ANDALEX RESOURCES, INC.

CENTENNIAL PROJECT
GOB GAS VENT HOLES
GVH#1, GVH#5 and GVH#6
C/007/019

FEBRUARY 2005

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CHAPTER 1
LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

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110 MINIMUM REQUIREMENTS FOR LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

111 Introduction

This project is a "Ventilation Assistance Program", wherein hazardous "gob gas" from the longwall will be partially vented to the surface. The quantity and quality of the vented gas will be the same as that presently being discharged at the mine fan. The discharged "gob gas" will be of no commercial value. It should also be noted that GVH#1 has already been authorized under emergency permitting criteria (March 10, 2005). The same performance standards which are required for GVH#5 and GVH#6 also apply to GVH#1.

The proposed project will start with 3 gob gas vent holes to be placed 1 on the present longwall panel and 2 across the next projected longwall panel. The holes will be located on surface property owned by Dave R. and Mildred Cave, et al., and Mathis Land, Inc. The mineral rights are owned by Mathis Land, Inc. And the United States Government (B.L.M.) And are under lease by Andalex Resources, Inc. Hole #1 has already been approved by the Division as an emergency permitting action, due to safety concerns (DOGM task 2166.)

The proposed hole locations are described in Table 1-1 and are shown on Figure 1-1.

TABLE 1-1
Gob Gas Well Locations (see Figure 1-1)
Deadman Canyon, Utah Quadrangle, Salt Lake Meridian

Hole Number	Section	Township and Range
GVH-1	31	T.12S., R.11E.
GVH-5	31	T.12S., R.11E.
GVH-6	31	T.12S., R.11E.

112 Identification of Interests

Refer to the same section of the approved M&RP.

112.100 Business Entity

Refer to the same section of the approved M&RP.

112.200 Applicant and Operator

Applicant and Operator:	Andalex Resources, Inc Tower Division P.O. Box 902 Price, Utah 84501 Telephone: (435) 637-5385
Contact Person and Resident Agent:	Michael W. Glasson Andalex Resources, Inc Tower Division P.O. Box 902 Price, Utah 84501 Telephone: (435) 637-5385

Responsibility: Andalex Resources, Inc. is responsible for submission of information and will pay abandoned mine reclamation fees.

112.300 Officers of the Applicant

Refer to the same section of the approved M&RP.

112.400 Coal Mining and Reclamation Operation Owned or Controlled

Refer to the same section of the approved M&RP.

112.500 Legal or Equitable Owner of the Surface and Mineral Properties

The legal and equitable owner of the surface and mineral properties to be affected by this operation during the duration of the permit period are listed below:

Surface Owners

David R. & Mildred Cave, et al.
144 South 1650 East
Price, Utah 84501

Mathis Land Co.
Sunnyside Star Route
Price, Utah 84501

Sub-Surface Owners

United States of America
Bureau of Land Management
Utah State Office
136 East South Temple
Salt Lake City, Utah 84111

Mathis Land Co.
Sunnyside Star Route
Price, Utah 84501

112.600 Owners of Record of Property Contiguous to Proposed Permit Area

Owners of record for surface and mineral properties contiguous to the proposed permit area are listed below:

Contiguous Surface Owners

David R. & Mildred Cave, et al.
144 South 1650 East
Price, Utah 84501

Mathis Land Co.
Sunnyside Star Route
Price, Utah 84501

F. and D. Shimmin
711 North 500 East
Price, Utah 84501

Contiguous Sub-Surface Owners

United States of America
Bureau of Land Management
Utah State Office
136 East South Temple
Salt Lake City, Utah 84111

State of Utah
School Trust Lands Administration
675 East 500 South
Salt Lake City, Utah 84102

Mathis Land Co.
Sunnyside Star Route
Price, Utah 84501

112.700 MSHA Numbers

Refer to the same section of the approved M&RP.

112.800 Interest in Contiguous Lands

Andalex Resources, Inc. has no interest in contiguous lands other than those currently owned as shown on Plate 1A of the approved M&RP.

112.900 Certification of Submittal Information

No information has changed in the approved M&RP because of this submittal. Refer to the same section of the approved M&RP.

113 Violation Information

Refer to the same section in the approved M&RP.

114 Right-of-Entry Information

Refer to the same section of the approved M&RP. A surface use agreement with the private surface owners is in place. A memorandum of this agreement is included in the MRP and is on record at the County Recorder's office. (See Appendix X-1)

Since each well site has not been finally located or surveyed in the field, an assumed disturbance of 1.0 acres is used as an estimate for each site.

See Table 1-2 for disturbed acreage for each well site. The actual disturbed acres will be added to the total disturbed acreage for the Centennial Project as each site is constructed.

TABLE 1-2
Disturbed Acres by Well Site

Well Site	Disturbed Acres
GVH-1	1.0
GVH-5	1.0
GVH-6	1.0

115 Status of Unsuitability Claims

Refer to the same section of the approved M&RP.

116 Permit Term

Refer to the same section of the approved M&RP.

117 Insurance, Proof of Publication, and Facilities and Structures Used in Common

The certificate of insurance(s) for each well will be obtained if required when the well is drilled. The certificate of insurance(s) will be included in Appendix B of the approved M&RP.

118 Filing Fees

Refer to the same section of the approved M&RP.

120 PERMIT APPLICATION FORMAT AND CONTENTS

This amendment submittal will comply with R645-301-120.

130 REPORTING OF TECHNICAL DATA

All technical data submitted in the amendment will be accompanied by the name or organization responsible for the collection and analysis of data, dates of collection and descriptions of methodology used. Technical analyses will be planned by or under the direction of a qualified professional in the subject to be analyzed.

140 MAPS AND PLANS

The maps and plans in the Mining and Reclamation Plan will correspond with the requirements in R645-301-140.

150 COMPLETENESS

Andalex Resources, Inc. believes the information in this permit application to be complete and correct.

ANDALEX RESOURCES, INC.

CENTENNIAL PROJECT
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C/007/019

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SOILS

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210 INTRODUCTION

This chapter and associated attachments address the pertinent data required for the addition of the 3 degassification well sites for the Centennial Project (GVH#1, GVH#5 and GVH#6). Only those sections of the Division regulations that apply to the well sites have been addressed. The remainder of the regulations have already been addressed in the existing M&RP. The M&RP and this document contain pertinent information relating to the identification, management, and reclamation activities associated with the soil resources.

It should be noted that, at this time and due to winter conditions, no site-specific soils information is available for the proposed wells. Therefore, the data herein presented is general, and will be refined as conditions allow for field location and studies to be implemented. It should also be noted that GVH#1 has already been authorized under emergency permitting criteria. The same performance standards which are required for GVH#5 and GVH#6 also apply to GVH#1.

220 ENVIRONMENTAL DESCRIPTION

The well sites range in elevation from approximately 8400 to 8600 feet. The well sites are located in the Summit Creek/Emma Park area of the Book Cliffs. General vegetation includes sagebrush-grass, aspen and oak brush communities.

221 Prime Farmland Investigation

Due to limiting terrain, lack of water for irrigation and no evidence of past cultivation of the sites, it is concluded that no prime farmland exists within the area of the well site disturbance.

222 Soil Survey

221.100 Soils Map

Site specific soils information will be provided for each site when conditions allow. An order I soil survey will be conducted of the area to help define the previous conditions at well sites 1, 5 and 6. This information will be used for final reclamation, as well as for the anticipated future gob gas vent wells.

222.200 Soil Identification

See Attachment 2-1, Order 3 Soil Survey

222.300 Soil Description

See Attachment 2-1, Order 3 Soil Survey

222.400 Soil Productivity

See Attachment 2-1, Order 3 Soil Survey

TABLE 2-1
Topsoil Volumes

Note: 2400 CY per Well is assumed until final surveys are done. Actual size of the pads could be less than 1 acre, in which case the volume stored will be reduced accordingly.

Well No.	Cubic Yards of Material
GVH-1	2400
GVH-5	2400
GVH-6	2400

223 Soil Characterization

See attachment 2-1, Order 3 Soil Survey

224 Substitute Topsoil

Andalex Resources, Inc. does not plan to use substitute topsoil as growth media unless described in Section 222.400.

230 OPERATION PLAN

231 General Requirements

231.100 Removing and Storing Topsoil Methods

The topsoil will be removed (and replaced) to a depth of 18 inches where the thickness exists, stockpiled and protected with a berm and/or silt fence. A qualified person will be on site during soil salvage to monitor and supervise the operation for the purpose of maximizing salvage volumes. Prior to topsoil salvage shrubs/vegetation will be removed and placed/wind rowed along the inside perimeter of the disturbed area. Stockpiled topsoil will not be allowed to remain at the angle of repose (1h:1v) for a period of longer than two weeks. During contemporaneous reclamation, or after two weeks, the stockpiled topsoil slopes will be reduced to less than 2h:1v. The topsoil will then be immediately seeded after the proper angle in achieved. Reseeding will use the approved seed mixture found in ARI's Mining and Reclamation Plan (page 3-21), or a mix recommended by the Division, and will

be hand broadcast, raked in slightly and mulched with straw or alfalfa hay. Hand broadcasting requires twice the seed rate per acre as drilling.

After the topsoil is removed, the mud pit will be excavated and the soils from the mud pit excavation will be stored immediately adjacent to the mud pit. Mud pit excavation of subsoil will be approximately 110 CY at each well site. Generally, it is expected that mud pits will be excavated in an area roughly 200 square feet by 15 feet deep. A larger area is possible, should the depth not be achievable, or multiple pits may be employed . However a mud pit volume of roughly 3000 cubic feet per drill site is needed. A portable container for drilling fluids will be used if necessary, should there not be sufficient subsoil depth to excavate a mud pit (where bed rock is encountered).

Topsoil beneath the topsoil stockpiles will not be removed. Ribbon or a marking fabric will be placed on top of the topsoil prior to placement of the topsoil from the well pad area.

The volume of subsoil to be salvaged and used to create berms around the perimeter of the well including the topsoil stockpile perimeter is approximately 150 cubic yards.

231.200 Suitability of Topsoil Substitutes/Supplements

See Section 224.

231.300 Testing of Topsoil Handling and Reclamation Procedures Regarding Revegetation

Andalex Resources, Inc. will exercise care to guard against erosion during and after application of topsoil and will employ the necessary measures to ensure the stability on graded slopes. Erosion control measures will include silt fences, berms, seeding, straw bales, soil roughening, and mulching of the soils.

Topsoil will be redistributed and the original soil surface beneath the topsoil stockpile will be roughened as presented in Section 242.100 and seeded with the seed mix described in Chapter 3, Section 356.

231.400 Construction, Modification, Use, and Maintenance of Topsoil Storage Pile

Topsoil removed from the drill pad sites will be stockpiled on the site. The estimated volumes of topsoil stockpile for each site are shown in Table 2-1. The stockpiles will be sized as shown in Table 2-2.

The slopes of the stockpile will be 1H:1V or approximately 45° during the construction phase. Soils in these areas generally have an angle of repose greater than 50 degrees, making a stockpile with 1:1 slopes feasible. The steeper slope also help minimize the area to be disturbed. During the operational phase the remaining topsoil will be stockpiled with slopes of 2H:1V.

TABLE 2-2
Topsoil Stockpile Dimensions*

Well No.	Length (ft)	Width (ft)	Height (ft)
GVH-1	100	40	16
GVH-5	100	40	16
GVH-6	100	40	16

* These are approximate dimensions of the topsoil stockpile and construction dimensions may vary.
Note: Sizes are based on the estimated 2400 CY from Table 2-1.

See section 234.200 for detailed information on the topsoil stockpile(s).

232 Topsoil and Subsoil Removal

232.100 Topsoil Removal and Segregation

All topsoil will be removed as a single layer with no segregation to a depth of 18 inches, where available. Topsoil will be removed using a dozer and/or loader. Refer to Section 231.100 for additional details.

232.200 Poor Topsoil

Not Anticipated

232.300 Thin Topsoil

Not Anticipated

232.400 Minor Disturbances Not Requiring Topsoil Removal

Not Anticipated

232.500 Subsoil Segregation

The B and C soil horizons will generally not be removed. However, in drill pad locations where the A horizon is 18 inches or less, up to six inches of sub-soil may be removed for the purpose of constructing a berm around the perimeter of the drill pad. Construction of this berm, which will be roughly triangular in shape and roughly one foot in height (1V:1H), will accumulate an additional storage of either lower A or possibly B horizon soil of approximately 800 cubic feet or 30 cubic yards of material, per site.

232.600 Timing

Topsoil removal will take place after all vegetation that could interfere with salvaging the topsoil has been grubbed.

232.700 Topsoil and Subsoil Removal Under Adverse Conditions

The topsoil will be removed first and stockpiled and the remaining soil horizons will be left in place, except where natural conditions render removal operations hazardous or detrimental to soils outside the disturbed area then topsoil will not be removed.

Conventional Machines - In locations where steep grades, adverse terrains, sever rockiness, limited depth of soils, or other adverse conditions exist that render soil removal activities using conventional machines hazardous, soils will not be salvaged and stockpiled. Such conditions are not likely to occur in these areas.

Substitute Topsoil - Importing of substitute topsoil is not anticipated (Section 224).

233 Topsoil Substitutes and Supplements

233.100 Overburden Materials Supplementing and/or Replacing Topsoil

No overburden material will be used.

233.200 Suitability of Topsoil Substitutes and Supplements

No substitute topsoil is planned.

233.300 Physical and Chemical Analyses

See Section 243

233.400 Testing of Substitute Topsoil

No substitute topsoil is planned.

234 Topsoil Storage

234.100 Topsoil Stockpiling

Topsoil will be stockpiled for later use in reclamation operations.

234.200 Topsoil Stockpile

Stable Stockpile Site - Stockpiled material will be placed on a stable site.

Protection from Contaminants and Compaction - To protect the topsoil from contaminants and unnecessary compaction that could interfere with vegetation, the stockpile will be isolated from the main surface area by a berm and/or silt fence. A sign designating "topsoil" will be installed on the stockpile.

The topsoil stockpile will be constructed in such a manner as to allow access for repair of the pile surfaces and diversion structures.

Wind and Water Erosion Protection - The topsoil stockpile will be protected from water erosion by berms, which trap sediment runoff from the stockpile. The berms have been designed to completely contain the 10-year 24-hour storm event (see Attachment 7-1). The stockpile will be surface pitted, gouged and/or roughened and revegetated using the grass seeds listed in Table 3-2 to prevent wind erosion.

Topsoil Redistribution - Stockpile soil will not be moved until redistribution during contemporaneous or final reclamation operations unless approved by the Division.

234.300 Topsoil Stockpile Relocation

Stockpiles soil in jeopardy of being detrimentally affected in terms of its quality by drilling operations may be temporarily redistributed or relocated on approval by the Division and modification of this M&RP.

240 RECLAMATION PLAN

241 General Information

Reclamation of the sites (topsoil redistribution, amendments, and stabilization) is discussed in Sections 242, 243 and 244 respectively.

242 Soil Redistribution

242.100 Soil Redistribution Practices

The topsoil will be placed after recontouring of the site has occurred. Topsoil will be handled when loose or in a friable condition. The moisture content will be visually monitored and water will be added as needed to enhance the soil's condition for handling. The approximate amount of topsoil available for each site is shown in Table 2-1.

The topsoil will be distributed in two phases at each well site. The first phase will be the contemporaneous reclamation of a portion of the pad area used during well construction (see Figures 5-2). During contemporaneous reclamation topsoil from the stockpile will be distributed on each site in the depths shown in Table 2-3.

Final reclamation will occur at all well sites after venting of the gob gas is complete, venting equipment has been removed and the well has been plugged. The topsoil stockpile storage area and any access road required to be removed will be reclaimed during this final phase. If access roads were pre-existing, they will not be reclaimed. Refer to Section 341 for additional information.

Soil Thickness - The topsoil will be distributed during contemporaneous and final reclamation in the thickness shown in Table 2-3. (Note: A topsoil thickness of 18" is assumed for all sites until actual measurements can be taken.)

TABLE 2-3
Approximate Topsoil Distribution Thickness

Well Site No.	Topsoil Thickness (inches)
GVH-1	18
GVH-5	18
GVH-6	18

Compaction - Prior to the application of topsoil, compacted subsoils will be roughened or loosened for a depth of 18 to 24 inches. To prevent compaction of topsoil, soil moving equipment will refrain from unnecessary operation over spread topsoil. The topsoil will be in a loosened condition prior to seeding.

Following the drying of the mud pit materials, the dirt excavated to create the mud pit will be mixed with the drill cutting and returned to the pit to prevent a boundary of hard material from forming in the mud pit are that would hamper root penetration and then compacted to minimize settling.

Erosion - Care will be exercised to ensure the stability of topsoil on graded slopes to guard against erosion during and after topsoil application. Post reclamation (contemporaneous and final) erosion control measures will be surface roughing, mulching and seeding. Outslopes along all the access roads will be seeded with a fast growing type of seed, rye grass for example. This will quickly establish an erosion control measure on the outslopes.

242.200 Regrading

The areas will be graded to their approximated original topographic configuration.

242.300 Topsoil Redistribution on Impoundments and Roads

The mud pits will be dismantled and filled following completion of drilling. See Section 242.100, Compaction for additional information. Mud pits will be covered with the same amount of topsoil as the rest of the site. The roads existing prior to starting the drilling program will not be reclaimed. Access roads built to allow entrance to the drilling pads will be reclaimed and will receive topsoil in the same depth as their corresponding pad areas when gob gas venting is complete.

243 Soil Nutrients and Amendments

The soils will be analyzed directly following salvage to determine if amendments are needed. Testing of the topsoil will be done according to Table 6 of the Division's Topsoil and Overburden Guidelines. The topsoil will be tested at a minimum for the following parameters: Texture, pH, electrical conductivity, total carbon, SAR, water holding capacity, plant available nitrogen, and phosphorus. Results of these analyses will be incorporated into Attachment 2-2.

244 Soil Stabilization

244.100 Protection and Stabilization of Surface Area

All reclaimed areas will be stabilized to control erosion by application of mulch, tackifier, and roughening of the surface. The areas will be graded to the approximately original topographic configuration. Seeding will be accomplished with the application of seeds and mulch with a long fiber tackifier or broadcast. Methods of protection and stabilization are further discussed in Chapter 3, Section 341.

244.200 Mulch Application

Mulch/tackifier will be applied to stabilize the soil on all areas that have been regraded and covered with growth media. For further discussion of revegetation practices to be utilized, see Chapter 3, Section 341.

244.300 Rills and Gullies

Postmining Land Use and Revegetation - Rills and gullies that are approximately nine (9) inches in depth and disrupt the postmining land use or reestablishment of vegetative cover will be regraded and seeded.

Water Quality - There are no streams immediately adjacent to the well sites.

250 PERFORMANCE STANDARDS

251 Topsoil, Subsoil, and Topsoil Supplements Management

All topsoil, subsoil, and topsoil supplements will be managed as outlined in Sections 230 and 240.

252 Stockpiled Topsoil and Subsoil

All stockpiled topsoil and subsoil will be managed according to plans outlined in Sections 230 and 240.

ATTACHMENT 2-1
SOIL INVENTORY AND ASSESSMENT

mountain big sagebrush and Thurber fescue. Elevation is 8,800 to 9,700 feet. The average annual precipitation is about 20 to 30 inches, the average annual air temperature is 36 to 38 degrees F, and the average freeze-free period is 40 to 60 days.

Typically, the surface layer is dark grayish brown loam about 11 inches thick. The subsoil to a depth of 35 inches is dark grayish brown loam and clay loam over sandstone. Depth to sandstone ranges from 20 to 40 inches.

Included in this unit are about 5 percent Beje fine sandy loam intermingled throughout the unit, 5 percent soils that are similar to this Senchert family soil but are more than 40 inches deep to bedrock and are intermingled throughout the unit, 5 percent Senchert loam, 3 to 15 percent slopes, and 5 percent Toze family loam.

Permeability of this Senchert family soil is moderately slow. Available water capacity is about 5 to 7 inches. Water supplying capacity is 12 to 16 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is slow, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on the Senchert family soil is 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Among the important plants are Thurber fescue, mountain brome, slender wheatgrass, aspen peavine, and mountain big sagebrush.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, brush management and seeding can be used to improve the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of this unit for rangeland seeding is good. Plants suitable for seeding include adapted native plants and smooth brome, regar brome, alfalfa, and bitterbrush.

This map unit is in capability subclass VIe, nonirrigated, and in the High Mountain Loam (Thurber Fescue) range site.

105—Senchert family-Senchert complex. This map unit is on mountain slopes. It is east of Scofield Reservoir. Slopes are 30 to 40 percent, 100 to 200 feet long, and concave to convex. Elevation is 8,000 to 9,100 feet. The average annual precipitation is about 20 to 30 inches, the average annual air temperature is 36 to 38 degrees F, and the average freeze-free period is 40 to 60 days.

This unit is 40 percent Senchert family very fine sandy loam, 30 to 50 percent slopes; 35 percent Senchert loam, 30 to 50 percent slopes; and 25 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 15 percent Podo cobbly loam and 10 percent soils that are similar to the Senchert soil but have 35 percent rock fragments and are under oak.

The Senchert family soil is moderately deep and well drained. It formed in alluvium and residuum derived dominantly from calcareous sandstone. The present vegetation is mainly mountain big sagebrush, vetch, and Columbia needlegrass. Typically, the surface layer is brown very fine sandy loam about 8 inches thick. The subsoil is brown clay loam about 16 inches thick. The substratum to a depth of 27 inches is very pale brown clay loam over calcareous sandstone. Depth to sandstone ranges from 20 to 40 inches.

Permeability of the Senchert family soil is moderate. Available water capacity is about 4.0 to 5.5 inches. Water supplying capacity is 9 to 13 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Senchert soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from sandstone. The present vegetation is mainly aspen, snowberry, and western coneflower. Typically, the surface layer is very dark grayish brown loam about 4 inches thick. The upper part of the subsoil is brown loam about 12 inches thick, and the lower part to a depth of 35 inches is brown clay loam over sandstone. Depth to sandstone ranges from 20 to 40 inches.

Permeability of the Senchert soil is moderate. Available water capacity is about 5 to 6 inches. Water supplying capacity is 12 to 17 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, wildlife habitat, recreation areas, and watershed.

The potential vegetation on the Senchert family soil is 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Among the important plants are Thurber fescue, mountain brome, slender wheatgrass, mountain big sagebrush, and aspen peavine.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, brush management and seeding can be used to improve the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of this soil for rangeland seeding is good. Plants suitable for seeding include adapted native

plants and smooth brome, regar brome, alfalfa, and bitterbrush.

The vegetation on the Senchert soil includes an overstory of aspen with a canopy of 40 percent. The understory vegetation is 65 percent grasses, 15 percent forbs, and 20 percent shrubs. Among the important plants are slender wheatgrass, Columbia needlegrass, Thurber fescue, and quaking aspen.

This soil is well suited to the production of aspen. The site index for aspen ranges from 60 to 80. The unit can produce about 40 cubic feet of aspen wood products per acre per year. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

The suitability of this soil for grazing is only fair because of the steepness of slope. Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, burning can be used to improve the rangeland vegetation.

The suitability of this soil for rangeland seeding is poor. The main limitations are competition from aspen and steepness of slope.

This map unit is in capability subclass VIIe, nonirrigated. The Senchert family soil is in the High Mountain Loam (Thurber Fescue) range site. The Senchert soil is in the High Mountain Loam (Aspen) woodland site.

106—Sheepcan-Podo-Rock outcrop complex. This map unit is on mountain slopes along the northern side of Minniemaud Creek. Slopes are 40 to 60 percent. Elevation is 7,000 to 8,500 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit is 35 percent Sheepcan stony loam, 40 to 70 percent slopes, eroded, in the lower lying areas; 25 percent Podo gravelly loam, dry, 40 to 60 percent slopes, eroded, in the higher lying areas; 15 percent Rock outcrop intermingled with the areas of the Podo soil; and 25 percent other soils and miscellaneous areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 8 percent Pathead gravelly loam; 5 percent Guben extremely bouldery fine sandy loam, 50 to 80 percent slopes; 5 percent Shupert gravelly loam; and small areas of Datino Variant extremely stony fine sandy loam, Cabba family bouldery loam, 40 to 70 percent slopes, and Badland.

The Sheepcan soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale of the Green River Formation. About 20 percent of this soil has slopes of 40 to 50 percent. Slopes are 100 to 200 feet long, are concave to convex, and have south aspect. The present vegetation in most areas is mainly big sagebrush, Utah juniper, Rocky mountain juniper, and antelope bitterbrush. Typically, the surface layer is light yellowish brown stony loam about 9 inches thick. The upper 19 inches of the underlying material is light gray and pale yellow gravelly clay loam and cobbly clay loam, and the lower part to a depth of 60 inches or more is white very cobbly clay loam.

Permeability of the Sheepcan soil is moderately slow. Available water capacity is 6.0 to 7.5 inches. Water supplying capacity is 8.5 to 11.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 inches. Runoff is medium, and the hazard of water erosion is high.

The Podo soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from shale of the Green River Formation. About 20 percent of this soil has slopes of 40 to 50 percent. Slopes are 200 to 300 feet long, are concave to convex, and have south aspect. The present vegetation in most areas is mainly Salina wildrye, curlleaf mountainmahogany, Utah juniper, pinyon, and Douglas-fir. Typically, the surface layer is pale brown gravelly loam about 1 inch thick. The underlying material to a depth of 8 inches is pale brown gravelly loam over hard shale. Depth to bedrock ranges from 8 to 20 inches.

Permeability of the Podo soil is moderately rapid. Available water capacity is about 1 to 2 inches. Water supplying capacity is 2 to 4 inches. Effective rooting depth is 8 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

Rock outcrop consists of exposures of bedrock in the form of steep and very steep escarpments and ridges. The rock is sandstone, siltstone, and shale. These areas are mostly barren; however, enough soil material has collected in small depressional areas, crevices, and cracks to support some grasses and stunted trees and shrubs.

This unit is used as rangeland, woodland, wildlife habitat, and recreation areas.

The potential plant community on the Sheepcan soil is 60 percent grasses, 15 percent forbs, and 25 percent shrubs. Among the important plants are Salina wildrye, prairie junegrass, snowberry, and serviceberry.

This soil is not grazeable by livestock because of the steepness of slope and the hazard of erosion.

The potential vegetation on the Podo soil includes an overstory of pinyon, Utah juniper, and Douglas-fir with a canopy of 30 percent. The understory vegetation is 10 percent grasses, 15 percent forbs, and 75 percent shrubs. Among the important plants are birchleaf mountainmahogany, Utah serviceberry, bluegrass, and Salina wildrye.

The site index for pinyon and Utah juniper is 37. Average yield is 6 cords of wood per acre. The potential for the production of posts or Christmas trees is poor.

the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of this soil for rangeland seeding is good. Plants suitable for seeding include those native to the soil and intermediate wheatgrass, smooth brome, regar brome, slender wheatgrass, and alfalfa. The suitability for grazing is good.

The potential plant community on the Beje soil is 60 percent grasses, 15 percent forbs, and 25 percent shrubs. Among the important plants are Salina wildrye, mountain big sagebrush, snowberry, and slender wheatgrass.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. Suitable brush management practices include prescribed burning and chemical spraying.

The suitability of this soil for rangeland seeding is very poor. The main limitations are the shallow soil depth and steepness of slope.

The potential plant community on the Rottulee family soil is 20 percent grasses, 10 percent forbs, and 70 percent shrubs. Among the important plants are birchleaf mountainmahogany, and serviceberry.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

It is not practical to revegetate large areas of this soil because of the stoniness of the soil. For critical erosion control, small areas can be mechanically treated and seeded. Plants that may be suitable for critical area seedings are those native to the soil and intermediate wheatgrass, orchardgrass, smooth brome, ladak alfalfa, Lewis flax, small burnet, and yellow sweetclover.

This map unit is in capability subclass VIe, nonirrigated. The Trag soil is in the Mountain Loam (Saline Wildrye) range site. The Beje soil is in the Mountain Shallow Loam (Mountain Big Sagebrush) range site. The Rottulee family soil is in the Mountain Stony Loam (Browse) range site.

117—Trag-Beje-Senchert complex. This map unit is on north aspects of plateaus in the Emma Park. Slopes are 3 to 30 percent, 300 to 400 feet long, and convex. Elevation is 7,200 to 8,500 feet.

This unit is 45 percent Trag clay loam, 3 to 30 percent slopes; 15 percent Beje loam, 3 to 15 percent slopes; and 15 percent Senchert loam, 3 to 15 percent slopes; and 25 percent other soils. The Trag soil is on mountain slopes, the Beje soil is on side slopes adjacent to drainageways, and the Senchert soil is on the sides of drainageways and in draws. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Perma family soils that have slopes of 15 to 40 percent and are on spur ridges, 15 percent soils that are similar to the Beje soil but have a layer of calcium carbonate accumulation and are on the sides of drainageways, and small areas of Beje very gravelly fine sandy loam and Silas loam in draws.

The Trag soil is very deep and well drained. It formed in alluvium derived dominantly from shale and sandstone. The present vegetation is mainly mountain big sagebrush, Salina wildrye, and serviceberry. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days. Typically, the surface layer is dark brown clay loam about 5 inches thick. The subsoil is brown and light brown clay loam about 34 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown clay loam.

Permeability of the Trag soil is moderate. Available water capacity is about 9.5 to 11.0 inches. Water supplying capacity is 10 to 16 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Beje soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from calcareous sandstone. The present vegetation is mainly Gambel oak, western wheatgrass, snowberry, and mountain big sagebrush. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days. Typically, the surface layer is brown loam about 6 inches thick. The subsoil to a depth of 14 inches is brown clay loam over sandstone. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Beje soil is moderate. Available water capacity is 2 to 3 inches. Water supplying capacity is 4 to 6 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 3 to 5 percent. Runoff is medium, and the hazard of water erosion is slight.

The Senchert soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone. The present vegetation is mainly aspen and snowberry. The average annual precipitation is 20 to 22 inches, the average annual air temperature is 37 to 38 degrees F, and the average freeze-free period is 50 to 60 days. Typically, the surface layer is very dark grayish brown loam about 4 inches thick. The upper part of the subsoil is brown loam about 12 inches thick, and the lower part to a depth of 35 inches is brown clay loam over calcareous sandstone. Depth to sandstone ranges from 20 to 40 inches.

