21.0 RULE 6.4.21: EXHIBIT U – DESIGNATED MINING OPERATION ENVIRONMENTAL PROTECTION PLAN

21.1 THE ENVIRONMENTAL PROTECTION PLAN

The Environmental Protection Plan shall describe how the Operator/Applicant will assure compliance with the provisions of the Act and Rules in order to protect all areas that have the potential to be affected by designated chemicals, toxic or acid-forming materials or acid mine drainage, or that will be or have the potential to be affected by uranium mining. In addition, the plan shall include an Emergency Response Plan that complies with Sections 34-32-103(4.9) and 34-32-116.5(5), C.R.S. 1984, as amended, and Rule 8.3, for designated chemicals used on site, and appropriate measures recommended by Colorado Parks and Wildlife (CPW) for the protection of wildlife from damage from designated chemicals, toxic or acid-forming materials and acid mine drainage.

(a) An Environmental Protection Plan is not required to address proposed or permitted activities that do not involve, affect, or influence the storage, handling, or disposal of the designated chemicals and that do not disturb toxic or acid-forming materials, and that do not cause, or have the potential to cause, generation of acid mine drainage unless such proposed or permitted activities involve uranium mining in which case an Environmental Protection Plan shall be required.

(b) In order to protect the public and the environment from the adverse effects of uranium mining, designated chemicals, acid or toxic producing materials or acid mine drainage, the Board may consider whether there is a potential for adverse impacts.

(c) Such a determination will evaluate, specifically, the potential for adverse impacts from any:

(i) leach facilities, or heap leach pad;

(ii) tailings storage or disposal areas;

(iii) impoundment;

(iv) waste rock piles;

(v) stock piles, temporary or permanent;

(vi) land application sites;

(vii) milling or metallurgical process: or

(viii) in situ leach operations or conventional uranium operations.

(d) The Board shall consider economic reasonableness and technical feasibility when determining whether the proposed location adequately assures compliance with performance standards of the Act, or may require that an alternate location be evaluated.

(e) The Board shall also consider current or pre-existing conditions and the degree to which the proposed plan would provide for net improvements in the protection of human health, property or the environment.

This section describes the procedures and containment strategies implement by which the Mill, will protect human health and the environment. On November 23, 2011 CDRMS listed the Leadville Mill as "Designated Mining Operation" (DMO). The DMO regulations requires the preparation of an Emergency Response and Management Plan and an Environmental Protection Plan (EPP).

The purpose of the plans to establish emergency response plans and to set guidelines to manage designated chemicals.

The DMO designation requires an operator using chemicals such as xanthates, to prepare a safety, chemical and containment management plans outlining the use, storage, handling, and disposal of chemicals.

The Mill has designed the milling process and the FTD to minimize the amount of water and chemicals used in the process as well as minimizing the amount of water required to dispose tailings disposal.

The EPP includes:

- Managing and minimizing chemical uses
- Implementing "best management" water recycling technologies,
- Managing and maintaining the FTD containment,
- Constructing and maintaining chemical secondary containment barriers,
- Adopting good housekeeping practices, and
- Implementing and maintaining process and environmental monitoring programs.

21.2 MAPS

An Environmental Protection Plan shall identify on map(s), sketch(es), plan(s) or other equivalent representations, the locations where designated chemicals, toxic or acid-forming materials, which will be used, stored, handled, exposed, disturbed or disposed of within the permit area, and existing or potential sources of acid mine drainage. The Environmental Protection Plan shall also identify on maps, sketches, plans or other equivalent representations, the location of affected lands, surface water, and groundwater which will be or has the reasonable potential to be affected by uranium mining operations. The locations shall be shown in accurate relationship to topography and other project facilities within the permit areas. The Operator/Applicant may submit this information as a map accompanying this Exhibit or include the information on the maps required as Exhibit C in this Rule, 6.4.3.

Mill site general arrangement and reclamation maps shown in **Exhibit C** and **Exhibit F** include:

- **Figure 3-4**: Leadville Mill General Arrangement
- **Figure 6-1** Reclamation Plan Map
- **Figure 6-2** ECS Reclaimed Plan View
- **Figure 6-3** ECS Reclaimed Cross Section
- **Figure 6-4** FTD Reclaimed Plan View
- **Figure 6-5** FTD Reclaimed Cross Section
- **Figure 6-6** FTD Reclaimed Containment Pond

21.3 IDENTIFICATION OF OTHER AGENCIES' ENVIRONMENTAL PROTECTION MEASURES & MONITORING

Identification of other agencies' environmental protection measures & monitoring identify which environmental protection measures and monitoring are required by statute, regulation or permit by other agencies or jurisdictions.

CJK has obtained a Colorado Department of Health and Environment (CDPHE) Stormwater Management Plan (SWMP).

The SWMP permit shown in **Appendix 21-1** provides stormwater management and maintenance commitments.

Stormwater controls will be inspected bi-weekly or after significant rainfall events during construction and monthly thereafter. When necessary, non-functioning control

structures will be repaired. Stormwater water quality samples will be obtained quarterly, and water quality results will be reported pursuant to permit terms.

The Mill will operate as a "zero - discharge" facility. A CDPHE point discharge permit is not required.

The Mill permit area does not have riparian or wetlands designated areas.

21.4 OTHER PERMITS AND LICENSES

The Environmental Protection Plan shall:

21.4.1 LIST OF PERMITS, LICENSES OR OTHER FORMAL AUTHORIZATIONS.

(a) list any air, water quality, solid and hazardous waste, and other federal, state permits or local licenses, or other formal authorizations which the Operator/Applicant holds or will be seeking applicable to the use, handling, storage, or disposal of designated chemicals and acid mine drainage-forming materials within the permit area.

Table 21-1 lists permits and authorizations applicable for the use of designated chemicals at the Mill.

TABLE 21-1: PERMITS, LICENSES & OTHER FORMAL AUTHORIZATIONS

Agency	PERMIT/LICENSE/APPROVAL	STATUS
CDRMS	Mine Permit	Active, M1990-057
CDPHE	General Stormwater Permit for Metal Mining	Submitted
CDPHE	Construction Stormwater Permit	Submitted
CDPHE	Industrial Discharge Individual Permit	Not Req.- Non-Discharge Facility
CDPHE	Air Quality Permit	In Process
MSHA	Mill ID: 0504992	Inactive. Reactivate upon M1990-057 112 Amendment submission
Lake Co	Conditional Use Permit	CUP No. 11-07 Active. New CUP process upon M1990-057 112 Amendment submission

21.4.2 LOCATION OF PERMITS, LICENSES OR OTHER FORMAL AUTHORIZATIONS.

(b) Where such permits have been obtained, the Environmental Protection Plan shall identify where copies of such authorization(s) may be obtained, and shall provide any information contained in, or a portion of, or a complete copy of the permit(s), if required by the Office or Board.

Table 21-2 lists where permit documents can be obtained.

TABLE 21-2: LOCATION OF PERMITS, LICENSES AND OTHER FORMAL AUTHORIZATIONS

Authorizations/Agency	Permit/License	Location
CDPHE-Water Quality Division	Stormwater Discharge Permit	Mill office & CJK's files
CDPHE-Water Quality Division	Industrial Permit Discharge Permit	Not Required-"zero discharge" facility
CDPHE-Air Quality Division	Air Quality Permit	Mill office & CJK's files
CDPHE- Air Quality Division	Air Quality Certificate of Designation	Not Required
State Historical Preservation Office	Notification-Filed	Mill office & CJK's files
CDOT	Highway Access Permit	Mill office & CJK's files
Lake County	Conditional Use Permit	Mill office & CJK's files
Lake County	Construction Permit	Mill office & CJK's files
Lake County	Certificate of Occupancy	Mill office & CJK's files
Lake County	Noxious Weed Management Plan	Mill office & CJK's files
Lake County	Water Supply Agreement, Parkville Water District	Mill office & CJK's files

21.4.3 ADDITIONAL PERMITS

(c) When such permits, for uranium mining, or for the use, handling, storage or disposal of designated chemicals or acid mine drainage-forming materials within the permit area, are obtained after the submission of the Environmental Protection Plan, the Operator/Applicant will provide the Office the same information within thirty (30) days of receipt.

Copies of new or renewed facility permits will be sent to CDRMS within 30 days of receipt and kept on file within the Mill office.

21.4.4 COMPLIANCE

(d) The Board reserves the right to deny an application for a Permit or Modification to an existing Permit where there is substantial evidence that the operation is or may be contrary to the laws or regulations of this state, or the United States, including but not limited to all federal, state, and local permits, licenses and approvals. The Board may continue the consideration of the application, or condition approval, pending final resolution of the matter. In addition, as to any in situ leach mining applications, the Board may or shall, whichever is applicable, deny any such permit application in accordance with the provisions of Rule 1.4.10.

The Mill will be operated in compliance with county, State and federal regulations.

21.5 DESIGNATED CHEMICAL(S) EVALUATION

An Environmental Protection Plan shall contain a presentation and discussion of the types, quantities, and concentrations of designated chemicals within the permit area,

and to the degree such chemicals are present or used within the permit area, shall characterize the designated chemicals as to:

21.5.1 POTENTIAL TO AFFECT HUMAN HEALTH, PROPERTY, OR ENVIRONMENT

(a) their known potential to affect human health, property or the environment; and

Listed process chemicals will be managed in accordance with MSHA requirements and as suggested, in the Material Safety Data Sheets (MSDS) shown in **Appendix 21-2**. A chemical summary which may have the potential to affect human health and the environment is presented in **Table 21-3**.

TABLE 21-3: DESIGNATED & OTHER STORED CHEMICALS

Chemical	Handling Issues	Potential Human Effects	Potential Environmental Effects
Flocculant DAF-30 (or equivalent)	• No hazardous ingredients • Store in drums or bags. • Store in well ventilated dry area.	• No acute toxicological effects expected. • Moderate skin and eye irritant.	• No known toxicity
Hydrated Lime CaO	• Store in factory bags in dry place.	• No acute toxicological effects expected. • Moderate skin and eye irritant.	• No known toxicity
Sodium Cyanide NaCN	• Signal Word: DANGER • Wear PPE • Use only under fume hood • Do not breath dust • Do not get in eyes, skin or clothing • Do not eat or smoke when using product • Use good hygiene	• Possibly fatal if swallowed • Possibly fatal in contact with skin • Possibly fatal if inhaled • May cause respiratory damage • May cause drowsiness or dizziness • Causes damage to organs • Causes damage to organs through prolonged or repeated exposure	• Toxic to aquatic organisms • Soluble in water. Persistence is unlikely based on information available.
Sodium BisulfateNaHSO$_3$	• Signal Word: WARNING • Store in well ventilated place.	• Harmful if swallowed • May cause respiratory irritation.	• Soluble in water. Persistence is unlikely based on information available.
Lead Nitrate Pb(NO$_3$)2	• Use only under fume hood • Use PPE • Store in cool ventilated place	• Harmful if swallowed • May cause respiratory, eye or skin irritation	• Toxic to aquatic organisms

21.5.2 EXPECTED CONCENTRATIONS, PROCESS SOLUTION VOLUMES & FATE

(b) based on the best information available at the time of submittal of the Environmental Protection Plan, specify the expected concentrations, process solution volumes and fate of designated chemicals to be used in existing and proposed extractive metallurgical processes at the mine, and/or mill site, if applicable.

The estimated amount of chemicals to be used per ton of ore is discussed in Exhibit D, Section 4.1.1. Approximately 0.33 tons of water will be used for every ton of ore milled. The annual estimated amount of chemicals and water usage is summarized in **Table 21-4, Table 21-5** and **Table 21-6**.

TABLE 21-4: REAGENT CONSUMPTION, GRINDING & AGITATED LEACH CIRCUIT

No.	Reagent	Consumption		
		Unit/Rate (lbs./st)	Daily (lbs)	Monthly (tons)
1	Water	587	234,600	3,578
2	Flocculant/TNS	1.66	664.00	10.1
3	Lime - CaO	8.00	3,200	49
3.5	Caustic Soda-NaOH	0.10	40	0.61
4	Sodium Cyanide-NaCN	4.00	1,600	24.4
5	Sodium Bisulfite - NaHSO3	0	0	0
6	Copper Sulfate - CuSO4	0	0	0
7	Lead Nitrate - Pb(NO3)2	0.01	4.00	0.06
8	Ferrous Sulfate-FeSO4	0.5	200	3.1
9	Zinc Powder-Zn	0.11	44	0.67
10	Diatomaceous Earth	0.01	4	0.06
	Flux Materials			
11	Potassium Nitrate-KNO3	0.007	2.8	0.04
12	Silica-Si	0.01	4	0.06
13	Borax Glass	0.01	4	0.06
14	Flourspar-CaF2	<100Lbs/y		
15	Soda Ash-Na2CO3	0.0014	0.56	0.0085
16	Salt-NaCl	<100Lbs/y		

TABLE 21-5: REAGENT CONSUMPTION, REFINERY

No.	Reagent	Consumption			
		Quantity	Units	Daily (lbs)	Monthly (lbs)
1	Zinc Oxide - ZnO	0.53	lb/ton	212	6,400
2	Borax - $Na_2[B_4O_5(OH)_4]$				200
3	Soda Ash - Na_2O_3				100
4	Silica Sand - SiO_2				400
5	Potasium Nitrate - KNO_3				150
6	Flourspar - CaF_2				5
7	Silicon Carbide Cement - SiC (1)	-	-	-	-<10

(1) These reagents are used during Au-Ag pours, so only monthly values are reported.
(2) Silicon Carbide is used as needed for furnace repair.

TABLE 21-6: REAGENT CONSUMPTION, OTHER

No.	Reagent	Consumption			
		Quantity	Units	Monthly Quantity	Units
1	Diesel Fuel	20	gal/day	600	gallons
2	Gasoline	2	gal/day	60	gallons

21.5.3 MSDS

(c) Provide, to the extent reasonably available, material safety data sheets for designated chemicals.

MSDS sheets are shown in **Appendix 21-2**.

21.6 DESIGNATED CHEMICAL(S) AND MATERIAL(S) HANDLING

21.6.1 PROC. FOR DISPOSAL, DECOM., DETOX., STABILIZATION

(a) Fully describe the procedures for the disposal, decommissioning, detoxification or stabilization for all designated chemicals and toxic or acid-forming materials. Specifically describe measures to be taken to prevent any unauthorized release of pollutants to the environment. Include adequate reclamation and closure practices for such designated chemicals, toxic or acid-forming materials and how unauthorized discharge of acid mine drainage will be prevented.

Process chemicals will be consumptively used or disposed in the FTD. Upon cessation of operations remaining process chemicals will be disposed offsite at a federally licensed facility. Tailings will be detoxified, filtered, and placed in the FTD. Tailings management is discussed in **Appendix 4-2**. Other disposal management activities, if required, will be subject to a CDRMS Technical Revision (TR) prior to implementation.

21.6.2 NARRATIVE DESCRIPTION

(b) Submit a narrative description or plan that:

(i) describes how all designated chemicals used in the extractive metallurgical process will be handled during active mining operations, during periods of Temporary Cessation, and disposed or detoxified at the conclusion of operations so as to comply with all applicable environmental protection and reclamation standards and regulations;

Chemicals will be handled and stored in accordance with MSDS and federal, State, and county regulations. Specifically, for this operation, this includes the following:

- Chemicals will be transported to their designated storage location via vehicle and unloaded by forklift or manually,
- Chemical storage locations will be locked and secured during non-operating hours or during periods of cessation,

- Mill personnel will be trained appropriately in the proper storage and use of site-specific chemicals during the milling operation,
- Chemicals used in the milling operation will only be used in the Mill,
- Chemicals will be disposed of properly upon Mill closure.

(ii) describes how materials that have the potential to produce acid mine drainage or are toxic or acid-forming will be handled to ensure that the affected lands will be reclaimed and returned to the approved post-mining land use; and

- RoM material in process including course ore bin through thickeners and filter presses will be cleaned out per standard operation procedures (SOPs).
- Liquid reagents in piping will be manually drained into buckets or pumped back in their barrels and disposed in accordance with applicable federal, State and county regulations.
- Remaining solid reagents within the process circuit will be placed in the FTD.
- Once material in the system is processed, remaining process water will be pumped through the system to clean pipes, tanks, thickeners, and filter equipment. This water will then be detoxified and will report to the FTD.
- During temporary cessation, liquid reagents and lubricants will be kept in their original barrels/overpack containers, and solid reagents in their bags. Inventory will remain in a secured area within the Mill building or the cyanide conex storage container.
- There are no bulk petroleum storage tanks onsite. Diesel fuel will be kept in a pickup truck transfer tank.
- During closure, reagents will be either sold, recycled, or disposed of at an approved facility.
- Lubricants will be recycled at an approved facility.
- Received RoM will be initially stored on the RoM pad. The pad is designed to allow easy access to transfer the Rom to the Mill while containing potential ore leachate from entering the environment.
- Processed ore will be placed in the FTD.

(iii)describes how the Operator/Applicant will prevent adverse off-site impacts during periods of active mine site operations and periods of Temporary Cessation.

The following measures will be taken to prevent off-site impacts:

- Prior to processing, stockpiled ore will be placed on an impermeable concrete pad.

- The pad will be covered and protected on three sides.
- Limited quantities of designated chemicals will be used in the Mill at any given time.
- The mill building is designed to contain spills. Spill prevention measures include concrete floors and over-liners for liquid chemical storage within the storage and processing areas.
- Liquid chemical will be stored in designated areas in 55-gallon over-packs barrels.
- A mill sump will contain spills within the Mill building. If a spill breaches the Mill building the ECS will provide containment. See discussion in Section 4.4.
- Environmental water, air and mine waste monitoring and maintenance programs will be active during and following closure.

(c) Based upon acceptable site-specific analyses of site construction materials, waste rock, ore, product stockpiles, and mill tailings, if applicable, provide an assessment of the nature, concentrations and expected fate of potential acid mine drainage- forming materials.

Not applicable.

21.7 FACILITIES EVALUATION

Provide an evaluation of the expected effectiveness of each proposed and existing Environmental Protection Plan facility, taking into consideration:

21.7.1 SITE SPECIFIC CONDITIONS:

(a) site-specific conditions;

The following site-specific environmental protection SOPs will be managed by the Mill manager:

- Small quantities of designated chemicals will be used at any given time.
- Chemicals (reagents) are stored in the Mill in secondary spill containment structures.
- Within the permit area the depth to groundwater is greater than 60ft below-ground surface which provides a depth to minimize spills affecting groundwater quality. (Colorado State Engineers, Ground Water Section, (1990)
- Tailings have a low moisture holding capacity (<35%) and the FTD double liner is designed to prevent process water from migrating from the Mill complex.

- Up and down gradient wells from the Mill have been installed and sampled since 2014 and will be sampled quarterly in the future. Well sampling will provide water quality background and operating information to determine if water quality changes have occurred during Mill operation.

21.7.2 DESIGNATED AND OTHER CHEMICALS

(b) designated chemicals, uranium, uranium by products and other radionuclides, acid mine drainage and toxic or acid-forming materials and associated by-products and sludges that will be retained, either temporarily or permanently, on site by each facility;

- Designated chemicals and other consumed chemicals during the milling process are summarized in **Table 21-4, Table 21-5** and **Table 21-6**.

21.7.3 ALTERATION TO NATURALLY OCCURRING GEO. & GEOCHEM. CONDITIONS

(c) naturally occurring geological and geochemical conditions, and alterations of these conditions by the mining and metallurgical process.

- The Mill will not alter natural geological or affect geochemical conditions at the facility. Only RoM material ores meeting mill acceptance criteria will be processed.

21.7.4 MONITORING SYSTEMS

(d) Describe, with maps and narrative, the monitoring systems, monitoring site locations, sample designator, parameters sampled, frequency of sampling, report dates, media sampled, method of sampling and analysis employed or to be employed during mining and reclamation operations to evaluate the effectiveness of each Environmental Protection Plan facility and activity.

- An ECS sump using a 4in PVC monitoring well will be periodically sampled. In the unlikely event water is encountered, a sample will be collected and analyzed. The analytical data will be used to determine the potential source of the sample. A technical report will be submitted to CDRMS summarizing technical findings and recommendations.
- Water runoff from the FTD will be captured in a catchment pond and recycled in the process facility. This water will be periodically sampled for process related quality control.
- Surface water continues to be sampled on a quarterly basis.
- The Mill has secondary and tertiary containment features as discussed in Section 4.4.

- Quarterly surface and groundwater water sampling results will be submitted to CDRMS annually. If chemical spills occur outside of the containment structures, emergency response activities will be initiated per the Emergency Response and Management Plan. Grab samples of the affected media will be obtained within 24hr of occurrence and sent to a laboratory for analysis. An analytical spill response data sheet will be sent to CDRMS within 14 days of receipt of laboratory results.

21.7.5 CHEMICALS MANAGEMENT

(e) Taking into consideration the nature of the chemicals and the risk to human health, property and the environment, describe any release response procedures, redundancies, and "backup" measures necessary, appropriate, and economically reasonable, to control, prevent and mitigate releases of the designated chemicals and toxic or acid-forming materials from the containment facility outside the permit area during mining and reclamation operations.

- Liquid chemical drums will be contained in in secondary containment units capable of storing 150% of the volume being stored. Solid chemicals will be stored within the concrete-lined Mill building or the cyanide conex storage container.
- Mill material identified as being acidic and toxic forming (ore, mine waste contaminated soils) will be disposed in the FTD.
- In the event of a spill within Mill building, immediate action will be undertaken to contain and clean the affected areas. Contaminated debris and fluids will be placed in the FTD.
- Spill response kits will be collocated in the chemical storage area and in the mill processing complex.

21.7.6 SIZE OF CONTAINMENT FACILITY

(f) Demonstrate that containment facilities shall be of adequate size to provide sufficient reserve capacity to prevent a release of designated chemicals or toxic or acid-forming materials from design storm events plus operational water volumes during worst case conditions as specified by the Office.

The Mill building and leach tank area will each have emergency containment capabilities. Notwithstanding this, the ECS will at all times have no less than 110% sump capacity to contain the entire volumes of all process areas. This feature allows the facility to maintain its zero-discharge design.

21.8 GROUNDWATER INFORMATION

21.8.1 MAP(S)

(a) locate on a map, in Exhibit C, all tributary water courses, wells, springs, stock water ponds, reservoirs and ditches, on the affected land and on adjacent lands where such structures or waters are within two (2) miles, of the existing or proposed affected lands. The required information may further be limited to that area which can also be demonstrated by the Operator to lie within the local ground and surface water regimes that include the affected lands. On a site-specific basis, the Office or Board may extend the distance beyond two (2) miles;

Figure 21-1 shows wells and water features within 2mi of the Mill. Domestic and industrial well owners are listed in **Appendix 21-3**.

21.8.2 FACTURE SYSTEM WITH RESPECT TO FACILITIES

(b) identify all known aquifers and related subsurface water-bearing fracture systems within two (2) miles of the affected lands. The required information may further be limited to that area which can also be demonstrated by the Operator to lie within the local ground and surface water regimes that include the affected lands. In addition, using available data or information, when acceptable to the Office, provide the general direction and rate of flow of groundwater in these aquifers and fracture systems. On a case-by-case basis, the Office may require hydrologic testing and analysis, where available information is inadequate to describe or address potential impacts to groundwater resources;

Water information is discussed in **Exhibit G**. Mill area geological bedrock fractures and faults have not been mapped because the basement rock is covered by unconsolidated alluvial sands, gravels, and soils at least 80ft thick.

21.8.3 GEOLOGIC MEDIA BENEATH FACILITIES

(c) describe all geologic media down to and including the upper most aquifer under proposed sites of material storage, stockpiles, waste piles, disposal sites, solution containment facilities and other sites within the existing or proposed affected area where such subsurface materials and any associated waters have the potential to be contaminated by designated chemicals used in the extractive metallurgical process or by materials that are toxic or acid-forming, or that produce acid mine drainage;

Soils are discussed in **Exhibit I**.

21.8.4 POTENTIAL IMPACTS TO SURFACE AND GROUNDWATER

(d) identify and locate on a map, in Exhibit C, known major fracture systems that affect rock formations under proposed sites of material storage, stockpiles, waste piles, disposal sites, solution containment facilities and other sites within the existing or proposed affected (land) area where such fractures and any associated waters have the potential to be contaminated by toxic or acid-forming materials or designated chemicals used in extractive metallurgical process or that produce acid mine drainage; and

The Mill building and FTD are designed to prevent chemicals entering surface and groundwater. The impoundment is lined with a leak detection system. The Mill building is designed as a secondary containment structure. To document containment, CJK has installed a surface and groundwater monitoring well and reporting program to document if spill containment is performing as designed.

21.8.5 HYDROGEOLOGY

(e) describe and illustrate the hydrogeology of the area where surface or groundwater may be impacted by the Designated Mining Operation activities. Include in the description and illustration, those geologic strata and fracture systems that have the potential to transmit groundwater.

Hydrogeology is discussed in **Exhibit G**.

21.9 GROUNDWATER QUALITY DATA

Two groundwater monitoring wells fitted with pumps were installed in 2014 and quarterly sampled since. Monitoring well LMMW-2 (Permit 295655) is a down-gradient well which serves as the Mill's groundwater point compliance well. The upgradient well LMMW-3 (Permit 295654) serves as a upgradient background water quality sampling point. In addition historic wells BMW-1 and PZ-4 serve as upgradient regional monitoring wells and MW-13 and MW-13a serve as downgradient monitoring wells. Hydrogeology is discussed in **Exhibit G** and well illustrations are shown on **Figure 7-1**.

21.9.1 DOWN-GRADIENT GROUNDWATER USES

(a) Indicate the existing and reasonably potential future groundwater uses on and within two (2) miles down-gradient of the affected lands. The required information may further be limited to that area which can also be demonstrated by the Operator to lie within the local ground and surface water regimes that include the affected lands. On a site-specific basis the Office or Board may extend the distance beyond two (2) miles.

As reported by the office of the State Engineer, as of January 2021 there are 510 domestic wells within a 2-mile radius of the Mill, as shown in **Figure 21-1**. There are 11 wells located approximately 0.5 miles from the Mill; 8 are domestic, 2 are EPA monitoring wells and one is an industrial well. These wells are listed in **Table 21-7**.

TABLE 21-7: REAGENT CONSUMPTION, GRINDING & AGITATED LEACH CIRCUIT

No.	Hole ID[1]	Type[2]	1/4, 1/4, Section	Owner[2]	Latitude[2]	Longitude[2]	Distance (ft)[3]	Location
1	DW01	Domestic	NW, NE, 33	Wood	39.2290775	-106.3346511	450	Down Gradient
2	DW02	Domestic	SW, SE, 28	Benson	39.2326040	-106.3363120	850	Up Gradient
3	DW03	Domestic	NE, NE, 33	Stapleton	39.2281441	-106.3311845	475	Down Gradient
4	DW04	Domestic	SE, NE, 28	Haynes	39.2393530	-106.3303940	3,100	Up Gradient
5	DW05	Domestic	NE, SW, 28	Smith	39.2371320	-106.3402510	2,970	Up Gradient
6	DW06	Domestic	SW, SW, 28	Eaton	39.2318080	-106.3451880	3,350	Up Gradient
7	DW07	Domestic	NE, NW, 33	Flank Oil Co	39.2264430	-106.3384462	1,850	Down Gradient
8	DW08	Domestic	SE, NW, 33	Molleur	39.2236431	-106.3402349	2,900	Down Gradient
9	EPA01	Monitoring	NW, NW, 33	EPA*	-	-	1,300	Down Gradient
10	EPA02	Monitoring	NE, SW, 27	EPA*	-	-	1,990	Down Gradient
11	IW01	Industrial	NE, SW, 27	Diedrich	39.2354140	-106.3218730	2,925	Up Gradient

Note the light red shaded background in **Figure 21-1**, indicates potentially contaminated groundwater as reported by the Colorado Department of Water Resources in January 2021.

Groundwater flows from the northeast to the southwest towards California Gulch at a rate of approximately 0.85 feet per day.

