BLM Plan of Operations UTU-070557
UDOGM Notice of Intention M0270032
To Commence Large Mining Operations for BEG Resources, LC
Red Dome Mine

Submitted By:

BEG Resources, LC
95 North 200 East
P.O. Box 974
American Fork, Utah 84003

to:

Bureau of Land Management
Fillmore Field Office
95 E. 500 N.
Fillmore, Utah 84631

&

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

Plan of Operations and
Notice of Intention to Commence Large Mining Operations
BEG Resources, LC.
Red Dome Mine

Table of Contents

Contents

List of Tables

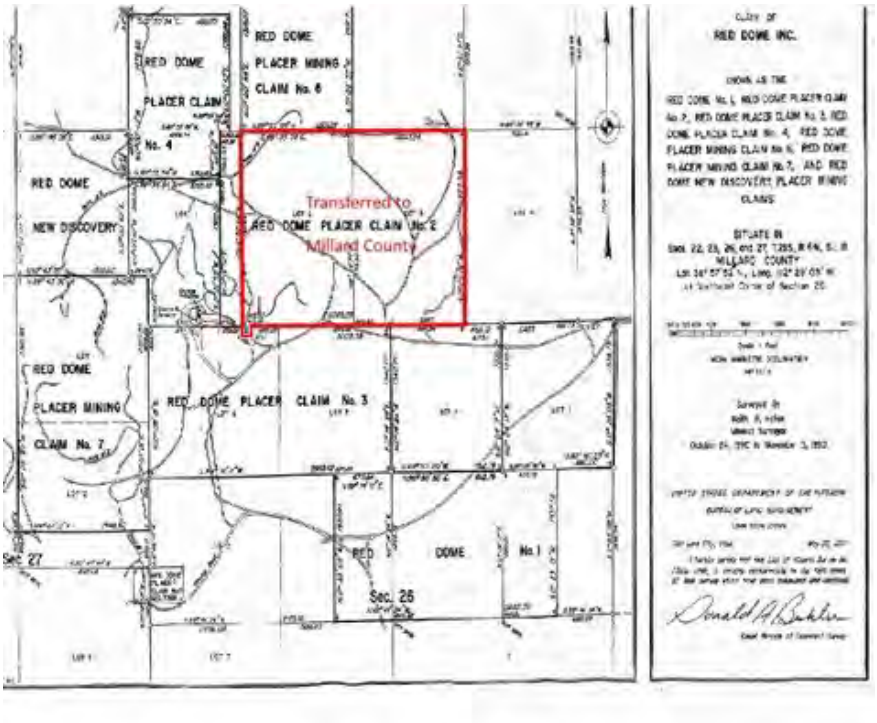
Appendices

Introduction/Project Background

The Red Dome Mine located near Flowell, Utah consists of eight placer claims which span over 300 Acres approximately 10 miles west of Fillmore, Utah in Millard County (see Appendix A - Figure 1). The Red Dome Claims have been mined for over a century dating back to early pioneer times. Material from the Red Dome mine is a common site around houses and farms in the surrounding area.

Red Dome Inc. was formed in the 1970's by Dexter Anderson who mined and marketed the material across the United States. The claims were purchased by Gordon Griffin whose company Beckford Griffin Family Investments L.L.C. In late 2019, a portion of lot 2 & lot 3 of Red Dome Placer Claim No. 2 (UMC 58769) and No. 3 (UMC 58770) rights, consisting of 106.84 acres, were sold to Millard County to be used as a county pit for their road chips. Also, a 0.21-acre parcel located in the southwest corner of Section 23, Lot 2, and a portion of the Section 26, was sold to the County which included the appurtenant shop building. Red Dome retains the rights of Lot 1 and the western 10 acres of Lot 2 of Placer Claim No. 2 (see figure below).

In January 2019, Red Dome Inc. entered into an agreement with BEG Resources LC (BEG) to transfer ownership of the mineral rights over the span of five (5) years. In January 2024, BEG completed the purchase agreement with Red Dome and has transferred the ownership of the mine and mining claims to its responsibility (see Appendix N).



Plan of Operations / Notice of Intention to Commence Large Mining OperationsRed Dome

This document represents the joint submittal for a Plan of Operations (PoO) and a Notice of Intention (NOI) is submitted to both the Bureau of Land Management (BLM) for compliance with and approval under CFR 43 Rule 3809.401 and the Utah Division of Oil, Gas and Mining (UDOGM) for compliance with and approval under R647-4-103 of the Utah Minerals Reclamation Program

3809.401 (b)(1)/Rule R647-4-104 Owner/Operator Information

1. **Mine Name**: Red Dome

2. **Name of applicant or company**: BEG Resources, LC
   Business Entity #: 9812912-0160
   TIN: 87-0572713
   Registered Agent: Jake Burningham
   Address: 95 N 200 E,
   American Fork, Utah
   Phone: 801-960-5662
   E-mail address: jakeb@burninghamtrucking.com

3. **Permanent address**: P.O. Box 974 (Corporate Office)
   American Fork, Utah
   Phone: 801-756-8138 Fax: 801-756-4123

4. **Company Representative**: Jake Burningham, Mine Supervisor
   Address: P.O. Box 974
   American Fork, Utah
   Phone: 801-960-5662 Fax: 801-756-4123
   E-mail address: jakeb@burninghamtrucking.com

5. **Location of Operation**: 5865 W. 200 S. Fillmore, Utah 84631
   County: Millard County, State of Utah.
   Lat. 38º 57' 52" - Long. 112º 29' 03" at Northeast corner of Section 26, T 21S, R 6W

6. **Other Federal, State, or Local Permits**

   BEG is filing this joint document as a Plan of Operations (PoO) for the Red Dome Mine with the BLM Fillmore Field Office referenced as UTU-070557. The BLM will be notified within 30-days of any change of operator for the operation.

   Division of Water Quality (DWQ)/UPDES: As there is no runoff from the project site, due to the porous nature of the volcanic bedrock, there are no DWQ or UPDES permits.

Utah Division of Air Quality (DAQ): DAQ has determined that an air permit is not required based on the limited emissions.

7. **Ownership of the land surface**

Public Domain (BLM)
Nearest offices located:
Department of Interior Bureau of Land Management
95 E. 500 N.
Fillmore, Utah 84631
435-743-3100

8. **Owner of record of the minerals to be mined:**

Department of Interior Bureau of Land Management
95 E. 500 N.
Fillmore, Utah 84631
435-743-3100

9. **Adjacent landowners:**

Department of Interior Bureau of Land Management
95 E. 500 N. Fillmore, Utah 84631
435-743-3100

10. **Have the land, mineral, and adjacent landowners been notified in writing?**

Yes, the BLM has been notified.

11. **Does the operator have legal right to enter and conduct mining operations on the land covered by this PoO or notice?**

Yes, BEG has purchased from Red Dome Inc. mining claims for the minerals through the BLM unpatented placer mining claims which include:

Red Dome	UMC 58767
Red Dome Placer Claim #1	UMC 58768
Red Dome Placer Claim #2	UMC 58769
Red Dome Placer Claim #3	UMC 58770
Red Dome Placer Claim #4	UMC 58771
Red Dome Placer Claim #5	UMC 58772
Red Dome Placer Claim #6	UMC 58773
Red Dome Placer Claim #7	UMC 58774
Red Dome New Discovery Placer Claim	UMC 59192

All these claims are situated in sections 22, 23, 26, 27 Township 21S Range 6W, S.L.B.M. Also, BEG, as part of the Red Dome claims, has use of public access roads to all Red Dome Placer Claims.

BEG will conduct mining operations in accordance with a BLM approved PoO and UDOGM permit.

Rule 3809.401 (b)(2)(i-ii)/R647-4-105 Maps, Drawings & Photographs

The mining operation maps show site topography, mining areas, surface facilities, claim boundaries, and access routes as required under R647-4-105. These maps are attached in Appendix A at the end of this document.

Rule 3809.401 (b)(2)/R647-4-106 Operational Plan

106.1 Type of Mineral to be Mined

The material to be mined is from a volcanic cone made of foamy volcanic scoria (cinders). Most of the deposit consists of a dark black or grey colored basaltic rock but can vary from bright red to deep purple in different locations. Rock products from historic operations have been used for construction, decorative, and infrastructure purposes. Materials mined from Red Dome cinder mine will continue to be used for the following purposes:

- Cinder Blocks
- Roof Tiles
- De-slicking grit
- Lightweight Borrow/Backfill
- Warning Track
- Decorative Rock
- General Fill

106.2 Type of Operations to be Conducted

The Red Dome operation will consist of a surface mining operation for cinders. Mining of cinders will be conducted by ripping and excavation the exposed volcanic cone by dozer and loader and hauling with haul trucks. Drilling and blasting will not be required on this site, due to the inherent ease of ripping of the consolidated cinders.

Current Phase

The current development area of the Red Dome claims is presented on Appendix A - Figure 2a and 2b. Current Phase represents the historical phase of development that is currently underway. For the last 75 plus years mining has been conducted in the flat areas around the claims in a hunt and peck/gloryholing manner. Due to this method of mining, it has led to a massive footprint and area for which a significant surety is required. BEG's goal is to identify areas that can be regraded and reseeded to reduce the bond to a more manageable amount.

This effort will consist of consolidating mining operations and stockpile areas as close to the mining areas as possible to reduce unnecessary space. No new disturbance outside the existing disturbance boundaries, shown on Appendix A - Figures 2a/2b/2c, will occur without additional permitting and appropriate bonding.

As discussed previously, this will result in several areas that are no longer required for mining which will be contemporaneously reclaimed and reseeded.

Figures 2a & 2c show the current extent of the project area and site disturbances, the anticipated life of mine area, location of the production and mining access roads, location of the three active mining areas, location of the natural revegetated area, production crushing and storage areas, location of the control and metal container storage areas, fuel truck storage, and port-a-potty location. Additionally, the figure shows the area of future mining that will be disturbed over the life to the operation.

The Production area is planned to stay in the same place during the life of the operation. If there are any changes to the planned layout, the NOI and maps will be updated.

The disturbance boundary is different from the previous boundary submitted to UDOGM. The changes are due to the sale of a portion of the property purchased by Millard County, areas that are required to allow mining of the crest of the volcanic cone, and removal of the private ground from the PoO or permit area.

3809.401 (b)(2)(vii) Schedule of Mining

BEG's intention is to mine the cinder reserves in phases that will occur in variable increments for at least the next 100-years. A series of figures have been developed to show the various phases of mining and reclamation for the modified PoO or permit and disturbance boundaries for the proposed Red Dome operation. Descriptions of the phasing of the life of mine disturbances are presented in Appendix A - Figures 3 through 6 and described below. A discussion of the anticipated mining volumes during each phase is presented in Section 106.9. The details of the proposed mining activities of these areas are discussed in Sections 107 and 109 of the application.

PHASE 1 - Figures 3a and 3b present the modifications anticipated for Phase 1. These efforts consist of evaluations of the PoO or permit area to assess the uses that are required for an efficient operation. Work areas are being shifted within the disturbed area as necessary to accomplish this. Also BEG is concentrating on identification of areas that are not needed for current or short-term mining. Those areas identified as not being required will be regraded and revegetated to consolidate the disturbed area to a more manageable size and to reduce the area covered by the bond. Contemporaneous reclamation efforts of these areas are discussed in the Reclamation Plan Section 3809.401(b) (3) and R647-110.

Additionally, the mining activities would be modified to change from mining the face of the volcanic cone to mining the top of the volcanic cone. This mining approach would help to minimize the steepness of the outslope of the cone. Dozers would be used at the top of the cone to rip and excavate the cinder materials and create a working pad. The excavated materials would then be pushed off the edge of the working pad at the top of the cone toward the south- and west-facing slopes of the cone and allowed to cascade to the toe of the slope. Wheel loaders and trucks would then be used to gather the cinder materials and haul it to the various crushers to size and process the materials.

Currently, there are two processing and storage areas on the east and west sides of the production area. The eastern one is for red cinder processing and storage, while the western one is for black cinders. These processing areas would continue to be used through the Phase 1 period.

The mining in Phase 1 would result in the top of the cone being excavated down about 50 feet. These excavations are anticipated to take about 5-years.

PHASE 2 – Figures 4a and 4b present the modifications for Phase 2. Much of the disturbance would remain the same with an expansion of the mining footprint to allow continued mining for the top of the cone. The mining activities will only disturb vegetation as needed and not all at once. It is anticipated that areas of mining will be expanded in increments of 5 -10 acres at a time depending on the color and condition of the materials. Due to the depth of the material in the Phase 2 portion of the mine, each increase in acreage is estimated to occur on a schedule of every 10+ years or if absolutely needed. In each expansion, BLM will be notified when we are disturbing the native soils. As each expansion area is mined down, the areas no longer required for mining will be contemporaneously reclaimed. This phase would continue until the major portions of the southern and western portions of the cone were mined essentially flat with the processing facilities area.

For the contemporaneously reclaimed areas from Phase 1, if they meet the reclamation standards, then they will be removed from the PoO and permit area. This will allow a reduction of the bond the BEG will be required to post.

For Phase 2 the processing and storage areas would remain the same as in Phase 1. Due to the volume of the cone materials, it is anticipated that Phase 2 will take about 75 to 80 years to complete.

PHASE 3 – Figure 5a and 5b present the final phase of mining, Phase 3. This would consist of both new mining in the northern future mining area and reclamation of significant portions of the Phase 2 mining area. To minimize the disturbance, the facilities area would remain the same and haul roads would be extended to allow access to the future mining area.

For the mined areas from Phase 2, these areas would be regraded and reseeded per the reclamation plan. Over the life to the phase, if they meet the reclamation standards, then they will be removed from the PoO and permit area. This will again allow a reduction of the bond the BEG will be required to post.

PHASE 4 – Figure 6a and 6b present the total reclamation phase. This will include the final mining areas, the removal of the production stockpiles and equipment, and all site access roads. Over a period of three years, BEG will work with both the BLM and UDOGM to assess the status of the site reclamation. Once the reclamation standards are met, then the operation will be determined fully reclaimed.

3809.401 (b)(2)(viii) Transportation and Access

Access to the mine from I-15 is via exit 163 in Fillmore, Utah. Head west and use Park Ave to head north to 200 South, then head west approximately 10 miles. The pavement ends in a dirt/gravel road maintained by Millard County. The mine gate/entrance is about 1 mile beyond the end of the pavement.

The main gate to the mine site connects via existing dirt facilities access/haul roads to the mine production storage and loading areas. The product from the mine is loaded into over-the-road trucks in the product storage area and then hauled off site.

The contracted or customer-contracted trucks are weighed as they enter the site, trucks are loaded with bulk product, and they are weighed again before leaving. This occurs at the east end of the PoO or permit area (see Appendix 1 - Figure 2a), facilitated by a wood-framed scale house and in-road scale.

Mined cinders are collected from the various pit areas via mine pit/highwall access haul roads

which have been cut into the slopes to provide safe access. The specific areas mined at any given time is based upon the visual determination of product color and customer demand. Product demand will determine the mine pits that the materials will be hauled from. The roads will continue to be used and provide future access to mining areas. Some of these roads have been used for over 75 years.

The facilities access/haul roads and the mine pit/highwall access roads will be maintained by BEG on an as-needed basis. The locations of these roads are presented on the various phase maps. The facilities access/haul roads currently are approximately 40 feet wide and have a maximum gradient of 5%.

3809.401 (b)(2) Equipment and Processing Operations

The products from the various pits are hauled to the processing area. The processing equipment includes crushers, screeners, and radial stackers. These are primarily mobile equipment that can either move around the site as desired or be taken off site for other projects.

The processing, stockpiling, and maintenance areas are described below and shown in Appendix A - Figure 2a. The cinders from the mine pits are loaded using front end loaders/wheel excavators into Cat 740 haul trucks and positioned/stockpiled near the processing area or loaded directly into crushers. The in-pit jaw/cone crusher sizes the materials and separates them through screening. These separated materials are moved using conveyors and placed in various stockpiles via radial stackers.

Processing: The mined cinders are crushed and screened with portable equipment. The crushed cinders are separated into the various products described in Section 106.1. Processing structures include a cone crusher with conveyors and hoppers. From time to time, two smaller self-contained mobile crushers can be brought on site if demand is sufficient. These mobile crushers can be relocated as needed for efficient operations (see locations in Appendix A – Figure 2a).

Once processed, the landscape-rock is then stored in temporary color- and size-segregated stockpiles. For the materials that do not meet the sizing requirements for landscaping rock, the remaining products are separately stockpiled and sold as a soil conditioning product or for other uses. Thus, there are no waste products from the operation.

Fuel for the loaders and equipment is brought in by fuel contractors from off-site and put into a portable fuel truck. The fuel truck is stored in a lined area to ensure that spill containment is provided. No fuel is stored in stationary tanks onsite.

Stockpiling: The nature of operations is such that stockpile locations vary depending upon the location of the crushers and the active stacking area. However, active stockpile areas are estimated to be not more than 20 acres at any given time. Typically, stockpiles are consolidated around the various crushers shown in Appendix A - Figure 2a.

The conveyors from the crushers to the stockpiles will be shifted from time to time to allow distribution of the crushed materials as needed to match the product demands. The maximum height of the stockpiles is limited by the conveyors. The conveyors can be raised to a maximum height slightly greater than 20 feet. Thus, the stockpiles will be limited to a max height of about 20 feet.

Support structures: Red Dome had used the metal building for various support functions and a shop prior to the sale. Following the sale to Millard County, the BLM indicated that the county has use of the building as part of the Free-Use site, but that it cannot be used by a for profit company. Therefore, BEG moved all equipment and storage from the building to a series of metal storage containers and is no longer using the structure.

Support structures include: a series of metal storage containers and a control tower for the crushers and conveyors (see Appendix A Figure 2a). The site maintenance is conducted adjacent to the storage containers for general maintenance of machines and equipment. Limited amounts of fluids are stored in 55-gallon drums inside the storage containers. The drums are kept in contained areas as addressed in the spill containment plan (see Appendix B). Used oil from services are immediately removed offsite and taken to oil recycling locations. No used oil would be stored onsite.

Water Discharge

Currently, there is no process water discharge from the property. Water is not used to wash products. The current process consists of only a dry screening method.

Given the porous nature of the native materials and the site topography, storm water runoff and/or ponding is negligible at this operation. Precipitation immediately infiltrates into the underlying porous volcanic rock and disappears from the surface. Similarly, erosion by water is minimal/limited even in bare ground areas. This due both to the lack of surface runoff and the general lack of soil or fine-grained materials on the surface of the volcanic deposits.

Further, there are no nearby watercourses that would act as receiving waters. Combined, these characteristics render traditional stormwater management features like ditches, diversions, and ponds unnecessary. Since there is no storm water discharge leaving the claims, no storm water permit is needed for the site.

That said, BEG is cognizant of the need to control pollutant sources. Attention to hydrocarbon spill potential, timely clean-up of any inadvertent hydrocarbon spills, ongoing efforts to remove and consolidate unused equipment and debris from the previous operations, and routine inspections for altered runoff/erosion conditions are the primary measures in this regard.

Electrical Power Supply and Natural Gas

A transmission line is located along the main access road entering the mine site. The poles, cables, and pad mounted transformer located near the production storage area are all property of Dixie Power, the local electric service provider in the area (see Appendix C). There is currently no natural gas located on the site.

In addition, from time to time, BEG has had diesel fueled generator sets on site. These generators are used to power the portable/mobile screen and crushing units on an as needed basis.

Water Supply and Wastewater

Water use is minimal as none is needed for operations or processing. An old water tank is located near the storage building, but it is not currently used. If water is needed it is hauled in by truck.

The operators and individual employees bring bottled water for personal employee use.

A sanitation company provides sewer services via a rental outhouse that is regularly pumped and maintained (see Figure 2c of Appendix A).

106.3 Estimated acreage:

Over the last 75 years of mining, the Red Dome mine had disturbed a large area encompassing approximately 257.7 acres. Table 106.3-1 shows the breakdown of this acreage, and the text below describes how it has adjusted over time. In 2016, Red Dome in coordination with BLM and UDOGM staffs have evaluated the areas and determined that 143 acres were disturbed and have not been used since 1975 and are considered Pre-law. Thus, the Post-law area acreage at the Red Dome Mine at that time was 114.7 acres. The outlines of these Pre-law and Post-law areas are shown on Appendix A - Figure 1.

As indicated in the Introduction, in 2018, Red Dome sold a portion of Red Dome Placer Claim No. 2 to Millard County. Thus, the portion of the disturbance that is within the Millard County parcel, has been removed from the Red Dome Post-law boundary. The disturbed area transferred from Red Dome to Millard County is approximately 16.7 acres.

Table 106.3-1 – Current Project Acreage

Activity Description	Area Change (acres)	Total Area (acres)
Historical Disturbance	257.7	257.7
2016 Determination of Pre-Law Area	-143	114.70
2018 Sale to Millard County	-16.7	98.0
2022 expansion area	65.85	163.85
Current PoO or Permit Area Breakdown		163.85
Future mining area	-72.91	90.94
Shared access area for right-of-way	-1.36	89.58
Active pit area	-15.09	74.49
Mine Development area	-53.07	21.42
Active production area	-5.80	15.62
Contemporaneous reclamation	-1.13	14.49
Natural revegetation area	-9.55	4.94
Active access roads	-1.54	3.40
Active mining/pit access roads	-3.40	0

There is a portion of the current Red Dome disturbance located within the Lot 2 area of the Millard County parcel mainly for access. This is referred to as the shared access area. BEG has moved all operations in this overlap area to other portions of the PoO and permit area, thus, Millard County is now responsible for the reclamation of the area. Therefore, this area has been removed from the BEG disturbed area boundary and is shown on the figures and reclamation summary.

Therefore, the adjusted Post-law area, consisting of 98.0 acres, is considered the current disturbed area and is shown in Appendix A – Figure 1. These areas are described as currently disturbed. In addition to these areas, BEG is proposing to expand the operation boundary to

include the future mining areas shown on Appendix A – Figure 1. The composite active mining and future mining areas will raise the PoO or permit area to 163.85 acres. All BEG operations will occur within these PoO or permit areas.

For the various phases, the various acreages will vary. Table 106.3-2 presents the different breakdowns anticipated over time. These will be adjusted as the various phases of the mine develops however, the maximum footprint is not expected to exceed the total area.

Table 106.3-2 – Phased Project Acreage

Activity Description	Current	Phase 1	Phase 2	Phase 3	Phase 4
Active pit areas	15.09	40.11	84.42	39.19	0
Mining Development areas	53.07	17.89	2.71	17.50	0
Production/storage areas	5.80	5.80	5.80	5.80	0
Contemporaneous reclamation areas	1.13	28.80	30.37	98.46	162.49
Natural revegetation area	9.55	9.55	0	0	0
Active access roads	1.54	1.54	0	1.54	0
Active pit roads	3.40	3.40	0	0	0
Bonded Area	89.58	100.26	123.30	162.49	162.49
Shared Road area to remain	1.36	1.36	1.36	1.36	1.36
Future mining areas	72.91	62.23	39.19	0	0
Total Area	163.85	163.85	163.85	163.85	163.85

Note: where the roads enter the active pit areas they are included in the area acreage. The shared road area includes the area within the permit boundary,

BEG is also notifying the agencies that future mining plans include expanding the current PoO or permit area to include the future mining area of approximately 63.19 acres, as shown on Figure 2a. This area will be for incremental development during future phases of mining over the life of the operation. For this permit application, the Phase 1 area is planned for development in the next 5 years. Any additional expansion will only occur after submission of updated NOI and associated maps, approval from the various agencies, and posting of the required bond.

All cinders contained within the PoO or permit area are considered saleable materials.

106.4 Nature of material including waste rock/overburden and estimated tonnage

Nature of Material

The material currently being mined is volcanic scoria also known as cinders. In 2005, a Utah Geological Survey senior geologist visited the site and investigated the geologic materials associated with the Red Dome mine. His report (contained in Appendix D, Resource Information) described the materials mined as basalt flows intermingled with scoria throughout the deposit. The report notes the young age of the materials due to its angular appearance with “well preserved bubble and flow textures”.

The prior operator of the mine conducted lab work consisting of whole-rock analysis including numerous heavy metals (EPA 6010B – ICP/AES method) of individual samples of

the red, black, and mixed colored cinders, 32 separate elements were analyzed for. The red and mixed color cinder results had similar concentrations, while the black cinders had substantially higher concentrations.

Diethylenetriaminepentaacetic acid (DTPA) micronutrient analyses were also performed on the same three samples. The DTPA test is an extraction method used in agronomy to determine availability of several elements necessary for plant growth. Elements analyzed were cobalt, copper, iron, manganese, molybdenum, selenium, and zinc.

The FL Smidth lab also performed an Inductively Coupled Plasma (ICP) scan on a rock sample from the mine. That scan determined the proportional makeup of 58 elements, including those commonly found on the earth surface in at relatively high concentrations (e.g., aluminum) and those typically found only at trace concentrations (e.g., zirconium).

Results of all these lab tests are presented in Appendix E. As shown in the lab reports from both labs, aluminum, calcium, iron, magnesium, potassium, and sodium were found in the greatest amounts. These same metals are typically reported as the largest components (besides the non-metallic element silica) of igneous rock in readily available crustal abundance tables.

All of elements found in the samples, including those reported at very small concentrations, occur naturally in geologic materials and soils in varying amounts, and are widely distributed in the earth's crust. Many have both beneficial and harmful effects, depending upon their availability and concentration.

For example, selenium as included in the DTPA analysis because it is an essential life element; but at excessive concentrations it can be toxic. Weathering of rocks and soils may result in soluble forms of some of these elements being present in runoff water and soil moisture, which may be taken up by plants and animals exposed to this water.

Whole rock and plant availability analyses do not provide any indication of metals concentrations in surface waters or groundwater that contact the rock. However, the non-deleterious nature of these materials can be demonstrated by the ultimate use of the mined volcanic product for landscaping and soil conditioner uses. As far as is known, no leach tests have been performed on rock from or near the site. However, data do not indicate that any are warranted.

Overburden

Most of the volcanic deposit is exposed at the surface and does not have any overlying cover. What little overburden exists on the site consists of foreign blow sand transported by wind from the surrounding desert over long periods of time. The blow sand consists of a very fine clay and silt that varies in depth depending on the wind patterns and the location on the site. The prevailing winds generally blow in southern and northern directions. Therefore, most of the blow sand deposits exist on the northern and southern slopes of the mountain. The depth of this overburden, in these locations, varies from 3-5 inches in depth.

Estimated Volume of Material

The cinder cone being mined is approximately 200 ft in height at its tallest point and spans the entire PoO or permit area. It is estimated that the cinder cone contains a potential volcanic product at the site of about 100 million tons above ground, with another 200 million tons below. Section 106.10 discusses the planned extraction volumes (see table 106.10-1). The

mined rock is porous and has a very low density. There is no waste rock as every size of material from boulders to fines can be sold as product.

106.5 Existing soil types, location of plant growth material:

In 2005, WP Natural Resource Consulting, LC prepared a Baseline Vegetation and Soil Assessment report for the Red Dome Mine. Their report is attached as Appendix F. Soils information was updated/confirmed in 2017 (see Table 106.5-1 below). The entire PoO or permit area is mapped as a single soil unit: Lava flows-Shotwell complex, 0 to 8 percent slopes. The complex consists of about 60 percent lava flows and 25 percent Shotwell, with the remaining made up of various small inclusions. As described in the 2005 report, the lava flows are lightweight cinders that originate from Quaternary-age lava flows; they are not a true soil.

The Shotwell component of the complex is a shallow cobbly loam originating from residuum derived from basalt and cinders. Shotwell soils are limited to the flatter areas surrounding the base of the cinder deposits. Due to the long term, historic nature of mining and mining related disturbance in the PoO or permit area, very little if any Shotwell soils remain. Some areas of Shotwell soils appear to be primarily confined to the private land south of the scale house and storage building. No soils were stockpiled during historic mining operations or other past activities at the site.

Field observations made in March 2017 by Stantec staff essentially confirmed information included in the 2005 report (See Appendix F).

Natural Resources Conservation Service (NRCS) Web Soil Survey, see Appendix A – Figure 8, indicates that the soils area listed as soil 81 in Table 106.5-1 has a typical soil profile of 0-3 inches of very cobbly loam as an A horizon and 3-14 inches of loam in the Bw horizon. However, this is not the case based on the data from the 2005 report and verified by the Stantec review in 2017. For the major portion of the site area, the lava flows are exposed at the surface and extend for a significant depth below the surface. It is possible that the soils described in the Web Survey, are found in the flats away from the cinder deposits.

The largest accumulations of soils appear to occur in the lay down yard located on private land south of the scales area, and along the access road into the mine area. Soils observed near the cinder deposit areas varied based on location. Those on the east and western sides were noted to be rocky and composed of cinders and cinder ash. Those on the northern and southern sides were a mix of wind-blown fines and crushed scoria/cinders. The soils on the southern side of the cone were largely disturbed by historical mining activities. These limited soils can be found in very shallow, isolated areas that create only limited habitat for plant species to take hold.

Table 106.5-1. Soil types and descriptions

Soil Type, Number	Soil Taxonomic Class	Soil Name	Texture	Depth of bedrock	Potential vegetation type	Origin of Soil
81		Lava flows	Lightweight Cinders	At surface	None-nearly devoid of plants	Quaternary lava flows
81	Lithic Xeric Torriorthents	Shotwell	0-3" - very cobbly loam 3-14" - loam	14 inches	Semidesert shallow loam 20% Bluebrush wheatgrass 20% Wyoming big sagebrush 10% Indian ricegrass 10% Nevada Bluegrass 5% each of Needle and thread. bottlebrush squirreltail, other perennial grasses, gooseberry leaf, globemallow, other perennial forbs, Nevada Mormon tea, and Mexican cliffrose.	Residuum derived from basalt and cinders
23, 24	Xeric Haplocalcids	Boxelder silt loam	0-5" - silt loam 5-27" - loam 27-60" loam	Greater than 60 inches	**Semidesert limy loam** 20% Bottlebrush Squirreltail 15% Wyoming big sagebrush 15% Indian ricegrass 10% Other Shrubs 10% Nevada Bluegrass 5% each of Rubber rabbitbrush, other perennial forbs, Winterfat western wheatgrass, other annual forbs, and scarlet globemallow.	Alluvium derived from calcareous sediment
31	Lithic Xeric	Cloyd gravelly loam	0-3" - gravelly loam 3-7" - cobbly loam 7-15"- gravelly loam	15 inches	**Semidesert shallow loam** Vegetation listed above	Residuum derived from travertine
73, 74	Xeric Haplocalcids	Kessler silt loam	0-15"- silt loam 15-60" - silt loam	Greater than 60 inches	**Semidesert loam** 25% Bluebunch wheatgrass 20% Wyoming big sagebrush 10% Indian big sagebrush 10% other shrubs 10% Bottlebrush squirreltail 5% each of needle and thread, Hood phlox, Douglas rabbitbrush, scarlet globemallow, and penstemon	Alluvium and lacustrine deposits

*Scientific names of plant species included in 2005 Report by WP Natural Resource Consulting in Appendix F)

106.6 Plan for Protecting and Redepositing Existing Soils

As described in section 106.5, there are very limited soils in the permit area. Historically, these soils have not been salvaged due to the isolated and distributed nature.

BEG is willing to meet with the BLM and UDOGM staffs to review in the field those areas of the PoO or permit area that may contain suitable plant growth materials that could be salvaged. Those areas could be delineated, and the materials salvaged and stored in stockpiles for future reclamation use.

At the most, there is about 20 acres within the claims outside of the PoO pr existing permit area that still contains overburden. During future phases of mining activities with appropriate

approvals, should BEG disturb these areas, BEG commits to salvage, as described above, and stockpile the overburden/soils and redisperse it proportionately over the disturbed areas.

106.7 Existing vegetative communities to establish benchmarks for revegetation success

Within the PoO or permit area boundaries, the vegetative cover has undergone extensive disturbance due to historic mining operations. The 2005 Baseline Vegetation and Soil Assessment report (contained in Appendix F and Table 106.5-1.) provides photos and transect information from the vegetation survey and contains an updated seed mix (Table 106.7-1) composed of native grasses, forbs, and shrubs. This report records the total pre-disturbance vegetation cover as 29.7%. To meet successful reclamation requirements, 70% of the pre-mining vegetation cover is required (i.e., 20.8%). Due to the harsh environment, limited soils, and other site conditions, it may be difficult to achieve this level of cover success. In conversations with the BLM, they indicated anything more than a 20% revegetation success would be acceptable. If a new vegetative survey is conducted and the vegetative regrowth is greater than that from the 2005 study, the post-mining vegetative would be adjusted to meet 70% of that cover percentage.

During a March 2017 site visit, the only plant found growing in the disturbed cinders was a Mentzelia species. Invasive plants including cheat grass (Bromus tectorum), halogeton (Halogeton glomeratus), tumble mustard (Sisymbrium altissimum), and Russian thistle (Salsola sp) were also observed in the general area. Native vegetation in areas where topsoil depths were suitable (mostly in the non-permitted area) were dominated by Wyoming big sagebrush (Artemisia tridentata) and rabbitbrush (Chrysothamnus nauseosus).

In the event of a future expansion of the PoO or permitted disturbance boundaries, BEG will conduct a vegetation survey for the expansion area.

106.8 Depth to groundwater, depth of overburden material, and geologic setting

Depth to Groundwater

The water rights database was reviewed for wells around the project site. There are no wells near the site to the west, however, there are wells to the east. Table 106.8-1 shows the seven closest well locations, depths, and water levels (see Appendix G). Based on these well records, there are two water bearing zones in the project area. The wells closest to the lava flows encountered water at a depth between 50 and 150 feet below ground surface. The water level in these wells ranged from 31 to 70 feet below ground surface. Therefore, these shallow wells are confined under a slight artesian condition.

The deeper wells, completed from 330 to 798 feet below ground surface, have groundwater levels of 10 feet below ground surface to artesian flows. Thus, these deeper wells are confined with a significant artesian condition.

The nearby well (see Appendix A - Figure 1) which is owned by Red Dome under water right (#67-1183) is reported to have a total depth of 80 feet below ground surface. Depth to groundwater at the Red Dome well is estimated at approximately 30-80 feet. This level approximates the shallow wells further to the east which show water levels that range from 30 to 70 feet below ground surface.

Table 106.8-1 – Water wells in the Project Area

Water Right	Well ID	Latitude	Longitude	Owner	Well Collar Elevation	Well Depth	Water Level	Water Elevation	Flow Condition
67-866	1112	38.9643	-112.4788	Ladon Anderson	4662	150	70	4592	Artesian 1
67-1729	1124	38.9661	-112.4707	Swallow AG, LLC	4661	162	31	4630	Artesian 1
67-1779	441533	38.9569	-112.4671	Ladon Anderson	4664	307	35	4629	Artesian 1
67-13	904	38.9552	-112.4665	Ladon Anderson	4663	798	0	4663	Artesian 2
67-1115	905	38.9541	-112.4656	Sprague	4664	550	0	4664	Artesian 2
67-247	434883	38.9473	-112.4729	Ladon Anderson	4665	825	10	4655	Artesian 2
67-1183	16197	38.9601	-112.4912	Red Dome	4679	80	30	4649	Artesian 1

From top of deposit facing west

Extent of Overburden Material

As discussed in Section 106.4, most of the volcanic deposit is exposed at the surface and does not have any overlying cover. This is due to the nature of the deposit. As the cinders result from lava flows or volcanic eruptions and created the cinder cone, they were the last material to be deposited in the project area. No additional significant geologic materials were placed at the site. For example, the western slopes of the cinder cone seen in photograph above have never been disturbed and demonstrate that most of the site do not have any soil or vegetative cover but consist of nothing but exposed cinders and contain no natural overburden.

As discussed in both Section 106.4 and 107, what little soil/overburden material exists is the result of wind-blown fine-grained materials that were deposited near the base of the cinder cone and can vary in depth from 0-6 inches depending on the location.

Geologic Setting

As discussed in Section 106.4, the cinder cone that BEG is mining results due to volcanic activities during the Quaternary period. Surface geology is shown on Appendix A - Figure 7, which indicates that the entire PoO or permit area is located on Quaternary age volcanic basalt lava flows labeled Qvb1 deposits. Those deposits, and others shown in the adjacent areas of the map consist of:

Qvb1	Basalt of Ice Springs
Qal1	Alluvium, Late Holocene
Qed	Eolian dunes
Qlf	Fine-grained lacustrine deposits
Qpm	Playa mud
Qvb2	Basalt of Tabernacle Hill
Qlf/Qvb2	Fine-grained lacustrine deposits of basalt of Tabernacle Hill
Qed/Qvb1	Eolian dunes over basalt of Ice Springs
Qed/Qlf	Eolian dunes over fine-grained lacustrine deposits
Qed/Qvb3	Eolian dunes over basalt of Pahvant Butte

A series of cinder cones dominate the landscape local to the PoO or permit area. The approximate locations of the cones are shown on Appendix A - Figure 7. In some areas, the lava flows are overlain by alluvial deposits of various types. The mapped geologic units are listed in Appendix A- Figure 7.

106.9 Location and size of ore and waste stockpiles, tailings and treatment ponds, and discharges

The cinder cone that is covered by the PoO or permit area is estimated to contain a potential volcanic product at the site of about 100 million tons above ground, with another 200 million tons below.

There is no waste rock associated with the Red Dome mining operations. Material from Red Dome mine will be sized or crushed and screened onsite as it is extracted. All sizes are currently sold as products. Thus, there will be no waste rock piles.

The facilities layout shown in Appendix A - Figure 2a shows the current location of the finished product stockpiles on the eastern side of the deposit and are estimated to be about 10 acres in size. It is envisioned that this would be the largest area at any given time based on the current production rate. Any changes in the product production area would be contained within the PoO or permit area.

Red Dome mining operations are dry screening only. Therefore, no tailings, treatment, or sediment ponds are needed for this type of operation. BEG does not intend to introduce wet screening applications in the foreseeable future, if changes are required, BEG will work with the BLM and UDOGM to modify the PoO and NOI before any changes would occur.

106.10 Amounts of material to be extracted or moved

As noted in Section 106.4, there is no waste rock or waste from the mining operation. There also in no overburden. Current yearly production of mined cinders ranges between 50,000 to 150,000 tons. This varies depending on demand for the materials. One specific example is the demand for state road jobs that may require a lightweight fill. If, a significant number of road job projects are being undertaken, then the demand would be higher.

Associated with this is the fact that no waste material is generated as part of the operation. Sale of 100% of all mined material can be marketed as various products. These materials are then transported all over the state and country. With the majority being split between the Salt Lake and St. George areas.

The text below and Table 106.9-1 presents the anticipated production/development schedule for the various phases. While specific production rates are projections and cannot be assured, they do represent the current plans for the operation.

Table 106.10-1 Anticipated Production Schedule

Period	Phase	Annual Production	Period Production	Total Production
Pre-2022	Current	50-150K tons/year	150K tons	150K tons
2022-2026	Phase 1	120-150K tons/year	600K tons	750K tons
2026-2106	Phase 2	500k-1.2m tons/year	90m tons	91m tons
2107-2126	Phase 3	300 – 400k tons/year	8m tons	99m tons
2127-2130	Phase 4	0 tons		

For the Phase 1 period, approximately, 600,000 tons of rock with a density of 1.0 tons/cubic yard (see lava rock classification in Appendix H) are expected to be mined in the five-year period between January 2021 and January 2026.

It is planned that once the Phase 2 layout and operation is achieved, that annual production would ramp up. Initially, starting about 500,000 tons per year and increasing to between 1 to

1.2 million tons per year. It is anticipated that this mining would continue for about 80 years, during which time the major portion of the volcanic cone would be mined flat with the surrounding production area.

For Phase 3, the volume of material mined would likely decrease as the mining expands into the northern cone area and the above ground volume decreases. This phase of mining would continue for about 19 to 20 years.

Phase 4 would consist of the reclamation of the final mining area and removal of the production area and all site equipment. It is expected that this phase would last for about 5 years.

Currently, there are no plans to mine below the ground surface around the cone area. If that changes in the future, the PoO and NOI will be modified as required by the regulation then in-place. Based on the estimated above ground rock volume, BEG's Red Dome mine operations are provided with materials to continue for at least the next 100 years.

Red Dome Operation view from high wall facing east.

Rule 3809.401 (b)(2)/647-4-107 - Operation Practices

As required, the operator shall conform to the relevant Operation Practices Stipulated in R647-4-107 as described below:

Public Safety and Welfare

BEG commits to minimizing hazards to public safety and welfare. This consists of such measures as:

- Limiting public access to the exit/entry gate with site specific guidelines regarding safety while onsite. All alternative entry routes have been bermed off.
- Warning signs will be posted as required by MSHA where applicable. Speed limit signs have been posted as well as no trespassing signs where needed.
- Placement of safety berms around areas with drop offs or highwalls consistent with MSHA protocols. Mining benches, if needed, will be 25ft-wide rising by 40ft high increments with a 15ft -wide slope section of wall resulting in an overall 1H:1V slope.
- There are no exploratory or other drill holes known onsite that need to be capped.
- All trash and scrap metal are collected and stored in temporary bins until it can be disposed of. The trash bin is emptied weekly and hauled offsite to a local landfill.
- There are no existing shafts or tunnels onsite.

Erosion Control

There are no existing streams or drains on the claims. Due to the nature of cinders, any snowmelt or rainwater is absorbed and immediately enters the ground. There is no surface drainage on the PoO or permitted area. Under these conditions, sediment erosion leaving the site is non-existent.

Deleterious Materials

There are a few deleterious materials presently stored on the mine site. These materials include diesel fuel, engine oil, hydraulic fluid, coolant and diesel exhaust fluid (DEF).

Diesel fuel is stored in a mobile fuel truck that has two 1,000-gallon tanks. Fuel is brought to site by a local fuel supplier on an as needed basis.

Shop fluids are kept in 55-gallon drums which are placed on spill containment totes inside the cargo containers. These fluids include engine oil, hydraulic oil, coolant, and DEF. All used fluids are immediately removed offsite to a recycling facility after the equipment has been serviced.

BEG developed a spill containment plan in Appendix B. Safety Data Sheets for these various materials are included in Appendix I.

Soils

As discussed in Section 106.6, no significant soils materials exist within the project area. Therefore, BEG commits to salvage as much suitable soil substitutes and overburden materials from undeveloped areas as possible for future redistribution for reclamation purposes.

Concurrent Reclamation

BEG has and will continue to conduct reclamation where practical. According to the facilities map on Appendix A - Figure 2a one of the main goals during Phase 1 is to identify possible

areas within the disturbance area that can be regraded or reclaimed. Because of previous mining practices by other operators, the disturbance area is much larger than what BEG feels is necessary. As stated previously, the goal is to consolidate mining operations as close to the highwall and stockpiling areas as possible.

Rule 3809.401 (b)(3)/R647 - 108 - Hole Plugging Requirements

There are currently no exploration holes within the PoO or permitted area and no drilling activities are anticipated. Should there be a future need, the PoO and NOI would need to be modified and approved by both BLM and UDOGM and all holes would be plugged according to the requirements of R647-4-108. Drill holes would not be left unplugged for more than 30 days unless approved by UDOGM. The only completed drill hole in the immediate area is a well owned by Red Dome that is on private property and not part of the PoO or permit area.

Rule 3809.401 (c)/R647 - 109 - Impact Statement

109.1 Impacts to Surface and Groundwater Systems

Surface Water

There are no surface water resources within and adjacent to the PoO or permit area. In large measure this is due to the surficial volcanic materials being extremely porous. This is further supported by the lack of any surficial drainage channels within and adjacent to the site, where the existing topography is irregular. The high porosity is shown by the rapid infiltration rate and large capacity for infiltration. As such, there is negligible potential to generate runoff within the PoO or permit area.

Due to the lack of runoff, there is no potential for flooding or erosion from the project area. Also, as there are no surface drainages in the project and surrounding areas, there is no potential for impacts to surface water from the site area.

Groundwater

As reported in Section 106.8, the groundwater in the project area is located at depth. Operations at the mine are not expected to affect the groundwater aquifers in the area. First because the materials mined at the site are predominantly the same natural geologic materials that the aquifers are flowing through in their unaltered (except for size) state. Second, these groundwaters are under artesian head.

The operations that could impact the groundwater include hydrocarbon leaks and septic system spills.

To minimize the potential for a hydrocarbon leak or spill, hydrocarbons are generally not stored on site. While there could inadvertently be a spill and release to the ground surface, BEG attempts to minimize the potential for such an occurrence. This is accomplished by not storing fuel on site, hauling the used oil to a disposal site as soon as possible after generated, and storing any materials in a lined, bermed area (see Figure 2c).