Permeability of the Senchert soil is moderate. Available water capacity is about 5 to 6 inches. Water

supplying capacity is 9 to 17 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential plant community on the Trag soil is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Among the important plants are Salina wildrye, bluegrass, mountain brome, mountain big sagebrush, and snowberry.

If the desirable forage plants are mostly depleted, brush management and seeding can be used to improve the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of this soil for rangeland seeding is good. Plants suitable for seeding include those native to the soil and intermediate wheatgrass, smooth brome, regar brome, slender wheatgrass, and alfalfa. The suitability for grazing is good.

The potential plant community on the Beje soil is 60 percent grasses, 15 percent forbs, and 25 percent shrubs. Among the important plants are Salina wildrye, mountain big sagebrush, serviceberry, and slender wheatgrass.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. Suitable brush management practices include prescribed burning and chemical spraying.

The suitability of this soil for rangeland seeding is very poor. The main limitations are the shallow soil depth and steepness of slope.

The vegetation on the Senchert soil includes an overstory of aspen with a canopy of 60 percent. The understory vegetation is 65 percent grasses, 15 percent forbs, and 20 percent shrubs. Among the important plants are slender wheatgrass, Columbia needlegrass, Thurber fescue, and quaking aspen.

This soil is well suited to the production of aspen. The site index for aspen ranges from 60 to 80. The unit can produce about 40 cubic feet of aspen wood products per acre per year. Limitations for the harvesting of wood products are slight.

The suitability of this soil for grazing is good. Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, burning can be used to improve the rangeland vegetation.

The suitability of this soil for rangeland seeding is poor. The main limitation is competition from aspen.

The map unit is in capability subclass VIIe, nonirrigated. The Trag soil is in the Mountain Loam (Salina Wildrye) range site. The Beje soil is in the Mountain Shallow Loam (Mountain Big Sagebrush) range site. The Senchert soil is in the High Mountain Loam (Aspen) woodland site.

118—Trag-Croydon complex. This map unit is on mountain slopes in the vicinity of Pleasant Valley. Slopes are 30 to 60 percent, 100 to 200 feet long, and concave to convex. Elevation is 7,600 to 9,500 feet.

This unit is 50 percent Trag stony loam, 30 to 60 percent slopes, eroded; 30 percent Croydon loam, 30 to 50 percent slopes; and 20 percent other soils and miscellaneous areas. About 80 percent of the unit has slopes of 30 to 50 percent.

Included in this unit are about 10 percent soils that are similar to the Trag soil but have a thin extremely bouldery loam surface layer, 5 percent Falcon stony sandy loam, and 5 percent Rock outcrop.

The Trag soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale of the Black Hawk Formation. The present vegetation in most areas is mainly mountain big sagebrush, lupine, bitterbrush, and rabbitbrush. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 36 to 40 degrees F, and the average freeze-free period is 60 to 80 days. Typically, the surface layer is dark grayish brown stony loam about 10 inches thick. The subsoil is dark grayish brown clay loam about 26 inches thick. The substratum to a depth of 60 inches or more is dark grayish brown and very pale brown clay loam.

Permeability of the Trag soil is moderate. Available water capacity is about 9.0 to 10.5 inches. Water supplying capacity is 10 to 16 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is high.

The Croydon soil is deep and well drained. It formed in colluvium and alluvium derived dominantly from sandstone and shale of the Black Hawk Formation. The present vegetation in most areas is mainly quaking aspen, peavine, sneezeweed, Columbia needlegrass, and bluegrasses. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 34 to 38 degrees F, and the average freeze-free period is 40 to 60 days. Typically, the surface layer is dark yellowish brown and yellowish brown loam 16 inches thick. The subsurface layer is very pale brown loam 7 inches thick. The subsoil to a depth of 48 inches is light yellowish brown clay loam over weathered sandstone. Depth to sandstone ranges from 40 to 60 inches or more.

Permeability of the Croydon soil is moderately slow. Available water capacity is about 7 to 9 inches. Water supplying capacity is 16 to 18 inches. Effective rooting depth is 40 to 60 inches or more. The organic matter content of the surface layer is 5 to 10 percent. Runoff is rapid, and the hazard of water erosion is high.

ANDALEX RESOURCES, INC.

CENTENNIAL PROJECT
GOB GAS VENT HOLES
GVH#1, GVH#5 and GVH#6
C/007/019

FEBRUARY 2005

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BIOLOGY

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310 INTRODUCTION

This chapter presents a description of the biological resources found on the Centennial Project gob gas vent hole sites GVH#1, GVH#5 and GVH#6. areas. It should be noted that the information herein presented is general in nature, since site-specific studies have not been completed. Details for each of the sites will be provided upon completion of required studies.

311 Vegetation, Fish and Wildlife Resources

Vegetative, fish, and wildlife resource conditions in and adjacent to the proposed degassification wells are discussed in Section 320 of this submittal and the approved M&RP.

312 Potential Impacts to Vegetative, Fish, and Wildlife Resources

Potential impacts to vegetative, fish, and wildlife resources and the associated mitigation plan is presented in Section 330 and 340 of this chapter.

313 Description of Reclamation Plan

The reclamation plan used to restore the vegetative, fish, and wildlife resources to a condition suitable for the post mining land use is presented in Section 340.

320 ENVIRONMENTAL DESCRIPTION

321 Vegetation Information

This section and the approved M&RP contain the environmental descriptions of the vegetation for the permit and adjacent areas. Since vegetation reference areas, typically used for reclamation plans, are not available for Gob Gas Vent Holes 1, 5 and 6, the range site method will be used. For the range sites to be used for GVH hole numbers 1, 5 and 6, ANDALEX has provided productivity values, ecological site descriptions (ESD) and determinations that the sites are in fair to better condition as estimated by NRCS methods. This Range site method is considered a Class III type survey and is included in Attachment 3-1

321.100 Plant Communities Within the Proposed Permit Area

Plate 19A of the M&RP shows the sites to be generally in the sagebrush-grass, aspen and oak brush communities. Vegetation specific to each of the sites will be provided when conditions allow access. ARI is committed to performing a qualitative vegetative inventory (analysis) during the summer of 2005, providing that 2005 is a normal precipitation year.

312.200 Land Productivity Prior to Mining

(see 312.100) Also, ARI will take photographs of the sites prior to disturbance. These photo locations will be identifiable and repeatable.

TABLE 3-1
Land Productivity
(To be determined)

Well No.	Productivity (lbs.) Per Acre
GVH-1	See Mountain Loam Range Site
GVH-5	See Mountain Loam Range Site
GVH-6	See High Mountain Loam Range Site

322 Fish and Wildlife Information

Fish and wildlife information associated with the degas wells is provided in this chapter. A summary of the fish and wildlife resource information for th permit and adjacent areas is contained in Section 322.100 through 322.200 of the approved M&RP.

322.100 Level of Detail

The scope and level of detail within the "Gob Gas Vent Holes" amendment are sufficient to design the protection and enhancement plan for wildlife and fish associated with the degas wells. Additional information pertaining to fish and wildlife in the permit area is located in the M&RP.

322.200 Site-Specific Resource Information

Raptors - An aerial raptor nest survey was done of the area by the Utah Division of Wildlife Resource personnel in 2004. The results of the survey are provided in Appendix D of the M&RP.

A raptor survey will be conducted of the well site areas, each year that the wells are in operation.

Bats - No known open mine shafts, caves, adits or other man made structures that might provide habitats for bats are known to exist in the degas project area. The sites are open and the lack of a food source would force the bats to seek habitat and nourishment elsewhere.

Threatened and Endangered Plant and Wildlife Species - There are no known federally or state listed threatened and endangered plant and wildlife species within the sites planned for degassification wells. This is based on research and analysis by Mt. Nebo Scientific of Springville, Utah and EIS of Helper Utah. The Bureau of Land Management has also reviewed the access and drill sites and has stated that although this area represents important habitat for both Mule deer and Elk, it is not characterized as crucial

or critical.

There are no known groundwater or surface water flows to the Colorado or Green Rivers with potential for impact by the drilling of the degas wells. Potential adverse affects to the four Colorado River endangered fish species (refer to table below) would not be likely since there is no direct route to the Colorado River or Green River from the proposed well locations. Per the Windy Gap Process consumption estimates for the degas wells: evaporation from ventilation - zero, drill holes will not intersect the coal seam being mined, therefore no access to mine ventilation until after area is sealed; coal preparation - zero, no coal preparation at degas sites (see Sections 522 and 523); sediment pond evaporation - zero, no sediment pond at degas sites (see Section 732.200); subsidence effects on springs - zero, no anticipated subsidence at degas sites (see Section 525); alluvial aquifer abstraction into mines - zero, no alluvial aquifer abstractions associated with degas drill holes (see Sections 513.500 and 600); postmining inflow to workings - zero, no workings for postmining inflow associated with degas wells (see Sections 513.500 and 600); coal moisture loss - zero, no coal therefore no moisture loss (See Sections 522 and 523). Mitigation will not be required since the estimated loss for the construction and reclamation of the degas holes is zero acre feet per year.

Federal and State Listed, Threatened, Endangered and Candidate Species
Plants and Wildlife
Carbon County, Utah
October, 2002

CARBON

Graham Beardtongue	*Penstemon grahamii*
Uinta Basin Hookless Cactus	*Schlerocactus glaucus*
Bonytail[4, 10]	*Gila elagans*
Colorado Pikeminnow[4, 10]	E *Ptychocheilus lucius*
Humpback Chub[4, 10]	*Gila cypha*
E Razorback Sucker [4, 10]	*Xyrauchen texanus*
E Bald Eagle [3]	*Haliaeetus leucocephalus*
T Mexican Spotted Owl [4]	*Strix occidentalis lucida*
T Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*
Black-footed Ferret [6]	*Mustela nigripes*
E	

1 Nests in this county of Utah
2 Migrates through Utah, no resident populations.
3 Wintering populations (only five known nesting pairs in Utah).
4 Critical habitat designated in this county.
5 Critical habitat proposed in this county
6 Historical range.
7 Experimental nonessential population
8 Introduced, refugia population.
9 Candidate species have no legal population under the Endangered Species Act. However, these species are under active consideration by the Service for addition to the Federal List of Endangered and Threatened Species and my be proposed or listed during the development of the proposed project.
10 Water depletions from any portion of the occupied drainage basin are considered to adversely affect or adversely modify the critical habitat of the endangered fish species, and must be evaluated with regard to the criteria described in the pertinent fish recovery programs.

For additional information contact: U.S. Fish and Wildlife Service, Utah Field Office, 2369 West Orton Circle, Suite 50, West Valley City, Utah 84119 Telephone (801) 975-3330.

322.300 Fish and Wildlife Service Review

If requested, Andalex Resources, Inc. authorizes the release of information pertaining to Section 322 and 333 to the U.S. Fish And Wildlife Service Regional and Field Office for their review.

323 Maps and Aerial Photographs

Location of the well sites can be seen in Figure 1-1 of this submittal.

323.100 Location and Boundary of Proposed Reference Area

Reference areas for the well sites will be established during the vegetative studies. Gob Vent Holes 1,5 and 6 will employ range sites for determining vegetative success. Subsequent holes will use standard reference areas including baseline data.

323.200 Elevation and Locations of Monitoring Stations

N/A

323.300 Facilities for Protection and Enhancement

Section 333.300 and 358.500 of the approved M&RP contain additional discussion pertaining to protective measures to be taken by Andalex Resources, Inc.

323.400 Vegetation Type and Plant Communities

Vegetative types and plant communities will be outlined in the vegetative report in Attachment 3-1 upon completion.

330 OPERATION PLAN

331 Measures Taken to Disturb the Smallest Possible Area

The well sites will be sized to disturb the smallest acreage possible and still meet the requirements for the drilling equipment. The drainage control required will be built to satisfy the environmental requirements. Please refer to the typical proposed site plans for the gob gas wells which show estimated dimensions, location and type of sediment control, location of topsoill storage as well as approximate size and set-up of equipment.

332 Description of Anticipated Impacts of Subsidence

Refer to Section 525.

333 Plan to Minimize Disturbances and Adverse Impacts

General control and mitigation measures addressing potential related biological impacts will include the following. (All well sites will be fenced according to land-owner requirements and suitable for wildlife protection)

- Minimizing the total area of disturbance
- Design, construction, and operation of the well sites to minimize impacts
- Exclusion of wildlife from potentially hazardous areas, and
- Reclamation of disturbed areas when they are no longer needed.

All water associated with the drilling of these wells will be appropriated and hauled and/or pumped to the sites by a licensed contractor. Since the drilling of degas wells does not involve the mining of coal, the USWFS consumption requirements for underground operations do not apply (i.e., evaporation from ventilation, coal preparation, sediment pond evaporation, subsidence of springs, alluvial aquifer abstractions into the mine, postmining inflow to workings, coal moisture loss, direct diversions).

333.100 Minimize Disturbance to Endangered or Threatened Species

Andalex Resources, Inc. will apply all methods necessary to minimize disturbances or any adverse effects to threatened or endangered species. Note that T&E species are not anticipated to be discovered, however, should ARI determine that such species exist, the regulatory authority will be notified and appropriate remedial action taken. Also, See Section 322.200.

333.200 Species and Habitats

All species and habitats within the permit area will be protected to the best of Andalex Resources, Inc. ability. Note that T&E species are not anticipated to be discovered, however, should ARI determine that such species exist, the regulatory authority will be notified and appropriate remedial action taken.

333.300 Protective Measures

Refer to Section 333.300 of the approved M&RP. All well sites will be fenced and road construction will avoid habitat if discovered.

340 RECLAMATION PLAN

341 Revegetation

Revegetation of the sites will occur in two phases. The first phase is to redistribute topsoil and seed the well area not needed for access and operation of the gas exhaust blower. The second phase will consist of plugging the well and distributing the remaining topsoil and seeding on the remaining pad area. Refer to Section 242.100 for additional detail.

The short-term goal of this revegetation plan is the immediate stabilization of the disturbed sites through erosion control this objective will be achieved through controlled grading practices, proper seedbed preparation to encourage rapid plant establishment, inclusion of rapidly establishing species in the seed mixture to be planted, and mulch application.

The long-term goals are to establish useful, and productive range. These goals will be attained through the selection and placement of desirable and productive plant species and a commitment to monitor and maintain revegetated areas throughout the bond liability period.

The well sites will be fenced to discourage wildlife and livestock from grazing the reclaimed areas until bond release.

341.100 Schedule and Timetable

The reclamation timetable shown in Figures 5-6 of this submittal and the reclamation monitoring schedule is found in Chapter 2, R645-301-240 of the approved M&RP.

341.200 Descriptions

Species and Amounts of Seed - The well sites will be planted with the seed mix listed on Table 3-2. The seed mix will be used in both contemporaneous and final reclamation phases. The seed will be incorporated with a small amount of wood fiber mulch and applied by hydroseeding equipment or broadcast. Refer to Section 234.200 for topsoil stockpile seeding description.

Methods Used for Planting and Seeding - The degassification sites will be graded to final contour, then ripped to relieve compaction. The depth of ripping will be from 18 to 24 inches. Following ripping, topsoil will be applied to the ripped surface and left in a gouged and roughened state.

Mulching Techniques - Wood fiber mulch will be applied on top of the seed with hydroseeding equipment at the rate of 2,000 pounds per acre and anchored with a tackifier.

Irrigation, Pest, and Disease Control - No irrigation is planned and pesticides will not be used unless previously approved by the Division.

Measures Proposed for Revegetation Success - Refer to Section 356.

341.300 Greenhouse Studies, Field Trials, or Other Equivalent Studies

Refer to the Section 341.300 of the approved M&RP.

342 Fish and Wildlife

342.100 Enhancement Measures

Post bond release enhancement measure will include the establishment of vegetation for wildlife food, cover, and the break up of large blocks of monoculture to diversify habitat.

342.200 Plants Used for Wildlife Habitat

Nutritional Value - The nutritional value will be consistent with that of vegetation in the surrounding areas.

Cover - Cover will be comparable to the cover on the associated reference area.

342.300 Cropland

Cropland is not a postmining land use.

342.400 Residential, Public Service, and Industrial Land Use

No residential, industrial or public service use is planned.

350 PERFORMANCE STANDARDS

351 General Requirements

Andalex Resources, Inc. commits to conduct all operations in accordance with the plans submitted in Sections R645-301-330 through R645-301-340 of the permit application.

352 Contemporaneous Reclamation

Reclamation activities prior to final reclamation will, to the extent feasible, be performed contemporaneously. Contemporaneous reclamation will be performed at the well sites following construction of the wells. Refer to Section 341 for additional details.

353 Revegetation: General Requirements

A vegetative cover will be established on all reclaimed areas to allow for the designated postmining land use of grazing. Refer to Section 411 for additional information.

353.100 Vegetative Cover

The seed mix proposed for revegetation is intended to provide vegetative cover that will be diverse, effective, and permanent. The seed mixture was selected with respect t the climate, potential seedbed quality, erosion control, drought tolerance, and the mixture's ability for quick establishment and spreading.

Native Species - The reclamation vegetation mixture will be comprised of species indigenous to the area and capable of achieving the postmining land use. Diversity of species should allow utilization of plants by wildlife and domestic livestock. The recommended seed mix is comprised of native species.

Extent of Cover - The vegetative cover will be at least equal in extent to the cover at the designated reference areas.

Stabilizing - The vegetative cover mixture is capable of stabilizing the soil surfaces from erosion.

353.200 Reestablished Plant Species

Compatible - The reestablished plant species have been selected to ensure their compatibility with the approved postmining use.

Seasonal Characteristics - The revegetation plant species will have the same growing season as the adjacent areas.

Self-Generation - The reestablished plants are species capable of self-generation and plant succession.

Compatibility - The seed mix suggested for revegetation contains plants native to the area and compatible with the plant and animal species of the permit area.

Federal and Utah Laws or Regulation - The seed mix purchased to revegetate the degassification well sites will contain no poisonous or noxious plants (see Section 234.200). No species will be introduced in the area without being approved by the Division.

Table 3-2
Reclamation Seed Mix
(See MRP, page 3-21)
This seed mixture will be modified at the recommendation of the Division, Bureau of Land management and in consultation with the private surface owner.

SPECIES	#PLS/acre	#pls/sq.ft**

353.300 Vegetative Exception

Andalex Resources, Inc. does not require vegetative exception at this time.

353.400 Cropland

The permit area contains no land designated as cropland.

354 Revegetation: Timing

Andalex Resources, Inc. will follow the recommended guidelines for revegetation and planting during the first normal period for favorable planting conditions after replacement of the topsoil. In Utah the planting period is usually Fall due to the precipitation events.

355 Revegetation: Mulching and Other Soil Stabilizing Practices

Mulch and/or other soil stabilizing practices (roughing, etc.) Will be used on all areas that have been regraded and covered by topsoil (Section 341.200). Andalex, Resources, Inc. will exercise care to guard against erosion during and after application of topsoil.

356 Revegetation: Standards for Success

356.100 Success of Revegetation

The success of revegetation will be judged on the effectiveness of the vegetation for postmining land use, the extent of cover on each degassification well site compared to their respective reference areas. In the case specifically of Gob Gas Vent hole numbers 1, 5, and 6, ANDALEX will employ the range site method for determining an area in the immediate vicinity of these holes which will act as a revegetation reference area appropriate for both interim and final reclamation. These range site(s) will be chosen by an expert in this field, approved by the Division. In the case of all other future gob gas wells, ANDALEX will use the traditional reference area method, which will include baseline data to be collected in the Spring/Summer of 2005.

Sampling Techniques - Andalex Resources, Inc. will comply with the standards for success, statistically valid sampling techniques for measuring success, and the approved methods outline in the Division's "Vegetation Information Guidelines, Appendix A" for sampling.

The sampling methods to be used during reclamation will be specific to the requirements at the time of reclamation. Nonetheless, according to the currently approved UDOGM guidelines, these sampling methods would be used: sample adequacy, cover (line interception), density (belt transects or plots) and productivity (clipping). The Jaccard's

Community Coefficient will be used to calculate acceptable plant similarity and diversity.

Standards for Success - The standards for success will include criteria representative of undisturbed lands in the area of the degas wells as means to evaluate ground cover, production and stocking of th reclaimed site.

356.200 Standards for Success

Standards of success will be applied in accordance with the approved postmining land use as described in this section.

Grazing Land and Pasture Land - The ground cover and production of living plants on the revegetated area will be at least equal to the reference area.

Cropland - There is no area designated as cropland within the degassification well sites.

Fish and Wildlife Habitat - The postmining land use for the degas well sites will be wildlife habitat on pre-existing roads. Pre-existing roads will be returned to their approximate original contour and compacted.

Industrial, Commercial or Residential - The postmining land use for the permit area is not designated for industrial, commercial, or residential use.

Previously Disturbed Areas - N/A

356.300 Siltation Structures

Siltation structures will be maintained until the disturbed areas have been stabilized and revegetated. For additional details on siltation structures, see Sections 542 and 763 of this amendment.

356.400 Removal of Siltation Structures

The land on which siltation structures are located will be revegetated in accordance with the reclamation plan discussed in Section 353 and 357. Refer to Section 763 for additional information pertaining to the removal of siltation structures.

357 Revegetation: Extended Responsibility Period

Andalex Resources, Inc. will be responsible for the success of revegetation for a period of 10 years following seeding of the reclaimed area or upon Diviison bond release.

357.100 Extended Period Begins

The period of extended responsibility will begin after disturbed areas have been reseeded.

357.200 Vegetation Parameters

Vegetation parameters will equal or exceed the approved success standard during the last 2 years of the responsibility period. The success standards are outlined in Section 356 of this application.

357.300 Husbandry Practices

The use of husbandry practices are not being requested.

358 Protection of Fish, Wildlife, and Related Environmental Values

Andalex Resources, Inc. will minimize disturbances and adverse impacts on wildlife and their related environments as outlined in Section 333 of the approved M&RP and Section 342 of this submittal. See Chapter 7, Section 731.100 of the approved M&RP for methods to protect water sources in the area.

358.100 Existence of Endangered or Threatened Species

The well sites will not be constructed or operated where they might jeopardize the existence of any endangered or threatened species. Refer to Section 322.200 and Attachments 3-1, 3-2 and 3-3 for additional information pertaining to threatened, endangered, and sensitive species.

State or federally listed endangered or threatened species will be reported to the Division upon its discovery.

358.200 Bald and Golden Eagles

Andalex Resources, Inc. understands that there is no permission implied by these regulations for taking of bald or golden eagles, their nest, or eggs. If found, nests will be reported to the Division.

358.300 Taking of Endangered or Threatened Species

Andalex Resources, Inc. understands that there is no permission implied by these regulations for taking of endangered or threatened species, their nest, or eggs.

358.400 Replacement of Wetland or Riparian Vegetation

The sites contain no wetland or riparian vegetation.

358.500 Manmade Wildlife Protection Measure

Electric Power Lines - No utilities will exist at the well sites.

Potential Barriers - No potential barriers will exist at any of the well sites. No ponds exist at the well sites. Refer to Section 231.100 and 242 for information pertaining to the mud pit.

ATTACHMENT 3-1
VEGETATION INVENTORY
NRCS LETTER

ANDELEX RESOURCES, INC.

Michael W. Glasson, P.G.
P.O. Box 902
Price Ut. 84501

March 31, 2005

Dear Sir,

Range Site Information from the Carbon County Soil Survey
GVH site #1,#5 and #6 are located on sheet number 10 of the Carbon County Soil Survey T. 12 S. R. 11 E. Sec. 31
Number 1 and #5 are located in mapping unit 117-Trag-Bege-Senchert complex. GVH Site #1 and #5 are located on the Trag soil of this complex. The Range Site for this soil is Mountain Loam (Salina Wildrye). The productivity of the Mountain Loam (Salina Wildrye) range site is 1900 pounds per acre. The range site is in good ecological condition.

GVH site #6 is located in mapping unit number 105-Sencert Family-Sencert complex. GVH site #6 is located on Sencert Family of this mapping unit . The range site for the Sencert Family soil is High Mountain Loam (Thurber Fescue). The High Mountain Loam (Thurber Fescue) range site production is 1800 pounds per acre. The range site is in fair condition.

Sincerely,
Signature George S. Cook

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

This draft ecological site description is approved for field use and testing for a one year period beginning MM, YYYY.
Additional information and comments on this site should be sent to the Utah State Range Management Specialist.

STATE: Utah
SITE TYPE: Rangeland
ECOLOGICAL SITE NAME: Mountain Loam (Salina wildrye)
SITE NUMBER: 048AY409UT
MLRA: 048A
Original Site Description: Author: GSC DJS Date: 05/25/1981
Revised Site Description: Author: GSC DJS Date: 01/18/1994
Approved by: Title: State Range Cons. Signed: Pat Shaver Date: 05/27/1994

Ecological Site Definition - A distinctive kind of land, with specific physical characteristics, which differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation, and in its response to management.

A. PHYSICAL CHARACTERISTICS

(description narrative of this particular site)

1. SOILS

Depth: >60 inches
Surface Textures:
Surface Fragments(<=3" % cover, >3" % cover):
Subsurface Textures:
Subsurface Fragments(<=3" % vol, >3" % vol):
Geologic Parent Materials: Colluvium from Sedimentary Parent Materials
Moisture Regime:
Temperature Regime:
Runoff: Medium to Rapid
Permeability(min-max): Moderate to Moderately Slow
Drainage Class(min-max): Well Drained
Water Erosion Hazard:
Wind Erosion Hazard:
Electrical Conductivity (EC in mmhos/cm):
Sodium Adsorption Ration (SAR):
Soil Reaction (1:1 water):
Soil Reaction (0.1 M CaCl2):
pH Range:
Available Water Capacity (inches):

Major Soils Associated With This Site:

Soil Survey Area: 616
Trag CL, 3 to 30% Carbon SS
Trag L, 3 to 8%
Doney Family GR-SL, 15 to 40%
Brycan L, 3 to 8%
Trag ST-L, 30 to 60%
Frandsen L, 1 to 8%
Rabbitex SIL, 15 to 50%

Additional information may be found in Section II of the Field Office Technical Guide.

Site Type: Rangeland
Ecological Site Name: Mountain Loam (Salina wildrye)
Site Number: 048AY409UT

2. PHYSIOGRAPHIC FEATURES

Landform and Position: Pediment Shoulders and Backslopes and on Mountain Slopes
Aspect: Low Elevation-North / High Elevation-Southwest

	Minimum	Maximum
Slope:	15	50
Elevation:	7000	9200

Flooding:
Frequency:
Duration:
Ponding:
Depth (inches):
Frequency:
Duration:
Water Table Depth:

B. CLIMATIC FEATURES

Mean Annual Precipitation (inches): 16-20
Mean Annual Air Temperature: 40-45
Mean Annual Soil Temperature: 43-47
Frost Free Period (days): 60-100
Freeze Free Period (days): 0-0

Temperature and Moisture Distribution:

Temp	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
High												
Mean												
Low												

ppt	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
High												
Mean	1.67	1.64	1.74	1.67	1.59	1.17	1.66	2.00	1.66	1.63	1.35	1.45
Low												

Climate Stations: St. ID.: Location: Period:
From: To:
(Includes factors such as storm intensity, precipitation dependability, origin and pattern of storms, driest and wettest months, orographic effects, etc.)

Influencing Water Features (if any):

Wetland Description(Cowardin System) System Subsystem Class

Stream Types(Rosgen System) System

C. PLANT COMMUNITY CHARACTERISTICS

1. Potential Plant Community Description and Ecological Factors

The general view of this site is Salina wildrye and mountain big sagebrush. The natural plant community is composed of approximately 60 percent perennial grasses, 10 percent forbs, and 30 percent shrubs by air-dry weight. No trees are found in the potential natural plant community, other that a few scattered Douglas-fir and Gambel oak.

2. Plant Community Composition by Weight and Percentage

Grasses and Grasslike, %

Common Name	National Symbol	Group	Pounds per Acre		% by Weight of Total Composition	
			Low	High	Low	High
Salina wildrye	LESAS		375	525	25	35
Nevada bluegrass	PONE3		75	150	5	10
Bluebunch wheatgrass	PSSP6		45	75	3	5
Indian ricegrass	ACHY		45	75	3	5
Needleandthread	HECO26	1	45	75	3	5
Prairie junegrass	KOMA	1	45	75	3	5
Letterman needlegrass	ACLE9	1	45	75	3	5
Ross sedge	CARO5	1	45	75	3	5
Columbia needlegrass	ACNE9	1	45	75	3	5
Other perennial grasses	PPGG	1	75	150	5	10
Other annual grasses	AAGG	1	75	150	5	10

Forbs, %

Common Name	National Symbol	Group	Pounds per Acre		% by Weight of Total Composition	
			Low	High	Low	High
Pacific aster	ASCH2	2	15	45	1	3
Wyoming Indian paintbrush	CALI4	2	15	45	1	3
Blue flax	LIPE2	2	15	45	1	3
Spurred lupine	LUCAC3	2	15	45	1	3
Lobeleaf groundsel	SEMU3	2	15	45	1	3
Longleaf hawksbeard	CRAC2	2	15	45	1	3
Watson penstemon	PEWA	2	15	45	1	3
Common yarrow	ACMI2	2	15	45	1	3
Arrowleaf balsamroot	BASA3	2	15	45	1	3
Cushion wild buckwheat	EROV	2	15	45	1	3
Small leaf pussytoes	ANMI3	2	15	45	1	3
Scarlet globemallow	SPCO	2	15	45	1	3
Lambert crazyweed	OXLA3	2	15	45	1	3
Other perennial forbs	PPFF	2	150	225	10	15
Other annual forbs	AAFF	2	150	225	10	15

Shrubs/Vines, %

Common Name	National Symbol	Group	Pounds per Acre		% by Weight of Total Composition	
			Low	High	Low	High

Mountain big sagebrush	ARTRV		75	150	5	10
Mountain snowberry	SYOR2		75	150	5	10
Bitterbrush	PUTR2		45	75	3	5
Utah serviceberry	AMUT		45	75	3	5
Birchleaf mountainmahogany	CEMO2	3	15	45	1	3
Crispleaf wild buckwheat	ERCO14	3	15	45	1	3
Creeping Oregon grape	MARE11	3	15	45	1	3
Woods rose	ROWO	3	15	45	1	3
Tobaccobrush	CEVE	3	15	45	1	3
Gambel oak	QUGA	3	15	45	1	3
Other shrubs	SSSS	3	45	75	3	5

Trees, %

Common Name	National Symbol	Group	Pounds per Acre		% by Weight of Total Composition	
			Low	High	Low	High

3. Plant Community Annual Production

At the highest potential similarity index, this site will produce approximately the following amount of air-dry herbage, expressed as pounds/acre:

	Low	High
Favorable Year	1900	2000
Average Year	1400	1500
Unfavorable Year	900	1000

4. Ground Cover and Structure

a. Vegetative

Vegetation Type	Percent Canopy Cover	Height Range (ft)	Percent Basal Area Cover
Grasses & Grass-like (perennial)	40	2	15
Forbs (perennial)	5	1	2
Shrubs	20	3	10
Trees			
Cryptogams			

b. Other

Litter	
Coarse Fragments	
Bare Ground	

5. Ecological Dynamics of the Site

As ecological conditions deteriorates due to overgrazing, bitterbrush, serviceberry, bluegrass, and bluebunch wheatgrass decrease, while Salina wildrye and mountain big sagebrush increase.