21.9.2 GROUNDWATER QUALITY DATA

(b) Submit, at a minimum, groundwater quality data collected during five (5) successive calendar quarters, or as specified by the Office, as may be necessary to adequately characterize baseline conditions. This baseline data shall be sufficient to provide for the proper design of facilities, to serve as a basis for the evaluation of reclamation performance standards, and to ensure the adequacy of Environmental Protection Facility design, maintenance and operation. In the case of an in situ leach mining operation, a permit applicant must design and conduct a scientifically defensible groundwater, surface water and environmental baseline site characterization and monitoring plan for the proposed mining operation which, at a minimum, includes five (5) successive calendar quarters, or the period specified by the Office as necessary to adequately characterize the baseline conditions, of water quality data, prior to submitting the permit application.

Groundwater monitoring data is presented in **Appendix 21-5**.

21.9.3 GROUNDWATER QUALITY PARAMETERS

(c) Analytical detection limits and groundwater quality parameters must be acceptable to the Office.

Groundwater quality parameters are listed in **Table 21-8** and reported in micrograms per milliliter (µ/ml).

TABLE 21-8: GROUNDWATER QUALITY PARAMETERS

Analyte	Field Measurements	Method 200.7 REV 4.4 Metals (ICP) Total Recoverable	Method 200.8 ICP/MS	Method 245.1 Mercury	Method 300.0 Anions Ion Chromatography	Method 9012B Total	Method SM 2320B	Method 351.2	Method 353.2	Nitrogen Calc Using Nitrate-Nitrite & TKN	Method SM 2540C	Fiberquant (Eurofin Subcontractor)
Alkalinity, Total							X					
Bicarbonate, as CaCO3							X					
Carbonate, CaCO3							X					
Hydroxide							X					
Aluminum		X										
Antimony			X									
Arsenic			X									
Asbestos												X
Barium			X									
Berylium			X									
Boron		X										
Cadmium			X									
Calcium		X										
Chloride					X							
Chromium			X									
Cobalt			X									
Cyanide, Total						X						
Flouride					X							
Iron		X										
Lead			X									
Manganese			X									
Mercury				X								
Molybdenum			X									
Nickel			X									
Nitrate as N									X			
Nitrate Nitrite as N									X			
Nitrite as N									X			
Nitrogen, Total Kjeldahl								X				
Nitrogen, Total (Calculated)										X		
pH	X											
Selenium			X									
Silver			X									
Sodium		X										
Sulfate					X							
Temperature	X											
Thallium			X									
Total Dissolved Solids											X	
Uranium			X									
Vanadium			X									
Zinc			X									
EC Conductivity	X											

21.10 SURFACE WATER CONTROL AND CONTAINMENT FACILITIES INFORMATION

(a) Provide design specifications certified by a licensed professional engineer for all Environmental Protection Facilities intended to:

(i) hold, convey, contain, or transport designated chemicals used in the extractive metallurgical process;

(ii) convey, transport or divert surface water around or away from acid mine drainage or toxic or acid-forming material; or

(iii) capture and/or retain surface water run-off from areas affected by the Designated Mining Operation prior to its release from the mine-site into the natural water drainage system.

(b) Submit a Storm Water Management Plan, if required by the Water Quality Control Division, including a copy of such plan and a maintenance and inspection program to ensure all drainage control and containment facilities will be properly operated and maintained.

Storm Water Management Plan is shown in **Appendix 21-1**.

21.11 SURFACE WATER QUALITY DATA

(a) Indicate the existing surface water receiving stream standards, existing or reasonably potential future uses of surface water and, where receiving stream standards have not been determined, within two (2) miles, down-gradient of the affected lands. On a site-specific basis, the Board or Office may extend the distance beyond two (2) miles downstream.

The Stream Classification is as follows:

Region: Arkansas
Basin: Upper Arkansas River

Stream Segment Description: Segment 6, Main stem of the California Gulch, including all tributaries, from the source to the confluence with the Arkansas River. Main stem of St Kevin's Gulch from the source to the confluence with Tennessee Creek.

Designation: Agriculture
Reviewable: Ag Life Cold 1
Recreation: E1

Water Supply
Temporary Mod:
Arsenic = hybrid
Expiration- 12/23/2021
Uranium-(acute)
Uranium –(chronic)
Physical & Biological Parameters: E. Coli 630/100ml
Inorganic* Parameters:
Ammonia: Table Value Standards (TVS)
Boron-Chronic .75
Chlorine: 0.019 acute 0.011 chronic
Nitrite- 0.05 acute

*Metals to be reported as total recoverable

(b) Submit surface water quality and flow data collected during a minimum of five (5) successive calendar quarters and such other additional data, or a period specified by the Office, as may be necessary to adequately characterize baseline conditions. This baseline data shall be sufficient to provide for the proper design of facilities, to serve as a basis for the evaluation of reclamation performance standards success, and to insure the adequacy of environmental protection facility design, maintenance and operation. Where surface water samples are not available during the specified time period due to climatic condition, the Office must be contacted so that other alternatives may be agreed upon, except that in the case of an in situ leach mining operation, a permit applicant must design and conduct a scientifically defensible groundwater, surface water and environmental baseline site characterization and monitoring plan for the proposed mining operation which, at a minimum, includes five (5) successive calendar quarters, or the period specified by the Office as necessary to adequately characterize the baseline conditions, of water quality data, prior to submitting the permit application.

With the exception of an ephemeral drainage which sporadically flows during heavy rain events, there is no stream within the Mill property.

(c) Analytical detection limits for surface water must be acceptable to the Office for surface water quality parameters in consultation with the Water Quality Control Division.

With the exception of an ephemeral drainage which sporadically flows during heavy rain events, there is no stream within the Mill property.

21.12 WATER QUALITY MONITORING PLAN

Where necessary to demonstrate that the Environmental Protection Plan requirements are being met a water quality monitoring plan shall be proposed for both surface and groundwater. The intent of the proposed water quality monitoring plan shall be to demonstrate that all environmental protection facilities designed to protect water quality are functioning as designed and whether the operation is in compliance with all applicable surface water and groundwater standards and Permit conditions. Where a Colorado Discharge Permit System (CDPS) discharge permit exists or has been applied for, such permit may be adequate to satisfy the requirements of Rule 6.4.21. In addition, for an in situ leach mining operation, the required groundwater, surface water and environmental baseline site characterization and monitoring plan must be designed to thoroughly characterize pre-mining conditions; detect any subsurface excursions of groundwater containing chemicals used in or mobilized by such operation; and evaluate the effectiveness of post-mining reclamation and groundwater reclamation.

Groundwater monitoring and results are discussed in Section 21.9.

21.13 CLIMATE

On A Case-By-Case Basis, The Environmental Protection Plan Shall:

(a) Provide adequate climatic data representative of the site to perform an acceptable "water balance" for all liquid containment systems open to the environment and intended to contain designated chemicals or acid mine drainage, and demonstrate that the amount of evaporation required to maintain reserve facility capacity will occur, or that there is sufficient reserve capacity to compensate for the uncertainty associated with the data.

(b) Provide the following information regarding climatic factors, above six thousand five hundred (6,500) feet of elevation, (with the approval of the Office, data may be provided from existing stations within the vicinity of the Permit area):

(i) the mean annual precipitation for a minimum of five (5) years and, where available, one (1) set of data for the wettest year on record for the area;

(ii) the average direction and velocity of the prevailing winds;

(iii)the mean monthly temperature and temperature ranges for a minimum of five (5) years;

(iv)on a case-by-case, site-specific evaporation and sublimation rates for the proposed site.

(c) For operations below elevations of six thousand five hundred (6,500) feet, provide the above data covering a period of one (1) year.

Climactic site characteristics are discussed in **Exhibit K**.

21.14 GEOCHEMICAL DATA AND ANALYSIS

Include appropriate geochemical evaluations of any material that will be exposed by mining, placed in on-site solution containment systems or facilities, stockpiled, or disposed of on the affected land, and that involves uranium mining or has the potential to cause acid mine drainage or to release designated chemicals, or toxic or acid-forming materials.

(a) Such evaluations shall be site specific and appropriate for the types of materials exposed or to be exposed by the mining and reclamation operations.

(b) Such evaluations shall be conducted on materials that are representative of the composition of the mineral, rocks or materials that are exposed or to be exposed during the proposed life of the mining operations.

(c) Such evaluations shall be appropriate for the intended use or fate of the material exposed or to be exposed during the proposed life of the mining operations, and on a case-by-case basis shall include evaluation of weathering effects, shall simulate, to the extent reasonable, the conditions under which the material will be used, stockpiled or disposed and which shall reasonably be expected to prevail after mining and reclamation operations have ceased.

(d) Such evaluations shall be performed on both ore and overburden, and shall identify the most reasonable sources, probable fate, and transport mechanisms of metal and acid-producing minerals that may be mobilized by ordinary weathering reactions that are likely to prevail after mining and reclamation operations have ceased. Such analyses may include only those tests that are necessary to satisfy the conditions of Rule 6.4.21(14)(c), and such evaluations may be prioritized, in descending order of importance, as follows:

(i) mineralogical analyses;

(ii) trace element analyses;

(iii)major element analyses;

(iv)microprobe or other comparable analyses.

(e) Where a net neutralizing, metal adsorption or metal ion exchange potential over the long-term cannot be demonstrated, the Operator/Applicant shall fully describe

measures to prevent unpermitted discharges, and how reclamation, sufficient to achieve the post-mine land use will be assured.

Ore will be analyzed prior to processing to document that the material meets CJK's acceptance criteria based on RCRA (Metals ICP/MS) and Mercury (CVAA) analysis to determine characteristics as well as TCLP tests to determine possible leaching.

RCRA and TCLP analysis for the Penn Mine, representing approximately the first 5yrs of production are shown in **Table 21-9**.

TABLE 21-9: PENN MINE CONSTITUENT ANALYSIS

EPA Waste No.	Hazardous Constituent	Standard (mg/l)	ALS Results (mg/l)	% of Standard
D004	Arsenic	5.0	0.045	0.90%
D005	Barium	100.0	0.182	0.18%
D006	Cadmium	1.0	0.008	0.80%
D007	Chromium	5.0	0.02	0.40%
D008	Lead	5.0	0.037	0.74%
D009	Mercury	0.2	0.00975	4.88%
D010	Selenium	1.0	0.05	5.00%
D011	Silver	5.0	0.01	0.20%

The FTD is lined with synthetic liners to prevent contaminant migration and the Mill is designed with secondary containment systems to mitigate spills that could potentially migrate from the mill building. Details are discussed in **Exhibit D**.

21.15 CONSTRUCTION SCHEDULE INFORMATION

Provide a detailed construction schedule for the following:

(a) all facilities designed to contain or transport uranium, uranium by-products or other radionuclides, toxic or acid-forming materials or designated chemicals used in the extractive metallurgical process; and

Not applicable.

(b) all facilities proposed to contain, hold, or for disposal of material that has the potential to cause acid mine drainage.

This is presented in **Appendix 4-2** in **Exhibit D**.

21.16 QUALITY ASSURANCE AND CONTROL

Describe the Quality Assurance and Quality Control program and measures to be employed during construction of those Environmental Protection Facilities that typically warrant Quality Assurance and Quality Control.

This is presented in **Appendix 4-2** in **Exhibit D**.

21.17 PLANT GROWTH MEDIUM (SOILS)

Where revegetation is part of the Reclamation Plan, and in order to assure that acceptable plant growth medium is preserved, and to determine what soil amendments may be necessary to promote reclamation, the Operator/Applicant shall:

(a) provide a soil survey map of the proposed affected area that delineates soil units, soil texture, estimated cubic yards of soil and subsoils available for reclamation and if saved, where such material will be stockpiled for reclamation;

(b) Such map shall be based on site specific soils investigations and shall be on such a scale as to provide a basis for soil management recommendations and be the same scale as the reclamation map; and

(c) provide, for each soil map unit, in tabular form, all data from analyses of representative samples of surface and subsurface soil units as to:

(i) soil pH, texture, electrical conductivity, sodium adsorption ratio and any other parameters that the Operator/Applicant or Office deems necessary for proper soils characterization;

(ii) indicate on a map, or in the soils narrative the location of each soil unit on the affected area where the above soil characteristics may be problematic as to suitability for a plant growth medium; and

(iii)type, form and amounts of any soil amendments that may be necessary or recommended by the local Soil Conservation Service, Conservation District, or other qualified special district, and standard soil laboratory analyses and fertilizer recommendations (if available) for the types of plant species proposed to be established; or

(iv)provide, as an alternative to Rule 6.4.21(17)(c), a plan of experiments to determine the type, form and amount of any soil amendments that may be necessary to fulfill the requirements of the Reclamation Plan.

This is presented in **Exhibit I** and **Exhibit E**.

21.18 WILDLIFE PROTECTION

In addition to the performance requirements of Rule 3.1, the Office or Board shall require the Operator to describe measures to minimize or prevent harm or damage to wildlife species and habitat, including:

(a) adequately describe mitigation measures to ensure that there is no overall net loss of critical or important wildlife habitat consistent with Colorado Parks and Wildlife (CPW)and United States Fish and Wildlife Service (USFWS) recommendations, if any; and

This is presented in **Exhibit H**.

(b) describe measures to prevent wildlife from coming into contact with uranium, uranium by-products or other radionuclides, designated chemicals, toxic or acid-forming chemicals or areas with acid mine drainage.

Designated chemicals will be stored inside structures, and inaccessible by wildlife.

21.19 TAILINGS DISPOSAL

Disposal of tailings and sludges in mine workings - In order to ensure the proper disposal of tailings and sludges in mine workings, an Applicant shall comply with the provisions of Rule 3.1.7.

There are no surface or underground mine workings within the permitted area. All on-site tailings will be placed in the FTD.

APPENDIX 21-1

STORM WATER MANAGEMENT PLAN

SWMP

STORM WATER MANAGEMENT PLAN
INDIVIDUAL PERMIT

Leadville Mill
Lake County, Colorado
January 2023

Prepared by

Union Milling Contractors, LLC
P.O. Box 620490
Littleton, CO 80162-0490

TABLE OF CONTENTS

TABLE OF CONTENTS ..... **I**
LIST OF FIGURES ..... **II**
LIST OF APPENDICIES ..... **II**
1.0 INTRODUCTION & PROJECT DESCRIPTION **1-2**
BACKGROUND 1-2
1.1 SITE DESCRIPTION 1-2
1.1.1 FACILITY 1-3
1.2 SITE VEGETATION, GENERAL DRAINAGE AND INFORMATION 1-4
1.2.1 SOILS 1-4
1.2.2 VEGETATION 1-4
1.2.3 DRAINAGE 1-4
1.2.4 MILL SITE DRAINAGE 1-4
1.3 SITE ACTIVITIES 1-5
2.0 EROSION CONTROL MEASURES, MONITORING, INSPECTION & MAINTENANCE **2-6**
2.1 EROSION CONTROL MEASURE (ECM) 2-6
2.1.1 MONITORING 2-6
2.1.2 INSPECTION & MAINTENANCE 2-8

LIST OF FIGURES

Figure 1: Leadville South Quadrangle USGS 7.5.....2-10

LIST OF APPENDICIES

Appendix 1 Drainage Report 2-11
Appendix 2 ECM, Monitoring, Inspection & Maintenance 2-46
Appendix 3 Spill Report Form.....2-76
Appendix 4 Site Stabilization Form 2-79
Appendix 5 Inspection Reports.....2-81
Appendix 6 Federal, State or Local Storm Water or.....2-86

STORM WATER MANAGEMENT PLAN
LEADVILLE MILL
LAKE COUNTY COLORADO

CERTIFICATION OF THE STORM WATER MANAGEMENT PLAN

STORM WATER DISCHARGES ASSOCIATED WITH LEADVILLE MILL

Certification No. COR411153

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons personally responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Mary Knigge
CJK Milling Company, LLC

1/30/23
Date

1.0 INTRODUCTION & PROJECT DESCRIPTION

The Leadville Mill (Mill) Stormwater Management Plan (SWMP) is prepared in accordance with the Colorado Department of Public Health and the Environment (CDPHE) and the Colorado Division of Reclamation Mining and Safety (CDRMS) ore processing and safety criteria. The SWMP is intended to satisfy the requirements of both the CDPS Individual Permit Stormwater Discharges associated with Metal Ore Processing Operations (MMGP). The constructed Engineering Control Measures (ECMs) outlined in the SWMP includes, but is not limited to, this narrative SWMP Drainage Plan.

The SWMP identifies potential sources that could contribute pollutants to waters of the State, and Best Management Practices (BMP aka ECM) that, when implemented, will reduce, or eliminate surface water quality impacts. The plan is designed to be implemented after the permit for ore processing has been granted by CDRMS. The SWMP for the site summarizes drainage plan assumptions, approach to the design, ECM, maps, drawings, drainage basin characteristics, culverts, rock berms, ditches and ditch design flow calculations for the site-specific structures.

Site surface water flow is estimated using methods developed by Wilkes, S.G and E.C. King, 1975 "Procedures for Determining Peak Flows in Colorado", Soil Conservation Service, U.S. Department of Agriculture. Input parameters included NOAA 2-, 10-, 25- and 100-year 24-hour Type II storm rainfall estimates (U.S. Department of Commerce, 1961); curve number(s)[1], management factors (Wilkes et at, 1975); and drainage area. The rainfall for the rainfall return rates are as follows: 100yr-24hr return period is 2.48 inches(in), and a 10yr-24hr return is 1.58in. The National Resource Conservation Service (NRCS) runoff Curve Numbers (CN) ranges from 77 to 98 (Flatirons 2014, p. 6). The drainage areas, surface, points of interest and associated acreages are illustrated on **Appendix 1**.

BACKGROUND

The Mill is owned by CJK Milling Company, LLC (CJK) with corporate offices located in Evergreen, Colorado and operated by Union Milling Contractors located in Littleton, Colorado. The Mill is located at 13815 Highway 24, Leadville, Colorado 80461. The Mill is permitted under Permit M1990-057 (the Permit). CJK is amending the permit to a 112(d) regulated custom ore processing Mill, which will occupy a 34.0 acre (ac) permit area.

The facility is in Lake County, about 2.5mi West of Leadville, Colorado. The Mill has a Lake County Conditional Use Permit (CUP) granted on September 9, 2011; and other permits are summarized in the Colorado Department of Reclamation Mining and Safety (CDRMS) permit application M-1990-057 (See Exhibit F).

1.1 SITE DESCRIPTION

The Mill site occupies an area of 34.0ac, located in Lake County, about 2.5mi West of Leadville, Colorado. The site is located on the Leadville South Quadrangle USGS 7.5 quadrangle map located in the Northeast Quarter of the Northeast Quarter of Section 33, and the Southeast Quarter of the Southeast Quarter of Section 28, Township 9 South, Range 80 West of the 6th Principal Meridian, Lake County Colorado. See **Figure 1**.

[1] *Curve Number(s) are a runoff coefficients which considers slopes, vegetation types, and densities.*

The Mill is accessed by Highway 24 where the property boundary is approximately 500ft from the highway entrance. The property is located at N39°13'50.33" and W106°19'58.48" at an elevation of 9,745ft. The property is bounded on the East by the Leadville Sanitation District facility, on the North and South, by lands zoned Industrial/Mining (IM), and on the West by lands zoned Agricultural/Forestry(AF).

1.1.1 Facility

The Mill site is a separate, stand-alone facility with no mining operations on or immediately adjacent to the facility. See **Appendix 1**. The Mill is inoperative, undergoing renovation and facilities reconstruction. There is no mining operation, consequently there are no:

- Overburden removal activities
- Overburden stockpile activities
- New waste rock stockpiles
- Ore deposit excavations, or
- Other related mining events outside of ore processing

There is no groundwater within fifty (50) ft of the surface, dewatering is not anticipated, process water and surface stormwater will be contained. In addition, the facility is a "no-discharge" facility which alleviates the need for a facility point discharge permit.

Located within the permit boundary are:

- Mill buildings,
- Leach Tanks,
- Crusher Building,
- Chemical Storage Areas,
- Truck Scales,
- Haul and Access Roads,
- Emergency Containment Sump (ECS),
- Emergency Water Storage Tank,
- Designated Ore Bunkers,
- Xcel Gas and Power Lines,
- Leadville Sanitation Sewer,
- CJK Milling Pipelines,
- Domestic Waste Facilities,
- Designated Ore and Topsoil Stockpiles,
- Fences and gates,
- ECMs, and
- Groundwater Monitoring Wells

Roads will be upgraded and constructed. Stormwater management control features will be maintained to allow access for emergency vehicles, haul trucks, and activities implementing road safety features.

Upgrading features will include ECMs, such as debris basins, ditches, swales, snow storage areas, rock berms, culverts, and check dams. See **Appendix 2**.

1.2 SITE VEGETATION, GENERAL DRAINAGE AND INFORMATION

1.2.1 Soils

There are two distinct topographical features describing the Mill property. The northern portion of the property consists of a gently sloping area that drains toward the West-Southwest. South of this is a moderately steep, south-facing slope, draining to the South. The average grade of this slope is 25% and ranges in elevation from 9,700ft to 9,810ft. The southern portion of the property consists of a gently sloping area that drains toward the west-southwest. The drainage channel grade ranges from 1% to 4% and the relief ranges in the northern portion of the permit boundary is over 9,800 to a low of 9,700ft at the southwest property corner.

Areas that have been historically disturbed (roads, benches) show particularly good re-growth without fertilizer or other amendments. The Mill site soils, as described by USDA-Salida, Colorado District office, were formed on glacial outwash sedimentary rock with slopes ranging from 3% to 35%. Leadville soil is very deep and well drained, formed in glacial outwash. Typically, the surface layer consists of dark grayish brown sandy loam 1in thick. The subsurface layer is pink stony sandy loam 7in thick. The subsoil is extremely stony clay loam 32in thick. The substratum is extremely stony loam to a depth of 60in or more. The soil is medium acidic to a depth of 8in and slightly acidic and neutral below that depth. Permeability is moderately slow, and available water capacity is moderate. Surface runoff is medium to very rapid, and the hazard of erosion of unprotected soil by water is moderate to extremely high.

According to the NRCS, Leadville sandy loam (LeE) is the only soil type that exists within the property's drainage area. The predominant tree species on the property is Lodgepole Pine. See **Appendix 1**.

1.2.2 Vegetation

Small areas have limited vegetation consisting of grasses. See **Appendix 1**.

The permit area contains limited vegetation consisting of pine trees.

1.2.3 Drainage

Coniferous trees cover the site, except the area where the Leadville Mill building, access roads and ECM are located. Lodgepole Pine is the predominant tree species. See **Appendix 1.**

1.2.4 Mill Site Drainage

An unnamed 1ft deep-3ft wide drainage channel (the Channel) enters the property on the eastern boundary, adjacent to the northwest corner of the Leadville Sanitation District polishing pond. See **Appendix 1**. The Channel flows to the southwest across the property, crossing under two access service roads. The Channel collects runoff water from undisturbed upgradient ground and flows into what appears to be an old soil conservation drainage ditch in the southwest corner of the property and the water then flows to the southwest, exiting the property on the western boundary. The flows are limited and the culverts under the road are 12in in diameter, with no evidence of overtopping or washouts. The water exits the property through a sediment trap, flowing to the Highway 24 drainage network and then to California Gulch.

Undisturbed area runoff water South of the Channel reports to the conservation drainage ditch, and overland sheet flows through trees and vegetative cover, leaving the property along the southern boundary. For further information regarding site drainage and hydraulic details refer to **Appendix 1**.

1.3 SITE ACTIVITIES

- The Mill will operate 365 days 24hrs 7 days a week (weather permitting).
- Winter road maintenance will include plowing snow. ECMs such as rock berms, culverts, riprap and ditches, will be installed to control snow/stormwater runoff and sediment.
- Repair or install ECMs.

2.0 EROSION CONTROL MEASURES, MONITORING, INSPECTION & MAINTENANCE

2.1 EROSION CONTROL MEASURE (ECM)

ECMs will be implemented to manage stormwater and to prevent sediment from entering the waters of the State at the following locations (see **Appendix 1**):

a. Leadville Mill Infrastructure,
b. Rock and topsoil storage areas
c. Roads
d. Filtered Tailings Disposal

ECMs are discussed and illustrated in **Appendix 2**.

2.1.1 Monitoring

- ECMs will be inspected once a week and after significant precipitation during operations. See Section 2.1.2 for more details.
- Road Maintenance will be routinely conducted to maintain ECMs such as road grades, active milling areas and pipelines.

STORMWATER MANAGEMENT CONTROLS

1. SWMP Administration

a) Stockpiled soils, ore and bunkers

Stockpiled soils and ore will be stored in areas outside of drainage channels and within perimeter rock berms, rock berms, or ore bunkers.

b) Vehicle tracking water control measures

Truck tracking controls have been installed at the Mill entrance.

c) Management of contaminated soils

If chemical or petroleum spills occur or acid producing soils are encountered, the contaminated material will be removed by drum or bagged and removed. Acid or toxic producing materials or spills will be removed within 24hrs of occurrence and arrangements to dispose of the materials in an approved facility within 30 days of the occurrence will be arranged.

d) Loading and unloading operations

Loading and unloading of liquids and solids during site operation will be conducted under the supervision of the Mill Manager or designated personnel. See Storage Areas in **Appendix 1**.

e) Equipment maintenance and fueling

Fuels and lubricants will be appropriately stored in secondary containment structures if the volume exceeds 55 gallons or in petroleum service vehicles.

f) Working areas

ECMs including emergency response and spill containment kits will be made available in convenient locations to control spills.

g) Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc.

Use of chemicals will be conducted in accordance with manufactures recommendations and the approval of CDRMS, and in accordance with county regulations. Most of the maintenance activities will be related to chemical management, filtered tailings disposal area, fueling equipment, and the application of herbicides/pesticides. The use of herbicides/pesticides will be conducted in accordance with the guidelines presented in the CDRMS Leadville Mill weed control management plan.

h) On-site waste management practices

Generated solid waste will be hauled off site and disposed of in a licensed sanitary landfill. Hazardous substances including used oil, tires, solvents, paints etc. will be hauled offsite and disposed of in accordance with State and county waste management criteria.

i) Concrete truck/equipment washing including the concrete truck chute and associated fixtures and equipment.

Concrete truck operators (if used on site) will not be permitted to wash their equipment on site without a proper lined wash-out pond.

j) Dedicated asphalt and concrete batch plants

No asphalt or concrete batch plants are planned.

k) Non-industrial waste sources

Worker trash will be removed from the site once a week. Generated waste will be removed from the site and disposed in a county or State approved waste disposal facility.

l) Other areas or procedures

Absorbent socks and Chem-Dri or suitable alternatives will be stored in the Mill where chemicals of concern are stored.

Hazardous waste materials will be disposed under the direction of the Mill manager in the manner specified by federal, State, and local regulations and by the manufacturer of such products. As soon as possible, and in consultation with the designated Mill representative, listed chemical spills will be reported to the appropriate agencies. As required under the provisions of the Clean Water Act, any spill or discharge entering waters of the United States will be reported. The Manager will prepare a written record of any spill and associated clean-up activities of petroleum products or hazardous materials more than 1gal or reportable quantities, whichever is less. The Manager or his designated representative will immediately notify the appropriate agencies upon identification of a reportable spill. A spill report form is presented in **Appendix 3**.

Petroleum products or hazardous material spills more than Reportable Quantities (RQs), will be reported, by the Manager or his designated representative, to the EPA National Response Center (1-800-424-8802), the Colorado Department of Public Health and Environment (877-518-5608) and the Colorado Division of Reclamation, Milling and Safety (303-866-3567).

2.1.2 Inspection & Maintenance

1. Inspection Schedules

   a) During initial site activities, ECMs will be inspected at least once every 7 calendar days, and within 24hrs after the end of a precipitation or snowmelt event that causes surface erosion and during months were there is no snow on the ground or melting conditions that may create surface erosion. The milling activity and Site Stabilization Log included in **Appendix 4** will be summarized monthly. ECMs will be inspected weekly commencing in April and terminated in November.

   b) During snowy months (November through May), ECMs will be inspected and maintained as weather permits. The second year after ECMs are in place and following the first winter event, ECMs will be inspected quarterly until the first snow fall returns.