In the event of a spill given the porous nature of the ground and the lack of surface flow paths, the materials would rapidly infiltrate into the volcanic rock.

Septic system leak could impact groundwater with organic contamination. BEG attempts to control this, by not having a on-site leach field and having a system consisting of portable units that are serviced weekly.

109.2 Impacts to State or Federal Threatened and Endangered Species or Their Habitats

Most of the PoO or permit area is currently very disturbed and essentially barren of vegetation, thus is unsuitable for long term habitation by most animal species. Habitat for wildlife is limited in the Red Dome quarry area. No trees exist on the entire PoO or permitted area. However, evidence of use by small rodents was found during a March 2017 by Stantec engineers site visit. As described in the 2005 Baseline Vegetation and Soil Assessment report and previously in Section 106.7, vegetation is sparse in the PoO or permit area due to natural conditions and previous mining activities. Further, there are no wetlands in or adjacent to the PoO or permit area.

Table 109.2-1 presents a list of potential threatened, endangered, and candidate species that may exist in the project area. A Sensitive Species dataset, representing Utah's federally and state listed threatened, endangered, and sensitive animal and plant species occurrences as compiled by the Utah Natural Heritage Program (UDHP) of the Utah Division of Wildlife Resources (UDWR) was examined for the PoO or permit area and surroundings. Ranking definitions for relevant species are as follows:

- G2 - Imperiled – Imperiled because of rarity or because of some factor(s) making it very vulnerable to extirpation or extinction. Typically, 6 to 20 occurrences or between 1,000 and 3,000 remaining individuals.
- G4 – Apparently Secure – Uncommon but not rare, and usually widespread. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals.
- G5 – Secure – Common, widespread, and abundant. Perpetually secure under present conditions. Typically, with considerably more than 100 occurrences and more than 10,000 individuals.
- S2 – Imperiled – Imperiled because of rarity or because of some factor(s) making it very vulnerable to extirpation or extinction. Typically, 6 to 20 occurrences or between 1,000 and 3,000 remaining individuals.
- S3 – Vulnerable – Vulnerable either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation or extinction. Typically, 21 to 100 occurrences or between 3,000 and 10,000 individuals.
- S4 – Apparently Secure – Uncommon but not rare, and usually widespread. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals.
- B – Breeding – Basic rank refers to the breeding population or the element in the nation or subnation (Example: S2B = Subnational Imperiled – Breeding Population)
- N – Non-Breeding – Basic rank refers to the non-breeding population of the element in the nation or subnation (Example: S3N = Subnational Vulnerable – Non-Breeding Population)

Table 109.2-1. Threatened, Endangered, and Candidate Species that may occur with the project area of influence

Common Name	Scientific Name	Status
Ferruginous Hawk	Buteo regalis	G4, S3B
Kit Fox	Vulpes macrotis	G4, S3
Northern Goshawk	Accipiter gentilis	G5, S4
Townsend's Big Eared Bat	Corynorhinus townsendii	G4, S4
Bald Eagle	Haliaeetus leucocephalus	G5, S2B, S4N
Fringed myotis	Myotis thysanodes	G4G5, S2B
Long-billed Curlew	Numenius americanus	G5, S3B
Short-eared owl	*Asio flammeus*	G5, S4
Southern leatherside chub	*Lepidomeda aliciae*	G2, S2.

Species-specific rankings and potential presences/descriptions are as follows:

Ferruginous hawk *(Buteo regalis)* G4, S3B. The PoO or permit area is in the range of the ferruginous hawk and suitable habitat is located nearby. It may be used for foraging, but disturbance and persistent mine activity likely prohibits any other use of the mine area by ferruginous hawks.

Kit fox *(Vulpes macrotis)* G4, S3. The PoO or permit area may provide limited foraging opportunities for kit fox, but the lack of available burrowing soil would likely discourage any long-term use of the mine by kit fox.

Northern goshawk (Accipiter gentilis) G5, S4. There is very limited habitat, if any, for goshawk near the PoO or permit area. Goshawks may fly over the area during migration and may forage on or near the mine, but it is unlikely goshawks would use the PoO or permit area long term. Its lack of trees or other nesting substrate suitable to goshawks would make it unlikely that goshawks would utilize the mine for any long-term activities.

Townsend's Big-eared bat *(Corynorhinus townsendii)* G4, S4. Townsend's big-eared bats could utilize the PoO or permit area for roosting and foraging. Townsend's big-eared bats are known to roost in bridges, culverts, mines, abandoned buildings, and rock cavities. Suitable habitat for roosting and foraging are available on and near the PoO or permit area

Bald eagle *(Haliaeetus leucocephalus)* G5, S2B, S4N. Winter foraging and perching use of the PoO or permit area by bald eagles may occur during winter. A lack of trees and suitable habitat would likely make the area unsuitable for bald eagle nesting.

Fringed myotis *(Myotis thysanodes)* G4G5, S2B. Suitable foraging and roosting habitat does exist on the PoO or permit area for fringed myotis. Fringed myotis feeds mainly by gleaning moths and beetles from the air as they fly. Fringed myotis roost in mines, caves, buildings so roosting opportunities are available on the PoO or permit area. Preferred habitat for the fringed myotis is pinion pine and arid forest habitats. While this habitat does not occur directly in the PoO or permit area, this habitat is found in the general vicinity.

Long-billed Curlew *(Numenius americanus)* G5, S3B. Long-billed curlew habitat includes shoreline and short-growth grassland prairies. While this habitat exists near the PoO or permit area, suitable habitat for long-billed curlew does not exist within the PoO or permit area.

Short-eared owl *(Asio flammeus)* G5, S4. The short-eared owl relies primarily on intact native grassland for nesting and foraging. While this habitat exists near the PoO or permit area, there is no habitat for short-eared owls within the PoO or permit area. Use of the PoO or permit area by short-eared owls, if any, would be for foraging.

Southern leatherside chub *(Lepidomeda aliciae)* G2, S2. No habitat exists on the PoO or permit area for southern leatherside chub as there are no surface water features on the mine site, or nearby areas.

109.3 Existing Soil and Plant Resources

As described in Sections 106.5 and 106.6, little soil likely occurred originally over much of the PoO or permit area due to the cinder cone and related geologic materials, and little remains today after years of historic mining. The area on private land south and east of the scales area and storage building, contains some in situ soil resources. Another area where in situ soils remain is along the main access road. No further disturbances will occur in these areas. These areas are also not prone to erosion. None of the soils in or adjacent to the PoO or permit area are hydric; neither are they Prime Farmlands. New impacts to soil resources within the PoO or permit area would be negligible.

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

Slope Stability

Due to the historic mining in the area, it is not possible to estimate the original slope of the volcanic cone. Historic mining of the volcanic cone has been conducted from the bottom of the cone face upward. This created a series of benches and an over-steepened slope in excess of 1H:1V. UDOGM raised concerns with the over-steepened slopes and asked that they be reduced to at least 1H:1V or shallower.

The historic mining activities are located on the northeastern area of the cinder cone. This area had a series of highwalls and benches that were developed to access the cinders. The slopes in this area and the various highwalls were at a slope less than 1H:1V.

To the southern part of the cinder cone, the existing highwall, created by historic mining, contained the steepest slope in the Permit Area. This slope was near vertical and not being mined by the operation.

BEG continued mining in these areas as part of their planned mining activities. Their initial mining consisted of efforts to reduce the overall slope configurations to less than 1H:1V or 45° slope to create a safe mining environment. The operational highwalls were planned to consist of 40-foot-highwalls with 25-foot-wide benches and a 15 ft slope from bench to top of next bench. These benches would act as both access to the working areas for mining and as catch benches for collection of materials from the overlying highwall.

Since BEG has started operations, efforts have been made of reduce the exposed highwalls. To check this, BEG had Wall Engineering conduct updated profile surveys for the slopes in 2021. Appendix J shows profiles of the current slopes for the operation. Table 109.4-1 shows the overall slope of the current disturbances and specific slopes for the highwalls above the benches.

Table 109.4-1 – Summary of Highwall Slopes

Profile ID	Overall Slope	Intermediate Slopes
2600	2.36H:1V	1.47H:1V
2800	1.62H:1V	
3000	1.64H:1V	1.53H:1V & 1.15H:1V
3200	2.09H:1V	1.20H:1V
A-A’	1.72H:1V	1.09H:1V & 1.06H:1V

Thus, the mining by BEG has reduced the highwall to a maximum of slightly less steep than 1H:1V in the steepest portion of the highwall.

As described in Section 106.2, the phasing discussion, the current mining activities are located on the northeastern, southeastern, and southwestern areas of the cinder cone. These areas have a series of highwalls and benches that have been developed to access the cinders.

Continued mine expansion will include mining in the Phase 1 area (see Figure 3a & 3b). To assist in minimizing the highwalls, BEG will start in Phase 1 to modify the mining as described in Section 106.2 where mining will commence at the top of the cone with materials being pushed off the top pad and allowed to cascade or flow down the face of the cone. This approach will initially cover and minimize the exposed highwalls. Overall, by reducing the

height of the cone this mining approach will aid in reducing the overall slopes to less than 1H:1V or 45° slope.

The ultimate plan is to mine the cinder cone so that the final configuration is relatively flat. By doing this, BEG will maximize the resource and stability while minimizing safety concerns through the mining of the cone.

Throughout the mining process, BEG is committed to maintaining and establishing safe and stable highwall maximum slope for the mining areas until the transition to mining from the top are established.

Runoff and Erosion Control

There is little opportunity for erosion in the PoO or permit area, despite its already highly disturbed and bare ground nature. The natural geologic materials are porous, and topography is irregular. The infiltration rate is rapid and capacity for infiltration is large. As such, there is negligible potential to generate runoff or erode in situ or mined materials. Ditches, diversions, ponds, or similar runoff control structures are not needed at this operation due to these characteristics.

Air Quality

Although occasional windy conditions can produce dust, air quality impacts are minimal due to the lack of fine-grained materials and the coarse nature of the cinders.

BEG has taken preventive measures to control dust such as speed limits within the pit and using a water truck when needed. The cinders being mined from the deposit often contain some percentage of moisture. This moisture is enough during the crushing process so little to no dust is generated. BEG abides by Rule R307-205 (Emission Standards: Fugitive Emissions and Fugitive Dust) set forth by the Utah Department of Environmental Quality for the State of Utah. BEG filed with the Division of Air Quality and received a small source registration see (Appendix K).

Public Health & Safety

All BEG operations at the Red Dome mine are conducted in compliance with MSHA safety regulations. This includes proper training for all employees and truckers who work onsite. Some health and safety measures have been addressed previously in Section IV Operations Practices, additionally the following practices will be observed.

- Public safety is maintained via access restriction. Site access to much of the PoO or permit area is controlled by topography, lack of suitable roads, and the nature of the surface cinders. Alternative routes have been blocked off using berms. The site is not fenced, but access via the main access road is controlled by a locked gate Appendix A - Figure 4.
- All trash, debris, wood, buildings with no future use shall be removed and disposed of in and appropriate disposal facility. The process of demolition of buildings, facilities, and associated structures is planned to occur within one year of ending operations.
- During final reclamation, all berms along the highwall and other areas shall be made safe and warning signs shall be posted to deter access

Rule 3809.401 (b)(3)/R647 - 4 - 110: Reclamation Plan

110.1 Current land use and post-mining land use

Current Land Use

The current land use is mining on BLM land on which the Red Dome placer claims lie (Appendix A - Figure 1). Lands to the east of the claims are agricultural lands. Lands to the north, west, and south are BLM public use lands.

Based on current mining plans, the anticipated mine life will be approximately 100 years. The mining is expected to continue until the cinder cone is reduced flat.

Post Mining Land Use

After active mining and reclamation have ceased, the land will be returned to public use as BLM land. Based on the ultimate mining plan, the surfaces will be left in a relatively flat condition and restored to vegetated surface that matches the surrounding natural vegetation, suitable for public uses.

110.2 Reclamation of roads, high walls, slopes, leach pads, dumps, etc.

Assuming that the end mining will be at the ultimate planned configuration, the PoO or permit area will be essentially mined flat. This will be accomplished by mining from the top of the cinder cone down. Throughout this process, the overall slope of the mined slope will be reduced and ultimately will not exist.

Should BEG decide to conclude mining activities before the ultimate mine plan is complete, the mined slope will be left in a final condition that will achieve an overall final slope of 45° (1H:lV) or less. These slopes will include a combination of crest protection berms, highwalls, bench areas to safely create a final slope configuration. At its final configuration, a safety berm will be constructed along the top of the highest highwalls that will be left.

Figures 2a through 6 (Appendix A) show the various phases of the proposed mining. As shown on these figures during the various mining phases, there are areas that will be contemporaneously reclaimed. This reclamation will include grading/backfilling as needed to blend with natural surrounding topography, with no slopes left at greater than 2H:1V. Finished ground surfaces will be left with undulations, depressions, and other micro-topographies to facilitate habitats, plant growth, and water retention. The in-situ material that remains after mining will be the fines and cinders not recovered from the site area; no waste dumps or overburden were generated during operations.

Certain outlying areas that are included in the disturbed area may not be subject to future disturbance, and their condition at the time of reclamation may be preferable to remain without additional disturbance during reclamation. While shown on Appendix A - Figures 2a through 5a as areas to be graded, ripped, and seeded, and included in the surety as such, these areas will be assessed with BLM and UDOGM staff and determinations made at that time as to what types, if any, additional reclamation treatments are needed.

Given the highly porous nature of the volcanic cinders, as well as the generally flat topography over much of the area, it is not likely that any water courses were present before the historic mining activities. None will be established during reclamation. The regraded slopes and pad areas will allow the precipitation to readily infiltrate.

There were no waste dumps created during mining. Should any product stockpiles remain on site, they would be spread as part of grading and would serve as a growth medium. There are

no drill holes, impoundments, tailings, shafts, ponds, waste dumps, etc. located in the Project Area that need to be reclaimed. All equipment including tanks, containers, trash oil, fuel, concrete blocks, debris, and structures will be removed from the site and prepped for reclamation.

Roads will be ripped using a D8 dozer to not only shape the surface but to soften up the native material. Ripping of the roads with the dozer will create furrows to allow for seed and plant growth.

110.3 Surface Facilities to be Left

The access road to the metal building on the county land past the scale house and scale will be left for future county access. The utility poles and transmission line to the site are the property of Dixie Power and will also be left for the county to use to provide power to the site and building.

For clarification purposes, the metal buildings that appears close to the crushing and storage areas of the site are owned by Millard County. These structures are to remain and are not part of the BEG reclamation activities as indicated in Appendix C. The documents show the exact locations of the metal building purchased by the county and associated documents. Also, a drawing of the power line that includes a paragraph with an arrow that indicates that the power equipment is owned by Flowell Electric (now Dixie Power) and was put in the 1950's. A signed letter from the BLM stating that the equipment does not need to be relocated or removed (see Appendix C).

110.4 Treatment, Location and Disposition of Deleterious Materials

As discussed in Sections 106 & 107, there are a few deleterious materials presently temporarily stored on the mine site. These include diesel fuel, engine oil, hydraulic oil, coolant, and DEF. As discussed in Section 106, these are temporarily stored in a small bermed, lined area shown on Figure 2c. Currently no other deleterious materials are planned for use or present onsite. Appendix B presents the Spill Containment Plans. As such BEG attempts to minimize the deleterious materials used on site. After mining is complete there will be no deleterious materials left onsite.

At reclamation, the liner from the small bermed and lined area will be removed and haul to an appropriate off-site disposal area. If any other deleterious materials (i.e., cleaning agents or hydrocarbons in drums) exist onsite at reclamation, they will be removed for appropriate off-site disposal as part of the site reclamation.

110.5 Revegetation Planting Program and Topsoil Redistribution

Soil Material Replacement

As discussed in the soils section, negligible amounts of soil existed in the project area. Very few deposits were likely present prior to the historic mining, given the nature of the volcanic cinders. Due to the historic nature of mining operations at the site, what soils were present were not salvaged by past operations. Some soils remain locally along the main access road. They would not be sufficient to redistribute over the remaining area. Instead, they will remain at that location.

After any needed regrading, selected areas, such as roadways or other disturbances that may be somewhat compacted (to the extent that the unconsolidated cinders do compact) will be ripped to prepare a seedbed. A D8 dozer will be used to shape, slope, and rip a minimum of 12-18 inches to help achieve revegetation success. Roads will be ripped at least 18 inches to soften compacted surfaces. This will ensure a roughened surface is available to promote seed and root penetration.

Seed Bed Preparation

Due to the lack of suitable topsoil to redistribute over the entire PoO or permit area the cinders will serve as a good growth media. The remaining fine cinders and rock has little, if any, organic matter. To improve this material and add some organic matter, BEG will set-up a series of test plots as part of the Phase 1 reclamation activities to assess various soil amendment mixes with the existing site materials. These mixtures will consist of 0.5, 1, 2, 4, 6, 8, and 10 tons/acre of sawdust, biosolids, or weed-free composted manure (depending on what is readily available) to be added and mixed with the cinders at the time of reclamation. These test plots will be monitored over several years and the vegetative cover of each will be assessed. The lowest amendment volume that will meet the reclamation standard will be used for the contemporaneous and final reclamation efforts. BEG, with their consultant, proposes an on-site meeting with UDOGM and BLM representatives to determine the location and configuration of the test plots. Once determined, the locations will be added to the facilities area maps and amended in the permit.

Soils along either side of the access road, will remain in-place and will be lightly prepared for reseeding and scarification. Other areas may also only need slight scarification. For bonding purposes, ripping costs are assumed across the site.

Seed Mixture

A multi seed mix is proposed for all reclaimed surfaces. However, the final seed mix would be approved by both BLM and UDOGM. As shown in Table 110.5-1, the seed mix is comprised of various native grasses, forbs, and shrubs. Should seed availability change prior to reclamation, some variation in the mix could occur, with both agency's approval.

Seeding Method

The seed mix would be applied with a drill seeder in all accessible areas. In areas inaccessible to the drill seeder, these areas would be broadcast seeded. For areas that are broadcast seeded, the application rate would be doubled. The seeding would be followed by "dimpling" the seeded surface with a sheep's foot compactor to create micro-niches.

Revegetation work, including both seedbed preparation and seed application will take place in the late fall season and seed would be spread immediately following seedbed preparation. BEG will monitor revegetation success annually for three years.

Table 110.5-1. Reclamation Seed Mix for Red Dome Mine

Common Name	Scientific Name	Rate (PLS lbs/ acre
Grasses		
Sandberg's bluegrass	*Poa Secunda*	2
Indian Ricegrass	*Oryzopsis Hymenoides*	3
Bluebunch Wheatgrass	*Pseudoroegneria Spicata ssp. spicata*	4
Bottlebrush Squirreltail	*Elymus elymoides*	3
Forbs		
Globemallow	*Sphaeralcea Coccinea*	0.5
Shrubs		
Rabbitbrush	*Chrysothamnus nauseosus*	1
Wyoming Sagebrush	*Artemisia Tridentata var wyomingensis*	0.5
Forage Kochia	*Bassia prostrata*	0.5
TOTAL		14.5lbs/ acre

110.6 Operator Statement Committing to Reclamation

The Operator will conduct reclamation as specified in this PoO/NOI and as required by the BLM and UDOGM rules. Reclamation success will be as defined in those rules, with the measure of comparison being offsite reference areas that are surveyed at the time of reclamation.

Interim Management Plan

Should operations need to be suspended for temporary periods, BLM and UDOGM will be notified at the time of suspension. These notifications will include:

- Planned dates of suspension.
- Contact information for Operator representative.
- Acknowledgement of inspection rights.

In the event of such temporary closures, BEG will ensure that:

- excavation and working are left in a stable configuration
- all toxic or deleterious materials will be removed from the site,
- equipment, supplies, and structures will be adequately stored to ensure that no inadvertent failures or accidents occur
- site is left in a safe and clean condition
- Site would be inspected on a monthly basis during period of non-operation to

assess the site conditions and determine if any special maintenance would be required

In the event that the temporary closure extends for a period of more than 2 years, BEG will notify both BLM and UDOGM of such conditions and discuss efforts that may be required to stabilize the site for the longer time period.

Rule 3809.420/R647 - 4 – 111 RECLAMATION PRACTICES

During reclamation, BEG agrees to conform with the reclamation practices and standards as outlined in the rules 3809.420 and R647-4-111, unless the BLM or Division grants a variance in writing.

Rule R647 - 4 - 112 VARIANCE

113.1 Topsoil Redistribution

Historical mining from the period prior to 1975, did not salvage topsoil over most of the current disturbed area. A review of the areas of the project boundary has shown that minimal soil existed on the disturbed area as well as on the undisturbed portion of the remainder of the site area. Therefore, a variance is being requested for where topsoil replacement is not feasible. This includes historical mined areas where no topsoil exists or was not salvaged historically and placement of topsoil on areas such as bedrock benches. Any areas of future mining will salvage any remaining topsoil which will be reserved and stockpiled for future mining reclamation in those areas that the topsoil was salvaged from.

Rule 3809.401 (d)/R647- 4 - 113 - SURETY

With the completion of the Red Dome purchase agreement (see Appendix N), BEG Resources understands that the reclamation surety approved by BLM and UDOGM needs to be provided by BEG to cover the permitting and reclamation responsibility. To aid in the transfer of responsibility, BEG provides these surety calculations. Once approved, BEG will post the required surety. Supporting and relevant information (UDOGM 2024 rate sheet) are included as Appendix L. Current surety is calculated for existing disturbed areas based on the most recent calculations.

Bond cost summary

RED DOME RECLAMATION COST ESTIMATE		
Direct Costs		
Subtotal Demolition and Removal	$31,385.50	15.8%
Subtotal Backfilling and Grading	$142,142.36	71.5%
Subtotal Revegetation	$25,408.35	12.8%
Total Direct Costs	**$198,936.21**	
Indirect Costs		
Mob/Demob	$19,894.00	10.0%
Contingency	$9,947.00	5.0%
Engineering Redesign	$4,973.00	2.5%
Main Office Expense	$13,528.00	6.8%
Project Management Fee	$4,973.00	2.5%
Total Indirect Costs	**$53,315.00**	**26.8%**
Total Reclamation Cost 2024	**$252,251.21**	
Number of Years	5	
Escalation Factor	0.0485	
Escalation Amount	$67,399.00	
Reclamation Cost Escalated	$319,650.21	
Required Reclamation Surety (rounded to nearest $1,000)	**$320,000.00**	
2029 Dollars		
Posted Bond *(as of January 2021)*	$344,000.00	
Difference Between Required Reclamation Surety and Posted Bond	-$24,000.00	
Percent Difference	-7.0%	

Permit Fee (Mined Land Reclamation Act 40-8-7 (I)

A permit fee is required by the Utah Division of Oil, Gas & Mining upon submittal of the application and yearly thereafter. Due to the size of the disturbed area, Red Dome will post $1000.00 for disturbances over 50 acres. The fees are due with the application and on January 31 of each year thereafter.

With the completed the BEG and Red Dome agreement, BEG is submitting this NOI update with a UDOGM Transfer of Notice of Intention for Large Mining Operations form to transfer the approved permit for a large mining operation between the parties. Also, BEG is also submitting this NOI to notify BLM of the change in operator for the PoO. BEG will post a new reclamation surety and will assume full responsibility for continued mining operations and all reclamation obligations associated with the PoO and large mining operation.

Signature Requirement

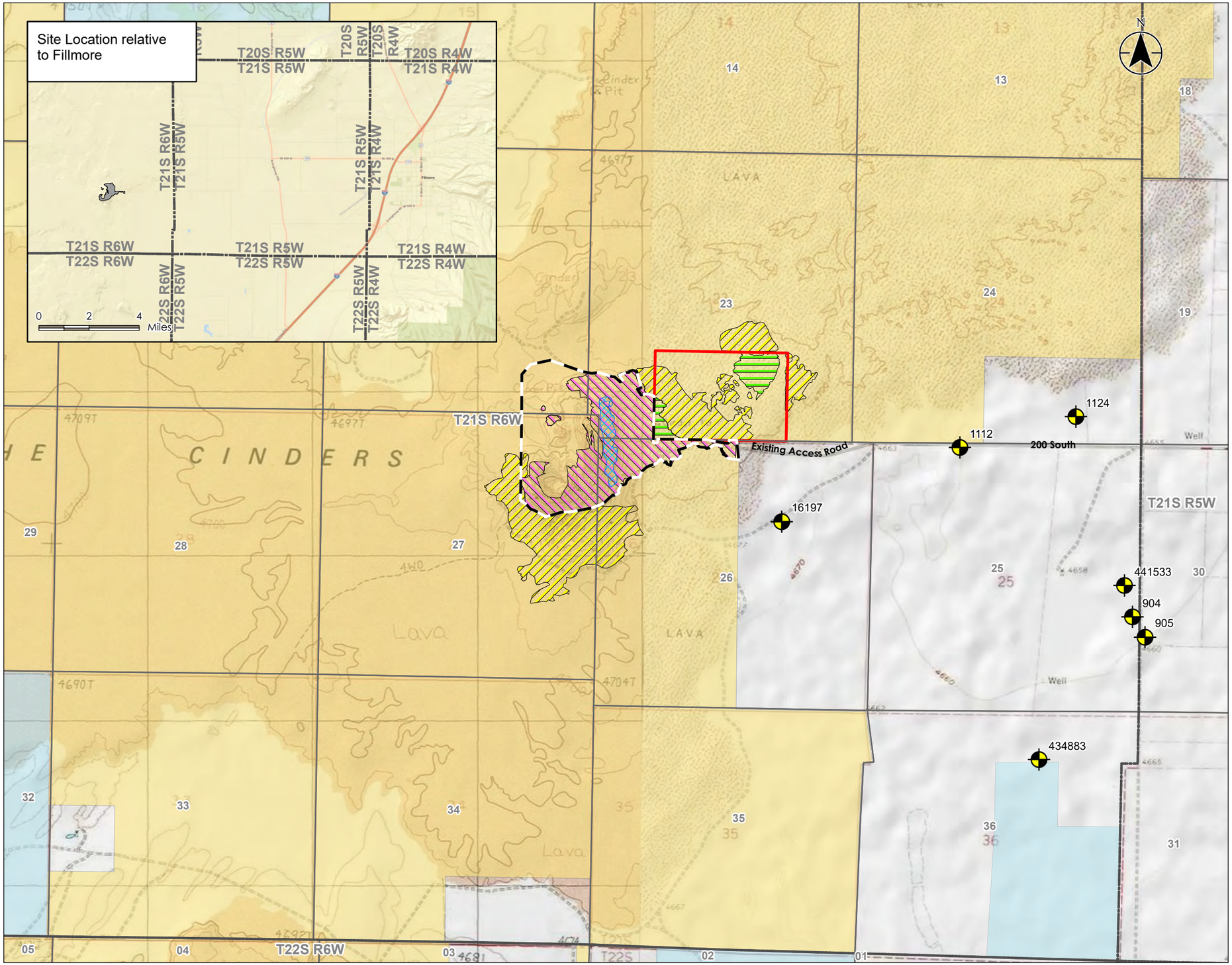
I hereby certify that the foregoing is true and correct

Signature of Operator / Applicant Name *BEG Resources, LC*

Jake Burningham
Title: V.P. of Mining

Date: 11/11/24

Appendix A.
Figures



Stantec

- Well Locations
- Site Boundary
- Purchased by Millard County
- Highwall - GPS
- Post Law Existing Surface Disturbance Boundary
- Pre Law Areas DOGM Estimate
- Millard County disturbed areas
- Overall Disturbance Footprint (shown in inset map)
- Section Township Range Boundary

Land Status

- Bureau of Land Management
- Private
- State Trust Lands

0 2,000 4,000 Feet

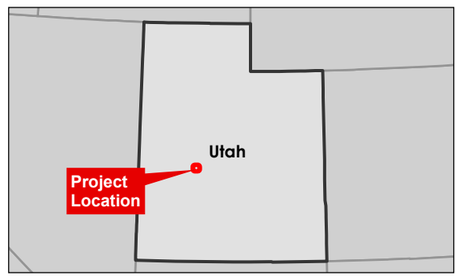
1:13,887,398 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N

2. Service Layer Credits: USA Topo Maps: Copyright:© 2013 National Geographic Society, i-cubed
World Street Map: Bureau of Land Management, Utah AGRC, Esri, HERE, Garmin, NGA, USGS, NPS

3. Land Status layer downloaded from Utah AGRC, source: SITLA and BLM.



Project Location

T21S R6W
Millard County, Utah

Prepared by JT on 2022-03-02
Technical Review by TS on 2022-03-02
Independent Review by XX on 2022-03-02

Client/Project

BEG Resources, LC
Red Dome Project
Permitting

Figure No.

1

Title

Red Dome Base Map

Millard County Area

Existing Road

Product Storage Piles

Control Tower on Top of Storage Containers

PortaPotty

Fuel Truck w/ Containment

Truck Dump/ Crusher

Stick Nest

Project Access Road

Production/ Storage Area

Transformers

Scale House and Scale

Soil Conditioner

5/16th Cinders

Truck Dump/ Cone Crusher

Project Production Area

LEGEND

Section Lines		
Mining Claims		
5ft Contours 2021		
Conveyors		
Millard County Property		
Power Line		
Scale Area		
Shop/Storage Buildings		
Roads - County		
Roads - Shared County Access		1.36 ac
Future Mining Area		72.91 ac
Mine Development Area		53.07 ac
Active Mining Area		15.09 ac
Natural Revegetation Area		9.55 ac
Proposed Revegetation Area		1.09 ac
Production Areas		5.80 ac
Roads - Facilities Access/Haul		1.54 ac
Roads - Mine Pit/Highwall Access		3.44 ac

FIGURE 2a

Red Dome

Stantec

TITLE

Current Operations Area
Red Dome Mine
Filmore, Utah

SCALE	DATE	FILENAME:	REV.
1"=350'	10/5/24	203722423/T/100.140 2024 Red Dome Contours3.dwg	0

Existing Road

Millard County Area

Product Storage Piles

Fuel Truck w/
Containment

Control Tower on Top
of Storage Containers

Truck Dump/
Crusher

PortaPotty

Stick Nest

Project Access Road

Production/
Storage Area

Transformers

Scale House
and Scale

Soil Conditioner

5/16th Cinders

Truck Dump/
Cone Crusher

Project Production Area

FIGURE 2c

Red Dome

Stantec

TITLE

Current Operations Production Area
Red Dome Mine
Filmore, Utah

SCALE	DATE	FILENAME	REV.
1"=100'	10/1/24	203722423/T/100.140 2024 Red Dome Contours2.dwg	0

Millard County Area

Existing Road

Product Storage Piles

Control Tower on Top of Storage Containers

PortaPotty

Stick Nest

Fuel Truck w/ Containment

Truck Dump/ Crusher

Production/ Storage Area

Transformers

Project Access Road

Scale House and Scale

Soil Conditioner

5/16th Cinders

Truck Dump/ Cone Crusher

Project Production Area

LEGEND

Section Lines		
Mining Claims		
5ft Contours 2021		
Conveyors		
Millard County Property		
Power Line		
Scale Area		
Shop/Storage Buildings		
Roads - County		
Roads - Shared County Access		1.36 ac
Future Mining Area		62.23 ac
Mine Development Area		17.89 ac
Active Mining Area		40.11 ac
Natural Revegetation Area		2.72 ac
Proposed Revegetation Area		28.80 ac
Production Areas		5.80 ac
Roads - Facilities Access/Haul		1.54 ac
Roads - Mine Pit/Highwall Access		3.40 ac

FIGURE 3a

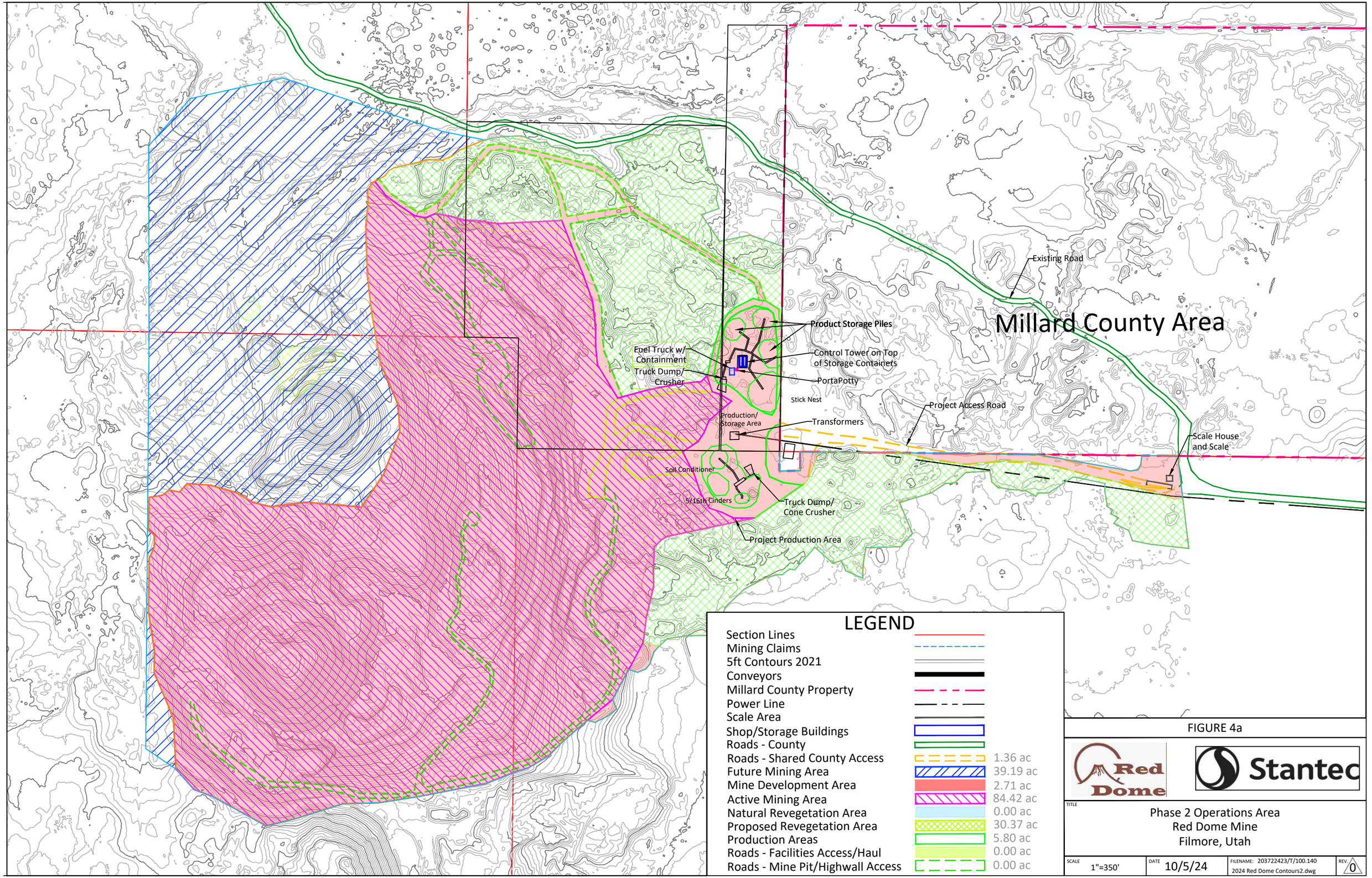
Red Dome

Stantec

TITLE

Phase 1 Operations Area
Red Dome Mine
Filmore, Utah

SCALE	DATE	FILENAME	REV.
1"=350'	10/5/24	203722423/T/100.140 2024 Red Dome Contours3.dwg	0



LEGEND

Section Lines		
Mining Claims		
5ft Contours 2021		
Conveyors		
Millard County Property		
Power Line		
Scale Area		
Shop/Storage Buildings		
Roads - County		
Roads - Shared County Access		1.36 ac
Future Mining Area		39.19 ac
Mine Development Area		2.71 ac
Active Mining Area		84.42 ac
Natural Revegetation Area		0.00 ac
Proposed Revegetation Area		30.37 ac
Production Areas		5.80 ac
Roads - Facilities Access/Haul		0.00 ac
Roads - Mine Pit/Highwall Access		0.00 ac

FIGURE 4a

Red Dome

Stantec

TITLE

Phase 2 Operations Area
Red Dome Mine
Filmore, Utah

SCALE	DATE	FILENAME	REV.
1"=350'	10/5/24	203722423/T/100.140 2024 Red Dome Contours2.dwg	0

Existing Road

Millard County Area

Product Storage Piles

Fuel Truck w/ Containment Truck Dump/ Crusher

Control Tower on Top of Storage Containers

PortaPotty

Stick Nest

Project Access Road

Production/ Storage Area

Transformers

Scale House and Scale

Soil Conditioner

5/16th Cinders

Truck Dump/ Cone Crusher

Project Production Area

LEGEND

Section Lines		
Mining Claims		
5ft Contours 2021		
Conveyors		
Millard County Property		
Power Line		
Scale Area		
Shop/Storage Buildings		
Roads - County		
Roads - Shared County Access		1.90 ac
Future Mining Area		0.00 ac
Mine Development Area		17.50 ac
Active Mining Area		39.19 ac
Natural Revegetation Area		0.00 ac
Proposed Revegetation Area		98.46 ac
Production Areas		5.80 ac
Roads - Facilities Access/Haul		1.54 ac
Roads - Mine Pit/Highwall Access		0.00 ac

FIGURE 5a

Red Dome

Stantec

TITLE

Phase 3 Operations Area
Red Dome Mine
Filmore, Utah

SCALE	DATE	FILENAME:	REV.
1"=350'	10/5/24	203722423/T/100.140 2024 Red Dome Contours2.dwg	0

LEGEND

Section Lines	
Mining Claims	
5ft Contours 2021	
Conveyors	
Millard County Property	
Power Line	
Scale Area	
Shop/Storage Buildings	
Roads - County	
Roads - Shared County Access	1.36 ac
Future Mining Area	0.00 ac
Mine Development Area	0.00 ac
Active Mining Area	0.00 ac
Natural Revegetation Area	0.00 ac
Proposed Revegetation Area	162.49 ac
Production Areas	0.00 ac
Roads - Facilities Access/Haul	0.00 ac
Roads - Mine Pit/Highwall Access	0.00 ac

FIGURE 6

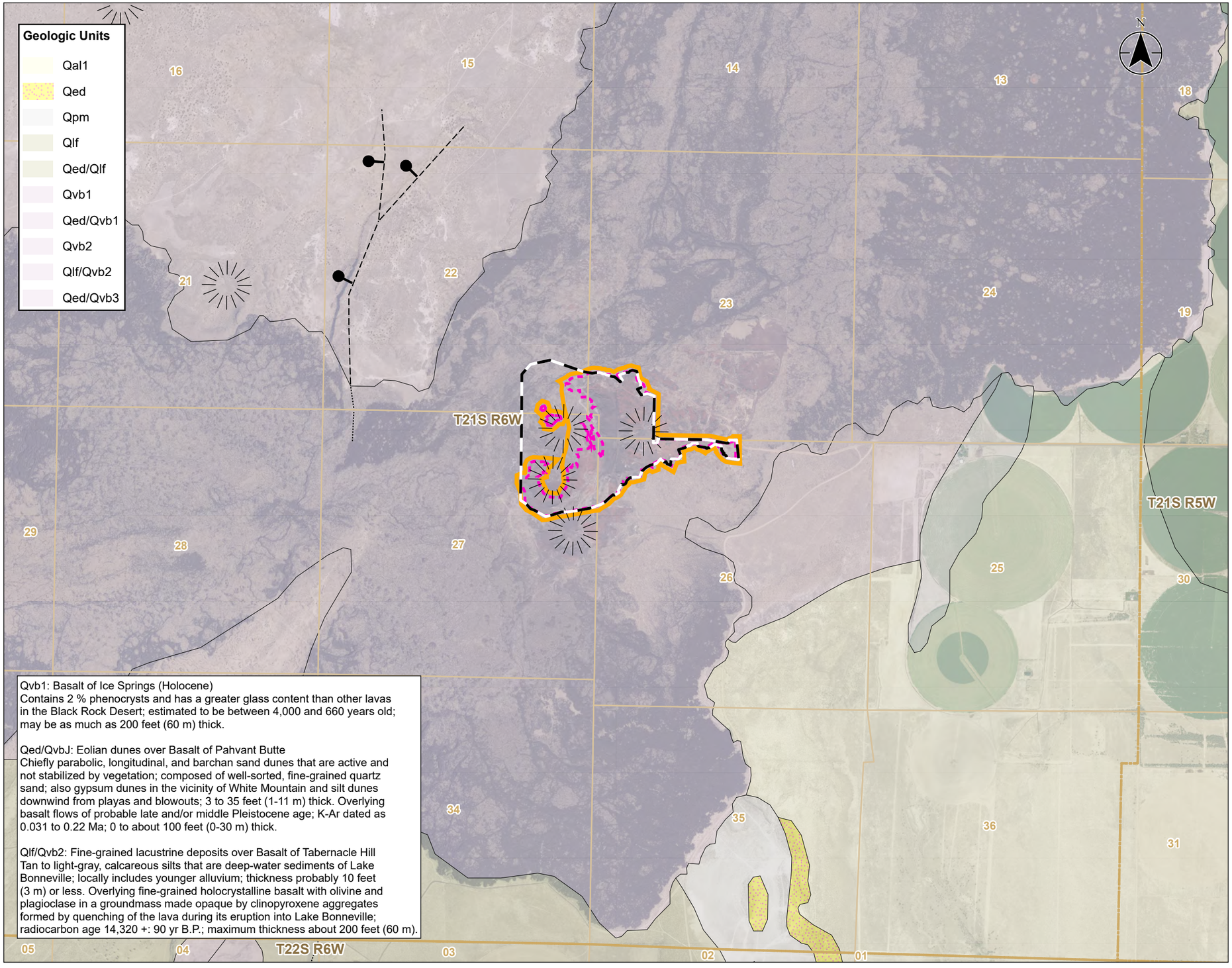
Red Dome

Stantec

TITLE

Phase 4 Reclamation Area
Red Dome Mine
Filmore, Utah

SCALE	DATE	FILENAME:	REV.
1"=350'	10/5/24	203722423/T/100.140 2024 Red Dome Contours2.dwg	0



Qvb1: Basalt of Ice Springs (Holocene)
Contains 2 % phenocrysts and has a greater glass content than other lavas in the Black Rock Desert; estimated to be between 4,000 and 660 years old; may be as much as 200 feet (60 m) thick.

Qed/QvbJ: Eolian dunes over Basalt of Pahvant Butte
Chiefly parabolic, longitudinal, and barchan sand dunes that are active and not stabilized by vegetation; composed of well-sorted, fine-grained quartz sand; also gypsum dunes in the vicinity of White Mountain and silt dunes downwind from playas and blowouts; 3 to 35 feet (1-11 m) thick. Overlying basalt flows of probable late and/or middle Pleistocene age; K-Ar dated as 0.031 to 0.22 Ma; 0 to about 100 feet (0-30 m) thick.

Qlf/Qvb2: Fine-grained lacustrine deposits over Basalt of Tabernacle Hill
Tan to light-gray, calcareous silts that are deep-water sediments of Lake Bonneville; locally includes younger alluvium; thickness probably 10 feet (3 m) or less. Overlying fine-grained holocrystalline basalt with olivine and plagioclase in a groundmass made opaque by clinopyroxene aggregates formed by quenching of the lava during its eruption into Lake Bonneville; radiocarbon age 14,320 +: 90 yr B.P.; maximum thickness about 200 feet (60 m).