When the potential natural plant community is burned, bitterbrush, serviceberry and sagebrush decrease while Salina wildrye and snowberry increase.

Thistles, stickseed, houndstongue and other annual or biannual weeds are most likely to invade this site.

Plant Communities & Transitional Pathways

(Show a steady state diagram with influences to move from one steady state to another)

6. Plant Growth Curves

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Percent Growth	0	0	0	5	15	40	30	5	5	0	0	0
Name	PNC											
ID Number	UT4091											
Description	Excellent Condition											

7. Aspect Differences Near MLRA Boundaries

(Give related range sites in MLRA's above and below)

8. Associated Sites Within MLRA

048AY448UT
Mountain Stony Loam (Mountain big sagebrush)

048AY451UT
Mountain Stony Loam (Browse)

9. Correlated Sites in Other States

(Give site name and number)

D. MAJOR USES OF THIS SITE

1. Livestock

a. Site Factors Influencing Management

Salina wildrye provides a moderate amount of fair quality forage during the growing season but is unpalatable when mature and dried. (Vallentine 1961; from Welsh et al: A Utah Flora 1987 pg. 726).

b. Guide to Forage Quality(Plant preference by season)

Species	Oct-Nov	Dec-Feb	Mar-May	Jun-Sep

VG = Very Good G = Good F = Fair P = Poor

2. Wildlife

a. Site Factors Influencing Management

This site produces food and cover for wildlife.

b. List of Potential Species Present

Wildlife species that use this site include sage grouse, rabbit, coyote, mule deer, and elk.

This is a short list of the more common species found. Many other species are present as well and migratory birds are present at times.

c. Guide to Forage Preference of Managed Wildlife Species

Wildlife Species →				
Plant Species ↓	Use	Season	Use	Season

Use - A = preferred or desirable
B = some use, but less important
C = little use or used occasionally

Season - F = Fall (Oct-Nov)
W = Winter (Dec-Feb)
Sp. = Spring (Mar-May)
Su. = Summer (Jun-Sep)

3. Recreational Uses

This site offers color and aesthetic appeal during the growing season. Recreation values include hiking and hunting.

4. Wood Products

None

5. Other Uses

E. THREATENED AND ENDANGERED SPECIES

1. Plants

2. Animals

F. MODAL LOCATION AND DOCUMENTATION

State: Utah County:
Latitude: Longitude:

Modal Soil: Trag L, 3 to 8% — fine-loamy mixed, Typic Argiboralls

Type Location: See Carbon Soil Survey for location.

General Legal Description:

Field Office Site Location
Price
Roosevelt

Legal Description: See Carbon Soil Survey for location.

Data Collected and References

Sampling Source	Number of Records	Range Similarity Index			
		> 76%	51-75%	26-50%	0-25%
NRCS - ECS - 417					
UTAH - RANGE - 2					
Permanent Transect Location					

Other References

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

This draft ecological site description is approved for field use and testing for a one year period beginning MM, YYYY.
Additional information and comments on this site should be sent to the Utah State Range Management Specialist.

STATE: Utah
SITE TYPE: Rangeland
ECOLOGICAL SITE NAME: High Mountain Loam (Thurber fescue)
SITE NUMBER: 048AY515UT
MLRA: 048A
Original Site Description: Author: GSC DJS Date: 11/15/1974
Revised Site Description: Author: GSC DJS Date: 02/01/1994
Approved by: Title: State Range Cons. Signed: Pat Shaver Date: 05/27/1994

Ecological Site Definition - A distinctive kind of land, with specific physical characteristics, which differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation, and in its response to management.

A. PHYSICAL CHARACTERISTICS

(description narrative of this particular site)

1. SOILS

Depth: 20-40 inches
Surface Textures: Dark Grayish Brown Loam
Surface Fragments(<=3" % cover, >3" % cover):
Subsurface Textures: Dark Grayish Brown Loam and Clay Loam
Subsurface Fragments(<=3" % vol, >3" % vol):
Geologic Parent Materials: Residuum from Sandstone
Moisture Regime:
Temperature Regime:
Runoff: Medium
Permeability(min-max): Moderately Slow
Drainage Class(min-max): Well Drained
Water Erosion Hazard: Moderate
Wind Erosion Hazard:
Electrical Conductivity (EC in mmhos/cm):
Sodium Adsorption Ration (SAR):
Soil Reaction (1:1 water):
Soil Reaction (0.1 M CaCl2):
pH Range:
Available Water Capacity (inches): 5-6

Major Soils Associated With This Site:

Soil Survey Area: 616
Senchert Family L

Additional information may be found in Section II of the Field Office Technical Guide.

2. PHYSIOGRAPHIC FEATURES

Site Type: Rangeland
Ecological Site Name: High Mountain Loam (Thurber fescue)
Site Number: 048AY515UT

Landform and Position: Gently Sloping to Very Steep Mountain Slopes
Aspect: All

	Minimum	Maximum
Slope:	1	20
Elevation:	7200	9999

Flooding:
Frequency:
Duration:
Ponding:
Depth (inches):
Frequency:
Duration:
Water Table Depth:

B. CLIMATIC FEATURES

Mean Annual Precipitation (inches): 20-30
Mean Annual Air Temperature: 36-38
Mean Annual Soil Temperature: 32-47
Frost Free Period (days): 0-0
Freeze Free Period (days): 40-60

Temperature and Moisture Distribution:

Temp	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
High	32	34	38	47	58	69	77	74	67	57	41	34
Mean	20	21	25	34	44	52	60	58	50	42	29	22
Low	8	9	12	22	29	35	42	41	34	27	17	10

ppt	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
High												
Mean	2.29	2.10	2.29	1.90	1.38	1.12	1.49	2.15	1.60	1.49	1.58	2.59
Low												

Climate Stations: St. ID.: Location: Period:
From: To:

(Includes factors such as storm intensity, precipitation dependability, origin and pattern of storms, driest and wettest months, orographic effects, etc.)

Influencing Water Features (if any):

Wetland Description(Cowardin System) System Subsystem Class

Stream Types(Rosgen System) System

C. PLANT COMMUNITY CHARACTERISTICS

Site Type: Rangeland
Ecological Site Name: High Mountain Loam (Thurber fescue)
Site Number: 048AY515UT

1. Potential Plant Community Description and Ecological Factors

The general view of this site is grassland. The composition by air-dry weight is approximately 60 percent perennial grasses, 25 percent forbs, and 15 percent shrubs.

2. Plant Community Composition by Weight and Percentage

Grasses and Grasslike, %

Common Name	National Symbol	Group	Pounds per Acre		% by Weight of Total Composition	
			Low	High	Low	High
Thurber fescue	FETH		500	625	20	25
Mountain brome	BRCA5		125	250	5	10
Slender wheatgrass	ELTR7		125	250	5	10
Muttongrass	POFE		75	125	3	5
Nevada bluegrass	PONE3		25	75	1	3
Douglas sedge	CADO2		25	75	1	3
Columbia needlegrass	ACNE9		25	75	1	3
Letterman needlegrass	ACLE9		25	75	1	3
Prairie junegrass	KOMA		25	75	1	3
Western wheatgrass	PASM		25	75	1	3
Sandberg bluegrass	POSE		25	75	1	3
Other perennial grasses	PPGG		125	250	5	10
Other annual grasses	AAGG		125	250	5	10

Forbs, %

Common Name	National Symbol	Group	Pounds per Acre		% by Weight of Total Composition	
			Low	High	Low	High
Thickleaf peavine	LALA3		75	125	3	5
Spurred lupine	LUCAC3		75	125	3	5
Tobacco root	VAED		25	75	1	3
Common yarrow	ACMI2		25	75	1	3
Lobeleaf groundsel	SEMU3		25	75	1	3
Fendler meadowrue	THFE		25	75	1	3
Wyoming Indian paintbrush	CALI4		25	75	1	3
Pacific aster	ASCH2		25	75	1	3
Shaggy fleabane	ERPU2		25	75	1	3
Sweetanice	OSOC		25	75	1	3
Other perennial forbs	PPFF		250	375	10	15
Other annual forbs	AAFF		250	375	10	15

Shrubs/Vines, %

Common Name	National Symbol	Group	Pounds per Acre		% by Weight of Total Composition	
			Low	High	Low	High
Mountain big sagebrush	ARTRV		75	125	3	5

Mountain snowberry	SYOR2		75	125	3	5
Stickyleaf low rabbitbrush	CHVIV4		25	75	1	3
Silver sagebrush	ARCA13		25	75	1	3
Creeping Oregon grape	MARE11		25	75	1	3
Other shrubs	SSSS		75	125	3	5

Trees, %

Common Name	National Symbol	Group	Pounds per Acre		% by Weight of Total Composition	
			Low	High	Low	High

3. Plant Community Annual Production

At the highest potential similarity index, this site will produce approximately the following amount of air-dry herbage, expressed as pounds/acre:

	Low	High
Favorable Year	2900	3000
Average Year	2400	2500
Unfavorable Year	1900	2000

4. Ground Cover and Structure

a. Vegetative

Vegetation Type	Percent Canopy Cover	Height Range (ft)	Percent Basal Area Cover
Grasses & Grass-like (perennial)	40	2	20
Forbs (perennial)	15	1	5
Shrubs	10	3	5
Trees			
Cryptogams			

b. Other

Litter	
Coarse Fragments	
Bare Ground	

5. Ecological Dynamics of the Site

As this site deteriorates due to grazing pressure, palatable perennial grasses and forbs decrease while sagebrush, snowberry, and rabbitbrush increase. Fire tolerant plants dominate the site after the burn.

Plant Communities & Transitional Pathways

(Show a steady state diagram with influences to move from one steady state to another)

6. Plant Growth Curves

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Percent Growth	0	0	0	0	5	20	40	30	5	0	0	0
Name	PNC											
ID Number	UT5151											
Description	Excellent Condition											

7. Aspect Differences Near MLRA Boundaries

(Give related range sites in MLRA's above and below)

8. Associated Sites Within MLRA

048AY506UT
High Mountain Loam (Aspen)

9. Correlated Sites in Other States

(Give site name and number)

D. MAJOR USES OF THIS SITE

1. Livestock

a. Site Factors Influencing Management

This site provides proper grazing for cattle and sheep during summer and fall.

b. Guide to Forage Quality(Plant preference by season)

Species	Oct-Nov	Dec-Feb	Mar-May	Jun-Sep

VG = Very Good G = Good F = Fair P = Poor

2. Wildlife

a. Site Factors Influencing Management

This site provides food and cover for wildlife.

b. List of Potential Species Present

Wildlife using this site include mule deer, elk, rabbit, coyote, squirrel, hawk, owl, and sparrow.

This is a short list of the more common species found. Many other species are present as well and migratory birds are present at times.

c. Guide to Forage Preference of Managed Wildlife Species

Wildlife Species →				
Plant Species ↓	Use	Season	Use	Season

Use - A = preferred or desirable
B = some use, but less important
C = little use or used occasionally

Season - F = Fall (Oct-Nov)
W = Winter (Dec-Feb)
Sp. = Spring (Mar-May)
Su. = Summer (Jun-Sep)

3. Recreational Uses

Hiking and hunting

4. Wood Products

None

5. Other Uses

E. THREATENED AND ENDANGERED SPECIES

ATTACHMENT 3-2
THREATENED, ENDANGERED, AND SENSITIVE SPECIES INFORMATION

MT NEBO SCIENTIFIC, INC.
research & consulting

VIA: Facsimile

March 16, 2005

Michael Glasson
ANDALEX RESOURCES
Centennial Mine
P.O Box 902
Price, UT 84501

RE: T & E Species

Dear Mr. Glasson:

This letter is in response to your questions regarding threatened or endangered species in a specific location within your mine permit area. The area in question was at and around Section 31, Township 12 South, Range 11 East, or also called the *Summit Creek/Mathis Lease Area*.

Although I have made no on-site field investigations in that specific area, I have checked the list of potential T&E species in Carbon County, Utah and compared it to the biological resources I have available at my office as well as vegetation maps I have prepared of that area. It is my opinion that there is very little chance that any federally listed endangered or threatened plant or animal species occur there.

Let me know if I can be of further assistance.

Sincerely,

Patrick D. Collins, Ph.D.
Biologist

330 East 400 South, Ste. 6, P.O. Box 337, Springville, Utah 84663
(801) 489-6937, (fax) 489-6779

ATTACHMENT 3-3
2005 RAPTOR SURVEY
(To be Included)

ANDALEX RESOURCES, INC.

CENTENNIAL PROJECT
GOB GAS VENT HOLES
GVH#1, GVH#5 and GVH#6
C/007/019

FEBRUARY 2005

CHAPTER 4
LAND USE AND AIR QUALITY

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LIST OF ATTACHMENTS

Attachment 4-1 Cultural Resource Survey and Inventory
Attachment 4-2 Surface Land Owner Notification

410 LAND USE

411 Environmental Description

A statement of the conditions and capabilities of the land to be affected by mining and reclamation operations follows in this section.

411.100 Premining Land Use

The area is utilized for the landowners private use, including hunting and as open range for livestock and wildlife.

411.110 Land Use Map and Narrative

Refer to the same section of the approved M&RP.

411.120 Land Capability

The major plant communities at well sites 1, 5 and 6 are identified in Section 321. No cultivated lands lie within the well boundaries, due to the limiting terrain and lack of water for irrigation. Refer to Section 321.200, Table 3-1 of this submittal for forage production per acre for each well site.

411.130 Land Use Description

The wells are located on land administered by Dave R. & Mildred Cave, et al., and Mathis Land, Inc. and zoned by Carbon County for mining and grazing (MG-1).

No industrial or municipal facilities are located on or immediately adjacent to the well sites.

411.140 Cultural and Historic Resources Information

Archeological surveys will be conducted on any future proposed well sites as soon as weather and ground conditions allow. The Cultural Resource Survey will be included in Attachment 4-1 of this application. For Gob Gas Holes 1, 5 and 6, Prliminary research and file search has been conducted by Scenco-Phoenix of Price, Utah for Gob Vent Holes 1, 5 and 6 and the research indicates that there is a very low probability of the occurrance of cultural resources at the proposed drill sites.

Andalex Resources, Inc. agrees to notify the Division and State Historical Preservation Office (SHPO) of previously unidentified cultural resources discovered in the course of operations. Andalex also agrees to have any such cultural resources evaluated in terms of NRHP eligibility criteria. Protection of eligible cultural resources will be in accordance

with Division and SHPO requirements. Andalex will also instruct its employees that it is a violation of federal and state low to collect individual artifacts or to otherwise disturb cultural resources.

411.200 Previous Mining Activity

Andalex Resource, Inc. has no knowledge of the removal of coal or other minerals in the well site areas.

412 Reclamation Plan

412.100 Postmining Land-Use Plan

All uses of the land prior to the wells construction/operation and the capacity of the land to support prior alternate uses will remain available throughout the life of the sites.

Andalex Resource, Inc. intends the postmining land use to be livestock and wildlife grazing and other uses as indicated by the land owner (hunting, etc.). Final reclamation activities will be completed in a manner to provide the lands to parallel the premining land use.

412.200 Land Owner or Surface Manager Comments

Surface lands are owned by Dave R. & Mildred Cave, et al., and Mathis Land, Inc. Appropriate landowner approvals have been obtained for the proposed wells. Required notification of drilling will be sent to the landowners prior to start. Copies of the notification letters will be included in Attachment 4-2.

413 Performance Standards

413.100 Postmining Land Use

Postmining land uses are discussed in Section 412.100. The postmining lands will be reclaimed in a timely manner and capable of supporting such uses (see Chapters 2, 3, 5 and 7).

413.200 Determining Premining Uses of Land

Refer t Section 411.100.

413.300 Criteria for Alternative Postmining Land Use

No alternative postmining land uses have been planned.

414 Alternative Land Use

No alternative postmining land uses have been planned.

420 AIR QUALITY

421 Air Quality Standards

Gob gas vent hole activities will be conducted in compliance with the requirements of the Federal Clean Air Act and the Utah Air Conservation Rules.

422 Compliance Efforts

See Fugitive Dust Control Plan, Section 424.

423 Monitoring Program

Refer to the same section in the approved M&RP.

424 Fugitive Dust Control Plan

Operational areas that are used by mobile equipment will be water sprayed to control fugitive dust. The application of water will be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition unless it is below freezing.

425 Additional Division Requirements

Refer to the same section of the approved M&RP.

ATTACHMENT 4-1
CULTURAL RESOURCE SURVEY

SENCO-PHENIX

March 22, 2005

Mr. Mike Glasson
Andalex Resources, Inc.
Tower Division
P.O. Box 902
Price, UT 845501

Re: Gob Vent Holes, Aberdeen Mine

Dear Mike:

Pursuant to your request I performed a file search at the Price Field Office of the BLM on March 17, 2005. The purpose of the file search was to determine the probability of archeological sites in the vicinity of your three proposed gob vent holes in Section 31, T12S, R11E, Carbon County, Utah. The file search revealed the following:

- 1984 Nickens and Associates surveyed three 160-acre blocks in Sections 29, 32 and 33. The block in Section 32 was in the SW ¼, adjacent to the proposed project. No cultural resources were located.
- 1986, SENCO-PHENIX surveyed several drill hole locations and access corridors just south of the proposed project. No cultural resources were located.

The area of the proposed project has a very low probability for containing archeological sites for the following reasons:

1. The negative finding of the previous surveys, which include over 500 acres of inventory.
2. High elevation above 8,400 feet.
3. Lack of permanent water or other favorable environmental factors.

SENCO-PHENIX feels that no historic properties will be affected and recommends archeological clearance without a class III walkover survey.

If we can be of further assistance please do not hesitate to contact us.

Sincerely,

John A. Senulis

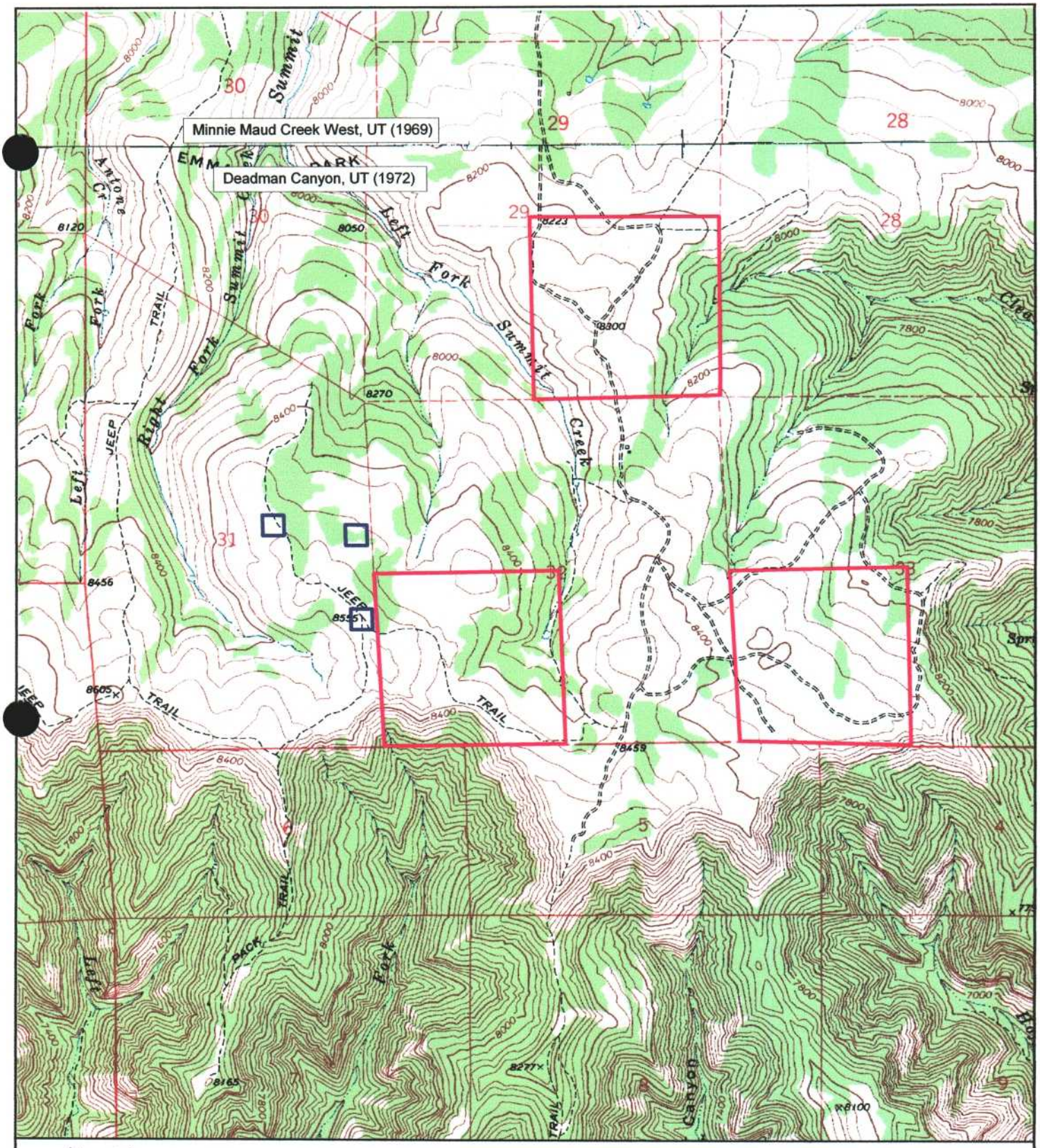
John A Senulis
Principal Investigator

Encl.

References

Reed, Alan D. and Susan Chandler
1984 *A Sample Oriented Cultural Resource Inventory in Carbon, Emery and Sanpete Counties*, BLM through Nickens and Associates, Montrose Colorado. (84-30)

Senulis, John A.
1986 *Intensive Cultural Resource Survey and Inventory of the Left Fork of Deadman Canyon Coal Mine*, SENCO-PHENIX, Salt Lake City, Utah. (86-424)



SENCO-PHENIX

N

Scale 1:24,000
1"= 2,000'

Proposed Drill Holes

Previous Survey

Eligible Sites

Ineligible Sites

Gob Vent Holes, Aberdeen Mine
Andalex Resources, Tower Division
Carbon County, Utah
Section 31, T12S, R11E
March 2005
SPUT-494

ATTACHMENT 4-2
SURFACE LAND OWNER NOTIFICATION

The surface owner land use agreement is also on file at the Carbon County Recorder's office in Price, Utah

MEMORANDUM OF UNDERGROUND COAL LEASE

THIS MEMORANDUM OF UNDERGROUND COAL LEASE ("Lease") entered into effective as of the 1st day of January, 1998, among **Mathis Land, Inc.**, a Utah corporation, c/o William Dale Mathis, 643 South 200 East, Price, Utah 84501; **Rex Morrell Mathis**, Box 311, Duchesne, Utah 84021; **JoAnn L. Mathis Ross**, 1208 North 575 West, Centerville, Utah 84014; **William Dale Mathis**, 643 South 200 East, Price, Utah 84501; **Marc Pickup** and **Shawnda Pickup Cave** (Mark Pickup and Shawnda Pickup Cave are executing individually and as an heir to the Estate of Gwen Dora Mathis Pickup, respectively son and daughter) having an address at 818 North 900 West, Price, Utah 84501 (collectively all of the above hereinafter referred to as "Lessors"); and ANDALEX Resources, Inc., a Delaware corporation, with an address at 45 West 10000 South, Suite 401, Sandy, Utah 84070, hereinafter called "Lessee."

W I T N E S S E T H:

The parties hereto agree:

1. Upon the terms and conditions set forth in that certain Underground Coal Lease (hereinafter "Lease"), effective of even date herewith, all of which are hereby incorporated herein as if set forth in full, Lessor does hereby grant and lease unto Lessee for the purposes described in paragraph 2 of this Memorandum of Underground Coal Lease and in the Lease those certain lands situated in Carbon County, State of Utah, more particularly described as follows, to-wit:

Township 12 South, Range 10 East, SLB&M

Section 36: All.

00065992 Bk00408 Pg00348-00355

ANN B. O'BRIEN-COUNTY OF CARBON
1998 MAY 07 10:19 AM FEE $28.00 BY
REQUEST: ANDALEX RESOURCES, INC

2. The Underground Coal Lease grants to Lessee the exclusive right and privilege to explore for, mine (by any method), remove extract, store, prepare, ship and dispose of the coal and gas occurring in coal seams, beds or deposits when vented as a non-commercial substance in conjunction with coal development or extraction operations. The leasing, exploration for, or development of other minerals or substances other than coal and substances mixed with coal shall not interfere in any way with the coal mining operations of the Lessee during the term of this Lease. Leases related to other minerals issued by Lessors after the date of this Lease shall be specifically made subject to the priority of the coal mining operations.

3. The term of the Lease is for a term of ten (10) years which commenced on January 1, 1998, subject to the right of Lessee to extend said term for ten (10) additional periods of one year.

00065992 Bk00408 Pg00349

IN WITNESS WHEREOF, the parties hereto have caused this Memorandum of Underground Coal Lease and the Underground Coal Lease to be signed effective as of the day and year first above written.

SOCIAL SECURITY NUMBER OR EMPLOYER IDENTIFICATION NO.:	LESSORS:
87-0379137	MATHIS LAND, INC., a Utah Corporation By: Wm Dale Mathis Its: President
529-56-7255	Rex Morrell Mathis Rex Morrell Mathis
528-66-3380	JoAnn L. Mathis Ross JoAnn L. Mathis Ross
528-66-3381	Wm Dale Mathis William Dale Mathis
	HEIRS OF GWEN DORA MATHIS PICKUP:
529-21-2381	Marc Pickup ~~Mark~~ Pickup Marc
528-21-9058	Shawnda Pickup Cave Shawnda Pickup Cave

00065992 Bk00408 Pg00350

LESSEE:

61-0931325

ANDALEX RESOURCES, INC.,
a Delaware corporation

By: Samuel C Dudley
Its: ~~V. President - Western Operations~~

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 6 day of May, 1998, personally appeared before me William Dale Mathis, the President of Mathis Land, Inc., a Utah corporation, who signed the foregoing instrument on behalf of Mathis Land, Inc. and acknowledged to me that he executed the same.

NYLA NOYES
NOTARY PUBLIC • STATE of UTAH
190 N. CARBON AVE.
PRICE, UT. 84501
COMM. EXP. 11-17-1999

Nyla Noyes
Notary Public
Residing at: Price, Utah

My commission expires:

11-17-99

00065992 Bk00408 Pg00351

00065992 Bk00408 Pg00352

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 6th day of May, 1998, personally appeared before me Rex Morrell Mathis, who signed the foregoing instrument and acknowledged to me that he executed the same.

NYLA NOYES
NOTARY PUBLIC • STATE of UTAH
190 N. CARBON AVE.
PRICE, UT. 84501
COMM. EXP. 11-17-1999

Nyla Noyes
Notary Public
Residing at: Price, Utah

My commission expires:

11-17-99

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 5 day of May, 1998, personally appeared before me JoAnn L. Mathis Ross, who signed the foregoing instrument and acknowledged to me that she executed the same.

Margie Hancock
Notary Public
Residing at: Centerville

My commission expires:

5/12/99

MARGIE HANCOCK
Notary Public
STATE OF UTAH
My Comm. Expires MAY 12, 1999
25 WEST PARRISH LANE CENTERVILLE UT 84014

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 6th day of May, 1998, personally appeared before me William Dale Mathis, who signed the foregoing instrument and acknowledged to me that he executed the same.

NYLA NOYES
NOTARY PUBLIC • STATE of UTAH
190 N. CARBON AVE.
PRICE, UT. 84501
COMM. EXP. 11-17-1999

Nyla Noyes
Notary Public
Residing at: Price, Utah

My commission expires:

11-17-99

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 4th day of May, 1998, personally appeared before me Marc Pickup, who signed the foregoing instrument and acknowledged to me that he executed the same.

NYLA NOYES
NOTARY PUBLIC • STATE of UTAH
190 N. CARBON AVE.
PRICE, UT. 84501
COMM. EXP. 11-17-1999

Nyla Noyes
Notary Public
Residing at: Price, Utah

My commission expires:

11-17-99

00065992 Bk00408 Pg00353

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 4th day of May, 1998, personally appeared before me Shawnda Pickup Cave, who signed the foregoing instrument and acknowledged to me that she executed the same.

NYLA NOYES
NOTARY PUBLIC • STATE of UTAH
190 N. CARBON AVE.
PRICE, UT. 84501
COMM. EXP. 11-17-1999

Nyla Noyes
Notary Public
Residing at: ~~11-17-99~~ Price, Utah

My commission expires:

11-17-99

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

On the 6th day of May, 1998, personally appeared before me Samuel C. Quigley, the V. President - Western Operations of ANDALEX Resources, Inc., who signed the foregoing instrument on behalf of ANDALEX Resources, Inc. and acknowledged to me that he executed the same.

NYLA NOYES
NOTARY PUBLIC • STATE of UTAH
190 N. CARBON AVE.
PRICE, UT. 84501
COMM. EXP. 11-17-1999

Nyla Noyes
Notary Public
Residing at: Price, Utah

My commission expires:

11-17-99

00065992 Bk00408 Pg00354

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LICENSE AGREEMENT
with Surface Owner Consent

This **LICENSE AGREEMENT** ("Agreement") is made and entered into effective as the 29th day of March, 2005, by and between Funnon T. Shimmin whose address is 1551 East North Coal Creek Road, Wellington, Utah 84542, mailing address P.O. Box 785, Price, Utah, 84501, (hereinafter "Owner") and ANDALEX Resources, Inc., a Delaware corporation, whose address is 45 West 10000 South, #401, Sandy, Utah 84070 (hereinafter "ANDALEX").

