO PREVENT PHYSICAL ABRASION.

SKIN: NONE KNOWN.

INHALATION: SHORT TERM EXPOSURE TO HIGH DUST LEVELS COULD CAUSE MINOR IRRITATION. LONG TERM EXPOSURE TO HIGH CONCENTRATIONS OF DUST SHOULD BE AVOIDED DUE TO THE PRESENCE OF QUARTZ WHICH CAN CAUSE SEVERE AND PERMANENT LUNG DAMAGE WHEN INHALED. CONTROL DUST LEVELS WITH ENGINEERING CONTROLS (LOCAL EXHAUST VENTILATION). PREVENT DUST INHALATION WITH USE OF A NIOSH APPROVED DUST RESPIRATOR IF ENGINEERING CONTROLS ARE INADEQUATE.

CARCINOGENICITY: IARC HAS CLASSIFIED CRYSTALLINE SILICA AS A HUMAN CARCINOGEN, CLASS 1.
TARGET ORGAN: LUNGS

SECTION IV - EMERGENCY AND FIRST AID MEASURES:

SKIN: WASH OFF WITH SOAP AND WATER.
EYE: FLUSH WITH TEPID WATER FOR 15 MINUTES. IF IRRITATION OR PAIN PERSISTS, SEEK MEDICAL ATTENTION.

INHALATION: REMOVE PERSON TO FRESH AIR. SEEK MEDICAL ATTENTION IF SHORTNESS OF BREATH OR IRRITATION PERSISTS.

INGESTION: COULD RESULT IN INTESTINAL BLOCKAGE. IF LARGE AMOUNTS ARE SWALLOWED SEEK MEDICAL ATTENTION.

NOTES TO PHYSICIAN: MIXTURE IS ORALLY NON-TOXIC. SEE SECTION 11 FOR ADDITIONAL TOXICOLOGICAL DATA.

SECTION V - FIRE FIGHTING MEASURES:

FLASHPOINT: NOT APPLICABLE

UPPER EXPLOSIVE LIMIT: NOT APPLICABLE
LOWER EXPLOSIVE LIMIT: NOT APPLICABLE
AUTOIGNITION TEMPERATURE: NOT APPLICABLE
THIN-FILM IGNITION TEMPERATURE: NOT APPLICABLE
HAZARDOUS COMBUSTION PRODUCTS: NONE
BASIC FIRE FIGHTING GUIDANCE: USE APPROPRIATE MEASURES FOR SURROUNDING FIRE.
EXTINGUISHING MEDIA: NOT APPLICABLE

SECTION VI - ACCIDENTAL RELEASE MEASURES:

WET DOWN LARGE SPILLS WITH WATER MIST TO AVOID GENERATING EXCESSIVE DUST LEVELS. CAUTION: THIS MATERIAL IS VERY SLIPPERY WHEN WET. APPROPRIATE PRECAUTIONS SHOULD BE TAKEN TO AVOID SLIPS AND FALLS.

CLEAN-UP PROCEDURES AND EQUIPMENT: USE OF A DUSTLESS VACUUM SYSTEM OR SHOVELING. FLUSHING WITH WATER IS ALSO AN ACCEPTABLE METHOD. AVOID DRY SWEEPING OR OTHER METHODS THAT MAY GENERATE HIGH DUST CONCENTRATIONS. WEAR NIOSH APPROVED DUST RESPIRATOR.

SECTION VII - HANDLING AND STORAGE:

HANDLING: ADEQUATE VENTILATION IS NECESSARY IN HANDLING AREAS TO PREVENT EXCESSIVE AIR-BORNE DUST.

STORAGE: STORE IN CLOSED CONTAINERS IN A DRY AREA.

SECTION VIII - EXPOSURE CONTROLS, PERSONAL PROTECTION:

ENGINEERING CONTROLS: PROVIDE GENERAL OR LOCAL VENTILATION ADEQUATE TO MAINTAIN AIRBORNE LEVELS BELOW OCCUPATIONAL EXPOSURE LIMITS.

PERSONAL PROTECTION EQUIPMENT:

EYE/FACE: USE SAFETY GLASSES OR GOGGLES.

SKIN: NONE

RESPIRATORY: USE A NIOSH APPROVED, AIR PURIFYING DUST RESPIRATOR IF DUST LEVELS ARE ABOVE EXPOSURE LIMITS. HALF-MASKS ARE USUALLY SUFFICIENT FOR NORMAL USE.