Stantec

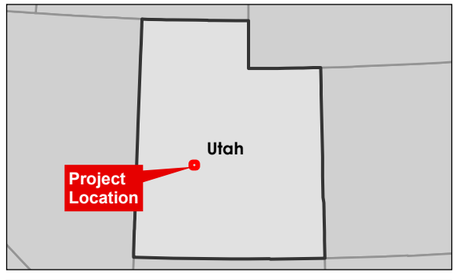
- Site Boundary
- Post Law Existing Surface Disturbance Boundary
- Permit Area (Bonded)
- Township Boundary

Geologic Symbols

- normal fault
- volcanic vent/cinder cone
- contact, well located
- fault, normal, approximately located
- fault, normal, concealed
- geounit label
- leader line
- Township/Range
- Section

0 2,000 4,000 Feet
1:13,887,398 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: 2021 NAIP Imagery
3. Geologic data downloaded from Utah Geologic Survey; Richfield 30' x 60' quadrangle. 2003



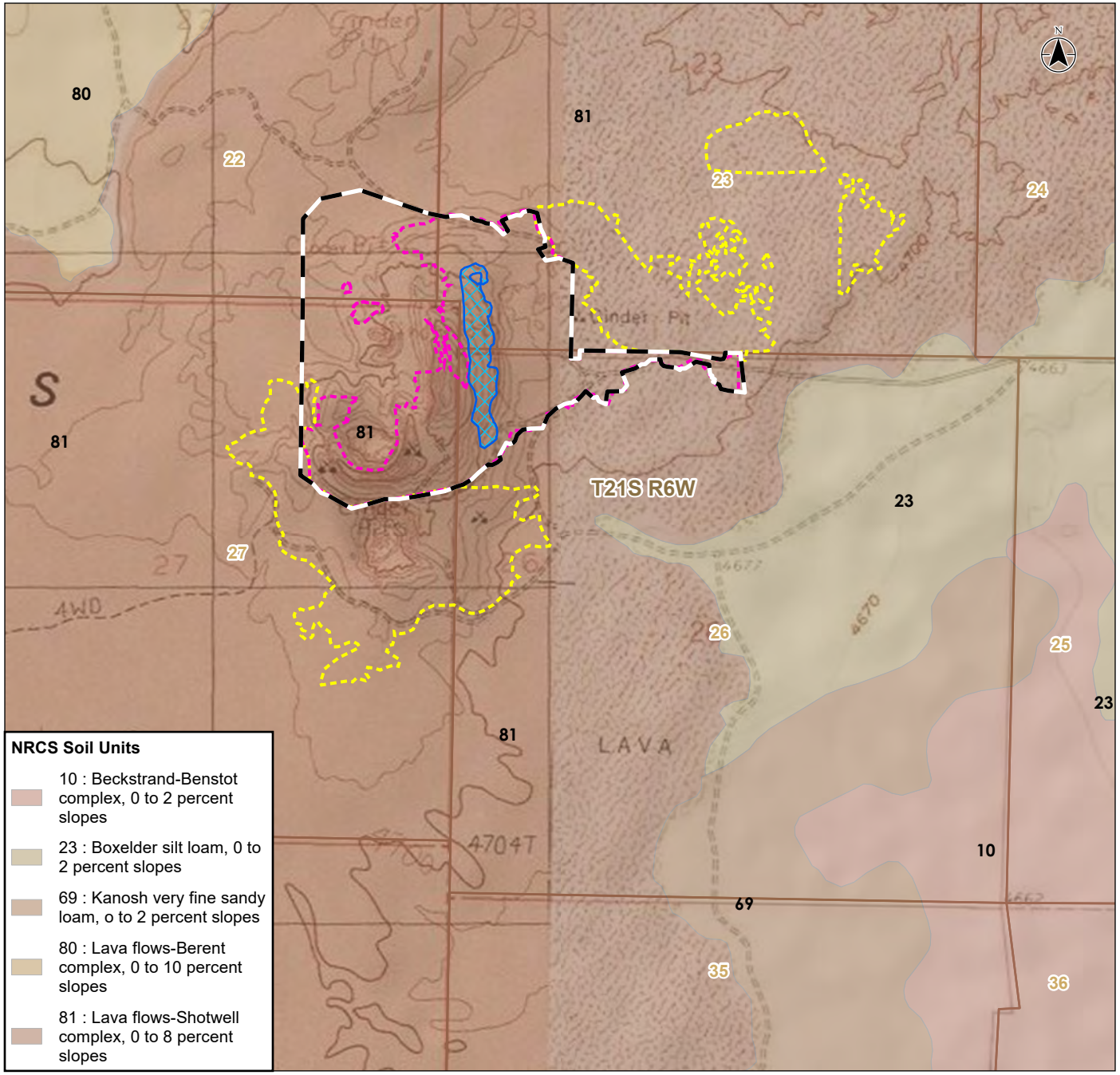
Project Location
T21S R6W
Millard County, Utah

Prepared by JT on 2022-04-07
Technical Review by TS on 2022-04-07
Independent Review by XX on 2022-04-07

Client/Project
BEG Resources, LC
Red Dome Project
Permitting

Figure No.
7

Title
Geology Map



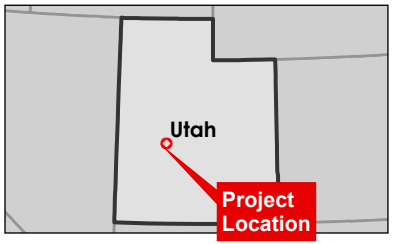
Stantec

0 750 1,500 Feet

1:20,454,388 (At Original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: USA Topo Maps: Copyright:© 2013 National Geographic Society, i-cubed
3. Soil Unit data downloaded from NRCS, suvey area UT618.



Project Location
T21S R6W
Millard County, Utah

Prepared by JT on 2022-04-07
Technical Review by TS on 2022-04-07
Independent Review by XX on 2022-04-07

Client/Project
BEG Resources, LC
Red Dome Project
Permitting

Figure No.
8

Title
Soils Map

Appendix B.
Spill Containment Plan

APPENDIX B - SPILL CONTINGENCY PLAN

PURPOSE AND SCOPE:

The purpose of this Spill Contingency Plan is to clearly identify potential spill risks associated with the RED DOME mining operation, and to identify the procedures to be followed to facilitate the rapid deployment of resources to minimize impacts and risks to the environment.

It is understood and expected that subcontractors will have in place relevant inspection and maintenance regimes for any equipment that will be used on-site. This will be the first level of preventive measures to reduce the risk of spills of substances such as hydrocarbon fuels or lubricants. It is a contractual requirement of all subcontractors is thoroughly familiar with this plan.

IDENTIFICATION OF HAZARDOUS MATERIALS:

The following substances will be utilized during project construction:

- Lubricating Oils;
- Diesel;
- Gasoline;
- Hydraulic Fluid;
- Engine Oil; and
- Diesel Exhaust Fluid.

Additional substances identified subsequent to the distribution of this plan will be addressed as quantities and suppliers are finalized. Safety Data Sheets (SDS) for all substances used will be maintained on site in the control tower accessible to all employees (also found as part of the PoO or DOGM NOI). These sheets identify:

- product information;
- hazardous ingredients;
- physical data;
- fire and explosion hazard;
- reactivity data;
- toxicological properties;
- preventative measures;
- first aid measures; and,
- preparation information, as required by the Workers.

ASSOCIATED RISKS:

Risks associated with the occurrence of spills include:

- environmental pollution/degradation;
- human exposure, via dermal contact or inhalation possibly resulting in illness;
- slipping, possibly resulting in personal injury; and/or,
- fire.

In order to minimize the occurrence/consequences of spills it is important to ensure that:

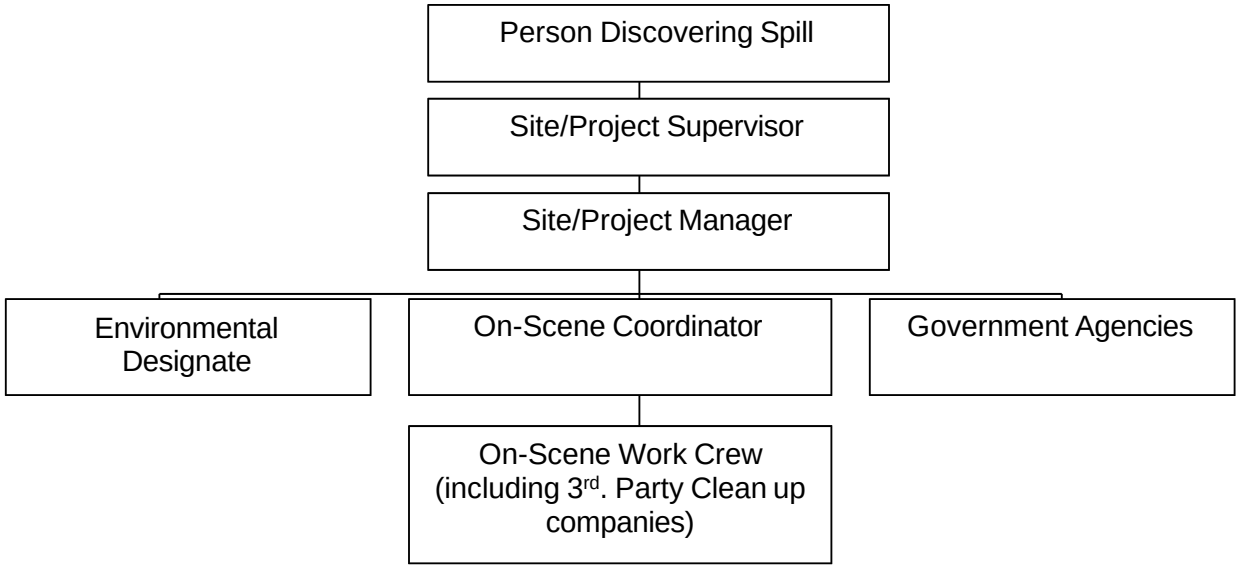
- Equipment is properly maintained, ensuring all leaks are repaired;
- All onsite fuel is properly stored within the fuel truck and within approved secondary containment facilities;
- Oil and lubricant containers are stored on spill containment totes with the lids on in order to prevent overflow during heavy rainfall, or spills if accidentally knocked over;
- Spill kits are available in visible, accessible locations; and,
- Prompt and effective clean-up is initiated in the event of a spill.

Workers will be encouraged to provide information on weaknesses in current management control and prevention systems such that improvements can be made which may eliminate the occurrence of a spill.

EMERGENCY ORGANIZATION AND RESPONSIBILITIES:

Spills of fuels, oils, and other substances may occur as isolated events or they may occur in association with other emergencies such as fire, explosion, natural causes or accident.

The key personnel involved during a spill incident and the reporting responsibilities are illustrated in the following chart.



The responsibilities of each of these personnel are discussed on the following pages, with names and numbers kept current at all times at the project site.

RESPONSIBILITIES OF THE PERSON DISCOVERING THE SPILL, FIRE OR INJURY:

Any person discovering a spill will:

- Assess the initial severity of the spill and safety concerns. If a risk of gas poisoning exists or if fire or explosion hazards are perceived, then warn all personnel to evacuate the area.
- Identify the source of the spill.
- Arrange for appropriate operating equipment to be shut down, if applicable, contain the spill and remove any sources of ignition.
- Notify his/her Supervisor immediately.
- If warranted, notify on-site Occupational First Aid persons to administer first aid.

Any person attending a person exposed to spilled substances will:

- Notify on- Occupational First Aid persons to administer first aid.
- Notify his/her Supervisor immediately.
- Notify ambulance or police if required.

RESPONSIBILITIES OF THE SITE/PROJECT SUPERVISOR:

The Supervisor must immediately contact the Site/Project Manager with the following information:

- The name of the person discovering the spill;
- The time of the incident;
- The location of the incident;
- The type and quantity of the substance spilled;
- The cause of the incident, if known;
- The current weather conditions;
- Any perceived potential for hazard, and any injury to people, wildlife or the marine environment;
- Whether a fire or explosion hazard is deemed to exist;
- Any actions already taken; and,
- Any persons already notified.
- The Supervisor will remain on-site, with the exception of imminent personal danger.

RESPONSIBILITIES OF THE SITE/PROJECT MANAGER:

In the case of a significant spill, the Site/Project Manager will immediately inform the following:

- The Environmental Designate
- 3rd Party Spill Clean Up Company depending on the nature of spill (extent and substance spilled)
- Local fire department
- The Utah Emergency Spill Program at **1-801-536-4123**.This 24-hour government contact will notify all concerned municipal, state and federal agencies, including the following, as appropriate:
    - The local Waste Management office;
    - The fire department/police;
    - The State Waste Management Branch;
    - The State Health;
    - If needed, Environmental Protection Agency, and
    - Any other relevant agencies.

The Site/Project Manager will plan for the disposal of recovered spill material and, upon completion of the cleanup and restoration, prepare a Spill Report.

A complete log of events and activities undertaken during and after the spill, and photographs if possible for legal purposes and critical review of events at a later date.

RESPONSIBILITIES OF THE ENVIRONMENTAL DESIGNATE:

The Environmental Designate will maintain contact with, advise and coordinate work crews undertaking the actual cleanup of a spill. After successful cleanup is completed, the Environmental Designate will:

- Ensure this Spill Contingency Plan is up-to-date with all potentially hazardous materials listed and all names of personnel and phone numbers accurate;
- Be responsible for assessing new spill hazards as they develop and take preventative actions, whether covered in this Plan or not;
- Check and maintain the operating status of required response equipment which may be required at a spill (i.e. a spill kit containing: absorbent material such as Dry Rite, absorbent pads, booms); and,
- Train emergency response personnel with respect to their duties.

RESPONSIBILITIES OF THE ON-SCENE COORDINATOR AND WORK CREW:

Upon receiving a report of a spill, the On-Scene Coordinator and Work Crew will carry out the following:

- If injury, serious health threats or potential equipment hazards exist, call the Site/Project Manager if the person reporting the spill has not already done so.
- Consult the appropriate SDS to review the properties of the spilled material and recommended response actions. If further information is required, contact one of the resource services listed below.
- Assess the spill requirements for human resources, equipment, materials, tools and protective gear to contain the spill, in consideration of the resources available. Mobilize these resources and take responsibility for implementation of the response actions at the spill site.
- Contact the Environmental Designate to determine what, if any, sampling should be done and to discuss the spill and any environmental implications.
- With the lack of drainages in and around the project site area there is minimal risk for impact to fish bearing waters. However, it is critical that all attempts be undertaken to minimize the spread of spilled material into the environment. This can be achieved through the use of spill kit equipment including absorbent pads or in the case of a high-volume spill, as may occur in a vehicular accident, a temporary berm made of local substrate material to impede flow and contain the spill.

ANNUAL SPILL RESPONSE EXERCISE:

A spill response exercise will be conducted at least once per year to test and evaluate the state-of-preparedness of the Spill Response Team and the communications links with the state, federal and municipal agencies that could become involved with responding to actual spill incidents.

Spill response exercises can take the form of desk-top exercises intended to evaluate the decision-making procedures required in the event of an actual spill incident. In particular, this type of exercise exposes the members of the Spill Response Team to their responsibilities in the event of a spill and provides the opportunity to evaluate communications among the team and with the regulatory and resource agency reporting system.

RESOURCES AND PHONE NUMBERS:

Response to accidents involving the transportation of dangerous goods is the responsibility of the shipper. Site personnel will lend whatever assistance is required in order to rapidly contain and clean up spill incidents.

Once products are received on site, response to spills involving products received from a supplier is the site's responsibility. It is anticipated that the procedures outlined above will be sufficient in most instances to deal with problems that may arise. However, in some cases there may be a need to obtain further assistance. The following list summarizes personnel and/or resources to be contacted in case of a spill, fire or injury incident, as well as additional resources that may be able to provide information or assistance.

EMERGENCY CONTACTS:

Fire, Police, Ambulance	911
Poison Control Center	1-800-222-1222
Project site number	TBD
Site/Project Manager – Adam McDermaid	1-435-590-8299
Site/Project Superintendent – Jeremy Jones	1-435-503-1229
Project Coordinator – Jake Burningham	1-801-960-5662
Environmental Designate – Rick Welsh	1-435-660-0891
Utah Waste Managemnt Emergency Program 24-hour	1-801-536-4123

Appendix C.
Structures to Remain

WARRANTY DEED

Red Dome Inc., a Utah Corporation, Grantor, of 5865 West 200 South, P.O. Box 372, Fillmore, Utah 84631 for $10.00 and other good and valuable consideration hereby conveys and warrants all of its rights, title and interest to Millard County, a body corporate and politic and a political subdivision of the State of Utah, Grantee, whose mailing address is 50 South Main Street, Fillmore, Utah 84631, in and to certain unpatented placer mining claims, identified as part of Red Dome (Claim No. UMC58767), part of Red Dome Placer No. 2 (Claim No. UMC58769), and part of Red Dome Placer No. 3 (Claim No. UMC58770), situated in the Millard County, State of Utah, and more particularly described as follows:

Lot 2 and 3 of Section 23, Township 21 South, Range 6 West, Salt Lake Base and Meridian containing 106.84 acres, more or less, together with: Commencing at the South quarter corner of Section 23, Township 21 South, Range 6 West, Salt Lake Base and Meridian; thence North 89°20'54" West 1195.70 feet along the section line; thence South 00°38'24" West 73.04 feet leaving said section line; thence North 89°20'54" West 125 feet; thence North 00°38'24" East 73.04 feet to Southwest corner of Lot 2 of said Section 23; thence South 89°20'54" East 125 feet along the section line to the Point of Beginning, containing 9130 square feet or 0.210 acres, more or less, including appurtenant shop building;

Dated this 25 day of November 2019.

Red Dome Inc.

By: _____
Dionis Griffin - President and Director

By: _____
Gordon D. Griffin - Stockholder

By: _____
Dexter L. Anderson - Lien Holder

State of North Carolina)
:ss.
County of Alamance)

On the 20 Day of November 2019 personally appeared before me Dionis Griffin and Gordon D. Griffin, signers of the foregoing Warranty Deed, who each acknowledged to me that he/she executed the same.

Annamarie S. Tencer
NOTARY PUBLIC
Guilford County
North Carolina
My Commission Expires September 17, 2024

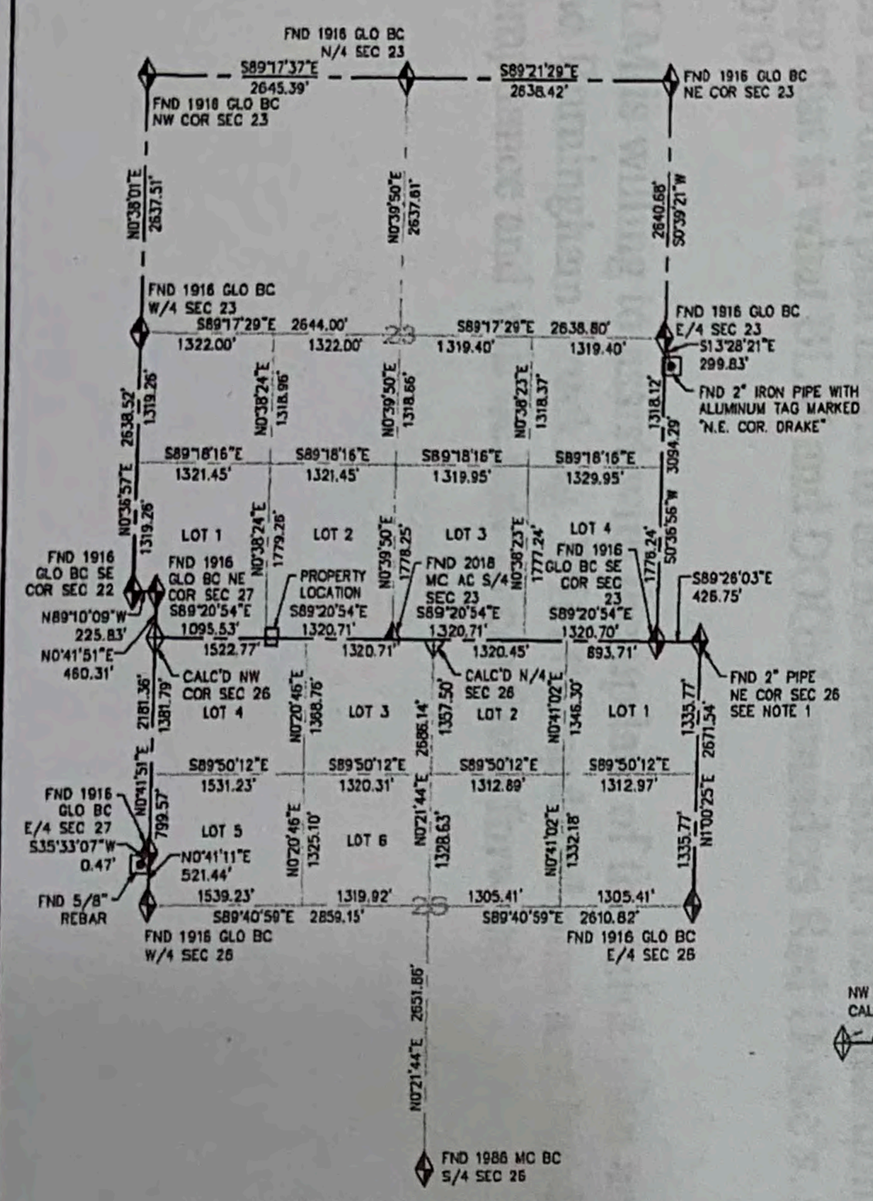
Notary Public

State of Utah)
:ss.
County of Millard)

On the 25th Day of November 2019 personally appeared before me Dexter L. Anderson, signer of the foregoing Warranty Deed, who acknowledged to me that he/she executed the same.

NOTARY PUBLIC
JENNIFER BRUNSON
693015
COMMISSION EXPIRES
JANUARY 22, 2021
STATE OF UTAH

Notary Public



SECTION 23 & 26 T21S R6W SLM

(NOT TO SCALE)

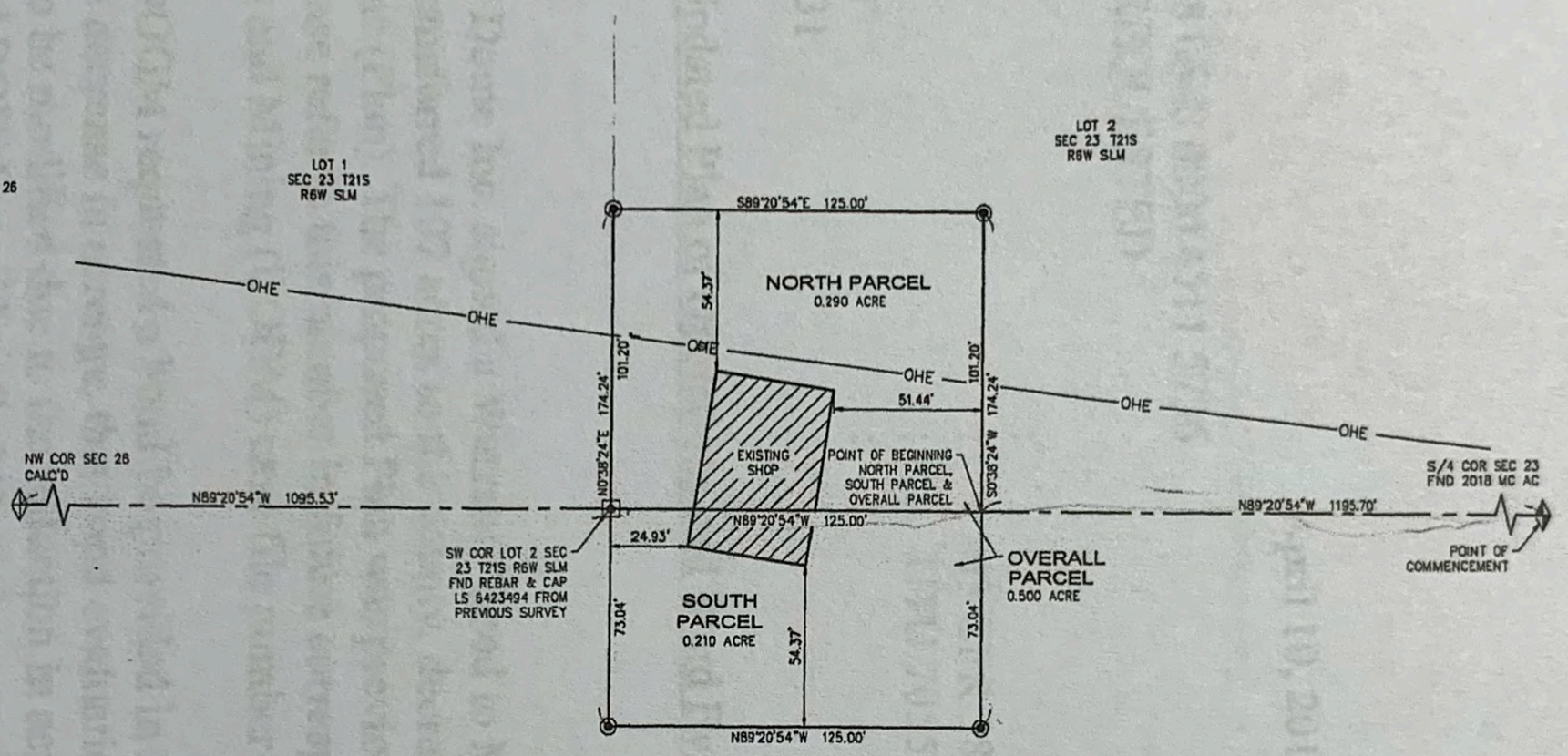
MONUMENT LEGEND

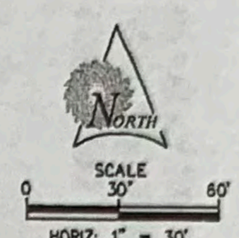
SET FND CALC

- SECTION MONUMENT
- PROPERTY CORNER
- RIGHT OF WAY MONUMENT
- INTERSECTION MONUMENT
- WITNESS MONUMENT

LINE LEGEND

- SUBJECT BOUNDARY LINE
- OTHER PROPERTY LINE
- SECTION LINE
- SUB-SECTION LINE
- SURVEY TIE LINE
- OHE — OVERHEAD POWER LINE
- FENCE LINE
- POWER POLE





SURVEYOR'S CERTIFICATE

I, KEITH B. BIGELOW, DO HEREBY CERTIFY THAT I AM A PROFESSIONAL LAND SURVEYOR, AND THAT I HOLD LICENSE NUMBER 6423494 AS PRESCRIBED UNDER THE LAWS OF THE STATE OF UTAH, AND THAT A SURVEY OF THE PROPERTY DESCRIBED HEREON WAS PERFORMED BY ME OR UNDER MY DIRECTION, AND THAT THIS PLAT CORRECTLY DEPICTS THE FINDINGS OF THAT SURVEY.

NARRATIVE

THE PURPOSE OF THIS SURVEY IS TO CREATE AN OVERALL LEGAL DESCRIPTION FOR A 0.50 ACRE PARCEL OF LAND SURROUNDING AN EXISTING SHOP BUILDING. SEPARATE LEGAL DESCRIPTIONS WERE ALSO CREATED FOR THAT PORTION OF THE 0.50 ACRE PARCEL THAT LIES WITHIN SECTION 23 AND THAT PORTION THAT LIES WITHIN SECTION 26, T21S, R6W, SLM. THE CORNERS OF THE OVERALL PARCEL WERE ALSO MONUMENTED.

THE BASIS OF BEARINGS FOR THIS SURVEY IS NAD83 UTAH CENTRAL ZONE AS NOTED BETWEEN FOUND MONUMENTS. ALL DISTANCES ARE SCALED TO GROUND WITH A COMBINED SCALE FACTOR OF 1.0002114415.

REFERENCES

1. MILLARD COUNTY SURVEYOR'S SECTION TIE SHEETS.
2. 1916 GLO SURVEY BY JOHN W. DOUGALL.
3. PREVIOUS RECORD OF SURVEY'S FOR THE MILLARD COUNTY ROAD DEPARTMENT BY SUNRISE ENGINEERING, LOCATED IN SECTION 23, T21S, R6W, SLM.

NOTES

1. AT THE LOCATION OF THE NORTHEAST CORNER OF SECTION 26, T21S, R6W, SLM, A 2" DIA. STEEL PIPE WAS FOUND 12" BELOW GROUND USING THE RECORD TIES PER THE MILLARD COUNTY SURVEYOR'S SECTION TIE SHEET, PAGE 172-54, AS FOUND ON FILE IN THE MILLARD COUNTY RECORDER'S OFFICE. THE 1916 GLO SURVEY NOTES STATE THAT THIS CORNER WAS MONUMENTED BY AN IRON POST, 3' LONG, 2" IN DIAMETER, 24" IN THE GROUND WITH A BRASS CAP. IT IS APPARENT THAT THE BRASS CAP WAS OBLITERATED AT SOME POINT. I ACCEPTED THE CENTER OF THE FOUND 2" DIA. STEEL PIPE AS THE CORNER LOCATION.

SURVEYED DESCRIPTIONS

SOUTH PARCEL
Commencing at the South quarter corner of Section 23, Township 21 South, Range 6 West, Salt Lake Meridian; thence North 89°20'54" West 1195.70 feet along the section line to the POINT OF BEGINNING; thence South 00°38'24" West 73.04 feet leaving said section line; thence North 89°20'54" West 125.00 feet; thence North 00°38'24" East 73.04 feet to Southwest corner of Lot 2 of said Section 23; thence South 89°20'54" East 125.00 feet along the section line to the POINT OF BEGINNING.
Contains 9130 square feet or 0.210 acres, more or less.

NORTH PARCEL
Commencing at the South quarter corner of Section 23, Township 21 South, Range 6 West, Salt Lake Meridian; thence North 89°20'54" West 1195.70 feet along the section line to the POINT OF BEGINNING; thence continuing along said section line North 89°20'54" West 125.00 feet to the Southwest corner of Lot 2 of said section 23; thence North 00°38'24" East 101.20 feet along the sixteenth section line; thence South 89°20'54" East 125.00 feet leaving said sixteenth section line; thence South 00°38'24" West 101.20 feet to the POINT OF BEGINNING.
Contains 12650 square feet or 0.290 acres, more or less.

OVERALL PARCEL
Commencing at the South quarter corner of Section 23, Township 21 South, Range 6 West, Salt Lake Meridian; thence North 89°20'54" West 1195.70 feet along the section line to the POINT OF BEGINNING; thence South 00°38'24" West 73.04 feet leaving said section line; thence North 89°20'54" West 125.00 feet; thence North 00°38'24" East 73.04 feet to the Southwest corner of Lot 2 of said section 23; thence continuing North 00°38'24" East 101.20 feet along the sixteenth section line; thence South 89°20'54" East 125.00 feet leaving said sixteenth section line; thence South 00°38'24" West 101.20 feet to the POINT OF BEGINNING.
Contains 21780 square feet or 0.500 acres, more or less.

REV NO.	COMMENT	DATE
0	final draft	01/15/19

PROFESSIONAL LAND SURVEYOR 6423494 STATE OF UTAH KEITH B. BIGELOW

SUNRISE ENGINEERING

25 EAST 500 NORTH
FILLMORE, UTAH 84631
TEL 435.743.5151 • FAX 435.743.7900
www.sunrise-eng.com

DEXTER ANDERSON

RECORD OF SURVEY
LOCATED IN SECTION 23 & 26
T21S R6W SLM

SDI NO.	SURVEYED	DRAWN	CHECKED	SHEET NO.	19-004
06656	JAS	KBB	DJR	1 of 1	

U:\Anderson\06656 Dexter Anderson Boundary Survey\Design\SURVEY\ANDERSON-s-R05.dwg Jan 16, 2019 7:55am kbigelow

8019605662

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Fillmore Field Office
95 East 500 North
Fillmore, UT 84631
Phone: (435)743-3100; Fax: (435)743-3136
https://www.blm.gov/office/fillmore-field-office

IN REPLY REFER TO:
3809 (UTW02000)
UTU-70557

April 10, 2019

CERTIFIED MAIL #7018 0680 0000 4511 5736
RETURNED RECEIPT REQUESTED

DEXTER ANDERSON
RED DOME, INC.
730 NORTH 3900 WEST
FILLMORE, UTAH 84631

43 CFR 3809 - Surface Management Plan
UTU 70557

Updated Plan of Operations and Bond Evaluation

Dear Mr. Anderson:

On January 29, 2019 Red Dome Inc. signed a Warranty Deed to Millard County. With this, Red Dome Inc. (Red Dome) transferred 107 acres to the county, decreasing the project area in Red Dome's Plan of Operations (Plan). The proposed Plan was previously assigned BLM case file number UTU-70557. Please refer to this number in future correspondence. The corresponding Utah Division of Oil, Gas and Mining (DOGM) case file number is M/027/0032.

On November 14, 2018 DOGM requested a bond be provided in full for all the acreage from before the Deed. With the decrease in acreage, this bond evaluation will change. A bond estimate and the draft plan needs to be modified due to the reduction in acres and facilities. Attached is a map that is what BLM and DOGM considers Red Dome's. area of disturbance as of January 30, 2019.

BLM is willing to assist with the update of the mine plan and bond estimate if requested by you and Burningham Trucking. With the updated plan and bond calculation, Red Dome will be in compliance and will be able to continue forward.

This needs to be submitted within 30 days or BLM will respond in a decisive manner. If you have any questions, please contact Stephanie deGraffenried, Geologist at 435-743-3115.

Sincerely,

Michael D. Gates
Field Manager

Attachment: Updated Disturbed Area Map

cc: Peter Brinton
UDOGM
1594 W. North Temple, Suite 1210
Salt Lake City, UT 84114

Terry Snyder
BLM Utah State Office
440 W 200 S, Suite 500
Salt Lake City, UT 84101

A. PURPOSE AND NEED

This Environmental Assessment (EA) is being prepared to address the environmental affects of a Plan of Operations filed by Red Dome, Inc. which is the owner of several mining claims in Millard County, Utah. The Plan of Operations was filed as required by the Surface Management Regulations (43 CFR 3809). Under these regulations the Bureau of Land Management (BLM) is required to prepare EAs on all Plans of Operations to determine if an Environmental Impact Statement is needed or if additional environmental mitigation, beyond that proposed by the mining claimant, is needed to prevent unnecessary and undue degradation of the public lands.

B. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Alternatives to the proposed action, including the No Action Alternative, are not addressed in this EA. Suitable areas for alternate locations of the operation do not exist in this area and the adoption of the No Action Alternative would abrogate rights granted to the operator by the general mining law of 1872 (30 USCA 22 et. seq.).

1. Location

The proposed action is located in parts of Sections 22, 23, 26, and 27 of T. 21 S., R. 6 W. which is approximately 6 miles west of the town of Fillmore, Utah. Fillmore is located approximately 150 miles south of Salt Lake City, Utah. The area proposed for mining is a recent (from 600 to 1,000 year old) basalt lava flow on which three cinder cones occur. This flow is called the Ice Springs Flow because there used to be a lava tube in which ice could be found year round. About 50 years ago an attempt was made to expand the area where ice was found and the tube was destroyed by the blasting used for this expansion. The area of the mine is shown on Attachment A. The area to be disturbed is shown on Attachment B.

2. Mining History

The first mining claim involved in this proposed action was filed on May 24, 1935. Subsequent claims were filed in 1936, 1946 and 1950. Mining of cinders and lava rock has taken place more or less continuously since the original claim was located. There have been periods of inactivity. These periods of inactivity have been the result of market conditions related to the principle product from the claim, which is cinder for use in the manufacture of precast cement blocks. Expanded shale is a competitive product to cinder. Expanded shale is a manufactured product which takes the place of cinder in the block market. The cost of expanded shale is linked to the cost of the energy used to heat the shale for expansion. During the 1960's the cost of expanded shale was highly competitive with the cost of cinders. After the price increases in the energy markets of the 1970's, cinder prices became more attractive to block manufacturers.

On January 1, 1981, regulations on the surface management of mining claims became effective. These regulations are found at 43 CFR 3809. 43 CFR 3809.1-8(a)(2) requires that plans be submitted for existing operations within 120

days of the effective date of the regulations. This regulation also allowed the authorized officer to provide an extension not to exceed 180 days on a showing of good cause by the operator. For reasons that are not clearly understood, no effort was made to enforce this regulation on Red Dome, Inc., until late 1989. A plan of operations was finally obtained from this operator on February 13, 1991, more than ten years after the effective date of the surface management regulations. The Bureau of Land Management (BLM) accepts responsibility for this lapse in enforcement of its regulations. Approval of this Plan of Operations or approval of this Plan of Operations with additional mitigation measures will bring this operation into compliance with the surface management regulations.

About 320 acres were disturbed by mining on these claims prior to the effective date of the surface mining regulations. In addition to surface disturbance, a nearly vertical highwall about 40 feet high and 1000 feet long was constructed. Because this highwall was constructed prior to the effective date of the surface management regulations, the hazards associated with its presence cannot be directly abated through mitigation to this plan of operations.

3. Plan of Operations

The present plan is to continue mining on about 80 acres of the project area. All of the 80 acres are within the area which was disturbed prior to 1981. Mining will be done with front end loaders. Selective mining will be conducted from open pits and surface exposures. Mining near the highwall is not proposed in this Plan of Operations. Should this plan be amended at some later date to include mining from the face of the highwall, then some form of slope reduction should be considered.

A variety of materials are produced from this mine. These included both red and black cinders, and a wide variety of sizes of lava rock for landscaping purposes. Small amounts of materials are also produced for specialty markets including stone for use in fish tanks and for novelty items. Different markets have different specifications. Color and density are most important to the landscaping market. Density and strength characteristics are most important to the block market. There is variation in the deposit, and the claims are developed by mining many small areas within the deposit that meet the specifications of individual customers. Some of the material for specialty markets is hand selected.

Facilities include an access road, a crusher with screens, a power line and a shed to house the crusher. Power is supplied by Flowell Electric through a power line located on BLM right-of way U028894 granted on May 27, 1958. There are no residences on the claims and access through the claims is unrestricted. Two public roads cross the property and will not be relocated by the claimant.

Equipment used in mining includes a 10 yard dump truck and several front end loaders. Occasionally a backhoe and a bulldozer are used. Periodically blasting is required. The backhoe, bulldozer, and equipment required for blasting are used so infrequently that they are not kept at the mine site and are transported to the mine site when they are needed.

Number: J-050-091-058EA

Red Dome, Incorporated
Mine Plan of Operations Environmental Assessment

Team Leader:
Philip Allard, Geologist

Participating Staff:
Larry Sip, Realty Specialist
Don Burt, Range Conservationist
Pat Fosse, Range Conservationist
Brenda Smith, Wildlife Biologist
Lynn Fergus, Outdoor Recreation Planner
Melanie Mendenhall, Range Conservationist

Reviewed By:
[signature] 6/11/91
Environmental Coordinator Date

Approved By:
[signature] 6/11/91
Area Manager Date

Appendix D.
Geology of Red Dome

M/027/032
CC: Daron, tom
Susan. MaryAnn

MEMORANDUM

TO: Utah Division of Oil, Gas and Mining (DOGM), Minerals Regulatory Program
FROM: Bryce Tripp, Senior Scientist, Utah Geological Survey
DATE: September 26, 2005
SUBJECT: Geology of the Red Dome, Inc. cinder pit

As requested by DOGM, I have evaluated the geology of the material mined at the Red Dome, Inc. pit. I have reviewed the literature and available geologic maps and toured the property. Daron Haddock and I met Dexter Anderson and Lee Miller at the Red Dome pit at around 11:00 am on September 15, 2005. Daron discussed the applicable rules with them and I gave them a quick summary of the geology of their property as published in Oviatt (1991). Dexter and Lee then gave us a tour of the property.

The Red Dome, Inc. cinder (scoria) pit is excavated in the Ice Springs volcanic cone (located in section 22, 23, 26, and 27, T.21S., R.6W., Tabernacle Hill and Meadow 7.5' quadrangles, in Millard County). The volcanic cone is composed of the Quaternary Basalt of Ice Springs (Oviatt, 1991) (Qvb1 on figure 1). The volcanic rock consists of basalt flows with associated volcanic cinders. This basalt is very young, perhaps only 4000 to 660 years old (Hintze and others, 2003).

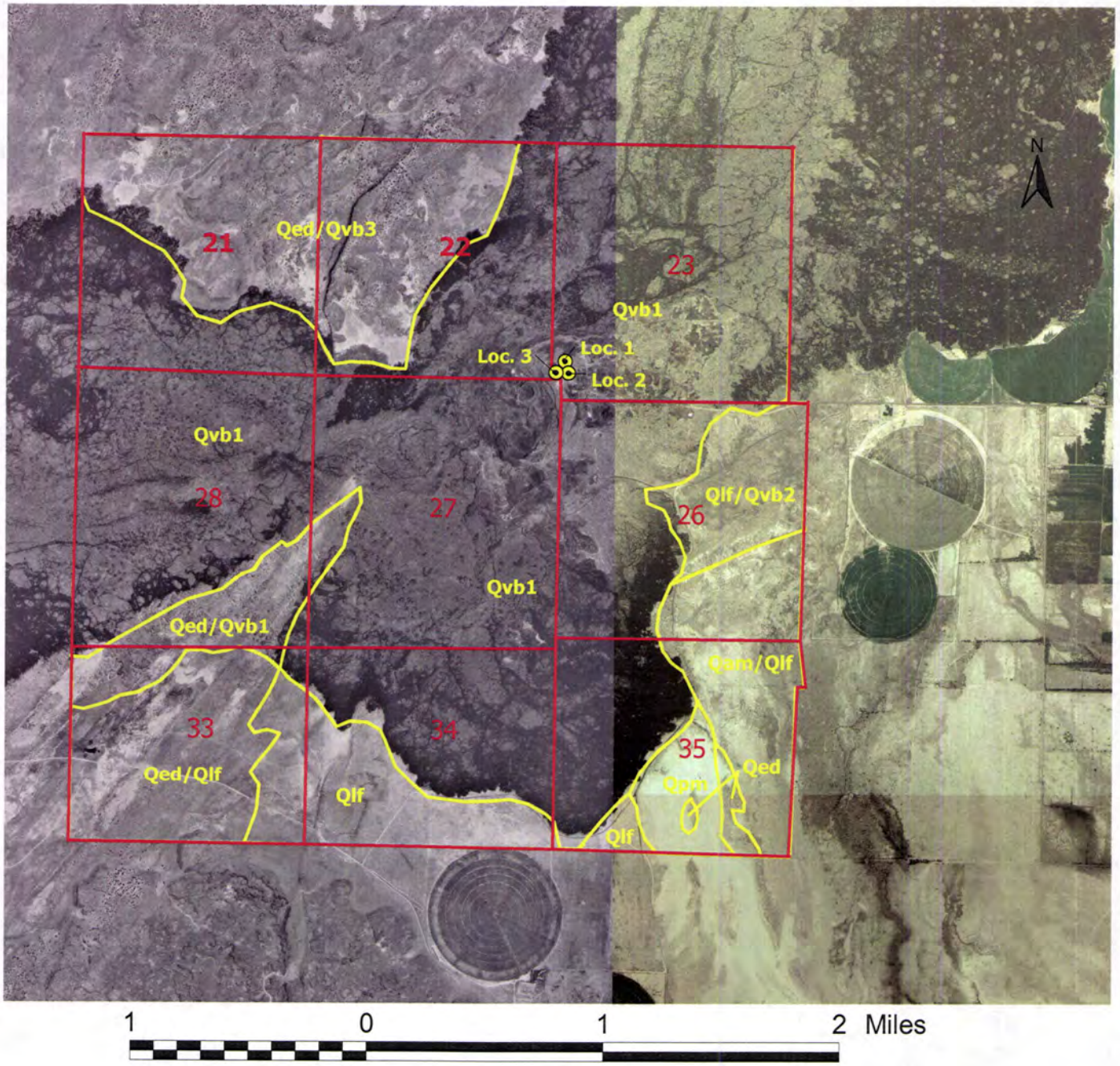
All of the basalt flow and cinder material (Qvb1 on figure 1) is considered bedrock or bedrock float because it is in place or has not moved very far from where it was erupted. None of this material has been significantly water transported either by streams or by lake currents. It is very fresh and angular (figures 2 and 3), with shiny, commonly iridescent surfaces. A large percent of the fragments shows well-preserved bubble and flow textures (figure 4).

Additionally, there is not enough topographic relief on this volcanic cone to have developed streams, and as the volcanic cone is much younger than Lake Bonneville, there has been no water transport or rounding of the cinders by lake currents. In summary, there is no evidence that material mined at this site was deposited by sedimentary processes.

References:

Hintze, L.F., Davis, F.D., Rowley, P.D., Cunningham, C.G., Steven, T.A., and Willis, G.C., 2003, Geologic map of the Richfield 30' x 60' quadrangle, southeast Millard County and parts of Beaver, Piute, and Sevier Counties, Utah: Utah Geological Survey Map 195, scale 1:100,000.

Oviatt, C.G., 1991, Quaternary geology of the Black Rock Desert, Millard County, Utah: Utah Geological Survey Special Studies 73, 23 p., 1 plate, scale 1:100,000.



Qvb1 - Basalt of Ice Springs

Qed/Qvb3 - Wind-blown sand/Basalt of Pavant Ridge

Qed/Qvb1 - Wind-blown sand/Basalt of Ice Springs

Qed - Wind-blown sand

Qlf - Younger fine-grained lake deposits

Qpm - Mud flats

Qed/Qlf - Wind-blown sand/younger fine-grained lake deposits

Qam/Qlf - Alluvial mud/younger fine-grained lake deposits

Figure 1. Geology of the Ice Springs crater area, T.21S., R.6W., SLBM (from Oviatt, 1991). Red Dome, Inc. cinder pit is located within sections 22, 23, 26, and 27. Photo locations are shown as yellow and black dots. (Black and white part of the photographic base is a 1993, 1-meter resolution, U.S. Geological Survey digital orthophoto; the color part of the base is a 2004, 1-meter National Agricultural Imagery Program photo).