RECITALS:

WHEREAS, Owner is the owner of certain lands located in Carbon County, Utah more particularly described as all of Section 32, Township 12 South, Range 11 East, SLB&M (hereinafter the "Premises"); and

WHEREAS, Owner is the owner of other lands located in Carbon County, Utah more particularly described as S1/2 and NE1/4 Section 29, Township 12 South, Range 11 East, SLB&M (hereinafter the "Access Lands"); and

WHEREAS, ANDALEX is the Lessee of record of United States coal leases covering a portion of the Premises and owns or controls coal leases and/or the surface and mineral estate in lands in the vicinity of the Premises and is presently conducting coal mining operations on a portion of its lands; and

WHEREAS, ANDALEX desires to make use of the surface of the Premises and ensure access across the Access Lands for the purpose of conducting certain drilling and Gob Gas well maintenance operations in connection with its coal mining activities.

WITNESSETH:

NOW THEREFORE, for and in consideration of the mutual promises set forth below a payment [redacted] as described below and for other good and valuable consideration, the adequacy and receipt of which is hereby acknowledged, Owner and ANDALEX agree as follows:

1. License and Surface Owner Consent. Owner hereby consents to the use of the Premises including the use of roads by ANDALEX for the drilling of gob gas vent holes as necessary for underground coal mining operations and hereby licenses and permits ANDALEX, its contractors, agents and representatives, subject to the terms and conditions hereinafter stated, to access the Premises using roads on the Premises for the purpose of transporting men, materials and equipment and the establishment of gob gas well sites associated with the drilling of up to three gob gas ventilation wells. Said wells will be drilled as early as April 2005 and could be

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drilled as late as the Fall of 2006. To the extent necessary, the existing fence line will be modified to provide a fence around each well site. The fencing surrounding the well site will be connected to the existing fence to maintain a separation between Owners property and adjoining properties. It is anticipated that the well sites will be approximately 150 feet x 150 feet and the well site fence line could extend as much as 400 feet east of the existing fence line.

The Owner hereby consents to the use of Owner's existing roads through Access Lands for the purpose of providing access for men and equipment necessary for the drilling and year around maintenance of gob gas ventilation well sites associated with ANDALEX mining operations. With respect to the easements across neighboring lands which provide access to the Owner's property, ANDALEX shall be responsible for obtaining permission from said neighbors or ANDALEX shall have the right to establish Owner's easements at ANDALEX'S option and sole expense.

2. Term. The term of this Agreement shall commence effective as of March 22, 2005 and shall terminate as of December 31, 2010 unless on or before said date, ANDALEX has given written notice to Owner of its need to continue to use the Premises in connection with its mining operations. In such event, this Agreement shall be renewed for a period of one year and shall be subject to further one year renewals until the Premises are no longer needed for the ANDALEX mining operations.

3. Consideration. Upon execution of this Agreement, ANDALEX has compensated Owner in the amount of [redacted] as consideration for the first year of this Agreement. Until such time as ANDALEX has notified Owner that the Premises are no longer needed in connection with ANDALEX's mining operation, ANDALEX shall annually on the anniversary date of this Agreement make payment to Owner in the amount of [redacted] per well site location in active use by ANDALEX on the Premises and [redacted] per year for the right to use the roads on Premises and on Access Lands. Shut in wells and well sites under reclamation shall not be counted in this calculation.

4. Compliance with Laws. ANDALEX shall, at its sole cost and expense, fully comply with all state, federal and local laws, ordinances and regulations and any and all other legal requirements pertaining to its entry upon the Premises and the exercise of the rights granted pursuant to this Agreement.

6. Damages to Property and/or Livestock. ANDALEX hereby guarantees payment of damages for any damage to Owner's property and/or livestock that may result from its actions or those of any of its agents as a result of their activities on the Premises or the Access Lands.

7. Reclamation and Surrender. Prior to the expiration of the term of this Agreement, ANDALEX shall, at its sole cost and expense, reclaim and repair any damage done to the Premises or any improvements thereon to the standards required by the Division of Oil, Gas & Mining and such additional standards as Owner might reasonably request. ANDALEX shall also

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reestablish the fence line at the same location as it existed prior to the execution of this Agreement.

8. Liens. ANDALEX shall fully pay for any and all activities related to the conduct of its operations, including, but not limited to, labor and employment costs and expenses and materials utilized in connection with the rights granted pursuant to this Agreement. ANDALEX shall not permit or suffer any mechanic's or materialmen's liens of any kind or nature to be enforced against the Premises and ANDALEX shall indemnify and hold harmless Owner against any and all liens, claims, demands, costs and expenses of whatsoever nature in any way connected with or growing out of such work performed, labor performed, or materials furnished.

9. Indemnity. ANDALEX agrees to defend, hold harmless, and indemnify Owner from and against any and all claims, costs, expenses, damages and liabilities, including reasonable attorney's fees, arising from any bodily injury (including injury to the parties hereto), their offices, agents, servants and employees or property damage when such injury, death, loss, damage or destruction results from or arises in any way in connection with, or incident to, the right, privilege and permission herein granted, or results from or arises in connection with any work performed on the Premises by ANDALEX and its representatives under this Agreement.

10. No Waiver. The waiver by Owner of the breach of any condition, covenant or agreement herein contained, to be kept, observed and performed by ANDALEX, shall in no way impair the right of Owner to avail himself of any subsequent breach thereof.

11. Entire Agreement. This Agreement executed by the parties represents the entire understanding of the parties with respect to activities hereunder and such understanding may not be amended, modified or terminated in any way whatsoever without the express written consent of Owner.

12. Governing Law. The validity, interpretation and performance of this Agreement and any dispute arising under this Agreement shall be construed, enforced and governed in accordance with the laws of the State of Utah.

13. Successors and Assigns. This Agreement shall be binding upon the heirs, devisees, administrators, executors, successors in interest and assigns of the parties hereto.

14, Document Review Fee. Upon execution of this Agreement, ANDALEX agrees to pay to Owner the sum of [redacted] and no/100 dollars for and as a document and easement review fee.

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IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed effective as of the date first herein written.

OWNER:

Funnon T. Shimmin

Funnon T. Shimmin

ANDALEX

By: Samuel C Quigley

Its: V.P Operations

STATE OF UTAH)
ss
COUNTY OF Carbon)

The foregoing instrument was acknowledged before me this 28 day of March, 2005, by Funnon T. Shimmin.

KATHLEEN ATWOOD
NOTARY PUBLIC • STATE of UTAH
100 N. 200 W. #13
HUNTINGTON, UT 84528
COMM. EXPIRES 12-2-2007

Notary Public for
Residing at:
My Commission Expires:

STATE OF UTAH)
ss
COUNTY OF Carbon)

The foregoing instrument was acknowledged before me this 28 day of March, 2005, by Samuel Quigley, its V.P of ANDALEX Resources, Inc., a Delaware corporation located at 45 West 10000 South, #401, Sandy, UT 84070.

KATHLEEN ATWOOD
NOTARY PUBLIC • STATE of UTAH
100 N. 200 W. #13
HUNTINGTON, UT 84528
COMM. EXPIRES 12-2-2007

Notary Public for
Residing at:
My Commission Expires:

CONFIDENTIAL

Silvester & Conroy
Attorneys at Law
A Utah Limited Liability Company

Fred R. Silvester

1371 East 2100 South, Suite 200
Salt Lake City, Utah 841025

Tel (801) 532-2266
Fax (801) 532-2270
fred@silconlaw.com

March 17, 2005

Mr. John S. Kirkham
Stoel Rives, LLP
201 S. Main Street
Suite 1100
Salt Lake City, Utah 84111

Dear John:

My clients appreciated the candid meeting with Andalex management yesterday, and they are sensitive to the need for expeditious action so the mine can continue operations. We also understand Andalex is not presently willing to resolve issues relating to the methane which will be wasted through the drill holes. My clients are willing to enter an agreement on the surface issues and reserve their rights with respect to the gas.

The following terms are proposed for the issues discussed regarding access and drilling. My clients want the road up the canyon to stay on their property as much as possible, realizing there is a small portion presently on BLM land. If none of the improvements to the road extend onto BLM land future road maintenance will be easier. We realize there will be substantial improvement to accommodate drill rigs, those improvements will become the property of my clients when installed. For existing roads above the canyon any improvements become their property upon installation. All roads will require erosion controls, including water bars in the roads as well as drainage protections to avoid erosion from road run-off. Andalex will consult with my clients on road improvements to insure the least impact on the surrounding land.

All new roads, drill pads or other disturbance of the land will be reclaimed to my clients satisfaction. All drill pads will be fenced while in use. My clients would prefer no mud pits because even reclaimed they leave a bog for years. Mud and re-circulation liquids can be gathered in tanks.

The gate at the bottom of the canyon will always remain locked, even when Andalex employees are on the property. Andalex will keep a log of all persons with access keys, and will log in and out all persons going up the road for duties at the well sites. No Andalex employee or contractor may enter the property with a firearm.

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Andalex will provide my clients with detailed logs of the quantity and quality of methane exhausted from each drill hole. It is our understanding from the meeting yesterday there will be four drill holes on Section 31 and the panel 7 holes will be in use for approximately two years following the completion of panel 6. We assume from this that access and use of the drill holes will be complete within two years. Therefore the agreement on surface use will be for a period of 2 ½ years beginning immediately.

The financial terms my clients are willing to accept are as follows. They will lease all roads existing or developed to Andalex for [redacted] per year. They will lease four drill pads, whether used immediately or in the future, to Andalex for [redacted] per year per pad for a total of [redacted]

As my clients stated clearly in the meeting yesterday, the major impact on them is the nuisance and loss of quiet enjoyment of the land for the next two and a half years, since this property is a primary sanctuary for their extended family. My client will provide a release to Andalex for any claim they might have in the next two and a half years for the nuisance and loss of quiet enjoyment for a one time payment of [redacted] to be paid within sixty days.

My clients will not release claims they may have for the value of the methane exhausted from the property, nor will they release any future claim they may have for damages due to subsidence, or trespass outside the terms of the agreement.

Andalex will indemnify and hold harmless the land owners from any damages to equipment, or injury to its employees or contractors.

If these terms are acceptable, Andalex through its council should prepare the appropriate documents and may begin the road improvements.

Very truly yours,

Fred R. Silvester

FRS/tj

STOEL RIVES LLP
ATTORNEYS AT LAW

CONFIDENTIAL

201 S. Main Street, Suite 1100
Salt Lake City, Utah 84111
www.stoel.com

JOHN S. KIRKHAM
Direct (801) 578-6956
jskirkham@stoel.com

March 17, 2005

Fred R. Silvester, Esq.
Silvester & Conroy
1371 East 2100 South, Suite 200
Salt Lake City, Utah 84102

RE: ANDALEX Resources, Inc. – Cave–Critchlow Surface Use Agreement

Dear Fred:

I am in receipt of your letter of March 17, 2005 regarding the agreement to make use of the surface lands of your clients. We appreciate, very much, your timely response and your concern that this matter be expedited in order to insure that the needed surface activities can occur as soon as possible.

We appreciate very much the cooperative spirit in which your clients have made their proposal. Generally, the proposal is acceptable with several clarifications and suggested modifications. For purposes of these comments, I have numbered your paragraphs sequentially and will respond to each of the paragraphs.

Paragraph 1. The content of paragraph 1 is acceptable.

Paragraph 2. The content of paragraph 2 is acceptable subject to concurrence by the Division of Oil, Gas & Mining with respect to the maintenance of the roads after mining as an approved post-mining land use.

Paragraph 3. With respect to the first sentence, we must also comply with the requirements of the Division of Oil, Gas & Mining so we would suggest a simple addition to say that reclamation will be to your clients reasonable satisfaction and the requirements of the law. With respect to the second sentence, we would like to clarify that the fencing would probably not occur until drilling is complete. We anticipate there will be adjustments in the active area during the drilling period and would want to limit the enclosure to the minimum necessary. With respect to the third sentence, we understand that your clients would prefer that there be no mud pits. However, we have contacted the drilling contractor and because the contractor uses bio-degradable foam to float the cuttings, it is not practical to use tanks to replace the mud pits. Therefore, we are proposing as a substitute that the mud pits would be allowed but that they would be fenced until final reclamation of the pits has been approved by the land owners.

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Paragraph 4. ANDALEX finds these provisions acceptable. Our past experience indicates we might need to do a little further clarification as to exactly how the process will work for the use of keys and the logging of persons utilizing the road for access.

Paragraph 5. With respect to the content of this paragraph, again we need to clarify certain of the issues you have identified. While it cannot be determined at this time precisely how many gob gas vent holes will be needed, ANDALEX is currently anticipating the possibility that there will be a total of 8 holes on the lands in Section 31. At any given time, current planning would indicate that only 3-4 holes would be open and in use. The total elapsed time period for the use of holes on panels 6, 7, 10, and 11 could extend, including final reclamation of the holes, for a period of up to 6 years. Therefore, ANDALEX is proposing that the document will identify the fact that there could be as many as 8 drill holes on section 31 with the agreement in existence for a period of up to 6 years including final reclamation. We would be happy to discuss this further if it remains an issue.

Paragraph 6. The terms in paragraph 6 are acceptable in that ANDALEX is willing to accept a [redacted] annual payment per year covering [redacted] for the roads that will be developed on Sections 6 and 31 and [redacted] per year for the drill pads that will be in existence during the 6 year life of the Agreement. While we anticipate a total of 8 potential drill pads, we also anticipate that at any given time during the Agreement only 4 drill pads would be open and in use. Therefore, the terms as proposed are acceptable.

Paragraph 7. ANDALEX is agreeable to the one time payment of [redacted]. However, as indicated above, the life of the Agreement will need to be 6 years in order to accommodate the drill holes that could be needed in panels 10 and 11. Inasmuch as these panels are some distance from the family cabins, we believe this amount continues to be reasonable. As an aside, it is ANDALEX's position that this payment is significantly greater than ANDALEX would otherwise be obligated to pay under the terms of the patent for actual damage to the surface. However, in a spirit of cooperative utilization of the lands, ANDALEX is willing to make this payment as a demonstration of its good faith to cooperate in this mutually beneficial effort.

Paragraph 8. This provision is acceptable.

Paragraph 9. This provision is acceptable.

ANDALEX would request that your clients agree to a right to renew the surface use agreement on a year-to-year basis after the 6 year primary term if it is absolutely required to do so. As you can appreciate the production rate has diminished significantly because of the requirements

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imposed by MSHA. ANDALEX would like to have the flexibility to extend on a year-to-year basis if required to do so to obtain full utilization of the resource.

It is our proposal that if the modifications outlined above are acceptable to your client, that ANDALEX would be given immediate access to the property while we prepare a final form of a Drilling and Surface Use Agreement reflecting the terms described in your letter and this response. In order to demonstrate ANDALEX's good faith in this regard, we would immediately tender to you in trust for your clients a [redacted] payment and in return ANDALEX would be authorized to immediately start road construction in accordance with the terms of these letters. We would then work diligently to obtain the execution of the final drilling and surface use agreement evidencing the provisions contained in these letters at which time the [redacted] payment would be made. We are suggesting that this would all be accomplished within the next ten (10) days. I will prepare a first draft of the proposed document for your review. In order to prepare the document, we would also need to obtain from you all of the details with respect to the individuals to be named as Lessors under the Drilling and Surface Use Agreement.

If the foregoing is acceptable, please indicate by signing and returning a copy of this letter. Upon receipt, we will have an ANDALEX check hand-delivered to your office. If you have any questions or concerns, please do not hesitate to call me.

Very truly yours,

John S. Kirkham

JSK:jse
cc: Doug Smith
Sam Quigley

The foregoing terms are accepted on behalf of the land owners this 17 day of March, 2005.

Saltlake-248622.1 0020261-00001

ANDALEX
RESOURCES, INC

P.O. BOX 902
PRICE, UTAH 84501
PHONE (435) 637-5385
FAX (435) 637-8860

April 30, 2004

David R. and Mildred Cave, et. al.
3379 East Highway 6
Price, Utah 84501

Judson D. and Cherie Critchlow
229 South 500 east
Price, Utah 84501

RE: Surface Owners on Federal Coal Lease

Dear Mr. Dave, Cave, et.al.,

ANDALEX Resources, Inc. has applied for a Federal Coal Lease to extend its Aberdeen Mine workings to the north. This Federal Coal Lease, should ANDALEX successfully acquire it, will involve additional future underground development and longwall mining beneath your private surface, beginning in 2004. Utah Coal Mining Regulations require that ANDALEX inform you of this proposed mining activity beneath your surface and that its plans may be reviewed at the Utah Division of Oil, Gas and Mining offices in Salt Lake City, Utah and/or Price, Utah.

Utah Division of Oil, Gas and Mining
Coal Program
1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801

Utah Division of Oil, Gas and Mining
Coal Program/Price Field Office
College of Eastern Utah
451 East 400 North
Price, Utah 84501

Should you have any questions, please do not hesitate to call me.

Sincerely,

Michael W. Glasson
Resident Agent

cc: Mathis Land Company
Funnon T. Shimmin
Bureau of Land Mangement, Price Coal Office
School and Institutional Trust Lands Administration

ANDALEX RESOURCES, INC.

CENTENNIAL PROJECT
GOB GAS VENT HOLES
GVH#1, GVH#5 and GVH#6
C/007/019

FEBRUARY 2005

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ENGINEERING

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510 INTRODUCTION

This chapter provides a discussion of general engineering aspects, an operation plan, a reclamation plan, design criteria, and performance standards related to the degassification well sites. (#'s 1, 5 and 6) The activities associated with the construction and reclamation of the well sites have been or will be designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plans.

Designs and other information herein presented will be of a general nature or in the form of typicals, since the proposed sites are not yet accessible for detailed surveying or studies. Site specific information will be provided in this chapter as it becomes available.

511 General Requirements

The permit application includes descriptions of construction, maintenance, and reclamation operations of the proposed well sites with maps and plans. Potential environmental impact as well as methods and calculations utilized to achieve compliance with the design criteria are also presented.

512 Certification

Where required by the regulations, cross sections and maps in this permit application have been prepared by or under the direction of, and certified by, qualified registered professional engineers or land surveyors. As appropriate, these persons were assisted by experts in the fields of hydrology, geology, biology, etc.

512.100 Cross Sections and Maps

Cross sections for the degassification well pads will be provided upon completion of surveys. Typical road cross sections are shown on Figures 5-5.

512.200 Plans and Engineering Designs

Excess Spoil - No excess spoil will be generated from the well sites.

Durable Rock Fills - No durable rock fills will exist at the well sites.

Coal Mine Waste - No coal mine waste will exist at the well sites.

Impoundments - Refer to Section 733.200 of this submittal.

Primary Roads - Short sections of road may be required to access certain well sites. Topsoil will be stripped from the road alignment and stored with the topsoil stripped from

the pad area prior to grading the new access road. When possible, well sites will be placed on existing roads.

Variance from Approximate Original Contour - No variance from approximate original contour is required for the well sites.

513 Compliance with MSHA Regulations and MSHA Approval

513.100 Coal Processing Waste Dams and Embankments

No coal processing waste dams and embankments will exist at the well sites.

513.200 Impoundments and Sedimentation Ponds

Refer to Section 733.200 of this submittal.

513.300 Underground Development Waste, Coal Processing Waste, and Excess Spoil

No underground waste, coal processing waste, and excess spoil will exist at the well sites.

513.400 Refuse Piles

No refuse piles will exist at the well sites.

513.500 Underground Openings to the Surface

The well will be equipped with a valve that will be closed and locked when not in use. A typical well head is shown in Figure 5-4.

513.600 Discharge to Underground Mine

No discharge to the underground mine will occur at the well sites.

513.700 Surface Coal Mining and Reclamation Activities

No surface coal mining, or reclamation activities associated with surface coal mining will occur at the well sites.

513.800 Coal Mine Waste Fire

No coal waste will be developed, therefore, no coal waste fires will occur at the well sites.

514 Inspection

514.100 Excess Spoil

No excess spoil will be stored at the well sites.

514.200 Refuse Piles

No refuse piles will exist at the well sites.

514.300 Impoundments

Refer to Section 7133.200 of this submittal.

515 Reporting and Emergency Procedures

515.100 Slides

Refer to Section 515.100 in the approved M&RP.

515.200 Impoundment Hazards

No impoundments will exist at the well sites.

515.300 Temporary Cessation of Operations

If temporary cessation of the mining operations does occur, the wells will remain open. Once liberation of the gob gas is completed, the wells will be sealed as discussed in Section 542.700 of this submittal.

520 OPERATION PLAN

521 General

Detailed maps will be provided of each of the well sites when conditions allow access.

521.100 Cross Sections and Maps

Existing Surface and Subsurface Facilities Features - No buildings are located on or within 1,000 feet of any of the well sites.

Landowner, Right-of-Entry, and Public Interest - The land which the wells will be drilled on is owned by Dave R. & Mildred Cave, et al., and Mathis Land, Inc. Andalex Resources,

Inc. has completed landowner agreements to allow access for the construction and drilling of the wells (see Attachment 4-2).

Mining Sequence and Planned Subsidence - Refer to Section 525.

Land Surface Configuration - Surface contours of undisturbed well sites will be included when completed.

Surface Facilities - No permanent surface facilities will exist at the well sites.

521.200 Signs and Markers

Mine and Permit Identification Signs - A mine and permit identification sign will be displayed at each well site. This sign will be a design that can be easily seen and read, will be made of durable material, will conform to local regulation, and will be maintained until after the release of all bonds for the well site areas. The sign will contain the following information:

- Mine name,
- Company name,
- Company address and telephone number,
- MSHA identification number, and
- Permanent program permit identification number

Perimeter Markers - The perimeter of all areas affected will be clearly marked before beginning drilling activities. The markers will be a design that can be easily seen and read, will be made of durable material, will conform to local regulations, and will be maintained until after the release of all bonds for the permit area.

Buffer Zone Markers - Stream buffer zone markers will not be required at any of the well sites.

Topsoil Markers - Markers will be placed on all topsoil stockpiles. These markers will be a design that can be easily seen and read, will b made of durable material, will conform to local regulations, and will be maintained until topsoil is redistributed on the well sites.

Construction Markers - Not applicable.

522 Coal Recovery

No coal recovery will be performed at the well sites.

523 Mining Methods

No mining will be performed at the well sites.

524 Blasting and Explosives

No explosives are to be used at the well sites.

525 Subsidence

No subsidence will occur at the well sites, as a result of drilling and development of the degassification well sites. Subsidence could occur at the well site because of underground mining see Section 525 of the approved M&RP.

526 Mine Facilities

526.100 Mine Structures and Facilities

No buildings exist or are proposed at the well sites; therefore, no existing building will be used in connection with or to facilitate this proposed coal mining and reclamation plan.

526.200 Utility and Support Facilities

No utilities are to be installed at the well sites. A portable exhaust unit will be temporarily installed to draw gob gas to the surface from the mined panel. The exhaust blower will be started by using propane from portable tanks. Once started and running, the unit will be powered by burning the extracted gas. Excess gob gas will be vented to the atmosphere. The blower is approximately 12-feet long by 6-feet wide and about 10-feet tall. It is not known how long the degassification of the longwall panel will take.

527 Transportation Facilities

527.100 Road Classification

Well sites 1, 5 and 6 will be developed near existing private roads whenever possible. The new access roads will be classified as primary roads and will be maintained by the permitee. The access route will be by way of an existing road up the bottom of Deadman Canyon over a distance of 2 ½ miles. The existing road is suitable for access with the exception of widening approximately 4 turns and the installation of new 18-24 inch culverts at locations where road drainage was never previously installed by the road builder, during the construction sometime prior to 1977. It should be noted that silt fences will be installed along this road as an improvement while the road is being used by ARI. Any access roads which are no longer needed will be reseeded with the approved seed mixture at the appropriate season and as recommended by the Division. These measures will be monitored as necessary to determine success and/or the need for subsequent

treatment.

527.200 Description of Transportation Facilities

The well sites have been chosen close to existing roads whenever possible in the area to limit surface disturbance. The existing roads were constructed and are maintained by the land owner. The existing roads are approximately 16 feet wide. See Figure 5-5 for a typical cross section of the existing roads. This route is located in the bottom of Deadman Canyon north of the Centennial Project Minesite surface facilities. This road is a continuation of the paved Carbon County Road #299, which ends at the north ern end Centennial Minesite surface facilities. The access road, which was constructed by the surface owner, is capable of carrying heavy equipment to and from the site. This same road was used by ARI in 1989 for another surface drilling project. The road will require minor drainage control upgrades (18 and/or 24 inch culverts) and slight widening of several sharp turns enroute to the drilling sites. Given the present snow cover, existing roads will be located by using GPS methods and also, the surface owner will be present to assist.

528 Handling and Disposal of Coal, Excess Spoil, and Coal Mine Waste

No disposal of coal, excess spoil, and coal mine waste will occur at the well sites.

529 Management of Mine Openings

The perimeter of the sites, including the topsoil stockpiles will be fenced with gates on the access roads. The well casing will have a valve that is closed and locked. The valve will also prevent access by animals or other material. Mine openings will be monitored in accordance with Federal and State Regulations.

During the life of the wells, the sites will be inspected as needed by mine personnel to verify the continued operation of the pumping equipment and general site conditions.

530 OPERATIONAL DESIGN CRITERIA AND PLANS

531 General

This section contains the general plans for the construction of sediment controls and general construction and maintenance of the well sites.

The proposed well site locations are shown on Figure 1-1.

532 Sediment Control

Sediment control measures for the well sites are described in Sections 732 and 742 of this submittal. Runoff control structures at the well sites have been designed to convey runoff in a non-erosive manner. Sediment yields in the well permit area are minimized by:

- Disturbing the smallest practicable area during the construction of the well site and
- Contemporaneously reclaiming areas suitable for such reclamation.

533 Impoundments

No impoundments will exist at the well sites.

534 Roads

Refer to Section 527 of this submittal.

535 Spoil

No spoil will be generated at the well sites.

536 Coal Mine Waste

No coal mine waste will be stored at the well sites.

537 Regraded Slopes

537.100 Division Approval

No mining or reclamation activities will be conducted in the permit area that requires approval of the Division for alternative specifications or for steep cut slopes.

537.200 Regrading of Settled and Revegetated Fills

Upon completion of the well site, the areas not required for the exhaust blower will be regraded to approximate original contour. Because of the nature of the well site, settling is not anticipated. However, if settlement does occur, these areas will be regraded.

540 RECLAMATION PLAN

541 General

541.100 Commitment

Upon the permanent cessation of gob gas venting, Andalex Resources, inc. permanently reclaim all affected areas in accordance with the R645 regulations and this reclamation plan.

541.200 Surface Coal Mining and Reclamation Activities

Not applicable.

541.300 Underground Coal Mining and Reclamation Activities

Upon completion of the gob gas venting activities the wells will be reclaimed.

541.400 Environmental Protection Performance Standards

The plan presented is designed to meet the requirements of R645-301 and the environmental protection performance standards of the State Program.

542 Narratives, Maps, and Plans

542.100 Reclamation Timetable

A general timetable for the completion of each major step in the reclamation plan is presented in Figure 5-6.

542.200 Plan for Backfilling, Soil Stabilization, Compacting, and Grading

Following completion of the venting activities, the well site will be prepared for contouring and soil distribution. Details regarding topsoil placement and revegetation are provided in Section 242 and Section 353, respectively.

Sedimentation Pond Removal and Interim Sediment Control - See Section 542.500 of this submittal.

542.300 Final Surface Configuration Maps and Cross Sections

The sites will be regraded to the approximate original contour, the contours representing the pre-disturbance topography also represent the reclamation topography. Cross sections representing the final surface configuration will be included upon completion.

542.400 Removal of Temporary Structures

The well sites will not have surface structures.

542.500 Removal of Sedimentation Pond

No sedimentation pond will be constructed at the well sites.

542.600 Roads

The roads which existed prior to the drilling program will be retained after reclamation. The access roads established during the drilling program will be reclaimed after gob gas extraction has been completed. See Section 242 for additional detail concerning the reclamation plan.

542.700 Final Abandonment of Mine Openings and Disposal Areas

All openings will be sealed in accordance with Federal and State Regulations. The casings will be plugged at the bottom to hold concrete. A lean concrete mixture will be poured into the casing until the concrete is within five (5) feet of the surface. At that time the casing will be cut off at ground level and the rest of the casing will be filled with lean

concrete. The concrete will be allowed to harden before final reclamation is completed.

542.800 Estimated Cost of Reclamation

Refer to Appendix B of the existing M&RP. It is anticipated that the cost of reclamation of the well sites is adequately covered by the Centennial Project Reclamation Bond. Refer to Chapter 8 for additional detail.

550 RECLAMATION DESIGN CRITERIA AND PLANS

551 Casing and Sealing of Underground Openings

Permanent sealing is described in Section 542.700.

552 Permanent Features

552.100 Small Depressions

No permanent small depressions will be created as part of the well site construction and reclamation.

552.200 Permanent Impoundments

See Section 515.200 of this submittal.

553 Backfilling and Grading

553.100 Disturbed Area Backfilling and Grading

Approximate Original Contour - The well sites will be returned to their approximate original contour after reclamation is completed.

Erosion and Water Pollution - Sediment controls will consist of gouging the surface to create depressions and mounds which store and impede the movement of water. As vegetation becomes established on the reclaimed surface, erosion potential will be further minimized.

Post-Mining Land Use - The disturbed area will be reclaimed in a manner that supports the approved post-mining land use. Refer to Section 411 and 412 for additional detail.

553.200 Spoil and Waste

Spoil - No Spoil will be generated within the well sites.

Coal Processing Waste - No coal processing waste will be generated within the well sites.

553.250 Refuse Piles

No refuse piles will exist at the well sites.

553.300 Exposed Coal Seams, Acid and Toxic Forming Materials and Combustible Materials

No coal seams will be left exposed at the well sites. All wells will be sealed according to Federal and State regulations.

553.400 Cut and Fill Terraces

No unnecessary cut and fill terraces will be constructed at the well sites.