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE:	TAN POWDER
ODOR:	MILD
PHYSICAL STATE:	SOLID
pH:	NOT APPLICABLE
VAPOR PRESSURE:	NOT APPLICABLE
VAPOR DENSITY:	NOT APPLICABLE
BOILING POINT:	NOT APPLICABLE
MELTING POINT:	NOT APPLICABLE
SOLUBILITY:	NEGLIGIBLE
SPECIFIC GRAVITY:	2.6

SECTION X - STABILITY AND REACTIVITY:

INCOMPATIBILITIES: NONE

CONDITIONS TO AVOID: NOT APPLICABLE

STABILITY: THIS MATERIAL IS STABLE UNDER NORMAL STORAGE AND HANDLING CONDITIONS.

HAZARDOUS POLYMERIZATION: NOT APPLICABLE

SECTION XI -TOXICOLOGICAL INFORMATION:

THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER HAS DETERMINED THAT OVER-EXPOSURE TO CRYSTALLINE SILICA CAN CAUSE LUNG CANCER AND SILICOSIS, A PROGRESSIVE LUNG DISEASE IN HUMANS. HEALTH EFFECTS FROM EXPOSURE TO CRYSTALLINE SILICA OCCUR ONLY WHEN IT IS INHALED.

INHALATION EFFECTS: CRYSTALLINE SILICA HAS BEEN SHOWN TO CAUSE SILICOSIS AND LUNG CANCER. CRYSTALLINE SILICA ONLY CAUSES THESE CONDITIONS WHEN INHALED.

SKIN CONTACT: PROLONGED SKIN CONTACT MAY LEAD TO DRYING OR CRACKING OF THE SKIN DUE TO THE ABSORPTION OF MOISTURE.

EYE CONTACT: AS WITH ANY DUST, WILL BE IRRITATING TO THE EYES DUE TO PHYSICAL ABRASION.

MEDICAL CONDITIONS AGGREVATED: RESPIRATORY DISORDERS.

OCCUPATIONAL EXPOSURE LIMITS: STUDIES HAVE SHOWN THAT THE CRYSTALLINE SILICA IS EVENLY DISTRIBUTED THROUGHOUT ALL PARTICLE SIZES OF THIS PRODUCT. KEEP DUST LEVELS BELOW PERMISSIBLE LIMITS.

ACGIH TWA:	0.1 mg/cu.m. (as quartz)
ACGIH STEL:	N.A.
OSHA PEL (respirable):	10 mg/cu-m- / % SiO_2 + 2
OSHA PEL (total dust):	30 mg/cu.m. / % SiO_2 + 2

SECTION XII - ECOLOGICAL INFORMATION:

ECOTOXICOLOGICAL INFORMATION: NONE KNOWN

SECTION XIII - DISPOSAL CONSIDERATIONS:

DISPOSE OF IN A MANNER IN ACCORDANCE WITH LOCAL AND FEDERAL REGULATIONS. THIS INFORMATION APPLIES TO MATERIAL AS MANUFACTURED; CONTAMINATION OR PROCESSING MAY CHANGE WASTE CHARACTERISTICS AND REQUIREMENTS.

SECTION XIV - TRANSPORTATION INFORMATION:

THIS MATERIAL IS NOT REGULATED BY THE DEPARTMENT OF TRANSPORTATION.

SECTION XV - REGULATORY INFORMATION:

SARA 313:	NONE KNOWN
TSCA :	LISTED
EUROPEAN INVENTORY:	LISTED
CANADIAN DSL:	EXEMPT
AUSTRALIAN AICS:	LISTED
JAPANESE ENCS:	ENCS 9 1971

CALIFORNIA PROPOSITION 65: CRYSTALLINE SILICA IN AIRBORNE PARTICLES OF RESPIRABLE SIZE IS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

•Whittaker, Clark and Daniels, Inc. • 1000 Coolidge St. • South Plainfield, NJ 07080•
Technical Services Department • Phone: 1 800 732-0562 • Fax: 1 800 833-8139

EUROPE: QUARTZ EXPOSURE LIMITS.

BELGIUM:	0.1 mg/cu.m. TWA
DENMARK:	0.1 mg/cu.m. TWA
SWEDEN:	0.1 mg/cu.m. TWA
U.K. :	0.1 mg/cu.m. (respirable)
	0.3 mg/cu.m. (total dust)
RUSSIA:	14.0 mg/cu.m. (STEL)
THAILAND:	10.0 mg/cu.m. (respirable)
	30.0 mg/cu.m. (total dust)
FINLAND:	0.2 mg/cu.m. TWA
GERMANY:	0.2 mg/cu.m. TWA
SWITZERLAND:	0.15 mg/cu.m. TWA

NOTE: DIFFERENT COUNTRIES APPLY QUARTZ OCCUPATIONAL EXPOSURE LIMITS IN DIFFERENT MANNERS, DEPENDING ON HOW THEY DEFINE "RESPIRABLE" FRACTION, AND MASS PERCENTAGE OF A TOTAL MIXTURE; CONSULT LOCAL AUTHORITIES FOR APPLICATION.