2. Inspection Procedures

- Verify and maintain the integrity of rock berms, ditches, sediment traps, drainage channels, and check dams (USEPA, 1992) (VDCR, 2005),
- Maintain haul and service roads,
- Identify and repair rills and gullies that are greater than 12in deep; and
- Record site maintenance activities

3. Maintenance/Replacement and Failed ECMs

   ECMs will be repaired or replaced within 7 calendar days after failed ECMs have been identified. Sediment from erosion control structures will be removed, as necessary, and disposed in the topsoil storage areas.

4. Record Keeping and Documenting Inspections

   Inspections and maintenance activities (**Appendix 5**) will be documented, and records will be kept in the Mill office for a period of 3yrs.

5. Agency Storm Water Inspections

   The Manager, or his designated representative, will inspect the site with the regulatory inspector and document any deficiencies or suggestions noted during the inspection. The Manager will prepare an Inspection Report (**Attachment 5**) for the day of the agency inspection. Deficiencies of any type, field or documentation-related, will be noted on the Inspection Report as a deficiency and resolved as soon as practicable or as directed.

   The Manager or his designated representative will report to the agency inspection immediately, but no later than 24hrs after the inspector has left the jobsite. Storm water or erosion and sediment (E&S) agency visits to the Mill site, whether an official inspection occurred or not, will be reported to the Manager or his designated representative. Any agency inspector, including MSHA and utility inspectors that comment on ECMs (inlet protection, track out, etc.) must be reported to the Mill Manager or his designated representative.

   A log of all inspections by federal, State, or local storm water or other environmental agencies will be kept in the SWMP Binder. The log form can be found in **Appendix 6** and must include the date and time of the visit and whether a report was issued, or will be issued, as a result of the inspection. All inspection reports issued by an agency must be reported to the Mill Manager, within 24hrs of receipt.

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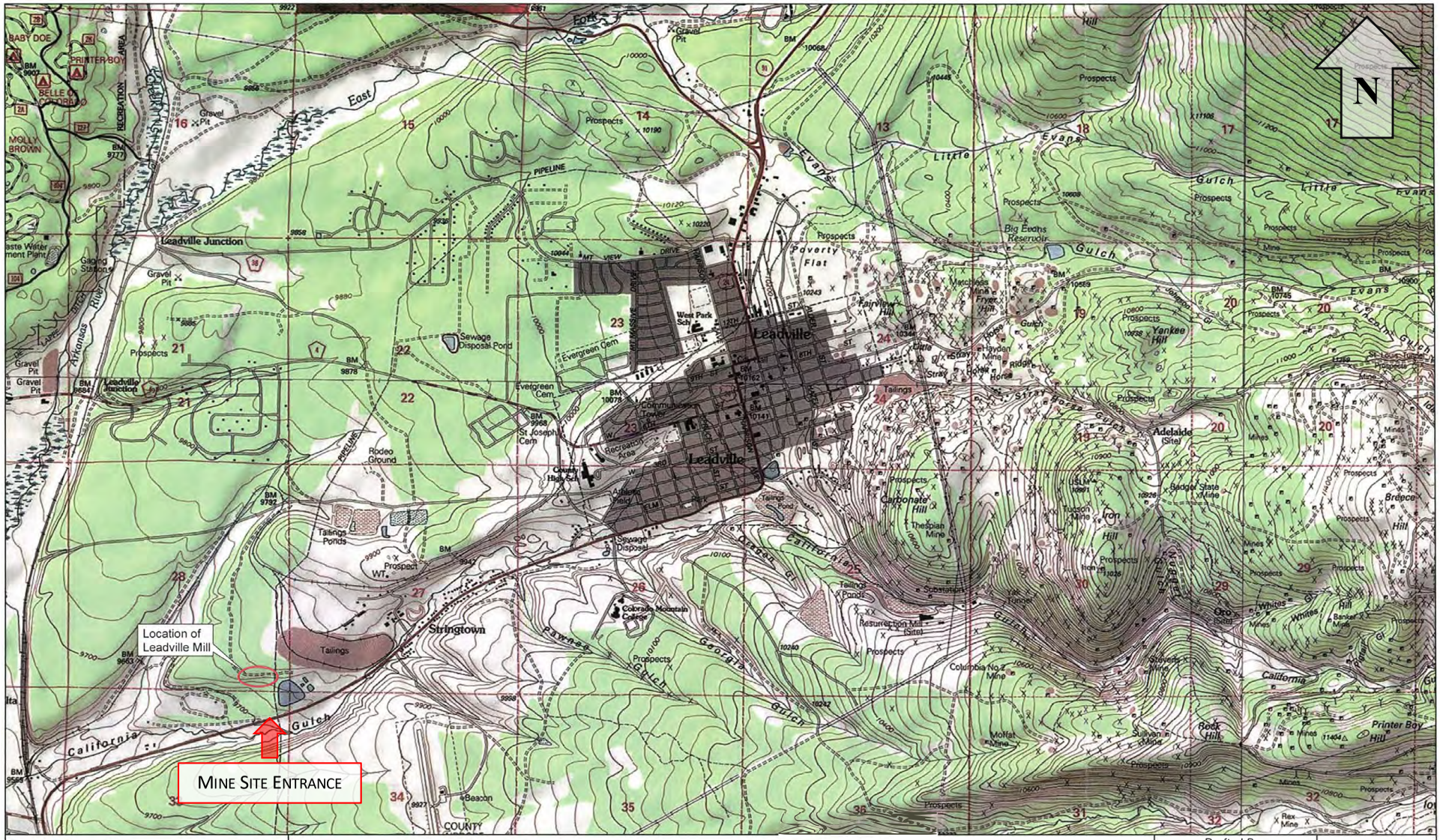
U.S. Department of Commerce, 1961, Technical Paper 40-Rainfall Frequency Atlas of the United States for Durations from 30 minutes to 24 hours and Return Periods from 1 to 100 years, Washington, D.C.

USEPA (U.S. Environmental Protection Agency). 1992, Stormwater Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices. EPA 832-R-92-005. U.S. Environmental Protection Agency, Office of Water, Washington D.C.)



LEADVILLE MILL GENERAL LOCATION

LEADVILLE MILL
CJK MILLING COMPANY, LLC - LEADVILLE, COLORADO

Drafted By: *C. Rice*

Date: *Jan 2021*

FIGURE **1**

CJK MILLING
REMOVE ▲ REUSE ▲ RESTORE

APPENDIX 1
DRAINAGE REPORT

DRAINAGE PLAN

Leadville Mill
Lake County Colorado
January 2023

Prepared by

Union Milling Contractors, LLC
P.O. Box 620490
Littleton, CO 80162-0490

TABLE OF CONTENTS

LIST OF FIGURES ..... **II**

LIST OF ATTACHMENTS ..... **II**

1.0 PROJECT BACKGROUND **1-1**

1.1 BACKGROUND 1-1
1.2 PROJECT LOCATION 1-1
1.3 PROPERTY DESCRIPTION 1-1
1.4 DRAINAGE DESIGN CRITERIA 1-1
1.5 HYDRAULIC CRITERIA 1-2

2.0 DRAINAGE BASINS AND SUB BASINS **2-3**

2.1 GENERAL CONCEPT 2-3

3.0 MILL DRAINAGE PLAN **3-7**

3.1 MILL BASIN NO. 1 3-7
3.2 MILL BASIN NO. 2 3-8
3.3 MILL BASIN NO. 3 3-8
3.4 FILTERED TAILINGS DEPOSIT (FTD) 3-8
3.5 REFERENCES 3-9

LIST OF FIGURES

Figure 1: Leadville South Quadrangle USGS 7.5 3-10
Figure 2: Basin Delineation & Surface Flow Direction 3-11
Figure 3: Facility Drainage Management Base Map Delineation 3-12
Figure 4: Mill Site Drainage Plan 3-13
Figure 5: Crusher Drainage Plan 3-14
Figure 6: FTD Drainage Plan 3-15

LIST OF ATTACHMENTS

Attachment 1 Precipitation Characterization 3-16
Attachment 2 10yr-24hr, 100yr-24hr Rainfall & Precipitation 3-20
Attachment 3 NRCS Curve Number Tables 3-23
Attachment 4 Facility Culvert Calculations 3-31

1.0 PROJECT BACKGROUND

1.1 BACKGROUND

The Drainage Report follows the criteria set forth by Urban Hydrology for Small Watersheds, TR-55 by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Conservation Engineering Division. In addition, lsbash's riprap sizing equation outlined in Blevins, 2003, p 218, (NCHRP, 2006, p.14) is used.

The purpose of the Drainage Plan is to support the Leadville Mill (Mill) sitewide Storm Water Management Plan (SWMP). The SWMP is to outline guidelines to control, contain, monitor, maintain and mitigate potential surface water off-site erosion and sedimentation impacts from milling activities.

1.2 PROJECT LOCATION

The Leadville Mill is located 2.5 miles southwest of the City of Leadville in Sections 28 and 33, Township 9 South, Range 80 West, 6th P.M., Lake County, Colorado. See **Figure 1**. The site is located on the north side of US Highway 24 on the southern face of an East/West trending ridge.

There are no ponds, or perennial streams within the property. Surface runoff is conveyed through the site defined natural channels.

1.3 PROPERTY DESCRIPTION

The Mill site is zoned industrial/mining (IM) and occupies an area of approximately 34 acres(ac). The site is characterized as having steep slopes of 25% to 30% on the middle one third of the property and slopes on the rest of the property range from 5% to 10%. The Mill site drainage basins flow lines are illustrated on **Figure 2**, whereas the Mill and Filtered Tailings Disposal (FTD) infrastructure are illustrated on **Figure 3**.

The property is covered with a healthy, mature pine forest with a poor under story. There is little ground cover.

1.4 DRAINAGE DESIGN CRITERIA

The 10- and 100-year 24-hour storm events are used as the Mill's stormwater control design criteria. The runoff estimate used the criteria set forth by Urban Hydrology/or Small Watersheds, TR-55 by the USDA, NRCS, Conservation Engineering Division, dated June 1986.

Design rainfall estimates are obtained from National Oceanic and Atmospheric Administration (NOAA) Precipitation Frequency Data Server website. The values for Leadville are obtained from NOAA Atlas 14, Volume 8. Version 2. The rain precipitation data are found in **Attachment 2** 10yr-24hr, the 100yr-24hr rainfall Precipitation Frequency Estimates table.

The Mill site 10yr-24hr storm is 1.58 inches (in) for the 24hr event. The 100yr storm event is 2.48in for the 24hr event.

The NRCS mapped the study area soil as a Leadville Sandy Loam, 3% to 35% slopes. See **Attachment 3**. The soils are well drained and consist of stony and cobbly, medium-textured alluvium; and stony and medium cobbly, medium textured till. The soils are assigned a Hydrologic Group C rating.

Runoff Curve Numbers (RCN) were used to model the mill site runoff. See **Attachment 3**.

1.5 HYDRAULIC CRITERIA

Drainage channels that drain undisturbed areas offsite whereas upgradient disturbed area runoff is discharged directly into the Emergency Containment Sump (ECS)[1]. See **Figure 3**. Channel areas are designed to carry the 100yr flows with at least a 0.5ft freeboard. Channels are designed with 3:1 or 2.5: 1 side slopes at specified depths. As necessary, channels within disturbed areas may be seeded and lined with fiber mats and staked, as necessary. Undisturbed drainage channels are to be modified, if necessary, to convey the peak flow from the 100yr- storm event. The assigned curve number (CN) for undisturbed drainage channels is 0.035.

[1] *ECS contained water will be recycled through the Mill process.*

2.0 DRAINAGE BASINS AND SUB BASINS

2.1 GENERAL CONCEPT

The drainage plan is designed without significantly altering the natural drainage patterns or affecting water quality of the area. Runoff from non-impacted areas is kept separated to the extent practicable and directed away from impacted areas. Surface flows from disturbed areas above the Mill are directed to the ECS. Water in the ECS is retained, reused, and not released. Small sedimentation traps have been installed to contain runoff and potential sediment migration from the ECS embankment. While revegetation is being established rock berms have been placed at the corners and South face of the ECS to control flows and sediment migration. Runoff from disturbed areas to the extent practical.

3.0 MILL DRAINAGE PLAN

The Mill property is in the California Gulch Basin, 1.5mi upstream from the confluence with the Arkansas River. See **Figure 1**. The regional area has a history of mining and milling activity dating back to the 1800s. The surface runoff directed around and through the site discharges into the California Gulch whereas surface runoff from the FTD area flows toward the West and eventually discharges to the Arkansas River.

The Mill property is not located in a flood hazard area according to the FEMA Food Insurance Rate Map: Community Panel No. 080282-0004 A, dated March 1, 1998.

The drainage areas and associated flow line directions for the Mill and FTD is conceptually illustrated on **Figure 2**.

The drainage plan components are identified on **Figure 3** and includes detailed design for the Mill, crusher, storage bunkers, stockpiles, and roads. The Mill infrastructure drainage plan is illustrated on **Figure 4** and references the crusher facility drainage management plan. See **Figure 5**.

The FTD facility drainage plan is illustrated on **Figure 6**.

3.1 MILL BASIN NO. 1

This Drainage Area is 7ac. See **Figure 2**.

Drainage from basin No. 1 discharges directly into the ECS. See **Figure 4**. The crusher building drainage is contained in ECS. See **Figure 5**.

Mill Facility drainage management design includes diversion berms, check dams, sediment trap, perimeter rock berms, ditches, riprapped channels, dikes and sumps. The Engineered Control Measures (ECMs) are illustrated on **Figure 4** and the ECMs design details are defined and illustrated in **Appendix 2**.

A diversion berm is installed to divert stormwater runoff from the drainage basin on the southwest side of the Mill including fluids and solids which may be discharged into the ECS in the unlikely event a Mill catastrophic event occurs.

A sediment trap is located on the southwest corner of the ECS. The sediment trap drainage channels are designed to convey the flows from the 100yr-24hr storm event and to trap sediment from the 10yr-24hr storm event.

Perimeter berms are installed to mitigate soil erosion from stockpiles, and roads.

Ditches are used to efficiently convey surface flows from the property and to the extent possible, to prevent mixing disturbed flows with flows from undisturbed areas. The ditches are designed to convey the peak flow from the 100yr-24hr storm while maintaining ditch flow velocities less than 5.0 feet per second[3] (fps).

Riprap (D_{50}=6in) is placed in cut banks, ditches, culvert inlets/ outlets, sediment traps and check dams

Dikes are designed to contain 150% of chemical[2] leach tank volumes.

[2] *Chemicals are managed in accordance with CDRMS mine permit.*

Sumps. There are 2 mill sumps; 1 sump is in the lower southwest corner of the Mill building, and the second sump is the ECS. **See Figure 3**.

3.2 MILL BASIN NO. 2

This Mill Drainage Area is less than 3ac. See **Figure 2**.

South of the ECS, flows and sediment control features areas designed to convey the peak runoff from the 100yr-24hr storm event. The channels are at least 1.5ft deep with channels slopes than range between 2% to 6%. See **Figure 4**. Channel slopes in disturbed areas that exceed 4% will be riprapped (D_{50}=4in).

Roads, stockpiles, perimeter berms, culverts[3], and the sediment trap are designed to contain the 10yr-24hr storm event flow (volume is 4,400ft^3). The sediment trap design will be approximately 4ft deep, 20ft wide and 55ft long). The sediment trap is illustrated on **Figure 4**.

Road ditches are designed to convey the peak flow from the 100yr-24hr storm and spring snow melt runoff events. See **Appendix 2**.

3.3 MILL BASIN NO. 3

This Drainage area is less than 10ac. See **Figure 2**.

Basin No. 3 in **Figure 2** illustrates an area within the permit boundary where sheet flow drainage predominates. There are no defined channels with Mill Basin No. 3. Within this area ECMs includes perimeter berms for road and ore/topsoil stockpiles. See **Figure 4**.

3.4 FILTERED TAILINGS DEPOSIT (FTD)

Figure 6 illustrates the FTD drainage plan where perimeter berms and perimeter ditches are to be installed. See **Figure 5**. Perimeter berms and ditches will also be installed within the FTD filtration building area. From the FTD disturbed area, storm and snow melt water will be diverted to the FTD catchment pond.

The catchment pond water will be pumped to the Mill in a 2in pipe. The recycled water will be used as Mill make up water.

[3] *Attachment 4 Culver Flow Calculations*

3.5 REFERENCES

Flatirons Inc. 2014, Final Drainage Report, Union Milling Company, LLC Union Mill, Lake County, Colorado

NRCS, 2007, Part 654 Stream Restoration Design National Engineering Handbook, Chapter 8 Threshold Channel Design p.8-37.

Urban Storm Drainage Criteria Manual Volumes 1 and 2 June 2001; Revised April 2008 Urban Drainage and Flood d Control District

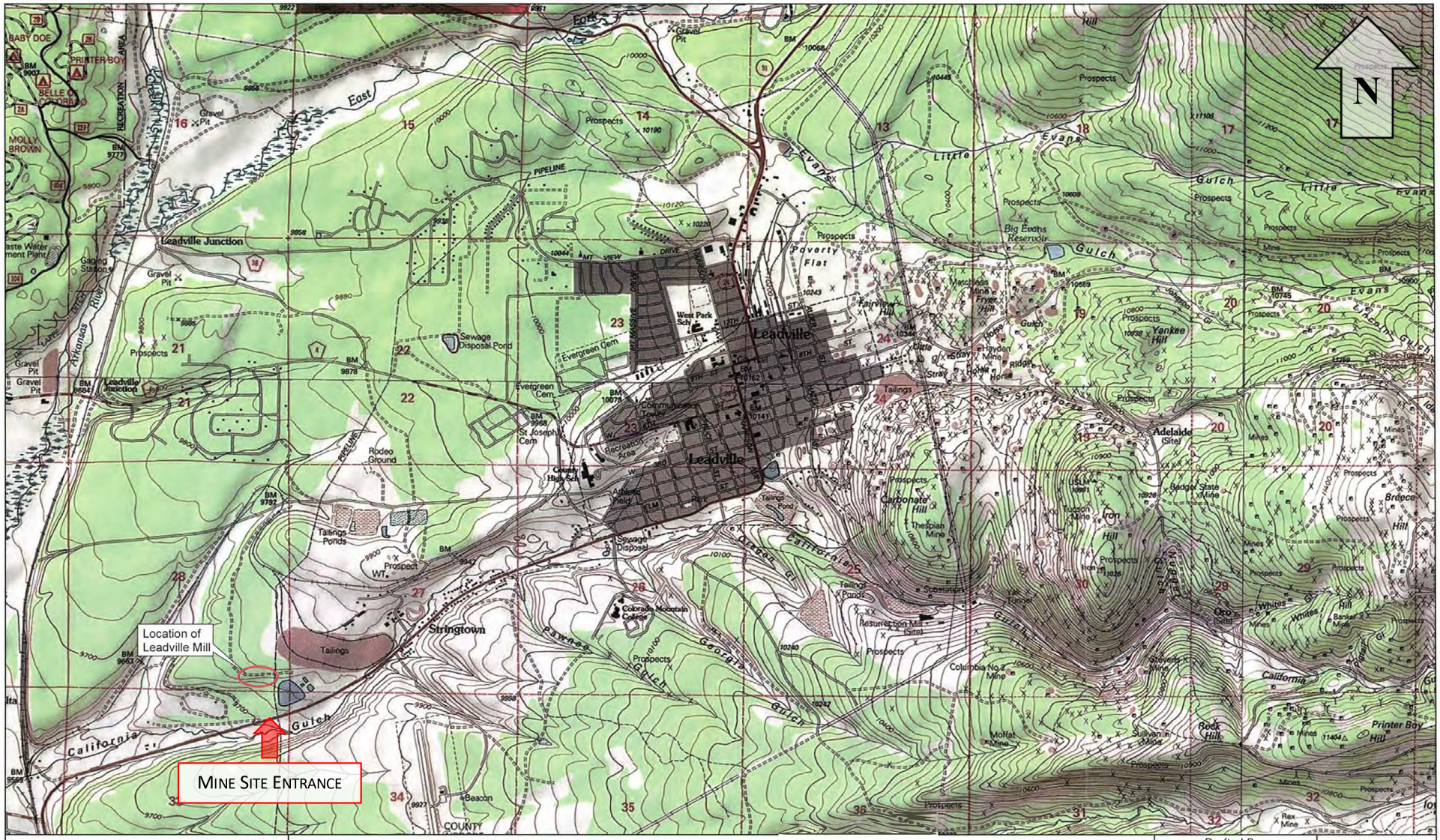
Urban Storm Drainage Criteria Manual, Volume 3 - Best Management Practices November 2010-Urban Drainage and Flood Control District

InstaNatural Resources Conservation Service National Cooperative Soil Survey http://websoilsurvey.nrcs.usda.gov/app/

InstaNatural Resources Conservation Service Urban Hydrology for Small Watersheds ftp://ftp.wcc.nrcs.usda.gov/wntsc/H%26H/other/f R55documentation.pdf

NOAA National Weather Service Precipitation Frequency Data Server Hsdc.nws.noaa.gov/hdsc/pfds

Federal Highway Administration, 2005, Design of Roadside Channels with Flexible Linings Hydraulic Engineering Circular Number 15, ReportNo.FHWA-NHI-05-114 HEC 15



LEADVILLE MILL GENERAL LOCATION

LEADVILLE MILL
CJK MILLING COMPANY, LLC - LEADVILLE, COLORADO

Drafted By: *C. Rice*

Date: *Jan 2021*

FIGURE **1**

CJK MILLING
REMOVE ▲ REUSE ▲ RESTORE

DRAINAGE AREA-1
<7 ACRES

DRAINAGE AREA 2
<3 ACRES

DRAINAGE AREA 3
<10 ACRES

EMERGENCY CONTAINMEN SUMP

SEDIMENT TRAP

DRAINS TO EMERGENCY CONTAINMEN SUMP

DRAINS TO SEIMENT TRAP

SHEET WASH DRAINAGE TO CALIFORNIA GULCH

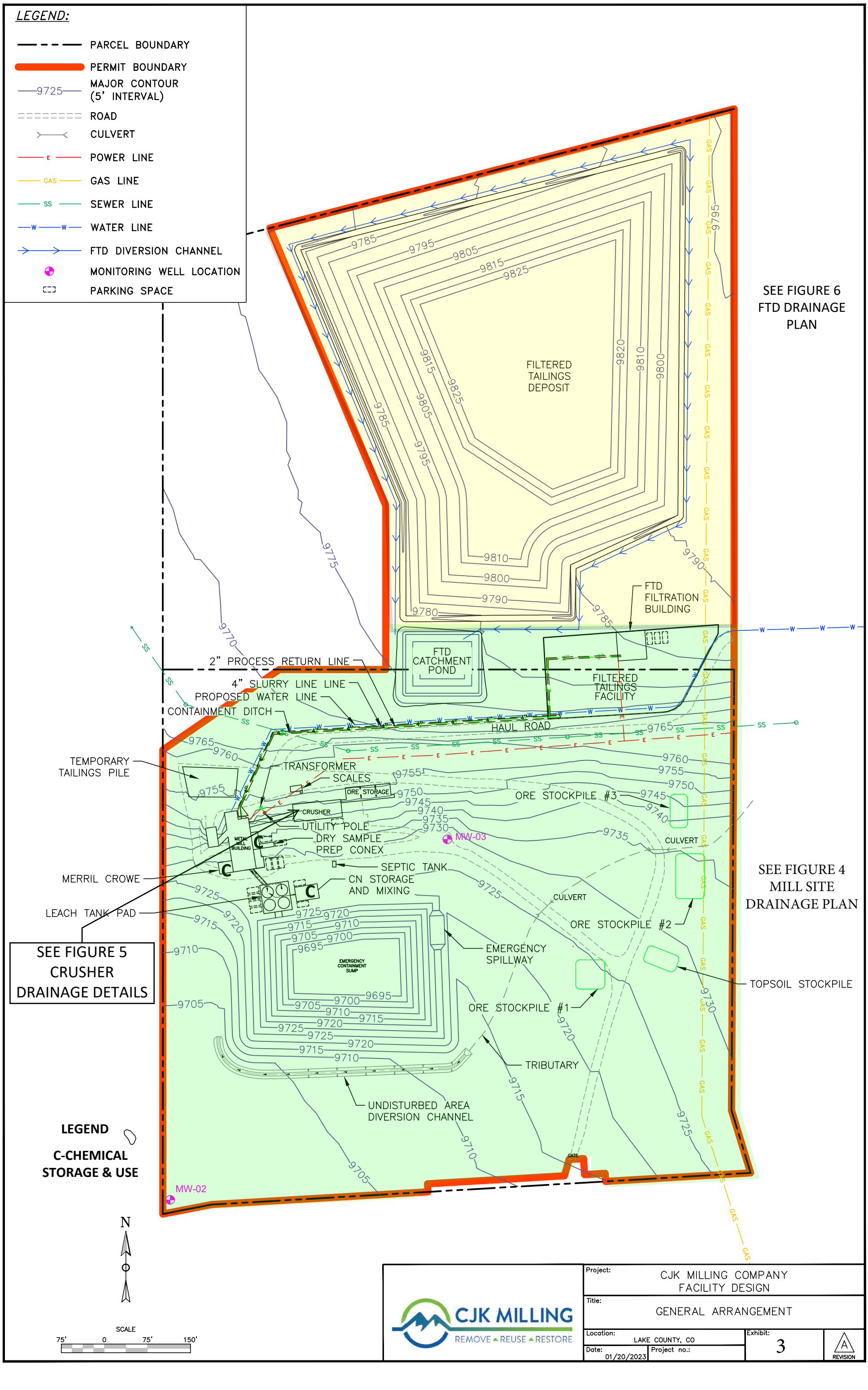
CHECK DAM

SEDIMENT TRAP

FIRE CISTERN
UTILITY POLE
NEW OFFICE BUILDING
METAL MILL BUILDING
TRAILER FOUNDATION
SEWAGE LIFT STATION
NEW CONCENTRATE STORAGE ROOM
TAILINGS TROUGH
NEW THICKENER
BERM
SAMPLING PIPE
DISTURBANCE DRAINS TO TSF
MONITORING WELL 3
APPROX. ORE STOCKPILE
12" CULVERT
CULVERT -12"
APPROX. TOPSOIL STOCKPILE
LEAK DETECTION SUMP
FLOOR ELEV. 9694
CREST ELEV. 9723
DISTURBANCE AREA DRAINAGE SEDIMENT BASIN 2
DISTURBANCE AREA DRAINAGE SEDIMENT BASIN 3
DISTURBANCE AREA DRAINAGE SEDIMENT BASIN 4
DISTURBANCE AREA DRAINAGE SEDIMENT BASINS
UNDISTURBED AREA DIVERSION CHANNEL
MONITORING WELL
GATE
LEADVILLE MILL SURFACE OWNERSHIP BOUNDARY
MONITORING WELL 2
994.92' – N 90°00'00"E
537.01' – N 0°00'00" E
410.89
939.81' S 86°37'58" W
505.36' – S 0°20'0
113.7
S 17°01'0
SCALE
0
100
N
ssued by:

FIGURE 2
LEADVILLE MILL
MILL SITE DRAINAGE CAPTURE

CJK MILLING
REMOVE ▲ REUSE ▲ RESTORE


LEGEND:
PARCEL BOUNDARY
PERMIT BOUNDARY
9725 MAJOR CONTOUR (5' INTERVAL)
ROAD
CULVERT
E POWER LINE
GAS GAS LINE
SS SEWER LINE
W W WATER LINE
FTD DIVERSION CHANNEL
MONITORING WELL LOCATION
PARKING SPACE
SEE FIGURE 6 FTD DRAINAGE PLAN
FILTERED TAILINGS DEPOSIT
FTD CATCHMENT POND
FTD FILTRATION BUILDING
FILTERED TAILINGS FACILITY
2" PROCESS RETURN LINE
4" SLURRY LINE LINE
PROPOSED WATER LINE
CONTAINMENT DITCH
HAUL ROAD
TEMPORARY TAILINGS PILE
TRANSFORMER
SCALES
ORE STORAGE
CRUSHER
UTILITY POLE
DRY SAMPLE PREP CONEX
METAL MILL BUILDING
SEPTIC TANK
CN STORAGE AND MIXING
MERRIL CROWE
LEACH TANK PAD
SEE FIGURE 5 CRUSHER DRAINAGE DETAILS
EMERGENCY CONTAINMENT SUMP
EMERGENCY SPILLWAY
ORE STOCKPILE #3
ORE STOCKPILE #2
ORE STOCKPILE #1
TOPSOIL STOCKPILE
TRIBUTARY
UNDISTURBED AREA DIVERSION CHANNEL
CULVERT
GATE
MW-02
MW-03
SEE FIGURE 4 MILL SITE DRAINAGE PLAN
LEGEND
C-CHEMICAL STORAGE & USE
N
SCALE
75' 0 75' 150'
CJK MILLING
REMOVE ▲ REUSE ▲ RESTORE
Project: CJK MILLING COMPANY FACILITY DESIGN
Title: GENERAL ARRANGEMENT
Location: LAKE COUNTY, CO
Date: 01/20/2023
Project no.:
Exhibit: 3
A REVISION
M:\CLIENTS\UMC\LEADVILLE-MILL\112D-PERMITTING-2022\LVM-GENERAL-ARRANGE.DWG 10/17/2022

994.92' – N 90°00'00"E

FIRE CISTERN

UTILITY POLE

NEW OFFICE BUILDING

METAL MILL BUILDING

TRAILER FOUNDATION

MONITORING WELL 3

NEW CONCENTRATE STORAGE ROOM

SEWAGE LIFT STATION

DISTURBANCE DRAINS TO TSF

TAILINGS TROUGH

NEW THICKENER

BERM

SAMPLING PIPE

APPROX. ORE STOCKPILE

12" CULVERT

APPROX. ORE STOCKPILE

CULVERT -12"

APPROX. TOPSOIL STOCKPILE

537.01' – N 0°00'00" E

505.36' – S 0°20'0

LEAK DETECTION SUMP

FLOOR ELEV. 9694

CREST ELEV. 9723

0.5%

DISTURBANCE AREA DRAINAGE SEDIMENT BASIN 2

DISTURBANCE AREA DRAINAGE SEDIMENT BASIN 3

DISTURBANCE AREA DRAINAGE SEDIMENT BASIN 4

Outfall -001

DISTURBANCE AREA DRAINAGE SEDIMENT BASINS

UNDISTURBED AREA DIVERSION CHANNEL

APPROX. ORE STOCKPILE

MONITORING WELL

GATE

410.89

0°01'00" E

LEADVILLE MILL SURFACE OWNERSHIP BOUNDARY

MONITORING WELL 2

939.81' S 86°37'58" W

113.75

S 17°01'0

LEGEND

- TOPSOIL
- STOCKPILES ORE
- SUB SOIL STOCKPILES
- DITCH
- RIPRAP
- ROCK BERMS
- SEDIMENT TRAP DRAINAGE
- FLOW LINES

N

SCALE

0 100

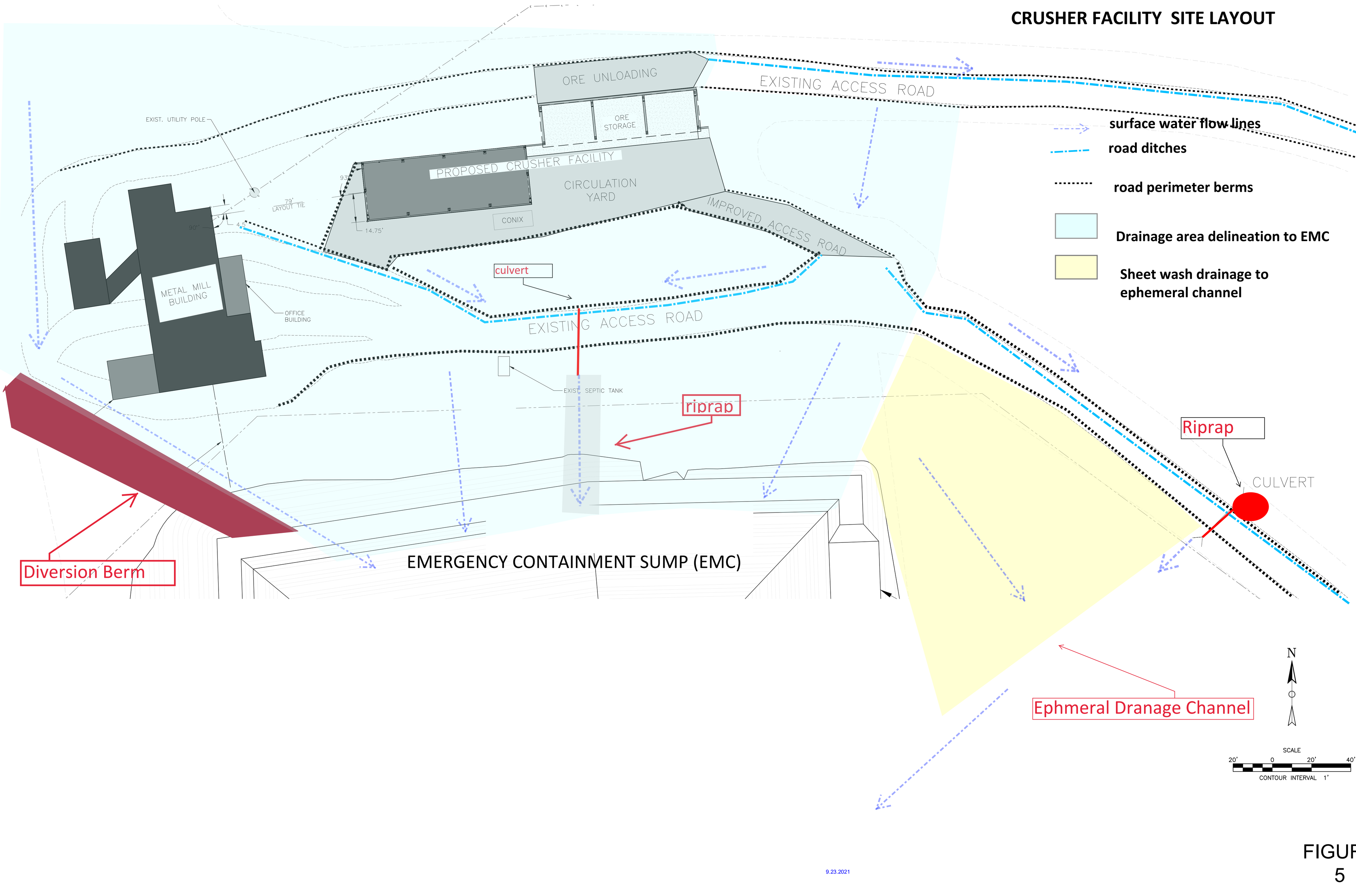
ssued by:

CJK MILLING
REMOVE ▲ REUSE ▲ RESTORE

FIGURE 4
MILL DRAINAGE PLAN

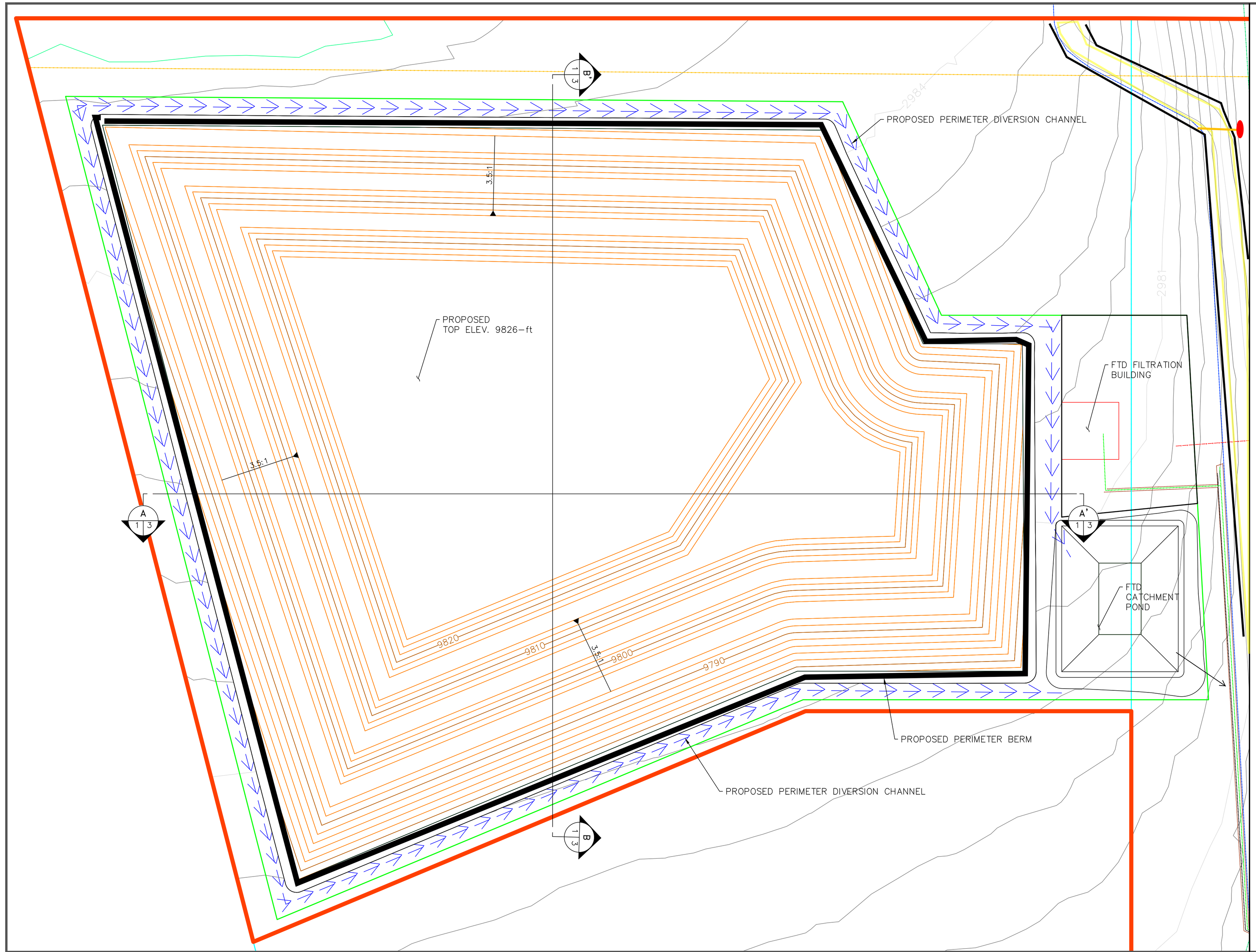
A
FV SIO1

CRUSHER FACILITY SITE LAYOUT



9.23.2021

FIGURE 5



LEGEND

- EXISTING GROUND CONTOURS (1855 / 1845)
- FTD DESIGN CONTOURS (2250 / 2215)
- PERIMETER BERM (2250 / 2215)
- SECTION LETTER / SECTION LOCATION (A, 1 2)
- SECTION IDENTIFICATION / DRAWING LOCATION (A', 1 2)
- FTD LIMIT
- PARCEL BOUNDARY
- PERMIT BOUNDARY
- ROAD
- POWER LINE
- GAS LINE
- SEWER LINE
- WATER LINE
- ROCK BERM INSIDE DITCH
- CULVERT
- RIPRAP
- DECANT LINE TO MILL

DESCRIPTION	2D AREA (ft^2)	3D AREA (ft^2)	VOLUME (yd^3)	MASS (TON)
3.5:1 OUTER SLOPE	373,928.82	388,239.99	341,008.44	501,159.43
FOUNDATION EXCAVATION (2–ft)	373,930.92	375,279.35	31,543.37	–
DRAINAGE LAYER (1–ft)	368,810.97	368,921.94	14,040.68	–
PERIMETER BERM (FILL)	–	–	1,059.31	–
COVER MATERIAL (assumes 4–in)	373,928.82	388,239.99	4,745.16	–
COVER MATERIAL (assumes 6–in)	373,928.82	388,239.99	7,189.63	–

N E S W

35 0 17.5 35 70 140

SCALE IN FEET
CONTOUR INTERVAL: 2–ft

No.	Description	Por	Fecha
01	BASE TOPOGRAPHY AS PROVIDED BY CLIENT	CLIENT	10/22

REFERENCES

Rev	By	Apr	Description	Date
0	GRE	MRQ	SUBMITTED AS FINAL	01/05/23

REVISIONS

Scale: As Shown

Design: GRE
Drawn: LAQ
Revised by: MRQ
Approved by: MRQ

Prepared by: GRE Global Resource Engineering

Prepared for: CJK MILLING — REMOVE ▲ REUSE ▲ RESTORE

Title: Filtered Tailings Disposal Drainage Plan

0 REVISION

Project: CJK MILLING COMPANY FTD DESIGN

Project No. 22–1382

Date: JANUARY 2023

DRAIWING 6

LOCATION: C:\Users\Luis Q\OneDrive – Global Resource Engineering, LTD\Union Milling\CAD\22–1382 CJK–FTD_DWG–01–02–03.dwg DATE: 1/5/2023 2:30 PM PLOT SCALE = 1:8.7041 PLOTTED BY: LUIS Q

ATTACHMENT 1

PRECIPITATION CHARACTERIZATION

NOAA Atlas 14, Volume 8, Version 2 LEADVILLE 2 SW
Station ID: 05-4885
Location name: Leadville, Colorado, US*
Latitude: 39.2242°, Longitude: -106.3164°
Elevation:
Elevation (station metadata): 9938 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.081 (0.063-0.103)	0.119 (0.093-0.152)	0.180 (0.140-0.231)	0.230 (0.177-0.297)	0.295 (0.218-0.396)	0.344 (0.249-0.471)	0.392 (0.274-0.554)	0.438 (0.294-0.643)	0.498 (0.322-0.758)	0.541 (0.342-0.845)
10-min	0.118 (0.092-0.151)	0.174 (0.136-0.223)	0.264 (0.205-0.339)	0.336 (0.260-0.434)	0.432 (0.320-0.580)	0.504 (0.365-0.690)	0.574 (0.402-0.812)	0.642 (0.431-0.942)	0.729 (0.471-1.11)	0.792 (0.501-1.24)
15-min	0.144 (0.112-0.184)	0.213 (0.166-0.272)	0.322 (0.250-0.413)	0.410 (0.317-0.530)	0.527 (0.390-0.707)	0.615 (0.445-0.842)	0.700 (0.490-0.990)	0.783 (0.526-1.15)	0.889 (0.574-1.35)	0.965 (0.611-1.51)
30-min	0.212 (0.166-0.271)	0.298 (0.233-0.382)	0.436 (0.339-0.560)	0.547 (0.423-0.706)	0.694 (0.514-0.931)	0.804 (0.583-1.10)	0.910 (0.638-1.29)	1.01 (0.682-1.49)	1.15 (0.742-1.75)	1.24 (0.787-1.94)
60-min	0.282 (0.220-0.360)	0.373 (0.291-0.477)	0.519 (0.404-0.667)	0.638 (0.493-0.824)	0.797 (0.591-1.07)	0.917 (0.665-1.25)	1.03 (0.725-1.46)	1.15 (0.773-1.69)	1.30 (0.840-1.98)	1.41 (0.890-2.20)
2-hr	0.352 (0.278-0.445)	0.448 (0.353-0.567)	0.603 (0.473-0.766)	0.729 (0.569-0.932)	0.900 (0.675-1.20)	1.03 (0.755-1.40)	1.16 (0.820-1.62)	1.28 (0.873-1.86)	1.45 (0.947-2.18)	1.57 (1.00-2.42)
3-hr	0.413 (0.328-0.519)	0.498 (0.395-0.628)	0.639 (0.505-0.808)	0.757 (0.595-0.963)	0.922 (0.699-1.22)	1.05 (0.778-1.42)	1.18 (0.845-1.65)	1.31 (0.901-1.90)	1.49 (0.983-2.24)	1.63 (1.04-2.49)
6-hr	0.554 (0.444-0.690)	0.632 (0.506-0.788)	0.767 (0.613-0.960)	0.888 (0.705-1.12)	1.07 (0.824-1.41)	1.21 (0.914-1.64)	1.37 (0.995-1.91)	1.54 (1.07-2.21)	1.77 (1.18-2.64)	1.96 (1.27-2.96)
12-hr	0.720 (0.584-0.888)	0.839 (0.680-1.04)	1.04 (0.842-1.29)	1.22 (0.979-1.52)	1.48 (1.15-1.93)	1.68 (1.28-2.24)	1.90 (1.39-2.60)	2.12 (1.49-3.02)	2.43 (1.65-3.58)	2.68 (1.76-4.01)
24-hr	0.916 (0.751-1.12)	1.07 (0.879-1.31)	1.34 (1.10-1.65)	1.58 (1.28-1.95)	1.92 (1.51-2.48)	2.19 (1.68-2.88)	2.48 (1.84-3.36)	2.78 (1.97-3.90)	3.19 (2.18-4.64)	3.52 (2.34-5.20)
2-day	1.14 (0.944-1.38)	1.30 (1.07-1.57)	1.58 (1.30-1.92)	1.84 (1.51-2.24)	2.23 (1.78-2.87)	2.55 (1.99-3.34)	2.90 (2.18-3.91)	3.28 (2.36-4.57)	3.81 (2.64-5.50)	4.24 (2.85-6.20)
3-day	1.27 (1.06-1.53)	1.45 (1.21-1.74)	1.76 (1.46-2.13)	2.05 (1.69-2.48)	2.48 (2.00-3.17)	2.84 (2.23-3.69)	3.22 (2.44-4.32)	3.64 (2.64-5.04)	4.23 (2.95-6.06)	4.71 (3.18-6.83)
4-day	1.39 (1.16-1.66)	1.58 (1.32-1.89)	1.92 (1.60-2.31)	2.23 (1.85-2.69)	2.69 (2.17-3.42)	3.07 (2.42-3.96)	3.48 (2.64-4.63)	3.91 (2.85-5.38)	4.53 (3.17-6.45)	5.03 (3.41-7.25)
7-day	1.70 (1.44-2.02)	1.92 (1.62-2.28)	2.31 (1.94-2.75)	2.65 (2.21-3.17)	3.14 (2.56-3.94)	3.55 (2.82-4.53)	3.98 (3.05-5.23)	4.43 (3.25-6.03)	5.07 (3.57-7.12)	5.58 (3.82-7.95)
10-day	1.97 (1.67-2.32)	2.21 (1.88-2.60)	2.62 (2.22-3.10)	2.98 (2.51-3.55)	3.51 (2.87-4.37)	3.94 (3.14-4.99)	4.39 (3.38-5.72)	4.86 (3.59-6.56)	5.52 (3.91-7.70)	6.04 (4.16-8.56)
20-day	2.65 (2.28-3.10)	2.96 (2.54-3.46)	3.47 (2.98-4.07)	3.92 (3.34-4.62)	4.57 (3.77-5.61)	5.09 (4.10-6.35)	5.63 (4.38-7.24)	6.19 (4.62-8.23)	6.97 (4.99-9.59)	7.58 (5.28-10.6)
30-day	3.22 (2.79-3.73)	3.58 (3.10-4.16)	4.20 (3.63-4.89)	4.73 (4.06-5.54)	5.48 (4.55-6.67)	6.08 (4.93-7.53)	6.69 (5.24-8.54)	7.33 (5.50-9.67)	8.20 (5.91-11.2)	8.88 (6.22-12.3)
45-day	3.94 (3.44-4.54)	4.41 (3.84-5.08)	5.17 (4.49-5.98)	5.81 (5.02-6.75)	6.69 (5.58-8.06)	7.38 (6.01-9.05)	8.07 (6.35-10.2)	8.78 (6.62-11.5)	9.72 (7.04-13.1)	10.4 (7.36-14.4)
60-day	4.58 (4.01-5.25)	5.13 (4.50-5.89)	6.03 (5.26-6.95)	6.76 (5.87-7.83)	7.76 (6.49-9.27)	8.51 (6.96-10.4)	9.26 (7.31-11.6)	10.0 (7.56-13.0)	11.0 (7.97-14.7)	11.7 (8.28-16.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

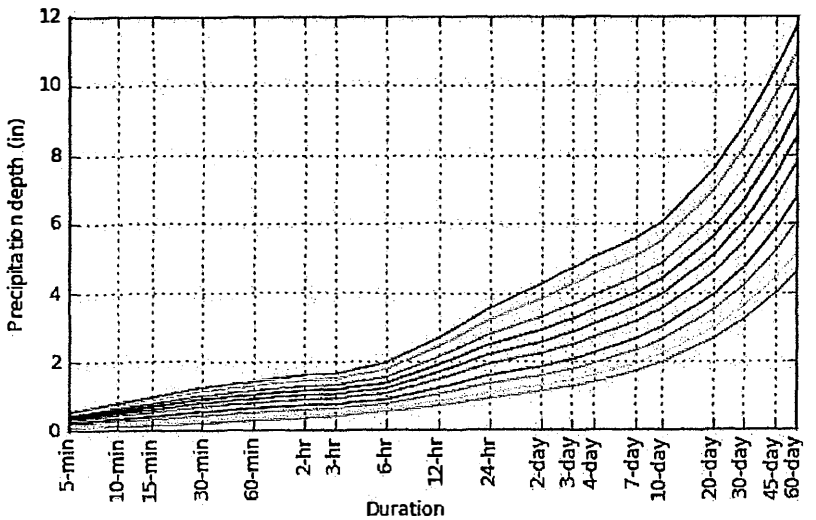
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

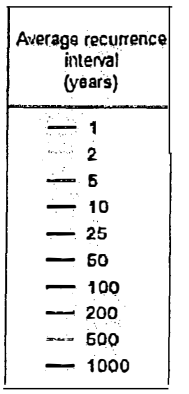
Please refer to NOAA Atlas 14 document for more information.

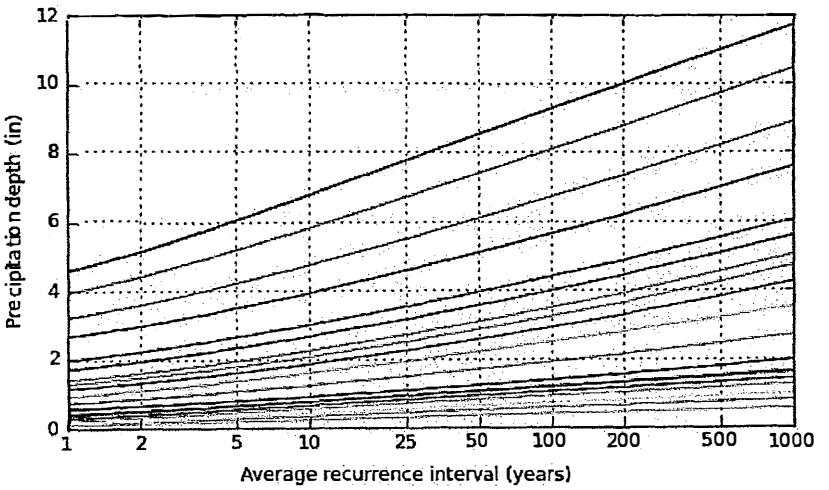
Back to Top

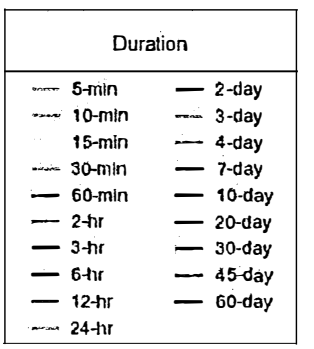
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 39.2242°, Longitude: -106.3164°









NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Mon Feb 24 19:11:53 2014

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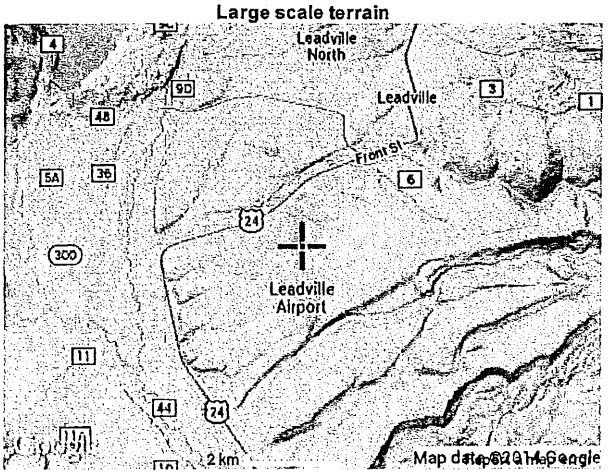

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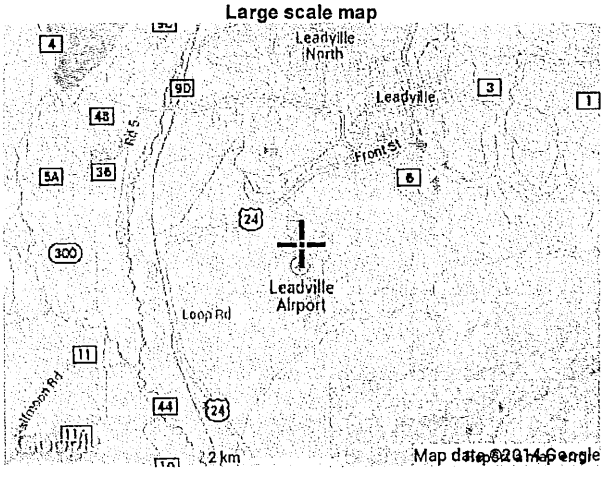
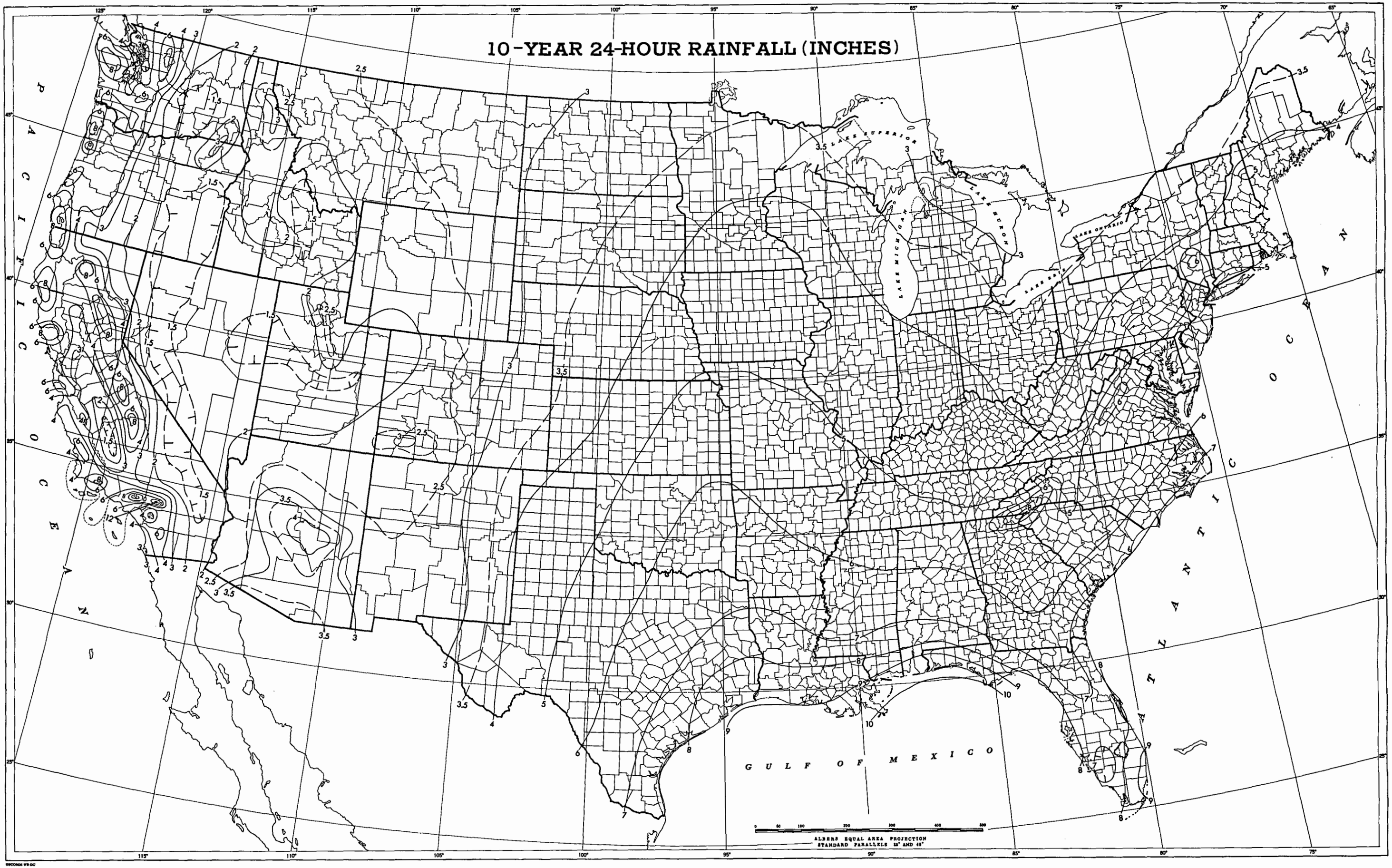