553.500 Highwall From Previously Mined Areas

No highwalls exist or will be built at the well sites.

553.600 Previously Mined Area

No previously mined areas exist at the well sites.

553.700 Backfilling and Grading - Thin Overburden

No surface mining and reclamation activities involving thin overburden will occur at the well sites.

553.800 Backfilling and Grading - Thick Overburden

No surface mining and reclamation activities involving thick overburden will occur at the well sites.

553.900 Regrading of Settled and Revegetated Rills

If settlement or rills occur at the well sites, they will be regraded and revegetated. Refer to Section 244.300.

560 PERFORMANCE STANDARDS

Performance of the well sites will be conducted in accordance with the approved permit

and the requirements of R645-301-510 through R645-301-553.

PROJECTED GOB GAS VENT HOLE RECLAMATION SCHEDULE

*** CONTEMPORANEOUS RECLAMATION**

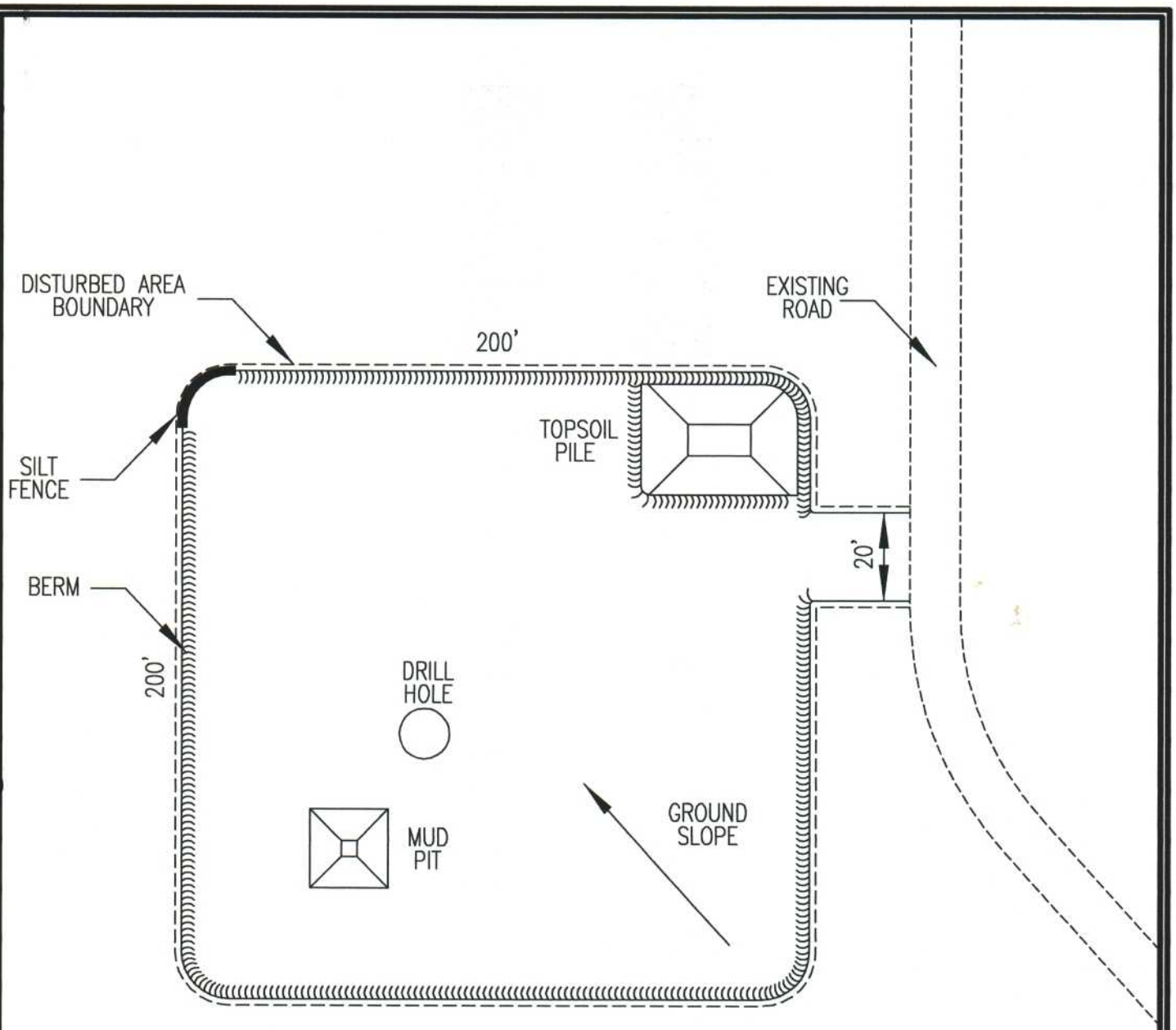
1- Regrading	1 Days
2- Ripping	1 Day
3- Spread Topsoil/Roughen	1 Days
4- Re-establish Berms/Drainage Control	1 Days
5- Seed/Mulch	1 Day
Estimated Total Time -	5 Days

* After drilling and installation of all operational equipment.

FINAL RECLAMATION

1- Structure Removal	1 Days
2- Plug Well	1 Days
3- Regrading	2 Days
4- Ripping	1 Day
5- Topsoil/Roughening	1 Days
6- Seed/Mulch	1 Day
Estimated Total Time -	7 Days

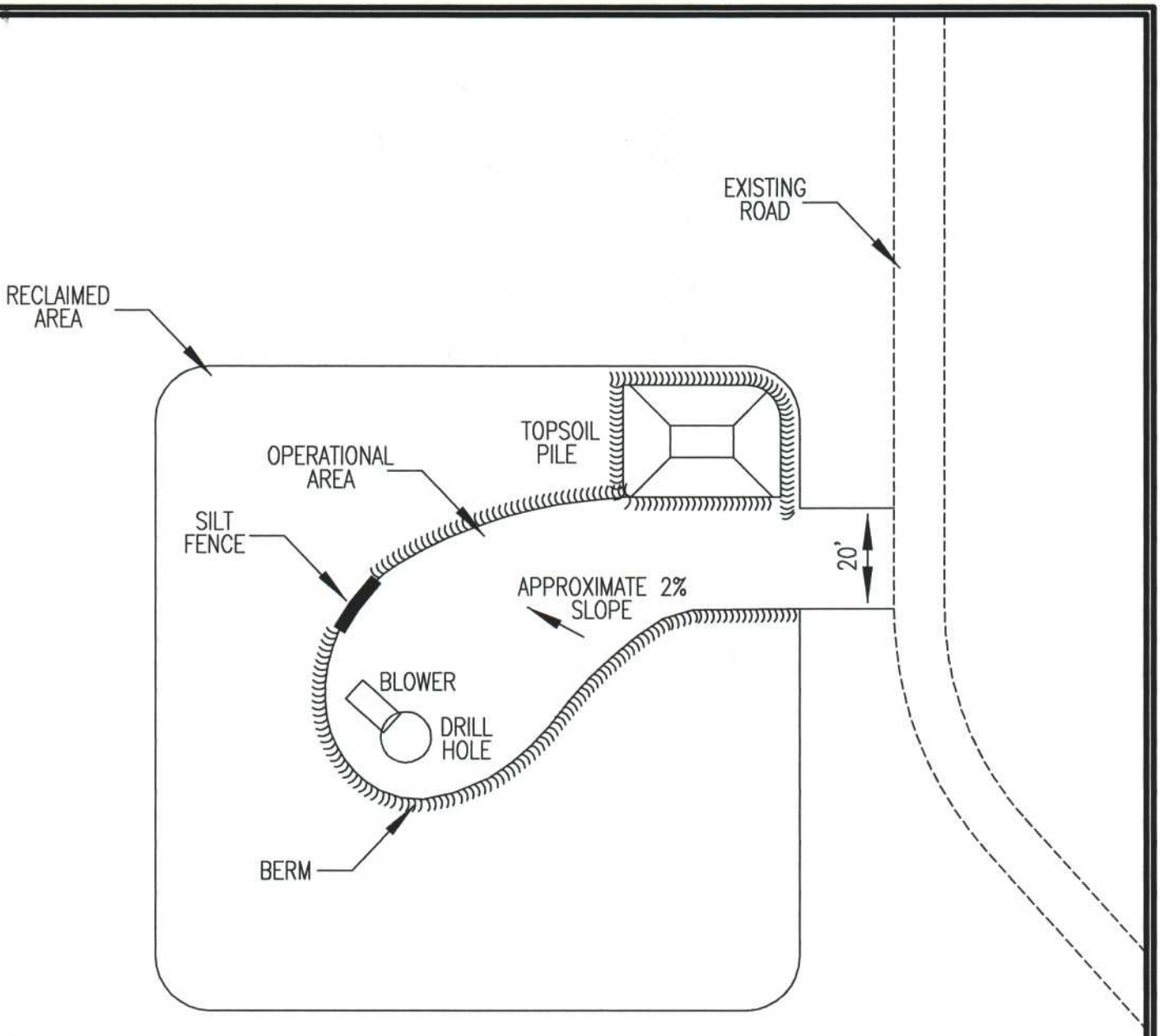
FIGURE 5-6



TYPICAL GOB GAS VENT HOLE
DRILLING PLAN
SCALE: 1" =50'

UTAH REGISTERED
#154168
DAN W. GUY
PROFESSIONAL ENGINEER

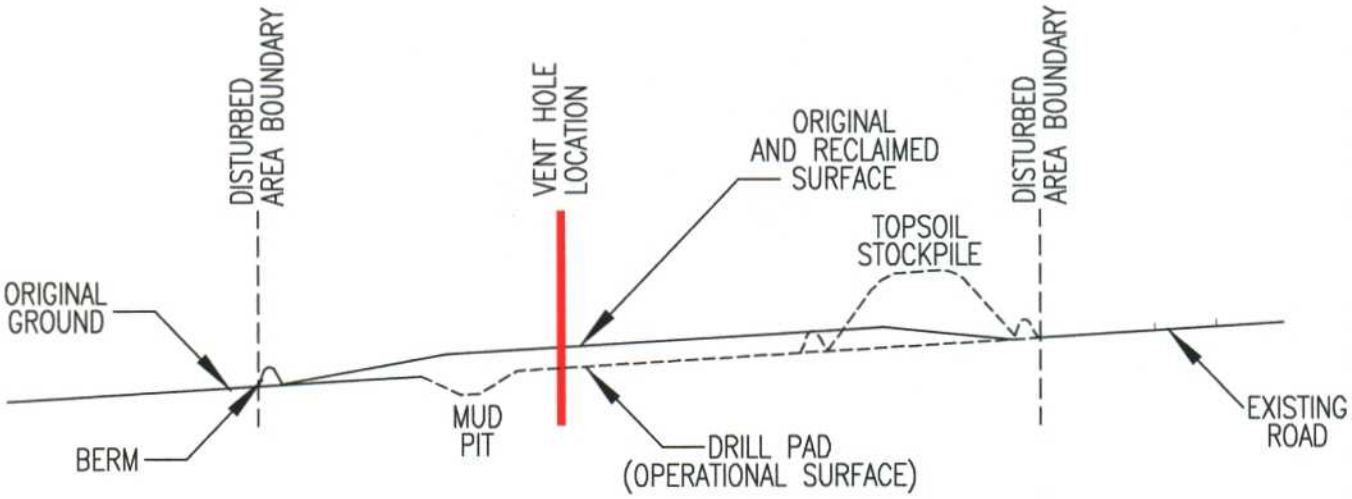
FIGURE 5-1



TYPICAL GOB GAS VENT HOLE
OPERATIONAL PLAN
SCALE: 1" =50'

UTAH REGISTERED
#154168
DAN W. GUY
8/4/05
PROFESSIONAL ENGINEER

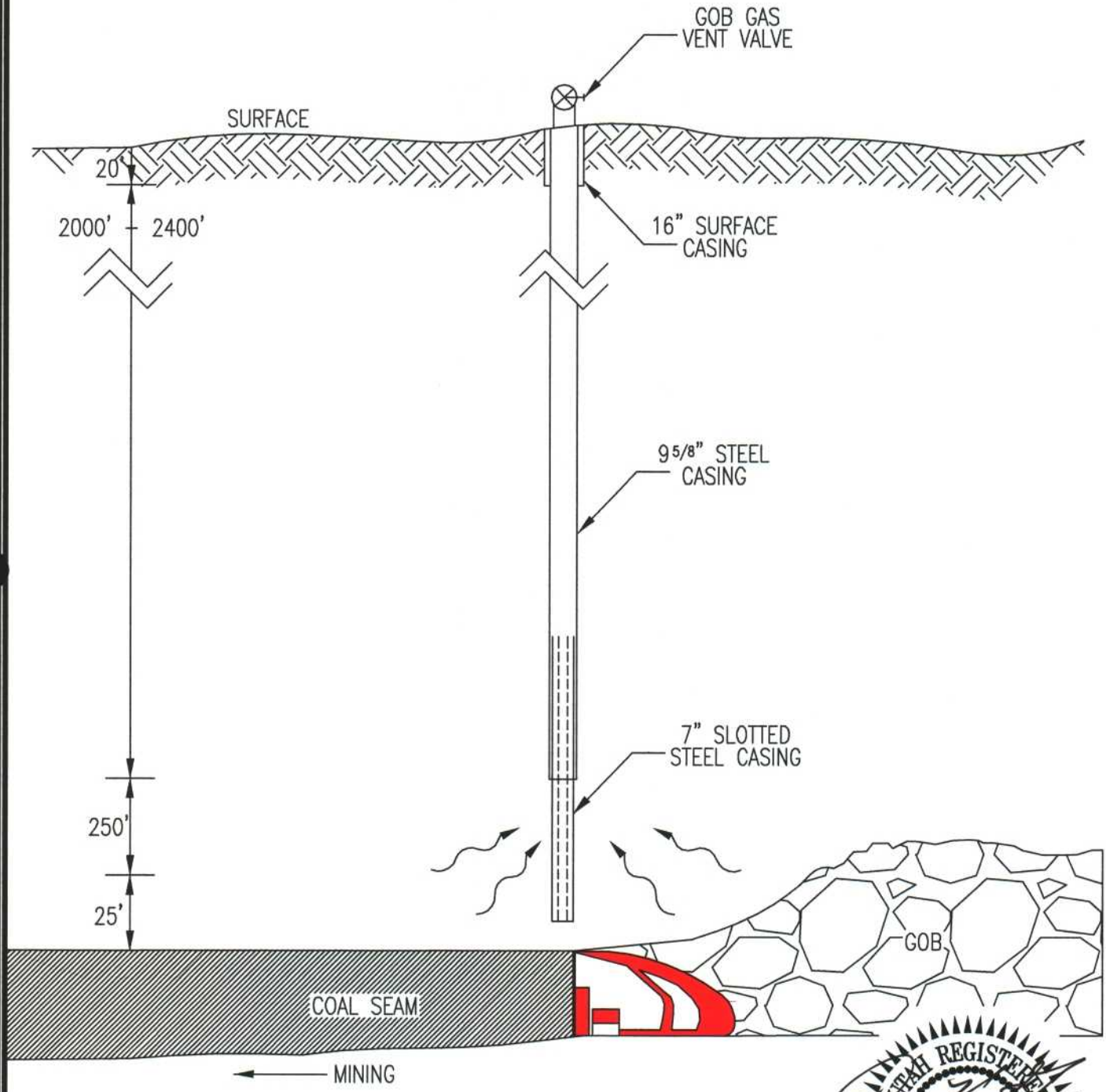
FIGURE 5-2



TYPICAL GOB GAS VENT HOLE
PAD CROSS SECTION
SCALE: 1" =50'

FIGURE 5-3

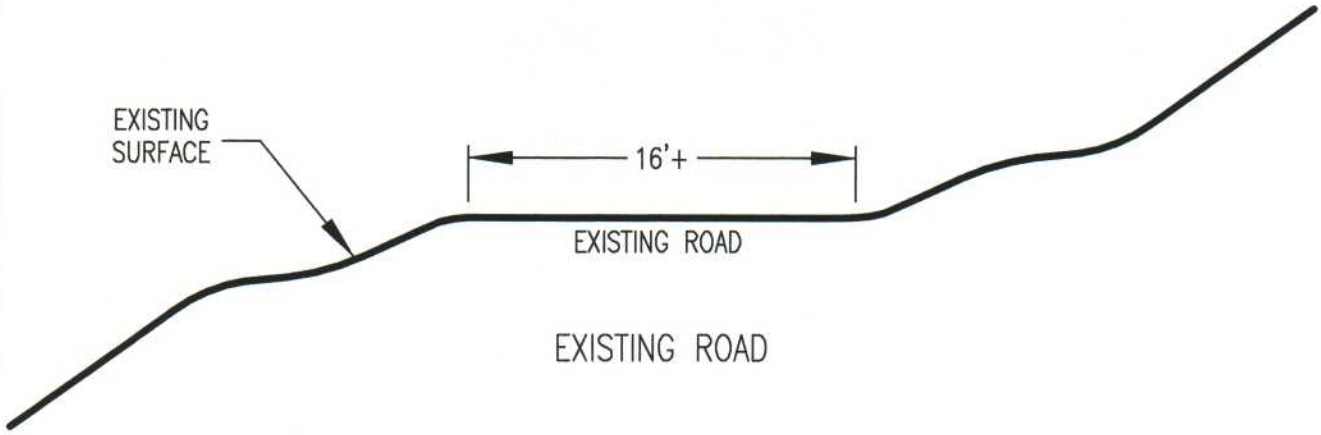
TYPICAL GOB GAS VENT HOLE



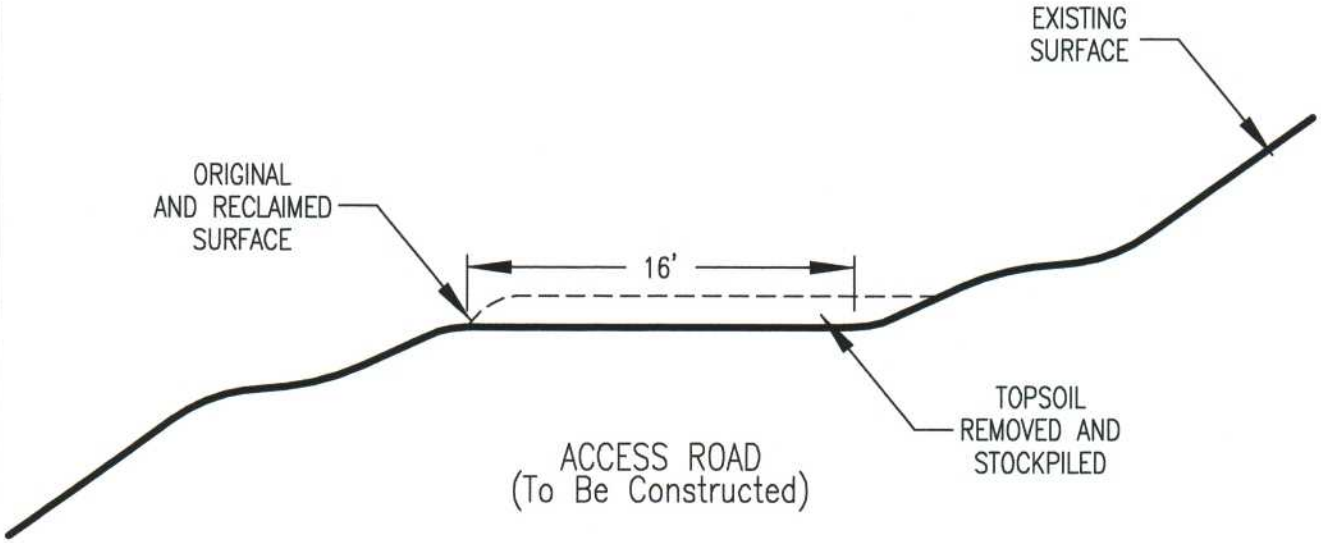
UTAH REGISTERED
#154168
DAN W. GUY
4/4/05
PROFESSIONAL ENGINEER

FIGURE 5-4

TYPICAL ROAD
CROSS SECTIONS



EXISTING ROAD



ACCESS ROAD
(To Be Constructed)

UTAH REGISTERED
#154168
DAN W. GUY
4/4/05
PROFESSIONAL ENGINEER

FIGURE 5–5

ANDALEX RESOURCES, INC.

CENTENNIAL PROJECT
GOB GAS VENT HOLES
GVH#1, GVH#5 and GVH#6
C/007/019

FEBRUARY 2005

CHAPTER 6
GEOLOGY

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610 INTRODUCTION

This chapter presents a description of the geologic resources in the area of the Centennial Project. Most of this chapter has been compiled from the approved Geology section of the Centennial Project, Mining and Reclamation Plan.

611 General Requirements

The geologic resources in the Centennial Project area are discussed in Sections 621 through 627 of the M&RP. Information pertaining to the well sites is discussed below.

612 Certification

All maps, plans, and cross-sections presented in this chapter, required by the regulations, have or will have been certified by a professional engineer.

620 ENVIRONMENTAL DESCRIPTION

This section presents a description of the geologic resources in the Centennial Project well site areas.

621 General Requirements

This section presents the regional and site-specific geologic information for the Centennial Project wells sites.

622 Cross Sections, Maps and Plans

Refer to Plate 21 of the approved M&RP for geology associated with the entire permit area, including proposed well site locations.

623 Geologic Determinations

No acid or toxic forming materials will originate at the well sites.

624 Geologic Information

624.100 Regional Setting

Refer to Section 624 of the approved M&RP.

624.200 Test Boring and Drill Hole Data (overburden removed)

No test boring or drill cores are planned at the well sites.

624.300 Test Boring and Drill Hole Data (overburden not removed)

No test boring or drill cores are planned at the well sites.

625 Additional Geologic Information

It is not anticipated that any additional geologic data will need to be collected at the well sites.

625 Sampling Waivers

A sampling waiver is not requested at this time for the well sites.

627 Description of the Overburden Thickness and Lithology

Not applicable to this amendment.

630 OPERATIONAL PLAN

631 Casing and Sealing of Exploration Holes

Not applicable to this amendment.

632 Subsidence Monitoring

See Section 525 for additional information

640 PERFORMANCE STANDARDS

641 Exploration and Drill Holes

The performance standards used in the casing and sealing of all exploration holes and drill holes are outlined in the approved M&RP, Section 542.700.

642 Monuments and Surface Markers of Subsidence Monitoring Points

The performance standards used in the reclamation of all monuments and surface markers used in subsidence monitoring points are outlined in the approved M&RP, Section 525.

ANDALEX RESOURCES, INC.

CENTENNIAL PROJECT
GOB GAS VENT HOLES
GVH#1, GVH#5 and GVH#6
C/007/019

FEBRUARY 2005

CHAPTER 7
HYDROLOGY

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710 INTRODUCTION

711 General Requirements

This chapter presents a description of the following:

- Proposed operations and the potential impacts to the hydrologic balance;
- Methods of compliance with design criteria and the calculations utilized to show compliance; and
- Applicable hydrologic performance standards.

Please note that information presented in this chapter at this time is general in nature, since the proposed sites GVH#1, GVH#5 and GVH#6, are not yet accessible for detailed study. Site-specific information for each site will be provided as soon as it is available.

712 Certification

All required maps, plans, and cross sections presented in this chapter have been or will be certified by a qualified, registered professional engineer.

713 Inspection

Inspections are not required since no permanent impoundments will exist at the well sites.

720 ENVIRONMENTAL DESCRIPTION

721 General Requirements

This section presents a description of the pre-mining hydrologic resources within the well pad and their adjacent areas that may be affected or impacted by the proposed coal mining and reclamation operations.

722 Cross Sections and Maps

722.100 Location and Extent of Subsurface Water

Section 724 of the approved M&RP provides baseline information. Appendix L of the M&RP includes Surface and Ground Water Inventories.

722.200 Location of Surface Water Bodies

Figures 4 & 5 in the approved M&RP (Appendix L: Surface and Groundwater Hydrologic Inventory) show the locations of the surface-water bodies and existing or pending water

rights. Section 724.200 of the approved M&RP provides baseline surface water conditions.

722.300 Locations of Monitoring Stations

Figure 6 and IV-II in the approved M&RP (Appendix L: Surface and Groundwater Hydrologic Inventory) shows the location of surface water and groundwater monitoring stations.

722.400 Locations and Depth of Water Wells

Refer to Section 722.400 of the approved M&RP for information pertaining to the groundwater monitoring wells.

722.500 Surface Topography

Surface topography features at the well sites and adjacent areas are shown on Figure 1-1.

723 Sampling and Analysis

Refer to Section 723 of the approved M&RP.

724 Baseline Information

Refer to Section 724 of the approved M&RP.

724.100 Groundwater Information

Refer to Section 724.100 of the approved M&RP.

724.200 Surface Water Information

Refer to Section 724.200 of the approved M&RP.

724.300 Geologic Information

Geologic information related to the well sites and adjacent areas is presented in Chapter 6 of this submittal and in th approved M&RP.

724.400 Climatological Information

Climatological information is provided in Section 724.400 of the approved M&RP.

724.500 Supplemental Information

Refer to Section 724.500 of the approved M&RP.

724.600 Survey of Renewable Resource Lands

Refer to Section 724.600 of the approved M&RP.

724.700 Alluvial Valley Floor Requirements

Information provided in Appendix L of the M&RP shows this area does not meet requirements for Alluvial Valley Floors.

725 Baseline Cumulative Impact Area Information

The CHIA currently in place for the Centennial Project covers the well sites. The hydrologic and geologic information required for the Division to develop a Cumulative Hydrologic Impact Assessment (CHIA) is presented in the approved M&RP.

726 Modeling

No groundwater or surface water modeling was conducted in support of this submittal

727 Alternative Water Source Information

Not applicable.

728 Probable Hydrologic Consequences

This section addresses the probable hydrologic consequences of construction and reclamation operations at the well sites. Mitigation measures are discussed generally in this section and in detail in Section 730 of the approved M&RP.

728.100 Potential Impacts of Surface and Groundwater

Potential impacts of the well sites in this area on the quality and quantity of surface and groundwater flow may include contamination from materials associated with the drilling of the wells. The potential impact is addressed in Section 728.300 of this submittal.

728.200 Baseline Hydrologic and Geologic Information

Baseline geologic information is presented in Chapter 6 of the approved M&RP. Baseline hydrologic information is presented in Section 724.100 and 724.200 of the approved M&RP.

728.300 PHC Determination

Potential Impacts to the Hydrologic Balance - Potential impacts of the Centennial Project on the hydrologic balance of the well sites and adjacent areas are addressed in the subsections of this submittal and the approved M&RP.

Acid and Toxic Forming Materials - No acid or toxic forming materials have been identified in the soils or strata of the Centennial Project (Chapter 6, Section 623 of this submittal). Additional information is located in Appendix E of the approved M&RP.

Groundwater - During drilling of the wells, the groundwater encountered will be affected. Drilling mud will be used to seal the groundwater aquifers. Once drilling is completed, the casing will be grouted in the well hole. This will seal the aquifers to prevent any groundwater from migrating down the outside of the casing into the mine.

Potential Hydrocarbon Contamination - Hydrocarbon products will not be stored at the well sites, however fuels, greases, and other oils may leak from equipment during drilling operations. Absorbent materials will be used for the collection of leaked fuels, greases, and other oils. The saturated absorbent materials will be disposed of at an appropriate landfill facility.

729 Cumulative Hydrologic Impact Assessment (CHIA)

The Cumulative Hydrologic Impact Assessment currently in place for the Centennial Project includes the well sites and adjacent areas.

730 OPERATION PLAN

731 General Requirements

731.100 Hydrologic - Balance Protection

Groundwater Protection - The effect on groundwater at the well sites is expected to be minimal. Groundwater encountered during drilling will be sealed off, refer to Section 728.300.

Surface Water Protection - To protect the hydrologic balance, construction, maintenance, and reclamation operations will be conducted to handle earth materials and runoff in a manner that prevents, to the extent possible, additional contributions of suspended solids to stream flow outside the permit are, and otherwise prevent water pollution.

During initial drilling, the sites will be graded to ensure that storm runoff will flow towards the berms surrounding the entire drilling pad area. The berms will direct the runoff to the lowest point(s) within the pad area where a silt fence and/or straw bale dike(s) will treat the runoff. The berm placed at the top of the drilling pad cut slopes will divert runoff

around the drilling pad. Thus reducing the runoff affected by the drilling pad.

After drilling, the pad size will be reduced for exhausting operations. The pad will be re-graded to cause the storm runoff to sheet flow towards a lilt fence and/or straw bale dike. A berm will be placed at the top of the fill slope to direct any runoff from the operational pad to the silt fence and/or straw bale dike. The silt fences and/or straw bale dikes will be periodically inspected, and accumulated sediment will be removed as needed to maintain functionality. The sediment from the silt fence an/or straw bale dikes will be piled on the pad and will be used for fill during final reclamation of the well site. During the drilling phase a berm and silt fence will be installed at the toe fo the fill slope to treat any runoff from the drilling pad. During the operational phase there will still be sediment control (silt fence) at the toe of the slope

731.200 Water Monitoring

No water monitoring will be conducted at the degas well sites. Refer to approved M&RP for a description of water monitoring.

731.300 Acid or Toxic Forming Materials

No acid or toxic forming materials are anticipated at the well sites. (see Section 728.300).

731.400 Transfer of Wells

Refer to Section 731.400 of the approved M&RP.

731.500 Discharge

No discharge to underground workings.

731.600 Stream Buffer Zones

Stream Channel Diversions - No stream channel diversions are planned at the well sites.

Buffer Zone Designation - None of the drilling sites are adjacent to a stream, therefore the establishment of a stream buffer zone is not necessary.

731.700 Cross Section and Maps

Not applicable.

731.800 Water Rights and Replacement

Refer to Sections 728.300 and 731.800 of the approved M&RP.

732 Sediment Control Measures

The sediment control measures within the well sites have been designed to prevent additional contributions of sediment to stream flow or to runoff outside the well sites. In addition, the well sites have been designed to minimize erosion to the extent possible.

The structures to be used for runoff control at the well sites are berms, silt fences and/or straw bale dikes. Please refer to the typical drawings provided with this Appendix (5-1, 5-2, 5-3, 5-4 and 5-5), found at the end of Chapter 5. These drawings show slope and location of sedimentation structures (silt fences, berms).