SECTION XVI - OTHER INFORMATION:

"Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Whittaker, Clark & Daniels, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Whittaker, Clark & Daniels, Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. **NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, THAT THE PRODUCTS TO WHICH THE INFORMATION REFERS MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS, OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS. IN NO CASE SHALL THE INFORMATION BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE."**

Issued: 4/98
Supercedes: 1/97

•Whittaker, Clark and Daniels, Inc. • 1000 Coolidge St. • South Plainfield, NJ 07080•
Technical Services Department • Phone: 1 800 732-0562 • Fax: 1 800 833-8139

MSDS-207
April 2005

MATERIAL SAFETY DATA SHEET
CPD SUPERPLUG

SECTION 1 - PRODUCT INFORMATION

Manufacturer: CPD Construction Products
219 Connie Crescent # 13
Concord, Ontario L4K 1L4

1. PRODUCT INFORMATION

Product Identifier: CPD Superplug (fast setting hydraulic cement)

Application and Use: Water plug and fast setting patching compound.

Product Description: Blend of Hydraulic Cements and Silica Aggregate.

Regulatory Classification:
WHMIS - Class E (Corrosive)
Class D Division 2 Subdivision A (Quartz)

Transportation of Dangerous Goods - Not regulated under current TDG Legislation.

EMERGENCY NUMBERS
Business (905) 669-5013 24 Hours (416) 425-3846

SECTION 2 - HAZARDOUS INGREDIENTS

The following component data is defined in accordance with sub-paragraph 13(a)(i) to (iv) or paragraph 14(a) of the Hazardous Products Act.

NAME	(pbw)%	CAS
Sand ** (Quartz)	30-60	14808-60-7
Portland Cement (Hydraulic Cement)	30-60	65997-15-1

Sand - LD50 - Not available - LC50 - Not available
Portland Cement - LD50 - Not available LC50 - Not available

** The sand used in this product contains crystalline silica (quartz). The quartz that exists as dust particles with an aerodynamic diameter less than 5 microns is hazardous. An approved dust mask (for crystalline silica) should be worn by workers handling this product in a dry state.

SECTION 3 - PHYSICAL DATA

Physical State: Powder (Granular Solid)
Vapour Pressure: Not applicable
PH (Aqueous Solution): 12.5
Viscosity: Not applicable
Evaporation Rate: Not applicable
Odour: None
Specific Gravity: 2.20
Solubility in Water: <3%
Boiling Point: Not applicable
Vapour Density (AIR=1): Not applicable
% Volatile: None
Appearance: Dark Grey Powder containing fine silica sand.

SECTION 4 - TOXICOLOGICAL PROPERTIES

NATURE OF HAZARD

INHALATION: Crystalline Silica (Quartz) dust particles below 5 microns in diameter may be present in this product. Excessive inhalation of particles of this size (or smaller) may cause lung disease (Silicosis). The prolonged inhalation of dust may result in irritation of nasal tissue and the cornea (white) of the eye. Certain people may develop allergic dermatitis.

EYE CONTACT: May cause irritation to eye tissue on contact. Extreme exposure could lead to severe irritation if nc immediately treated.

/...2

SKIN CONTACT: Will dry skin and cause defatting dermatitis. A latent period may exist between exposure and sense irritation.

INGESTION: May cause burns. Irritation of mucous membranes of mouth, throat, esophagus and stomach will result from ingestion.

CHRONIC: Excessive exposure (Inhalation) could lead to development of the irreversible lung disease "Silicosis". Crystalline silica is classified by IARC as "2A - probably Carcinogenic to Humans". Also chronic local exposure may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, chronic inhalation may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness.

OCCUPATIONAL EXPOSURE LIMIT: Maximum TWA of silica is 0.2 mg/M3 of air. For further information of the designated substance "Silica" contact the Ministry of Labour (Occupational Health and Safety Division) in your region.

SECTION 5 - FIRST AID MEASURES

INHALATION: Remove to fresh air. If irritation of the respiratory tract is experienced seek medical attention.

EYE CONTACT: Flush eye "immediately" with water for at least 15 minutes holding eyelids open. If irritation persists seek medical attention.