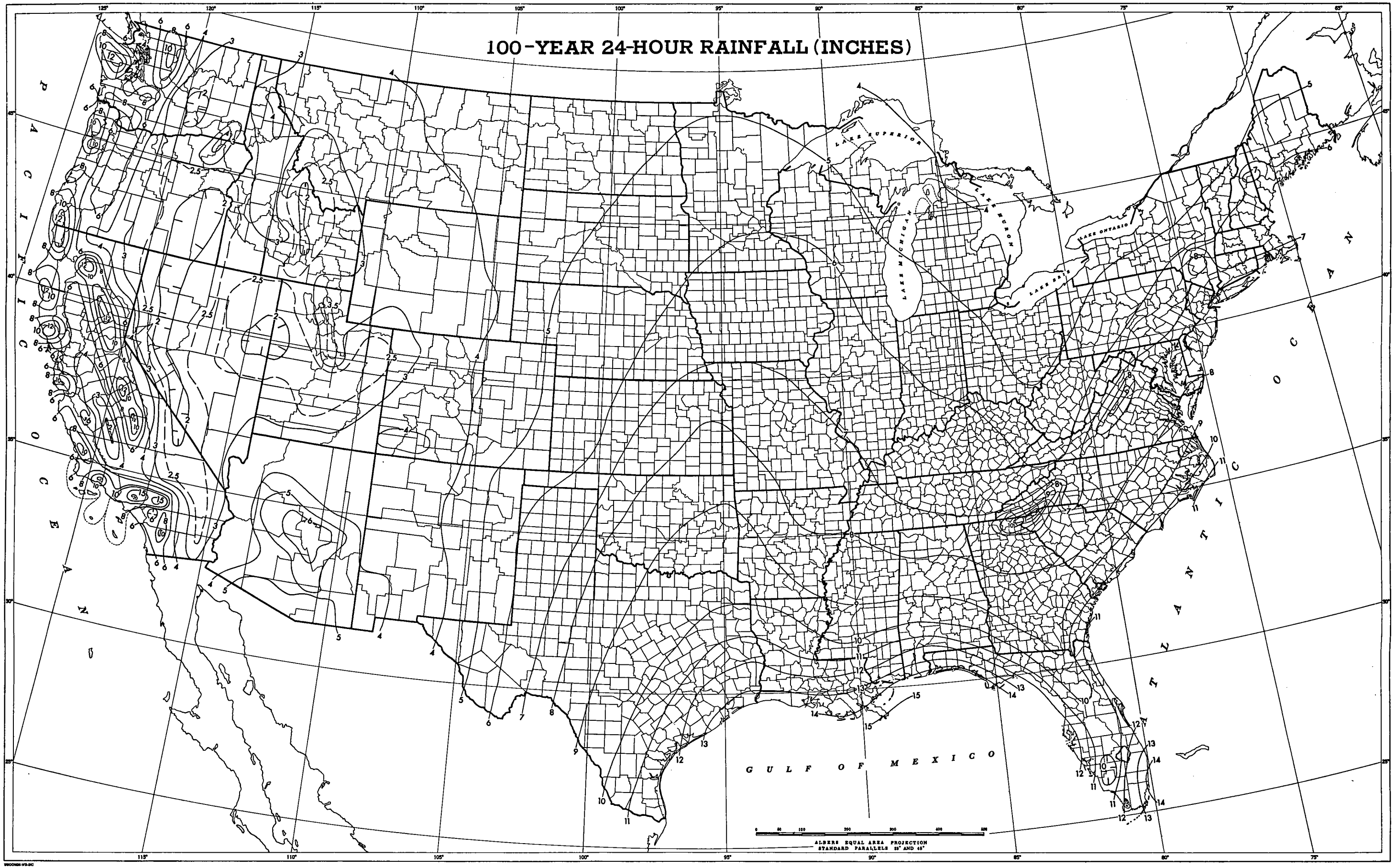
ATTACHMENT 2

10YR-24HR, 100YR-24HR RAINFALL & PRECIPITATION

10-YEAR 24-HOUR RAINFALL (INCHES)



100-YEAR 24-HOUR RAINFALL (INCHES)



ATTACHMENT 3
NRCS CURVE NUMBER TABLES

CURVE NUMBER OF VARIOUS LAND USES

Table 2. Curve number of various land use and HSG in Kardeh watershed

Land use	Hydrologic soil group	Area (ha)	CN
Dry farmland (rainfed farming)	A	102.30	62
	B	2204.90	71
	C	4378.10	78
Forest	A	83.98	36
[1]Thin forest	B	1262.60	60
	C	809.60	73
	D	398.70	79
Forest	B	24.40	55
[2]Fair forest	C	447.70	70
	D	44.16	77
Rangeland	A	4.70	35
[3]Good condition	B	72.60	35
	C	1208.54	47
	D	1996.19	55
Rangeland	A	26.97	51
[4]Fair condition	B	1809.90	51
	C	2628.26	63
	D	4808.70	70
Rangeland	A	215.36	67
[5]Poor condition	B	5649.30	67
	C	7930.9	80
	D	6649.90	85
Orchards and irrigated farmland	A	428.99	43
	B	510.30	65
	C	803.00	76
Settlement	D	28.40	93
Rocks	D	286.50	91
Total area		44814.95	-

1. *Thin forest*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning. 2. *Fair forest:* Woods are grazed but not burned, and some forest litter covers the soil. *Good forest:* Woods are protected from grazing, and litter and brush adequately cover the soil.
3. *Rangeland with Good condition*: > 70% ground cover.
4. *Fair condition*: 30 to 70% ground cover.
5. *Poor condition*: <30% ground cover (litter, grass, and brush over-story). (USDA/NRC,1986).

Soil Map—Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
(Union Mill)

Map Scale: 1:4,650 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 8, Dec 23, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 12, 2011—Sep 22, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties (CO658)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
LeE	Leadville sandy loam, 3 to 35 percent slopes	96.8	84.4%
MP	Mine pits and Dumps	11.0	9.6%
PgD	Pierian gravelly sandy loam, 3 to 9 percent slopes	0.8	0.7%
W	Water	6.0	5.3%
Totals for Area of Interest		**114.7**	**100.0%**

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties

LeE—Leadville sandy loam, 3 to 35 percent slopes

Map Unit Setting

Elevation: 8,200 to 10,000 feet
Mean annual precipitation: 16 to 20 inches
Frost-free period: 10 to 75 days

Map Unit Composition

Leadville and similar soils: 100 percent

Description of Leadville

Setting

Landform: Mountains
Landform position (two-dimensional): Toeslope, footslope, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stony & cobbly, medium-textured alluvium and/or stony & cobbly, medium-textured till

Properties and qualities

Slope: 3 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.2 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 6e
Hydrologic Soil Group: C

Typical profile

0 to 8 inches: Sandy loam
8 to 14 inches: Stony sandy clay loam
14 to 40 inches: Extremely stony clay loam
40 to 60 inches: Extremely stony loam

Data Source Information

Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 8, Dec 23, 2013

ATTACHMENT 4
FACILITY CULVERT CALCULATIONS

Upper Culvert 12 inch CMP Calculator Report
Worksheet-4

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	5.00	ft	Headwater Depth/ Height	1.00	
Computed Headwater Elevation	5.00	ft	Discharge	1.856	cfs
Inlet Control HW Elev	4.94	ft	Tailwater Elevation	2.00	ft
Outlet Control HW Elev	5.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	4.00	ft	Downstream Invert	3.50	ft
Length	30.00	ft	Constructed Slope	0.016667	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	0.58	ft
Slope Type	Mild		Normal Depth	0.64	ft
Flow Regime	Subcritical		Critical Depth	0.58	ft
Velocity Downstream	3.93	ft/s	Critical Slope	0.022708	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	1.00	ft
Section Size	12 inch		Rise	1.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev	5.00	ft	Upstream Velocity Head	0.19	ft
Ke	0.90		Entrance Loss	0.17	ft

Inlet Control Properties					
Inlet Control HW Elev	4.94	ft	Flow Control	Unsubmerged	
Inlet Type	Projecting		Area Full	0.8	ft²
K	0.03400		HDS 5 Chart	2	
M	1.50000		HDS 5 Scale	3	
C	0.05530		Equation Form	1	
Y	0.54000				

Down Gradient Culvert 12 inch CMP Calculator Report
10yr-24 hour storm

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	5.50	ft	Headwater Depth/ Height	1.50	
Computed Headwater Elevation	5.50	ft	Discharge	3.013	cfs
Inlet Control HW Elev	5.36	ft	Tailwater Elevation	3.50	ft
Outlet Control HW Elev	5.50	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	4.00	ft	Downstream Invert	3.50	ft
Length	30.00	ft	Constructed Slope	0.016667	ft/ft

Hydraulic Profile					
Profile	CompositeM2Pressure		Depth, Downstream	0.74	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	0.74	ft
Velocity Downstream	4.81	ft/s	Critical Slope	0.029865	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	1.00	ft
Section Size	12 inch		Rise	1.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev	5.50	ft	Upstream Velocity Head	0.23	ft
Ke	0.90		Entrance Loss	0.21	ft

Inlet Control Properties					
Inlet Control HW Elev	5.36	ft	Flow Control	Transition	
Inlet Type	Projecting		Area Full	0.8	ft²
K	0.03400		HDS 5 Chart	2	
M	1.50000		HDS 5 Scale	3	
C	0.05530		Equation Form	1	
Y	0.54000				

APPENDIX 2
ECM, MONITORING, INSPECTION & MAINTENANCE

APPENDIX 2
ENGINEERING CONTROL MEASURES

Leadville Mill
Lake County Colorado
January 2023

Prepared by

Union Milling Contractors, LLC
P.O. Box 620490
Littleton, CO 80162-0490

TABLE OF CONTENTS

TABLE OF CONTENTS ..... **I**
LIST OF FIGURES ..... **II**
1.0 ENGINEERING CONTROL MEASURES **1-1**
1.1 ROCK CHECK DAMS (SEE FIGURE 1) 1-1
1.1.1 OPERATION & MAINTENANCE 1-1
1.2 CULVERTS (SEE FIGURE 2 & 3) 1-1
1.3 DITCHES 1-3
1.4 PERIMETER CONTROL DITCHES 1-4
1.4.1 DITCH CAPACITY AND PROTECTION 1-4
1.4.2 PERIMETER CONTROL BERMS 1-5
1.4.3 ROCK BARRIERS/BERMS 1-5
1.5 SEDIMENT TRAPS (SEE FIGURE 4) 1-5
1.5.1 EMBANKMENT 1-5
1.5.2 EXCAVATION 1-5
1.5.3 STONE SIZE 1-6
1.6 OPEN CHANNELS (SEE FIGURE 5) 1-7
1.7 VEHICLE TRACKING PAD (SEE FIGURE 6) 1-7
1.7.1 DESIGN AND CONSTRUCTION 1-7
1.7.2 INSPECTION 1-8
1.7.3 MAINTENANCE 1-8

LIST OF FIGURES

Figure 1: Rock Check Dam **1-10**
Figure 2: Culvert Protection Plan **1-11**
Figure 3: Culvert Protection Plan **1-12**
Figure 4: Sediment Trap **1-13**
Figure 5: Diversion Open Channel **1-14**
Figure 6: Vehicle Tracking **1-15**

1.0 ENGINEERING CONTROL MEASURES

1.1 ROCK CHECK DAMS (SEE FIGURE 1)

Rock Check dams will be installed in permanent ditches or swales that cannot receive a permanent non-erodible lining for an extended period. The maximum height of the rock check dam will be 2.5ft. The top of the rock check dam will be a minimum of 1.0ft below the top of the ditch or swale.

The maximum spacing between the dams will be such that the toe of the upstream dam is at the same elevation as the top of the rock at the center of the downstream dam.

The rock check dams will be placed such that the resultant ponding will not cause inconvenience or damage to adjacent areas or structures.

The center of the rock check dam will be at least 6 inches lower than the sides. Hand or mechanical placement may be necessary to achieve complete coverage of the ditch or swale and to assure that the center of the dam is lower than the sides.

1.1.1 Operation & Maintenance

On active construction sites, the rock check dams will be inspected at least once every 7 days and within 24hrs of a rainfall of 0.5in or more. If any erosion has taken place around or below the rock check dam or if rocks have been dislodged, repairs will be made to prevent further damage.

Sediment will be removed once it has accumulated to one-half the height of the rock check dam. The center of the rock check dam will also be inspected periodically to ensure that the center of the dam is lower than the sides.

Unless they will be incorporated into a permanent stormwater management control, rock check dams will be removed when their useful life has been completed. In temporary ditches and swales, rock check dams will be removed, and the ditch filled in when they are no longer needed. In permanent structures, rock check dams will be removed when a permanent lining can be installed. In the case of grass-lined ditches, rock check dams will be removed when the grass has matured sufficiently to protect the ditch or swale. The area beneath the rock check dams will be seeded and mulched immediately after they are removed.

For rock check dams that are made a part of a permanent stormwater management control, regular inspections will be made to see if any erosion has occurred around or below the dam and if any rock has been dislodged all needed repairs to prevent further damage will be made immediately. If sediment trapping is to be a continuing function of the rock check dam, the sediment will be removed when it has accumulated to one-half the depth of the rock check dam.

1.2 CULVERTS (SEE FIGURE 2 & 3)

Drainage culverts and ditches within disturbed areas are designed to carry the peak flow from the 100-yr storm event.

Culverts will be placed in natural watercourses intersected by the haulage road. In cut fill sections, culverts may be placed at various intervals along the ditch to intercept drainage and convey it to natural drain ways below the fill slope. This procedure can significantly reduce the size of the ditch required by breaking runoff areas into small segments that contribute only to specific ditch segments.

CULVERT ROAD GRADE SPACING

Road Grade (%)	Road Grade (%)
2-5	300-800
6-10	200-300
11-15	TBD

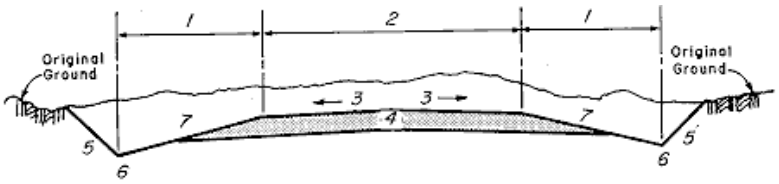
SIZING FOR FLOW DISSIPATERS AT CULVERT OUTLET

Culvert Size	Average Rock Size	Apron Width[1]	Apron Length[2]
12 in	5 in	3-4 ft	4-6 ft
18 in	8 in	4-6 ft	6-8 ft

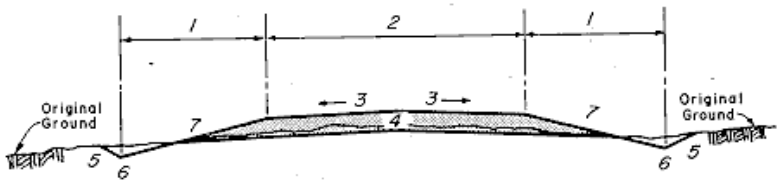
1. *Apron width at the narrow end (pipe or channel outlet)*
2. *Apron length for slow-flow (no pressure head) culverts*

1.3 DITCHES

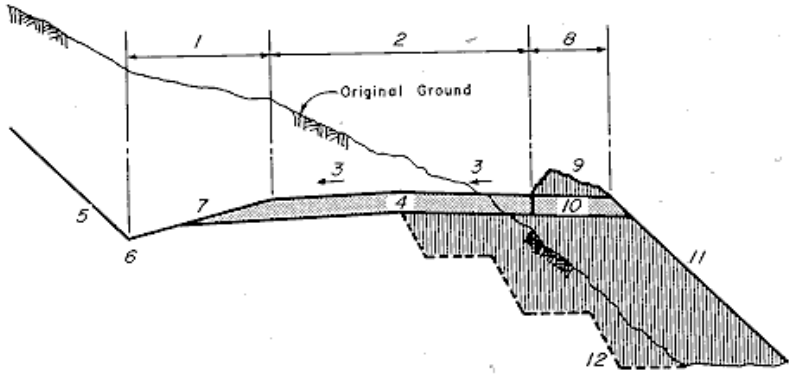
DITCH CONFIGURATION SPECIFICATIONS FOLLOW:



TYPICAL CUT SECTION



TYPICAL FILL SECTION



TYPICAL CUT – FILL SECTION

FIGURE 25. - Typical haulageway sections.

Key

1. Lane edge to centerline of ditch dimension varies with centerline depth (6) and required slope (7).
2. Lane width will be 20 feet wide based on dimension of largest vehicle and numbers of lanes desired.
3. Typical cross slope for excavated subgrade and final surface. Either 1/4 or 1/2 inches per foot (ipf), depending on surface material used.
4. Combined surface and subbase depth varies with wheel load concentration.
5. Ditch out slope natural angle of repose in rock, 2:1.
6. Depth at centerline of ditch is required to be below subbase and deep enough to accept total volume of runoff from adjacent drainage area.
7. Ditch slope adjacent to roadway varies from 4:1 to 2:1.
8. Road widening to accommodate safety berm dimension varies with berm size required.
9. Safety berm constructed with a near vertical slope adjacent to lane edge, final height and out slope of berm depends upon the rolling radius of the largest tires that will traverse the haulage road.
10. Berm support constructed of subbase material only; surface material ends at berm face.

1.4 PERIMETER CONTROL DITCHES

Perimeter control ditches function like rock berms – they redirect downslope sheet flow from the disturbed area perimeter to a sediment trap, settling pond, rock berm, or other treatment unit designed to settle or filter fine grained soil and waste rock from site runoff. Design includes the following:

- Ditches will be stabilized immediately after construction. Seeding rates and the use of mulch or rolled erosion control products will be determined by the ditch slope and other site-specific factors.
- Long, steep ditches may need temporary ditch check dams to prevent erosion and downcutting.
- Where using a ditch or berm to redirect site runoff from the perimeter to a separate treatment unit (e.g., sediment trap or pond) siting the permitter control ditches may be placed at an upslope location.
- Observe the flow perimeter of ditches and note any vertical or horizontal scour erosion. Repair ditches when the depth exceeds 1ft from the original depth design.
- Mitigate scour and off-site sediment discharges where ditches overflow during heavy rains.

1.4.1 Ditch Capacity and Protection

Ditches are designed to convey expected runoff flows from the 100yr-24hr storm event under various slope conditions as outlined in the following section.

At a 0% to 3% grade, ditches will be constructed without benefit of a liner.

At a 3% to 5% grade, the ditch lining will consist of >3/8in sized rock.

At grades > 5%, the lining will consist of dumped rock placed evenly on both sides to a height no less than 0.5 foot above the computed maximum depth.

TABLE 11. - Water-volume capacity for various V-ditch configurations, cubic feet per second

Depth of water (feet)	Slope, percent																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Grass cover			Jute matting					Dumped Rock											
	2:1 0.1																			
0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
.4	.4	.5	.6	.6	.7	.5	.5	.5	.6	.6	.6	.7	.7	.7	.8	.8	.8	.8	.8	.9
.6	1.1	1.6	1.7	1.9	2.1	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.1	2.2	2.3	2.4	2.4	2.5	2.6
.8	2.5	3.5	3.6	4.1	4.6	3.0	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.6	4.8	4.9	5.1	5.2	5.4	5.5
1.0	4.5	6.3	6.5	7.5	8.3	5.5	5.9	6.3	6.7	7.1	7.4	7.8	8.1	8.4	8.7	9.0	9.2	9.5	9.8	10.0
1.2	7.3	10.3	10.5	12.1	13.6	8.9	9.6	10.3	10.9	11.5	12.1	12.6	13.1	13.6	14.1	14.5	15.0	15.4	15.9	16.3
1.4	11.0	15.5	15.8	18.3	20.4	13.4	14.5	15.5	16.4	17.3	18.2	19.0	19.8	20.5	21.2	21.9	22.6	23.3	23.9	24.5
1.6	15.6	22.1	22.6	26.1	29.1	19.2	20.7	22.1	23.5	24.7	25.9	27.1	28.2	29.3	30.3	31.3	32.2	33.2	34.1	35.0
1.8	21.4	30.3	30.9	35.7	39.9	26.2	28.3	30.3	32.1	33.8	35.5	37.1	38.6	40.0	41.4	42.8	44.1	45.4	46.6	47.8
2.0	28.3	40.0	40.9	47.2	52.8	34.7	37.5	40.0	42.5	44.8	47.0	49.0	51.0	53.0	54.8	56.6	58.4	60.1	61.7	63.3
									2:1 3:1											
0.2	0.1	0.2	0.2	00.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
.4	.8	1.1	1.1	1.3	1.5	1.0	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.7
.6	2.3	3.3	3.3	3.8	4.3	2.8	3.0	3.3	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.6	4.7	4.9	5.0	5.1
.8	4.9	7.0	7.1	8.2	9.2	6.1	6.5	7.0	7.4	7.8	8.2	8.6	8.9	9.3	9.6	9.9	10.2	10.5	10.8	11.1
1.0	9.0	12.7	12.9	14.9	16.7	11.0	11.8	12.7	13.4	14.2	14.9	15.5	16.1	16.8	17.3	17.9	18.5	19.0	19.5	20.0
1.2	14.5	20.6	21.0	24.2	27.1	17.8	19.2	20.6	21.8	23.0	24.1	25.2	26.2	27.2	28.2	29.1	30.0	31.7	31.7	32.5
1.4	21.9	31.0	31.6	36.5	40.9	26.9	29.0	31.0	32.9	34.7	36.4	38.0	39.5	41.0	42.5	43.9	45.2	46.5	47.8	49.0
1.6	31.3	44.2	45.1	52.1	58.3	38.3	41.4	44.2	46.9	49.5	51.9	54.2	56.4	58.5	60.6	62.6	64.5	66.3	68.2	69.9
1.8	42.8	60.5	61.8	71.3	79.7	52.4	56.6	60.5	64.2	67.7	71.0	74.1	77.1	80.0	82.9	85.6	88.2	90.8	93.3	95.7
2.0	56.6	80.1	81.7	94.4	105.5	69.4	74.9	80.1	84.9	89.5	93.9	98.1	102.1	105.9	109.7	113.3	116.7	120.1	123.4	126.6

The Soil Conservation Service Engineering Field Manual was used to develop peak flow rates, for the 10yr-24hr and the 100yr-24hr storm charts. The rainfall intensity generated by a 10yr storm is recognized as the applicable standard for road drainage design by the American Association of State Highway Officials. CJK

Milling has designed road ditches to accommodate snowfall runoff events, to convey the peak flow from a 100yr-24hr storm event.

If a ditch grade needs to be altered to accommodate changes in topography, the depth of the ditch may be changed accordingly.

Haul roads ditch design criteria follows:

Road Grade	Ditch Configuration	Depth (ft)	Freeboard (ft)	Peak Discharged (cfs)
0-5%	2:1	1.00	0.5	2.0
5-10%	2:1	1.00	0.5	5.0

1.4.2 Perimeter Control Berms

Perimeter control berms approximately 1.5 feet high with 2:1 side slopes consisting of rock will serve to reduce sediment discharges off-site, through filtration, or redirection of runoff to a sediment trap.

As with other perimeter controls, rock and other berms are typically installed on the contour, with the ends turned upslope to prevent bypasses.

Berms (i.e., linear rock riprap) used to redirect sheet flows to treatment areas (e.g., sediment traps, rock berm or check) will be stabilized to prevent the berm from eroding and becoming a source of sediment runoff. Temporary flow checks and an outlet flow dissipater may be needed, depending on the slope.

1.4.3 Rock Barriers/Berms

- Rock Berms will be installed considering compliance with MSHA haul road requirements and the ability to effectively maintain all weather access and haul roads.
- Berms will be maintained by retaining their initial configuration and filtration/flow function.
- Where necessary, mitigate scouring downslope of berms.
- Check berms and note areas where runoff has blown out or bypassed bermed areas.
- Mitigate washouts, undercutting (e.g., animal burrows), and end bypasses along berms.

1.5 SEDIMENT TRAPS (SEE FIGURE 4)

1.5.1 Embankment

Ensure that embankments for temporary sediment traps will not exceed 3ft in height measured at the centerline from the original ground surface to the top of the embankment. Additional freeboard may be added to the embankment height to allow flow through a designed bypass location. Embankments will be constructed with a minimum top width of 3ft and side slopes of 2:1 or flatter. The original ground under the embankment will be scarified to a depth of 6in or more prior to placement of the fill material. Fill material will not be placed over frozen ground.

1.5.2 Excavation

Where sediment pools are formed or enlarged by excavation, side slopes will be at 2:1 or flatter.

Outlet Section

Construct the sediment trap outlet using a stone section of embankment located at the low point in the basin. The stone section serves two purposes:

1) The top section serves as a nonerosive spillway outlet for flood flow, and

2) The bottom section provides a means of dewatering the basin between runoff events.

1.5.3 Stone Size

A combination of coarse aggregate and riprap will be used to provide for filtering/detention as well as outlet stability. Construct the outlet using well-graded stones with a d50 size of 9in and a maximum stone size of 14in. A 1ft-thick layer of 1/2in rock will be placed on the inside face to reduce drainage flow rate.

Side Slopes Stone Layer Thickness

Keep the side slopes of the spillway at least 21in thick.

Depth

Keep the crest of the spillway outlet a minimum of 1.5ft below the settled top of the embankment.

Protection From Piping

Excavate a keyway trench across the riprap foundation and up the sides to the height of the dam.

Weir Length and Depth

The spillway weir will be at least 4 feet long and sized to pass the peak discharge of the 10yr frequency, 24hr duration storm event.

A maximum flow depth of 1ft, a minimum freeboard of 0.5ft, and maximum side slopes of 2:1. Weir length will be selected from the table below:

DRAINAGE WEIR

Area (ac)	Length (ft)
1	4.0
2	6.0
3	8.0
4	10.0
5	12.0

The release rate of the basin will be that rate required to achieve minimum detention times. The elevation of the permeable fill outlet will be placed such that it only drains the dry detention storage. Where this channel intersects with the natural waterway, the discharge below the velocity which will initiate erosion or scour within the receiving channel. Outlets will be constructed to receive the discharge from the sediment trap.

1.6 OPEN CHANNELS (SEE FIGURE 5)

Open channels are designed to convey the peak flow from the 100yr-24hr storm event. As necessary, check dams will be installed where deemed necessary to trap sediment and to mitigate to the extent possible drainage channel scouring.