732.100 Siltation Structures

Berms, silt fences and straw bales dikes will be used to treat runoff.

732.200 Sedimentation Pond

The drilling sites will not have sedimentation ponds.

732.300 Diversions

Refer to Section 731.100 of this submittal.

732.400 Road Drainage

No diversion ditches will be constructed along the roads leading to the well sites. See Figures 5-5 for typical road cross section. Where needed roads accessing the drill sites will have a water bar constructed at the base of the road to divert water off the road prior to the runoff reaching the drill pad. The existing access road up Deadman Canyon to the locations will be equipped with silt fences in the Spring/Summer of 2005 to help control sediment. In addition to the water bars mentioned, 18-24 inch culverts will be installed on this private road and left in place at the owner's request.

733 Impoundments

733.100 General Plans

Not applicable.

733.200 Permanent and Temporary Impoundments

No permanent impoundments will exist at the well sites.

734 Discharge Structures

A berm will surround the entire drill pad at each well site during the drilling phase. The berm will divert undisturbed runoff around the drilling pad and direct runoff from the pad to a silt fence/straw bale dike at the lowest pont within the well pad disturbed area. A silt fence and/or straw bale dike will be the discharge structure for each of the well sites during the operational phase.

735 Disposal of Excess Spoil

There will be no excess spoil generated at the well sites.

736 Coal Mine Waste

There will be no coal mine waste generated or stored at the well sites.

737 Non-Coal Mine Waste

There will be no non-coal mine waste disposal at the well site.

738 Temporary Casing and Sealing of Wells

Refer to Section 542.700 of this submittal.

740 DESIGN CRITERIA AND PLANS

741 General Requirements

This submittal includes general well site plans that incorporate design criteria for the control of drainage.

742 Sediment Control Measures

742.100 General Requirements

Design - Sediment control measures have been formulated to prevent additional contributions of sediment to stream flow or to runoff outside the well site area; and minimize erosion to the extent possible.

Measures and Methods - Sediment control methods will include sit fence, berms, and straw bales to reduce runoff and trap sediment.

742.200 Siltation Structures

General Requirements - Additional contributions of suspended solids and sediment or runoff outside the well site area will be prevented to the extent possible using silt fence, berms, and straw bale dikes. Siltation structures (berms, silt fences and/or straw bale dikes) will be installed before the topsoil is removed from the well site. Construction activities will not occur during major precipitation events.

Design - All hydrology calculations will be made using the 10-year, 24-hour precipitation

event. Hydrology calculations will be completed as soon as site-specific data is available, and will be included in Attachment 7-1.

742.300 Diversions

No diversion ditches will be constructed as part of the drilling or operational phases.

742.400 Road Drainage

Refer to Section 732.400 of this submittal.

743 Impoundments

No impoundments will exist at the wells sites.

744 Discharge Structures

No discharge structures have been planned or designed.

745 Disposal of Excess Spoil

There will be no excess spoil generated at the well sites.

746 Coal Mine Waste

746.100 General Requirements

There will be no coal mine waste used at the well sites.

746.200 Refuse Piles

There will be no refuse piles at the well sites.

746.300 Impounding Structures

Refer to Section 733.200 of this submittal.

746.400 Return of Coal Processing Waste to Abandoned Underground Workings

No coal processing waste will be generated at the well sites.

747 Disposal of Non-Coal Mine Waste

All non-coal mine waste will be disposed of at an approved landfill.

748 Casing and Sealing Wells

Refer to Section 542.700 of this submittal.

750 PERFORMANCE STANDARDS

751 Water Quality Standards and Effluent Limitations

Water encountered during drilling and runoff water will be treated using silt fence and/or straw bale dikes prior to leaving the site. Should it become necessary the water encountered during drilling will be pumped into a tank and hauled form the site for disposal at a licensed facility.

752 Sediment Control Measures

All sediment control measures will be located, maintained, constructed and reclaimed according to plans and designs presented in Section 732, 742, and 760 of this submittal.

752.100 Siltation Structures and Diversions

Siltation structures will be located, maintained, constructed and reclaimed according to plans and designs presented in Section 732, 742, and 763 of this submittal.

752.200 Road Drainage

Refer to Section 732.400 of this submittal.

753 Impoundments and Discharge Structures

Refer to Section 733.200 of this submittal.

754 Disposal of Excess Spoil, Coal Mine Waste and Non-Coal Mine Waste

There will be no excess spoil or coal mine waste generated at the well sites. Refer to Section 747 of this submittal regarding non-coal waste disposal.

755 Casing and Sealing

Refer to Section 542.700 of this submittal.

760 RECLAMATION

761 General Requirements

A detailed reclamation plan for the well sites is presented in Section 540. No structures will exist at the well sites.

762 Roads

Refer to Section 542.600.

762.100 Restoring the Natural Drainage Patterns

The natural drainage patterns will be restored after degassification is completed.

762.200 Reshaping Cut and Fill Slopes

Cut and fill slopes will be reshaped at the well sites.

763 Siltation Structures

763.100 Maintenance of Siltation Structures

All siltation structures will be maintained until removed in accordance with the approved reclamation plan.

763.200 Removal of Siltation Structures

When a siltation structure is removed, the land on which the siltation structure was located will be regraded and revegetated in accordance with the reclamation plan presented in Section 540.

764 Structure Removal

A general timetable for the reclamation of the sites is presented in Figure 5-6.

765 Permanent Casing and Sealing of Wells

Refer to Section 542.700 of this submittal.

ANDALEX RESOURCES, INC.

CENTENNIAL PROJECT
GOB GAS VENT HOLES
GVH#1, GVH#5 and GVH#6
C/007/019

FEBRUARY 2005

CHAPTER 8
BONDING AND INSURANCE

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810 BONDING DEFINITIONS AND DIVERSION RESPONSIBILITIES

This chapter provides information regarding the bonding for reclamation of the proposed gob gas vent hole sites 1, 5 and 6 at the Centennial Project. Andalex, Resources, Inc. has on file with the Division a bond payable to the Division for performance of all requirements of the State Program.

820 REQUIREMENTS TO FILE A BOND

A description of the disturbed area location for each well site is found in Chapter 1, Table 1-1. Reclamation of the disturbed area are discussed in Section 340 of this submittal. The performance bond period is for the duration of coal mining and reclamation operations including the extended period designated by the Division. The bond is in the form of a surety bond and is described in Section 860 of the M&RP.

830 DETERMINATION OF BOND AMOUNT

The present bond of $1,080,000 is considered sufficient to assure the completion of the reclamation plan. The increase in disturbed area and resulting reclamation costs for each of the proposed well sites will likely be minimal and should not require an adjustment in the performance bond. Detailed costs will be provided when site-specific data is available, and a bonding determination can be made at that time. The gob gas sites will consist only of a trailer mounted engine and blower. Removal of these structures is not a cost. Replacement of topsoil and revegetation of these roughly one acre (or less) sites will require one week of construction and reseeding activity at an estimated cost of $10,000 per hole. It is estimated that one gob gas hole per year will require reclamation beginning in approximately 2007. The contingency in the existing reclamation bond more than adequately covers this cost. Monitoring costs for success are adequately addressed in the existing bond. However, should it be determined that additional bonding is required, ANDALEX will provide the adequate amount either by increasing the existing bond or by filing a separate cash bond. It should be noted also, that all of the activities around this gob gas vent hole project will be located on private land. As such, at the surface owner's request, ARI would like the opportunity to leave structures such as access roads in place. ARI will advise the Division if such a request is made, understanding its required reclamation liabilities and associated post mining land use changes. Unless a post mining land use change is applied for and approved, ARI assumes the responsibility of

reclamation of all access roads which were not previously existing at the time of this Gob Gas Vent Hole project. Please refer to the new ammended changes in the Bond estimates which demonstrate that the existing bond is adequate.

840 GENERAL TERMS AND CONDITIONS OF THE BOND

Refer to Chapter 8 and Appendix B of the approved M&RP.

850 BONDING REQUIREMENTS FOR UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES

Refer to Chapter 8 of the approved M&RP.

860 FORMS OF BONDS

Refer to Chapter 8 of the approved M&RP.

870 REPLACEMENT BONDS

Refer to Chapter 8 of the approved M&RP.

880 REQUIREMENTS TO RELEASE PERFORMANCE BONDS

The applicant will comply with the requirements described in Section R645-301-880 of the Division regulations when applying for the release of performance bonds.

890 TERMS AND CONDITIONS FOR LIABILITY INSURANCE

Certificates of insurance issued for the Centennial Project are included in Appendix B of the approved M&RP.

APPENDIX X-1

R2P2 Approval
MSDS Sheets
Bond Calculation Detail

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Utah State Office
P.O. Box 45155
Salt Lake City, UT 84145-0155
http://www.blm.gov

TAKE PRIDE IN AMERICA

IN REPLY PLEASE REFER TO:
3482, U-66060, UTU-79975

MAR 17 2005

RECEIVED BLM Price, Utah

Certified Mail–Return Receipt Requested
Certificate No: 7002 2410 0007 8750 8267

Mr. Michael W. Glasson, P.G.
Senior Geologist
Andalex Resources, Inc.
P.O. Box 902
Price, Utah 84501

Re: Minor Modification of Resource Recovery and Protection Plan (R2P2) for De-Gasification Boreholes into the Aberdeen Mine.

Dear Mr. Glasson:

The Bureau of Land Management (BLM) received a request dated 3 March 2005 from Andalex Resources, Tower Division (Andalex) to change the approved R2P2 to install a de-gas borehole into the mine to remove excess methane or other gases.

In a subsequent review meeting held at the mine site on 10 March 2005, Andalex provided further details of the project. This included the proposed locations for up to eight de-gas boreholes. At that meeting, BLM gave verbal approval for the first three scheduled boreholes Gas Vent Holes 1, 5, and 6 (GVH 1, 5, and 6).

The Aberdeen mine has had large quantities of methane gas released from the longwall coal production area in the process of mining the coal. Due to requirements imposed by the Mine Safety and Health Administration (MSHA) in an effort to assure miner safety, the mine personnel have had to severely reduce the rate of production. The reduced mining rate has made the mine uneconomic and can result in unforeseen loading conditions on the mine support systems .

This mine plan modification should have no effect on the recoverable coal reserves (except to help ensure the planned areas can be mined).

BLM verbally approved GVH 1, 5, 6 on 10 March 2005, and by this letter provides written approval for these and the remaining five gob vent holes (approval for GVH 1-8) as shown on the enclosed and approved map.

This approval of a minor modification is contingent on approval of the proposed amendment to the Centennial Project M.R.P. by the State of Utah Division of Oil, Gas & Mining (DOGM).

The modification of the R2P2 complies with the Mineral Leasing Act of 1920, as amended, the regulations at 3480, and the lease terms and conditions. The modification will achieve maximum economic recovery of the federal coal by maintaining a safe work environment in the mine.

The modification to the R2P2, as depicted on Drawing #1 is approved. A copy of the approved mine map is enclosed. If you have any questions, please contact Stephen Falk at the Price Field Office (435) 636-3605 or Jeff McKenzie of my staff at (801) 539-4038.

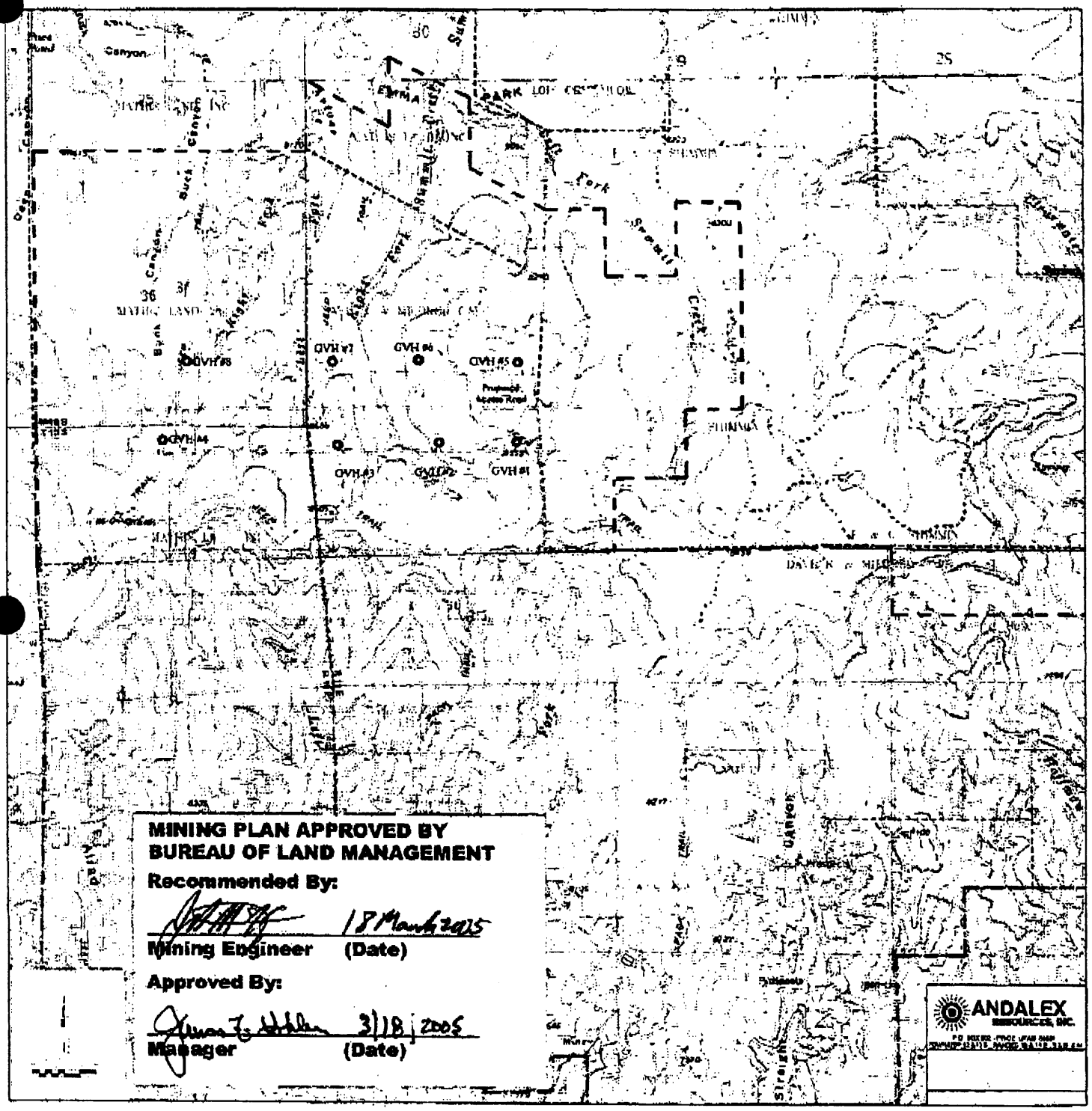
Sincerely,

JAMES F KOHLER

Chief, Solid Minerals

Enclosures:
Approved Mine Map

cc: UT-070, Price, Utah (w/encl.)
Utah Division of Oil Gas and Mining (w/encl.)
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-5801
Andalex Resources, Inc. (w/encl.)
Tower Division
P.O. Box 902
Price, Utah 84501


GVH #7
GVH #6
GVH #5
GVH #4
GVH #3
GVH #2
GVH #1
Proposed Access Road
MINING PLAN APPROVED BY
BUREAU OF LAND MANAGEMENT
Recommended By:
18 March 2005
Mining Engineer (Date)
Approved By:
3/18/2005
Manager (Date)
ANDALEX
RESOURCES, INC.

Material Safety Data Sheet

DRISPAC® POLYMER (REGULAR AND SUPERLO®)

October 30, 1998

MSDS #: 25950

CHEVRON PHILLIPS CHEMICAL COMPANY LP
1301 McKinney Street
Houston, Texas 77010-3030

PHONE NUMBERS
Emergency: (800) 231-0623 or
(510) 231-0623 (International)
TRANSPORTATION (24 HR): CHEMTREC
(800)424-9300 OR (703)527-3887
Technical Services: (800) 221-1956
For Additional MSDSs: (800) 352-5530

A. Product Identification

Synonyms: Viscosifier, Water Loss Control Agent
Chemical Name: Proprietary
Chemical Family: Cellulosic polymer
Chemical Formula: Proprietary
CAS Reg. No.: Proprietary
Product No.: Not Established

Product and/or Components Entered on EPA's TSCA Inventory: YES
This product is in U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals; hence, it may be subject to applicable TSCA provisions and restrictions.

Canadian Inventory Listing Status: DSL
All ingredients are listed in the Domestic Substances List (DSL). Impurities are exempt in accordance with Section 3 of the Canadian Environmental Protection Act (CEPA).

B. Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV

This product does not meet the definition of a hazardous chemical given in 29 CFR Part 1910.1200 (OSHA). Information on this form is furnished as a customer service.

See Section F, for Recommended Exposure Limits.

C. Personal Protection Information

Ventilation: Use adequate ventilation to control concentration below recommended exposure limits.

Respiratory Protection: Not generally required unless needed to prevent respiratory irritation. For concentrations exceeding the recommended exposure limit, use NIOSH approved air purifying respirator.

Eye Protection: Use safety glasses with side shields.

Skin Protection: Avoid unnecessary skin contamination with material.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Avoid contact with eyes, skin or clothing. Avoid breathing vapors, mist, fume or dust. Wear equipment and/or garments described in Section C if exposure conditions warrant. Launder contaminated clothing before reuse. Wash thoroughly after handling. Use with adequate ventilation.

Store in well-ventilated area. Store in closed container.

E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Established
Incompatibility (Materials to Avoid): Not Established

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Established
Hazardous Decomposition Products: Not Established

F. Health Hazard Data

Recommended Exposure Limits:

Control as Particulate Not Otherwise Classified (PNOC) or Regulated:

	OSHA PEL	ACGIH TLV*
Respirable Fraction	5 mg/m3	3 mg/m3
Total Dust	15 mg/m3	10 mg/m3

* The value is for inhalable (total) particulate matter containing no asbestos and

Acute Effects of Overexposure:

Eye: Dust may produce mechanical irritation.

Skin: May produce slight irritation with prolonged contact with moistened product.

Inhalation: Non-irritating to mucous membranes, however, breathing high concentrations of the dust may cause mechanical irritation of the nose, throat, and upper respiratory tract.

Ingestion: Passes through relatively inert. May cause some gastrointestinal upset. Oral LD50 > 25 g/Kg (rats).

Subchronic and Chronic Effects of Overexposure:

No adverse effects have been noted in chronic feeding studies using laboratory animals and humans. Sarcomas were exhibited at injection sites of animals receiving repeated massive subcutaneous injections of aqueous solutions of the material. The effects may have been the result of local trauma.

Other Health Effects:

Long term exposure to high dust concentrations may cause non-debilitating lung changes.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___

Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	___	___
Allergic Sensitizer	___	___	Specify - No known applicable information		
Highly Toxic	___	___			

Canadian WHMIS:

Specify: Does not meet criteria for any of the above categories.

First Aid and Emergency Procedures:

Eye: Flush eyes with running water. If irritation or adverse symptoms develop, seek medical attention.

Skin: Wash skin with soap and water. If irritation or adverse symptoms develop, seek medical attention.

Inhalation: Remove from exposure. If illness or adverse symptoms develop, seek medical attention.

Ingestion: If illness or adverse symptoms develop, seek medical attention.

G. Physical Data

Appearance:	Light colored powder
Odor:	Odorless
Boiling Point:	Not Applicable
Vapor Pressure:	Not Applicable
Vapor Density (Air = 1):	Not Applicable
Solubility in Water:	Complete
Specific Gravity (H_2O = 1):	1.6
Percent Volatile by Volume:	Negligible
Evaporation Rate (Butyl Acetate = 1):	Not Applicable
Viscosity:	Not Applicable

H. Fire and Explosion Data

Flash Point (Method Used):	Not Applicable
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam or carbon dioxide (CO_2), water spray or fog
Special Fire Fighting Procedures:	Evacuate area of all unnecessary personnel. Use NIOSH approved self-contained breathing apparatus (SCBA) and other protective equipment described in Section C if conditions

warrant. Water fog or spray may be used to cool exposed containers and equipment.

Fire and Explosion Hazards: Carbon oxides and various hydrocarbons formed when burned. If in a finely divided and suspended state, treat as a flammable dust.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Evacuate area of all unnecessary personnel. Contain spill. Sweep up spill and place in disposal container. If wet, material becomes very slippery. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Keep out of water sources and sewers.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Manage in a permitted waste management facility.

J. DOT Transportation

Shipping Name: Not Applicable
Hazard Class: Not Applicable
ID Number: Not Applicable
Packing Group: Not Applicable
Marking: Not Applicable
Label: Not Applicable
Placard: Not Applicable
Hazardous Substance/RQ: Not Applicable
Shipping Description: Not Applicable
Packaging References: Not Applicable

K. RCRA Classification - Unadulterated Product as a Waste

Prior to disposal, consult your environmental contact to determine if TCLP (Toxicity Characteristic Leaching Procedure, EPA Test Method 1311) is required. Reference 40 CFR Part 261.

L. Protection Required for Work on Contaminated Equipment

Contact immediate supervisor for specific instruction before work is initiated. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

M. Hazard Classification

___ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

___ Combustible Liquid	___ Flammable Aerosol	___ Oxidizer
___ Compressed Gas	___ Explosive	___ Pyrophoric
___ Flammable Gas	___ Health Hazard (Section F)	___ Unstable
___ Flammable Liquid	___ Organic Peroxide	___ Water Reactive
___ Flammable Solid		

_X_ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

Canadian WHMIS:

Does not meet the criteria for hazard classification specified by the Hazardous Products Act Controlled Products Regulations.

SARA 313

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NFPA 704 Hazard Codes - - - - - - - - - Signals

Health : 0	Least - 0
Flammability: 0	Slight - 1
Reactivity : 0	Moderate - 2
Special Haz.: -	High - 3
	Extreme - 4

ENVIRONMENTAL TOXICITY

The 96-hour LC50 for Drispac® Regular Polymer for freshwater trout was >32,000 ppm; for saltwater stickleback it was >56,000 ppm. The 96-hour LC50 for Drispac® Superlo Polymer for freshwater trout was >21,000 ppm; for saltwater stickleback it was >56,000 ppm.

Environmental effects testing has been conducted using Drispac® Polymer (both Regular and Superlo®) in generic mud. The tests were conducted following the Environmental Protection Agency's (EPA),

Region II drilling mud bioassay procedures.

The results of these tests classify Drispac® Regular Polymer and Drispac® Superlo Polymer as non-toxic drilling mud additives.

Chevron Phillips Chemical Company LP believes that the information contained herein (including data and statements) is accurate as of the date hereof. NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE AS CONCERNS THE INFORMATION HEREIN PROVIDED. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use of the product and information referred to herein are beyond the control of Chevron Phillips, Chevron Phillips expressly disclaims any and all liability as to any results obtained or arising from any use of the product or such information. No statement made herein shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents.

LANG EXPLORATORY DRILLING
MSDS Summary Page

Product Name EZ Mud

Manufacturer NL Baroid

HMIS Code 1 - 0 - 0 - A
(Health- Flammability- Reactivity- PPE; 0 = low, 4= high)

Health Hazard Information

Acute Effects: Irritant (eyes, skin).

Chronic Effects:

Physical Hazards:

Recommended Safe Handling Procedures

1. Wear safety glasses.
2. If prolonged or repeated contact is required, wear rubber or plastic gloves.

NL Baroid

Environmental, Safety and Transportation Data Sheet

EZ MUD

I PRODUCT IDENTIFICATION	
SUPPLIER NL BAROID	TELEPHONE NO. 713/987-5900
ADDRESS P.O. BOX 1675 HOUSTON, TEXAS 77251	
TRADE NAME EZ MUD®	
GENERIC DESCRIPTION POLYACRYLAMIDE/POLYACRYLATE	

II HAZARDOUS INGREDIENTS		
MATERIAL OR COMPONENT	%	HAZARD DATA
NONE		

III PHYSICAL DATA		
BOILING POINT (°F) >200	MELTING POINT NA	FREEZING POINT ND
SPECIFIC GRAVITY (H_2O = 1) 1.03	VAPOR PRESSURE (mm Hg) ND	
VAPOR DENSITY (AIR = 1) ND	SOLUBILITY IN H_2O, % BY WT. 70	
% VOLATILES BY VOL. 65	EVAPORATION RATE (BUTYL ACETATE = 1) SLOW	
APPEARANCE AND ODOR CREAM COLORED LIQUID, SLIGHT HYDROCARBON ODOR	Density @ 20° C: 8.6 LBS/GAL	
pH 8.4		

N/A = Not Applicable N/D = Not Determined

HEALTH HAZARD	0
FLAMMABILITY	0
REACTIVITY	0

Ratings based on NFPA Identification System for Occupationally Hazardous Materials" (1974)

All information recommendations and suggestions herein concerning our product are based upon tests and data believed to be reliable, however, it is the user's responsibility to determine the safety, toxicity, and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by NL Petroleum Services, Inc. as to the effects of such use, the results to be obtained, or the safety and toxicity of the product nor does NL Petroleum Services, Inc. assume any liability arising out of use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

BEST Sheet

VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

NONE

INCOMPATIBILITY

NONE

HAZARDOUS DECOMPOSITION PRODUCTS

EZ MUD IS NONFERMENTING.
NO HAZARDOUS DECOMPOSITION PRODUCTS ARE FORMED.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

NONE

VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

CONTAIN SPILL WITH ABSORBENT MATERIAL. PLACE IN CONTAINER FOR DISPOSAL. FINAL CLEAN-UP WITH DETERGENT AND WATER UNTIL SLIPPERY CONDITION IS ELIMINATED.

NEUTRALIZING CHEMICALS

NONE ARE REQUIRED

WASTE DISPOSAL METHOD

DISPOSE OF WASTE IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS.
THE INCLUSION OF EZ MUD IN A DRILLING MUD WILL NOT CAUSE THE DRILLING MUD TO BE CLASSIFIED AS A HAZARDOUS WASTE.

VIII INDUSTRIAL HYGIENE CONTROL MEASURES

VENTILATION REQUIREMENTS

NONE

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY

NONE REQUIRED.

EYE

GOGGLES.

GLOVES

RUBBER

OTHER CLOTHING AND EQUIPMENT

NONE

BEST Sheet

IX SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS

DO NOT TAKE INTERNALLY.
AVOID SKIN AND EYE CONTACT.
IF SPILLED MAY CAUSE SLIPPERY FLOOR CONDITIONS.

OTHER HANDLING AND STORAGE REQUIREMENTS

KEEP CONTAINERS CLOSED WHEN NOT IN USE

DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME: NONE

HAZARD CLASS: NOT HAZARDOUS

HAZARDOUS SUBSTANCE: NONE

PREPARED BY	NL Barold ENVIRONMENTAL SERVICES	DATE JULY, 1987

801-328-7112
Jerry
Univar

LANG EXPLORATORY DRILLING
MSDS Summary Page

Product Name Calcium Chloride Pellets SI

Manufacturer Van Waters and Rogers

HMIS Code 1 - 0- 1 - A
(Health- Flammability- Reactivity- PPE; 0 = low, 4= high)

Health Hazard Information

Acute Effects: Can cause severe eye irritation with possible cornea damage. Can also cause skin gastrointestinal and respiratory tract irritation.

Chronic Effects: Prolonged contact with cut or scratched skin can result in severe necrosis.

Physical Hazards: Can cause burns to the skin an eyes.

Recommended Safe Handling Procedures

1. Wear safety glasses.
2. If prolonged or repeated contact is necessary, wear rubber or plastic gloves.
3. If dusts are produced during use, wear a dust respirator.

PRODUCT NAME:
PELADOW* PREMIER SNOW AND ICE MELTER CALCIUM CHLORIDE (100LB BOX)

MSDS #: DW79537

2. COMPOSITION/INFORMATION ON INGREDIENTS

CALCIUM CHLORIDE	CAS# 010043-52-4	90-92%
SODIUM CHLORIDE	CAS# 007647-14-5	1- 2%
POTASSIUM CHLORIDE	CAS# 007447-40-7	2- 3%
WATER	CAS# 007732-18-5	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

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*************************************************************************
*  WHITE TO OFF-WHITE PELLETS.  ODORLESS.  CAUSES EYE IRRITATION.      *
*  MAY CAUSE SKIN IRRITATION.                                          *
*************************************************************************
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POTENTIAL HEALTH EFFECTS (SEE SECTION 11 FOR TOXICOLOGICAL DATA.)

EYE: PELLETS MAY CAUSE SLIGHT EYE IRRITATION. DUSTS MAY CAUSE SEVERE IRRITATION WITH CORNEAL INJURY. EFFECTS MAY BE SLOW TO HEAL. WHEN DISSOLVING, THE HEAT PRODUCED MAY CAUSE MORE INTENSE EFFECTS AS WELL AS THERMAL BURNS.

SKIN: SHORT SINGLE EXPOSURE NOT LIKELY TO CAUSE SIGNIFICANT SKIN IRRITATION. PROLONGED OR REPEATED EXPOSURE MAY CAUSE SKIN IRRITATION, EVEN A BURN. MAY CAUSE MORE SEVERE RESPONSE IF SKIN IS DAMP OR IF MATERIAL IS CONFINED TO SKIN. MAY CAUSE MORE SEVERE RESPONSE IF SKIN IS ABRADED (SCRATCHED OR CUT). WHEN DISSOLVING, THE HEAT PRODUCED MAY CAUSE MORE INTENSE EFFECTS AS WELL AS THERMAL BURNS. NOT CLASSIFIED AS CORROSIVE ACCORDING TO DOT. A SINGLE PROLONGED EXPOSURE IS NOT LIKELY TO RESULT IN THE MATERIAL BEING ABSORBED THROUGH SKIN IN HARMFUL AMOUNTS.

INGESTION: SINGLE DOSE ORAL TOXICITY IS CONSIDERED TO BE LOW. SMALL AMOUNTS SWALLOWED INCIDENTAL TO NORMAL HANDLING OPERATIONS ARE NOT LIKELY TO CAUSE INJURY; SWALLOWING AMOUNTS LARGER THAN THAT MAY CAUSE INJURY. INGESTION MAY CAUSE GASTROINTESTINAL IRRITATION OR ULCERATION.