SKIN CONTACT: Immediately wash with plenty of water for at least 15 minutes. Seek medical attention if rash results from contact.

INGESTION: Do not induce vomiting!! Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek Immediate Medical attention!

SECTION 6 - PREVENTIVE MEASURES

PERSONAL PROTECTION: Minimum safety equipment should consist of safety glasses with side shields, neoprene or PV full length waterproof gloves and coveralls. An approved dust mask for crystalline silica dust should also be worn when large quantities of this product are being used. Observe good personal hygiene. No engineering controls required under normal conditions of application.

HANDLING, STORAGE AND SHIPPING: Replace container lid tightly when not using. DO NOT ALLOW product to get wet as it will harden. No temperature restrictions for storage. Shelf life is approximately 2 years in unopened original container.

SPILL CONTROL AND DISPOSAL: Sweep area with dust retarding floor sweeping compound. Dispose of as normal garbage. No special precautions required.

SECTION 7 - FIRE AND EXPLOSION DATA

None. This product will not burn.

SECTION 8 - REACTIVITY DATA

Stable. Hazardous decomposition will not occur.

SECTION 9 - PREPARATION

Prepared By: R.J. Green
Plant Manager
CPD Construction Products
Concord, Ontario L4K 1L4

CONSTRUCTION SITE BEST MANAGEMENT PRACTICES

ATTACHMENT 2

CONSTRUCTION SITE BEST MANAGEMENT PRACTICES

SPILL PREVENTION AND CONTROL GM-6

- Keep waste storage areas clean, well organized, and well equipped.
- Information on proper storage, clean up and spill reports should be posted at a visible and accessible location at all times.
- Educate employees and subcontractors about what a "significant" and "insignificant" spill is for each chemical used on-site and train in spill prevention and cleanup.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Locate chemical storage and handling areas away from storm drains, waterways, or reservoirs.
- Do not store chemicals in areas where they may be susceptible to rain.
- Provide a secondary containment structure in case of leaks or spills.
- Always use a secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent material under paving equipment when not in use.
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal.
- Store cracked batteries in a non-leaking secondary container.
- If vehicles will be fueled on site:
  - Discourage "topping off".
  - Use designated areas located away from waterways and drainages.
  - Use a secondary containment to catch drips or spills.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Clean up spills immediately and dispose of contaminated soils and clean up materials properly.
  - Sweep up dry spills. Do not wash or hose down the area.
  - Wet spills on impermeable surfaces should be absorbed.
  - Wet spills on soils require digging up and disposing of the contaminated soil.

- A secondary containment with enough capacity to contain a spill is required for fueling areas.
- Report significant spills to local and state agencies, such as the Fire Department or NDEP, who may assist in the cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).
- Only a reputable, licensed company should be used to clean up large spills and dispose of contaminated materials.

Inspection and Maintenance:

- On a weekly basis, ensure that an adequate supply of spill control cleanup materials are located close to storage, fueling, and unloading areas.
- Inspect containment structures in fueling and storage areas.
- Spill prevention plans should be updated when the types of chemicals stored on site changes.
- Regularly inspect on-site vehicles and equipment for leaks, and repair them immediately.

VEHICLE AND EQUIPMENT MAINTENANCE AND FUELING

GM-8

- When a vehicle is located over a water body (dock, barge) and is planned to be idle for more than one hour, a drip pan or sheet should be placed under the vehicle.
- Fueling areas should be:
  - Located at least 100 feet from waterways, channels and storm drains.
  - Protected from run-on or runoff.
  - Located on a level-graded area.
  - Attended at all times during fueling.
- Fueling equipment should be equipped with an automatic shut-off nozzle to contain drips.
- Fuel tanks should not be "topped-off".
- Avoid mobile fueling.
- Observe federal, state, and local requirements relating to any stationary aboveground storage tanks.
- Do not dump fuels and lubricants on the ground.
- Do not bury used tires.
- Do not dispose of oil in a dumpster or pour it down the storm drain.
- Properly dispose of used batteries.
- Conduct washing, fueling, and major maintenance offsite whenever possible.
- Inspect vehicles for leaky hoses, gaskets, or other problems.
- Locate vehicle services areas away from waterways, storm drains, gutters, and curbs.
- Use berms, sandbags, or other barriers to contain areas.
- Do not use detergents, solvents, degreasers, or other chemical products to do on-site cleaning.
- Use a drip pan or drip cloth if fluids will be drained and replaced on-site.
- Collect all used fluids, store in separate labeled containers, and either recycle or dispose of properly.