Figure 2. Red Dome pit highwall (location 2 on figure 1) showing lava flow over angular cinders. Note pen for scale.

Figure 3. Blown-up detail from figure 2 (location 2 on figure 1) showing angularity and bubble and flow texture of basalt fragments. Note pen for scale.

Figure 4. Close-up of scoria in Red Dome pit highwall (location 1 figure 1) showing fresh, unabraded surfaces of fragments with preserved bubble and flow textures.

Appendix E.
Mineral Analysis

Heavy Metals Analysis
FICAP Screen

TEXAS PLANT & SOIL LAB

5115 West Monte Cristo Road ♦ Edinburg, Texas 78541
Telephone: 956-383-0739 ♦ Facsimile: 956-383-0730
www.TexasPlantAndSoilLab.com
A Full Service
Soil - Plant - Water - Compost - Fertilizer - Heavy Metals
analytical and Consulting Agronomic Laboratory.

Name: American Rio
Field: Oklahoma City, OK
Date: 4/11/2016
Lab #: 32041
Sampled ID: Mix

Analysis Method: EPA 6010 B	Level Found mg/kg	Detection Limit mg/kg
Cadmium (total Cd)	< 0.50	0.50
Chromium (total Cr)	24.67	1.00
Lead (total Pb)	9.68	1.00
Mercury (total Hg)	< 0.50	0.50
Arsenic (total As)	< 1.00	1.00
Molybdenum (total Mo)	< 0.50	0.50
Selenium (total Se)	5.68	1.00
Nickel (total Ni)	68.97	0.50
Beryllium (total Be)	< 1.00	1.00
Boron (total B)	68.12	1.00
Sodium (total Na)	1734.33	1.00
Magnesium (total Mg)	13008.53	1.00
Aluminum (total Al)	2191.36	5.00
Silicon (total Si)	26.99	0.10
Phosphorous (total P)	1101.39	10.00
Sulphur (total S)	152.13	2.50
Potassium (total K)	314.93	1.00
Calcium (total Ca)	10681.40	0.10
Vanadium (total V)	53.18	0.50
Manganese (total Mn)	259.77	0.10
Iron (total Fe)	11500.47	1.00
Cobalt (total Co)	10.13	1.00
Zinc (total Zn)	19.85	0.10
Silver (total Ag)	< 1.00	1.00
Antimony (total Sb)	0.24	0.10
Barium (total Ba)	23.28	0.50
Gold (total Au)	< 1.00	1.00
Thallium (total Tl)	< 1.00	1.00
Bismuth (total Bi)	303.71	1.00
Copper (total Cu)	23.55	0.10
Titanium (total Ti)	821.23	0.10
Strontium (total Sr)	26.96	0.10

**** bdl = Below Detection Limit***

Numerous interpretive standards exist for heavy metals. They often are contradictory because they reflect the varying objectives of the originating organizations and regulatory agencies. Most standards currently are undergoing review and therefore are subject to revision.

DTPA - Micronutrients	Levels Found (ppm)
Zinc (Zn)	0.09
Iron (Fe)	3.24
Manganese (Mn)	0.22
Copper (Cu)	0.07
Cobalt (Co)	0.003
Molybdenum (Mo)	0.001
Selenium (Se)	0.03

Heavy Metals Analysis
FICAP Screen

TEXAS PLANT & SOIL LAB

5115 West Monte Cristo Road ♦ Edinburg, Texas 78541
Telephone: 956-383-0739 ♦ Facsimile: 956-383-0730
www.TexasPlantAndSoilLab.com
A Full Service
Soil - Plant - Water - Compost - Fertilizer - Heavy Metals
analytical and Consulting Agronomic Laboratory.

Name: American Rio
Field: Oklahoma City, OK
Date: 4/11/2016
Lab #: 32039
Sampled ID: Black

Analysis Method: EPA 6010 B	Level Found mg/kg	Detection Limit mg/kg
Cadmium (total Cd)	< 0.50	0.50
Chromium (total Cr)	60.35	1.00
Lead (total Pb)	28.27	1.00
Mercury (total Hg)	< 0.50	0.50
Arsenic (total As)	< 1.00	1.00
Molybdenum (total Mo)	< 0.50	0.50
Selenium (total Se)	11.06	1.00
Nickel (total Ni)	98.93	0.50
Beryllium (total Be)	< 1.00	1.00
Boron (total B)	154.83	1.00
Sodium (total Na)	8219.94	1.00
Magnesium (total Mg)	21365.12	1.00
Aluminum (total Al)	2595.23	5.00
Silicon (total Si)	7.02	0.10
Phosphorous (total P)	1277.69	10.00
Sulphur (total S)	301.29	2.50
Potassium (total K)	4128.24	1.00
Calcium (total Ca)	21427.31	0.10
Vanadium (total V)	101.73	0.50
Manganese (total Mn)	500.56	0.10
Iron (total Fe)	29715.00	1.00
Cobalt (total Co)	16.79	1.00
Zinc (total Zn)	39.88	0.10
Silver (total Ag)	< 1.00	1.00
Antimony (total Sb)	1.88	0.10
Barium (total Ba)	164.22	0.50
Gold (total Au)	< 1.00	1.00
Thallium (total Tl)	< 1.00	1.00
Bismuth (total Bi)	455.35	1.00
Copper (total Cu)	18.08	0.10
Titanium (total Ti)	1224.14	0.10
Strontium (total Sr)	120.86	0.10

**** bdl = Below Detection Limit***

Numerous interpretive standards exist for heavy metals. They often are contradictory because they reflect the varying objectives of the originating organizations and regulatory agencies. Most standards currently are undergoing review and therefore are subject to revision.

DTPA - Micronutrients	Levels Found (ppm)
Zinc (Zn)	0.37
Iron (Fe)	5.60
Manganese (Mn)	0.37
Copper (Cu)	0.74
Cobalt (Co)	0.01
Molybdenum (Mo)	0.001
Selenium (Se)	0.02

Heavy Metals Analysis
FICAP Screen

TEXAS PLANT & SOIL LAB

5115 West Monte Cristo Road ♦ Edinburg, Texas 78541
Telephone: 956-383-0739 ♦ Facsimile: 956-383-0730
www.TexasPlantAndSoilLab.com
A Full Service
Soil - Plant - Water - Compost - Fertilizer - Heavy Metals
analytical and Consulting Agronomic Laboratory.

Name: American Rio
Field: Oklahoma City, OK
Date: 4/11/2016
Lab #: 32040
Sampled ID: Red

Analysis Method: EPA 6010 B	Level Found mg/kg	Detection Limit mg/kg
Cadmium (total Cd)	< 0.50	0.50
Chromium (total Cr)	23.75	1.00
Lead (total Pb)	11.68	1.00
Mercury (total Hg)	< 0.50	0.50
Arsenic (total As)	< 1.00	1.00
Molybdenum (total Mo)	< 0.50	0.50
Selenium (total Se)	4.76	1.00
Nickel (total Ni)	71.99	0.50
Beryllium (total Be)	< 1.00	1.00
Boron (total B)	64.11	1.00
Sodium (total Na)	1676.10	1.00
Magnesium (total Mg)	12673.64	1.00
Aluminum (total Al)	2233.96	5.00
Silicon (total Si)	18.49	0.10
Phosphorous (total P)	1061.63	10.00
Sulphur (total S)	159.48	2.50
Potassium (total K)	283.18	1.00
Calcium (total Ca)	10558.20	0.10
Vanadium (total V)	54.54	0.50
Manganese (total Mn)	215.42	0.10
Iron (total Fe)	10414.72	1.00
Cobalt (total Co)	9.71	1.00
Zinc (total Zn)	15.93	0.10
Silver (total Ag)	< 1.00	1.00
Antimony (total Sb)	0.50	0.10
Barium (total Ba)	19.90	0.50
Gold (total Au)	< 1.00	1.00
Thallium (total Tl)	< 1.00	1.00
Bismuth (total Bi)	293.04	1.00
Copper (total Cu)	8.78	0.10
Titanium (total Ti)	792.04	0.10
Strontium (total Sr)	24.47	0.10

**** bdl = Below Detection Limit***

Numerous interpretive standards exist for heavy metals. They often are contradictory because they reflect the varying objectives of the originating organizations and regulatory agencies. Most standards currently are undergoing review and therefore are subject to revision.

DTPA - Micronutrients	Levels Found (ppm)
Zinc (Zn)	1.07
Iron (Fe)	1.91
Manganese (Mn)	0.17
Copper (Cu)	0.07
Cobalt (Co)	0.0003
Molybdenum (Mo)	0.001
Selenium (Se)	0.03

Project	A15019
Sample Name	Volcanic ore
Sample No	170803

Major Constituents (wt%)		
Al	(wt%)	7.01
Ba	(wt%)	0.05
Bi	(wt%)	< 0.001
Ca	(wt%)	5.58
Cu	(wt%)	0.02
Fe	(wt%)	6.49
K	(wt%)	1.00
Mg	(wt%)	4.29
Mn	(wt%)	0.11
Mo	(wt%)	0.001
Na	(wt%)	2.00
Ni	(wt%)	0.01
P	(wt%)	0.15
Pb	(wt%)	0.004
S	(wt%)	0.06
Sn	(wt%)	< 0.001
Ti	(wt%)	0.80
W	(wt%)	0.01
Zn	(wt%)	0.02
Zr	(wt%)	0.02

Minor Constituents (ppm)					
Au	(ppm)	0.016	Nd	(ppm)	47
Ag	(ppm)	3.58	Pd	(ppm)	7
As	(ppm)	15	Pr	(ppm)	12
Be	(ppm)	< 2	Rb	(ppm)	27
Cd	(ppm)	< 2	Re	(ppm)	< 2
Ce	(ppm)	114	Sb	(ppm)	2
Co	(ppm)	54	Se	(ppm)	< 6
Cr	(ppm)	342	Sm	(ppm)	11
Cs	(ppm)	< 2	Sr	(ppm)	342
Dy	(ppm)	9	Ta	(ppm)	16
Er	(ppm)	5	Tb	(ppm)	< 2
Ga	(ppm)	39	Te	(ppm)	< 2
Gd	(ppm)	12	Th	(ppm)	5
Hf	(ppm)	4	Tl	(ppm)	< 2
Ho	(ppm)	2	Tm	(ppm)	< 2
La	(ppm)	54	U	(ppm)	< 2
Li	(ppm)	12	V	(ppm)	177
Lu	(ppm)	< 2	Y	(ppm)	34
Nb	(ppm)	34	Yb	(ppm)	4

Appendix F.
WP Natural Resource Consulting, LLC Vegetation and Soil Assessment 2005

2005 Baseline Vegetation and Soil Assessment at Red Dome Mine

Baseline Vegetation and Soil Assessment at Red Dome Mine

M/027/032

Prepared for:
Red Dome Mine
5865 W 200S
Fillmore, UT 84631

Prepared by:

WP Natural Resource Consulting, LLC
PO Box 520604
SLC, UT 84152
(801) 699-5459

INTRODUCTION

Red Dome Mine has been requested to submit a mine plan for their mine in Millard County. This mine is located in T21S, R6W in sections 22, 23, 26 and 27. These sections are included on the Tabernacle Hill and Meadow Quadrangles. As part of the mine plan, a soil and vegetation assessment is needed in order to evaluate baseline conditions. The purpose of this report is to provide this baseline characterization of soils and vegetation of the area according to the requirements of the Utah Oil, Gas and Mining Division to assist in the creation of a site appropriate and effective reclamation plan.

SITE DESCRIPTION

The area lies on the eastern side of Millard County, about 10 miles West of the town of Fillmore, and 6 miles West of Interstate 15. The area lies at about 4700 to almost 5000 feet elevation and receives about 15 inches of precipitation annually. Most precipitation arrives as snow from October to April. The freeze free season is approximately June 4 to September 15, or an average of about 117 days (NRCS, 1995).

The slopes of the Red Dome Mine permitted boundary range from 2 to about 25%. The topographic relief of the mine itself is somewhat unique for the area, as the area surrounding the mine is more uniform in slope. The prominent knoll of the mine is a result of basalt and basaltic andesite, which occurs in widespread lava flows, shield volcanoes and cinder cones. This variation in topography, in addition to past and present land use and disturbances within the area, are major determinants of soil and vegetation type.

Vegetation is sparse in areas of the lava flows, but where it does occur, the vegetation is dominated by sagebrush (*Artemisia tridentata* var. *wyomingensis*), broom snakeweed (*Gutierrezia sarothrae*), cheatgrass (*Bromus tectorum*) and limited perennial native grasses such as Indian ricegrass (*Oryzopsis hymenoides*), Sandberg's bluegrass (*Poa secunda*), and needle and thread grass (*Stipa comata*). Due to drought and various disturbances, the vegetation community at the Red Dome Mine site is not currently at its full potential. The NRCS list of the potential vegetation communities in the area is included in Table 1.

Figure 1. Vegetation community in Red Dome Mine area

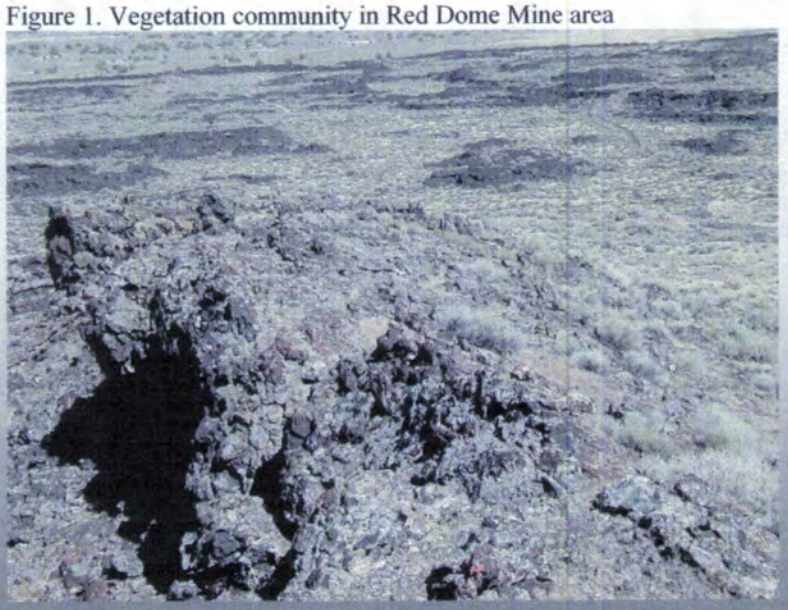
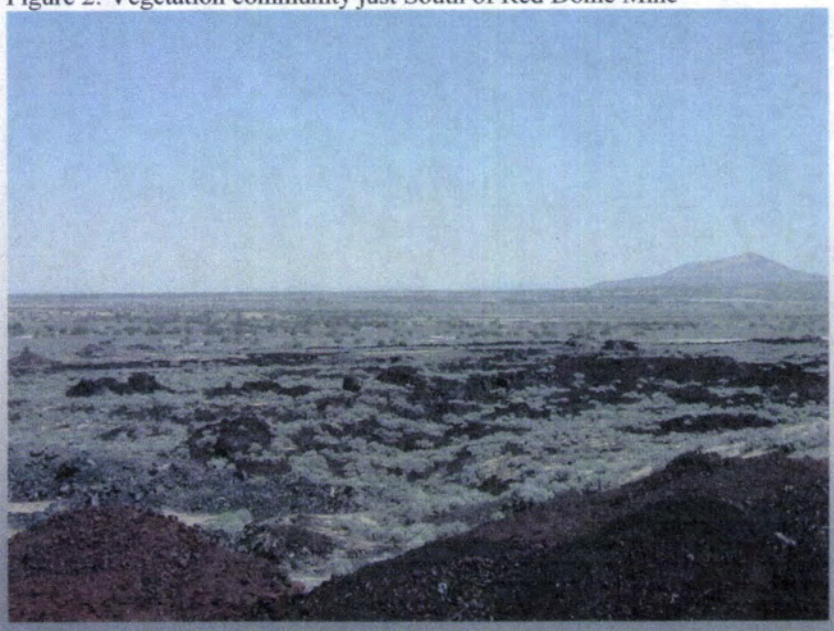


Figure 2. Vegetation community just South of Red Dome Mine



SOILS

The NRCS soil survey delineates the Cinders area as one soil type - Lava flows- Shotwell complex. This soil type consists of about 60% lava flows, 25% of the Shotwell complex and 5% inclusions of each of: Boxelder silt loam, Cloyd gravelly loam and Kessler silt loam. The following soils map depicts the soil type distribution and the numbers assigned to each soil type. Table 1 below depicts the characteristics of each of these soils found within the property of Red Dome Mine as well as details of the potential vegetation community for each soil type.

Figure 3. Soil Types at Red Dome Mine

See text for descriptions of soil numbers/ types

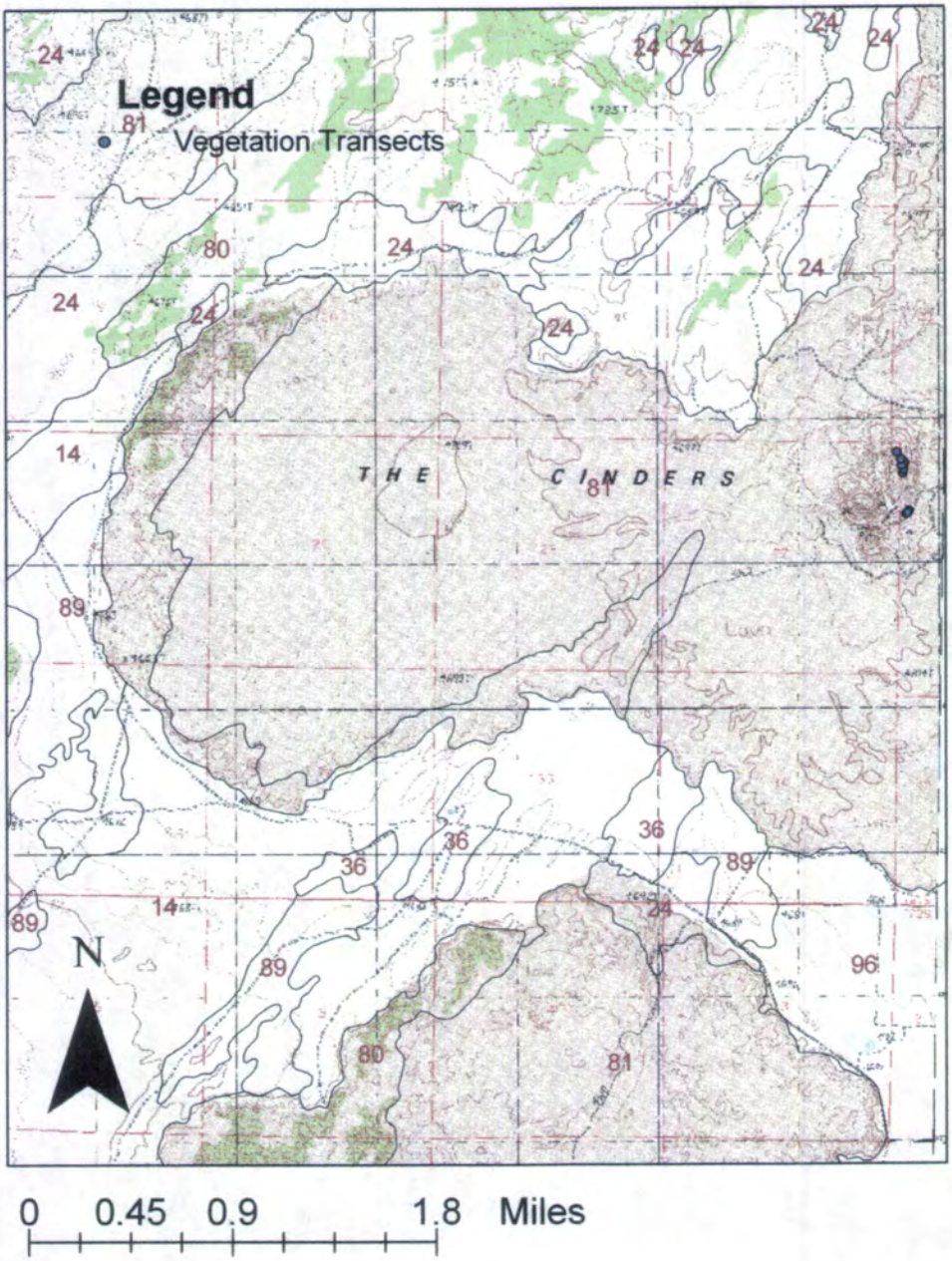
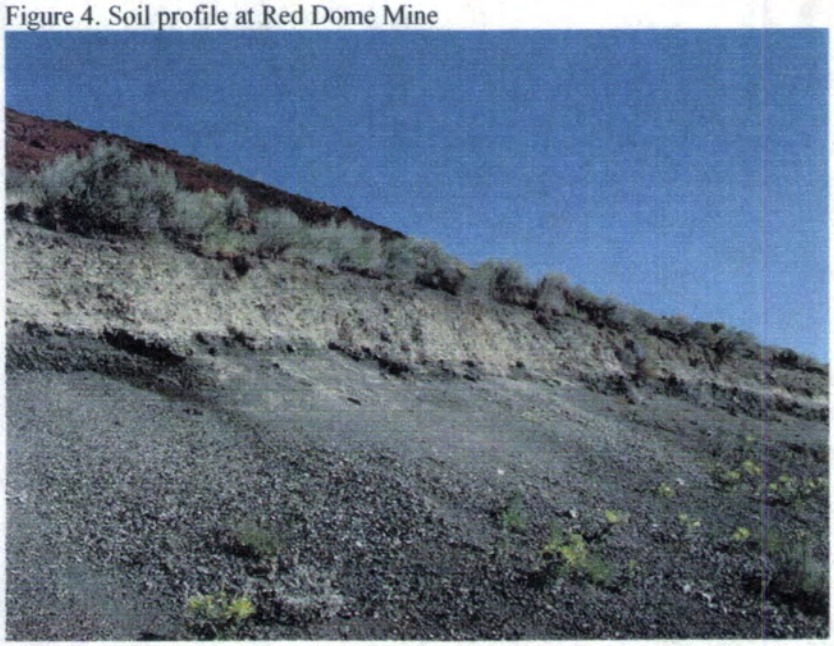


Table 1. Soil types and descriptions

Soil Type, Number	Soil Taxonomic class	Soil Name	Texture	Depth of bedrock	Potential vegetation type	Origin of soil
81		Lava flows	Lightweight cinders	At surface	None-nearly devoid of plants	Quaternary lava flows
81	Lithic Xeric Torriorthents	Shotwell	0-3"-very cobbly loam 3-14"- loam	14 inches	**Semidesert shallow loam** 20% Bluebunch wheatgrass 20% Wyoming big sagebrush 10% Indian ricegrass 10% Nevada bluegrass 5% each of Needle and thread, bottlebrush squirreltail, other perennial grasses, gooseberryleaf globemallow, other perennial forbs, Nevada Mormon tea, and Mexican cliffrose	Residuum derived from basalt and cinders
23,24	Xeric Haplocalcids	Boxelder silt loam	0-5" - silt loam 5-27"- loam 27-60" silt loam	Greater than 60 inches	**Semidesert limy loam** 20% Bottlebrush squirreltail 15% Wyoming big sagebrush 15% Indian ricegrass 10% Other shrubs 10% Other perennial grasses 5% each of rubber rabbitbrush, other perennial forbs, Winterfat, western wheatgrass, other annual forbs, and scarlet globemallow	Alluvium derived from calcareous sediment
31	Lithic Xeric Haplocalcids	Cloyd gravelly loam	0-3"- gravelly loam 3-7"- cobbly loam 7-15"-gravelly loam	15 inches	**Semidesert shallow loam** Vegetation listed above	Residuum derived from travertine
73,74	Xeric Haplocalcids	Kessler silt loam	0-15"-silt loam 15-60"-silt loam	Greater than 60 inches	**Semidesert loam** 25% Bluebunch wheatgrass 20% Wyoming big sagebrush 10% Indian ricegrass 10% Other shrubs 10% Bottlebrush squirreltail 5% each of needle and thread, Hood phlox, Douglas rabbitbrush, scarlet globemallow, and penstemon	Alluvium and lacustrine deposits

* Scientific names of plant species included at end of report

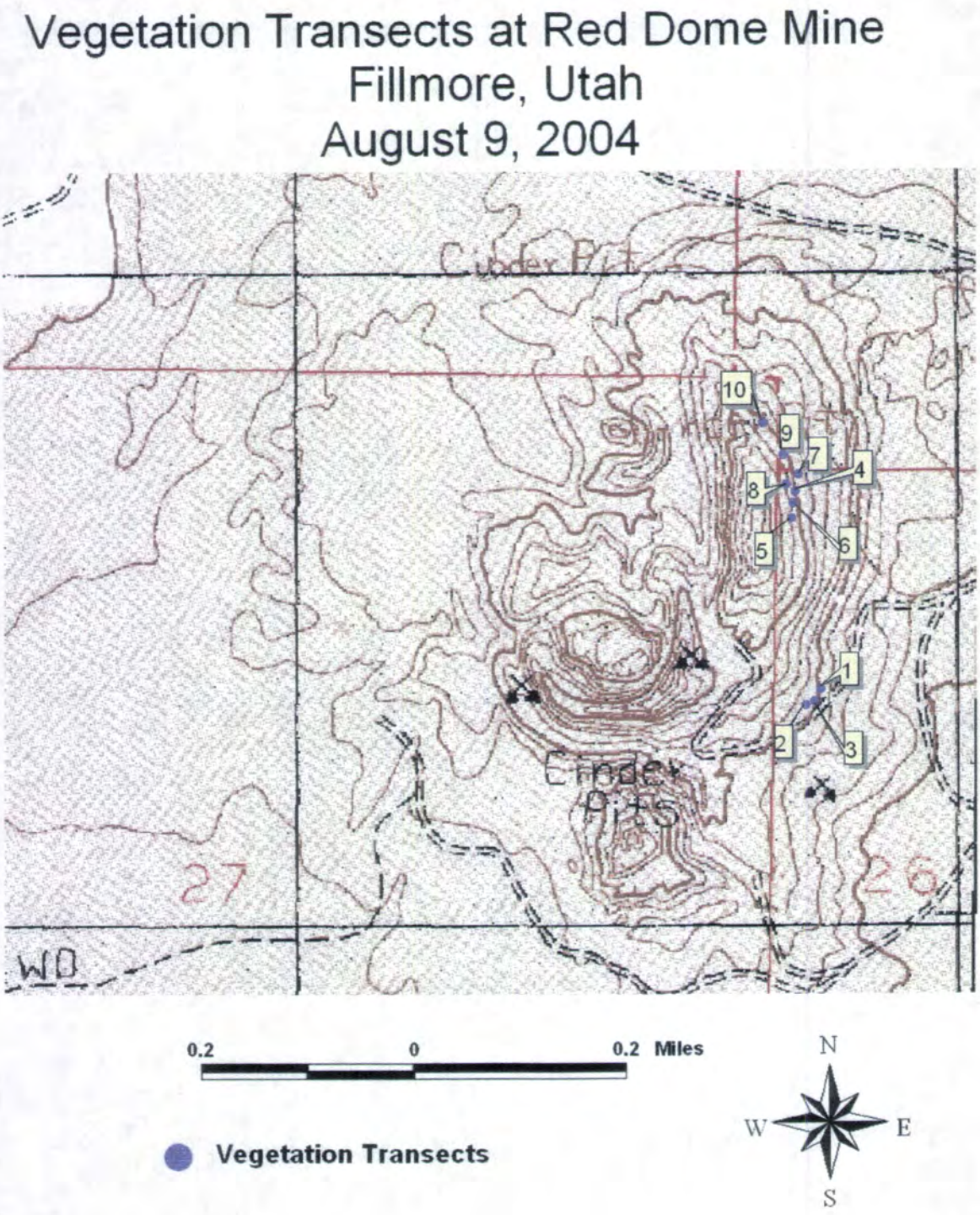
Figure 4. Soil profile at Red Dome Mine



METHODS

To ascertain the range of variability for vegetation cover, ground cover, and species composition, 10 transects of 100 feet each were established in areas within the mine property (See Figure 5). Once within a stand of typical vegetation, a pin was spun to randomly determine the azimuth of the transect. At each foot, vegetation (by species), litter, rock, gravel, or bare ground was recorded. The ten transects were placed in the mining area where the quarry supervisor located as undisturbed vegetation for a total of 100 points each. The vegetation assessment was completed on August 9, 2004.

Figure 5. Location of vegetation transects at Red Dome Mine

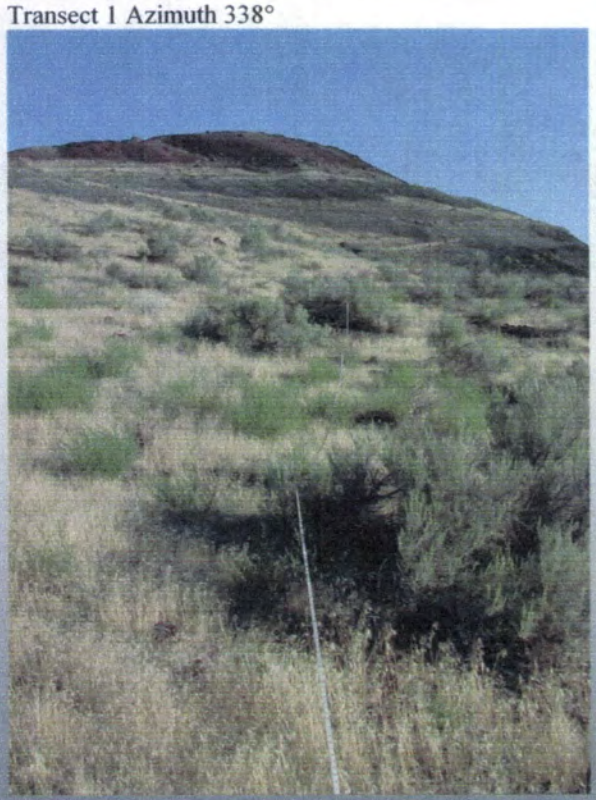


RESULTS

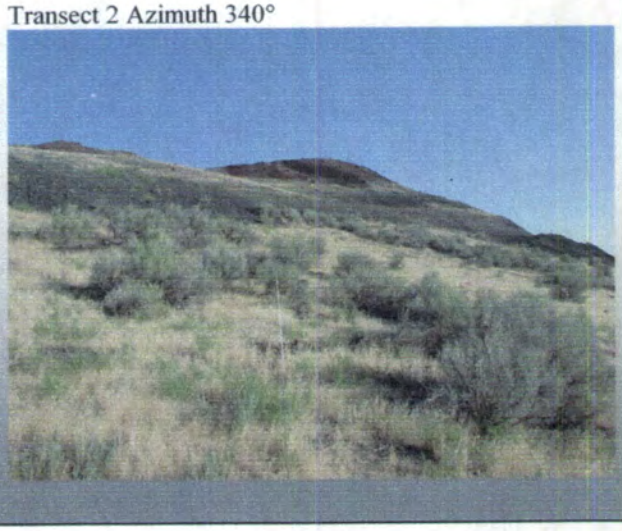
Vegetation communities at the site are in various stages of recovery/regneration and/or degeneration according to past disturbance histories and land use practices. The litter on most of the site was artificially high due to the high concentrations of cheatgrass.

Overall vegetation/ ground cover- Total vegetation cover is 29.7% +/- 8.8%. This includes weedy annual grasses. Litter, bare ground, gravel and rock cover were17.8% +/- 4.8%, 2.9% +/- 3.4%, 36.9% +/- 10.2% and 13.9% +/- 13.5% respectively. Wyoming big sagebrush (*Artemisia tridentata var. wyomingensis*), is clearly the dominant shrub (15% relative cover), with broom snakeweed (Gutierrezia sarothrae) contributing only 2% of the relative cover. Perennial grasses only comprised 0.7% relative cover. Native annual forbs contributed only 0.75% relative cover. Complete tabulated results are shown in Table 2.

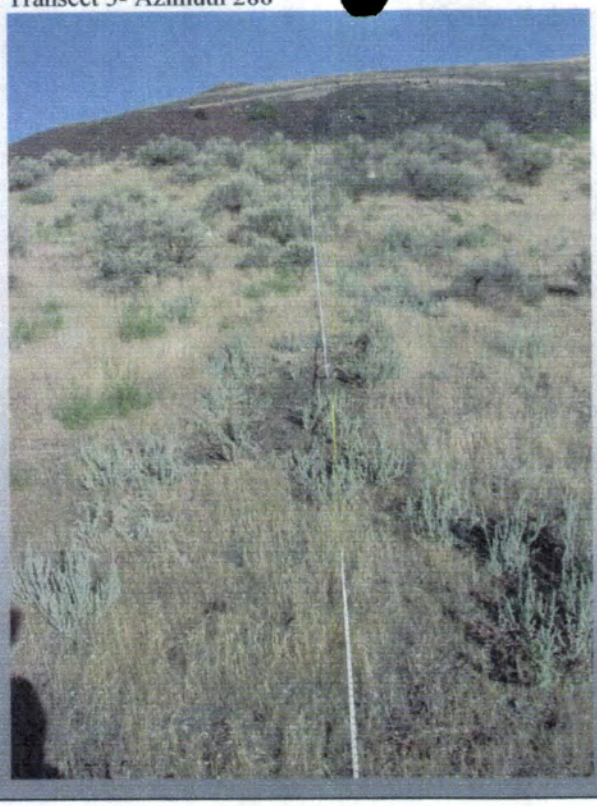
Transect 1 Azimuth 338°



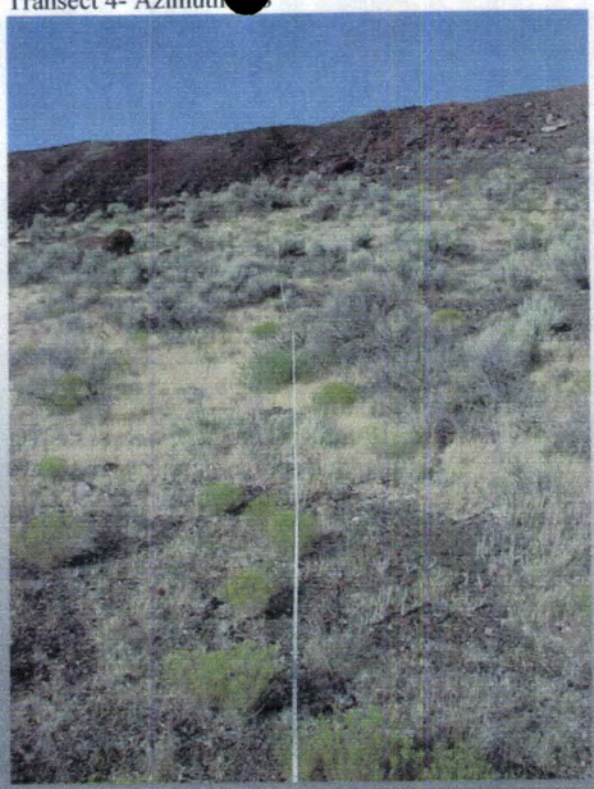
Transect 2 Azimuth 340°



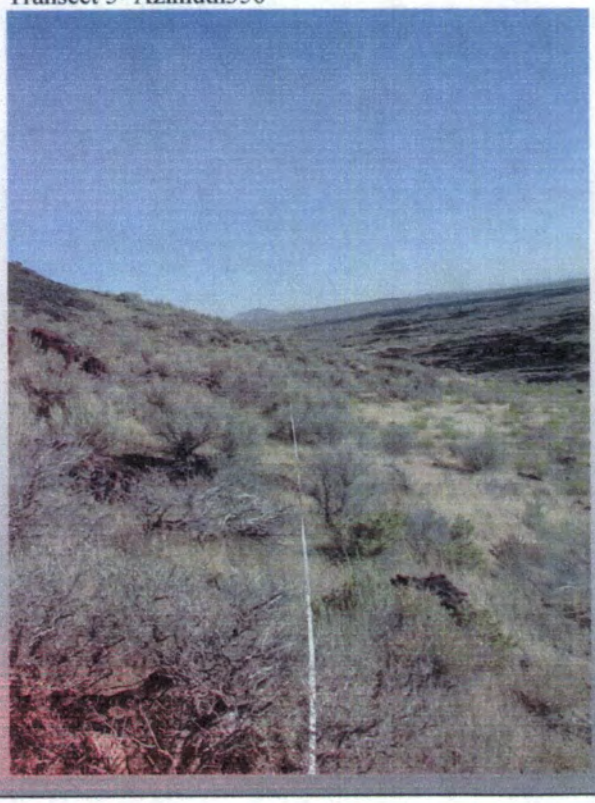
Transect 3- Azimuth 288°



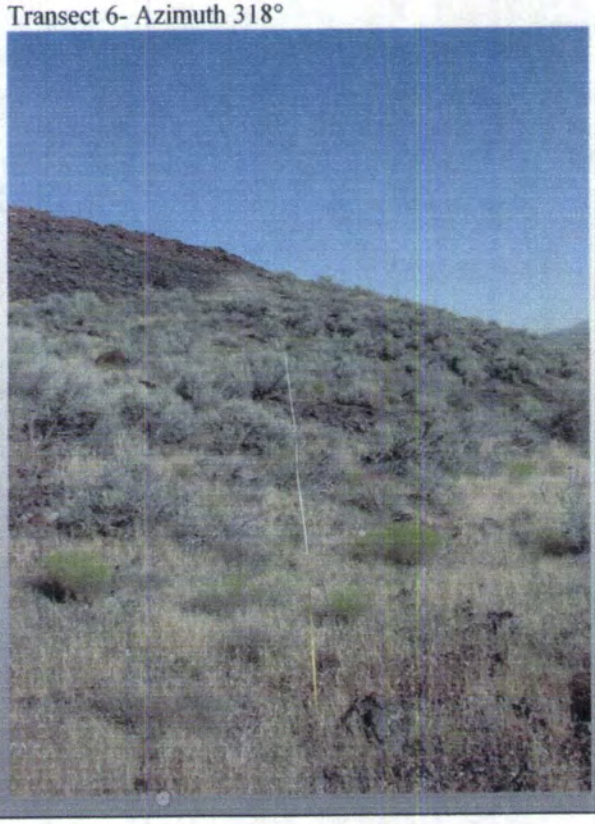
Transect 4- Azimuth [redacted] °



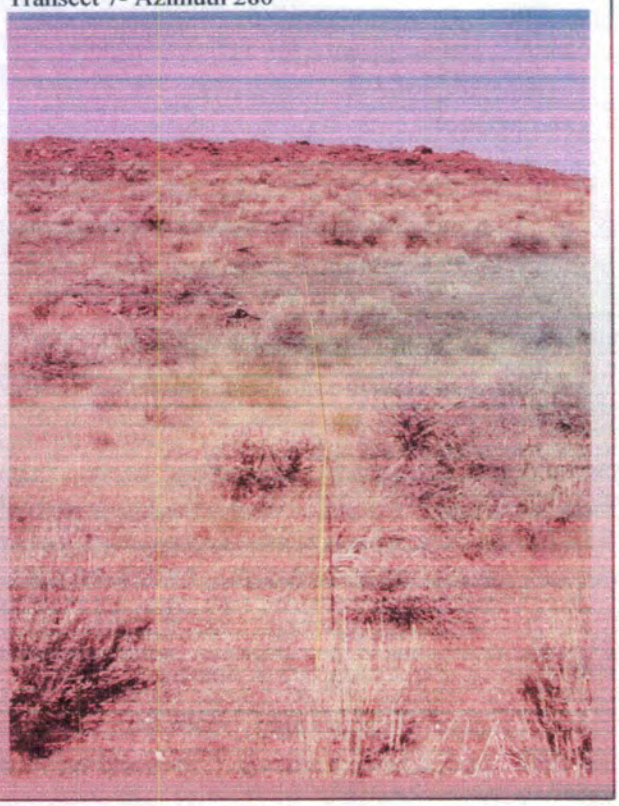
Transect 5- Azimuth350 °



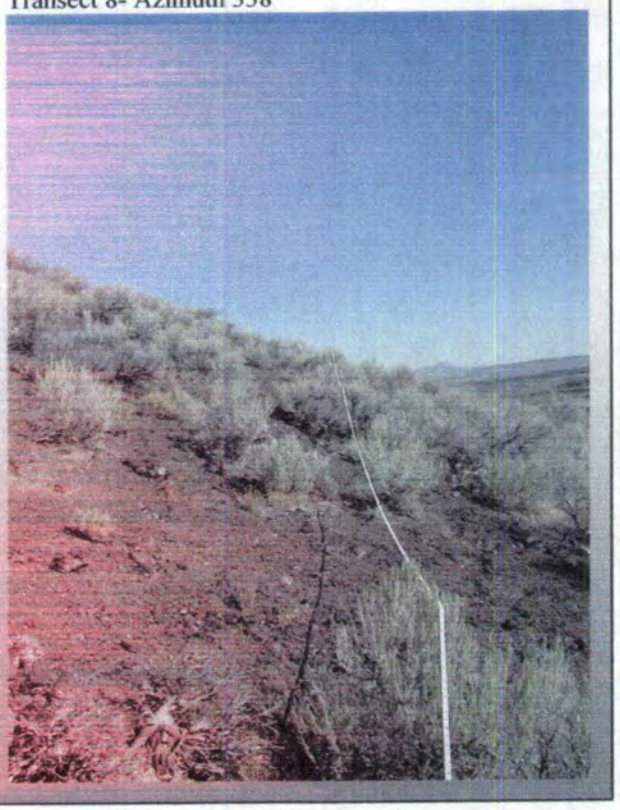
Transect 6- Azimuth 318°



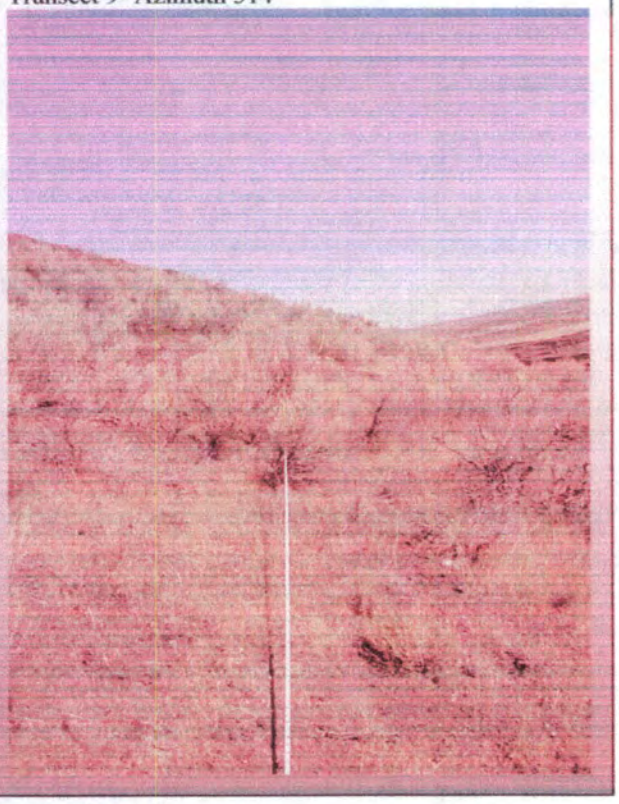
Transect 7- Azimuth 280°



Transect 8- Azimuth 338 °



Transect 9- Azimuth 314°



Transect10- Azimuth 164°

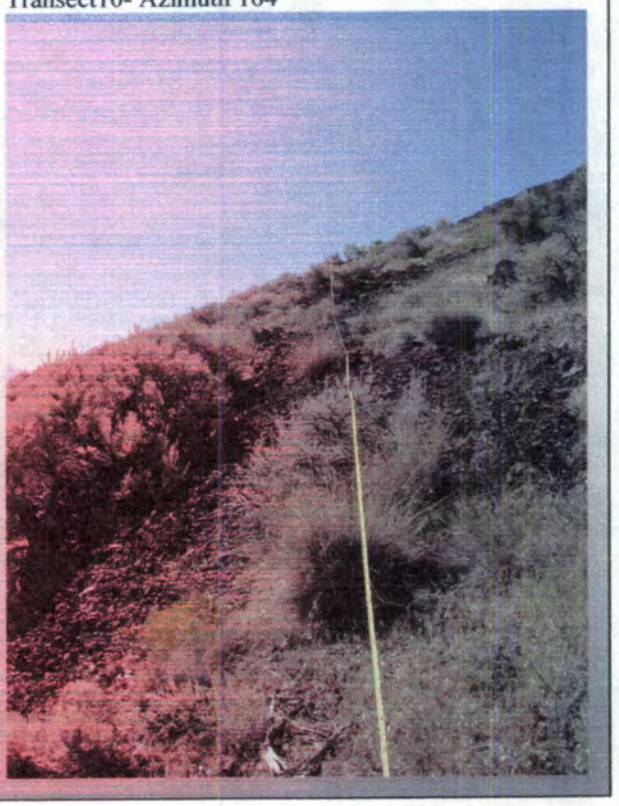


Table 2. An appropriate reclamation seed mix for Red Dome Mine:

Common Name	**Scientific Name**	**Rate (PLS lbs/ acre)**
Grasses		
Sandberg's bluegrass	*Poa secunda*	2
Indian ricegrass	*Oryzopsis hymenoides*	4
Bluebunch wheatgrass	*Pseudoroegneria spicata ssp. spicata*	5
Bottlebrush squirreltail	*Elymus elymoides*	4
Forbs		
Globemallow	*Sphaeralcea coccinea*	0.5
Shrubs		
Rabbitbrush	*Chyrsothamnus nauseosus*	1
Wyoming sagebrush	*Artemisia tridentata var wyomingensis*	1/2
TOTAL		16.5 lbs/ acre

The revegetation requirement for this area is approximately 20.8% total vegetation cover (70% of existing vegetation cover).