1.7 VEHICLE TRACKING PAD (SEE FIGURE 6)

The following design and maintenance guidelines have been considered:

- **Underlying soils on site** – silty and clayey soils cling more readily to tires and require longer or otherwise more effective exit pads.
- **Frequency of use** – heavier traffic will wear out small, thin rock pads quickly.
- **Length and width of the entrance/exit** – longer, wider pads will be able to accommodate heavier traffic and more challenging soils (e.g., clays, silts).
- **Depth of rock** – Thin rock layers do not scrape mud off tires as effectively as thicker rock pads.
- **Size and type of vehicles** – tractor trailers and heavy delivery trucks require a thicker, longer exit pad than exits serving pickup trucks and automobiles.
- **Frequency of maintenance** – exit pads sited in wet conditions, with clay or silt soils, and used frequently by heavy vehicles require more frequent cleaning and maintenance.

1.7.1 Design and Construction

Rock/stone pads (vehicle tracking pad) remove material from vehicle tires through physical scraping action. The amount of traffic and frequency of use has been considered. Specific design includes the following:

- The pad will be of sufficient width to treat the widest vehicles.
- Pads will be a minimum 20ft wide and 50ft long. If necessary, a longer pad will be added if needed to remove mud, soil, and rock from tires.
- Rock used for the pad will be coarse aggregate of sufficient size to remove mud from vehicles (e.g., 2in to 6in).
- Pad thickness will be sufficient to remove material from tires – 6in to 12in.
- A turning radius of 20ft will be included on each edge where the pad intersects the road.
- Designed so that drainage from the pad area will be controlled.

For most applications, the vehicle tracking BMP area can be graded to facilitate drainage toward a stabilized swale or ditch which empties a sediment trap. Additionally, a pipe, culvert, or water bar can be constructed as part of the BMP if needed to prevent surface water and runoff from flowing across the entrance and out onto paved roadways.

1.7.2 Inspection

Vehicle tracking ECMs will require monitoring, especially during and after rain events and during snowmelt, due to the risks posed by mud, soil, and other debris. Specific inspection requirements include the following:

- Check for mud and soil deposits on offsite roads and other areas.

  Inspect sediment deposition area for accumulations that affect exit pad performance.
- Ensure that exit pad area has positive drainage toward treatment ECM device/area.
- Inspect exit pad drainage ditch or swale to ensure proper vegetation or other stabilization.
- Inspect downgradient sediment treatment ECM to ensure ongoing effectiveness.
- During cold weather, monitor any drip-induced ice buildup on offsite paved surfaces.

1.7.3 Maintenance

If site inspection(s) reveal concerns, maintenance may be necessary. Maintenance of vehicle tracking ECM includes the following:

- Immediately remove mud, soil, and other debris from offsite areas – particularly roadways.
- Remove sediment that accumulates in the pad area, ditch/swale, or nearby stormwater facilities if performance is affected.
- Stabilize eroding ditches, swales, or traps/basins treating exit pad runoff.
- Adjust the vehicle tracking BMPs to ensure proper functioning if performance is poor, including the following:
  - Clean or add rock – including larger rock or extend the length of rock pads.
  - Regrade rock as needed to ensure positive drainage.
  - Extend the length of shaker racks; ensure drivers use enough speed to dislodge debris.

Cold weather considerations include the following:

- Provide rock/aggregate storage for top dressing and maintenance of the pad throughout winter.
- Maintain functioning vehicle tracking EMCs during the winter even if no mining activities are taking place.
- Plowing and/or street sweeping may be needed to ensure mud does not remain on roadways.
- Promptly remove sediment and sediment laden snow and ice on roadways.

References

NRCS, 2007, Part 654 Stream Restoration Design National Engineering Handbook, Chapter 8 Threshold Channel Design p.8-37.

Urban Storm Drainage Criteria Manual Volumes 1 and 2 June 2001; Revised April 2008 Urban Drainage and Flood d Control District

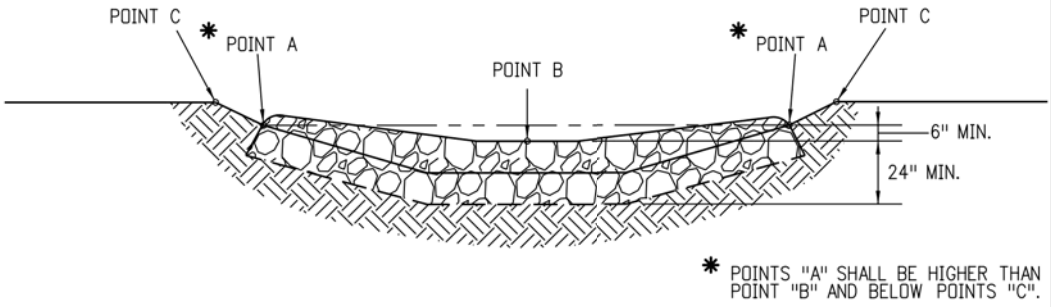
Urban Storm Drainage Criteria Manual, Volume 3 - Best Management Practices November 2010- Urban Drainage and Flood Control District

USDA Natural Resources Conservation Service National Cooperative Soil Survey http://websoilsurvey.nrcs.usda.gov/app/

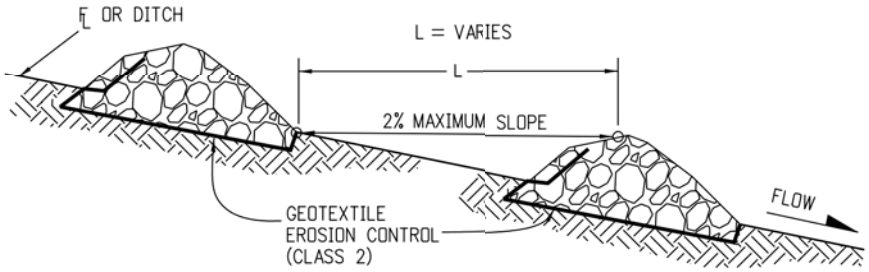
USDA Natural Resources Conservation Service Urban Hydrology for Small Watersheds ftp://ftp.wcc.nrcs.usda.gov/wntsc/H%26H/other/f R55documentation.pdf

NOAA National Weather Service Precipitation Frequency Data Server Hsdc.nws.noaa.gov/hdsc/pfds

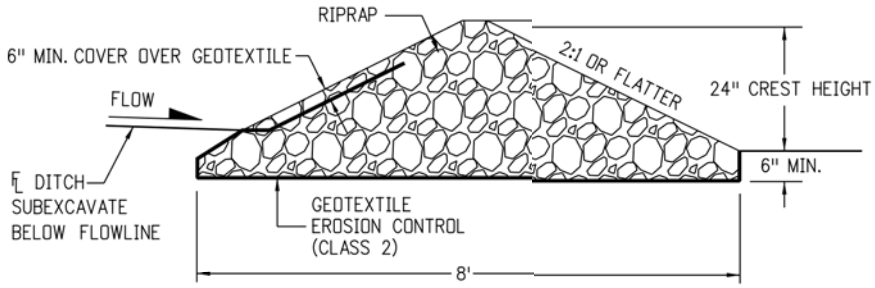
Federal Highway Administration, 2005, Design of Roadside Channels with Flexible Linings Hydraulic Engineering Circular Number 15, ReportNo.FHWA-NHI-05-114 HEC 15



TYPICAL SECTION VIEW



SECTION VIEW ALONG DITCH FLOWLINE

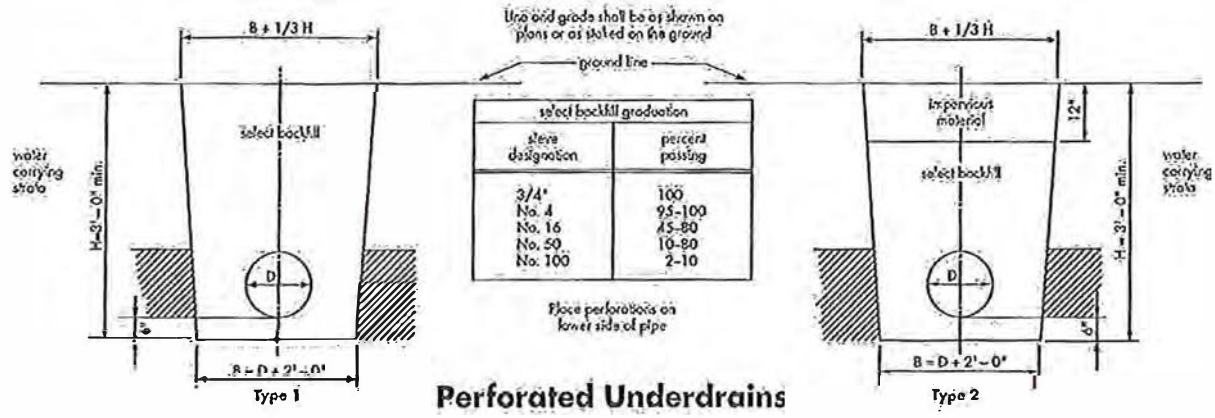


SECTION DETAIL

NOTES:
1. RIPRAP SIZE D_{50} = 6" OR AS SHOWN ON THE PLANS.
2. THE ENDS OF RIPRAP CHECK DAM SHALL BE A MINIMUM OF 6 IN. HIGHER THAN CENTER OF CHECK DAM.

ROCK CHECK DAM

FIGURE 1
ROCK CHECK DAM



Perforated Underdrains

Hand-Laid Rock Headwalls

Culvert Construction Details

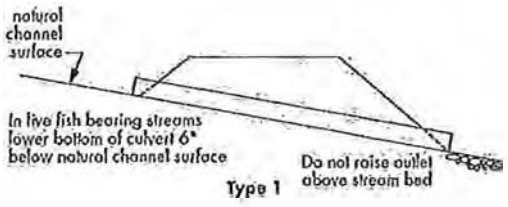
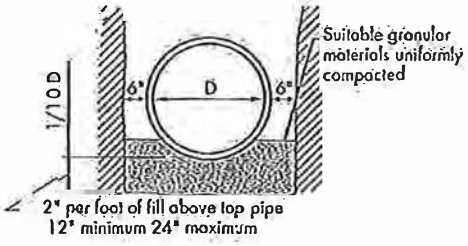
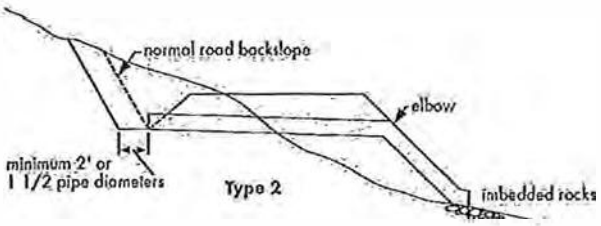


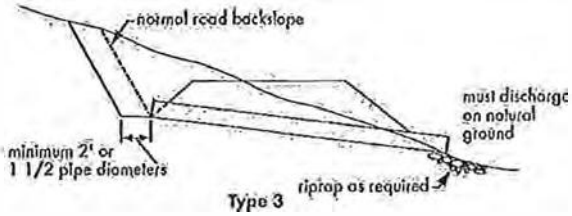
FIGURE 2
CULVERT
PROTECTION PLAN

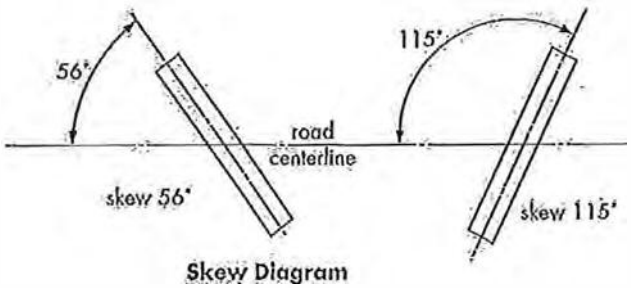
Typical Bedding Details



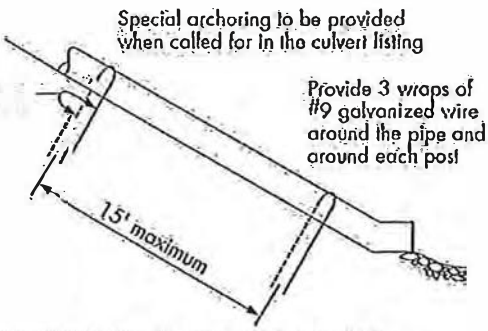
Rock Foundation



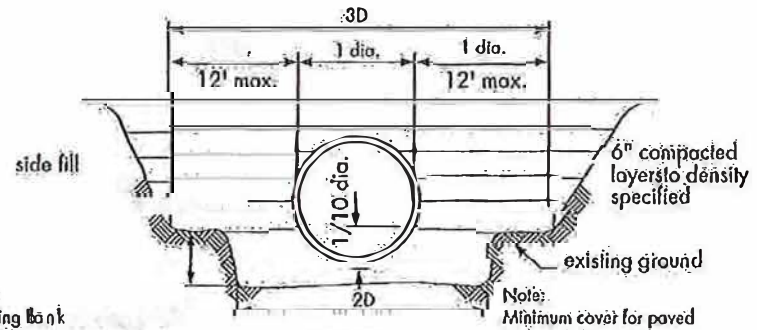




Skew Diagram



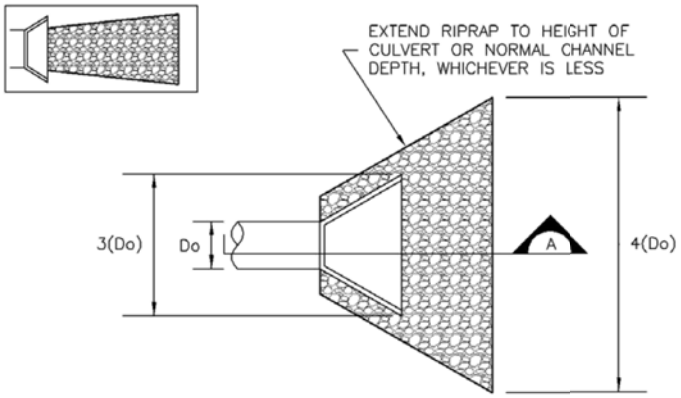
Special Anchoring Type 2 Downdrains



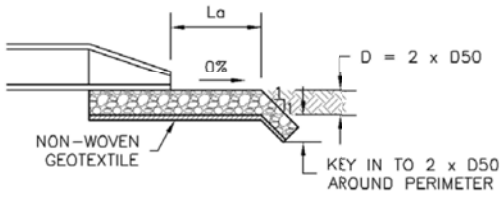
Note:
Bedding to be granular material shaped to fit

Sidefill

Note:
Minimum cover for paved surface is 12" minimum cover for dirt surface is 18"



TEMPORARY OUTLET PROTECTION PLAN



SECTION A

TABLE OP-1. TEMPORARY OUTLET PROTECTION SIZING TABLE			
PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5 5	5 10	4 6
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 9 12 16
24	30 40 50 60	16 26 26 30	9 9 12 16

OP-1. TEMPORARY OUTLET PROTECTION

FIGURE 3
CULVERT PROTECTION PLAN

FIGURE 3 CONTINUTED

Sizing for flow dissipater at culvert outlet

Culvert size		Avg. rock diameter	Apron width*	Apron length**	Apron length***
8"		3"	2–3 ft.	3–5 ft.	5–7 ft.
12"		5"	3–4 ft.	4–6 ft.	8–12 ft.
18"		8"	4–6 ft.	6–8 ft.	12–18 ft.
24"		10"	6–8 ft.	8–12 ft.	18–22 ft.
30"		12"	8–10 ft.	12–14 ft.	22–28 ft.
36"	14"	10–12 ft.	14–16 ft.	28–32 ft.	
42"	16"	12–14 ft.	16–18 ft.	32–38 ft.	
48"	20"	14–16 ft.	18–25 ft.	38–44 ft.	

* Apron width at the narrow end (pipe or channel outlet)
** Apron length for slow-flow (no pressure head) culverts
*** Apron length for high flow (pressure head) culverts

If the culvert outlet and receiving channel do

LEADVILLE MILL
LAKE COUNTY, COLORADO
CULVERT PROTECTION PLAN

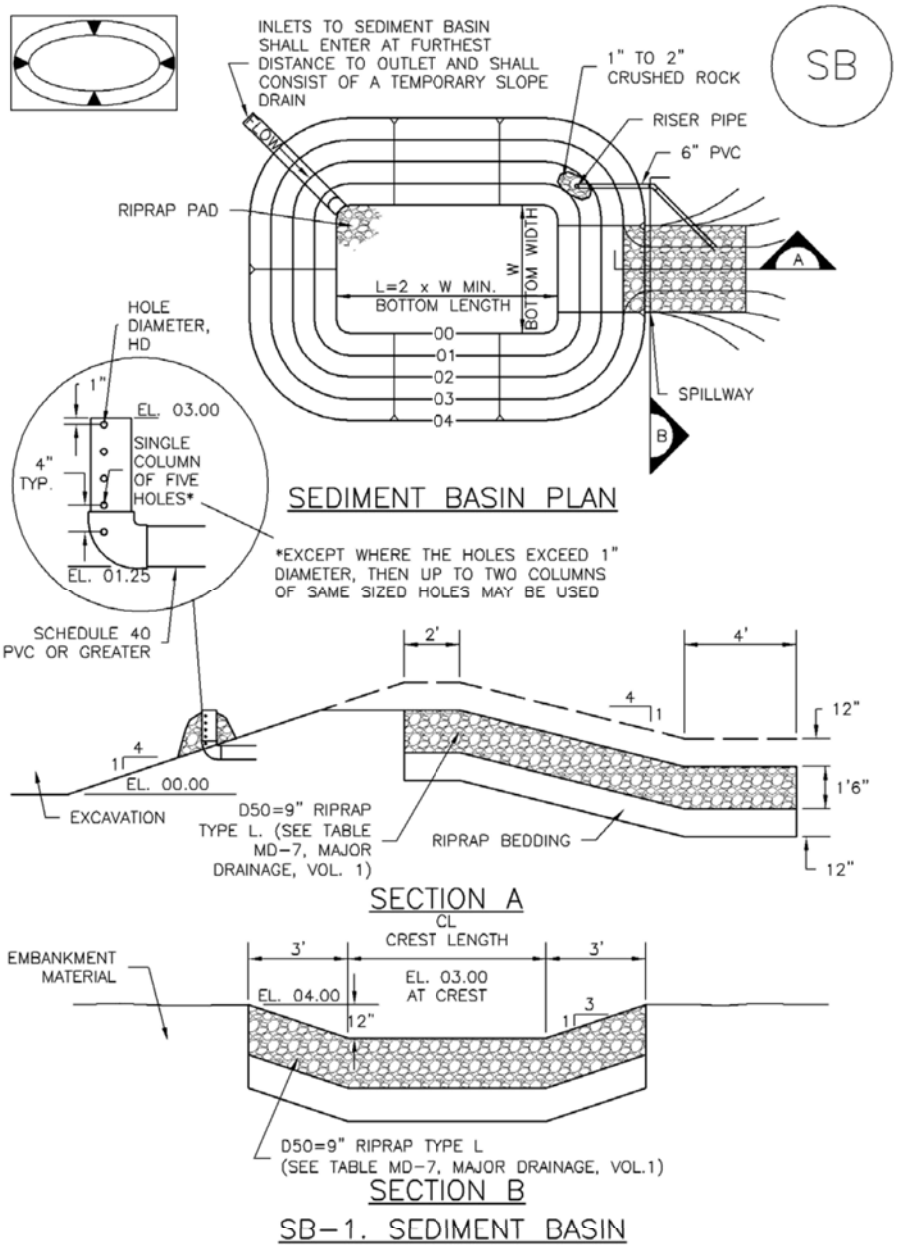
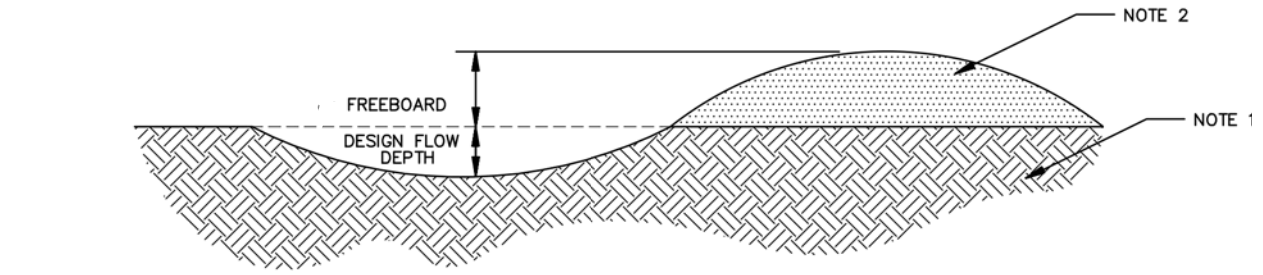
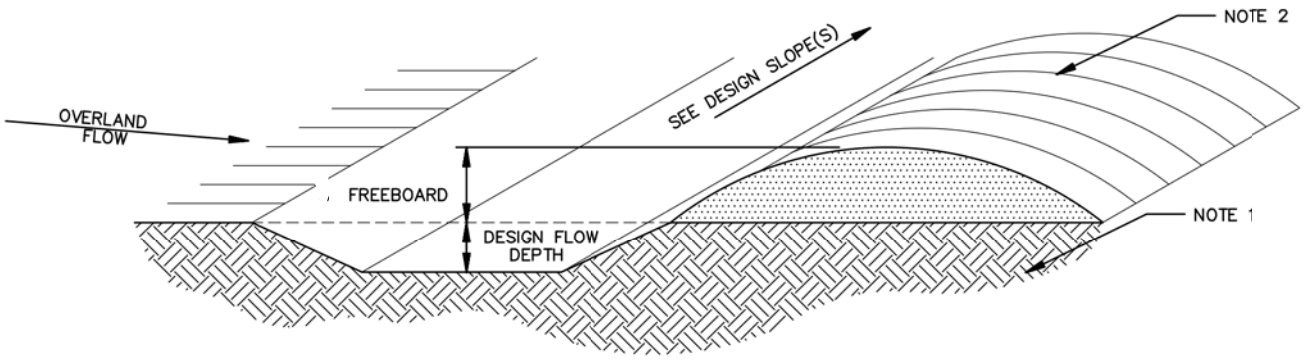


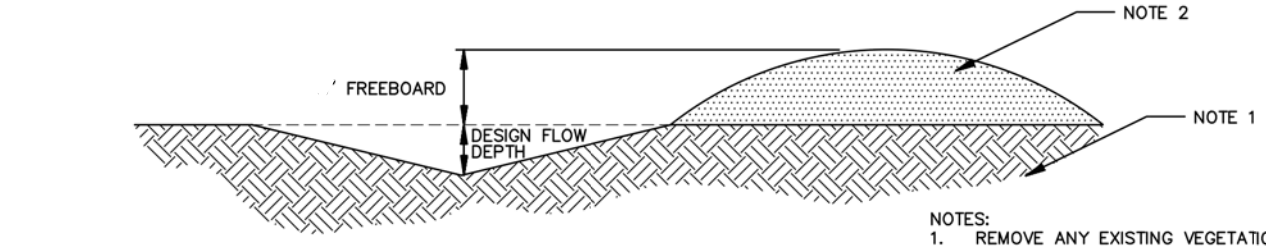
FIGURE 4
SEDIMENT TRAP



TYPICAL PARABOLIC DIVERSION



TYPICAL TRAPEZOIDAL DIVERSION



TYPICAL VEE–SHAPED DIVERSION

NOTES:
1. REMOVE ANY EXISTING VEGETATION AND SCARIFY OR BENCH ADJACENT SOILS PRIOR TO PLACING BERM.
2. BERM MATERIALS MUST BE ADEQUATELY COMPACTED AND STABILIZED.

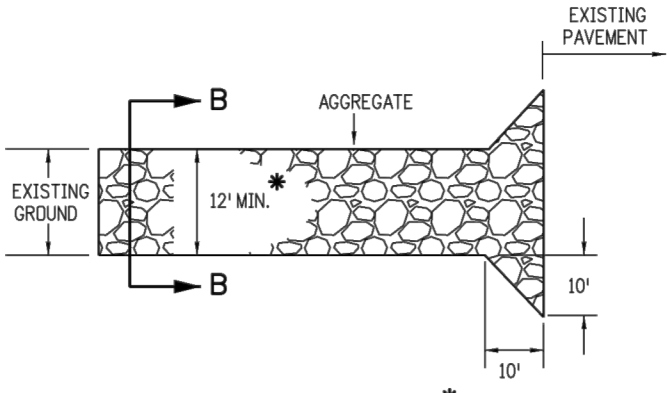
DIVERSIONS

N.T.S.

DV

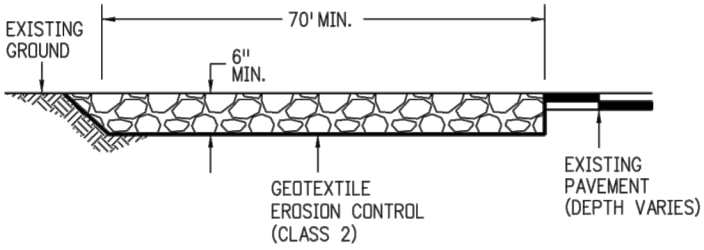
BERM SHALL NOT BE CONSTRUCTED OF TOPSOIL.

FIGURE 5
DIVERSION OPEN CHANNEL

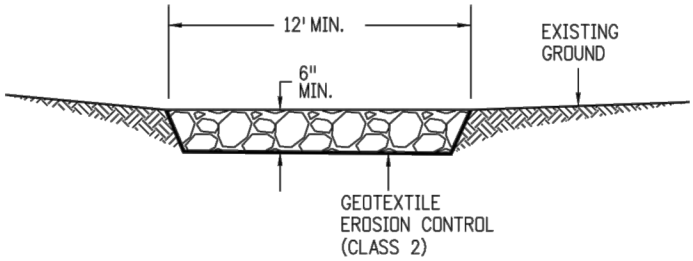


PLAN VIEW

* SHALL EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION.



ELEVATION SECTION



SECTION B-B

NOTES:

1. AGGREGATE FOR THE CONSTRUCTION ENTRANCE SHALL CONFORM TO SUBSECTION 208.02 (K).
2. THE CONTRACTOR SHALL PROTECT CURB AND GUTTER THAT CROSSES THE ENTRANCE FROM DAMAGE. PROTECTION OF THE CURB AND GUTTER WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.

VEHICLE TRACKING PAD

FIGURE 6
VEHICLE TRACKING PAD

APPENDIX 3
SPILL REPORT FORM

SPILL REPORT FORM

LEADVILLE MILL SWMP

LAKE COUNTY, COLORADO

NOTES TO MILL MANAGER:

1. Contact the appropriate regulatory agencies if the spill exceeds the applicable reportable quantity (RQs).
2. Complete this form in full for each spill that exceeds the reportable quantity for the Governing Agency and submit to Mill Manager or his designated representative.
3. Call the Mill Manager or his designated representative.
4. Transfer spill information to the Inspection Report and resolve as appropriate.

The Mill Manager or his designated representative will take photos to document spill clean-up measures and store the photos in the project file.

*When calling to report a spill, the Mill Manager or his designated representative should record the following information:

1. Caller (full name & firm)
2. Caller Telephone Number
3. Spill Date
4. Type of material spilled
5. Amount spilled
   a. Was the amount above the applicable reportable quantity (Yes or No)?
   b. If yes, has the governing agency been notified of the spill (Yes or No)?
   c. If yes, what agency was notified (agency name and how notified):
6. Location of the spill within the permit area.
7. Did the spill impact surface water, leave the site, or enter an inlet (Yes or No)?
   a. If yes, elaborate on impacts to surface water, off-site area &/or inlet.
8. Has spilled material and contaminated media (soil, pavement, etc.) been removed and/or cleaned (Yes or No)?
   a. If no, what additional measures need to be completed to remediate the spill?
9. Was the spill noted as a deficiency on the Inspection Report & resolved (or will be resolved) as soon as practicable (Yes or No)?
   a. If no, add to Inspection Report as a deficiency & resolve.
10. Has the Spill Report Form been completed and submitted to the Mill Manager or his designated representative (Yes or No)?
    a. If no, complete and submit the Spill Report Form.