VEHICLE AND EQUIPMENT MAINTENANCE AND FUELING

GM-8

Inspection and Maintenance:

- Inspect on all containment structures.
- Maintain waste fluid containers in a leak proof condition.
- Service sumps associated with wash areas regularly.
- Inspect daily for leaks on vehicles and equipment.
- Keep an ample supply of spill cleanup materials available onsite.
- Clean up spills immediately and dispose of waste properly.
- Prevent boil-overs by regularly cleaning equipment radiators.

MATERIAL DELIVERY, HANDLING, STORAGE AND USE

GM-10

Standards and Specifications:

- Designate a storage area that is not near a storm drain or watercourse.
- All contractors and subcontractors must train employees in proper materials handling, storage, application and delivery procedures.
- Follow manufacturers' instructions on application, storage and disposal of materials.
- Store onsite only the amount of material necessary for the job.
- Use non-hazardous and environmentally friendly products.
- Provide indoor storage or cover stockpiled materials and wastes with a tarp.
- Provide covered storage for secondary containment of hazardous materials.
- Use secondary storage to prevent soil contamination.
- Monitor employees and subcontractors to ensure that proper practices are being implemented.
- Keep all material in original containers.
- Label all stored materials according to state, local and federal regulations.
- Do not store incompatible materials together.
- Keep adequate supply of cleanup materials on site at all times.
- Report all spills.
- Do not apply hazardous chemicals during wet or windy conditions.

Inspection and Maintenance:

- Inspect storage areas weekly to ensure neatness.
- Post proper storage instructions and Material Safety Data Sheets (MSDS) for all currently stored materials.
- Repair and replace damaged secondary containment facilities.
- Remove all empty containers and packaging from site.
- Store materials with adequate clearances for access and emergency response.

LIQUID WASTE MANAGEMENT GM-13

Standards and Specifications:

- Protect drainage ways with earth dikes, filter fabric, sand bags etc. to divert or capture run off from operations. Gather and dispose of trapped material properly.
- Educate workers on how to identify a non-hazardous from a hazardous liquid waste.
- Educate workers that it is unacceptable to have any liquid waste enter storm drains, gutters or watercourses and drainage channels. Incorporate in safety meetings.
- Store and contain wastes in pits or portable tanks that are large enough to completely contain wastes. Locate where accidental discharge will not follow to storm drains, gutters, watercourses and drainage channels.
- If necessary, treat wastes by filtrations, sedimentation or chemical neutralization before disposal.

Inspection and Maintenance:

- Monitor employees and subcontractors to ensure that proper practices are being implemented
- Remove deposited solids from containment areas and capturing devices. Dispose of offsite according to all local, state and federal regulations.
- Inspect containment areas and capturing devices for damages and leaks. Repair or replace as needed.

- Contractor is required to follow all federal, state and local laws regarding handling, storing, and transporting waste materials.

Standards and Specifications:

- Contact Washoe County Environmental Health (775) 328-2436 regarding local hazardous waste management policies and procedures.
- Waste containers shall be constructed of a suitable material and properly labeled according to regulations. Labels must include type of material, time of collection and site location.
- Temporary containment for stored materials should be sized at 1.5 times the volume of the stored material. Materials must be stored in sealed drums.
- Temporary containment areas shall be free of accumulated stormwater and spills.
- Temporary containment areas shall have room between containers for emergency response and cleanup.
- Incompatible materials shall be stored separately.
- Do not store different materials in the same container.
- Do not locate temporary containment areas near storm drains, gutters, watercourses or drainage channels.
- Provide adequate access to temporary containment areas.
- Store containers on pallets under a covered, protected area unless containers are water tight.
- Do not dispose of liquid waste in dumpsters or other solid waste containers.
- Collect water from decontamination procedures, treat it and dispose of it at an appropriate disposal site.
- Educate employees and subcontractors in waste storage and disposal. Ensure that proper procedures are followed.
- Train employees in newest procedures for handling materials. Update when new information is available.
- Immediately repair all dikes and liners used for storage or containment.
- Recycle materials if appropriate.

HAZARDOUS WASTE MANAGEMENT GM-17

Inspection and Maintenance:

- Ensure that all wastes are properly labeled and stored.
- Verify that all hazardous wastes are disposed of properly.
- Hazardous wastes must be collected, labeled and disposed of at authorized disposal sites.
- Keep supplies on site for cleanup of spills.
- Post MSDS sheets for all materials stored on site.
- Immediately repair all dikes and liners used for storage or containment.