Table 3. Vegetation cover at Red Dome Mine

	Scientific Name	Average	St Deviation	St Error	Low	High	Relative Cover	Frequency
Total Vegetation Cover		29.700	8.769	2.773	17.000	44.000		
Total Ground Cover		97.700	3.199	1.012	89.000	100.000		
Bare Soil		2.875	3.357	1.187	1.000	11.000		
Litter		17.800	4.780	1.511	10.000	28.000		
Rock		13.889	13.486	4.495	2.000	43.000		
Gravel		36.900	10.236	3.237	25.000	56.000		
Lichen		3.000			0.000	3.000		
Perennial grasses								
Indian ricegrass	*Oryzopsis hymenoides*	0.600	1.075	0.340	0.000	3.000	0.90	30.00
Sandberg's bluegrass	*Poa sandbergii*	0.100	0.316	0.100	0.000	1.000	0.15	10.00
Sub-total		0.700					1.05	
Annual grasses								
Cheatgrass	*Bromus tectorum*	14.200	9.102	2.878	0.000	27.000	21.39	90.00
Sub-total		14.200					21.39	
Native annual forbs								
Buckwheat	*Eriogonum deflexum*	0.500	0.527	0.167	0.000	1.000	0.75	50.00
Sub-total		0.500					0.75	

	Scientific Name	Average	St Deviation	St Error	Low	High	Relative Cover	Frequency
Introduced annual and biennial forbs								
Halogeton	*Halogeton glomeratus*	0.400	0.966	0.306	0.000	3.000	0.60	20.00
Russian thistle	*Salsola kali*	1.200	1.874	0.593	0.000	5.000	1 81	40.00
Sub-total		1.600					2.41	
Sub-shrubs								
Broom snakeweed	*Gutierrezia sarothrae*	1.300	1.494	0.473	0.000	5.000	1.96	70.00
Sub-total		1.300					1.96	
Shrubs								
Wyoming sagebrush	*Artemisia tridentata var wyomingensis*	10.000	4.714	1.491	0.000	15 000	15 06	90.00
Shadscale	*Atriplex confertifolia*	0.100	0 316	0.100	0.000	1.000	0.15	10.00
Spiny horsebrush	*Tetradymia spinescens*	1.100	1.197	0.379	0.000	3.000	1.66	60.00
Sub-total		11.200					16.87	

Table 4. Scientific and Common Names of Plant Species

Common Name	Scientific Name	Synonyms
Grasses		
Indian ricegrass	*Oryzopsis hymenoides*	*Achnatherum hymenoides*
Bottlebrush squirreltail	*Elymus elymoides*	*Sitanion hystrix*
Nevada bluegrass, Sandberg's bluegrass	*Poa secunda*	*Poa nevadensis, P. sandbergii*
Bluebunch wheatgrass	*Pseudoroegnia spicata ssp spicata*	*Agropyron spicatum*
Needle and thread	*Stipa comata*	*Heterostipa comata*
Forbs		
Gooseberryleaf globemallow	*Sphaeralceagrossulariafolia*	
Scarlet globemallow	*Sphaeralcea coccinea*	
Hood phlox	*Phlox hoodii*	
Penstemon	*Penstemon spp*	
Shrubs		
Douglas rabbitbrush	*Chrysothamnus viscidiflorus*	
Rubber rabbitbrush	*Chrysothamnus nauseosus*	
Winterfat	*Ceratoides lanata*	*Krascheninnikovia lanata*
Mexican cliffrose	*Purshia mexicana*	

Appendix G.
Water Rights Information

Water Rights Information

STATE OF UTAH -- DIVISION OF WATER RIGHTS -- DATA PRINT OUT for 67-1183(A70879)

WATER RIGHT: 67-1183 APPLICATION/CLAIM NO.: A70879 CERT. NO.: CERTIFICAT

OWNERSHIP

NAME: Red Dome Inc.
ADDR: P.O. Box 183
Kanosh UT 84637

DATES, ETC.

LAND OWNED BY APPLICANT? Yes COUNTY TAX ID#:
FILED: 05/05/1997|PRIORITY: 05/05/1997|PUB BEGAN: 05/22/1997|PUB ENDED: 05/29/1997|NEWSPAPER: Millard County Chronicle Progre
ProtestEnd:06/18/1997|PROTESTED: [No]|HEARNG HLD: |SE ACTION: [Approved]|ActionDate:07/17/1997|PROOF DUE: 12/31/2002
EXTENSION: |ELEC/PROOF:[Proof]|ELEC/PROOF:12/12/2002|CERT/WUC: 11/07/2003|LAP, ETC: |LAPS LETTER:
RUSH LETTR: |RENOVATE: |RECON REQ: |TYPE: [ ]

PD BOOK: [67-]|MAP: [ ]|PUB DATE:

Type of Right: Application to Appropriate Source of Info: Certificate Status: Certificate

LOCATION OF WATER RIGHT

FLOW: 0.015 cfs OR 0.45 acre-feet

SOURCE: Underground Water Well

COUNTY: Millard COMMON DESCRIPTION: 3 miles SW of Flowell

POINT OF DIVERSION -- UNDERGROUND:
(1) N 1113 ft W 1728 ft from E4 cor, Sec 26, T 21S, R 6W, SLBM
DIAMETER OF WELL: 6 ins. DEPTH: 80 to ft. YEAR DRILLED: WELL LOG? No WELL ID#: 16197

USES OF WATER RIGHT******** ELU -- Equivalent Livestock Unit (cow, horse, etc.) ******** EDU -- Equivalent Domestic Unit or 1 Family
(The Beneficial Use Amount is the quantity of Use that this Water Right contributes to the Group Total.)

SUPPLEMENTAL GROUP NO. 432187.

OTHER: Office rest rooms in conjunction with mine operations. PERIOD OF USE: 01/01 TO 12/31
Acre Feet Contributed by this Right for this Use: 0.45

###PLACE OF USE:	NORTH WEST QUARTER				NORTH EAST QUARTER				SOUTH WEST QUARTER				SOUTH EAST QUARTER				
	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	
Sec 26 T 21S R 6W SLBM		X															0.0000

**********E N D O F D A T A**********

STATE OF UTAH -- DIVISION OF WATER RIGHTS -- DATA PRINT OUT for 67-866(A52668)

WATER RIGHT: 67-866 APPLICATION/CLAIM NO.: A52668 CERT. NO.: 12551

OWNERSHIP**********

NAME: LaDon J. Anderson
ADDR: Star Route, Box 191
Fillmore UT 84631
INTEREST: 100%

DATES, ETC.**********

LAND OWNED BY APPLICANT? COUNTY TAX ID#:
FILED: 02/16/1979|PRIORITY: 02/16/1979|PUB BEGAN: 05/24/1979|PUB ENDED: |NEWSPAPER:
ProtestEnd: |PROTESTED: [No]|HEARNG HLD: |SE ACTION: [Approved]|ActionDate:08/03/1979|PROOF DUE:
EXTENSION: |ELEC/PROOF:[Proof]|ELEC/PROOF:12/27/1984|CERT/WUC: 06/20/1985|LAP, ETC: |LAPS LETTER:
RUSH LETTR: |RENOVATE: |RECON REQ: |TYPE: [ ]

PD BOOK: [67-]|MAP: [ ]|PUB DATE:

Type of Right: Application to Appropriate Source of Info: Certificate Status: Certificate

LOCATION OF WATER RIGHT**********

FLOW: 0.015 cfs

SOURCE: Underground Water Well

COUNTY: Millard COMMON DESCRIPTION:

POINT OF DIVERSION -- UNDERGROUND:
(1) S 87 ft E 1760 ft from NW cor, Sec 25, T 21S, R 6W, SLBM
DIAMETER OF WELL: 6 ins. DEPTH: 150 to ft. YEAR DRILLED: WELL LOG? No WELL ID#: 1112

USES OF WATER RIGHT******** ELU -- Equivalent Livestock Unit (cow, horse, etc.) ******** EDU -- Equivalent Domestic Unit or 1 Family
(The Beneficial Use Amount is the quantity of Use that this Water Right contributes to the Group Total.)

SUPPLEMENTAL GROUP NO. 433064.

IRRIGATION: 0.25 acres PERIOD OF USE: 04/01 TO 10/31

STOCKWATER: 23.0000 Stock Units PERIOD OF USE: 01/01 TO 12/31

DOMESTIC: 1.0000 EDUs PERIOD OF USE: 01/01 TO 12/31

###PLACE OF USE:	NORTH WEST QUARTER				NORTH EAST QUARTER				SOUTH WEST QUARTER				SOUTH EAST QUARTER				Section
	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	Totals
Sec 25 T 21S R 6W SLBM		0.2500															0.2500
																GROUP ACREAGE TOTAL:	0.2500

PLACE OF USE for STOCKWATERING**********

	NORTH-WEST≈				NORTH-EAST≈				SOUTH-WEST≈				SOUTH-EAST≈			
	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE
Sec 25 T 21S R 6W SLBM		X:														

**********E N D O F D A T A**********

WELLPRT Well Log Information Listing

Version: 2003.09.18.00 Rundate: 10/08/2003 09:34 PM

Utah Division of Water Rights

Water Well Log

LOCATION:
S 87 ft E 1760 ft from NW CORNER of SECTION 25 T 21S R 6W BASE SL Elevation: feet

DRILLER ACTIVITIES:
ACTIVITY # 1 NEW WELL
DRILLER: STEPHENSON DRILLING LICENSE #: 106
START DATE: 05/19/1981 COMPLETION DATE: 05/20/1981

BOREHOLE INFORMATION:

Depth(ft) From	Depth(ft) To	Diameter(in)	Drilling Method	Drilling Fluid
0	150	6.63	ROTARY AIR	

LITHOLOGY:

Depth(ft) From	Depth(ft) To	Lithologic Description	Color	Rock Type
0	9	CLAY		CHALK
9	37	OTHER		LAVA
37	138	CLAY,SAND	BROWN	SANDY CLAY
138	150	WATER-BEARING,OTHER		LAVA

WATER LEVEL DATA:

Date	Time	Water Level (feet) (-)above ground	Status
05/20/1981		70.00	STATIC

CONSTRUCTION - CASING:

Depth(ft) From	Depth(ft) To	Material	Gage(in)	Diameter(in)
1	138	NEW	.280	6

CONSTRUCTION - SCREENS/PERFORATIONS:

Depth(ft) From	Depth(ft) To	Screen(S) or Perforation(P)	Slot/Perf. siz	Screen Diam/Length Perf(in)	Screen Type/# Perf.
130	138	PERFORATION	.375	2	20

CONSTRUCTION - FILTER PACK/ANNULAR SEALS

Depth(ft) From	Depth(ft) To	Material	Amount	Density(pcf)
0	40	CLAY		

WELL TESTS:

Date	Test Method	Yield (CFS)	Drawdown (ft)	Time Pumped (hrs)
05/20/1981	AIR	.067	0	8

Utah Division of Water Rights

WELLPRT Well Log Information Listing

Version: 2003.09.18.00 Rundate: 10/08/2003 08:41 PM

Utah Division of Water Rights

Water Well Log

LOCATION:
N 3911 ft E 864 ft from S4 CORNER of SECTION 36 T 21S R 6W BASE SL Elevation: feet

DRILLER ACTIVITIES:
ACTIVITY # 1 WELL REPLACEMENT
DRILLER: STEPHENSON DRILLING LICENSE #: 106
START DATE: 02/15/1969 COMPLETION DATE: 03/15/1969

BOREHOLE INFORMATION:

Depth(ft) From	Depth(ft) To	Diameter(in)	Drilling Method	Drilling Fluid
0	800	16	CABLE	

LITHOLOGY:

Depth(ft) From	Depth(ft) To	Lithologic Description	Color	Rock Type
1	14	OTHER		
		SURFACE		
14	15	OTHER		LAVA
15	30	CLAY	CHALK	
30	95	CLAY,SILT,SAND		
95	105	SAND		
105	220	CLAY,SAND		STRATIFIED
220	235	CLAY	CHALK	
235	330	CLAY,SILT,SAND	RED	MIXED LAYERS
330	335	WATER-BEARING,SAND		
335	340	CLAY	BLUE	
340	390	CLAY,SAND		
390	405	CLAY,GRAVEL		MIXED
405	415	CLAY	BLUE	
415	418	GRAVEL		
418	435	GRAVEL		CEMENTED
435	438	CLAY		
438	538	CLAY,SAND		MIXED
538	541	GRAVEL		
541	544	OTHER		CONGLOMERATE
544	585	CLAY	CHALK	
585	612	CLAY	PINK	
612	616	OTHER		HARDPAN
616	630	CLAY	PINK	
630	648	CLAY,SAND		
648	652	SAND		
652	657	CLAY		
657	700	GRAVEL		CEMENTED
700	712	CLAY,GRAVEL		CEMENTD GRAVEL
		LAYERS		
712	735	CLAY		
735	800	CLAY,GRAVEL		CEMENTD GRAVEL
		LAYERS		

CONSTRUCTION - CASING:

Depth(ft)	Material	Gage(in)	Diameter(in)

From	To			
1	798		.312	16

CONSTRUCTION - SCREENS/PERFORATIONS:

Depth(ft) From	Depth(ft) To	Screen(S) or Perforation(P)	Slot/Perf. siz	Screen Diam/Length Perf(in)	Screen Type/# Perf.
350	798	PERFORATION	.375	3	MILLS/450

WELL TESTS:

Date	Test Method	Yield (CFS)	Drawdown (ft)	Time Pumped (hrs)
03/15/1969	PUMP	4.011	120	4

GENERAL COMMENTS:

*CONTROL - Well was equipped with cap to control flow.

Utah Division of Water Rights

WELLPRT Well Log Information Listing

Version: 2003.09.18.00 Rundate: 10/08/2003 08:41 PM

Utah Division of Water Rights

Water Well Log

LOCATION:

N 1486 ft E 145 ft from SW CORNER of SECTION 30 T 21S R 5W BASE SL Elevation: feet

DRILLER ACTIVITIES:

ACTIVITY # 1 NEW WELL
DRILLER: STEPHENSON DRILLING LICENSE #: 106
START DATE: 02/15/1969 COMPLETION DATE: 03/15/1969
ACTIVITY # 2 WELL REPAIR
DRILLER: RHODES DRILLING LICENSE #: 257
START DATE: 05/01/2000 COMPLETION DATE: 06/15/2000

BOREHOLE INFORMATION:

Depth(ft) From	Depth(ft) To	Diameter(in)	Drilling Method	Drilling Fluid
0	835	16	CABLE	

LITHOLOGY:

Depth(ft) From	Depth(ft) To	Lithologic Description	Color	Rock Type
1	15	OTHER		
		SURFACE		
15	17	OTHER		LAVA
17	30	CLAY	CHALK	
30	90	CLAY,SAND		STRATIFIED
90	91	OTHER		LAVA SHOWING
91	260	CLAY,SAND		
260	280	CLAY,SAND		LAYERS
280	350	CLAY,SAND,GRAVEL		GRAVEL SHOWING
350	405	CLAY,SAND,GRAVEL		LAYERS
405	415	CLAY	GRAY	
415	425	SAND,GRAVEL		
425	435	CLAY,SAND,GRAVEL		
435	455	CLAY		
455	458	OTHER		HARDPAN
458	482	CLAY		
482	490	GRAVEL		
		GOOD		
490	506	CLAY		
506	512	GRAVEL		
512	532	CLAY		
532	535	OTHER		HARDPAN
535	547	CLAY,GRAVEL	LIGHT COLOR	GRAVEL MIXED
547	552	OTHER		HARDPAN
552	592	CLAY,GRAVEL		MIXED
592	635	CLAY,GRAVEL	RED CLAY	GRAVEL SHOWING
635	640	GRAVEL		
640	665	CLAY		
665	675	CLAY,SAND		
675	682	GRAVEL		
682	695	CLAY		
695	702	SAND,GRAVEL		
702	778	CLAY,SAND,GRAVEL		MIXED

778	830	CLAY	
830	835	GRAVEL	CEMENTED

CONSTRUCTION - CASING:

Depth(ft) From	Depth(ft) To	Material	Gage(in)	Diameter(in)
1	830	NEW	.312	16

CONSTRUCTION - SCREENS/PERFORATIONS:

Depth(ft) From	Depth(ft) To	Screen(S) or Perforation(P)	Slot/Perf. siz	Screen Diam/Length Perf(in)	Screen Type/# Perf.
350	830	PERFORATION	.375	3	MILLS/800

WELL TESTS:

Date	Test Method	Yield (CFS)	Drawdown (ft)	Time Pumped (hrs)
03/15/1969	PUMP	2.451	150	8

GENERAL COMMENTS:

*CONTROL - Well was equipped with cap to control flow.
*WELL LOG RECEIVED FOR REPAIR ON 7-7-2000
Start 5-1-2000 Completed: 6-15-2000
Use: Irrigation
BOREHOLE
0 to 835' Diameter: OD 16" Method: Cable tool 4-1969 Fluid: water
0 to 202' Diameter: OD 14" Method: Liner Installed
202 to 208' Diameter: OD 12" Method: Liner at bottom of 14"
Outside Diameter with packer
WELL LOG
This well was drilled 4-1969 Rhodes Drilling set 14" liner to 202 feet
to repair broken hole at 152 to 154 feet. Reduced to 12" with 14 to
12" Bell reduced to get through broken place at 152 to 154 feet.
Also formation packer installed @ 204 feet.
WATER LEVEL
6-7-2000
Flowing: yes
Point of measurement: ground level
CASING
0 to 835' Wall thick: .250
0 to 202' Type: A53B Wall thick: .312 Nom. Diameter: 14" OD
202 to 208 Type: A53B Wall thick: .375 Nom. Diameter: 12" ID
PERF
350 to 830' no data
Well Head Configuration: no data
Access Port Provided: no
Casing joint type: Welded
Perforator used: Mills
WELL TESTS
Date: 1969 Method: Test pump Yield: 1800 gpm Drawdown: 140
Time pumped: 24 hr.
PUMP
Description: Western Head 10" Column
Horsepower: 75
Pump intake depth: 140 ft.
Approx pumping rate: 1200 gpm
Well disinfected on completion: no
COMMENTS
14" Outside diameter casing installed to repair broken hole at 152
to 154 feet, with 14 to 12" reduced & 6 feet of 12" used to get
through the broken hole. Formation packer installed at 204 feet.
Additional data not available.

WELL DRILLER'S REPORT
State of Utah
Division of Water Rights

For additional space, use "Additional Well Data Form" and attach

Well Identification

Water Right: 67-13 WIN: 905

Owner *Note any changes*

LaDon J. Anderson
5745 West 200 South
Star Route Box 191B
Fillmore, UT 84631

Contact Person/Engineer: _____

Well Location *Note any changes*

S 1013 W 1948 from the NE corner of section 36, Township 21S, Range 6W, SL B&M

Location Description: (address, proximity to buildings, landmarks, ground elevation,local well #)

Drillers Activity Start Date: 3-22-11 Completion Date: 4-16-2011

Check all that apply: ☐ New ☒ Repair ☐ Deepen ☐ Clean ☐ Replace ☐ Public Nature of Use: _____

If a replacement well, provide location of new well. _____ feet north/south and _____ feet east/west of the existing well.

DEPTH (feet) FROM	TO	BOREHOLE DIAMETER (in)	DRILLING METHOD	DRILLING FLUID
0	200	14"	existing w 14 x 10 reducer	
200	400	10"	over burden casing driver	air foam
400	550	8"	rotary air	foam

Well Log

DEPTH (feet) FROM	TO	WATER	PERMEABLE High	PERMEABLE Low	UNCONSOLIDATED CLAY	SILT	SAND	GRAVEL	COBBLES	BOULDER	OTHER	CONSOLIDATED ROCK TYPE	COLOR	DESCRIPTION AND REMARKS (e.g., relative %, grain size, sorting, angularity, bedding, grain composition density, plasticity, shape, cementation, consistancy, water bearing, odor, fracturing, minerology, texture,degree of weathering, hardness, water quality, etc.)
0	550													cleaned old well, Sand & clay

RECEIVED
MAY 05 2011
WATER RIGHTS
SALT LAKE

Static Water Level

Date 4-16-2011 Water Level 0 feet Flowing? ☒ Yes ☐ No

Method of Water Level Measurement none If Flowing, Capped Pressure NA PSI

Point to Which Water Level Measurement was Referenced TOC Elevation _____

Height of Water Level reference point above ground surface 0 feet Temperature _____ degrees ☐ C ☐ F

SCANNED

Construction Information

DEPTH (feet) FROM	TO	CASING: CASING TYPE AND MATERIAL/GRADE	WALL THICK (in)	NOMINAL DIAM. (in)
200	400	8" steel (New)	.25	
		Repair		

DEPTH (feet) FROM	TO	☐SCREEN ☐PERFORATIONS ☒OPEN BOTTOM: SCREEN SLOT SIZE OR PERF SIZE (in)	SCREEN DIAM. OR PERF LENGTH (in)	SCREEN TYPE OR NUMBER PERF (per round/interval)
		Ø	Ø	Ø

Well Head Configuration: NA Access Port Provided? ☐Yes ☑No

Casing Joint Type: Welded Perforator Used: NA

Was a Surface Seal Installed? ☐Yes ☑No Depth of Surface Seal: NA feet Drive Shoe? ☑Yes ☐No

Surface Seal Material Placement Method: NA

Was a temporary surface casing used? ☐Yes ☑No If yes, depth of casing: _____ feet diameter: _____ inches

DEPTH (feet) FROM	TO	SURFACE SEAL / INTERVAL SEAL / FILTER PACK / PACKER INFORMATION: SEAL MATERIAL, FILTER PACK and PACKER TYPE and DESCRIPTION	**Quantity** of Material Used (if applicable)	GROUT DENSITY (lbs./gal., # bag mix, gal./sack etc.)
		existing well		

Well Development and Well Yield Test Information

DATE	METHOD	YIELD	Units Check One GPM	CFS	DRAWDOWN (ft)	TIME PUMPED (hrs & min)
	NA					

Pump (Permanent)

Pump Description: line shaft pump Horsepower: 75 Pump Intake Depth: 160 feet

Approximate Maximum Pumping Rate: _____ Well Disinfected upon Completion? ☐Yes ☑No

Comments

Description of construction activity, additional materials used, problems encountered, extraordinary Circumstances, abandonment procedures. *Use additional well data form for more space.*

old casing is in bad shape w/ holes thru-out this is a temporary fix, the well will need abandon and replace the next time it has problems

Well Driller Statement

This well was drilled and constructed under my supervision, according to applicable rules and regulations, and this report is complete and correct to the best of my knowledge and belief.

Name SHUMWAY EXPLORATION (Person, Firm, or Corporation - Print or Type) License No. 619

Signature _____ (Licensed Well Driller) Date 4-16-2011

WELLPRT Well Log Information Listing

Version: 2003.09.18.00 Rundate: 10/08/2003 09:34 PM

Utah Division of Water Rights

Water Well Log

LOCATION:
S 87 ft E 1760 ft from NW CORNER of SECTION 25 T 21S R 6W BASE SL Elevation: feet

DRILLER ACTIVITIES:
ACTIVITY # 1 NEW WELL
DRILLER: STEPHENSON DRILLING LICENSE #: 106
START DATE: 05/19/1981 COMPLETION DATE: 05/20/1981

BOREHOLE INFORMATION:

Depth(ft) From	Depth(ft) To	Diameter(in)	Drilling Method	Drilling Fluid
0	150	6.63	ROTARY AIR	

LITHOLOGY:

Depth(ft) From	Depth(ft) To	Lithologic Description	Color	Rock Type
0	9	CLAY		CHALK
9	37	OTHER		LAVA
37	138	CLAY,SAND	BROWN	SANDY CLAY
138	150	WATER-BEARING,OTHER		LAVA

WATER LEVEL DATA:

Date	Time	Water Level (feet) (-)above ground	Status
05/20/1981		70.00	STATIC

CONSTRUCTION - CASING:

Depth(ft) From	Depth(ft) To	Material	Gage(in)	Diameter(in)
1	138	NEW	.280	6

CONSTRUCTION - SCREENS/PERFORATIONS:

Depth(ft) From	Depth(ft) To	Screen(S) or Perforation(P)	Slot/Perf. siz	Screen Diam/Length Perf(in)	Screen Type/# Perf.
130	138	PERFORATION	.375	2	20

CONSTRUCTION - FILTER PACK/ANNULAR SEALS

Depth(ft) From	Depth(ft) To	Material	Amount	Density(pcf)
0	40	CLAY		

WELL TESTS:

Date	Test Method	Yield (CFS)	Drawdown (ft)	Time Pumped (hrs)
05/20/1981	AIR	.067	0	8

Form 113—594—12-60

Examined ... 20 ... DW

Recorded: B. C. ____ T. B. ____

Inspection Sheet ____

Copied ____

REPORT OF WELL DRILLER

STATE OF UTAH

Application No. 52668 (67-866)

Claim No. ____

Coordinate No. (C-21S-6W)25 bab

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) WELL OWNER:

Name: Ladon Anderson Star Route Box 191B

Address: Fillmore, Utah 84631

(2) LOCATION OF WELL:

County: Millard — Ground Water Basin (leave blank) ____

~~North~~ South 200 feet, East ~~West~~ 1800 feet from NW Corner of Section 25, T. 21 S, R. 6 W, SLBM (strike out words not needed)

(3) NATURE OF WORK (check): New Well ☒ Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐

If abandonment, describe material and procedure: ____

(4) NATURE OF USE (check): Domestic ☒ Industrial ☐ Municipal ☐ Stockwater ☒ Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check): Rotary Air ☒ Dug ☐ Jetted ☐ Cable ☐ Driven ☐ Bored ☐

(6) CASING SCHEDULE: Threaded ☐ Welded ☒

6" Diam. from 1 feet to 138 feet Gage .280

____" Diam. from ____ feet to ____ feet Gage ____

____" Diam. from ____ feet to ____ feet Gage ____

New ☒ Reject ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☒ No ☐

Type of perforator used ____

Size of perforations 3/8 inches by 2 inches

20 perforations from 130 feet to 138 feet

____ perforations from ____ feet to ____ feet

____ perforations from ____ feet to ____ feet

____ perforations from ____ feet to ____ feet

____ perforations from ____ feet to ____ feet

(8) SCREENS: Well screen installed? Yes ☐ No ☐

Manufacturer's Name ____

Type ____ Model No. ____

Diam. ____ Slot size ____ Set from ____ ft. to ____

Diam. ____ Slot size ____ Set from ____ ft. to ____

(9) CONSTRUCTION:

Was well gravel packed? Yes ☐ No ☐ Size of gravel: ____

Gravel placed from ____ feet to ____ feet

Was a surface seal provided? Yes ☒ No ☐

To what depth? 40 feet

Material used in seal: Clay

Did any strata contain unusable water? Yes ☐ No ☐

Type of water: ____ Depth of strata ____

Method of sealing strata off: ____

Was surface casing used? Yes ☐ No ☒

Was it cemented in place? Yes ☐ No ☐

(10) WATER LEVELS:

Static level 70 feet below land surface Date May 20 81

Artesian pressure ____ feet above land surface Date ____

LOG RECEIVED:

RECEIVED
MAY 27 1981
WATER RIGHTS

(11) FLOWING WELL:

Controlled by (check) Valve ☐ Cap ☐ Plug ☐ No Control ☐

Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.

Was a pump test made? Yes ☐ No ☐ If so, by whom? ____

Yield: ____ gal./min. with ____ feet drawdown after ____ hours

" ____ " ____ " ____

" ____ " ____ " ____

~~Bailer~~ Air test 30 gal./min. with — feet drawdown after 8 hours

Artesian flow ____ g.p.m. Date ____

Temperature of water ____ Was a chemical analysis made? No ☐ Yes ☐

(13) WELL LOG: Diameter of well 6 5/8 inches

Depth drilled 150 feet. Depth of completed well 150 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

DEPTH From	DEPTH To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	REMARKS
0	9	X										Chalk
9	37											Lava
37	138	X		X								Brown sandy clay
138	150											Lava - water

Work started May 19, 1981 Completed May 20, 1981

(14) PUMP:

Manufacturer's Name ____

Type: ____ H. P. ____

Depth to pump or bowles ____ feet

Well Driller's Statement:

This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

Name Scott Stephenson Drilling (Person, firm, or corporation) (Type or print)

Address Box 141 Fillmore, Utah 84631

(Signed) Scott Stephenson (Well Driller)

License No. 106 Date May 20, 1981

USE OTHER SIDE FOR ADDITIONAL REMARKS

WELLPRT Well Log Information Listing

Version: 2003.09.18.00 Rundate: 10/08/2003 09:37 PM

Utah Division of Water Rights

Water Well Log

LOCATION:
N 544 ft E 4523 ft from SW CORNER of SECTION 24 T 21S R 6W BASE SL Elevation: feet

DRILLER ACTIVITIES:
ACTIVITY # 1 WELL REPLACEMENT
DRILLER: STEPHENSON DRILLING LICENSE #: 106
START DATE: 12/13/1976 COMPLETION DATE: 12/18/1976

BOREHOLE INFORMATION:

Depth(ft) From	Depth(ft) To	Diameter(in)	Drilling Method	Drilling Fluid
0	162	12	CABLE	

LITHOLOGY:

Depth(ft) From	Depth(ft) To	Lithologic Description	Color	Rock Type
0	3	CLAY,OTHER		LOAM
3	45	CLAY	GRAY	
45	75	CLAY	RED	
75	92	WATER-BEARING,CLAY,SAND WATER 75'	PINK CLAY	
92	113	CLAY,OTHER		LAVA
113	116	CLAY,GRAVEL,OTHER		LAVA
116	121	CLAY,OTHER		LAVA
121	125	OTHER		LAVA HARD
125	162	WATER-BEARING,CLAY,GRAVEL,OTHER LAVA TRACTARED WITH CLAY AND GRAVEL. WATER POOR.		LAVA

WATER LEVEL DATA:

Date	Time	Water Level (feet) (-)above ground	Status
12/18/1976		31.00	STATIC

CONSTRUCTION - CASING:

Depth(ft) From	Depth(ft) To	Material	Gage(in)	Diameter(in)
0	162	NEW		12

WELL DRILLER'S REPORT
State of Utah
Division of Water Rights

pg 1 of 2

For additional space, use "Additional Well Data Form" and attach

Well Identification

Water Right: 67-247 WIN: 434883

Owner *Note any changes*

LaDon J. Anderson
5745 West 200 South
Star Route Box 191B
Fillmore, UT 84631

Contact Person/Engineer: _____

Well Location *Note any changes*

S 993 W 2048 from the NE corner of section 36, Township 21S, Range 6W, SL B&M

S 809.47 Ft and West 138.19 Ft from E4 corner of section 25 TS 21South Range 6 west SL Bsm

Location Description: (address, proximity to buildings, landmarks, ground elevation, local well #)

Drillers Activity Start Date: 6-20-2011 Completion Date: 8-16-2011

Check all that apply: ☐ New ☐ Repair ☐ Deepen ☐ Clean ☒ Replace ☐ Public Nature of Use: irrigation

If a replacement well, provide location of new well. _____ feet north/south and _____ feet east/west of the existing well.

DEPTH (feet) FROM	TO	BOREHOLE DIAMETER (in)	DRILLING METHOD	DRILLING FLUID
0	825	19"	Rotary	Bentonite

Well Log

DEPTH (feet) FROM	TO	WATER	PERMEABLE High	PERMEABLE Low	UNCONSOLIDATED CLAY	SILT	SAND	GRAVEL	COBBLES	BOULDER	OTHER	CONSOLIDATED ROCK TYPE	COLOR	DESCRIPTION AND REMARKS (e.g., relative %, grain size, sorting, angularity, bedding, grain composition density, plasticity, shape, cementation, consistancy, water bearing, odor, fracturing, minerology, texture, degree of weathering, hardness, water quality, etc.)
0	75				X	X	X						Grey	Sticky clay, some cinders
75	100				X		X						Lt Green	clay
100	115				X								Lt Brown	clay
115	125	X	X					X					brown	small fine gravel
125	175				X								Red/blue	clay
175	181	X	X					X					Red	small gravel
181	287				X								red	red clay, wht, clay, sticky clay
287	288									X			red	large boulder
288	364				X		X						red	clay & some streaks of sand
364	368		X					X					red	medium size gravel

RECEIVED
AUG 31 2011 AM
WATER RIGHTS
SALT LAKE

Static Water Level

Date 8-16-2011 Water Level 10 feet Flowing? ☐ Yes ☒ No

Method of Water Level Measurement Sounder If Flowing, Capped Pressure _____ PSI

Point to Which Water Level Measurement was Referenced 2 Feet above ground Elevation _____

Height of Water Level reference point above ground surface 2 feet Temperature _____ degrees ☐ C ☐ F

[redacted] *Well Log* [redacted]

Construction Information

DEPTH (feet) FROM	TO	CASING TYPE AND MATERIAL/GRADE	WALL THICK (in)	NOMINAL DIAM. (in)
0	500	steel	.25	14"
500	825	steel	.25	12"

DEPTH (feet) FROM	TO	☐SCREEN ☑PERFORATIONS ☑OPEN BOTTOM SCREEN SLOT SIZE OR PERF SIZE (in)	SCREEN DIAM. OR PERF LENGTH (in)	SCREEN TYPE OR NUMBER PERF (per round/interval)
300	500	.25	4"	6 per round
500	825	.25	4"	6 per round

Well Head Configuration: Flat plate for shaft driven pump Access Port Provided? ☐Yes ☑No

Casing Joint Type: welded Perforator Used: Factory

Was a Surface Seal Installed? ☑Yes ☐No Depth of Surface Seal: 30 feet Drive Shoe? ☐Yes ☑No

Surface Seal Material Placement Method: tremie

Was a temporary surface casing used? ☑Yes ☐No If yes, depth of casing: 20 feet diameter: 20 inches

SURFACE SEAL / INTERVAL SEAL / FILTER PACK / PACKER INFORMATION

DEPTH (feet) FROM	TO	SEAL MATERIAL, FILTER PACK and PACKER TYPE and DESCRIPTION	Quantity of Material Used (if applicable)	GROUT DENSITY (lbs./gal., # bag mix, gal./sack etc.)
0	30	Neat cement Type 1	27 bags	6 gallons per bag

Well Development and Well Yield Test Information

DATE	METHOD	YIELD	Units Check One GPM	Units Check One CFS	DRAWDOWN (ft)	TIME PUMPED (hrs & min)
8-16-2011	pumped	1350	✓		76.6	12 hrs

Pump (Permanent)

Pump Description: line Shaft Horsepower: 75 Pump Intake Depth: 200 feet

Approximate Maximum Pumping Rate: 1350 Well Disinfected upon Completion? ☐Yes ☑No

Comments

Description of construction activity, additional materials used, problems encountered, extraordinary Circumstances, abandonment procedures. *Use additional well data form for more space.*

Well Driller Statement

This well was drilled and constructed under my supervision, according to applicable rules and regulations, and this report is complete and correct to the best of my knowledge and belief.

Name SHUMWAY EXPLORATION (Person, Firm, or Corporation - Print or Type) License No. 619

Signature (Licensed Well Driller) Date 8-17-2011

WELL DRILLER'S REPORT ADDTIONAL DATA FORM
State of Utah
Division of Water Rights

Well Identification

Water Right: 67-247

Owner *Note any changes*

LaDon J. Anderson
5745 West 200 South
Star Route Box 191B
Fillmore, UT 84631

Contact Person/Engineer: _____

Well Location *Note any changes*

S 993 W 2048 from the NE corner of section 36, Township 21S, Range 6W, SL B&M

S 809.47 Ft and West 138.19 Ft from E4 corner of section 25, TS 21S range 6West SL b&M

Location Description: (address, proximity to buildings, landmarks, ground elevation,local well #)

Well Log

DEPTH (feet) FROM	TO	WATER	PERMEABLE High	PERMEABLE Low	UNCONSOLIDATED CLAY	SILT	SAND	GRAVEL	COBBLES	BOULDER	OTHER	CONSOLIDATED ROCK TYPE	COLOR	DESCRIPTION AND REMARKS (e.g., relative %, grain size, sorting, angularity, bedding, grain composition density, plasticity, shape, cementation, consistancy, water bearing, odor, fracturing, minerology, texture,degree of weathering, hardness, water quality, etc.)
368	~~400~~ 396				X		X			X			Lt brown	streaks of clay with sandstone boulders
396	400	X	X					X					Lt brown	good gravel w/ good water
404	473				X		X	X					Lt brown	mostly clay, one hard spot @ 431-433' Lava?
473	530				X								red clay	sticky w/ hard streaks
530	536								X				red	large cobble
536	570				X				X				red	cobble w/ clay
570	600				X				X				grey, blue	clay w/ cobbles
600	630				X								grey	slow drilling sticky clay
630	635						X	X					multi	small gravel, sand
635	675				X								grey	clay
675	724	X	X				X	X		X			multi	good gravel, small boulders, sand
724	730				X								red	sticky clay
730	803	X	X		X		X	X					multi	almost all was gravel, some small streaks of clay
803	825				X								red	clay

RECEIVED
AUG 31 2011
WATER RIGHTS
SALT LAKE

WELL DRILLER'S REPORT
State of Utah
Division of Water Rights

For additional space, use "Additional Well Data Form" and attach

Well Identification

Change Application: a42703 (67-1779) WIN: 441533

Owner *Note any changes*

Michael LaDon and Amber Lee Anderson
5745 West 200 South
Fillmore, UT 84631

Contact Person/Engineer: _____

Well Location *Note any changes*

S 170 W 270 from the E4 corner of section 25, Township 21S, Range 6W, SL B&M

Location Description: (address, proximity to buildings, landmarks, ground elevation,local well #)

Drillers Activity Start Date: 1-18-18 Completion Date: 1-22-18

Check all that apply: ☒ New ☐ Repair ☐ Deepen ☐ Clean ☐ Replace ☐ Public Nature of Use: _____

If a replacement well, provide location of new well. _____ feet north/south and _____ feet east/west of the existing well.

DEPTH (feet) FROM	TO	BOREHOLE DIAMETER (in)	DRILLING METHOD	DRILLING FLUID
0	307	12¼	Mud rotary	Bentonite

Well Log

DEPTH (feet) FROM	TO	WATER	PERMEABLE High	PERMEABLE Low	UNCONSOLIDATED CLAY	SILT	SAND	GRAVEL	COBBLES	BOULDER	OTHER	CONSOLIDATED ROCK TYPE	COLOR	DESCRIPTION AND REMARKS (e.g., relative %, grain size, sorting, angularity, bedding, grain composition density, plasticity, shape, cementation, consistancy, water bearing, odor, fracturing, minerology, texture,degree of weathering, hardness, water quality, etc.)
0	6				X								Brown	streak of lava @ 6' -Black
6	12				X								white	streak of lava @ 12' Black
12	75				X								Red	Gummy
75	95				X								white	Gummy
95	115						X	X						Medium sized gravel
115	120						X						Red	
120	138				X								Red	Gummy
138	142						X	X						small gravel
142	160				X		X	X					Red	Gummy Clay with sand streaks and very small gravel stre
160	182				X								Green	Gummy

RECEIVED
FEB 12 2018
WATER RIGHTS SALT LAKE

Static Water Level

Date 1-22-18 Water Level 35 feet Flowing? ☐ Yes ☒ No

Method of Water Level Measurement Tape tape If Flowing, Capped Pressure _____ PSI

Point to Which Water Level Measurement was Referenced TOC Elevation _____

Height of Water Level reference point above ground surface 2.5 feet Temperature _____ degrees ☐ C ☐ F

Construction Information

DEPTH (feet) FROM	TO	CASING: CASING TYPE AND MATERIAL/GRADE	WALL THICK (in)	NOMINAL DIAM. (in)
+2.5	17.5	steel	.250	6"
17.5	200	SDR-17		6"
300	302	SDR-17		6"

DEPTH (feet) FROM	TO	☑ SCREEN ☐ PERFORATIONS ☐ OPEN BOTTOM: SCREEN SLOT SIZE OR PERF SIZE (in)	SCREEN DIAM. OR PERF LENGTH (in)	SCREEN TYPE OR NUMBER PERF (per round/interval)
200	300	.032		

Well Head Configuration: Water tight Cap — Access Port Provided? ☐ Yes ☑ No

Casing Joint Type: Splice — Perforator Used: ____

Was a Surface Seal Installed? ☑ Yes ☐ No — Depth of Surface Seal: 35 feet — Drive Shoe? ☐ Yes ☑ No

Surface Seal Material Placement Method: top to bottom

Was a temporary surface casing used? ☐ Yes ☒ No If yes, depth of casing: ____ feet diameter: ____ inches

DEPTH (feet) FROM	TO	SURFACE SEAL / INTERVAL SEAL / FILTER PACK / PACKER INFORMATION: SEAL MATERIAL, FILTER PACK and PACKER TYPE and DESCRIPTION	**Quantity** of Material Used (if applicable)	GROUT DENSITY (lbs./gal., # bag mix, gal./sack etc.)
0	35	Bentonite	30 bags	50 lbs
35	302	3/8" washed gravel	10 yds	
275	302	Bentonite Seal inside of casing	5 buckets	50 lbs

Well Development and Well Yield Test Information

DATE	METHOD	YIELD	Units Check One GPM	Units Check One CFS	DRAWDOWN (ft)	TIME PUMPED (hrs & min)
1-22-18	Air Lift	50	X		120	7 hrs

Pump (Permanent)

Pump Description: N/A — Horsepower: ____ Pump Intake Depth: ____ feet

Approximate Maximum Pumping Rate: ____ Well Disinfected upon Completion? ☒ Yes ☐ No

Comments

Description of construction activity, additional materials used, problems encountered, extraordinary Circumstances, abandonment procedures. *Use additional well data form for more space.*

well still was producing a little bit of sand when working

Has a plug Bentonite Plug at 275' down to the bottom

RECEIVED
FEB 12 2018
WATER RIGHTS
SALT LAKE

Well Driller Statement

This well was drilled and constructed under my supervision, according to applicable rules and regulations, and this report is complete and correct to the best of my knowledge and belief.