INHALATION: VAPORS ARE UNLIKELY DUE TO PHYSICAL PROPERTIES. DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: FOR POTASSIUM CHLORIDE: IN ANIMALS, EFFECTS HAVE BEEN REPORTED ON THE FOLLOWING ORGANS FOLLOWING INGESTION: GASTROINTESTINAL TRACT, HEART, KIDNEY. DOSE LEVELS PRODUCING THESE EFFECTS WERE MANY TIMES HIGHER THAN ANY DOSE LEVELS EXPECTED FROM EXPOSURE DUE TO USE.

CANCER INFORMATION: NO RELEVANT INFORMATION FOUND.

TERATOLOGY (BIRTH DEFECTS): NO RELEVANT INFORMATION FOUND.

REPRODUCTIVE EFFECTS: NO RELEVANT INFORMATION FOUND.

4. FIRST AID

EYES: IMMEDIATELY FLUSH EYES WITH WATER; REMOVE CONTACT LENSES, IF PRESENT, AFTER THE FIRST 5 MINUTES, THEN CONTINUE FLUSHING EYES FOR AT LEAST 15 MINUTES. OBTAIN MEDICAL ATTENTION WITHOUT

DELAY, PREFERABLY FROM AN OPHTHALMOLOGIST.

SKIN: WASH SKIN WITH PLENTY OF WATER.

INGESTION: DO NOT INDUCE VOMITING. GIVE ONE CUP (8 OUNCES OR 240 ML) OF WATER OR MILK IF AVAILABLE AND TRANSPORT TO A MEDICAL FACILITY. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

INHALATION: MOVE PERSON TO FRESH AIR; IF EFFECTS OCCUR; CONSULT A PHYSICIAN.

NOTE TO PHYSICIAN: IF BURN IS PRESENT, TREAT AS ANY THERMAL BURN, AFTER DECONTAMINATION. DUE TO IRRITANT PROPERTIES, SWALLOWING MAY RESULT IN BURNS/ULCERATION OF MOUTH, STOMACH & LOWER GI TRACT WITH SUBSEQUENT STRICTURE. ASPIRATION OF VOMITUS MAY CAUSE LUNG INJURY. SUGGEST ENDOTRACHEAL/ESOPHAGEAL CONTROL IF LAVAGE IS DONE. NO SPECIFIC ANTIDOTE. TREATMENT OF EXPOSURE SHOULD BE DIRECTED AT THE CONTROL OF SYMPTOMS AND THE CLINICAL CONDITION OF THE PATIENT.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES
FLASH POINT: NONE
METHOD USED: NOT APPLICABLE
AUTOIGNITION TEMPERATURE: NOT APPLICABLE

FLAMMABILITY LIMITS
LFL: NOT APPLICABLE
UFL: NOT APPLICABLE

HAZARDOUS COMBUSTION PRODUCTS: NOT APPLICABLE.

OTHER FLAMMABILITY INFORMATION: HEAT IS GENERATED WHEN PRODUCT MIXES WITH WATER.

EXTINGUISHING MEDIA: THIS MATERIAL DOES NOT BURN. IF EXPOSED TO FIRE FROM ANOTHER SOURCE, USE SUITABLE FIRE EXTINGUISHING AGENT FOR THAT FIRE.

FIRE FIGHTING INSTRUCTIONS: KEEP PEOPLE AWAY. ISOLATE FIRE AREA AND DENY UNNECESSARY ENTRY. THIS MATERIAL DOES NOT BURN. FIGHT FIRE FOR OTHER MATERIAL THAT IS BURNING. WATER SHOULD BE APPLIED IN LARGE QUANTITIES AS A FINE SPRAY.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: WEAR POSITIVE-PRESSURE SELF-CONTAINED BREATHING APPARATUS (SCBA) AND PROTECTIVE FIRE FIGHTING CLOTHING (INCLUDES FIRE FIGHTING HELMET, COAT, PANTS BOOTS AND GLOVES). AVOID CONTACT WITH THIS MATERIAL DURING FIRE FIGHTING OPERATIONS. IF CONTACT IS LIKELY, CHANGE TO FULL CHEMICAL RESISTANT FIRE FIGHTING CLOTHING WITH SCBA. IF THIS IS NOT AVAILABLE, WEAR FULL CHEMICAL RESISTANT CLOTHING WITH SCBA AND FIGHT FIRE FROM A REMOTE LOCATION. FOR PROTECTIVE EQUIPMENT IN POST-FIRE OR NON-FIRE CLEAN UP SITUATIONS, REFER TO THE RELEVANT SECTIONS.

6. ACCIDENTAL RELEASE MEASURES (SEE SECTION 15 FOR REGULATORY INFORMATION)

PROTECT PEOPLE: ISOLATE AREA. KEEP UNNECESSARY AND UNPROTECTED PERSONNEL FROM ENTERING THE AREA. REFER TO SECTION 7, HANDLING FOR ADDITIONAL PRECAUTIONARY MEASURES. SPILLED MATERIAL MAY CAUSE A SLIPPING HAZARD. USE APPROPRIATE SAFETY EQUIPMENT. FOR ADDITIONAL INFORMATION, REFER TO SECTION 8, EXPOSURE CONTROLS/

PERSONAL PROTECTION

PROTECT THE ENVIRONMENT: PREVENT FROM ENTERING INTO SOIL, DITCHES, SEWERS, WATERWAYS AND/OR GROUNDWATER. SEE SECTION 12, ECOLOGICAL INFORMATION.

CLEANUP: SMALL SPILLS: CONTAIN SPILLED MATERIAL IF POSSIBLE. COLLECT IN SUITABLE AND PROPERLY LABELED CONTAINERS. WASH THE SPILL SITE WITH LARGE QUANTITIES OF WATER. LARGE SPILLS: DIKE AREA TO CONTAIN SPILL. COLLECT IN SUITABLE AND PROPERLY LABELED CONTAINERS. WASH THE SPILL SITE WITH LARGE QUANTITIES OF WATER.

7. HANDLING AND STORAGE

HANDLING: AVOID CONTACT WITH EYES, SKIN AND CLOTHING. WASH THOROUGHLY AFTER HANDLING. HEAT DEVELOPED DURING DILUTING OR DISSOLVING IS VERY HIGH. USE COOL WATER WHEN DILUTING OR DISSOLVING (TEMPERATURE LESS THAN 80F, 27C). SEE SECTION 8, EXPOSURE CONTROLS/PERSONAL PROTECTION.

STORAGE: KEEP CONTAINERS CLOSED. STORE IN A DRY PLACE. PROTECT FROM ATMOSPHERIC MOISTURE. DO NOT STORE IN ZINC.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: PROVIDE GENERAL AND/OR LOCAL EXHAUST VENTILATION TO CONTROL AIRBORNE LEVELS BELOW THE EXPOSURE GUIDELINES.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: USE SAFETY GLASSES. FOR DUSTY OPERATIONS OR WHEN HANDLING SOLUTIONS OF THE MATERIAL, WEAR CHEMICAL GOGGLES.

SKIN PROTECTION: WEAR CLEAN, LONG-SLEEVED, BODY-COVERING CLOTHING. USE GLOVES CHEMICALLY RESISTANT TO THIS MATERIAL. WHEN PROLONGED OR FREQUENTLY REPEATED CONTACT COULD OCCUR, USE CHEMICALLY PROTECTIVE CLOTHING RESISTANT TO THIS MATERIAL. SELECTION OF SPECIFIC ITEMS SUCH AS FACESHIELD, GLOVES, BOOTS, APRON, OR FULL-BODY SUIT WILL DEPEND ON OPERATION. IF HANDS ARE CUT OR SCRATCHED, USE GLOVES CHEMICALLY RESISTANT TO THIS MATERIAL EVEN FOR BRIEF EXPOSURES.

RESPIRATORY PROTECTION: ATMOSPHERIC LEVELS SHOULD BE MAINTAINED BELOW THE EXPOSURE GUIDELINE. FOR MOST CONDITIONS, NO RESPIRATORY PROTECTION SHOULD BE NEEDED; HOWEVER, IN DUSTY ATMOSPHERES, USE AN APPROVED PARTICULATE RESPIRATOR.

EXPOSURE GUIDELINES: CALCIUM CHLORIDE: DOW IHG IS 10 MG/M3.

SODIUM CHLORIDE: DOW IHG IS 10 MG/M3.

POTASSIUM CHLORIDE: DOW IHG IS 10 MG/M3.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE: WHITE TO OFF-WHITE PELLETS
ODOR: ODORLESS
MELTING POINT: APPROX. 1424F, 772C
BOILING POINT: >1500F, >815C
VAPOR PRESS: <0.005 MMHG @ 20C
VAPOR DENSITY: NOT APPLICABLE
SOLUBILITY IN WATER: VERY SOLUBLE

SPECIFIC GRAVITY: 2.2

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: STABLE. HYGROSCOPIC.

CONDITIONS TO AVOID: NONE KNOWN. AVOID MOISTURE.

INCOMPATIBILITY WITH OTHER MATERIALS: HEAT IS GENERATED WHEN MIXED WITH WATER. SPATTERING AND BOILING CAN OCCUR. AVOID CONTACT WITH SULFURIC ACID. CORROSIVE WHEN WET. FLAMMABLE HYDROGEN MAY BE GENERATED FROM CONTACT WITH METALS SUCH AS: ZINC, SODIUM.

HAZARDOUS DECOMPOSITION PRODUCTS: DOES NOT DECOMPOSE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

11. TOXICOLOGICAL INFORMATION (SEE SECTION 3 FOR POTENTIAL HEALTH EFFECTS. FOR DETAILED TOXICOLOGICAL DATA, WRITE OR CALL THE ADDRESS OR NON-EMERGENCY NUMBER SHOWN IN SECTION 1)

SKIN: THE LD50 FOR SKIN ABSORPTION IN RABBITS IS > 5000 MG/KG.

INGESTION: THE ORAL LD50 FOR RATS IS BETWEEN 967-1668 MG/KG.

MUTAGENICTY (EFFECTS ON GENETIC MATERIAL): FOR CACL2, IN VITRO GENETIC TOXICITY STUDIES WERE NEGATIVE.

12. ECOLOGICAL INFORMATION (FOR DETAILED ECOLOGICAL DATA, WRITE OR CALL THE ADDRESS OR NON-EMERGENCY NUMBER SHOWN IN SECTION 1)

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: PARTITIONING FROM WATER TO N-OCTANOL IS NOT APPLICABLE.

DEGRADATION & PERSISTANCE: INHIBITORY CONCENTRATION (IC50) IN OECD ACTIVATED SLUDGE RESPIRATION INHIBITION TEST (OECD TEST NO. 209) IS GREATER THAN 1000 MG/L.

ECOTOXICOLOGY: BASED LARGELY OR COMPLETELY ON DATA FOR MAJOR COMPONENT(S). MATERIAL IS PRACTICALLY NON-TOXIC TO AQUATIC ORGANISMS ON AN ACUTE BASIS (LC50/EC50 >100 MG/L IN MOST SENSITIVE SPECIES).
ACUTE LC50 IN BLUEGILL (LEPOMIS MACROCHIRUS) IS 8400-10650 MG/L.
ACUTE LC50 IN MOSQUITO FISH (GAMBUSIA AFFINIS) IS 13400 MG/L.
ACUTE LC50 IN WATER FLEA DAPHNIA MAGNA IS 759-3005.

13. DISPOSAL CONSIDERATIONS (SEE SECTION 15 FOR REGULATORY INFORMATION)

DISPOSAL: ALL DISPOSAL METHODS MUST BE IN COMPLIANCE WITH ALL FEDERAL, STATE/PROVINCIAL AND LOCAL LAWS AND REGULATIONS. REGULATIONS MAY VARY IN DIFFERENT LOCATIONS. WASTE CHARACTERIZATIONS AND COMPLIANCE WITH APPLICABLE LAWS ARE THE RESPONSIBILITY SOLELY OF THE WASTE GENERATOR. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (COMPOSITION/INFORMATION ON INGREDIENTS).

FOR UNUSED & UNCONTAMINATED PRODUCT, THE PREFERRED OPTIONS IN-

CLUDE SENDING TO A LICENSED, PERMITTED: RECLAIMER, LANDFILL, OR WASTE WATER TREATMENT SYSTEM.

FOR ADDITIONAL INFORMATION, REFER TO:
- HANDLING & STORAGE INFORMATION, MSDS SECTION 7.
- STABILITY & REACTIVITY INFORMATION, MSDS SECTION 10.
- REGULATORY INFORMATION, MSDS SECTION 15.

AS A SERVICE TO ITS CUSTOMERS, DOW CAN PROVIDE NAMES OF INFORMATION RESOURCES TO HELP IDENTIFY WASTE MANAGEMENT COMPANIES AND OTHER FACILITIES WHICH RECYCLE, REPROCESS OR MANAGE CHEMICALS OR PLASTICS, AND THAT MANAGE USED DRUMS. TELEPHONE DOW'S CUSTOMER INFORMATION CENTER AT 800-258-2436 OR 989-832-1556 FOR FURTHER DETAILS.

14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): THIS PRODUCT IS NOT REGULATED BY D.O.T. WHEN SHIPPED DOMESTICALLY BY LAND.

CANADIAN TDG INFORMATION: THIS PRODUCT IS NOT REGULATED BY TDG WHEN SHIPPED DOMESTICALLY BY LAND.

15. REGULATORY INFORMATION (NOT MEANT TO BE ALL-INCLUSIVE--SELECTED REGULATIONS REPRESENTED)

NOTICE: THE INFORMATION HEREIN IS PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE AS OF THE EFFECTIVE DATE SHOWN ABOVE. HOWEVER, NO WARRANTY, EXPRESS OR IMPLIED IS GIVEN. REGULATORY REQUIREMENTS ARE SUBJECT TO CHANGE AND MAY DIFFER FROM ONE LOCATION TO ANOTHER; IT IS THE BUYER'S RESPONSIBILITY TO ENSURE THAT ITS ACTIVITIES COMPLY WITH FEDERAL, STATE OR PROVINCIAL, AND LOCAL LAWS. THE FOLLOWING SPECIFIC INFORMATION IS MADE FOR THE PURPOSE OF COMPLYING WITH NUMEROUS FEDERAL, STATE OR PROVINCIAL, AND LOCAL LAWS AND REGULATIONS. SEE OTHER SECTIONS FOR HEALTH AND SAFETY INFORMATION.

SARA 313 INFORMATION: TO THE BEST OF OUR KNOWLEDGE, THIS PRODUCT CONTAINS NO CHEMICAL SUBJECT TO SARA TITLE III SECTION 313 SUPPLIER NOTIFICATION REQUIREMENTS.

SARA HAZARD CATEGORY: THIS PRODUCT HAS BEEN REVIEWED ACCORDING TO THE EPA "HAZARD CATEGORIES" PROMULGATED UNDER SECTIONS 311 AND 312 OF THE SUPERFUND AMENDMENT AND REAUTHORIZATION ACT OF 1986 (SARA TITLE III) AND IS CONSIDERED, UNDER APPLICABLE DEFINITIONS, TO MEET THE FOLLOWING CATEGORIES:

AN IMMEDIATE HEALTH HAZARD

TOXIC SUBSTANCES CONTROL ACT (TSCA):

ALL INGREDIENTS ARE ON THE TSCA INVENTORY OR ARE NOT REQUIRED TO BE LISTED ON THE TSCA INVENTORY.

THE CAS NUMBER(S) FOR TSCA IS(ARE):

CAS# 010043-52-4
CAS# 007647-14-5
CAS# 007447-40-7
CAS# 007732-18-5

STATE RIGHT-TO-KNOW: THIS PRODUCT IS NOT KNOWN TO CONTAIN ANY SUBSTANCES SUBJECT TO THE DISCLOSURE REQUIREMENTS OF

PENNSYLVANIA

OSHA HAZARD COMMUNICATION STANDARD:

THIS PRODUCT IS A "HAZARDOUS CHEMICAL" AS DEFINED BY THE OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, OR SUPERFUND):

TO THE BEST OF OUR KNOWLEDGE, THIS PRODUCT CONTAINS NO CHEMICAL SUBJECT TO REPORTING UNDER CERCLA.

CANADIAN REGULATIONS

WHMIS INFORMATION: THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) CLASSIFICATION FOR THIS PRODUCT IS:

D2B - EYE OR SKIN IRRITANT
REFER ELSEWHERE IN THE MSDS FOR SPECIFIC WARNINGS AND SAFE HANDLING INFORMATION. REFER TO THE EMPLOYER'S WORKPLACE EDUCATION PROGRAM.

- - - - -

CPR STATEMENT: THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS (CPR) AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE CPR.

- - - - -

HAZARDOUS PRODUCTS ACT INFORMATION: THIS PRODUCT CONTAINS THE FOLLOWING INGREDIENTS WHICH ARE CONTROLLED PRODUCTS AND/OR ON THE INGREDIENT DISCLOSURE LIST (CANADIAN HPA SECTION 13 AND 14):

COMPONENTS:	CAS #	AMOUNT(%W/W)
CALCIUM CHLORIDE	010043-52-4	90-92

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16. OTHER INFORMATION

MSDS STATUS: REVISED SECTIONS 3,4,5,6,7,8,9,10,11,15.

---------- FOR ADDITIONAL INFORMATION ----------
CONTACT: MSDS COORDINATOR UNIVAR USA INC.
DURING BUSINESS HOURS, PACIFIC TIME (425)889-3400
---------- NOTICE ----------

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* * * E N D O F M S D S * * *

MATERIAL SAFETY DATA SHEET
CALCIUM CHLORIDE, DIHYDRATE FLAKE
00121 1.00 US EA 07.04.1999 MSDS_US

1. PRODUCT AND COMPANY IDENTIFICATION

Product Code	00121
Trade Name	CALCIUM CHLORIDE, DIHYDRATE FLAKE
Generic Description	CALCIUM CHLORIDE
Manufacturer/Supplier	Baroid
Address	P.O. Box 1675 Houston, TX 77251
Phone Number	(281) 871-5900
Emergency Phone Number	(281) 871-5900
Chemtrec Number	(800) 424-9300
MSDS first issued	7 April 1999
MSDS data revised	

2. COMPOSITION/INFORMATION ON THE COMPONENTS

Hazardous Components in Preparation for US

Component Name	Codes	Concentration
NON-HAZARDOUS		

3. HAZARD IDENTIFICATION

Routes of Entry	- Eye contact - Skin contact
Carcinogenic Status	Not considered carcinogenic by NTP, IARC, and OSHA.
Target Organs	- Eye - Skin
Health Effects - Eyes	Dust may cause pain, transient irritation and superficial corneal effects.
Health Effects - Skin	Material will cause severe irritation and may cause chemical burns.
Health Effects - Ingestion	Swallowing may have the following effects: - irritation of mouth, throat and digestive tract
Health Effects - Inhalation	Exposure to dust may have the following effects: - irritation of nose, throat and respiratory tract

4. FIRST AID MEASURES

First Aid - Eyes	Immediately flood the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.
First Aid - Skin	Wash skin thoroughly with soap and water. Contaminated clothing should be washed or dry-cleaned before re-use.
First Aid - Ingestion	Have victim drink 1-3 glasses of water to dilute stomach contents. Induce vomiting. Obtain medical attention.
First Aid - Inhalation	Remove from exposure. If there is difficulty in breathing, give oxygen. Seek medical attention if symptoms persist.
Advice to Physicians	Treat symptomatically.

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5. FIRE FIGHTING MEASURES

Extinguishing Media	Select extinguishing agent appropriate to other materials involved.
Special Hazards of Product	This product may give rise to hazardous fumes in a fire.
Protective Equipment for Fire-Fighting	Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Spill Procedures	Sweep up into suitable containers for recovery or disposal. Transfer into suitable containers for recovery or disposal.
Personal Precautions	Wear appropriate protective clothing. Wear respiratory protection.
Environmental Precautions	Prevent the material from entering drains or water courses.

7. HANDLING AND STORAGE

Handling	Use in well ventilated area. Use local exhaust ventilation. Avoid inhaling dust. Avoid contact with eyes, skin and clothing. Emergency shower and eye wash facilities should be readily available.
Storage	Store in original containers. Storage area should be: - away from incompatible materials - cool - dry - well ventilated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Control Measures	Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions. If engineering controls and work practices are not effective in preventing or controlling exposure, then suitable personal protective equipment, which is known to perform satisfactorily, should be used. Use of the basic principles of Industrial Hygiene will enable this material to be used safely.
Respiratory Protection	The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.
Hand Protection	Chemical resistant gloves
Eye Protection	Chemical goggles.
Body Protection	Normal work wear.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Flakes
Color	White
Odor	Odorless
pH	Neutral
Specific Gravity	0.83
Boiling Range/Point (°C/F)	Not determined.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Flash Point (PMCC) (°C/F)	None.
Explosion Limits (%)	None.
Vapor Pressure	Not determined.
Density	Not determined.
Solubility in Water	Completely soluble
Vapor Density (Air = 1)	Not applicable.
Evaporation Rate	Not applicable.

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions.
Conditions to Avoid	None known.
Materials to Avoid	- Sulfuric acid - Zinc - methyl vinyl ether - Water
Hazardous Polymerization	CONTACT WITH METHYL VINYL ETHER STARTS RUNAWAY POLYMERIZATION REACTION.
Hazardous Decomposition Products	- hydrogen chloride

11. TOXICOLOGICAL INFORMATION

Acute Toxicity	Oral LD50 (rat) 1400mg/kg.
Chronic Toxicity/Carcinogenicity	No relevant studies identified.
Genotoxicity	No relevant studies identified.
Reproductive/Developmental Toxicity	No relevant studies identified.

12. ECOLOGICAL INFORMATION

Mobility	No relevant studies identified.
Persistence/Degradability	No relevant studies identified.
Bio-accumulation	No relevant studies identified.
Ecotoxicity	The product is expected to be slightly toxic to aquatic species.

13. DISPOSAL

Product Disposal	Dispose of in accordance with all applicable local and national regulations.
Container Disposal	Empty containers may contain hazardous residues. Dispose of containers with care.

14. TRANSPORT INFORMATION

DOT CFR 172.101 Data	Proper Shipping Name: Not Regulated
UN Proper Shipping Name	Not Regulated

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14. TRANSPORT INFORMATION

UN Class	None.
UN Number	None.

15. REGULATORY INFORMATION

TSCA Listed	Yes.
California Proposition 65	This product does not contain materials which the State of California has found to cause cancer, birth defects or other reproductive harm.
SARA Title III Sect. 302 (EHS)	Not listed.
SARA Title III Sect. 311/312 Categorization	Immediate (Acute) Health Hazard
SARA Title III Sect. 313	This product does not contain a chemical which is listed in Section 313 at or above de deminis concentrations.

16. OTHER INFORMATION

NFPA Ratings	NFPA Code for Health 1 NFPA Code for Flammability 0 NFPA Code for Reactivity 0
Abbreviations	® Registered trademark of Halliburton Energy Services Inc. (TM) Trademark of Halliburton Energy Services N A: Denotes no applicable information found or available CAS#: Chemical Abstracts Service Number ACGIH: American Conference of Governmental Industrial Hygienists OSHA: Occupational Safety and Health Administration TLV: Threshold Limit Value PEL: Permissible Exposure Limit STEL: Short Term Exposure Limit NTP: National Toxicology Program IARC: International Agency for Research on Cancer R: Risk S: Safety LC50: Lethal Concentration 50% LD50: Lethal Dose 50% BOD: Biological Oxygen Demand KoC: Soil Organic Carbon Partition Coefficient
Prepared By:	Environmental Services

All information recommendations and suggestions herein concerning our product are based on tests and data believed to be reliable, however, it is the user's responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantees, expressed or implied, is made by Baroid as to the effects of such use, the results to be obtained, or the safety and toxicity of the product nor does Baroid assume any liability arising from the use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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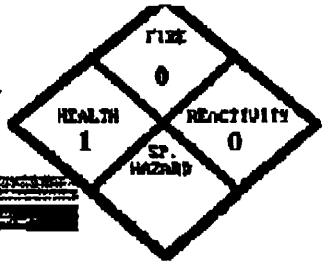
Baroid Environmental, Safety and Transportation Data Sheet



QUIK-GEL®

I. PRODUCT IDENTIFICATION

SUPPLIER BAROID DRILLING FLUIDS, INC.	REGULAR TELEPHONE NUMBER 713/987-5900 EMERGENCY TELEPHONE NO. 800 424-9300
ADDRESS P.O. BOX 1675 HOUSTON, TEXAS 77251	
TRADE NAME QUIK-GEL	
GENERIC DESCRIPTION HIGH YIELD BENTONITE: SODIUM MONTMORILLONITE 1302-78-9	

II. HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	%	HAZARD DATA
SILICA 14808-60-7	2-6%	LOW CONCENTRATIONS OF
		CRYSTALLINE SILICA (SiO2)
		IN THE FORM OF QUARTZ,
		CRISTOBALITE,AND TRIDYMITE
		MAY BE PRESENT
		(SEE SECTION V)

III. PHYSICAL DATA

BOILING POINT (Deg F) NA	MELTING POINT NA	FREEZING POINT NA
SPECIFIC GRAVITY (H2O = 1) 2.5	VAPOR PRESSURE (mm Hg) NA	
VAPOR DENSITY (AIR = 1) NA	SOLUBILITY IN WATER, % BY WT. NA	
% VOLATILES BY VOLUME NA	EVAPORATION RATE(BUTYL ACETATE = 1) NA	
APPEARANCE AND ODOR GREY, TAN POWDER, NO ODOR	DENSITY @ 20 Deg C (Uncompacted) 47.6 LB/CU	
pH NA		

NA = Not Applicable ND = Not Determined

All information recommendations and suggestions herein concerning our product are based on tests and data believed to be reliable. However, it is the user's responsibility to determine the safety, toxicity, and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Baroid Corporation as to the effects of such use, the results to be obtained, or the safety and toxicity of the product nor does Baroid Corporation assume any liability arising from the use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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Baroid Drilling Fluids, Inc.
P.O. Box 1675, Houston, Texas 77251

BEST Sheet **QUIK-GEL®**

IV. FIRE AND EXPLOSION DATA

NOT FLAMMABLE OR EXPLOSIVE DOES NOT SUPPORT COMBUSTION.
EXTINGUISHING MEDIA: USE MEDIA APPLICABLE TO SURROUNDING FIRE.
SPECIAL FIRE FIGHTING PROCEDURES: NONE ANTICIPATED

V. HEALTH HAZARD INFORMATION

CARCINOGENICITY - SEE ROUTES OF EXPOSURE AND EFFECTS (BELOW)

ACUTE ORAL LD50	ACUTE DERMAL LD50	AQUATIC TOXICITY LC50
ND	ND	ND

ROUTES OF EXPOSURE AND EFFECTS

THIS PRODUCT CONTAINS FREE CRYSTALLINE SILICA WHICH ACCORDING TO THE IARC HAS EXHIBITED LIMITED EVIDENCE OF CARCINOGENICITY IN HUMANS. PROLONGED INHALATION OF THE POWDER MAY RESULT IN SILICOSIS, A NONCANCEORUS LUNG DISEASE. OSHA FINAL LIMITS TABLE Z-3 MINERAL DUSTS.
CRYSTALLINE SILICA QUARTZ (RESPIRABLE) 10 mg/m3 ———— %SiO2 + 2
QUARTZ (TOTAL DUST) 30 mg/m3 ———— %SiO2 + 2
IF CRISTOBALITE OR TRIDYMITE IS DETECTED, USE ONE HALF THE VALUE CALCULTAED FROM FORMULA FOR QUARTZ.
EYES: IRRITANT SKIN: POTENTIAL IRRITANT INHALATION: IRRITATION TO LUNGS, NOSE, AND THROAT; PROLONGED INHALATION MAY CAUSE LUNG INJURY OR DISEASE.

EMERGENCY AND FIRST AID PROCEDURES

NORMAL PERSONAL HYGIENE.

VI. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY
STABLE

INCOMPATIBILITY
NONE

HAZARDOUS DECOMPOSITION PRODUCTS
NONE

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION
NONE

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
NORMAL HOUSEKEEPING; CAUSES SLIPPERY SURFACES WHEN WET.

NEUTRALIZING CHEMICALS
NA

WASTE DISPOSAL METHOD
DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS

VIII. INDUSTRIAL HYGIENE CONTROL MEASURES

VENTILATION REQUIREMENTS
MECHANICAL, GENERAL ROOM VENTILATION. USE LOCAL VENTILATION TO MAINTAIN TLV (SEE SECTION V)

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY
DUST MASK

EYE
SAFETY GLASSES, GOGGLES

GLOVES
WORK GLOVES

OTHER CLOTHING AND EQUIPMENT
APRON, EYEWASH

BEST Sheet **QUIK-GEL©**

IX. SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS

RECOMMENDED LABELING:
FRONT PANEL: CAUTION! SEE BACK PANEL FOR CAUTION BEFORE USE. BACK PANEL: CAUTION THIS PRODUCT CONTAINS FREE CRYSTALLINE SILICA WHICH ACCORDING TO THE IARC HAS EXHIBITED LIMITED EVIDENCE OF CARCINOGENICITY IN HUMANS. PROLONGED INHALATION OF THE POWDER MAY RESULT IN SILICOSIS. A NONCANCEROUS LUNG DISEASE. AVOID CREATING DUSTY CONDITIONS AND USE A NIOSH APPROVED DUST RESPIRATOR.