Name SHUMWAY EXPLORATION (Person, Firm, or Corporation - Print or Type) — **License No.** 619

Signature ____ (Licensed Well Driller) — **Date** 2-8-2018

WELL DRILLER'S REPORT ADDTIONAL DATA FORM
State of Utah
Division of Water Rights

Well Identification

Change Application: a42703 (67-1779)

Owner *Note any changes*

Michael LaDon and Amber Lee Anderson
5745 West 200 South
Fillmore, UT 84631

Contact Person/Engineer: _____

Well Location *Note any changes*

S 170 W 270 from the E4 corner of section 25, Township 21S, Range 6W, SL B&M

Location Description: (address, proximity to buildings, landmarks, ground elevation,local well #)

Well Log

DEPTH (feet) FROM	TO	WATER	PERMEABLE High	PERMEABLE Low	UNCONSOLIDATED CLAY	SILT	SAND	GRAVEL	COBBLES	BOULDER	OTHER	CONSOLIDATED ROCK TYPE	COLOR	DESCRIPTION AND REMARKS (e.g., relative %, grain size, sorting, angularity, bedding, grain composition density, plasticity, shape, cementation, consistancy, water bearing, odor, fracturing, minerology, texture,degree of weathering, hardness, water quality, etc.)
182	190						X	X						small gravel
190	210				X								Red	Gumy
210	218						X	X						small gravel
218	240				X								Red	Really Sticky
240	250				X								Red	Dry Clay
250	260				X								Red	Really Sticky
260	261						X	X						
261	270				X		X						Red	Sticky clay with sand streaks
270	307				X		X	X					Red	Sticky clay with sand streaks and small gravel

RECEIVED
FEB 12 2018
WATER RIGHTS
SALT LAKE

Construction Information (con't)

DEPTH (feet)		CASING			DEPTH (feet)		☐ SCREEN ☐ PERFORATIONS ☐ OPEN BOTTOM		
FROM	TO	CASING TYPE AND MATERIAL/GRADE	WALL THICK (in)	NOMINAL DIAM. (in)	FROM	TO	SCREEN SLOT SIZE OR PERF SIZE (in)	SCREEN DIAM. OR PERF LENGTH (in)	SCREEN TYPE OR NUMBER PERF (per round/interval)

DEPTH (feet)		SURFACE SEAL / INTERVAL SEAL / FILTER PACK / PACKER INFORMATION		
FROM	TO	SEAL MATERIAL, FILTER PACK and PACKER TYPE and DESCRIPTION	**Quantity** of Material Used (if applicable)	GROUT DENSITY (lbs./gal., # bag mix, gal./sack etc.)

Comments (con't)

RECEIVED
FEB 12 2018
WATER RIGHTS
SALT LAKE

Well Driller Statement

This well was drilled and constructed under my supervision, according to applicable rules and regulations, and this report is complete and correct to the best of my knowledge and belief.

Name SHUMWAY EXPLORATION (Person, Firm, or Corporation - Print or Type) **License No.** 619

Signature _____ (Licensed Well Driller) **Date** 2-8-2018

Appendix H.
Lava Rock Characteristics

GSH Materials Testing & Inspection Inc.

LABORATORY TEST RESULTS

Project: Red Dome Lava
Project No.: 3157-01M-20
Client: Red Dome
Source: Red Dome
Description: 1½" Gravel (Lava Rock) with Sand

Laboratory No.: M20-09-07
Sample Date: 9/8/2020
Sample Location: Red Dome
Sampled By: Red Dome
Specification Section: UDOT LT WT Pit Run

Designation	Standard Test Method		Result	Specification
ASTM D1557 AASHTO T180	Modified Proctor	Max Density, lbs/ft³	72.1	
		Optimum Moisture %	18.0	
ASTM C29 AASHTO T19	Bulk Density and Voids	Bulk Density of Aggregate lbs/ft³	39	
		Voids in Aggregate Percent %	56.6	
ASTM D4318 AASHTO T89/90	Liquid Limit	Liquid Limit	Non Plastic	
	Plastic Limit	Plastic Limit	Non Plastic	
	Plasticity Index	Plasticity Index	Non Plastic	
ASTM C127 AASHTO T85	Bulk Specific Gravity	Bulk Specific Gravity (Oven Dry)	1.448	
		Specific Gravity (SSD)	1.726	
		Apparent Specific Gravity	2.007	
		Absorption %	19.2	

ASTM C136 AASHTO T27	Sieve Analysis of Fine and Coarse Aggregates		Definitions of Gravel, Sand & Silt-Clay		Classifications of Soils and Soil Aggregate Mixtures
			ASTM D2487	AASHTO M145	AASHTO M145
Sieve Size	Percent Passing	Specification	BOULDERS / COBBLE	BOULDERS / COBBLE	A-1-a
100 mm (4")	100				
75.0 mm (3")	100		COARSE GRAVEL	GRAVEL	Classification of Soils (Unified Soil Classification System)
50.0 mm (2")	100	100			
37.5mm (1 ½")	97				ASTM D2487
25.0 mm (1")	94	80-100			Group Symbol
19.0 mm (¾")	88				
12.5 mm (½")	73		FINE GRAVEL		SP
9.5 mm (3/8")	58	40-100			
4.75 mm (No.4)	23	10-70			Group Name
2.36mm (No.8)	17		COARSE SAND		Poorly graded Gravel with Sand
2.00 mm (No.10)	17				
1.18 mm (No.16)	15	0-40	MEDIUM SAND	COARSE SAND	AASHTO ACCREDITED
0.600 mm (No.30)	13				
0.425 mm (No.40)	12			FINE SAND	
0.300 mm (No.50)	11	0-25	FINE SAND		
0.150 mm (No.100)	7				
0.075 mm (No. 200)	3.8	0-15			
Material Finer than .075 mm (No. 200)			SILT Plasticity Index > 4	SILT Plasticity Index ≥ 10	Performed By: Robert Tripp
ASTM C136 AASHTO T27	Moisture Content when Received	0.0	CLAY Plasticity Index ≤ 4	CLAY Plasticity Index ≤ 11	Reviewed By: Ken Lobato

GSH Materials Testing & Inspection Inc.

Bulk Density ("Unit Weight") and Voids in Aggregate
AASHTO T19 ASTM C29

AASHTO ACCREDITED

Project: Red Dome Lava
Project No: 3157-01M-20
Material Source: Red Dome
Sample Description: 1½" Gravel (Lava Rock) with Sand
Sample Location: Red Dome

Use: LT WT Fill
Specification: UDOT LT WT Pit Run
Lab No.: M20-09-36
Date: 9/23/2020
Procedure: Shoveling Procedure

Nominal Maximum Size of Aggregate: 1½

Volume of Measure (*V*): 0.25

Capacity of Measure: 0.25ft³

Calibration Date: 9/23/2020

Bulk Specific Gravity of the Aggregate (*S*): 1.448
(AASHTO T85 ASTM C127)

Mass of the Measure, lbs (*T*): 7.63

Trial No.:	1	2	3	4	5	AVG
Mass of Measure and Aggregate, lbs:	17.48	17.35	17.46	17.43	17.39	17.4
Mass of the Aggregate, lbs (*G-T*):	9.9	9.7	9.8	9.8	9.8	9.8

Calcualations:

Bulk Density (*M*) = (G - T) / V

$$\text{Voids \%} = \frac{100\,[(S \times W) - M]}{S \times W}$$

where:

M= bulk density of aggregate (lbs/ft³)
G= mass of measure and the aggregate (lbs)
T= mass of the measure (lbs)
V= volume of the measure (lbs/ft³)
S= bulk specific gravity of the aggregate (dry basis)
W= density of water (62.3 lbs/ft³)

Report

Bulk Density of Aggregate lbs/ft³: 39

Voids in Aggregate Percent %: 56.6

GSH Materials Testing & Inspection Inc.

Moisture-Density Relations of Soils

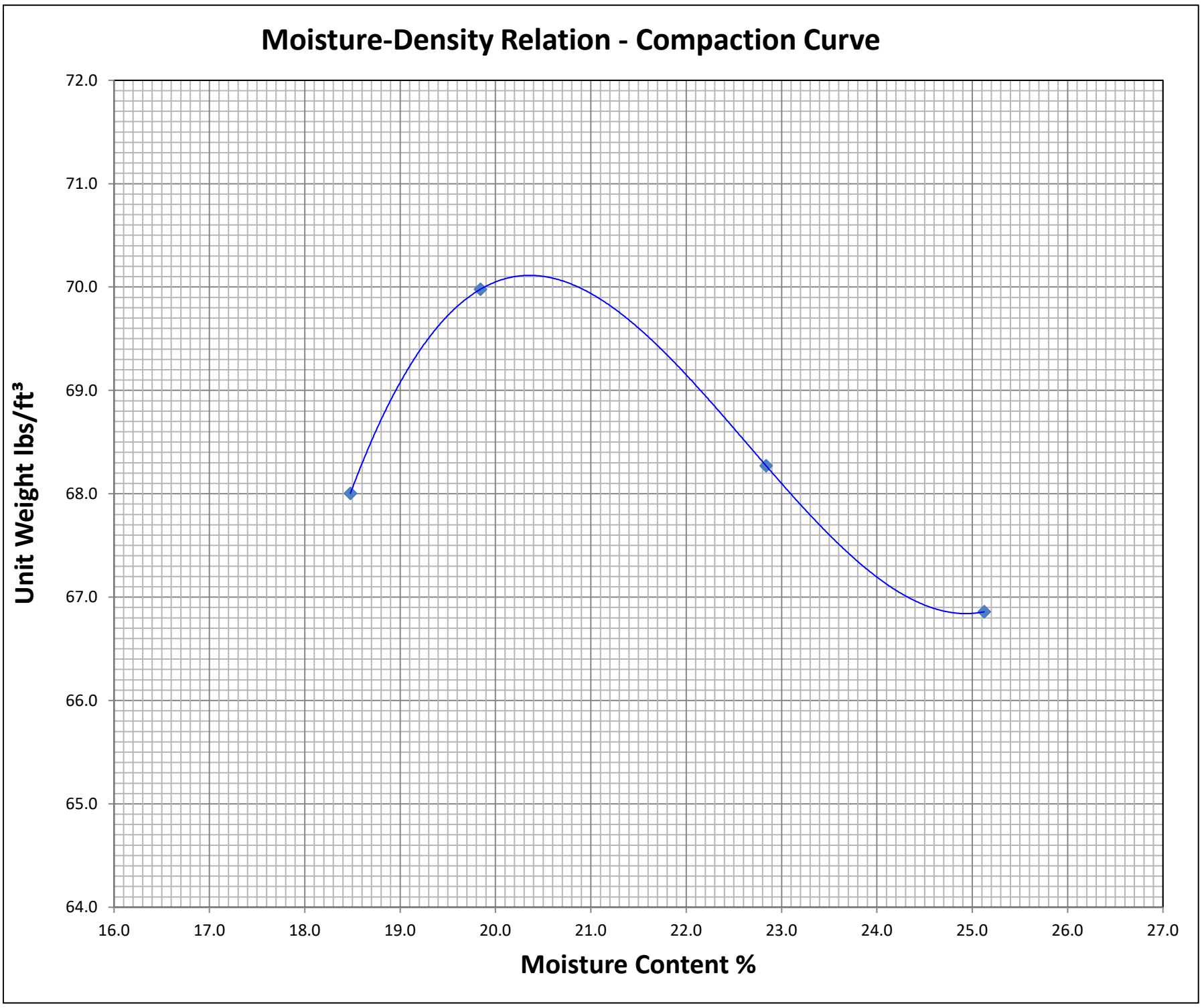
AASHTO T99 T180 | ASTM D698 D1557

AASHTO ACCREDITED

Project: Red Dome Lava
Project No.: 3157-01M-20
Client: Red Dome
Source: Red Dome
Description: 1½" Gravel (Lava Rock) with Sand

Laboratory No.: M20-09-07
Sample Date: 9/8/2020
Sample Location: Red Dome
Sampled By: Red Dome
Specification Section: UDOT LT WT Pit Run

Mold Volume ft³: 0.0750 **Method:** ASTM D1557, C **Mold Weight g:** 6114.0



Optimum Moisture Content and Maximum Density of Soil

Maximum Density from Curve	70.1	lbs/ft³
Optimum Moisture from Curve	20.3	%
Adjusted Maximum Density	72.1	lbs/ft³
Corrected Optimum Moisture	18.0	%

Specific Gravity & Absorption of Coarse Aggregate for Oversized Particle Correction

Percentage of Oversized Particles	12.3
Bulk Specific Gravity	1.448
Specific Gravity, SSD	1.726
Apparent Specific Gravity	2.007
Percent Absorption	19.2

GSH Materials Testing & Inspection Inc.

Liquid and Plastic Limit of Soils
ASTM D4318 | AASHTO T89 T90

Project: Red Dome Lava
Project No.: 3157-01M-20
Client: Red Dome
Source: Red Dome
Description: 1½" Gravel (Lava Rock) with Sand

Laboratory No.: M20-09-07
Sample Date: 9/8/2020
Sample Location: Red Dome
Sampled By: Red Dome
Specification Section: UDOT LT WT Pit Run

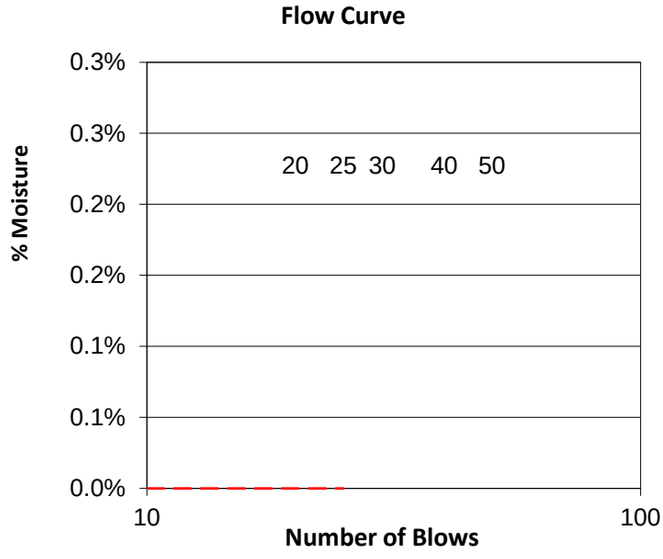
	Plastic Limit (PL)		
Trial No.	1	2	3
ID			
Wet weight + tare (w)			
Dry weight + tare (w')			
Water weight (w_w = w - w')			
Tare weight (w")			
Dry weight (w_s = w' - w")			
% Moisture [wp = (w_w / w_s)*100]			

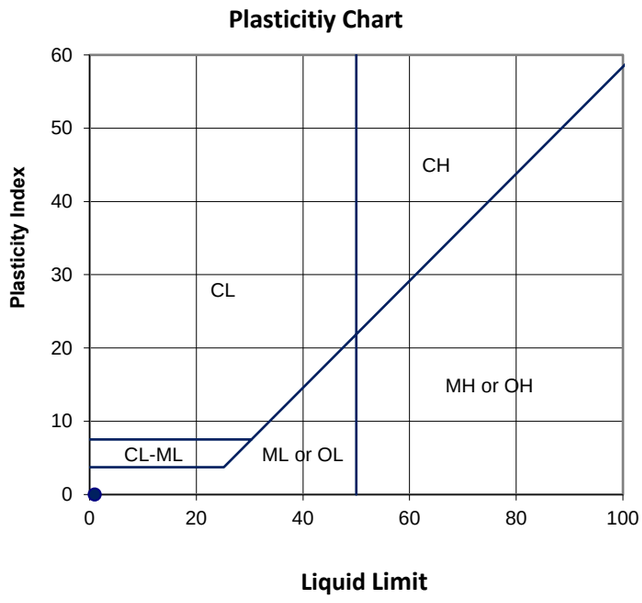
Natural Moisture (w_n)		
1	2	3

	Liquid Limit (LL)		
Trial No.	1	2	3
No. of Blows			
ID			
Wet weight + tare (w)			
Dry weight + tare (w')			
Water weight (w_w = w - w')			
Tare weight (w")			
Dry weight (w_s = w' - w")			
% Moisture [wp = (w_w / w_s)*100]			

Liquid Limit: Non Plastic
Plastic Limit: Non Plastic
Plasticity Index: Non Plastic
Preperation Method: Dry

Classification: A-1-a
Group Symbol: SP





GSH Materials Testing & Inspection Inc.

Sieve Analysis of Fine and Coarse Aggregate

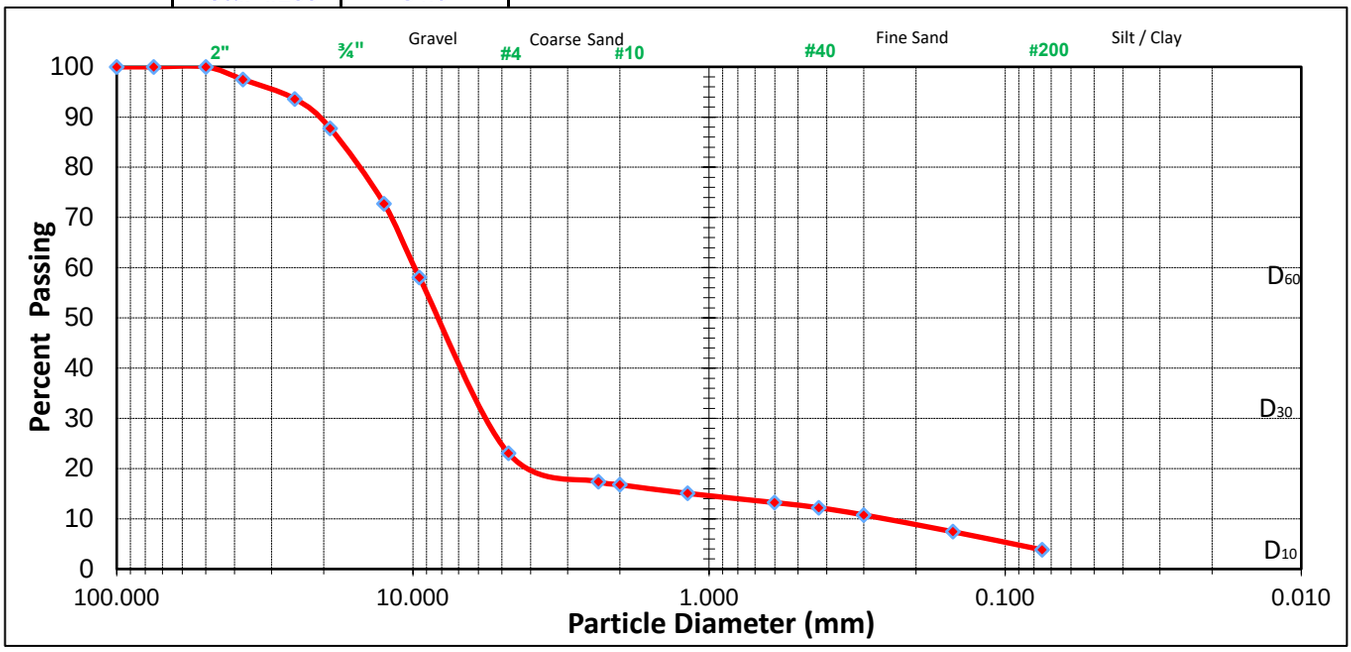
ASTM C136, C566 C117 | AASHTO T27, T255 T11

AASHTO ACCREDITED

Project: Red Dome Lava
Project No.: 3157-01M-20
Client: Red Dome
Source: Red Dome
Description: 1½" Gravel (Lava Rock) with Sand

Laboratory No.: M20-09-07
Sample Date: 9/8/2020
Sample Location: Red Dome
Sampled By: Red Dome
Specification Section: UDOT LT WT Pit Run

Sieve Number	Diameter (mm)	Weight Retained (g)	Percent Retained	Percent Passing	Specification	In Situ Moisture Content	
4"	100	0.0	0.0	100		Wet Wt + Tare	7022.5
3"	75	0.0	0.0	100	100	Dry Wt + Tare	7022.5
2"	50	0.0	0.0	100		Water WT	0.0
1½"	37.5	173.6	2.5	97	80-100	Tare Wt	100.0
1"	25.0	268.8	3.9	94		Dry Weight	6922.5
3/4"	19.0	407.0	5.9	88		% Moisture	0.0
1/2"	12.5	1039.5	15.0	73			
3/8"	9.5	1015.8	14.7	58	40-100		
#4	4.75	2424.1	35.0	23	10-70	Wt Passing #4	1593.7
#8	2.36	124.8	5.6	17		-#200 Wash	
#10	2.00	13.4	0.6	17		Wet Wt + Tare	1110.4
#16	1.18	38.0	1.7	15	0-40	Dry Wt + Tare	1056.2
#30	0.600	40.4	1.8	13		Tare Wt	601.0
#40	0.425	22.9	1.0	12		-#200 Wt	54.2
#50	0.300	31.6	1.4	11	0-25	Wt on Pan	30.4
#100	0.150	74.0	3.3	7		Total -#200	84.6
#200	0.075	79.7	3.6	3.8	0-15		
	Total -#200	84.6					



Grain Size Distribution

% Boulders & Cobble	0.0
% Gravel:	77.0
% Sand:	19.2
% Silt / Clay:	3.8

Coefficients

C_u:	
C_c:	

D_{10}:	
D_{30}:	
D_{60}:	

Classification: A-1-a
Group Symbol: SP
Group Name: Poorly graded Gravel with Sand

Appendix I.
Safety Data Sheets

SAFETY DATA SHEET
Multipurpose Engine Oil (All Grades)

Revision Date: 05-24-2018

Section 1. Identification

Product Identifier

Product Name	**Multipurpose Engine Oil (All Grades)**
Common Name	**Motor Oil SAE 10, 30, 40, 50**
Product Code(s)	**63025, 63029, 63030, 63031**

Recommended or Restricted Uses

Recommended Use	**Lubricant for engines**
Restricted Use	**Not Applicable**

Canadian Supplier

Supplier	**49 North Lubricants** **6611 45th Street,** **Leduc, Alberta** **T9E 7E3** **Canada** **Tel: (780) 986-9260** **Fax: (780) 986-9650**

Emergency Telephone Number

Emergency Telephone	**CHEMTREC: 1-800-424-9300**

Section 2. Hazard Identification

Hazard Classification

WHMIS Regulatory Status	**Not Regulated**
Physical Hazards	**Not Classified**
Health Hazards	**Not Classified**
Environmental Hazards	**Not Classified**
Label Elements	**Not Applicable**
Other Hazards	**Not Applicable**

Section 3. Composition / Information on Ingredients

Composition

This product does not contain any hazardous ingredients, or ingredients with national workplace exposure limits.

Section 4. First Aid Measures

Route of Exposure

Inhalation:	**Move affected person to fresh air and keep warm and at rest. Loosen tight clothing such as collar, tie or belt. If breathing becomes difficult, properly trained personnel can assist affected person by administering oxygen. Place unconscious person on their side in the recovery position and ensure breathing continues.**
Skin Contact:	**Rinse affected area with soap and water.**
Eye Contact:	**Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 10 minutes**
Ingestion:	**Rinse mouth thoroughly with water. Do not induce vomiting unless under the direction of medical personnel. Move affected person to fresh air and keep warm and at rest.**

Most Important Systems and Effects

Inhalation:	**May Cause: Coughing, Chest Tightness**
Skin Contact:	**May Cause: Temporary Skin Irritation**
Eye Contact:	**May Cause: Irritation or Redness in Eyes**
Ingestion:	**May Cause: Discomfort**

Immediate Medical Attention and Special Treatment

Note for the Doctor	**Treat Symptomatically**

Section 5. Fire-Fighting Measures

Extinguishing Media

Suitable Extinguishing Media	**Extinguish with alcohol-resistant foam, carbon dioxide powder or water fog.**
Unsuitable Extinguishing Media	**Do not use water jet as an extinguisher, this can spread the fire.**

Specific Hazards Arising from the Hazardous Product

Specific hazards	**Containers can burst violently or explode when heated. Contains Hydrocarbons. The product is immiscible with water and will spread on the water surface.**
Hazardous combustion products	**Hydrocarbons. Carbon Monoxide (CO). Carbon Dioxide (CO_2).**

Advice for Firefighters

Protective actions during firefighting	**Avoid breathing gases or vapours. Evacuate the area. Ventilate closed spaces before entering them. Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk.**
Special protective equipment for firefighters	**Not Applicable.**

Section 6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions	**Keep unnecessary and unprotected personnel away from spillage. Wear protective clothing as described in Section 8. Follow safe handing as described in Section 7. Wash thoroughly after dealing with a spill. Ensure procedures and training for emergency decontamination and disposal are in place. Do not touch or walk into spilled material.**

Methods and Material for Containment and Cleaning Up

Methods for cleaning up	**Absorb spillage with non-combustible, absorbent material. For small spillages: wipe up with an absorbent cloth. Avoid discharge into drains or watercourses or onto the ground. For large spillages: Contain the spilled material, removed and dispose of contaminated material with a licensed waste disposal site. If environmental pollution occurs (sewers, waterways, soil or air) inform the relevant authorities. Large spills may require pumping of water or excavation of soil to clean up.**
Methods for containment	**Use berms, skimmers, and absorbent to contain the spillage where appropriate. Ensure that wildlife is deterred from entering the contaminated area.**

Section 7. Handling and Storage

Precautions for Safe Handling

Usage precautions	**Read and follow manufacturer's recommendations. Wear PPE as described in Section 8. Eating, drinking, and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash before eating, drinking or smoking. Handle all packages and containers carefully. Keep all containers tightly sealed when not in use.**

Conditions for Safe Storage, Including any Incompatibilities

Storage Precautions	**Store away from incompatible materials listed in Section 10. Store in accordance with local regulations. Keep containers in a cool, well ventilated location. The storage area floor should be leak-tight and not absorbent.**
Storage Class	**Not Applicable**

Section 8. Exposure Controls / Personal Protection

Control Parameters

Occupational Exposure Limits	**Not Applicable**

Appropriate Engineering Controls

Engineering controls	**Provide adequate ventilation. Use engineered ventilation as the primary means to minimize worker exposure.**

Individual Protection Measures

General	**All personal protective equipment (PPE) should comply with Canada OH&S Regulations (SOR/86-304)**
Eye/Face protection	**Recommended: Safety glasses. Where splash hazards exist use a face shield as well.**
Hand protection	**Recommended: Nitrile gloves.**
Body protection	**Recommended: Long sleeved coveralls.**
Respiratory protection	**If engineered ventilation is inadequate, use a NIOSH-certified respirator with a dual cartridge for organic vapor and P95 particulates.**

Section 9. Physical and Chemical Properties

Physical Properties

Physical State	**Liquid**
Colour	**Amber**
Odour	**Mild**
Odour threshold	**Not Available**

Chemical Properties

pH	**Not Available**
Melting point / freezing point	**Not Available**
Flash point	**> 205 ºC (Method: Closed Cup)**
Evaporation rate	**< 1 (butyl acetate = 1)**
Flammability (solid; gas)	**Not Available**
Lower Explosive Limit	**Not Available**
Upper Explosive Limit	**Not Available**
Vapour pressure	**< 0.13 kPa @ 20ºC**
Vapour density	**Not Available**
Relative density	**0.88 – 0.89**
Solubility	**Insoluble in water**
Partition coefficient: n-octanol/water	**Not Available**
Decomposition temperature	**Not Available**
Viscosity	**Not Available**

Section 10. Stability and Reactivity

Reactivity	**Not Available**
Stability	**Stable under normal conditions and use**
Possibility of hazardous reactions	**No reactions under normal conditions and use**
Conditions to avoid	**Not Applicable**
Incompatible Materials	**Oxidizing Agents**
Hazardous decomposition products	**No hazardous decomposition products under normal conditions and use**

Section 11. Toxicological Information

Routes of Exposure	**Ingestion, Inhalation, Skin/Eye Contact**
Symptoms	
Physical	**Skin/Eye contact may cause irritation or redness Ingestion may cause discomfort**
Chemical	**No Available Data**
Toxicological	**No Available Data**
Exposure Effects	
Delayed Effects	**No Available Data**
Chronic Effects	**No Available Data**
Acute Toxicity Estimates (ATE)	
ATE oral (mg/kg)	**No Available Data**
ATE dermal (mg/kg)	**No Available Data**
ATE inhalation (mg/L)	**No Available Data**

Section 12. Ecological Information

No Available Data.

Section 13. Disposal Considerations

No Available Data. Follow local regulations.

Section 14. Transport Information

Not Applicable.

Section 15. Regulatory Information

Not Applicable.

Section 16. Other Information

SDS Revision Date:	**05-24-2018**
SDS Number(s)	**63025 / 63029 / 63030 / 63031**
Disclaimer:	**The information contained herein is accurate to the best of our knowledge.**

SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY INFORMATION

Product Name: **PREMIUM ANTI-WEAR "HD" HYDRAULIC OIL ISO GRADES: 10, 15, 22, 32, 46, 68, 100**

Product Use: Lubricant, Hydraulic Oil, ISO Grades: 10, 15, 22, 32, 46, 68, 100

Manufactures Name: Pinnacle Resources, Inc.
5504 Jefferson Parkway
Pine Bluff, AR 71602

Emergency Assistance: 870-247-2315 Business Telephone No.: 870-247-2315 Product Assistance: 870-247-2315

SECTION 2: HAZARD IDENTIFICATION

United States (U.S.)
According to OSHA 29 CFR 1910.1200 HCS

Classification of the mixture:
OSHA HCS 2012 Not Classified
Label Elements
OSHA HCS 2012 No signal word

Hazard Statements No known significant effects or critical hazards

Precautionary Statements No precautionary phrases

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

		%Weight
P	Premium AW "HD" Hydraulic Oils, ISO 10 - 100	100
1	Solvent refined, hydrotreated paraffinic distillate mineral base oil.	50-90
2	Refined and hydroprocessed heavy distillate/residual mineral oil	40-50
3	Additive system containing proprietary formulated ingredients	1-6
4	Other minor additives.	<1

SECTION 4: FIRST-AIDE MEASURES

Eye Contact - Flush with water for 15 minutes while holding eyelids open. If irritation persists, get medical attention.
Skin Contact -Remove contaminated clothing and wipe excess off. Wash with soap and water or a waterless hand cleaner followed by soap and water. If irritation occurs, get medical attention.
Inhalation - If overcome by vapor remove victim to fresh air; administer oxygen if breathing is difficult. Get medical attention.
Ingestion - Do not induce vomiting. In general no treatment is necessary unless large quantities of product are ingested. However, get medical attention.
Note to Physician - In general, Emesis Induction is unnecessary in high viscosity, low volatility products, I.E., most oils and greases.

SECTION 5: FIRE FIGHTING MEASURES

Flammable limits /% Volume in AiR
Lower: N/AV Upper: N/AV

NFPA RATINGS- Health: 1 Flammability: 1 Reactivity: 0 Special: --
NPCA-HMIS RATINGS- Health: 1 Flammability: 1 Reactivity: 0

NFPA
National Fire Protection Association (U.S.A.)

Extinguishing Media:
Use water fog, foam, dry chemical or CO_2. Do not use a direct stream of water. Product will float and be reignited on surface of water.Special Fire Fighting Procedures and Precautions:
Material will not burn unless preheated. Do not enter confined fire-space without full bunker gear (Helmet with face shield, bunker coats, gloves and rubber boots), including a positive-pressure NIOSH-Approved self-contained breathing apparatus. Cool fire exposed containers with water.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures:
May burn although not readily ignitable. Use cautious judgement when cleaning up large spills. ***Large Spills*** Wear respirator and protective clothing as appropriate. Shut off source of leak. If safe to do so, dike and contain. Remove with vacuum trucks or pump to storage salvage vessels. Soak up residue with an absorbent such as clay, sand, or other suitable materials; dispose of properly. Flush area with water to remove trace residue.
Small Spills Take up with an absorbent material and dispose of properly.
Waste Disposal: Place in an appropriate disposal facility in compliance with local regulations.

SECTION 7: HANDLING AND STORAGE

The health effects noted below are consistent with requirements under the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Eye Contact: Lubricating oils are general considered no more than minimally irritating to the eyes.Skin Contact: Lubricating oils are generally considered no more than mildly irritating to the skin. Prolonged and repeated contact may result in various skin disorders such as Dermatitis, Folliculitis or Oil Acne.
Inhalation: Inhalation of vapor (generated at high temperatures only) or oil mist from this product may result in mild irritation of the upper respiratory tract.
Ingestion: Lubricating oils are generally considered no more than slightly toxic if swallowed.
Signs and symptoms: Irritation as noted above.
Storage: Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Store and use only in equipment/containers designed for use with this product

Aggravated Medical Conditions:

Preexisting skin and respiratory disorders may be aggravated by exposure to this product. The International Agency For Cancer Research has determined there is sufficient evidence for the carcinogenicity in experimental animals exposed by contact to used motor (crankcase) oil. Handling procedures and safety precautions in the MSDS should be followed to minimize exposure to the product as used lubricating oil in gasoline or diesel fueled internal combustion engines.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Minimize skin contact. Wash with soap and water before eating, drinking, smoking or using toilet facilities. Launder contaminated clothing before reuse, properly dispose of contaminated leather articles, including shoes that cannot be decontaminated. Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures.
Respiratory Protection:
If exposure may or does exceed occupational exposure limits (SECTION 2) use a NIOSH-Approved respirator to prevent overexposure. In accord with 29 CFR 1910.134 use either an atmosphere-supplying respirator or an air-purifying respirator for organic vapors and particulate.
Protective clothing:
Wear chemical resistant gloves and other protective clothing as required to minimize skin contact. Wear safety goggles to avoid eye contact. Test data from published literature and/or glove and clothing manufacturers indicate the best protection is provided by nitrile gloves.
Occupational Exposure Limits (estimated 8-hour workday):

	OSHA Z1		ACGIH		OTHER	
Standards ——->	PEL/TWA	PEL/CEILING	TLV/TWA	TLV/STEL		
Oil Mist ——-—>	5 Mg/M^3*	None	5Mg/M^3*	10 Mg/M^3*	None	(*Oil Mist, Mineral)

SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

Physical State: Liquid
Boiling Point: NA
Evaporation Rate: NA
Solubility In Water: Negligible
PH: NA
Auto Ignition Temperature: >320˚C/608˚F
Gravity,(H2O=10.0) API @ 60˚F: 33.0 to 28.3
Percent Volatile by Volume: Negligible
Appearance: Clear-yellow to darker
Vapor Pressure: <0.3kPa (0.1 @ 20˚C [Est])
Upper/Lower Explosion/Flammability limits: 1-10 %V(based on Mineral Oil)
Melt Point: NA Pour Point: -35˚F to 0˚F
Vapor Density: (Air=1.0) >1.0
Odor: Mild Hydrocarbon
Electrical Conductivity: Not expected to be a static accumulator.
Flash Pt., COC: 370˚F to 450˚F
Viscosity@100˚C, cSt.: 2.8 - 10.6
Viscosity@ 40˚C, cSt.: 10.98 - 100

SECTION 10: REACTIVITY DATA

Stability: Stable Hazardous Polymerization: Will Not Occur Conditions and Materials to Avoid: Avoid heat, open flames and oxidizing materials.
Hazardous Decomposition Products:
Thermal decomposition products are highly dependent on the combustion conditions. A complex mixture of airborne solid, liquid, particulate and gases will evolve when this material undergoes pyrolysis or combustion. Carbon monoxide and other unidentified organic compounds may be formed upon combustion.

SECTION 11: TOXICOLOGICAL INFORMATION

Dermal LD50	>5.0 g/kg (Rabbit)	OSHA - Non Toxic	Based on similar material(s)
Oral LD50	>5.0 g/kg (Rat)	OSHA - Non Toxic	Based on similar material(s)

Carcinogenicity Classification (Highly Refined Mineral Oil/IP346<3%): IARC 3=No carcinogenicity to humans. ACGIH A4=Unclassified as a human carcinogen. GHS/CLP=No carcinogenicity classification. NTP=No IOSHA=No

SECTION 12: ECOLOGICAL INFORMATION

This product is classified as an oil under section 311 of the Clean Water Act. Spills entering (A) surface waters of (B) any water courses or sewer's-entering/leading to surface waters that cause a sheen must be reported to the nearest local Environmental Protection Agency Office.

SECTION 13: DISPOSAL CONSIDERATIONS

Product is suitable for burning in an enclosed, controlled burner for fuel value or disposal by supervised incineration. Proper characterization is recommended. The product is suitable for processing by an approved recycling facility or can be disposed of at an appropriate government waste disposal facility. Compliance with all appropriate Federal, State, and Local regulations should be satisfied at time of disposal. Base Oil Component is expected to be inherently biodegradable. The total mixture may be harmful to aquatic organisms.

SECTION 14: TRANSPORT INFORMATION

TDG Classification not regulated. Environmental transport classifications are indicate as non-hazard. DOT Identification Number: Not Regulated.
IMDG: Not Regulated.

SECTION 15: REGULATORY INFORMATION

U.S. TSCA 8b INVENTORY:	All components of this product are on the US TSCA Inventory.
Other TSCA Regulations:	None Known
SARA SECTIONS 301- 304:	This product does not contain greater than 1.0% of any chemical substance on the SARA Extremely Hazardous Substances List.
SARA SECTION 311/312(Hazard):	This product does not contain any chemical substance on SARA Hazard, Delayed Health Hazard List.
SARA SECTION 313:	This product does not contain greater than 1.0% (greater than 0.1% for carcinogenic substance) of any chemical (Toxic Chemicals) substances listed under SARA Section 313.
CERCLA HAZARDOUS SUBSTANCES:	None Known
FDA APPROVAL:	Not Applicable
RCRA STATUS:	If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic.
Under RCRA it is the	responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste.

SECTION 16: OTHER INFORMATION

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE AND IS BELIEVED TO BE CORRECT. HOWEVER, PINNACLE RESOURCES, INC. MAKES NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. PINNACLE RESOURCES, INC. ASSUMES NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

Date Prepared: October 11, 2018

PINNACLE RESOURCES, INC. MANUFACTURING FACILITY
Pine Bluff, Arkansas

Diesel Exhaust Fluid

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 03/05/2015 Supersedes: 07/01/2009 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name : Diesel Exhaust Fluid

Product form : Mixture

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

Use of the substance/mixture : Cleaning of waste gases

1.3. Details of the supplier of the safety data sheet

Blue Sky East, LLC.
800 Roosevelt Avenue
Carteret, New Jersey, 07008 USA
Tel: 732-969-9200
Fax: 732-541-7999
Contact: Thomas Sensbach
Email: tsensbach@blueskydefna.com
www.blueskydefna.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: Domestic North America: 800-424-9300
International: 703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Skin Irrit. 2 H315
Eye Irrit. 2A H319
STOT SE 3 H335

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :

GHS07

Signal word (GHS-US) : **Warning**

Hazard statements (GHS-US) : H315 - Causes skin irritation
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation

Precautionary statements (GHS-US) : P261 - Avoid breathing vapours
P264 - Wash hands, forearms and face thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear eye protection, protective clothing, protective gloves
P302+P352 - If on skin: Wash with plenty of soap and water
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P312 - Call a doctor, a POISON CENTER if you feel unwell
P321 - Specific treatment (see first aid instructions on this label)
P332+P313 - If skin irritation occurs: Get medical advice/attention
P337+P313 - If eye irritation persists: Get medical advice/attention
P362+P364 - Take off contaminated clothing and wash it before reuse
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%
Urea	(CAS No) 57-13-6	15 - 40
Urea, N,N-methylenebis-	(CAS No) 13547-17-6	<= 1
Imidodicarbonic diamide	(CAS No) 108-19-0	<= 1
Alkalinity, as Ammonia		<= 0.1

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : If exposed or concerned, get medical attention/advice. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use. Never give anything to an unconscious person.

First-aid measures after inhalation : IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if breathing is affected. If breathing is difficult, supply oxygen.

First-aid measures after skin contact : IF ON SKIN (or clothing): Remove affected clothing and wash all exposed skin with water for at least 15 minutes. If irritation develops or persists, get medical attention.

First-aid measures after eye contact : IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Remove contact lenses if present and easy to do so. If pain, blinking, or irritation develops or persists, get medical attention. Continue rinsing.

First-aid measures after ingestion : IF SWALLOWED: rinse mouth thoroughly. Do not induce vomiting without advice from poison control center or medical professional. Get medical attention if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation.

Symptoms/injuries after inhalation : May cause respiratory irritation.

Symptoms/injuries after skin contact : Causes skin irritation.

Symptoms/injuries after eye contact : Causes serious eye irritation.

Symptoms/injuries after ingestion : May cause gastrointestinal irritation.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Carbon dioxide. Dry powder.

5.2. Special hazards arising from the substance or mixture

Fire hazard : The product is not flammable.

Explosion hazard : Product is not explosive.

Reactivity : No dangerous reactions known under normal conditions of use.

5.3. Advice for firefighters

Precautionary measures fire : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Do not dispose of fire-fighting water in the environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate area. Ventilate area. Keep upwind. Spill should be handled by trained clean-up crews properly equipped with respiratory equipment and full chemical protective gear (see Section 8).

6.1.1. For non-emergency personnel

Protective equipment : Wear Protective equipment as described in Section 8.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Wear suitable protective clothing, gloves and eye or face protection. Approved supplied-air respirator, in case of emergency.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

For containment : Stop leak if safe to do so. Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Sweep or shovel spills into appropriate container for disposal. This material and its container must be disposed of in a safe way, and as per local legislation.

6.4. Reference to other sections

See Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Do not get in eyes, on skin, or on clothing. Avoid breathing vapours, mist. Use personal protective equipment as required. Ensure good ventilation of the work station. If process is performed that may cause airborne particles, appropriate respiratory protection should be used to avoid breathing any dust or vapors. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage conditions : Store in a dry, cool and well-ventilated place. Keep container tightly closed. Keep only in original container. Containers which are opened should be properly resealed and kept upright to prevent leakage. Do not store in unlabeled containers.

Storage temperature : -5 - 30 °C (23 - 86 °F)

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Urea (57-13-6)	
Remark (ACGIH)	OELs not established
Remark (OSHA)	OELs not established

Urea, N,N-methylenebis- (13547-17-6)	
Remark (ACGIH)	OELs not established
Remark (OSHA)	OELs not established

Imidodicarbonic diamide (108-19-0)	
Remark (ACGIH)	OELs not established
Remark (OSHA)	OELs not established

8.2. Exposure controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment with flammable materials. Ensure adequate ventilation, especially in confined areas.

Personal protective equipment : Gloves. Protective goggles. Protective clothing.

Hand protection : Use gloves chemically resistant to this material when prolonged or repeated contact could occur. Gloves should be classified under Standard EN 374 or ASTM F1296. Suggested glove materials are: Neoprene, Nitrile/butadiene rubber, Polyethylene, Ethyl vinyl alcohol laminate, PVC or vinyl. Change contaminated gloves immediately. Suitable gloves for this specific application can be recommended by the glove supplier.

Eye protection : Wear eye protection, including chemical splash goggles and a face shield when possibility exists for eye contact due to spraying liquid or airborne particles.

Skin and body protection : Wear long sleeves, and chemically impervious PPE/coveralls to minimize bodily exposure.

Respiratory protection : Use NIOSH-approved dust/particulate respirator. Where vapor, mist, or dust exceed PELs or other applicable OELs, use NIOSH-approved respiratory protective equipment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Appearance : Clear, colorless liquid.

Color	:	Colorless. Yellow.
Odor	:	Characteristic.
Odor Threshold	:	No data available
pH	:	10 [Conc. (% w/w): 10%]
Relative evaporation rate (butylacetate=1)	:	No data available
Melting point	:	No data available
Freezing point	:	-11 °C (12.2 °F)
Boiling point	:	103 °C (217.4 °F)
Flash point	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapour pressure	:	0.4 mm Hg @ 20 °C (68 °F)
Relative vapour density at 20 °C	:	No data available
Relative density	:	No data available
Density	:	1.087 - 1.093 g/cm³ @ 20 °C (68 °F)
Solubility	:	No data available
Log Pow	:	No data available
Log Kow	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	0.14 mPa.s (0.14 cP)
Explosive properties	:	No data available
Oxidising properties	:	No data available
Explosive limits	:	No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reactions known under normal conditions of use.

10.2. Chemical stability

Stable under recommended handling and storage conditions (see section 7).

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

Avoid contact with : Incompatible materials.

10.5. Incompatible materials

Oxidizing agent. Nitrites.

10.6. Hazardous decomposition products

Thermal decomposition generates : Carbon oxides (CO, CO_2). Nitrogen oxides. Ammonia.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Urea (57-13-6)	
LD50 oral rat	8471 mg/kg

Skin corrosion/irritation	:	Causes skin irritation. pH: 10 [Conc. (% w/w): 10%]
Serious eye damage/irritation	:	Causes serious eye irritation. pH: 10 [Conc. (% w/w): 10%]
Respiratory or skin sensitisation	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	May cause respiratory irritation.

Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified
Symptoms/injuries after inhalation	: May cause respiratory irritation.
Symptoms/injuries after skin contact	: Causes skin irritation.
Symptoms/injuries after eye contact	: Causes serious eye irritation.
Symptoms/injuries after ingestion	: May cause gastrointestinal irritation.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No information available.

12.2. Persistence and degradability

Diesel Exhaust Fluid	
Persistence and degradability	Readily biodegradable.

12.3. Bioaccumulative potential

Diesel Exhaust Fluid	
Bioaccumulative potential	No information available.

12.4. Mobility in soil

Diesel Exhaust Fluid	
Ecology - soil	No information available.

12.5. Other adverse effects

Other adverse effects : No data available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Obtain the consent of pollution control authorities before discharging to wastewater treatment plants.

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Do not allow the product to be released into the environment.

SECTION 14: Transport information

In accordance with DOT

Not hazardous for transport

Additional information

Other information : No supplementary information available.

Transport by sea

No additional information available

Air transport

No additional information available

SECTION 15: Regulatory information

15.1. US Federal regulations

Diesel Exhaust Fluid	
All chemical substances in this product are listed in the EPA (Environment Protection Agency) TSCA (Toxic Substances Control Act) Inventory All the constituents of this preparation are registered in the EINECS inventory or in the ELINCS list	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

15.2. International regulations

No additional information available.

15.3. US State regulations

California Proposition 65

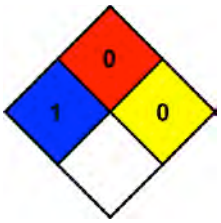
This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm.

SECTION 16: Other information

Indication of changes : Revision 1.0: New SDS Created.

Revision date	: 03/05/2015
Other information	: Author: BCS.

NFPA health hazard	: 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.
NFPA fire hazard	: 0 - Materials that will not burn.
NFPA reactivity	: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health	: 1
Flammability	: 0
Physical	: 0
Personal Protection	:

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Safety Data Sheet
Diesel Fuel

SECTION 1 IDENTIFICATION

Product Name: Diesel Fuel
Synonyms: No. 2 Diesel Fuel, Ultra Low Sulfur Diesel, Oil Distillate, Cycle Oil, Fuel Oil Diesels Cycle Oil, Furnace Oil, Dyed Fuel

SDS #: F2

Product Use: Diesel Fuel
Restrictions on Use: Use only as directed

Manufacturer:
Sinclair Oil Company
P.O. Box 30825
Salt Lake City, Utah 84130

Telephone: **General Information:** (801) 524-2777 **Fax:** (801) 524-2740
Contact person: Jeremiah Webster

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

SDS Date of Preparation: January 23, 2015

SECTION 2: HAZARDS IDENTIFICATION

Classification:

Physical	Health
Flammable Liquid Category 3	Acute Toxicity Category 4 (Oral) Aspiration Toxicity Category 1 Skin Irritation Category 2 Specific Target Organ Toxicity Repeat Exposure Category 1 Carcinogen Category 2

Label Elements:
Danger!

Hazard Phrases:
Flammable liquid and vapor.
Harmful if inhaled.
May be fatal if swallowed and enters airways.
Causes skin irritation.
Suspected of causing cancer.
Causes damage to thymus, liver and bone marrow through prolonged or repeated exposure.

Precautionary Phrases:
Prevention
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, sparks, open flames, and hot surfaces. No smoking.
Keep container tightly closed.
Ground and bond container and receiving equipment
Use explosion-proof electrical, ventilating and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe mist, vapors or spray.
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves, eye protection.

Response
IF SWALLOWED: Immediately call a POISON CENTER or doctor.
Do NOT induce vomiting.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
If skin irritation occurs: Get medical attention.
Take off contaminated clothing and wash it before reuse.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor.
IF exposed or concerned: Get medical attention.
In case of fire: Use water fog, foam, carbon dioxide, or dry chemical to extinguish.

Storage and Disposal
Store in a well-ventilated place. Keep cool. Keep container tightly closed.
Store locked up.
Dispose of contents and container in accordance with local and national regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Chemical name	CAS No.	Concentration
Diesel Fuel	68476-34-6	97-100%
Naphthalene	91-20-3	0-3%

SECTION 4 EMERGENCY and FIRST AID PROCEDURES

Eye Contact: Immediately flush eyes with water for several minutes. Get medical attention if irritation persists.

Skin Contact: Remove contaminated clothing and flush skin with water for several minutes. Wash thoroughly with soap and water. Get medical attention if irritation develops or persists. Launder clothing before reuse. Discard contaminated shoes.

Inhalation: Remove to fresh air. If breathing is difficult have qualified personnel administer oxygen. If breathing has stopped, administer artificial respiration. Get medical attention**.**

Ingestion: Do not induce vomiting. Rinse mouth with water. Never give anything by mouth to an unconsciousness person. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs. Get immediate medical attention.

Most important symptoms/effects, acute and delayed: May cause eye irritation. Causes skin irritation with redness and drying. Inhalation may cause respiratory irritation and central nervous system effects. Harmful or fatal if swallowed. Aspiration during swallowing or vomiting may cause lung damage. May cause cancer based on animal data.

Indication of immediate medical attention and special treatment, if necessary: Immediate medical attention is required for ingestion.

SECTION 5 FIRE and EXPLOSION HAZARD DATA

Suitable extinguishing media: Use water fog, foam, carbon dioxide, or dry chemical. Do not use a steady stream of water. Product may float on the surface of water and create a floating fire hazard.
Specific hazards arising from the chemical: This product is highly flammable and forms explosive mixtures with air. Vapors are heavier than air and will travel along surfaces to remote ignition sources and flash back. Closed containers may explode if exposed to extreme heat. Combustion may produce carbon oxides and other products of incomplete combustion.
Special protective equipment and precautions for fire-fighters: Firefighters should wear full emergency equipment and a NIOSH approved positive pressure self-contained breathing apparatus. Cool fire exposed container with water. Do not allow run-off from firefighting to enter drains or water courses.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures: Wear appropriate protective equipment. Eliminate ignitions sources and ventilate the area with explosion proof equipment. Wash thoroughly after handling.
Environmental hazards: Avoid release into the environment. Report spill as required by local and federal regulations.
Methods and materials for containment and cleaning up: Contain with an inert absorbent and place into a closable container for disposal. Use non-sparking tools and equipment. If spill has not ignited, use water spray to disperse the vapors and protect personnel attempting to stop leak. Prevent entry in storm sewers and waterways. Runoff can cause a fire or explosion hazard in sewers.

SECTION 7 HANDLING and STORAGE

Precautions for safe handling: Avoid contact with eyes, skin and clothing. Avoid breathing vapors. Wash thoroughly after handling. Use only with adequate ventilation. Wash thoroughly with soap and water after handling. Keep containers closed when not in use. Keep product away from heat, sparks, flames and all other sources of ignition. Do not permit smoking in use or storage areas. Use with non-sparking tools and explosion proof equipment. Electrically bond and ground containers for transfer

Do not cut, drill, grind or weld on or near containers, even empty containers. Empty containers retain product residues can be hazardous. Follow all SDS precautions when handling empty containers.

Conditions for safe storage, including any incompatibilities: S Store in accordance with regulations for the storage of flammable liquids. Store in a dry, well ventilated area away from heat, direct sunlight and all sources of ignition. Store away from oxidizers and other incompatible materials. Protect containers from physical damage.

SECTION 8 EXPOSURE CONTROLS and PERSONAL PROTECTION

Exposure Guidelines:

INGREDIENTS	EXPOSURE LIMITS
Diesel Fuel	100 mg/m^3 TWA ACGIH TLV (inhalable fraction and vapor)
Naphthalene	10 ppm TWA OSHA PEL
	10 ppm, skin TWA ACGIH TLV

Appropriate engineering controls: Use with local exhaust ventilation to maintain exposures below the occupational exposure limits. Use explosion proof equipment where required

Respiratory protection: If exposures are exceeded, use a NIOSH approved organic vapor respirator appropriate for the form and concentration of the contaminants should be used. Selection of respiratory protection depends on the contaminant type, form and concentration. Select in accordance with OSHA 1910.134 and good Industrial Hygiene practice.
Skin protection: Impervious gloves such as nitrile rubber recommended to prevent skin contact.
Eye protection: Wear chemical safety goggles to avoid eye contact.
Other: Impervious coveralls, apron and boots is required to prevent skin contact and contamination of personal clothing. A safety shower and eye wash should be available in the immediate work area.

SECTION 9 PHYSICAL and CHEMICAL PROPERTIES

Appearance (physical state, color, etc.): Colored or clear liquid
Odor: Aromatic hydrocarbon odor.

Odor threshold: Not available	**pH:** Not applicable
Melting point/Pourpoint: Not available	**Boiling Point:** 320-700° F (160-371-1°C)
Flash point: 126-152°F (51.6-66.6°C)	**Evaporation rate:** Not available
Flammability (solid, gas): Not applicable	
Flammable limits: LEL: 0.6%	**UEL:** 7.5%
Vapor pressure: <1 mmHg @ 60°F	**Vapor density:** ~3
Relative density: 0.82-0.88	**Solubility:** Insoluble in water
Partition coefficient: n-ctanol/water: Not available	**Auto-ignition temperature:** >490-545°F (>254.4-285°C)
Decomposition temperature: Not available	**Viscosity:** Not applicable

SECTION 10 STABILITY and REACTIVITY

Reactivity: This product is not expected to be reactive.
Chemical stability: The product is stable.
Possibility of hazardous reactions: None known.
Conditions to avoid: Keep away from heat and all sources of ignition.
Incompatible materials: Avoid oxidizing agents, acids, alkalies and halogens.
Hazardous decomposition products: Thermal decomposition may yield carbon oxides and other products of incomplete combustion.

SECTION 11 TOXICOLOGICAL INFORMATION

Health Hazards:

Inhalation: Vapors may cause respiratory irritation and central nervous system effect including headache, dizziness, headaches, giddiness, euphoria, vertigo, blurred vision, nausea, numbness, drowsiness, anesthesia, and coma.

Skin Contact: Skin contact may cause irritation, redness and defatting of the skin.

Eye Contact: Eye contact may cause mild irritation with redness, tearing and pain.

Ingestion: Swallowing may cause gastrointestinal irritation, nausea, vomiting, diarrhea, vertigo, drowsiness, mental confusion, staggering gait, slurred speech, convulsions, unconsciousness and death due to circulatory failure. Aspiration during swallowing or vomiting may cause lung damage.

Chronic Effects of Overexposure: Prolonged occupational overexposure may cause dermatitis. Reports have associated repeated and prolonged overexposure to petroleum distillates with adverse liver, kidney and bone marrow effects and with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the product may be harmful or fatal.

Mutagenicity: Diesel fuel was negative in the AMES test and in an in vitro mouse lymphoma assay.

Reproductive Toxicity: In a developmental study with diesel fuel, rats were administered 100 and 400 ppm for 6 hours a day from day 6-15 of gestation. No adverse effects were seen on reproduction or developmental paramental or in soft tissues or skeletons. NOEAL: 400 ppm

Carcinogenicity: Naphthalene is listed by IARC as “Possibly Carcinogenic to Humans”, Group 2B, as “Reasonably Anticipated to be a Human Carcinogen” and as a “Confirmed Animal Carcinogen with Unknown Relevance to Humans”, A3 by ACGIH.

Acute Toxicity Values: Acute Toxicity Estimate: Oral 14492 mg/kg
Diesel Fuel: Oral rat LD50 17900 mg/kg, Inhalation rat LC50 4.1 mg/L/4 hr, Dermal rabbit LD50 >4300 mg/kg
Naphthalene: Oral rat LD50 533 mg/kg, Inhalation rat LC0 0.4 mg/L (highest attainable concentration), Dermal rat LC50 >2500 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity:
Diesel Fuel: 96 hr LL50 Oncorhynchus mykiss 65 mg/kg, 48 hr EL50 > 1000, 72 hr EL50 Pseudokirchnerella subcapitata 10 mg/L
Naphthalene: 96 hr LC50 Pimephales promelas 6.08 mg/L, 48 hr EC50 daphnia magna 2.16 mg/L

Persistence and degradability: Diesel fuel is inherently biodegradable.
Bioaccumulative potential: The bioaccumulation potentials of the major components of diesel fuel range from low to high. Some higher molecular weight components may be taken up by fish and domestic animals and bioconcentrated if they persist in environment.
Mobility in soil: No data available.
Other adverse effects: None known.

SECTION 13: DISPOSAL INFORMATION

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

SECTION 14: TRANSPORTATION INFORMATION

	UN Number	Proper shipping name	Hazard Class	Packing Group	Environmental Hazard
DOT	NA1993	Diesel Fuel	3	PG III	No
TDG	UN1202	Diesel Fuel	3	PG III	No
IMDG	UN1202	Diesel Fuel	3	PG III	No
IATA	UN1202	Diesel Fuel	3	PG III	No

Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): Not applicable.

Special precautions: None known.

SECTION 15: REGULATORY INFORMATION

Safety, health, and environmental regulations specific for the product in question.

CERCLA Hazardous Substances (Section 103)/RQ: This product has a Reportable Quantity (RQ) of 3,333 lbs. (based on the RQ for Naphthalene of 100 lbs). Releases above the RQ must be reported to the National Response Center. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

EPA SARA 311 Hazard Classification: Acute Health, Chronic Health, Fire Hazard

SARA 313: This product contains the following chemicals subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372):

Naphthalene 91-20-3 0-3%

CALIFORNIA PROPOSITION 65: This product contains the following chemicals known to the State of California to cause cancer or reproductive toxicity.

Naphthalene 91-20-3 0-3% Cancer

WHMIS CLASSIFICATION: Class B, Division 3 (Combustible Liquid), Class D, Division 2A (Very Toxic Material Causing Other Toxic Effects)

This product has been classified in accordance with the hazard criteria in the CPR and the SDS contains all the information required by the CPR.

Australia AICS: All of the components are listed on the Australian Inventory of Chemical Substances.

Canada DSL: All of the components are listed on the Canadian Domestic Substances List.

China: All the components are listed on Inventory of Existing Chemical Substances in China.

European EINECS: All of the ingredients are listed on the EINECS inventory.

Korea: All the components are listed on the Korean Existing Chemical List.

New Zealand: All the components are listed on the New Zealand Inventory of Chemicals.

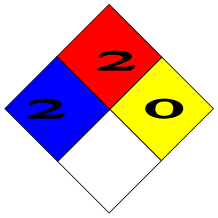
Philippines: All the components are listed on the Philippine Inventory of Chemical and Chemical Substances inventory.

US EPA Toxic Substances Control Act: All of the components of this product are listed on the TSCA inventory.

SECTION 16: OTHER INFORMATION

SDS Revision History: Converted to GHS format – all Sections revised
Date of current revision: January 23, 2015
Date of previous revision: January 2007

National Fire Protection Association (U.S.A)



Health: 2*
Flammability : 2
Instability: 0
Specific Hazard:

Disclaimer: This product material safety data sheet provides health and safety information. The product should be used in applications consistent with this product literature. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to ensure safe workplace operations.

This material safety data sheet is provided in good faith and meets the requirements of the hazardous communication provisions of SARA TITLE III and 29 CFR 1910.1200(g) of the OSHA regulations. The above information is based on review of available information Sinclair believes is reliable and is supplied for informational purposes only. Sinclair does not guarantee its completeness or accuracy. Since conditions of use are outside the control of Sinclair, Sinclair disclaims all warranties, express or implied, and any liability for damage or injury which results from the use of the above data. Nothing herein is intended to permit infringement of valid patents and licenses.

29 CFR 1910.1200 (OSHA HazCom 2012)

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product identifier

Trade name : ZEREX™ G05® Antifreeze Coolant

Details of the supplier of the safety data sheet Valvoline LLC 100 Valvoline Way Lexington, KY 40509 United States of America (USA) 1-800-TEAMVAL (1-800-832-6825) SDS@valvoline.com	**Emergency telephone number** 1-800-VALVOLINE (1-800-825-8654) **Regulatory Information Number** 1-800-TEAMVAL (1-800-832-6825) **Product Information** 1-800-TEAMVAL (1-800-832-6825)

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral)	:	Category 4
Carcinogenicity	:	Category 1B
Reproductive toxicity	:	Category 1B
Specific target organ systemic toxicity - repeated exposure (Oral)	:	Category 2 (Kidney, Liver)

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : Harmful if swallowed.
May cause cancer.
May damage fertility or the unborn child.
May cause damage to organs (Kidney, Liver) through

prolonged or repeated exposure if swallowed.

Precautionary Statements : **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
IF exposed or concerned: Get medical advice/ attention.
Storage:
Store locked up.
Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Classification	Concentration (%)
ETHYLENE GLYCOL	107-21-1	Acute Tox. 4; H302 STOT RE 2; H373	>=90.00 - <= 100.00
DIETHYLENE GLYCOL	111-46-6	Acute Tox. 4; H302 STOT RE 2; H373	>=1.50 - < 5.00
SODIUM BENZOATE	532-32-1	Eye Irrit. 2A; H319	>=1.50 - < 5.00
DISODIUM TETRABORATE	1330-43-4	Repr. 1B; H360	>=1.50 - < 5.00
SODIUM NITRITE	7632-00-0	Ox. Sol. 2; H272 Acute Tox. 3; H301	>=0.10 - < 0.50

		Eye Irrit. 2A; H319 Carc. 1B; H350	
SODIUM NITRATE	7631-99-4	Ox. Sol. 3; H272 Eye Irrit. 2A; H319 Carc. 1B; H350	>=0.10 - < 0.50

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : First aid is not normally required. However, it is recommended that exposed areas be cleaned by washing with soap and water.

In case of eye contact : Flush eyes with water as a precaution.
Remove contact lenses.
Protect unharmed eye.
If eye irritation persists, consult a specialist.

If swallowed : Obtain medical attention.
Rinse mouth with water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.

Most important symptoms and effects, both acute and delayed : Effects of acute ethylene glycol poisoning appear in three fairly distinct stages. The initial stage occurs shortly after exposure, lasts 6-12 hours, and is characterized by central nervous system effects (transient exhilaration, nausea, vomiting, and in severe cases, coma, convulsions, and possible death). The second stage lasts from 12-36 hours after exposure and is initiated by the onset of coma. This phase is characterized by tachypnia, tachycardia, mild hypotension, cyanosis, and in severe cases, pulmonary edema, bronchopneumonia, cardiac enlargement, and congestive failure. The final stage occurs 24-72 post-

exposure and is characterized by renal failure, ranging from a mild increase in blood urea nitrogen and creatinine followed by recovery, to complete anuria with acute tubular necrosis that can lead to death. Oxaluria is found in most cases. The most significant laboratory finding in ethylene glycol intoxication is severe metabolic acidosis.

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:
stomach or intestinal upset (nausea, vomiting, diarrhea)
irritation (nose, throat, airways)
Cough
pain in the abdomen and lower back
cyanosis (causes blue coloring of the skin and nails from lack of oxygen)
lung edema (fluid buildup in the lung tissue)
acute kidney failure (sudden slowing or stopping of urine production)
Convulsions
Harmful if swallowed.
May cause cancer.
May damage fertility or the unborn child.
May cause damage to organs through prolonged or repeated exposure if swallowed.

Notes to physician : This product contains ethylene glycol. Ethanol decreases the metabolism of ethylene glycol to toxic metabolites. Ethanol should be administered as soon as possible in cases of severe poisoning since the elimination half-life of ethylene glycol is 3 hours. If medical care will be delayed several hours, give the patient three to four 1-ounce oral "shots" of 86-proof or higher whiskey before or during transport to the hospital. Fomepizole (4-methylpyrazole) is an effective antagonist of alcohol dehydrogenase, and as such, may be used as an antidote in the treatment of ethylene glycol poisoning. Hemodialysis effectively removes ethylene glycol and its metabolites from the body.

SECTION 5. FIREFIGHTING MEASURES

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

Unsuitable extinguishing : High volume water jet

media

Specific hazards during firefighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	Alcohols Aldehydes carbon dioxide and carbon monoxide ethers toxic fumes Hydrocarbons Sodium oxides
Specific extinguishing methods	:	Product is compatible with standard fire-fighting agents.
		Product is compatible with standard fire-fighting agents.
Further information	:	Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
		Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.
Other information	:	Comply with all applicable federal, state, and local regulations.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : Do not breathe vapours/dust.
Do not smoke.
Container hazardous when empty.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
Smoking, eating and drinking should be prohibited in the application area.
For personal protection see section 8.
Dispose of rinse water in accordance with local and national regulations.

Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Observe label precautions.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
ETHYLENE GLYCOL	107-21-1	C	50 ppm 125 mg/m3	OSHA P0
		C	40 ppm 100 mg/m3 Vapour	CAL PEL
		TWA	25 ppm Vapour	ACGIH
		STEL	50 ppm Vapour	ACGIH
		STEL	10 mg/m3 Inhalable fraction, Aerosol only	ACGIH
DIETHYLENE GLYCOL	111-46-6	TWA	10 mg/m3	US WEEL
DISODIUM TETRABORATE	1330-43-4	TWA	1 mg/m3	NIOSH REL
		PEL	5 mg/m3	CAL PEL
		TWA	10 mg/m3	OSHA P0
		TWA	2 mg/m3 Inhalable fraction (Borate)	ACGIH
		STEL	6 mg/m3 Inhalable fraction (Borate)	ACGIH

Engineering measures : Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.

Personal protective equipment

Respiratory protection : A NIOSH-approved air-purifying respirator with an appropriate cartridge and/or filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits (if applicable) or if overexposure has otherwise been determined. Protection provided by air-purifying respirators is limited. Use a positive pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are not known or any other circumstances where an air-purifying respirator may not provide adequate protection.

In the case of vapour formation use a respirator with an approved filter.

Hand protection

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Not required under normal conditions of use. Wear splash-proof safety goggles if material could be misted or splashed into eyes.

Skin and body protection : Wear as appropriate:
Impervious clothing
Safety shoes
Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Wear resistant gloves (consult your safety equipment supplier).

Hygiene measures : Wash hands before breaks and at the end of workday.
When using do not eat or drink.
When using do not smoke.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state : liquid

Colour : light yellow

Odour : mild

Odour Threshold : No data available

pH	:	Average 6.5
Melting point/freezing point	:	No data available
Boiling point/boiling range	:	330 °F / 166 °C (1013 hPa)
Flash point	:	> 250.0 °F / > 121.1 °C Method: closed cup
Evaporation rate	:	> 1 Ethyl Ether
Flammability (solid, gas)	:	No data available
Upper explosion limit	:	15.3 %(V)
Lower explosion limit	:	3.2 %(V)
Vapour pressure	:	1.1 mmHg (20 °C)
Relative vapour density	:	> 1AIR=1
Relative density	:	No data available
Density	:	Average 1.1362 g/cm3 (15.56 °C)
Solubility(ies)		
Water solubility	:	No data available
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Thermal decomposition	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	No data available
Oxidizing properties	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No decomposition if stored and applied as directed.

Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	Product will not undergo hazardous polymerization.
Conditions to avoid	:	excessive heat Exposure to moisture
Incompatible materials	:	Acids Aldehydes Alkali metals Alkaline earth metals Bases iron salts strong alkalis Strong oxidizing agents Sulphur compounds
Hazardous decomposition products		Alcohols Aldehydes carbon dioxide and carbon monoxide ethers Hydrocarbons Organic acids Sodium oxides toxic fumes ketones

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Eye Contact
Ingestion
Acute toxicity
Harmful if swallowed.
Product:

Acute oral toxicity	:	Remarks: Ingestion of medications contaminated with diethylene glycol has caused kidney failure and death in humans. Products containing diethylene glycol should be considered toxic by ingestion. Acute toxicity estimate: 512.68 mg/kg Method: Calculation method
Acute dermal toxicity	:	Remarks: Skin absorption of this material (or a component)

may be increased through injured skin.

Components:

ETHYLENE GLYCOL:

Acute oral toxicity	:	LD0 (Human): estimated 1.56 g/kg Assessment: The component/mixture is classified as acute oral toxicity, category 4.
Acute inhalation toxicity	:	LC50 (Rat): 10.9 mg/l Exposure time: 1 h Test atmosphere: dust/mist Assessment: No adverse effect has been observed in acute inhalation toxicity tests.
Acute dermal toxicity	:	LD50 (Rabbit): 9,530 mg/kg
Acute toxicity (other routes of administration)	:	LD50 (Rat): 5,010 mg/kg Application Route: Intraperitoneal

DIETHYLENE GLYCOL:

Acute oral toxicity	:	LD50 (Human): Expected 1,120 mg/kg Target Organs: Kidney
Acute inhalation toxicity	:	LC50 (Rat): > 4.6 mg/l Exposure time: 4 h Test atmosphere: dust/mist Assessment: No adverse effect has been observed in acute inhalation toxicity tests.
Acute dermal toxicity	:	LD50 (Rabbit): 13,300 mg/kg

SODIUM BENZOATE:

Acute oral toxicity	:	LD50 (Rat, male and female): 3,450 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 12.2 mg/l Exposure time: 4 h Test atmosphere: dust/mist Remarks: Information given is based on data obtained from similar substances.

DISODIUM TETRABORATE:

Acute inhalation toxicity	:	LC50 (Rat): > 2.03 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Assessment: No adverse effect has been observed in acute inhalation toxicity tests.
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg Assessment: No adverse effect has been observed in acute

dermal toxicity tests.

SODIUM NITRITE:
Acute oral toxicity : LD50 (Rat): 180 mg/kg

Acute inhalation toxicity : LC50 (Rat): 5.5 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

SODIUM NITRATE:
Acute oral toxicity : LD50 (Rat): ca. 3,430 mg/kg
Method: OECD Test Guideline 401

Skin corrosion/irritation
Not classified based on available information.
Components:
ETHYLENE GLYCOL:
Species : Rabbit
Result : No skin irritation

DIETHYLENE GLYCOL:
Species : Human
Result : Slight, transient irritation

SODIUM BENZOATE:
Assessment : Slight, transient irritation
Result : Slight, transient irritation

DISODIUM TETRABORATE:
Species : Rabbit
Result : No skin irritation

SODIUM NITRITE:
Assessment : No skin irritation
Result : No skin irritation

SODIUM NITRATE:
Species : Rabbit
Method : OECD Test Guideline 404
Result : No skin irritation
Remarks : Information given is based on data obtained from similar substances.

Serious eye damage/eye irritation
Not classified based on available information.
Product:
Remarks : Unlikely to cause eye irritation or injury.

Components:
ETHYLENE GLYCOL:
Result : Slight, transient irritation

DIETHYLENE GLYCOL:

Species	:	Rabbit
Result	:	Slight, transient irritation

SODIUM BENZOATE:

Species	:	Rabbit
Result	:	Irritating to eyes.
Method	:	OECD Test Guideline 405

DISODIUM TETRABORATE:

Result	:	Slight, transient irritation

SODIUM NITRITE:

Result	:	Irritating to eyes.
Assessment	:	Irritating to eyes.

SODIUM NITRATE:

Species	:	Rabbit
Result	:	Irritating to eyes.
Method	:	OECD Test Guideline 405

Respiratory or skin sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Components:

ETHYLENE GLYCOL:

Test Type	:	Maximisation Test
Species	:	Guinea pig
Assessment	:	Does not cause skin sensitisation.

DIETHYLENE GLYCOL:

Test Type	:	Maximisation Test
Species	:	Guinea pig
Method	:	Directive 67/548/EEC, Annex V, B.6.
Result	:	Did not cause sensitisation on laboratory animals.

DISODIUM TETRABORATE:

Test Type	:	Buehler Test
Species	:	Guinea pig
Assessment	:	Does not cause skin sensitisation.
Method	:	OECD Test Guideline 406

Germ cell mutagenicity

Not classified based on available information.

Components:

ETHYLENE GLYCOL:

Genotoxicity in vitro	:	Test Type: Ames test Test system: Salmonella typhimurium

Metabolic activation: with and without metabolic activation
Result: negative

DIETHYLENE GLYCOL:

Genotoxicity in vitro : Test Type: Ames test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes

Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 479
Result: negative
GLP: yes

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse
Method: OECD Test Guideline 474
Result: negative
GLP: yes

Carcinogenicity

May cause cancer.

IARC Group 2A: Probably carcinogenic to humans
Sodium nitrite Not Assigned
(nitrite (ingested) under conditions that result in endogenous nitrosation)
Group 2A: Probably carcinogenic to humans
Sodium nitrate Not Assigned
(nitrate (ingested) under conditions that result in endogenous nitrosation)

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

May damage fertility or the unborn child.

Components:

DISODIUM TETRABORATE:

Reproductive toxicity - Assessment : Clear evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

May cause damage to organs (Kidney, Liver) through prolonged or repeated exposure if swallowed.

Components:
ETHYLENE GLYCOL:

Exposure routes	:	Ingestion
Target Organs	:	Kidney, Liver
Assessment	:	May cause damage to organs through prolonged or repeated exposure.

DIETHYLENE GLYCOL:

Exposure routes	:	Ingestion
Target Organs	:	Kidney
Assessment	:	May cause damage to organs through prolonged or repeated exposure.

Aspiration toxicity
Not classified based on available information.

Product:
No aspiration toxicity classification

Experience with human exposure
Components:
ETHYLENE GLYCOL:

Ingestion	:	Target Organs: Kidney

DIETHYLENE GLYCOL:

General Information	:	Liver Kidney

Further information
Product:

Remarks	:	No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Product:
Ecotoxicology Assessment

Short-term (acute) aquatic hazard	:	Acute aquatic toxicity Category 3; Harmful to aquatic life.
Long-term (chronic) aquatic hazard	:	Not classified based on available information.

Components:
ETHYLENE GLYCOL:

Toxicity to fish	:	LC50 (Lepomis macrochirus (Bluegill sunfish)): 27,540 mg/l Exposure time: 96 h Test Type: static test LC50 (Pimephales promelas (fathead minnow)): 8,050 mg/l

Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): > 10,000 mg/l
Exposure time: 48 h
Test Type: static test

Toxicity to algae : EC50 (Pseudokirchneriella subcapitata (green algae)): 6,500 - 13,000 mg/l
End point: Growth inhibition
Exposure time: 7 Days

Toxicity to fish (Chronic toxicity) : NOEC (Pimephales promelas (fathead minnow)): 32,000 mg/l
Exposure time: 7 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 24,000 mg/l
Exposure time: 7 d

DIETHYLENE GLYCOL:
Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): > 10,000 mg/l
Exposure time: 24 h
Test Type: static test
Method: DIN 38412

SODIUM BENZOATE:
Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 100 mg/l
Exposure time: 96 h
Test Type: static test
Method: Static
Remarks: Mortality

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 96 h
Test Type: static test
Method: Static
Remarks: Mortality

DISODIUM TETRABORATE:
Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 79.7 mg/l
Exposure time: 96 h
Remarks: Information refers to the main component.

Toxicity to algae : NOEC (Pseudokirchneriella subcapitata (green algae)): 17.5 mg/l
End point: Growth inhibition
Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201
Remarks: Information refers to the main component.

Toxicity to fish (Chronic : NOEC (Danio rerio (zebra fish)): 5.6 mg/l

toxicity)		Exposure time: 34 d Test Type: semi-static test Method: OECD Test Guideline 210 Remarks: Information refers to the main component.
SODIUM NITRITE:		
Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 2.35 - 3.81 mg/l Exposure time: 96 h Test Type: flow-through test LC50 (Oncorhynchus mykiss (rainbow trout)): 0.54 - 26.3 mg/l Exposure time: 96 h Test Type: flow-through test
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 15.4 mg/l Exposure time: 48 h Test Type: static test Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Test Type: Growth inhibition Method: OECD Test Guideline 201
Toxicity to fish (Chronic toxicity)	:	NOEC (Ictalurus catus (catfish)): 6.16 mg/l Exposure time: 31 d Test Type: flow-through test
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Aquatic invertebrates): 9.86 mg/l Exposure time: 80 d Test Type: static test
Toxicity to bacteria	:	EC10 (activated sludge): 210 mg/l Exposure time: 3 h Test Type: Static Method: OECD Test Guideline 209
SODIUM NITRATE:		
Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 1,355 - 2,063 mg/l Exposure time: 96 h Method: Static Remarks: Mortality
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Daphnia magna (Water flea)): 3,581 mg/l Exposure time: 48 h Method: Static LC50 (Daphnia magna (Water flea)): 665 mg/l Exposure time: 96 h

Method: Static

Persistence and degradability
Components:
ETHYLENE GLYCOL:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 90 - 100 %
Exposure time: 10 d
Method: OECD Test Guideline 301

DIETHYLENE GLYCOL:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 70 - 80 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

SODIUM BENZOATE:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 88 %
Exposure time: 28 d
Method: OECD Test Guideline 301

DISODIUM TETRABORATE:
Biodegradability : Result: The methods for determining biodegradability are not applicable to inorganic substances.

SODIUM NITRITE:
Biodegradability : Result: The methods for determining biodegradability are not applicable to inorganic substances.

No data available
Bioaccumulative potential
Components:
ETHYLENE GLYCOL:
Bioaccumulation : Species: Crayfish (Procambarus)
Bioconcentration factor (BCF): 0.27
Exposure time: 61 d
Concentration: 1000 mg/l
Method: Flow through

Partition coefficient: n-octanol/water : log Pow: -1.36

DIETHYLENE GLYCOL:
Bioaccumulation : Species: Leuciscus idus (Golden orfe)
Bioconcentration factor (BCF): 100

Partition coefficient: n-octanol/water : log Pow: -1.47

SODIUM NITRITE:

Partition coefficient: n-octanol/water : log Pow: -3.700 (25 °C)

No data available

Mobility in soil

Components:

SODIUM NITRITE:

Stability in soil : Remarks: Not expected to adsorb on soil.

No data available

Other adverse effects

No data available

Product:

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Harmful to aquatic life.

Components:

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

General advice : The product should not be allowed to enter drains, water courses or the soil.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Send to a licensed waste management company.

Dispose of in accordance with all applicable local, state and federal regulations.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Empty containers should be taken to an approved waste handling site for recycling or disposal.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International transport regulations

REGULATION

ID NUMBER	PROPER SHIPPING NAME	*HAZARD CLASS	SUBSIDIARY HAZARDS	PACKING GROUP	MARINE POLLUTANT / LTD. QTY.

U.S. DOT - ROAD

Not dangerous goods

CFR_RAIL_C

Not dangerous goods

U.S. DOT - INLAND WATERWAYS

Not dangerous goods

TDG_ROAD_C

Not dangerous goods

TDG_RAIL_C

Not dangerous goods

TDG_INWT_C

Not dangerous goods

INTERNATIONAL MARITIME DANGEROUS GOODS

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

Not dangerous goods

MX_DG

Not dangerous goods

***ORM = ORM-D, CBL = COMBUSTIBLE LIQUID**

Marine pollutant		no

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
ETHYLENE GLYCOL	107-21-1	5000	5315

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Acute toxicity (any route of exposure)
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)

California Prop. 65

⚠ **WARNING**: Reproductive Harm - www.P65Warnings.ca.gov.

The components of this product are reported in the following inventories:

DSL : All components of this product are on the Canadian DSL

AICS : On the inventory, or in compliance with the inventory

ENCS : Not in compliance with the inventory

KECI : Not in compliance with the inventory

PICCS : Not in compliance with the inventory

IECSC : On the inventory, or in compliance with the inventory

TSCA : On TSCA Inventory

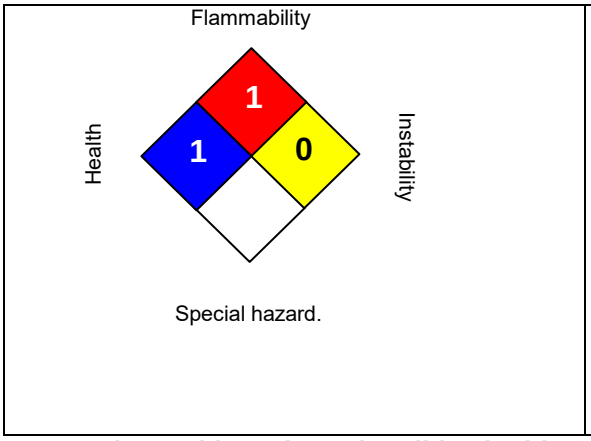
TSCA list

The following substance(s) is/are subject to TSCA 12(b) export notification requirements:
SODIUM NITRITE 7632-00-0

SECTION 16. OTHER INFORMATION

Further information
Revision Date: 08/31/2018

NFPA:	HMIS III:



HEALTH	1*
FLAMMABILITY	1
PHYSICAL HAZARD	0

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

NFPA Flammable and Combustible Liquids Classification
Combustible Liquid Class IIIB

Full text of H-Statements

H272	May intensify fire; oxidizer.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure if swallowed.

Sources of key data used to compile the Safety Data Sheet
Valvoline internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Valvoline's Environmental Health and Safety Department (1-800-VALVOLINE).

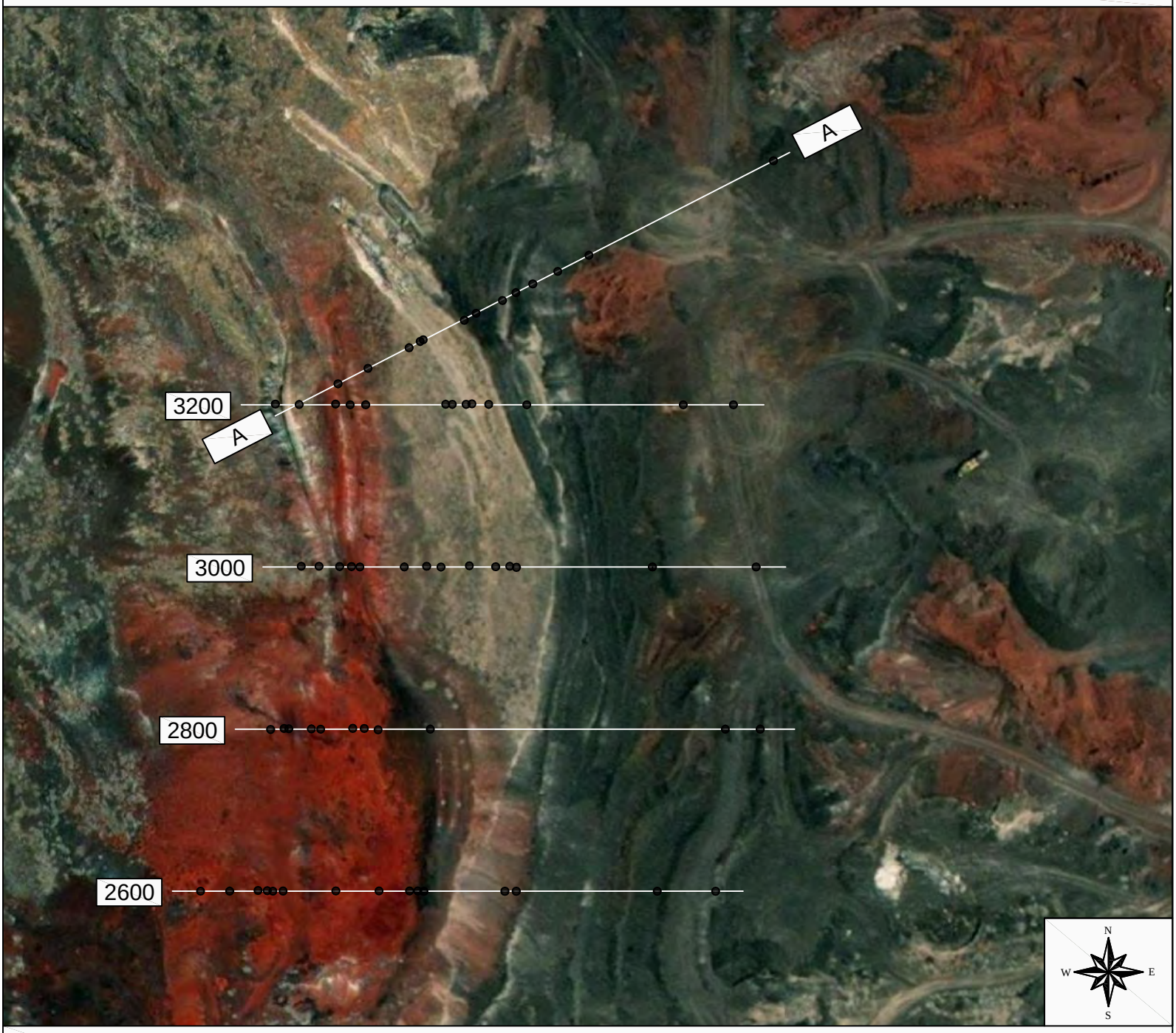
List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet :
ACGIH : American Conference of Industrial Hygienists
BEI : Biological Exposure Index
CAS : Chemical Abstracts Service (Division of the American Chemical Society).
CMR : Carcinogenic, Mutagenic or Toxic for Reproduction
FG : Food grade

GHS : Globally Harmonized System of Classification and Labeling of Chemicals.
H-statement : Hazard Statement
IATA : International Air Transport Association.
IATA-DGR : Dangerous Goods Regulation by the “International Air Transport Association” (IATA).

ICAO : International Civil Aviation Organization
ICAO-TI (ICAO) : Technical Instructions by the “International Civil Aviation Organization”
IMDG : International Maritime Code for Dangerous Goods
ISO : International Organization for Standardization
logPow : octanol-water partition coefficient
LCxx : Lethal Concentration, for xx percent of test population
LDxx : Lethal Dose, for xx percent of test population.
ICxx : Inhibitory Concentration for xx of a substance
Ecxx : Effective Concentration of xx
N.O.S.: Not Otherwise Specified
OECD : Organization for Economic Co-operation and Development
OEL : Occupational Exposure Limit
P-Statement : Precautionary Statement
PBT : Persistent , Bioaccumulative and Toxic
PPE : Personal Protective Equipment
STEL : Short-term exposure limit
STOT : Specific Target Organ Toxicity
TLV : Threshold Limit Value
TWA : Time-weighted average
vPvB : Very Persistent and Very Bioaccumulative
WEL : Workplace Exposure Level

CERCLA : Comprehensive Environmental Response, Compensation, and Liability Act
DOT : Department of Transportation
FIFRA : Federal Insecticide, Fungicide, and Rodenticide Act
HMIRC : Hazardous Materials Information Review Commission
HMIS : Hazardous Materials Identification System
NFPA : National Fire Protection Association
NIOSH : National Institute for Occupational Safety and Health
OSHA : Occupational Safety and Health Administration
PMRA : Health Canada Pest Management Regulatory Agency
RTK : Right to Know
WHMIS : Workplace Hazardous Materials Information System

Appendix J.
Wall Engineering Slope Cross-sections 2021



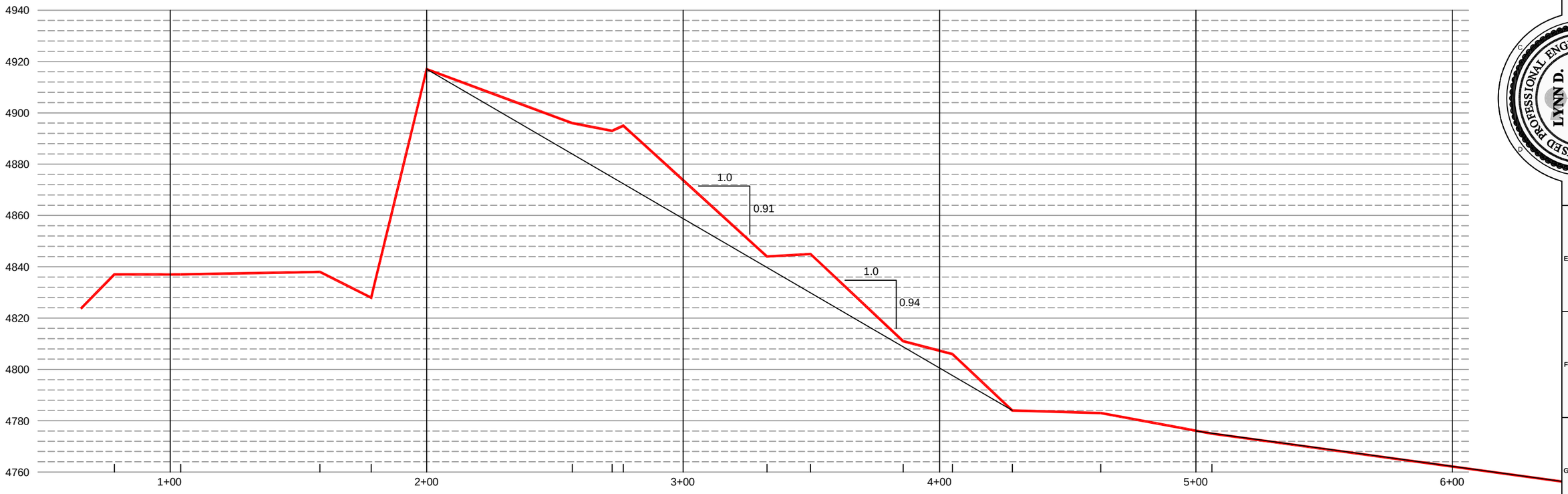
0' 150' 250' 350'

Wall Engineering, Inc.
55 So. Main #2, P.O. Box 39
Fillmore, Utah 84631
Cell: (435) 864-7503
lynn@wallengineering.net

LICENSED PROFESSIONAL ENGINEER
LYNN D. WALL
No. 182598
12-17-21
STATE OF UTAH

Red Dome High Wall Profiles, 2021

File Name: Red Dome\Plan and Sections
By: LDW
Date: December 17, 2021
Scale: 1" = 175'
Sheet 1 of 6



PROFILE A - A

HORIZONTAL AND VERTICAL SCALE: 1" = 40’

November 2021 Profile

November 2021 Overall Profile 1.72 H : 1.0 V

0 40 80

Scale

Angle of Repose Gravel or Crushed Stone: 45°
Glover, T.J. (1995) Pocket Reference.
Sequoia Publishing ISBN 978-1885071002.