OTHER HANDLING AND STORAGE REQUIREMENTS

STORE IN SHELTERED AREA OR COVER TO PROTECT FROM MOISTURE

X. DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME :
NOT REGULATED AS HAZARDOUS

PLACARDS :
NONE

HAZARD CLASS :
NOT HAZARDOUS

REPORTABLE QUANTITY :
NONE

HAZARDOUS SUBSTANCE :
NONE

ID NUMBER :
NONE

LABEL :
NONE REQUIRED

Prepared by:
Environmental Services

DATE:
June,1996

MATERIAL SAFETY DATA SHEET

QUIK-GEL®

00029 1.00 US EA 07.01.1999 MSDS_US

1. PRODUCT AND COMPANY IDENTIFICATION

Product Code	00029
Trade Name	QUIK-GEL®
Generic Description	BENTONITE, SODIUM MONTMORILLONITE (CAS# 1302-78-9)
Manufacturer/Supplier	Baroid
Address	P.O. Box 1675 Houston, TX 77251
Phone Number	(281) 871-5900
Emergency Phone Number	(281) 871-5900
Chemtrec Number	(800)424-9300
MSDS first issued	7 January 1999
MSDS data revised	

2. COMPOSITION/INFORMATION ON THE COMPONENTS

Hazardous Components in Preparation for US

Component Name	Codes	Concentration
SILICA, CRYSTALLINE AS QUARTZ	14808-60-7	2.00 - 6.00

3. HAZARD IDENTIFICATION

Routes of Entry	- Inhalation of dusts - Eye contact - Skin contact
Carcinogenic Status	An ingredient is: - Listed as carcinogenic by: - IARC
Target Organs	- Eye - Skin - Lung
Health Effects - Eyes	Dust may cause slight transient irritation.
Health Effects - Skin	Material may cause slight irritation on prolonged or repeated contact.
Health Effects - Ingestion	Swallowing may have the following effects: - irritation of mouth, throat and digestive tract
Health Effects - Inhalation	Exposure to dust may have the following effects: - irritation of nose, throat and respiratory tract Prolonged inhalation of dust may result in cancerous and noncancerous lung disease. Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans.

4. FIRST AID MEASURES

First Aid - Eyes	Immediately flood the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.
First Aid - Skin	Wash skin thoroughly with soap and water.
First Aid - Ingestion	Wash out mouth with water.
First Aid - Inhalation	Remove from exposure. If there is difficulty in breathing, give oxygen. Seek medical attention if symptoms persist.
Advice to Physicians	Treat symptomatically.

MATERIAL SAFETY DATA SHEET
QUIK-GEL®
00029 1.00 US EA 07.01.1999 MSDS_US

5. FIRE FIGHTING MEASURES

Extinguishing Media	Not combustible. Select extinguishing agent appropriate to other materials involved.
Special Hazards of Product	Avoid the formation of dust clouds.
Protective Equipment for Fire-Fighting	No specific measures necessary.

6. ACCIDENTAL RELEASE MEASURES

Spill Procedures	Avoid creating a dust. Sweep or preferably vacuum up and collect in suitable containers for recovery or disposal. Avoid accumulation of dust.
Personal Precautions	Wear appropriate protective clothing. Wear respiratory protection. Material can create slippery conditions underfoot.
Environmental Precautions	No specific measures necessary.

7. HANDLING AND STORAGE

Handling	Avoid creating a dust. Use in well ventilated area. Avoid inhaling dust.
Storage	Store in original containers. Storage area should be: - cool - dry - well ventilated - under cover

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Standards	
SILICA, CRYSTALLINE AS QUARTZ	OSHA (respirable): 10 mg/m3 / %SiO2 + 2 OSHA (Total Dust): 30 mg/m3 / %SiO2 + 2 Dust, respirable: ACGIH: TLV 0.1mg/m3 8h TWA. UK EH40: MEL 0.4mg/m3 8h TWA.
Engineering Control Measures	Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions. If engineering controls and work practices are not effective in preventing or controlling exposure, then suitable personal protective equipment, which is known to perform satisfactorily, should be used. Use of the basic principles of Industrial Hygiene will enable this material to be used safely.
Respiratory Protection	The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.
Hand Protection	Work gloves
Eye Protection	Dust tight goggles.
Body Protection	Normal work wear. - overall or apron

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Powder

9. PHYSICAL AND CHEMICAL PROPERTIES

Color	Light Brown - Grey
Odor	Odorless
pH	Not applicable.
Specific Gravity	2.5
Boiling Range/Point (°C/F)	Not determined.
Flash Point (PMCC) (°C/F)	None.
Explosion Limits (%)	None.
Vapor Pressure	Not applicable.
Density	47.6 lb/ft3 at 20 °C. (loose)
Solubility in Water	Not applicable.
Vapor Density (Air = 1)	Not applicable.
Evaporation Rate	Not applicable.
VOC (g/l)	0

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions.
Materials to Avoid	None known.
Hazardous Polymerization	Will not occur.
Hazardous Decomposition Products	None known.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity	Low order of acute toxicity predicted.
Chronic Toxicity/Carcinogenicity	IARC assessment: one of the components of this product is carcinogenic to humans (Group 1).
Genotoxicity	No relevant studies identified.
Reproductive/Developmental Toxicity	No relevant studies identified.

12. ECOLOGICAL INFORMATION

Mobility	The product is insoluble in water.
Persistence/Degradability	No relevant studies identified.
Bio-accumulation	No relevant studies identified.
Ecotoxicity	No relevant studies identified.

13. DISPOSAL

Product Disposal	Dispose of in accordance with all applicable local and national regulations.
Container Disposal	Dispose of containers with care.

14. TRANSPORT INFORMATION

DOT CFR 172.101 Data	Proper Shipping Name: Not Regulated
UN Proper Shipping Name	Not Regulated
UN Class	None.
UN Number	None.

15. REGULATORY INFORMATION

TSCA Listed	Yes.
MA Right To Know Law	Listed.
PA Right To Know Law	Listed
NJ Right to Know Law	Listed
California Proposition 65	This product contains the following chemicals that have been found by the State of California to cause cancer, birth defects or other reproductive harm: - Silica, crystalline
SARA Title III Sect. 302 (EHS)	Not listed.
SARA Title III Sect. 311/312 Categorization	Delayed (Chronic) Health Hazard
SARA Title III Sect. 313	This product does not contain a chemical which is listed in Section 313 at or above de deminis concentrations.

16. OTHER INFORMATION

NFPA Ratings	NFPA Code for Health 1 NFPA Code for Flammability 0 NFPA Code for Reactivity 0
Abbreviations	® Registered trademark of Baroid Technology (TM) Trademark of Halliburton Energy Services N/A: Denotes no applicable information found or available CAS#: Chemical Abstracts Service Number ACGIH: American Conference of Governmental Industrial Hygienists OSHA: Occupational Safety and Health Administration TLV: Threshold Limit Value PEL: Permissible Exposure Limit STEL: Short Term Exposure Limit NTP: National Toxicology Program IARC: International Agency for Research on Cancer R: Risk S: Safety LC50: Lethal Concentration 50% LD50: Lethal Dose 50% BOD: Biological Oxygen Demand KoC: Soil Organic Carbon Partition Coefficient
Prepared By:	Environmental Services

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16. OTHER INFORMATION

herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

Baroid Environmental, Safety and Transportation Data Sheet

QUIK-FOAM®

I PRODUCT IDENTIFICATION

SUPPLIER Baroid Drilling Fluids, Inc.	REGULAR TELEPHONE NO. (713) 987-5900 EMERGENCY TELEPHONE NO. (713) 987-4000
ADDRESS P.O. Box 1675 Houston, Texas 77251	
TRADE NAME QUIK-FOAM®	
GENERIC DESCRIPTION Liquid mixture of Anionic Surfactants	

II HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	%	HAZARD DATA
Isopropyl Alcohol 67-63-0	15	Flammable, TLV 400 ppm
Ethanol 64-17-5	5	Flammable, TLV 1000 ppm

III PHYSICAL DATA

BOILING POINT (°F) NA	MELTING POINT NA	FREEZING POINT -10 Pour Point
SPECIFIC GRAVITY (H_2O =1) 1.02	VAPOR PRESSURE (mm Hg) NA	
VAPOR DENSITY (AIR = 1) NA	SOLUBILITY IN H_2O, % BY WT. Soluble	
% VOLATILES BY VOL. ND	EVAPORATION RATE (BUTYL ACETATE = 1) NA	
APPEARANCE AND ODOR Light amber liquid, alcohol odor	Density @ 20° C (Uncompacted): 8.5 lbs/gal	
pH 7.3 – 7.8		

NA = Not Applicable ND = Not Determined

QUIK-FOAM ®

HEALTH HAZARD 1

FLAMMABILITY 3

REACTIVITY 1

Ratings based on NIOSH "Identification System for Occupationally Hazardous Materials" (1974)

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BEST Sheet

IV FIRE AND EXPLOSION DATA

Flash Point: 74°F PMCC

Extinguishing Media: Alcohol type foam or dry chemical. Use water spray to cool fire exposed surfaces. Respiratory and eye protection required for fire fighting personnel.

Flammable liquid, can release vapors that form flammable mixtures at temperatures at or above the flashpoint.

V HEALTH HAZARD INFORMATION

CARCINOGENICITY - NOT ON NTP, IARC OR OSHA LISTS

ACUTE ORAL LD_{50}	ACUTE DERMAL LD_{50}	AQUATIC TOXICITY (LC_{50})
5000 MG/KG	ND	1000-100 PPM

ROUTES OF EXPOSURE AND EFFECTS

Estimated Lethal Dose For Man – 1 Pint

INHALATION AND INGESTION: Irritating to respiratory tract. May cause headache and dizziness.

SKIN CONTACT: Frequent or prolonged contact may cause irritation and cause dermatitis.

EYES: Severely irritating upon contact. May injure eye tissue if not removed promptly.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Immediately remove person from exposure. Administer artificial respiration if breathing has stopped. If breathing is difficult give oxygen. Call for prompt medical attention.

SKIN CONTACT: Flush with large amounts of water; use soap if available. Remove contaminated clothing, including shoes, and launder before re-use. If irritation persists contact physician.

EYES: Flush eyes immediately with warm water for at least 15 minutes. Contact physician.

INGESTION: If swallowed and individual is conscious, give several glasses of water, induce vomiting by placing two fingers at the back of the throat. Do not make unconscious person vomit. Contact physician.

VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

THIS PRODUCT IS STABLE UNDER NORMAL DRILLING CONDITIONS.

INCOMPATIBILITY

NONE

HAZARDOUS DECOMPOSITION PRODUCTS

NONE

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

NONE

VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

NORMAL HOUSEKEEPING. CAUSES SLIPPERY SURFACES WHEN WET.

NEUTRALIZING CHEMICALS

NA

WASTE DISPOSAL METHOD

DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

VIII INDUSTRIAL HYGIENE CONTROL MEASURES

VENTILATION REQUIREMENTS

MECHANICAL, GENERAL ROOM VENTILATION
USE LOCAL VENTILATION TO MAINTAIN TLV (SEE SECTION V)

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY

USE A NIOSH APPROVED MECHANICAL FILTER RESPIRATOR FOR NONTOXIC DUSTS.

EYE

NONE REQUIRED

GLOVES

NONE REQUIRED

OTHER CLOTHING AND EQUIPMENT

APRON, EYEWASH STATION

BEST Sheet

IX SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS

QUIK-FOAM is moderately toxic to fish. Do not use, spill, or discard where it may leach, spill, or run off into waterways.

Keep away from flames or sparks.

OTHER HANDLING AND STORAGE REQUIREMENTS

Store in cool and well ventilated area, separate from oxidizing agents.

"Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. Do not pressurize, cut, weld, 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 returned to a drum reconditioner, or properly disposed of.

DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:
Combustible Liquid N.O.S.

PLACARDS:
Combustible

HAZARD CLASS:
Combustible Liquid

REPORTABLE QUANTITY:
None

HAZARDOUS SUBSTANCE:
Isopropyl Alcohol, Ethanol

ID NUMBER:
NA1993

LABEL:
Combustible Liquid

LANG EXPLORATORY DRILLING
MSDS Summary Page

Product Name Portland Cement

Manufacturer Riverside Cement Co.

HMIS Code 1 - 0 - 0 - A
(Health- Flammability- Reactivity- PPE; 0 = low, 4= high)

Health Hazard Information

Acute Effects: Irritant, as dust, to eyes and respiratory tract.

Chronic Effects: Overexposure to dust can cause inflammation of the lining tissue of the nose and inflammation of the eye.

Physical Hazards: Wet cement may cause burns to skin and eyes.

Recommended Safe Handling Procedures

1. Wear safety glasses.
2. If dust is produced during use, wear a dust respirator.
3. If prolonged or repeated contact is required, wear rubber or plastic gloves.

Riverside Cement Company

A Gifford-Hill Company — Member of THE BEAZER GROUP

GIFFORD-HILL

MATERIAL SAFETY DATA SHEET

SECTION I

Manufacturer's Name and Address
Riverside Cement Company
P. O. Box 4904
Diamond Bar, CA 91765

Emergency Telephone No.
(714) 861-6025

Trade Name and Synonyms
Portland Cements
Type II
Type V
Block
Plastic
White
Oil Well
Rapid

Chemical Name and Synonyms
Portland Cements (CAS #65997-15-1)

Formula
$3\ CaO\ .\ SiO_2$ (CAS # 11168-85-3)
$2\ CaO\ .\ SiO_2$ (CAS # 1003-77-2)
$3\ CaO\ .\ Al_2O_3$ (CAS # 12042-78-3)
$4\ CaO\ .\ Al_2O_3\ .\ Fe_2O_3$ (CAS # 12068-35-8)
$CaSO_4\ .\ 2H_2O$ (CAS # 13397-24-5)
plus small amounts of CaO. MgO. K_2SO_4. Na_2SO_4 may be present.

Chemical Family
Calcium Salts

SECTION II — HAZARDOUS INGREDIENTS

Portland cements are classified as nuisance dusts by OSHA (29 CFR 1910. 1000. Table Z-3), MSHA (30 CFR 56.5001. ACGIH TLV's for 1973. Appendix E). and ACGIH (TLV's for 1985-86. Appendix D). Portland cement is NOT listed by NTP. IARC. or OSHA as a carcinogen or potential carcinogen: however, it contains detectable amounts of chemical known to the State of California to cause cancer. birth defects or other reproductive harm.

SECTION III — PHYSICAL DATA

Boiling Point
Not applicable. as portland cement is a powdered solid

Specific Gravity
3.15

Vapor Pressure
Not applicable. as portland cement is a powdered solid

Percentage Volatile by Volume
0%

Vapor Density
Not applicable. as portland cement is a powdered solid

Evaporation Rate
Not applicable. as portland cement is a powdered solid

Solubility in Water
Slight (0.1 - 1.0%)

Appearance and Odor
Gray (or white) powder. no odor

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

Flash Point
Portland cements are noncombustible and nonexplosive

Special Firefighting Procedures
Not applicable

Flammable or Explosive Limits
Not applicable

Unusual Fire & Explosion Hazards
None

Extinguishing Media
Not applicable

SECTION V — HEALTH HAZARD DATA

WARNING

Portland cement contains detectable amounts of chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Threshold Limit Value
Respirable Dust - 5 mg/m3
Total Dust - 10 mg/m3
30 million Particles/ft3

Emergency and First Aid Procedures
Irrigate eyes with water, consult physician. Wash exposed skin areas with soap and water.

Effects of Overexposure
Acute: Wet cement, especially as an ingredient in plastic (unhardened) concrete, can dry the skin and cause alkali burns. Cement dust can irritate the eyes and upper respiratory tract.

Chronic: Cement dust can cause inflammation of the lining tissue of the interior of the nose and inflammation of the eye. Hypersensitive individuals may develop an allergic dermatitis (skin rash).

SECTION VI — REACTIVITY DATA

Stability
Product is stable. Keep dry until used.

Incompatibility
None

Hazardous Decomposition Products
None

Hazardous Polymerization
Will not occur

SECTION VII — SPILL PROCEDURES

Steps to be Taken in Case Material is Spilled
Use dry cleanup methods that do not disperse the dust into the air.

Waste Disposal Method
Material can be returned to container for later use, or it can be disposed of as an industrial waste.

SECTION VIII — SPECIAL PROTECTION INFORMATION

Respiratory Protection
In dusty environments, the use of NIOSH approved respirator is recommended.

Ventilation
Local exhaust can be used, if necessary, to control airborne dust levels.

Skin Protection
Use barrier creams, gloves, boots and clothing to protect the skin from prolonged contact with wet cement especially in plastic (unhardened) concrete. Immediately after working with cement, workers should shower with soap and water. Precautions must be observed because cement burns with little warning - little heat is sensed.

Eye Protection
In dusty environments, the use of tight fitting goggles is recommended.

SECTION IX — SPECIAL PRECAUTIONS

Precautions to be Taken Handling and Storing
None

Other Precautions
None

SECTION X — ABBREVIATIONS

ACGIH
American Conference of Governmental Industrial Hygienists

CAS
Chemical Abstract Service

CFR
Code of Federal Regulations

Cubic Foot

IARC
International Agency for Research on Cancer

m3
Cubic Meter

Mg
Milligram

MSHA
Mine Safety and Health Administration

NIOSH
National Institute for Occupational Safety & Health

NTP
National Toxicology Program

OSHA
Occupational Safety and Health Administration

TLV
Threshold Limit Value

Cenntennial Project C/007/019 Bond Amount Revised March 2005

Bonding Calculations
Centennial Mine C/007/019

Bond Summary

Direct Costs

Subtotal Demolition and Removal	$191,616.00	
Subtotal Backfilling and Grading	$364,963.00	
Subtotal Revegetation	$159,388.00	
Direct Costs	$715,967.00	
Indirect Costs		
Mob/Demob	$71,597.00	10.0%
Contingency	$35,798.00	5.0%
Engineering Redesign	$17,899.00	2.5%
Main Office Expense	$48,686.00	6.8%
Project Mainagement Fee	$17,899.00	2.5%
Subtotal Indirect Costs	$191,879.00	26.8%
Total Cost	$907,846.00	
Escalation factor		0.0444
Number of years		4
Escalation	$172,293.00	
Reclamation Cost	$1,080,139.00	
Bond Amount (rounded to nearest $1,000)	$1,080,000.00	
2009 Dollars		

Centennial Mine C\007\019

Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	N
	Loadout Bin No 01														
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	20							
	Structure's Vol. Demolished														
	Rubble's Weight (exclude steel)														
	Truck's Capacity														
	Haulage														
	Transportation Cost Non Steel Truck														
	Transportation Cost Non Steel Drive														
	Disposal Cost Non Steel														
	Steel's Weight														
	Truck's Capacity														
	Haulage														
	Transportation Cost Steel Truck														
	Transportation Cost Steel Truck Drive														
	Disposal Cost Steel														
	Subtotal														
	Equipment 's Disposal Cost														
	Dismantling Cost														
	Equipment 's Vol. Demolished														
	Loading Costs														
	Transport Costs														
	Disposal Costs														
	Subtotal														
	Concrete Demolition														
	Demolition Cost														
	Concrete's Vol. Demolished														
	Loading Cost														
	Transportation Cost														
	Disposal Costs														
	Subtotal														
	Concrete Demolition														
	Demolition Cost														
	Concrete's Vol. Demolished														
	Loading Cost														
	Transportation Cost														
	Disposal Costs														
	Subtotal														
	Concrete Demolition														
	Demolition Cost														
	Concrete's Vol. Demolished														
	Loading Cost														
	Transportation Cost														
	Disposal Costs														
	Subtotal														
	Total														

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Concrete No 02													
	Structure's Demolition Cost													
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY	20	28	0.75						
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Reclaim No 03													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	8	12	150						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Conveyor No 04													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	4	4	250						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description Hopper No 05	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Hopper No 05													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	15						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description Conveyor No 06	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Conveyor No 06													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	5	5	260						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Tunnel No 07													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	8	12	90						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Fan No 08													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	8	20	20						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Substation No 09													
	Structure's Demolition Cost													
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost	Mechanical equipment heavy	15055 300 3600	805	/ton									
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Equipment 's Disposal Cost	Chain link remove 8'-10'	02220 220 1700	2.92	/LF	104								
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Water Tank No 10													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF						941			
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Portals No 11													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	8						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Portals are already sealed													
	Equipment 's Disposal Cost	Seal Portals	AML1	5200	EA.									
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Main Office No 12													
	Office's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	32	60	16						
	Trailer's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	8	12	70						
	Water Tank's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF						706			
	Structure's Vol. Demolished nonsteel													
	Structure's Vol. Demolished steel													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel	City Services	City Service Price	4	/CY									
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY						47.15			
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Bath House No 13													
	Bath House 1's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	14	65	8						
	Bath House 2's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	12	50	8						
	Trailer's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	12	42	8						
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF						941			
	Structure's Vol. Demolished non steel													
	Structure's Vol. Demolished steel													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel	City Services	City Service Price	4	/CY									
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY	14	65	0.5						
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY	14	65	0.5						
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Substation No 14													
	Structure's Demolition Cost													
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Transformers													
	Equipment 's Disposal Cost	Mechanical equipment heavy	15055 300 3600	805	/ton									
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Chain Link Fence													
	Equipment 's Disposal Cost	Chain link remove 8'-10'	02220 220 1700	2.92	/LF	328								
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Loadout Bin No 15													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	24						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY	20	24	0.75						
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Conveyor No 16													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	4	4	200						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Reclaim No 17													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	8	12	24						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Hopper No 18													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	10	24	24						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Conveyor No 19													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	4	5	185						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Tunnel No 20													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	8	12	90						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Water Tank No 21													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	CF						1412			
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Rock Dust Tank No 22													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF						1570			
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Trailers No 23													
	Structure's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	10	55	8						
	Structure's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	10	50	8						
	Structure's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	10	40	8						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel	City Services	City Service Price	4	/CY									
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Portals No 24													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	8						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost	Seal Portals (Cost /sqft)	AML 4	25	/SqFt	20	6							
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Office No 25													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	24	42	8						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY	24	42	0.5						
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Portals No 26													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	7						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost	Seal Portals (Cost /sqft)	AML 4	25	/SqFt	20	4							
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	ShopWarehouse No 27													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	150	60	18						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY	150	60	1						
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019

Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Loadout No 28													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	18						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY	20	20	0.75						
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Conveyor No 29													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	4	4	350						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Reclaim No 30													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	8	12	170						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Hopper No 31													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	24	24	16						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Conveyor No 32													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	5	4	250						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Tunnel No 33													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	8	12	125						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Portals No 34													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	6						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost	Seal Portals (Cost /sqft)	AML 4	25	/SqFt	20	6							
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

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Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Water Tank No 35													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF					941				
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Shed No 36													
	Structure's Demolition Cost	Steel Bid. Large	02220 110 0012	0.2	/CF	10	50	8						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Magazines No 37													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	4	4	6						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Substation No 38													
	Structure's Demolition Cost	Mechanical equipment heavy	15055 300 3600	805	/ton									
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Fence													
	Equipment 's Disposal Cost	Chain link remove 8'-10'	02220 220 1700	2.92	/LF	105								
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Office No 39													
	Structure's Demolition Cost	Mixed Materials Bld. Large	02220 110 0100	0.21	/CF	25	40	8						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel	City Services	City Service Price	4	/CY									
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost	Concrete demolition	ConcreteDemo1	3.97	/CY	25	40	0.5						
	Concrete's Vol. Demolished													
	Loading Cost	Front end loader 3 CY	02315 424 1300	1.39	/CY									
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	02315 490 0320	3.44	/CY									
	Disposal Costs	On site disposal	02220 240 5550	7.6	/CY									
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Portals No 40													
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	25	8						
	Structure's Demolition Cost	Steel Bld. Large	02220 110 0012	0.2	/CF	20	20	8						
	Structure's Vol. Demolished													
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposal Cost	Seal Portals (Cost /sqft)	AML 4	25	/SqFt	20	6							
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

Centennial Mine C\007\019 Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Culverts No 41													
	12 inch culvert remove	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7	/CY	260	4	2						
	12 inch culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	02315 610 3080	1.53	/CY									
	18 inch culvert remove	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7	/CY	1340	4	3						
	18 inch culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	02315 610 3080	1.53	/CY									
	24 inch culvert remove	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7	/CY	330	4	4						
	24 inch culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	02315 610 3080	1.53	/CY									
	36 inch culvert remove	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7	/CY	1885	4	6						
	36 inch culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	02315 610 3080	1.53	/CY									
	42 inch culvert remove	Excavation Bulk Bank 2 CY (322BL)	02315 424 0260	1.7	/CY	2950	4	7						
	42 inch culvert backfill	Backfill Trench Mininal Haul 2 1/4 CY	02315 610 3080	1.53	/CY									
	Subtotal													
	Subtotal													
	Subtotal													
	Subtotal													
	Subtotal													
	Total													

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Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time
	Gob Vent Well 1													
	Structure's Demolition Cost	Mechanical equipment heavy	15055 300 3600	805	/ton							25		
	Plug Well	Plug Well	AML3	5000	EA.									
	Rubble's Weight (exclude steel)													
	Truck's Capacity													
	Haulage													
	Transportation Cost Non Steel Truck													
	Transportation Cost Non Steel Drive													
	Disposal Cost Non Steel													
	Steel's Weight													
	Truck's Capacity													
	Haulage													
	Transportation Cost Steel Truck													
	Transportation Cost Steel Truck Drive													
	Disposal Cost Steel													
	Subtotal													
	Equipment 's Disposai Cost													
	Dismantling Cost													
	Equipment 's Vol. Demolished													
	Loading Costs													
	Transport Costs													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Concrete Demolition													
	Demolition Cost													
	Concrete's Vol. Demolished													
	Loading Cost													
	Transportation Cost													
	Disposal Costs													
	Subtotal													
	Total													

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Earthwork Costs

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Uni
Mine Site														
Grading														
Backfill and rough grade pond, canyon and bench areas														
D9R Semi-U EROPS (9-54) (2H04)	17115	72.3	0.1	52	238.5	1	238.5	$/HR	81912	CY	144	CY/HR	568.8	HR
CLAB					41.55	0.5	20.78	$/HR					568.8	HR
Subtotal														
Backfill and grade benches, out slope and highwalls														
Use dozer productivity for time estimate														
D8R Series II Semi-U EROPS (9-55) (2nd04)	13720	53.4	0.1	52	196.49	1	196.49	$/HR	386	Scrapper/Hr	4	Scrapper	96.5	HR
827G EROPS (9-52) (2nd04)	16080	84.6	0.1	52	245.56	4	982.24	$/HR	81913	CY	212.5	CY/HR	96.5	HR
CLAB					41.55	2	83.1	$/HR					96.5	HR
Subtotal														
Haul and spread topsoil														
D8R Series II Semi-U EROPS (9-55) (2nd04)	13720	53.4	0.1	52	196.49	1	196.49	$/HR	118	Scrapper/Hr	4	Scrapper	29.5	HR
827G EROPS (9-52) (2nd04)	16080	84.6	0.1	52	245.56	4	982.24	$/HR	27588	CY	235	CY/HR	29.5	HR
Excavator for pocking														
CAT 325BL (10-7)(3Q00)	9780	26.05	0.1	45.95	135.73	1	135.73	$/HR					29.5	HR
CLAB					41.55	2	83.1	$/HR					29.5	HR
Subtotal														
Ripping														
D7R Series II (9-55) (2nd2004)	10565	41.1	0.1	52	163.24	1	163.24	$/HR	110352	CY	3083.8	CY/HR	35.8	HR
Multi-Shank Ripper 190-259 P (9-61) (2nd04)	1835	5.95	0.1	0	18.01	1	18.01	$/HR					35.8	HR
CLAB					41.55	0.5	20.78	$/HR					35.8	HR
Subtotal														
Support Personel														
Foreman Average, Outside					57.3	1	57.3	$/HR					96.5	HR
Pickup Truck Crew 4x4 1 ton (20-17) (2N04)	820	7.8	0.1	0	13.71	1	13.71	$/HR					96.5	HR
4,000 gal H2O truck Diesel (20-16) (2N04)	3350	19.85	0.1	42	84.77	1	84.77	$/HR					96.5	HR
Subtotal														
Total														

Centential Mine C/007/019

Earthwork Costs

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Uni
Centennial Mine														
Grading														
Backfill and rough grade pond, canyon and bench areas														
D7R Series II (9-55) (2nd2004)	10565	41.1	0.1	52	163.24	1	163.24	$/HR	25000	CY	250	CY/HR	100	HR
Subtotal														
Haul and spread topsoil														
D7R Series II (9-55) (2nd2004)	13720	53.4	0.1	52	196.49	1	196.49	$/HR	15000	CY	250	CY/HR	60	HR
Subtotal														
Support Personel														
Foreman Average, Outside					57.3	1	57.3	$/HR					26.4	HR
Pickup Truck Crew 4x4 1 ton (20-17) (2N04)	820	7.8	0.1	0	13.71	1	13.71	$/HR					26.4	HR
4,000 gal H2O truck Diesel (20-16) (2N04)	3350	19.85	0.1	42	84.77	1	84.77	$/HR					26.4	HR
Subtotal														
Total														

Centential Mine C/007/019

Earthwork Costs

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Uni
Centennial Mine														
Mine Site														
Gob Hole #1														
Gob Hole #2-8														
Total														

Centennial Mine C/007/019 Revegetation Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Nu
	Vegetation														
	Slopes														
	Ground Preparation														
	Gouging/Pocking	Excavation Bulk Bank 2 CY (322BL)	M023154240260	1.7	/CY						29201				
	Assume vol = area(18.1 AC) x 1 ft.														
	Seed for hydromulch	Seed Mix for Centennial Drainage	Centennial 001	447.7	$/AC					18.1					
	Hydroseed application	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	19.13	/MSF					18.1					
	Mulch material	Hay 1" material only 029105000250	Reveg001	68	/MSF					18.1					
	Hydroseed application	Hydro Spreader (equip. & labor) B-81	Reveg005	19.13	/MSF					18.1					
	Flat Areas														
	Ground Preparation														
	Scarify Area	75 HP Dozerw/scarifiers	M029107103100	3.87	/MSF					15.02					
	Seed for drilling	Seed Mix for Centennial Slopes	Centennial 002	560.55	$/AC					15.02					
	Drill seeding	Tractor Spreader (equip. & labor) B-66	Reveg004	10.5	/MSF					15.02					
	Drainages														
	Seedlings material cost	Transplants for Centennial Mine	Centennial 003	2835	$/AC					2.15					
	Seedlings labor	Common Labor	CLAB	41.55	/HR									16	
	Gob Hole														
	Ground Preparation														
	Gouging/Pocking	Excavation Bulk Bank 2 CY (322BL)	M023154240260	1.7	/CY						1700				
	Assume vol = area(18.1 AC) x 1 ft.														
	Seed for hydromulch	Seed Mix for Centennial Drainage	Centennial 001	447.7	$/AC					5					
	Hydroseed application	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	19.13	/MSF					5					
	Mulch material	Hay 1" material only 029105000250	Reveg001	68	/MSF					5					
	Hydroseed application	Hydro Spreader (equip. & labor) B-81	Reveg005	19.13	/MSF					5					
	Subtotal														
	Reseeding														
	Assume 25% reseeding rate														
	Subtotal														
	Total														