LICENSED PROFESSIONAL ENGINEER
LYNN D. WALL
No. 182598
12-17-21
STATE OF UTAH

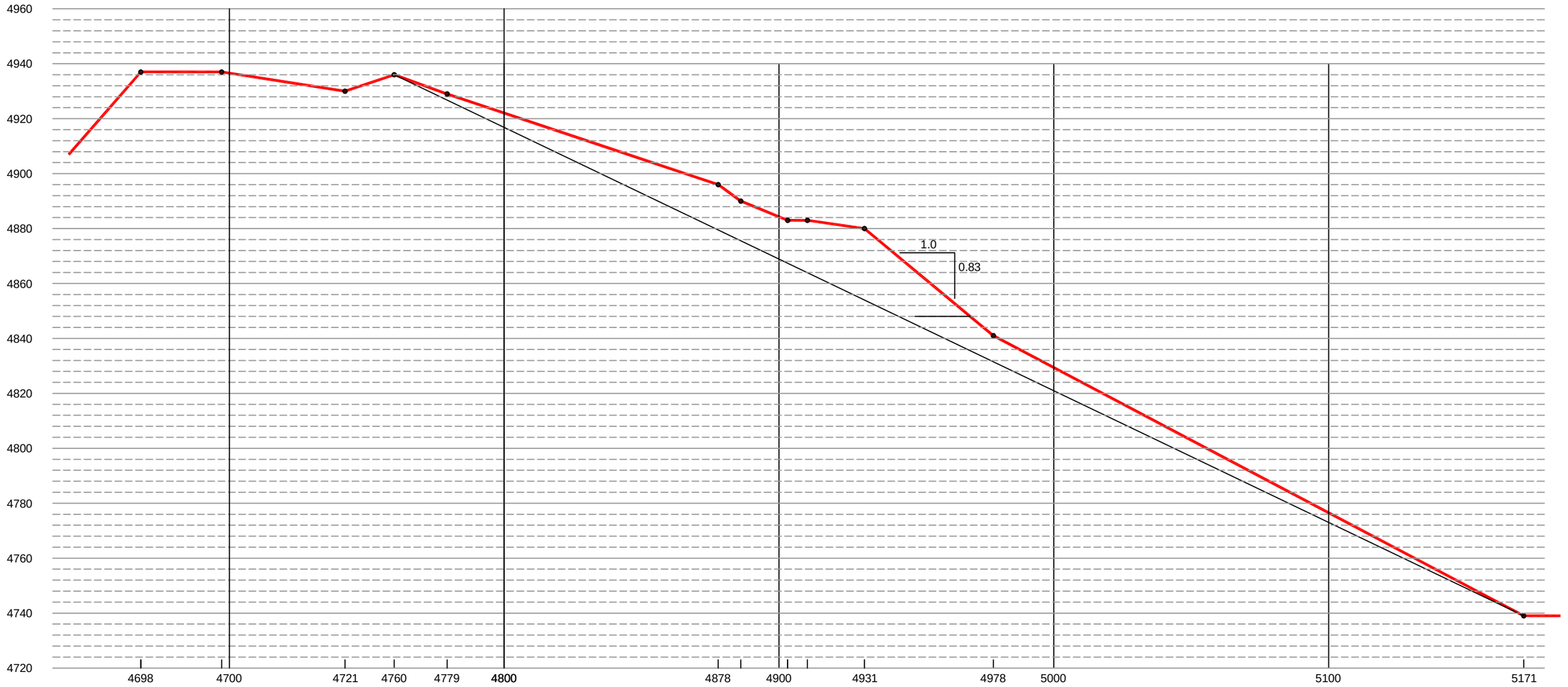
FILENAME: C:\...RED DOME 2021 PLAN AND SECTIONS.DWG
DESIGN: LDW
DRAWN: LDW
DATE: December 17, 2021

RED DOME HIGH WALL PROFILES, 2021

PROFILE A - A

WALL ENGINEERING, INC
55 SOUTH MAIN, NO. 2
P.O. BOX 39
FILLMORE, UTAH 84631
(435) 864-7503 CELL
lynn@wallengineering.net

SHEET NO: 2 of 6
DRAWING NO: ----
SCALE: SHOWN



PROFILE 3200

HORIZONTAL AND VERTICAL SCALE: 1" = 40'

November 2021 Profile

November 2021 Overall Profile 2.09 H : 1.0 V

0 40 80

Scale

Angle of Repose Gravel or Crushed Stone: 45°
Glover, T.J. (1995) Pocket Reference.
Sequoia Publishing ISBN 978-1885071002.

LICENSED PROFESSIONAL ENGINEER
LYNN D. WALL
No. 182598
12-17-21
STATE OF UTAH

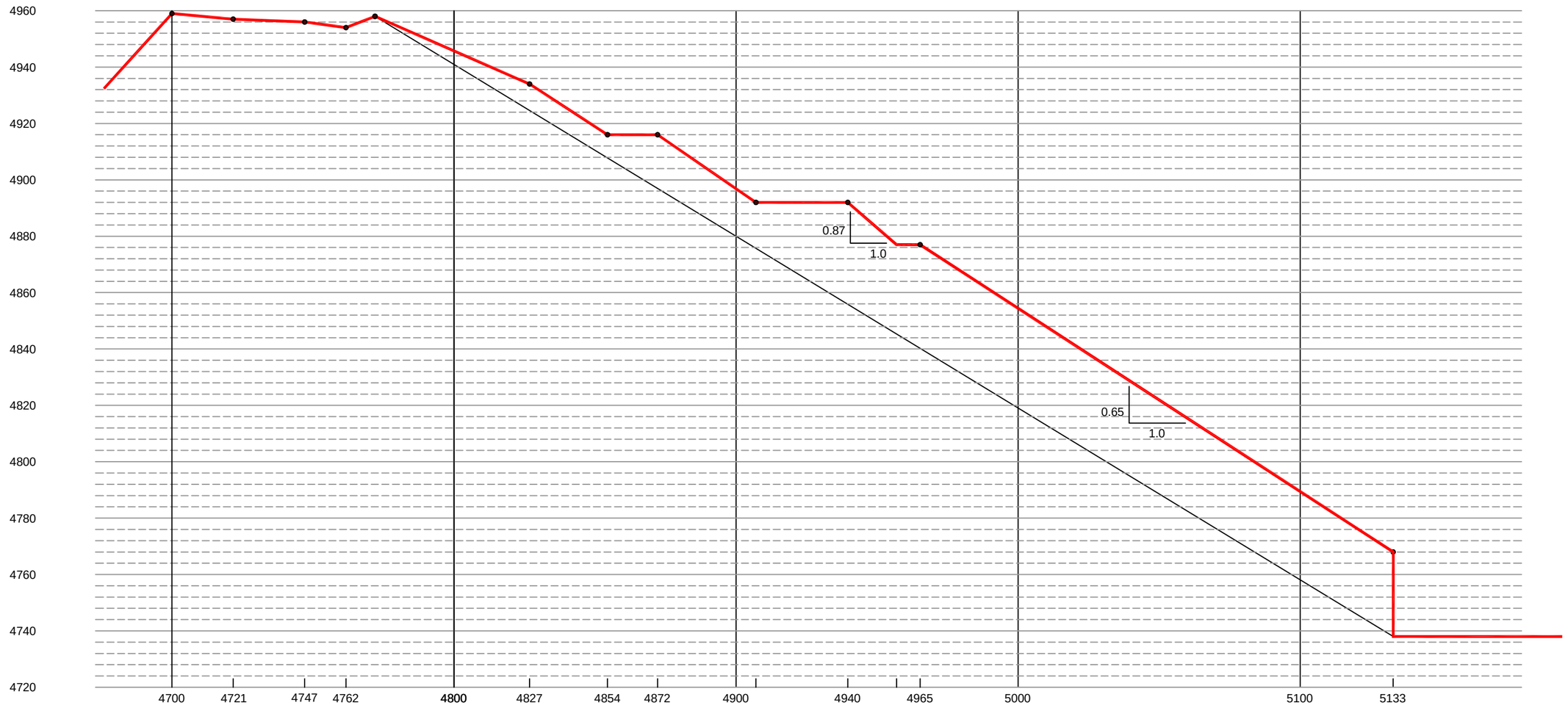
FILENAME: C:\...RED DOME 2021 PLAN AND SECTIONS.DWG
DESIGN: LDW
DRAWN: LDW
DATE: December 17, 2021

RED DOME HIGH WALL PROFILES, 2021

PROFILE 3200

WALL ENGINEERING, INC
55 SOUTH MAIN, NO. 2
P.O. BOX 39
FILLMORE, UTAH 84631
(435) 864-7503 CELL
lynn@wallengineering.net

SHEET NO: 3 of 6
DRAWING NO: ----
SCALE: SHOWN



PROFILE 3000

HORIZONTAL AND VERTICAL SCALE: 1" = 40'

November 2021 Profile

November 2021 Overall Profile 1.64 H : 1.0 V

0 40 80

Scale

Angle of Repose Gravel or Crushed Stone: 45°
Glover, T.J. (1995) Pocket Reference.
Sequoia Publishing ISBN 978-1885071002.

LICENSED PROFESSIONAL ENGINEER
LYNN D. WALL
No. 182598
12-17-21
STATE OF UTAH

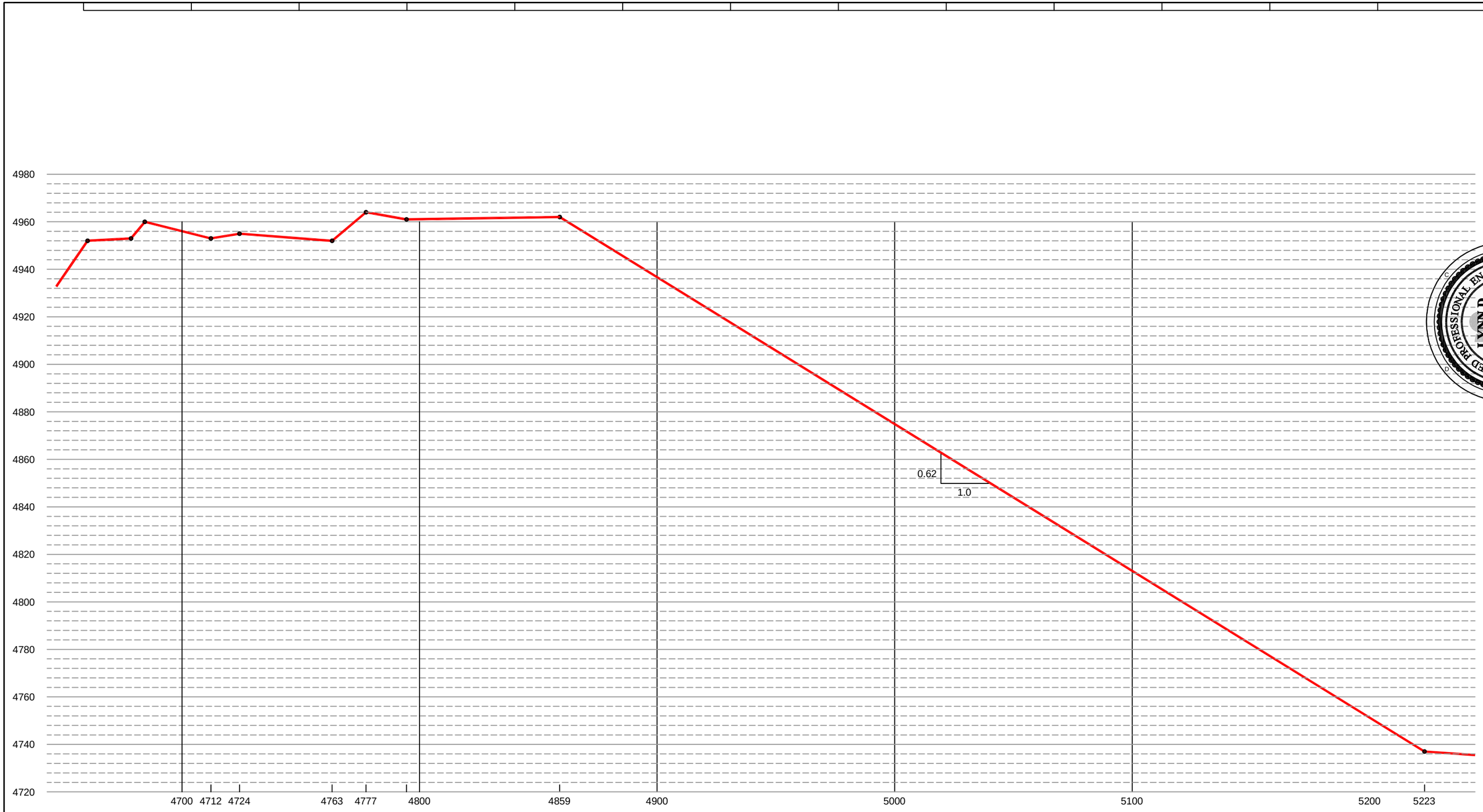
FILENAME: C:\...RED DOME 2021 PLAN AND SECTIONS.DWG
DESIGN: LDW
DRAWN: LDW
DATE: December 17, 2021

RED DOME HIGH WALL PROFILES, 2021

PROFILE 3000

WALL ENGINEERING, INC
55 SOUTH MAIN, NO. 2
P.O. BOX 39
FILLMORE, UTAH 84631
(435) 864-7503 CELL
lynn@wallengineering.net

SHEET NO: 4 of 6
DRAWING NO: ----
SCALE: SHOWN



PROFILE 2800

HORIZONTAL AND VERTICAL SCALE: 1" = 40'

November 2021 Profile

November 2021 Overall Profile 1.62 H : 1.0 V

0 40 80

Scale

Angle of Repose Gravel or Crushed Stone: 45°
Glover, T.J. (1995) Pocket Reference.
Sequoia Publishing ISBN 978-1885071002.

LICENSED PROFESSIONAL ENGINEER
LYNN D. WALL
No. 182598
12-17-21
STATE OF UTAH

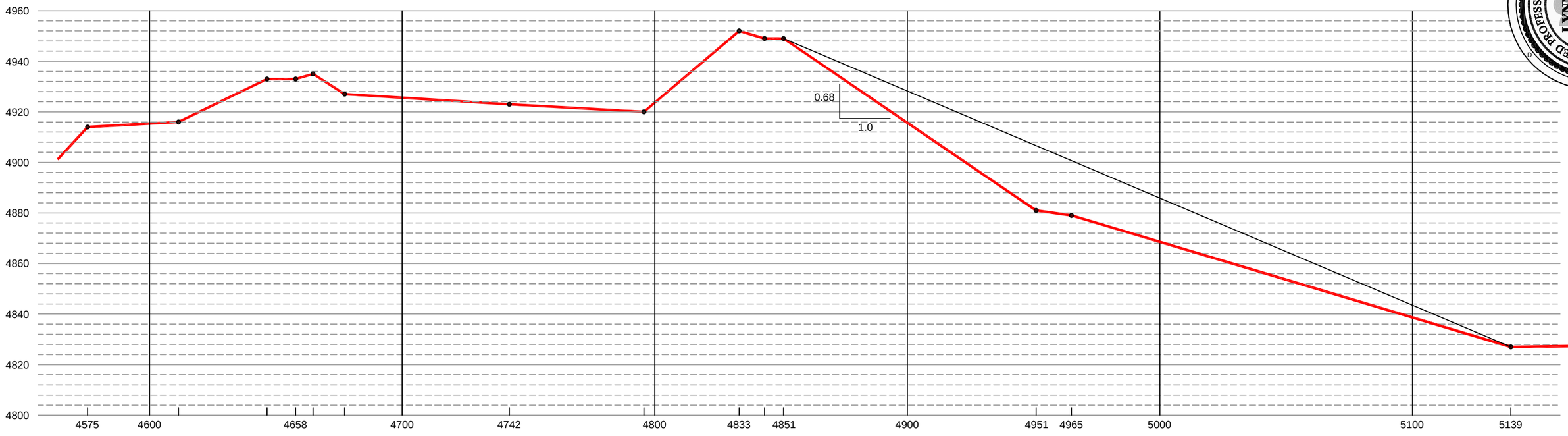
FILENAME: C:\...RED DOME 2021 PLAN AND SECTIONS.DWG
DESIGN: LDW
DRAWN: LDW
DATE: December 17, 2021

RED DOME HIGH WALL PROFILES, 2021

PROFILE 2800

WALL ENGINEERING, INC.
55 SOUTH MAIN, NO. 2
P.O. BOX 39
FILLMORE, UTAH 84631
(435) 864-7503 CELL
lynn@wallengineering.net

SHEET NO: 5 of 6
DRAWING NO: ----
SCALE: SHOWN



PROFILE 2600

HORIZONTAL AND VERTICAL SCALE: 1" = 40'

November 2021 Profile

November 2021 Overall Profile 2.36 H : 1.0 V

0 40 80

Scale

Angle of Repose Gravel or Crushed Stone: 45°
Glover, T.J. (1995) Pocket Reference.
Sequoia Publishing ISBN 978-1885071002.

LICENSED PROFESSIONAL ENGINEER
LYNN D. WALL
No. 182598
12-17-21
STATE OF UTAH

FILENAME: C:\...RED DOME 2021 PLAN AND SECTIONS.DWG
DESIGN: LDW
DRAWN: LDW
DATE: December 17, 2021

RED DOME HIGH WALL PROFILES, 2021

PROFILE 2600

WALL ENGINEERING, INC
55 SOUTH MAIN, NO. 2
P.O. BOX 39
FILLMORE, UTAH 84631
(435) 864-7503 CELL
lynn@wallengineering.net

SHEET NO: 6 of 6
DRAWING NO: ----
SCALE: SHOWN

Appendix K.
Air Quality Registration

State of Utah

SPENCER J. COX
Governor

DEIDRE HENDERSON
Lieutenant Governor

Department of
Environmental Quality

Kimberly D. Shelley
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

Small Source Registration

DAQE-EN160880001-22

January 11, 2022

Rick Welsh
Red Dome Inc.
P.O. Box 974
American Fork, UT 84003
rick.welsh122@icloud.com

Dear Mr. Welsh:

Re: Request for Evaluation of Compliance with Rule R307-401-9, UAC: Small Source Exemption
Project Fee Code: N160880001

On December 16, 2021, the Division of Air Quality (DAQ) received your request for a small source exemption for Red Dome Inc.'s Red Dome Cinder Mine. The source is located at 5865 West 200 South, Fillmore, Millard County. DAQ has determined the small source exemption applies to the source, as long as the equipment and associated processes operate as specified in the registration request.

The small source exemption does not exempt a source from complying with other applicable federal, state, and local regulations and the current Utah Administrative Code. Based on the emissions that you submitted to DAQ with your registration request, Red Dome Inc.'s Red Dome Cinder Mine is not required to obtain an approval order under R307-401. If you change your operation such that there is an increase in emissions, we recommend that you notify us, as an approval order may be required.

As authorized by the Utah Legislature, the fee for issuing this small source exemption is a one-time filing fee in addition to the actual time spent by the review engineer and all other staff on the project. Payment should be sent to DAQ upon receipt of the invoice.

Thank you for registering your source with the DAQ. If you have any additional questions, please contact John Persons at (385) 306-6503 or jpersons@utah.gov.

Sincerely,

Bryce C. Bird
Director

Alan D. Humpherys, Manager
New Source Review Section

BCB:ADH:JP:sa

Appendix L.
UDOGM Bond Calculations

RED DOME RECLAMATION COST ESTIMATE

Direct Costs			
Subtotal Demolition and Removal	$33,108.90	11.3%	
Subtotal Backfilling and Grading	$231,475.93	79.2%	
Subtotal Revegetation	$27,755.74	9.5%	
Total Direct Costs	**$292,340.57**		
Indirect Costs			
Mob/Demob	$29,234.00	10.0%	
Contingency	$14,617.00	5.0%	
Engineering Redesign	$7,309.00	2.5%	
Main Office Expense	$19,879.00	6.8%	
Project Management Fee	$7,309.00	2.5%	
Total Indirect Costs	**$78,348.00**	**26.8%**	
Total Reclamation Cost 2024	**$370,688.57**		
Number of Years	5		
Escalation Factor	0.0485		
Escalation Amount	$99,045.00		
Reclamation Cost Escalated	$469,733.57		
Required Reclamation Surety (rounded to nearest $1,000) 2029 Dollars	**$470,000.00**		**$4,818.54** $/ac
Posted Bond *(as of January 2021)*	$344,000.00		
Difference Between Required Reclamation Surety and Posted Bond	$126,000.00	Additional Bond Required	
Percent Difference	36.6%		

Ref	Description	Materials	R.S. Means Number	Unit Cost	Unit	Length ft	Width ft	Height ft	Area SF	Volume	Unit	Notes	# of Trucks (12 CY)	Est. # of Items	Unit	Volume	Unit	Cost
	Weigh Station Area (BLM)																	
	Demolish Scale House	Small steel single-wide trailer; haul 20 mi. included	02 41 16.13.0500	$ 0.50	per CF	40	20	10		8,000	CF							$ 4,000
	Additional 10 mi. haul (one-way)	12 CY trck, 20 mi. rt, 40 mph, 15 min wait	31 23 23.20.1078	$ 14.54	per CY					98	CY	FEMA: 33%						$ 1,422
	Disposal fee - C&D material	Offsite (county landfill in Fillmore); 290 CY (FEMA)	millardcounty.org	$ 12.00	per CY					98	CY							$ 1,173
	Remove Scales	Estimate	estimate	$ 1,500										1	scale			$ 1,500
	Demolish Scale Foundations (concrete)	Assume 2' x 3', 8 sec. @ 5' long, avg reinforc: +10%	02 41 16.17.1140	$ 27.02	per linear ft.	40	3	2		312	CF	*Assumes swell factor of 30%*						$ 1,081
		Add 10% for average reinforcing	02 41 16.17.1200 - F2-0_3_Avg	$ 29.72	per linear ft.	40	3	2		312	CF	*Assumes swell factor of 30%*						$ 1,189
	Disposal (onsite) of demolished concrete	Burial of concrete w/ adequate cover	02 41 16.17.4200	$ 12.53	per CY					12.71	CY							$ 159
	Total Weigh Station Area																	**$ 10,524**
	Mobile Office (Processing Area - BLM)																	
	Demolish Mobile Office	Small steel single-wide trailer; haul 20 mi. included	02 41 16.13.0500	$ 0.50	per CF	40	15	10		6,000	CF							$ 3,000
	Additional 10 mi. haul (one-way)	12 CY trck, 20 mi. rt, 40 mph, 15 min wait	31 23 23.20.1078	$ 14.54	per CY					290	CY							$ 4,217
	Disposal fee - C&D material	Offsite (county landfill in Fillmore); 290 CY (FEMA)	millardcounty.org	$ 12.00	per CY					290	CY							$ 3,480
	Total Mobile Office (Processing Area)																	**$ 10,697**
	Equipment & Trash (Processing Area - BLM)																	
	Demolish Control House	Single steel building; haul 20 mi. included	02 41 16.13.0500	$ 0.50	per CF	14	10	10		1,400	CF							$ 700
	Demolish Other Building	Single steel building; haul 20 mi. included	02 41 16.13.0500	$ 0.50	per CF	6	6	18		648	CF							$ 324
	Additional 10 mi. haul (one-way)	12 CY trck, 20 mi. rt, 40 mph, 15 min wait	31 23 23.20.1078	$ 14.54	per CY					25	CY	33% of volume						$ 364
	Dump fee - C&D material	Offsite (county landfill in Fillmore)	millardcounty.org	$ 12.00	per CY					25	CY	33% of volume						$ 300
	Remove Processing Equipment (stationary)	11 conveyor sections	estimate	$ 200	per section									11	sections			$ 2,200
	Remove Processing Equipment (stationary)	4 screens/crushers	estimate	$ 1,000	per piece									4	pieces			$ 4,000
	Remove Mobile Fleet Equipment	2 big loaders, 1 end dumps, 1 med dozer	estimate	$ 1,000	per piece									4	pieces			$ 4,000
	Total Equipment & Trash (Processing Area)																	**$ 11,888**
	Total Demolition Cost																	**$ 33,109**

	Source of 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.**		**Cost**
PROCESSING AREAS																
Rip flat process/stockpile areas																
D9 Dozer	Blue Book (equip costs, not incl. loc. factor); RSMeans (labor w/ O&P)	$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	5.80	ac	1.5	ac/hr	**3.9**	hrs	**$ 2,100**
ACTIVE MINING AREAS - SW, Central, and North																
Grade waste rock to 1h:1v or less																
D9 Dozer	Blue Book (equip costs, not incl. loc. factor); RSMeans (labor w/ O&P)	$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	40.11	ac	*0.24*	ac/hr	**168.1**	hrs	**$ 90,506**
Rip graded slopes on contour																
D9 Dozer	Blue Book (equip costs, not incl. loc. factor); RSMeans (labor w/ O&P)	$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	40.11	ac	1.5	ac/hr	**26.6**	hrs	**$ 14,322**
MINE DEVELOPMENT AREAS																
Grade Area to 2h:1v or less																
D9 Dozer (ROUGH TIME ESTIMATE)	Blue Book (equip costs, not incl. loc. factor); RSMeans (labor w/ O&P)	$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	17.89		*0.24*	est.	**75.0**	hrs	**$ 40,381**
Rip graded slopes on contour																
D9 Dozer	Blue Book (equip costs, not incl. loc. factor); RSMeans (labor w/ O&P)	$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	17.89	ac	1.5	ac/hr	**11.9**	hrs	**$ 6,407**
HIGHWALL																
Construct berm above highwall																
336 DL Excavator		$ 15,325	$65.86	**0.1**	$91.95	**$ 260.18**	1	**$ 260.18**	/hr	1,600	cy	373.5	cy/hr	**5.0**	hrs	**$ 1,301**
ROADS																
Contour South Road																
336 DL Excavator (TIME ESTIMATE)		$ 15,325	$65.86	**0.1**	$91.95	**$ 260.18**	1	**$ 260.18**	/hr	*1.64*		*1.5*	ac/hr	**1.1**	hrs	**$ 286**
Haul and Access Roads - Rip roads																
D9 Dozer (ripping)		$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	1.54	ac	1.5	ac/hr	**1.1**	hrs	**$ 592**
Contour North Road - Roads and central area																
ESTIMATE)		$ 15,325	$65.86	**0.1**	$91.95	**$ 260.18**	1	**$ 260.18**	/hr	*1.76*		*1.5*	ac/hr	**1.2**	hrs	**$ 312**
SHARED ROAD - To be left for County Access																
Shared Road - 1.36ac																
D9 Dozer (ripping)		$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	-	ac	1.5	ac/hr	**0.0**	hrs	**$ -**
PROPOSED REVEGETATION AREA																
Grade Area to 2h:1v or less																
D9 Dozer (ROUGH TIME ESTIMATE)	Blue Book (equip costs, not incl. loc. factor); RSMeans (labor w/ O&P)	$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	28.80		*0.24*	est.	**120.7**	hrs	**$ 64,986**
D9 Dozer (ripping)		$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	28.80	ac	1.5	ac/hr	**19.1**	hrs	**$ 10,284**
NATURAL REVEGETATION AREA																
Natural Area - 2.72ac																
D9 Dozer (ripping)		$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	-	ac	1.5	ac/hr	**0.0**	hrs	**$ -**
FUTURE MINING AREA																
Expansion Area - 62.23 ac																
D9 Dozer (ripping)		$ 41,755	$164.58	**0.1**	$96.40	**$ 538.41**	1	**$ 538.41**	/hr	-	ac	1.5	ac/hr	**0.0**	hrs	**$ -**
Little soil has been salvaged. Relatively little exists in this area of relatively recent (geologic time) volcanic activity. In the future, all soil should be salvaged where possible.																
Total Earthwork Cost																**$ 231,476**

Task	Materials	Reference #	Own/Rent	Operation	Labor	Total Op.	Unit	Production	Unit	Area (acres)		Reclamation Cost		TOTAL
		(numbers are RS Means 2022 referen	Cost	Cost	Cost	Cost		Rate		BLM	Private	BLM	Private	Cost
Actvie Mining Areas	Laborer	RS Means	$0.00	$0.00	$70.40	$70.40	$/hr	1.00	acre/hr	40.11	0	$ 12,851	$ -	**$ 12,851**
	Seed Cost	UDOGM estimate	$250.00				/ac							
Mine Development areas below highwall	CAT D9T Dozer	2022 EquipmentWatch & RS Means	Assumes seed spreader operated by dozer during ripping.					1.51	acre/hr	17.89	0	$ 4,643	$ -	**$ 4,643**
	Bowie Lancer 500 gal seed spreader	2022 EquipmentWatch & RS Means	$5.56	$8.81		$ 14.37	$/hr							
	Seed Cost	UDOGM estimate	$250.00				/ac		$/ac					
Future Mining areas - 63.19 ac	CAT D9T Dozer	2022 EquipmentWatch & RS Means	Assumes seed spreader operated by dozer during ripping.					1.51	acre/hr	0.00	0	$ -	$ -	**$ -**
	Bowie Lancer 500 gal seed spreader	2022 EquipmentWatch & RS Means	$5.56	$8.81		$ 14.37	$/hr							
	Seed Cost	UDOGM estimate	$250.00				/ac		$/ac					
Proposed Revegetation areas	CAT D9T Dozer	2022 EquipmentWatch & RS Means	Assumes seed spreader operated by dozer during ripping.					1.51	acre/hr	28.80	0	$ 7,474	$ -	**$ 7,474**
	Bowie Lancer 500 gal seed spreader	2022 EquipmentWatch & RS Means	$5.56	$8.81		$ 14.37	$/hr							
	Seed Cost	UDOGM estimate	$250.00				/ac		$/ac					
Processing areas	CAT D9T Dozer	2022 EquipmentWatch & RS Means	Assumes seed spreader operated by dozer during ripping.					1.51	acre/hr	5.80	0	$ 1,505	$ -	**$ 1,505**
	Bowie Lancer 500 gal seed spreader	2022 EquipmentWatch & RS Means	$5.56	$8.81		$ 14.37	$/hr							
	Seed Cost	UDOGM estimate	$250.00				/ac		$/ac					
Natural Revegetation Areas - 9.55 ac	CAT D9T Dozer	2022 EquipmentWatch & RS Means	Assumes seed spreader operated by dozer during ripping.					1.51	acre/hr	0.00	0	$ -	$ -	**$ -**
	Bowie Lancer 500 gal seed spreader	2022 EquipmentWatch & RS Means	$5.56	$8.81		$ 14.37	$/hr							
	Seed Cost	UDOGM estimate	$250.00				/ac		$/ac					
Access Roads (mostly flat haulroads & 2-track)	CAT D9T Dozer	2022 EquipmentWatch & RS Means	Assumes seed spreader operated by dozer during ripping.					1.51	acre/hr	1.54	0	$ 400	$ -	**$ 400**
	Bowie Lancer 500 gal seed spreader	2022 EquipmentWatch & RS Means	$5.56	$8.81		$ 14.37	$/hr							
	Seed Cost	UDOGM estimate	$250.00				/ac		$/ac					
Mine Pit Roads (regraded north and south roads)	CAT D9T Dozer	2022 EquipmentWatch & RS Means	Assumes seed spreader operated by dozer during ripping.					1.51	acre/hr	3.40	0	$ 882	$ -	**$ 882**
	Bowie Lancer 500 gal seed spreader	2022 EquipmentWatch & RS Means	$5.56	$8.81		$ 14.37	$/hr							
	Seed Cost	UDOGM estimate	$250.00				/ac		$/ac					

Assumes soil prep is part of Earthwork rip/grade.

Based on EPA source for planting rates (ac/hr), a conservative 5 acres/hour was selected. https://www.epa.gov/sites/production/files/2018-01/documents/seeding-rates-and-acres-planted-per-day-revised-final-030111.pdf
Seeder spreader is a hydroseeder

Seeding Cost (per acre) $ 284.56

NOTE: This calculation does not include largely vegetated acreage in west-southwest.

Total Revegetation Cost	(Total Seeded Disturbance area, ac)	97.54	0	$ 27,756	$ -	**$ 27,756**

Reclamation Cost Estimation Practices & Assumptions

Reclamation liabilities on Red Dome's adjusted disturbed acreage are included. Transfer of liability to Millard County is considered.
The 2016 determination of total disturbed acreage (BLM/private) is assumed to be accurate (about 257.7 ac), with 143 ac of Pre-Law area
In 2018, 16.7 acres were sold to Millard County and were removed from the total bonded acreage
Total Area assumed to be disturbed and the reclamation responsibility of Red Dome is 98 acres
The highwall will be mined at a slope no steeper than 45 degrees, and will not require major regrading work.
UDOGM field estimates of equipment operation times are the basis for earthwork costs.
No salvage value is considered in Demolition costs. (The effect is that unit costs are conservative.)
No location factors are applied to any unit costs. (The effect is that unit costs are conservative.)
BLM indirect cost percentages may need to be adjusted in the future.
Published 2024 EquipmentWatch Blue Book equipment ownership and operation rates were used for equipment operation cost estimation.
Published 2024 RS Means labor rates were used for equipment operation cost estimation. (Union Rates)
Published 2024 RS Means demolition costs were used for demolition estimation. (Union Rates)

Escalation Factor **0.0485**

Equipment Unit Costs for Earthwork and Revegetation

	Equipment Ownership Cost	Hourly Equipment Cost w/ Overhead	Hourly Operating Costs	Hourly Operating Cost w/ Overhead	Hourly Wage Rate	Hourly Eq. & Lab. Cost	Number of Men or Eq.	Total Hourly Costs
CAT D9T Dozer	$41,755	$260.97	$164.58	$181.04	$96.40	$538.41	1	$538.41
CAT D9T Dozer	$41,755	$260.97	$164.58	$181.04	$96.40	$538.41	1	$538.41
CAT 336 F Excavator	$15,325	$95.78	$65.86	$72.45	$91.95	$260.18	1	$260.18
Deere 5093E tractor	$6,520	$40.75	$28.39	$31.23	$91.95	$163.93	1	$163.93
Lancer 500 gal seed spreader	$890	$5.56	$8.01	$8.81	$0.00	$14.37	1	$14.37
Seed Cost (per acre)	BLM (est.)	$250	UDOGM rough estimate for a basic seed mix, based on experience.					

Demolition Unit Costs

Activity	Description	R.S. Means #	Unit Cost	Unit	
Demolish single buildings, no salvage, mixed	Includes 20 mi. haul (one-way), large urban,	02 41 16.13.0700	$ 0.50	per CF	
Demolish single buildings, no salvage, steel	No foundation or dump fees, C.F. is vol. of	02 41 16.13.0500	$ 0.50	per CF	
30% discount (no interior walls) - SINGLE STEE	building standing	02 41 16.13.0750 - SS	$ (0.15)	per CF	
Additional 10 mi. haul (one-way)	12 CY truck, 40 mph, 20 mi. cycle, 15 min ld	31 23 23.20.1078	$ 14.54	per CY	
Demolish floor, concrete slab	6", Reinforded, Rods	02 41 16.17.0440	$ 1.31	per SF	
Demolish footings, concrete	2' thick, 3' wide; avg reinforcing	02 41 16.17.1140	$ 27.02	per linear ft.	
	Average Reinforcing (add + 10%)	02 41 16.17.1200 - F2-0_3_Avg	$ 29.72	per linear ft.	
Demolish foundations, concrete	Assumes 8" thick	02 41 16.17.2420	$ 1.35	per SF	
	Average Reinforcing (add + 10%)	02 41 16.17.2600 - W8_Avg	$ 1.49	per SF	
Onsite disposal of demolished concrete	Burial of concrete w/ adequate cover	02 41 16.17.4200	$ 12.53	per CY	
Off-site disposal of demolished concrete	To 5 miles (Crew B-30: 12 CY truck)	02 41 16.17.4250	$ 25.24	per CY	
Additional 25 mi. haul (one-way)	12 CY truck, 40 mph, 50 mi cycle, 15 min ld/	31 23 23.20.1084	$ 29.12	per CY	
Disposal fee	C&D material; Millard Co landfill	millardcounty.org	$ 12.00	per CY	
Dumpster	20 CY (5 tons), 1 dump per week	02 41 19.19.0725	$ 625	per week	
Remove utility poles	wood, 30' high, on-site poles	02 41 13.80.0100	$ 380	per pole	
Remove utility pole cross arms	wood, 4'-6' long	02 41 13.80.0300	$ 167	per x-arm	

Labor Costs

Operator	*Labor Rate (per hr)*	*RS Means Code*	*Updated*
Equip. Operator, Crane/Shovel	$101.75	Eqhv	2024
Equip. Operator, Medium	$96.40	Eqmd	2024
Equip. Operator, Light	$91.95	Eqlt	2024
Helpers Average (5 trades)	$70.40	---	2024
Truck Driver	$82.00	Trlt	2024
Truck Driver	$85.10	Trhv	2024

1316.5

Project:	Red Dome
Date:	06/15/22
Prepared by:	TJS

WORKSHEET 6
PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE - RIPPING FOR REVEGETATION

Ripping Activity:

Rip processing areas, hill slopes (on contour), and roads.

Characterization of Dozer Used (type, size, etc.):

CAT D9 (410hp) dozer. Material is recently graded or mostly packed cinders - not difficult ripping conditions.

Description of Dozer Use (% grade, effective ripping width, operating speed, basis for each adjustment factor, etc.):

Assumed 2.5 mph speed. This function is not production ripping, but comparable to a farming tractor operation. Dozer ripping of compacted cinders could be much faster.
Operator and Efficiency factors are standard.
Material (not hard to rip, but not always loose) and Weight Correction (1000 lb/LCY) factors are assumed represented in the average speed.
Grade Factor: 1.0 (on contour)

Productivity Calculations:

Operator Adjustment Factor = 0.75 (operator factor) x 1.00 (material factor) x 0.83 (efficiency factor) x 1.00 (grade factor) x 1.00 (weight correction factor)

x 1.00 (production method/blade factor) x 1.00 (visibility factor) x 1.00 (elevation factor) = 0.62

Hourly Production = 2.0 (average speed) mi/hr x 10.0 (effective ripping width) ft x 5280 ft/mi x 1 ac

÷ 43560 ft² = 2.4 ac/hr

Net Hourly Production = 2.4 ac/hr x 0.62 (operating adjustment factor) = 1.51 ac/hr

Hours Required = (area to be ripped) ac ÷ 1.51 (net hourly production) ac/hr = 0.0 hr(s)

Data Source(s):
CAT Handbook 48, page 19-69

Project:	Red Dome
Date:	06/15/22
Prepared by:	TJS

WORKSHEET 10
PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Construct berm above main highwall by excavating a trench and piling excavated material adjacent to trench.

Characterization of the Excavator Used (type, size, etc.):

CAT 336 E L (300 hp, bucket capacity: 1.0 - 4.13 yd^3)

Description of Excavator Used (loading geometry, materials, etc.):

Trench dimensions for building berm is 3' across, 4' deep (0.58 loose yd^3/ft). Assuming angle of repose slopes, the resulting berm is over 3 ft high (more so on the trench side). Length of berm is estimated at 2700 ft. Volume (rounded to nearest 100 yd^3) is 1600 yd^3.

Productivity Calculations:

Net Bucket Capacity = 3 (heaped bucket capacity) LCY x 1 (bucket fill factor*) = 3.0 LCY

Hourly Production = 3.0 (net bucket capacity) LCY x 60 min/hr ÷ 0.4 (cycle time**) min x

0.83 (efficiency factor) = 373.5 LCY/hr

Hours Required = 1600.0 (volume to be handled) LCY ÷ 373.5 (net hourly production) LCY/hr = 4.3 hr

* See loader section of the equipment manual.

** See excavator section of equipment manual.

Data Source(s):

Project: Red Dome
Date: 06/15/22
Prepared by: TJS

WORKSHEET 7
PRODUCTIVITY AND HOURS REQUIRED FOR RIPPER-EQUIPPED DOZER USE

Ripping Activity:

Scarifier or ripper-equiped Dozer to be used to re-disc, re-harrow, re-scarify, or re-rip previously graded and ripped disturbance areas.

NOT USED IN CALCS - FOR DETERMINING REVEGETATION BOND AFTER REGRADING .

Characterization of Dozer and Ripper Use:

250 HP Tractor (assumed CAT D6 equivalent). Most of the area to be ripped, disked, or scarified is flat. Ripping of growth medium will allow furrows parallel to contours to limit meteoric water erosion and enhance the likelihood of revegetation success.

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Depth of second scarification: 6 inches . The material to be ripped is associated with roads on low slope areas and process areas. Cut Length: 1000 feet Width of Pass: 7'3' Speed: 2.0 mph road. The CAT Handbook of Ripping statement that 1-1.5 mph "gives the most economical production" refers to production ripping of bedrock (an alternative to blasting). Scarification of previously-ripped cinders would be significantly faster.

Productivity Calculations:

Cycle Time = 1000 ft (cut length) ÷ 176 ft/min ([speed]) + 0.25 min (fixed turn) = 5.9 min/pass

Passes/Hour = 60 min/hr ÷ 5.9 min/pass (cycle time) x 0.83 (efficiency) = 8.4 passes/hr

Area/Pass = (7.25 ft (pass width) x 1000 ft (pass length)) ÷ 43560 ft^2/acre

= 0.17 acres/pass

Hourly Production = 0.17 acres/pass x 8.4 passes/hr = 1.4 acres/hr

Hours Required = _____ acres (area to be ripped**) ÷ 1.4 acres/hr (hourly production) = 0.0 hr

* Fixed turn time depends upon dozer used. 0.25 min/turn is normal.

Data Source(s):
Reference Cat Performance Handbook

Appendix N.
Ownership Transfer Documents

AMENDMENT TO

THE AGREEMENT TO PURCHASE RED DOME PLACER MINING CLAIMS

WHEREAS the Parties, Red Dome, Inc., a Utah Corporation by its President and Director, Dionis Griffin and Stockholder Gordon D. Griffin, and lien holder Dexter L. Anderson, herein referred collectively as "Red Dome" and as "Seller" and BEG Resources L.L.C., a Utah Limited Liability company hereinafter referred to as "BEG" and "Buyer", entered into an Agreement to Purchase Red Dome Placer Mining Claims, dated January 10, 2019, herein referred to as the "Agreement", and intend to amend the Agreement in the following particulars and for due and valuable consideration:

1. **Section II** is hereby deleted in its entirety and amended to read as follows:

   A. The real property in Millard County, State of Utah, LESS Lot 2 and 3 of Section 23, Township 21 South, Range 6 West, Salt Lake Base and Meridian, as further described in Exhibit A attached hereto.
   B. Red Dome, Red Dome Placer Mining Claims No. 1-7, and Red Dome New Discover Placer Mining Claim, located in Millard County, State of Utah, LESS Lot 2 and 3 of Section 23, Township 21 South, Range 6 West, Salt Lake Base and Meridian, as further described in Exhibit A attached hereto.
   C. Crushing and screening plan equipment, platform scales, office equipment, and related parts and supplies located on the Red Dome Mining Claims or used in connection with the operation of the said claims. Herein after referred to as "equipment".
   D. Inventories of processed products stock piled on the said Red Dome Mining claims owned and held by Red Dome for sale to customers. Herein after referred to as "inventories."
   E. The full and exclusive use of the Red Dome, Inc. name, as consistent with BEG's intent to purchase the Red Dome business entity, its assets and obligations, and Red Dome's intent to be purchased by BEG, subject to full disclosure and due diligence.

2. **Section III, Paragraph 1** is hereby deleted in its entirety and amended to read as follows:

   1. Buyer shall purchase all described Red Dome Placer Mining Claims, real property, and business name, with appurtenant buildings, equipment and inventories, from Red Dome for the purchase price of as follows:

3. In all other respects, Parties hereby reconfirm all other provisions of the **Agreement to Purchase Red Dome Placer Mining Claims** which have not been modified by this Amendment.

Dated this 22nd day of January, 2024.

Red Dome, Inc.

By: Dexter L. Anderson

Dexter L. Anderson Power of Attorney

Dated this 22 day of Jan., 2024.

BEG Resources, LLC

By:

Jeff Burningham, Member