SPILL REPORT FORM

LEADVILLE MILL SWMP

LAKE COUNTY, COLORADO

Spill Reported by: _____

Date/Time Spill: _____

Date/Time Spill reported to Mill Manager or his designated representative. _____

Date/Time Spill Report Form faxed to the Mill Manager or his designated representative. _____

_____

Describe spill location and events leading to spill._____

Material spilled: _____

Source of spill: _____

Amount spilled: _____ Amount spilled to waterway: _____

Containment or clean up action: _____

Approximate depth of soil excavation: _____

List Injuries or Personal Contamination: _____

Action to be taken to prevent future spills:

_____

Modifications to the SWPPP, including required sampling, necessary due to this spill: _____

_____

Agencies notified of the spill: _____

_____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons personally responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____

Mill Manager Date

IMMEDIATELY COMPLETE AND FAX THIS FORM TO STEVE CRAIG OR HIS DESIGNATED REPRESENTATIVE

IMMEDIATELY CALL STEVE CRAIG-MILL MANAGER AT 303.877.9801 IF THE SPILL EXCEEDS 1-GALLON or EXCEEDS THE REPORTABLE QUANTITY FOR THE GOVERNING AGENCY.

SEE CDPHE REGULATIONS SECTION V, PART B.9. OF THE SWPPP TO DETERMINE THE REPORTABLE QUANTITY FOR GOVERNING AGENCY.

APPENDIX 4
SITE STABILIZATION FORM

SITE STABILIZATION

A record of dates when ECMs are installed or removed, stabilization measures are initiated, major grading activities occur, and site activities temporarily or permanently cease on a portion of the site will be maintained until final site stabilization is achieved and the Notice of Termination is filed. This form must be updated continuously throughout the project and filed. NOTE: The Mill Manager will complete at least 1-pg of stabilization and grading activities for each month the permit is active. Activities noted in this log must reflect information provided on Site Maps.

MAJOR STABILIZATION AND GRADING ACTIVITIES

Description of Activity: _____

Contractor performing Activity: _____ Begin (date): _____ End (date):_____

Location: _____

Description of Activity: _____

Contractor performing Activity: _____ Begin (date): _____ End (date):_____

Location: _____

Description of Activity: _____

Contractor performing Activity: _____ Begin (date): _____ End (date):_____

Location: _____

Description of Activity: _____

Contractor performing Activity: _____ Begin (date): _____ End (date):_____

Location: _____

Description of Activity: _____

Contractor performing Activity: _____ Begin (date): _____ End (date):_____

Location: _____

Description of Activity: _____

Contractor performing Activity: _____ Begin (date): _____ End (date):_____

Location: _____

Description of Activity: _____

Contractor performing Activity: _____ Begin (date): _____ End (date):_____

Location: _____

APPENDIX 5
INSPECTION REPORTS

STORM WATER MANAGEMENT

ACTIVITIES & MILL OPERATIONS

SITE INSPECTION REPORT

Project Name	LEADVILLE MILL		
NPDES Tracking Nos.		**Location**	Leadville, Colorado
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of mining			
Type of Inspection: ❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? ❑Yes ❑No. **If yes, provide:** Storm Start Date & Time: Storm Duration (hrs.): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? ❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds. ❑ Other: Temperature: Date seasonal snow cover occurred: Date melting conditions began:			
Have any discharges occurred since the last inspection? ❑Yes ❑No. **If yes, describe:**			
Are there any discharges at the time of inspection? ❑Yes ❑No. **If yes, describe:**			
Are there any previously unidentified sources of pollutants at the time of inspection? ❑Yes ❑No. **If yes, describe the location and any ECMs implemented to address:**			

I. SITE SPECIFIC EROSION CONTROL MEASURES

	ECM	ECM Installed?	ECM Maintenance Required?	Corrective Action Needed and Notes Please indicate specific location(s) of ECM(s)
1	Chemical/Fuel Storage	❑Yes ❑No	❑Yes ❑No	
2	Waste Disposal	❑Yes ❑No	❑Yes ❑No	
3	Earth/Rock Berms	❑Yes ❑No	❑Yes ❑No	
4	Run Outs	❑Yes ❑No	❑Yes ❑No	
5	Debris Basins	❑Yes ❑No	❑Yes ❑No	
6	Drainage Swales	❑Yes ❑No	❑Yes ❑No	
7	Access Roads	❑Yes ❑No	❑Yes ❑No	
8	Check Dams	❑Yes ❑No	❑Yes ❑No	
9	Culverts/Outfall Protection	❑Yes ❑No	❑Yes ❑No	
10	Straw Bales	❑Yes ❑No	❑Yes ❑No	
11	Erosion Control Blankets	❑Yes ❑No	❑Yes ❑No	
12	Guard Rails	❑Yes ❑No	❑Yes ❑No	
13	Rip Rap	❑Yes ❑No	❑Yes ❑No	
14	Staging Areas	❑Yes ❑No	❑Yes ❑No	
15	Mining Entrance	❑Yes ❑No	❑Yes ❑No	
16	Equipment Storage	❑Yes ❑No	❑Yes ❑No	
17	Vehicle Maintenance	❑Yes ❑No	❑Yes ❑No	
18	Fuel Storage	❑Yes ❑No	❑Yes ❑No	
19	Sediment Ponds/Traps	❑Yes ❑No	❑Yes ❑No	
20	Snow Removal	❑Yes ❑No	❑Yes ❑No	
21	Preventative Maintenance	❑Yes ❑No	❑Yes ❑No	

II. OVERALL SITE CONDITIONS

	ECM/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (*e.g.*, streams, wetlands, mature trees, etc.) protected with barriers or similar ECMs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the mining exit preventing sediment from being tracked into the county road?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	Are washout facilities (*e.g.*, paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (*e.g.*, wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
12	Are there any locations where additional ECMs are needed that were not in place at the time of the inspection?	❑Yes ❑No	❑Yes ❑No	
13	(Other)	❑Yes ❑No	❑Yes ❑No	

III. NON-COMPLIANCE

Describe any incidents of non-compliance not described above:

IV. CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons personally responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title:

_____

Signature_____ Date: _____

APPENDIX 6

FEDERAL, STATE OR LOCAL STORM WATER OR

OTHER ENVIRONMENTAL INSPECTOR SITE VISIT LOG

FEDERAL, STATE, OR LOCAL STORM WATER OR OTHER ENVIRONMENTAL INSPECTOR SITE VISIT LOG

1. **NOTES TO MILL MANAGER**: Upon completion of a storm water or erosion & sediment control agency inspection or site visit the Mill Manager will: ***see below**.
    i. Complete an Inspection Report
    ii. Transfer all noted deficiencies to the Inspection Report and resolve as appropriate
    iii. Complete the inspector site visit log
    iv. Submit agency inspection reports if/when received to the Mill Manager or his designated representative
    v. Take photos of any area or item that is photographed by the inspector

    Facility contractor is not required to complete the above noted steps if the agency inspection is not storm water related (i.e., MSHA, Fire Marshal, etc.); however, if any agency representative comments on storm water related ECMs while on-site the above noted steps must be followed.

    ***When calling the Mill Manager or his designated representative to report an agency inspection the Mill Manager should record the following information:**

    1. Caller (full name & firm)
    2. Caller Telephone Number
    3. Inspection Date
    4. Name of Agency & Agency Representative (Inspector)
    5. Was the inspection storm water / erosion related (Yes or No)?
        a. If no, what was inspected? _____

    Note: If the inspection was not storm water-related the remaining questions can be skipped.

    6. Deficiencies or items requested for improvement (add additional lines as needed):
        1)_____
        2)_____
    7. Were all issues noted by the Inspector, from question 6, added to the Inspection Report as deficiencies (Yes or No)?
        a. If no, add deficiencies to Inspection Report and resolve.
    8. Did the inspector provide a report while on site (Yes or No)?
        a. If yes, submit the report the Mill Manager or his designated representative by fax or email.
        b. If no, submit a report, if received, to the Mill Manager or his designated representative by fax or email.
    9. Was a Notice of Violation or similar warning issued or verbally referenced by the Inspector (Yes or No)?
        a. If yes, what specifically did the Inspector find in violation? _____
    10. Is an inspection response due (Yes or No)?
        a. If yes, when is the response due date? _____

11. Did the Inspector reference a follow-up inspection (Yes or No)?
    a. If yes, when is the follow-up inspection? _____
12. Was the Agency Inspection Log in the SWMP Binder updated (Yes or No)?
    b. If no, update the Inspection Log.

FEDERAL, STATE, OR LOCAL STORM WATER OR OTHER ENVIRONMENTAL INSPECTOR SITE VISIT LOG

Inspectors Name: _____ Agency: _____

Leadville Mill Representative Present[2:] _____

Others Present: _____

Comments: _____

Time and Date: _____ Report Prepared: Yes No

Date/Time Inspection Reported to / Mill: _____

Date/Time Inspection Report faxed to / Mill (N/A if not applicable):_____

Inspectors Name: _____ Agency: _____

Contractors Representative Present: _____

Others Present: _____

Comments: _____

Time and Date: _____ Report Prepared: Yes No

Date/Time Inspection Reported to / Mill: _____

Date/Time Inspection Report faxed to / Mill (N/A if not applicable): _____

Inspectors Name: _____ Agency: _____

Contractors Representative Present: _____

Others Present: _____

Comments: _____

Name:_____Date:_____Report Prepared: Yes No

Date/Time Inspection Reported to / Mill: _____

Date/Time Inspection Report faxed to / Mill (N/A if not applicable): _____

[2] *The Mill designated representative must be contacted at the conclusion of any storm water-related agency inspection. Caller must provide, as a minimum the date, inspection beginning and completion times, inspecting agency, agency inspector name, all representative names, and a brief summary of any comments, observations or deficiencies noted during the inspection.*

APPENDIX 21-2

MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheet

Catalog Number: 190308
Revision date: 24-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 190308

Product name: BORAX

Synonyms: Sodium Tetraborate decahydrate
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
BORAX	1303-96-4	90 - 100%	1 mg/m³ TWA (anhydrous); 5 mg/m³ TWA (decahydrate); 1 mg/m³ TWA (pentahydrate)	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed.

Category of Danger:
Harmful

Principle routes of exposure: Skin
Inhalation: Harmful by inhalation.
Ingestion: Harmful if swallowed.
Skin contact: Harmful in contact with skin.
Eye contact: Risk of serious damage to eyes

Statements of hazard HARMFUL IF SWALLOWED. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR INHALED.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice

Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined

NFPA rating:

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

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE
DESICCATE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	White crystalline
Physical state:	Powder

Formula:	B4Na2O7•10H2O
Molecular weight:	381.4
Melting point/range:	741ºC
Boiling point/range:	1575ºC
Density:	1.730 g/ml
Vapor pressure:	No data available
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Slightly soluble
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Reacts with acids, metallic salts.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	**RTECS Number:**	**Selected LD50s and LC50s**
BORAX	VZ2275000	Oral LD50 Rat : 2660 mg/kg Oral LD50 Mouse : 2 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

Components	**NIOSH - Health Effects**	**NIOSH - Target Organs**
BORAX	Skin, eye, and upper respiratory irritation; Possible shortness of breath and nose bleeds	respiratory system, skin, eyes

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
BORAX	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
BORAX	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
BORAX	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
BORAX	Not Listed	Not Listed	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
BORAX	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
BORAX	Not Listed

TDG (Canada):

WHMIS hazard class: D2a very toxic materials

:

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
BORAX	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
BORAX	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
Korean KECL:	KE-03483
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
BORAX	Not Listed	[present]	sn 0241	[present]

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
BORAX	effective March 13, 1992	Toxic	Not Listed	20 ug/m^3 HLV (anhydrous); 100 ug/m^3 HLV (decahydrate); 20 ug/m^3 (pentahydrate)

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
BORAX	Not Listed	Not Listed	None	None

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

AMERICAN ELEMENTS
THE MATERIALS SCIENCE MANUFACTURER®

SAFETY DATA SHEET

Date Printed: 01/04/2018
Date Revised: 05/15/2015

SECTION 1. IDENTIFICATION

Product Name: Copper Sulfate

Product Number: All applicable American Elements product codes, e.g. CU-SAT-02 , CU-SAT-03 , CU-SAT-04 , CU-SAT-05

CAS #: 7758-98-7

Relevant identified uses of the substance: Scientific research and development

Supplier details:
American Elements
10884 Weyburn Ave.
Los Angeles, CA 90024
Tel: +1 310-208-0551
Fax: +1 310-208-0351

Emergency telephone number:
Domestic, North America: +1 800-424-9300
International: +1 703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral(Category 4), H302
Skin irritation(Category 2), H315
Eye irritation(Category 2A), H319
Acute aquatic toxicity(Category 1), H400
Chronic aquatic toxicity(Category 1), H410
GHS Label elements, including precautionary statements
Pictogram

Signal word
Warning
Hazard statement(s)
H302
Harmful if swallowed.
H315

Causes skin irritation.
H319
Causes serious eye irritation.
H410
Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)
P264
Wash skin thoroughly after handling.
P270
Do not eat, drink or smoke when using this product.
P273
Avoid release to the environment.
P280
Wear eye protection/ face protection.
P280
Wear protective gloves.
P301 + P312 + P330
IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.
Rinse mouth.
P302 + P352
IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313
If skin irritation occurs: Get medical advice/ attention.
P337 + P313
If eye irritation persists: Get medical advice/ attention.
P362
Take off contaminated clothing and wash before reuse.
P391
Collect spillage.
P501
Dispose of contents/ container to an approved waste disposal plant.
Hazards not otherwise classified (HNOC) or not covered by GHS
-
none

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances
Synonyms: Cupric sulfate
Formula: CuO_4S
Molecular weight: 159.61 g/mol
CAS-No.: 7758-98-7
EC-No.: 231-847-6
Index-No.: 029-004-00-0

SECTION 4. FIRST AID MEASURES

Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.
Move out of dangerous area.
If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
In case of skin contact
Wash off with soap and plenty of water. Consult a physician.
In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.
Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11
Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5. FIREFIGHTING MEASURES

Extinguishing media
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Special hazards arising from the substance or mixture
No data available
Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.
Further information
No data available

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.
Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.
Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.
Reference to other sections
For disposal see section 13.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Further processing of solid materials may result in the formation of combustible dusts. The potential for

combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.
Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Air sensitive.
hygroscopic
Store under inert gas.
Keep in a dry place.
Storage class (TRGS 510): Non Combustible Solids
Specific end use(s)
Apart from the uses mentioned in section 1 no other specific uses are stipulated

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure controls
Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
Personal protective equipment
Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
Appearance
Form: powder
Color: light grey
Odor
No data available
Odor Threshold
No data available
pH

No data available
Melting point/freezing point
Melting point/range: 200 °C (392 °F)-dec.
Initial boiling point and boiling range
No data available
Flash point
N/A
Evaporation rate
No data available
Flammability (solid, gas)
No data available
Upper/lower flammability or explosive limits
No data available
Vapor pressure
9.7 hPa (7.3 mmHg) at 25 °C (77 °F)
Vapor density
No data available
Relative density
3.603 g/mL at 25 °C (77 °F)
Water solubility
No data available
Partition coefficient: n-octanol/water
No data available
Auto-ignition temperature
No data available
Decomposition temperature
No data available
Viscosity
No data available
Explosive properties
No data available
Oxidizing properties
No data available
Other safety information
Bulk density
1 kg/m3

SECTION 10. STABILITY AND REACTIVITY

Reactivity
No data available
Chemical stability
Stable under recommended storage conditions.
Possibility of hazardous reactions
No data available
Conditions to avoid
No data available
Incompatible materials
Powdered metals, hydroxylamine, Magnesium, Strong reducing agents
Hazardous decomposition products
Hazardous decomposition products formed under fire conditions.-Sulphur oxides, Borane/boron oxides, Copper oxides
Other decomposition products-No data available

In the event of fire: see section 5

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity
LD50 Oral-Rat-482 mg/kg
Inhalation: No data available
Dermal: No data available
LD50 Intraperitoneal-Rat-20 mg/kg
LD50 Subcutaneous-Rat-43 mg/kg
LD50 Intravenous-Rat-48.9 mg/kg
Skin corrosion/irritation
No data available
Serious eye damage/eye irritation
No data available
Respiratory or skin sensitisation
No data available
Germ cell mutagenicity
Rat
Liver
DNA damage
Mouse
DNA damage
Carcinogenicity
Carcinogenicity-Chicken-Parenteral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Endocrine:Tumors.
IARC:
No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
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.
OSHA:
No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Reproductive toxicity
No data available
Reproductive toxicity-Mouse-Intravenous
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
No data available
Developmental Toxicity-Mouse-Intravenous
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities:
Central nervous system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system.
Specific target organ toxicity -single exposure
No data available
Specific target organ toxicity -repeated exposure
No data available
Aspiration hazard
No data available
Additional Information

RTECS: GL8800000
Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Stomach-Irregularities-Based on Human Evidence
Stomach-Irregularities-Based on Human Evidence

SECTION 12. ECOLOGICAL INFORMATION

Toxicity
Toxicity to fish
mortality LC50-other fish-1 -2.5 mg/l-96.0 h
Toxicity to daphnia and other aquatic invertebrates
Immobilization EC50-Daphnia magna (Water flea)-0.024 mg/l-48 h
Persistence and degradability
No data available
Bioaccumulative potential
No data available
Mobility in soil
No data available
Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted
Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Product
Offer surplus and non-recyclable solutions to a licensed disposal company.
Contact a licensed professional waste disposal service to dispose of this material.
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.
Contaminated packaging
Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077
Class: 9
Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s.(Copper sulphate)

Reportable Quantity(RQ): 10lbs
Marine pollutant: yes
Poison Inhalation Hazard: No
IMDG
UN number: 3077
Class: 9
Packing group: III
EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(Copper sulphate)
Marine pollutant: yes
IATA
UN number: 3077
Class: 9
Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s.(Copper sulphate)

SECTION 15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:
Copper sulphate
CAS-No.
7758-98-7
Revision Date
1993-04-24
SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard
Massachusetts Right To Know Components
Copper sulphate
CAS-No.
7758-98-7
Revision Date
1993-04-24
Pennsylvania Right To Know Components
Copper sulphate
CAS-No.
7758-98-7
Revision Date
1993-04-24
New Jersey Right To Know Components
Copper sulphate
CAS-No.
7758-98-7
Revision Date
1993-04-24
California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. COPYRIGHT 1997-2018 AMERICAN ELEMENTS. LICENSED GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.

SAFETY DATA SHEET

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

As of the revision date above, this (M)SDS meets the regulations in New Caledonia.

1.1. PRODUCT IDENTIFIER

Product Name: **DIESEL FUEL**
Product Description: Hydrocarbons and Additives
Product Code: 708880-84

Trade Names	Trade Names
AUTOMOTIVE DIESEL	AUTOMOTIVE DIESEL OIL
DIESEL	DIESEL (10PPMS)
Diesel Efficient	Diesel Efficient RED
Diesel Efficient ROUGE	GAZOLE
GAZOLE ROUGE	RED DIESEL
SUPREME+ DIESEL	SUPREME+ GAZOLE
ULTRA LOW SULFUR DIESEL (10PPMS)	

1.2. RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST

Intended Use: Diesel engine fuel

1.3. DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Supplier: **MOBIL INTERNATIONAL PETROLEUM CORPORATION**
9 rue d'Austerlitz
BP 108
NOUMEA CEDEX 98845 New Caledonia

Supplier General Contact: 687-24 21 50
FAX: 687-27 56 62

1.4. EMERGENCY TELEPHONE NUMBER

24 Hour Emergency Telephone: +1 609 737 4411

SECTION 2 HAZARDS IDENTIFICATION

2.1. CLASSIFICATION OF SUBSTANCE OR MIXTURE

Classification according to Regulation (EC) No 1272/2008
Flammable liquid: Category 3.
Acute inhalation toxicant: Category 4. Skin irritation: Category 2. Carcinogen: Category 2. Specific target organ toxicant (repeated exposure): Category 2. Aspiration toxicant: Category 1.
Chronic aquatic toxicant: Category 2.

H226: Flammable liquid and vapour.
H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H332: Harmful if inhaled.
H351: Suspected of causing cancer. H373: May cause damage to organs through prolonged or repeated exposure. Bone marrow, Liver, Thymus
H411: Toxic to aquatic life with long lasting effects.

2.2. LABEL ELEMENTS

Label elements according to Regulation (EC) No 1272/2008

Pictograms:

Signal Word: Danger

Hazard Statements:

H226: Flammable liquid and vapour.
H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H332: Harmful if inhaled.
H351: Suspected of causing cancer. H373: May cause damage to organs through prolonged or repeated exposure. Bone marrow, Liver, Thymus
H411: Toxic to aquatic life with long lasting effects.

Precautionary Statements:

P101: If medical advice is needed, have product container or label at hand. P102: Keep out of reach of children.
P103: Read label before use.
P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a

POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish.
P391: Collect spillage.
P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.
P501: Dispose of contents and container in accordance with local regulations.

Contains: Fuels, diesel

2.3. OTHER HAZARDS

Physical / Chemical Hazards:

Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

Health Hazards:

High-pressure injection under skin may cause serious damage. Under conditions of poor personal hygiene and prolonged repeated contact, some polycyclic aromatic compounds (PACs) have been suspected as a cause of skin cancer in humans. May be irritating to the eyes, nose, throat, and lungs.

Environmental Hazards:

No additional hazards. Material does not meet the criteria for PBT or vPvB in accordance with REACH Annex XIII.

%

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

3.1. SUBSTANCES Not Applicable. This material is regulated as a mixture.

3.2. MIXTURES

This material is defined as a mixture.

Reportable hazardous substance(s) complying with the classification criteria and/or with an exposure limit (OEL)

Name	CAS#	EC#	Registration#	Concentration *	GHS/CLP classification
Fuels, diesel	68334-30-5	269-822-7	01-2119484664-27	100%	[Aquatic Acute 2 H401], Aquatic Chronic 2 H411, Acute Tox. 4 H332, Asp. Tox. 1 H304, Carc. 2 H351, Flam. Liq. 3 H226, Skin Irrit. 2 H315, STOT RE 2 H373, Note N

Note - any classification in brackets is a GHS building block that was not adopted by the EU in the CLP regulation (No 1272/2008) and therefore is not applicable in the EU or in non-EU countries which have implemented the CLP regulation and is shown for informational purposes only.

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

NOTE: Composition may contain up to 0.5% performance additives and / or dyes.

Note: See SDS Section 16 for full text of hazard statements.

SECTION 4 FIRST AID MEASURES

4.1. DESCRIPTION OF FIRST AID MEASURES

INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

4.2. MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

Headache, dizziness, drowsiness, nausea and other CNS effects. Itching, pain, redness, swelling of skin. Local necrosis as evidenced by delayed onset of pain and tissue damage a few hours after injection.

4.3. INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. Contains hydrocarbon solvent/petroleum hydrocarbons; skin contact may aggravate an existing dermatitis.

SECTION 5 FIRE FIGHTING MEASURES

5.1. EXTINGUISHING MEDIA

Suitable Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Unsuitable Extinguishing Media: Straight streams of water

5.2. SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

Hazardous Combustion Products: Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulphur oxides

5.3. ADVICE FOR FIRE FIGHTERS

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

FLAMMABILITY PROPERTIES

Flash Point [Method]: >56°C (133°F) [ASTM D-93]
Upper/Lower Flammable Limits (Approximate volume % in air): UEL: 5.0 LEL: 0.5 [test method unavailable]
Autoignition Temperature: >250°C (482°F) [test method unavailable]

SECTION 6 ACCIDENTAL RELEASE MEASURES

6.1. PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

6.2. ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

6.3. METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A

vapour-suppressing foam may be used to reduce vapour. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

6.4. REFERENCES TO OTHER SECTIONS

See Sections 8 and 13.

SECTION 7 HANDLING AND STORAGE

7.1. PRECAUTIONS FOR SAFE HANDLING

Avoid all personal contact. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put petrol into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapour and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Do not siphon by mouth. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

7.2. CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.

7.3. SPECIFIC END USES

Section 1 informs about identified end-uses. No industrial or sector specific guidance available.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. CONTROL PARAMETERS

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard			Note	Source
Fuels, diesel	Stable Aerosol.	TWA	5 mg/m3		Skin	ExxonMobil
Fuels, diesel	Vapour.	TWA	200 mg/m3		Skin	ExxonMobil
Fuels, diesel [total hydrocarb, vapor&aerosol]	Inhalable fraction and vapour	TWA	100 mg/m3		Skin	ACGIH

Note: Information about recommended monitoring procedures can be obtained from the relevant agency(ies)/institute(s):

UK Health and Safety Executive (HSE)

DERIVED NO EFFECT LEVEL (DNEL)/DERIVED MINIMAL EFFECT LEVEL (DMEL)

Worker

Substance Name	Dermal	Inhalation
Fuels, diesel	2.9 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects	68 mg/m3 DNEL, Chronic Exposure, Systemic Effects

Consumer

Substance Name	Dermal	Inhalation	Oral
Fuels, diesel	1.3 mg/kg bw/day DNEL, Chronic Exposure, Systemic Effects	20 mg/m3 DNEL, Chronic Exposure, Systemic Effects	NA

Note: The Derived No Effect Level (DNEL) is an estimated safe level of exposure that is derived from toxicity data in accord with specific guidance within the European REACH regulation. The DNEL may differ from an Occupational Exposure Limit (OEL) for the same chemical. OELs may be recommended by an individual company, a governmental regulatory body or an expert organization, such as the Scientific Committee for Occupational Exposure Limits (SCOEL) or the American Conference of Governmental Industrial Hygienists (ACGIH). OELs are considered to be safe exposure levels for a typical worker in an occupational setting for an 8-hour work shift, 40 hour work week, as a time weighted average (TWA) or a 15 minute short-term exposure limit (STEL). While also considered to be protective of health, OELs are derived by a process different from that of REACH.

PREDICTED NO EFFECT CONCENTRATION (PNEC)

Substance Name	Aqua (fresh water)	Aqua (marine water)	Aqua (intermittent release)	Sewage treatment plant	Sediment	Soil	Oral (secondary poisoning)
Fuels, diesel	NA	NA	NA	NA	NA	NA	NA

For hydrocarbon UVCBs, no single PNEC value is identified for the overall substance or used in risk assessment calculations. Therefore, no PNEC values are disclosed in the above table. For further information, please contact ExxonMobil.

8.2. EXPOSURE CONTROLS

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Type AP filter material.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves. Nitrile, Viton, CEN standards EN 420 and EN 374 provide general requirements and lists of glove types.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
Colour: Clear (May Be Dyed)
Odour: Petroleum/Solvent
Odour Threshold: No data available
pH: Not technically feasible
Melting Point: Not technically feasible
Freezing Point: No data available
Initial Boiling Point / and Boiling Range: 160°C (320°F) - 390°C (734°F) [test method unavailable]
Flash Point [Method]: >56°C (133°F) [ASTM D-93]
Evaporation Rate (n-butyl acetate = 1): < 0.1 [test method unavailable]
Flammability (Solid, Gas): Not technically feasible
Upper/Lower Flammable Limits (Approximate volume % in air): UEL: 5.0 LEL: 0.5 [test method unavailable]
Vapour Pressure: 0.3 kPa (2.25 mm Hg) at 20 °C [test method unavailable]
Vapour Density (Air = 1): 5 at 101 kPa [test method unavailable]
Relative Density (at 15 °C): 0.84 [test method unavailable]
Solubility(ies): water Negligible
Partition coefficient (n-Octanol/Water Partition Coefficient): No data available
Autoignition Temperature: >250°C (482°F) [test method unavailable]
Decomposition Temperature: No data available
Viscosity: 2 cSt (2 mm2/sec) at 40ºC - 4.5 cSt (4.5 mm2/sec) at 40ºC [test method unavailable]
Explosive Properties: None
Oxidizing Properties: None

9.2. OTHER INFORMATION

Pour Point: < 12°C (54°F) [test method unavailable]

SECTION 10 STABILITY AND REACTIVITY

10.1. REACTIVITY: See sub-sections below.

10.2. CHEMICAL STABILITY: Material is stable under normal conditions.

10.3. POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

10.4. CONDITIONS TO AVOID: Open flames and high energy ignition sources.

10.5. INCOMPATIBLE MATERIALS: Halogens, Strong Acids, Strong Bases, Strong oxidisers

10.6. HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

SECTION 11 TOXICOLOGICAL INFORMATION

11.1. INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 4 hour(s) LC50 > 4000 mg/m3 (Vapor and aerosol)	Moderately toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 5000 mg/kg Test scores or other study results do not meet criteria for classification.	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 434
Skin Corrosion/Irritation (Rabbit): Data available. Test scores or other study results meet criteria for classification.	Irritating to the skin. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation (Rabbit): Data available. Test scores or other study results do not meet criteria for classification.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available. Test scores or other study results do not meet criteria for classification.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available. Test scores or other study results do not meet criteria for classification.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 475
Carcinogenicity: Data available.	Caused cancer in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant.

Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: Data available.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 410 413

OTHER INFORMATION

For the product itself:

Target Organs Repeated Exposure: Bone marrow, Liver, Thymus

Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.
Diesel fuel: Carcinogenic in animal tests. Caused mutations in-vitro. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function. Diesel exhaust fumes: Carcinogenic in animal tests. Inhalation exposures to exhaust for 2 years in test animals resulted in lung tumours and lymphoma. Extract of particulate produced skin tumours in test animals. Caused mutations in-vitro.

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

12.1. TOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

12.2. PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

Majority of components -- Expected to degrade rapidly in air

12.3. BIOACCUMULATIVE POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

12.4. MOBILITY IN SOIL

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land.

Expected to partition to sediment and wastewater solids.
Majority of components -- Low potential to migrate through soil.

12.5. PERSISTENCE, BIOACCUMULATION AND TOXICITY FOR SUBSTANCE(S)
Material does not meet the Reach Annex XIII criteria for PBT or vPvB.

12.6. OTHER ADVERSE EFFECTS
No adverse effects are expected.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

13.1. WASTE TREATMENT METHODS
Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

European Waste Code: 13 07 01*

NOTE: These codes are assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste producers need to assess the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code(s).

This material is considered as hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (ADR/RID)
14.1. UN Number: 1202
14.2. UN Proper Shipping Name (Technical Name): DIESEL FUEL
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: III

14.5. Environmental Hazards: Yes
14.6. Special Precautions for users:
Proper Shipping Name Suffix: Special Provision 640L
Classification Code: F1
Label(s) / Mark(s): 3, EHS
Hazard ID Number: 30
Hazchem EAC: 3Y

SEA (IMDG)

14.1. UN Number: 1202
14.2. UN Proper Shipping Name (Technical Name): DIESEL FUEL
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: III
14.5. Environmental Hazards: Marine Pollutant
14.6. Special Precautions for users:
Label(s): 3
EMS Number: F-E, S-E
Transport Document Name: UN1202, DIESEL FUEL, 3, PG III, (>56°C c.c.), MARINE POLLUTANT

SEA (MARPOL 73/78 Convention - Annex II):

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not classified according to Annex II

AIR (IATA)

14.1. UN Number: 1202
14.2. UN Proper Shipping Name (Technical Name): DIESEL FUEL
14.3. Transport Hazard Class(es): 3
14.4. Packing Group: III
14.5. Environmental Hazards: Yes
14.6. Special Precautions for users:
Label(s) / Mark(s): 3
Transport Document Name: UN1202, DIESEL FUEL, 3, PG III

SECTION 15 REGULATORY INFORMATION

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Listed or exempt from listing/notification on the following chemical inventories (May contain substance(s) subject to notification to the EPA Active TSCA inventory prior to import to USA): AICS, DSL, IECSC, KECI, PICCS, TCSI, TSCA

15.1. SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE

Applicable EU Directives and Regulations:

1907/2006 [... on the Registration, Evaluation, Authorisation and Restriction of Chemicals ... and amendments thereto]
92/85/EEC [...pregnant workers...recently given birth or...breastfeeding directive]
94/33/EC [...on the protection of young people at work]
96/82/EC as extended by 2003/105/EC [... on the control of major-accident hazards involving dangerous substances]. Product contains a substance that falls within the criteria defined in Annex I. Refer to Directive for details of requirements taking into account the volume of product stored on site.
98/24/EC [... on the protection of workers from the risk related to chemical agents at work ...]. Refer to Directive for details of requirements.
1272/2008 [on classification, labelling and packaging of substances and mixtures.. and amendments thereto]

National Laws and Regulations:

Diseases with Occupational Characteristics: N°601
Strengthened medical surveillance:
CMR Legislation Applicable
Activity Restrictions: Pregnant women. Workers below 18 years.
Registered and Authorized Sites: 4330, 4331, 4511, 4734

15.2. CHEMICAL SAFETY ASSESSMENT

REACH Information: A Chemical Safety Assessment has been carried out for one or more substances present in the material.

SECTION 16 OTHER INFORMATION

REFERENCES: Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, CONCAWE Product Dossiers, publications from other trade associations, such as the EU Hydrocarbon Solvents REACH Consortium, U.S. HPV Program Robust Summaries, the EU IUCLID Data Base, U.S. NTP publications, and other sources, as appropriate.

List of abbreviations and acronyms that could be (but not necessarily are) used in this safety data sheet:

Acronym	Full text
N/A	Not applicable
N/D	Not determined
NE	Not established
VOC	Volatile Organic Compound
AICS	Australian Inventory of Chemical Substances
AIHA WEEL	American Industrial Hygiene Association Workplace Environmental Exposure Limits
ASTM	ASTM International, originally known as the American Society for Testing and Materials (ASTM)

DSL	Domestic Substance List (Canada)
EINECS	European Inventory of Existing Commercial Substances
ELINCS	European List of Notified Chemical Substances
ENCS	Existing and new Chemical Substances (Japanese inventory)
IECSC	Inventory of Existing Chemical Substances in China
KECI	Korean Existing Chemicals Inventory
NDSL	Non-Domestic Substances List (Canada)
NZIoC	New Zealand Inventory of Chemicals
PICCS	Philippine Inventory of Chemicals and Chemical Substances
TLV	Threshold Limit Value (American Conference of Governmental Industrial Hygienists)
TSCA	Toxic Substances Control Act (U.S. inventory)
UVCB	Substances of Unknown or Variable composition, Complex reaction products or Biological materials
LC	Lethal Concentration
LD	Lethal Dose
LL	Lethal Loading
EC	Effective Concentration
EL	Effective Loading
NOEC	No Observable Effect Concentration
NOELR	No Observable Effect Loading Rate

Classification according to Regulation (EC) No 1272/2008

Classification according to Regulation (EC) No 1272/2008	Classification procedure
Aquatic Chronic 2; H411	Calculation
Carc. 2; H351	Bridging, structurally similar materials
Flam. Liq. 3; H226	Based on test data
Skin Irrit. 2; H315	Bridging, structurally similar materials
STOT RE 2; H373	Bridging, structurally similar materials

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
Flam. Liq. 3 H226: Flammable liquid and vapor; Flammable Liquid, Cat 3
Asp. Tox. 1 H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
Skin Irrit. 2 H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
Acute Tox. 4 H332: Harmful if inhaled; Acute Tox Inh, Cat 4
Carc. 2 H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
STOT RE 2 H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
[Aquatic Acute 2 H401]: Toxic to aquatic life; Acute Env Tox, Cat 2
Aquatic Chronic 2 H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Section 01: Alternate Product Names Table information was modified.
Section 06: Accidental Release - Spill Management - Land information was modified.
Section 12: PBT/vPvB information was modified.

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Internal Use Only

MHC: 1A, 0B, 2, 0, 4, 1 PPEC: C

DGN: 7113386XNC (1010975)

Ferrous Sulfate, 1M

SECTION 1 : Identification of the substance/mixture and of the supplier

Product name : **Ferrous Sulfate, 1M**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25326**

Recommended uses of the product and uses restrictions on use:

Manufacturer Details:

AquaPhoenix Scientific
9 Barnhart Drive, Hanover, PA 17331

Supplier Details:

Fisher Science Education
15 Jet View Drive, Rochester, NY 14624

Emergency telephone number:

Fisher Science Education Emergency Telephone No.: 800-535-5053

SECTION 2 : Hazards identification

Classification of the substance or mixture:

Irritant
Acute toxicity (oral, dermal, inhalation), category 4
Skin irritation, category 2
Eye irritation, category 2A

Acute Tox. 4
Skin Irrit. 2
Eye Irrit. 2A
Corr. Metals

Signal word :Warning

Hazard statements:
May be corrosive to metals
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Wash ... thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Do not eat, drink or smoke when using this product
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
IF ON SKIN: Wash with soap and water
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do.
Continue rinsing

If skin irritation occurs: Get medical advice/attention
If eye irritation persists get medical advice/attention
Take off contaminated clothing and wash before reuse
Dispose of contents/container to ...

Other Non-GHS Classification:

WHMIS

E

NFPA/HMIS

NFPA SCALE (0-4)

Health	2
Flammability	0
Physical Hazard	0
Personal Protection	X

HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 7782-63-0	Ferrous sulfate heptahydrate	<22 %
CAS 7664-93-9	Sulfuric Acid	<1 %
CAS 7732-18-5	Deionized Water	<77 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position.If breathing difficult, give oxygen.Get medical attention.

After skin contact: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.Wash affected area with soap and water. Rinse/flush exposed skin gently using water for 15-20 minutes. Get medical attention.

After eye contact: Protect unexposed eye. Rinse/flush exposed eye(s) gently using water for 15-20 minutes. Remove contact lens(es) if able to do so during rinsing. Seek immediate medical attention or advice.

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Get medical attention.

Most important symptoms and effects, both acute and delayed:

Irritation, Nausea,Headache, Shortness of breath.;

Indication of any immediate medical attention and special treatment needed:

If seeking medical attention, provide SDS document to physician.Physician should treat symptomatically.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Use water spray, dry chemical, carbon dioxide, or chemical foam.

For safety reasons unsuitable extinguishing agents:

Special hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors.Contact with most metals generates flammable and explosive hydrogen gas .

Advice for firefighters:

Protective equipment: Wear protective eyeware, gloves, and clothing. Refer to Section 8.

Additional information (precautions): Avoid inhaling gases, fumes, dust, mist, vapor, and aerosols. Avoid contact with skin, eyes, and clothing.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Use spark-proof tools and explosion-proof equipment.Ensure adequate ventilation.Ensure that air-handling systems are operational.

Environmental precautions:

Should not be released into the environment.

Methods and material for containment and cleaning up:

Cover the spill with Sodium Carbonate or a soda ash - slaked lime mixture . Absorb with suitable material and containerize for disposal . Wear protective eyeware, gloves, and clothing. Refer to Section 8.Always obey local regulations.If necessary use trained response staff or contractor. Evacuate personnel to safe areas. Containerize for disposal. Refer to Section 13.Keep in suitable closed containers for disposal.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Avoid contact with skin, eyes, and clothing.Follow good hygiene procedures when handling chemical materials. Refer to Section 8.Follow proper disposal methods. Refer to Section 13.Do not eat, drink, smoke, or use personal products when handling chemical substances.

Conditions for safe storage, including any incompatibilities:

Store away from incompatible materials. Avoid storage near extreme heat, ignition sources or open flame. Store in a cool location.Keep away from food and beverages.Protect from freezing and physical damage.Provide ventilation for containers. Keep container tightly sealed.

SECTION 8 : Exposure controls/personal protection

Control Parameters: 7782-63-0, Ferrous sulfate heptahydrate, TWA 1 mg/m3 USA. ACGIH
7782-63-0, Ferrous sulfate heptahydrate, TWA 1 mg/m3 USA. OSHA
7782-63-0, Ferrous sulfate heptahydrate, TWA 1 mg/m3 USA. NIOSH
7664-93-9, Sulfuric acid, TWA 0.2 mg/m3 USA. ACGIH
7664-93-9, Sulfuric acid, TWA 1 mg/m3 USA. OSHA
7664-93-9, Sulfuric acid, TWA 1 mg/m3 USA. OSHA

Appropriate Engineering controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use/handling.Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor and mists below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above.

Respiratory protection: Not required under normal conditions of use. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls.When necessary use NIOSH approved breathing equipment.

Protection of skin: Select glove material impermeable and resistant to the substance.Select glove material based on rates of diffusion and degradation. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.Use proper glove removal technique without touching outer surface. Avoid skin contact with used gloves.Wear protective clothing.

Eye protection: Safety glasses with side shields or goggles.Wear equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

General hygienic measures: Perform routine housekeeping.Wash hands before breaks and immediately after handling the product.Avoid contact with skin, eyes, and clothing.Before rewearing wash contaminated clothing.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Clear colorless liquid to light green	**Explosion limit lower**: **Explosion limit upper**:	Not Determined Not Determined
Odor:	Odorless	**Vapor pressure**:	Not Determined
Odor threshold:	Not Determined	**Vapor density**:	Not Determined
pH-value:	< 3	**Relative density**:	Not Determined
Melting/Freezing point:	Approximately 0°C	**Solubilities**:	
Boiling point/Boiling range:	Approximately 100°C	**Partition coefficient (n-octanol/water)**:	Not Determined
Flash point (closed cup):	Not Determined	**Auto/Self-ignition temperature**:	Not Determined
Evaporation rate:	Not Determined	**Decomposition temperature**:	Not Determined
Flammability (solid,gaseous):	Not Determined	**Viscosity**:	a. Kinematic:Not Determined b. Dynamic: Not Determined
Density: Not Determined **Ferrous Sulfate:**Molecular Weight: 278.01			

SECTION 10 : Stability and reactivity

Reactivity: Nonreactive under normal conditions.
Chemical stability: Stable under normal conditions.
Possible hazardous reactions: None under normal processing.
Conditions to avoid: Incompatible materials.Excess heat.
Incompatible materials:S trong bases, strong oxidizing agents , organics, chlorates, carbides, reducing agents, nitrates, fulminates . Contact with water will generate heat.
Hazardous decomposition products: Sulphur oxides, Iron oxides

SECTION 11 : Toxicological information

Acute Toxicity:		
Oral:	7782-63-0	LD50 Oral - Mouse - 1,520 mg/kg
Oral:	7664-93-9	LD50 Oral - Rat - 2,140 mg/kg
Inhalation:	7664-93-9	LC50 Inhalation - Rat - 2 h - 510 mg/m3
Chronic Toxicity: No additional information.		
Corrosion Irritation:		
Dermal:	7664-93-9	Skin - Rabbit Result : Extremely corrosive and destructive to tissue
Ocular:	7664-93-9	Eyes - Rabbit Result : Corrosive to eyes
Sensitization:		No additional information.
Single Target Organ (STOT):		No additional information.
Numerical Measures:		No additional information.
Carcinogenicity:		No additional information.
Mutagenicity:		No additional information.
Reproductive Toxicity:		No additional information.

SECTION 12 : Ecological information

Ecotoxicity

7664-93-9: LC50 - Gambusia affinis (Mosquito fish) - 42 mg/l - 96 h

7664-93-9: EC50 - Daphnia magna (Water flea) - 29 mg/l - 24 h

Persistence and degradability: Readily degradable in the environment.
Bioaccumulative potential:
Mobility in soil:
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Cover with Sodium Carbonate or a soda ash - slaked lime mixture .Add water to form slurry. Flush to sewer with large quantities o f water.Treat solid residue as normal refuse, unless prohibited due to iron content in the

substance. Dispose of empty containers as unused product.Product or containers must not be disposed together with household garbage. It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations. Ensure complete and accurate classification.

SECTION 14 : Transport information

UN-Number

Not Regulated

UN proper shipping name

Not Regulated

Transport hazard class(es)
Packing group:Not Regulated
Environmental hazard:
Transport in bulk:
Special precautions for user:

SECTION 15 : Regulatory information

United States (USA)

SARA Section 311/312 (Specific toxic chemical listings):

Acute

SARA Section 313 (Specific toxic chemical listings):

7782-63-0 Ferrous Sulfate

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):

7782-63-0 Ferrous sulfate heptahydrate 1000 lb
7664-93-9 Sulfuric Acid 1000 lb

Proposition 65 (California):

Chemicals known to cause cancer:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed

Chemicals known to cause developmental toxicity:

None of the ingredients is listed

Canada

Canadian Domestic Substances List (DSL):

7782-63-0 Not listed.

Canadian NPRI Ingredient Disclosure list (limit 0.1%):

None of the ingredients is listed

Canadian NPRI Ingredient Disclosure list (limit 1%):

None of the ingredients is listed

SECTION 16 : Other information

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.Note:. The responsibility to provide a safe workplace remains with the user.The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment.The information contained herein is, to the best of our knowledge and belief, accurate.However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material.It is the responsibility of the user to comply with all applicable laws and regulations applicable to this material.

GHS Full Text Phrases:

Abbreviations and acronyms:
IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)
CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 01.07.2015
Last updated : 03.19.2015

SECTION 1. IDENTIFICATION

Product identifier

Trade name : Drewfloc™ 2611 FLOCCULANT
™ Trademark, Solenis or its subsidiaries or affiliates, registered in various countries

Recommended use of the chemical and restrictions on use

Details of the supplier of the safety data sheet	**Emergency telephone number**
Solenis LLC 500 Hercules Road Wilmington, Delaware 19808 United States of America (USA) RegulatoryRequestsNA@solenis.com	1-844-SOLENIS (844-765-3647) **Product Information** Contact your local Solenis representative

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

This material is not considered hazardous under the OSHA Hazard Communication Standard (HazCom 2012).

GHS label elements

This material is not considered hazardous under the OSHA Hazard Communication Standard (HazCom 2012).
This material is not considered hazardous under the OSHA Hazard Communication Standard (HazCom 2012).

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

No hazardous ingredients

SECTION 4. FIRST AID MEASURES

General advice : No hazards which require special first aid measures.

If inhaled	:	If breathed in, move person into fresh air. 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	:	Remove contact lenses. Protect unharmed eye.
If swallowed	:	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	:	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 Shortness of breath
Notes to physician	:	No hazards which require special first aid measures.

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
Specific hazards during firefighting	:	If product is heated above its flash point it will produce vapors sufficient to support combustion. Vapors are heavier than air and may travel along the ground and be ignited by heat, pilot lights, other flames and ignition sources at locations near the point of release. Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	Carbon monoxide Carbon dioxide (CO2) Nitrogen oxides (NOx) Ammonia sulfur oxides
Specific extinguishing methods	:	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.

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 : Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.
Comply with all applicable federal, state, and local regulations.

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.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Advice on safe handling : Smoking, eating and drinking should be prohibited in the application area.
For personal protection see section 8.

Conditions for safe storage : Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Electrical installations / working materials must comply with the technological safety standards.

Materials to avoid : No materials to be especially mentioned.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures : General room ventilation should be adequate for normal conditions of use. However, if unusual operating conditions exist, 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 : No personal respiratory protective equipment normally

required.

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: Safety shoes Wear resistant gloves (consult your safety equipment supplier).
Hygiene measures	:	General industrial hygiene practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	yellow
Odour	:	none
Odour Threshold	:	No data available
pH	:	3 - 4 (20 °C) Concentration: 10 g/l
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	100 °C
Flash point	:	> 100 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Self-ignition	:	No data available
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapour pressure	:	No data available
Relative vapour density	:	No data available
Relative density	:	1.1 (20 °C)
Density	:	1.1 g/ml

Solubility(ies)
Water solubility : soluble, With a rise in viscosity

Solubility in other solvents : No data available

Partition coefficient: n-octanol/water : No data available

Decomposition temperature : No data available

Viscosity
Viscosity, dynamic : 7,400 - 16,500 cps (-4 - 35 °C)

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 : Heat, flames and sparks.

Incompatible materials : chlorates
nitrates
Oxidizing agents
strong bases
Peroxides

Hazardous decomposition products : **Carbon monoxide**
Carbon dioxide (CO2)
Nitrogen oxides (NOx)
Ammonia
Sulphur oxides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Not classified based on available information.

Product:

Acute oral toxicity : Acute toxicity estimate: > 5,000 mg/kg
Method: Calculation method

Skin corrosion/irritation

Not classified based on available information.

Serious eye damage/eye irritation

Not classified based on available information.

Product:

Remarks: Unlikely to cause eye irritation or injury.

Respiratory or skin sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Germ cell mutagenicity

Not classified based on available information.

Carcinogenicity

Not classified based on available information.

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
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

Not classified based on available information.

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

Not classified based on available information.

Aspiration toxicity

Not classified based on available information.

Further information

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 2.73 mg/l
Exposure time: 96 h
Method: EPS 1/RM/9
GLP: no

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 4.5 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Ecotoxicology Assessment

Acute aquatic toxicity : Acute aquatic toxicity Category 2; Toxic to aquatic life.

Chronic aquatic toxicity : Not classified based on available information.

Persistence and degradability

Product:

Biodegradability : Result: Not readily biodegradable.

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.

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.

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

U.S. DOT - RAIL

Not dangerous goods

U.S. DOT - INLAND WATERWAYS

Not dangerous goods

TRANSPORT CANADA - ROAD

Not dangerous goods

TRANSPORT CANADA - RAIL

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

MEXICAN REGULATION FOR THE LAND TRANSPORT OF HAZARDOUS MATERIALS AND WASTES

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

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

ammonium sulphate	7783-20-2	2 %

California Prop. 65

Proposition 65 warnings are not required for this product based on the results of a risk assessment.

The components of this product are reported in the following inventories:

DSL	:	This product contains one or more components that are not on the Canadian DSL and have annual quantity limits.
AICS	:	On the inventory, or in compliance with the inventory
ENCS	:	Not in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	Not in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory
TCSI	:	On the inventory, or in compliance with the inventory
TSCA	:	On TSCA Inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Further information
Revision Date: 05/09/2018

Full text of other abbreviations

Further information

Other information : 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 MSDS has been prepared by the Solenis Environmental Health and Safety Department.

Sources of key data used to compile the Safety Data Sheet
Key literature references and sources of data
SOLENIS Internal data
SOLENIS internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic

Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

US / EN

Material Safety Data Sheet

Creation Date 07-Jul-2009 **Revision Date** 07-Jul-2009 **Revision Number** 1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Lead(II) nitrate**

Cat No. **L61-3, L62-12LC, L62-100, L62-500**

Synonyms Lead dinitrate; Plumbous nitrate

Recommended Use Laboratory chemicals

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 703-527-3887

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview

Oxidizer: Contact with combustible/organic material may cause fire. May cause cancer. Suspect cancer hazard. Harmful by inhalation and if swallowed. May cause eye, skin, and respiratory tract irritation . May cause central nervous system effects. May cause harm to the unborn child. Possible risk of impaired fertility. Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Appearance White **Physical State** Solid. **Odor** odorless

Target Organs Liver, Kidney, Central nervous system (CNS), Blood, Reproductive System

Potential Health Effects

Acute Effects
Principle Routes of Exposure

Eyes	May cause irritation.
Skin	May cause irritation. May be harmful in contact with skin.
Inhalation	Harmful by inhalation. May cause irritation of respiratory tract.
Ingestion	Harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic Effects May cause cancer. May cause harm to the unborn child. May impair fertility. Danger of cumulative effects. May cause adverse liver effects. May cause adverse kidney effects.

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Haz/Non-haz

Component	CAS-No	Weight %
Lead nitrate	10099-74-8	99

4. FIRST AID MEASURES

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point No information available.
Method No information available.

Autoignition Temperature No information available.
Explosion Limits
Upper No data available
Lower No data available

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available.

Hazardous Combustion Products No information available.

Sensitivity to mechanical impact No information available.
Sensitivity to static discharge No information available.

Specific Hazards Arising from the Chemical
Oxidizer: Contact with combustible/organic material may cause fire. Thermal decomposition can lead to release of irritating gases and vapors.

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

NFPA **Health** 2 **Flammability** 0 **Instability** 2 **Physical hazards** OX

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid dust formation.

Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Provide adequate ventilation. Keep combustibles (wood, paper, oil, etc) away from spilled material. Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. HANDLING AND STORAGE

Handling Use only under a chemical fume hood. Wear personal protective equipment. Keep away from clothing and other combustible materials. Avoid dust formation. Do not get in eyes, on skin, or on clothing. Do not breathe dust.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Do not store near combustible materials.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

NIOSH IDLH: *Immediately Dangerous to Life or Health*

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Appearance	White
Odor	odorless
Odor Threshold	No information available.
pH	3 - 4 20% aq. sol.
Vapor Pressure	negligible
Vapor Density	No information available.
Viscosity	No information available.
Boiling Point/Range	No information available.
Melting Point/Range	470°C / 878°F
Decomposition temperature °C	470°C
Flash Point	No information available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Evaporation Rate	negligible
Specific Gravity	4.530
Solubility	Soluble in water
log Pow	No data available
Molecular Weight	331.2
Molecular Formula	N2 O6 Pb

10. STABILITY AND REACTIVITY

Stability Oxidizer: Contact with combustible/organic material may cause fire.

Conditions to Avoid Avoid dust formation. Incompatible products. Excess heat. Combustible material.

Incompatible Materials Strong reducing agents, Organic materials, Powdered metals

Hazardous Decomposition Products Nitrogen oxides (NOx), lead oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions . None under normal processing..

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Irritation No information available.

Toxicologically Synergistic Products No information available.

Chronic Toxicity

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	ACGIH	IARC	NTP	OSHA	Mexico
Lead nitrate	Not listed	Group 2A	Not listed	X	Not listed

IARC: (International Agency for Research on Cancer)
IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

Sensitization No information available.

Mutagenic Effects Mutagenic effects have occurred in humans.

Reproductive Effects	Experiments have shown reproductive toxicity effects on laboratory animals.
Developmental Effects	Developmental effects have occurred in experimental animals.
Teratogenicity	Teratogenic effects have occurred in experimental animals..
Other Adverse Effects	The toxicological properties have not been fully investigated.. See actual entry in RTECS for complete information.
Endocrine Disruptor Information	No information available

12. ECOLOGICAL INFORMATION

This product contains a chemical which is listed as a marine pollutant according to DOT

Ecotoxicity
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Persistence and Degradability	No information available
Bioaccumulation/ Accumulation	No information available
Mobility	No information available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods	Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification

14. TRANSPORT INFORMATION

DOT

UN-No	UN1469
Proper Shipping Name	LEAD NITRATE
Hazard Class	5.1
Subsidiary Hazard Class	6.1
Packing Group	II

TDG

UN-No	UN1469
Proper Shipping Name	LEAD NITRATE

14. TRANSPORT INFORMATION

Hazard Class	5.1
Subsidiary Hazard Class	6.1
Packing Group	II

IATA

UN-No	1469
Proper Shipping Name	LEAD NITRATE
Hazard Class	5.1
Subsidiary Hazard Class	6.1
Packing Group	II

IMDG/IMO

UN-No	1469
Proper Shipping Name	LEAD NITRATE
Hazard Class	5.1
Subsidiary Hazard Class	6.1
Packing Group	II

15. REGULATORY INFORMATION

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	CHINA	KECL
Lead nitrate	X	X	-	233-245-9	-		X	X	X	X	KE-21907 X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313
Not applicable

SARA 311/312 Hazardous Categorization

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

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Lead nitrate	X	10 lb	-	-

Clean Air Act
Not applicable

OSHA
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Lead nitrate	10 lb	-

California Proposition 65
This product contains the following Proposition 65 chemicals:

Component	CAS-No	California Prop. 65	Prop 65 NSRL
Lead nitrate	10099-74-8	Cancer/Developmental	-

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Lead nitrate	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	Y
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
C Oxidizing materials
D1B Toxic materials
D2A Very toxic materials

16. OTHER INFORMATION

Prepared By	Regulatory Affairs Thermo Fisher Scientific Tel: (412) 490-8929
Creation Date	07-Jul-2009
Print Date	07-Jul-2009
Revision Summary	"***", and red text indicates revision

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

End of MSDS

SAFETY DATA SHEET

LIME

Section 1. Identification

GHS product identifier	:	LIME
Chemical name	:	Mixture
CAS number	:	Mixture
Other means of identification	:	CC01053986
Product type	:	liquid

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

Product use	:	Industrial applications. Plastics.

Supplier's details	:	**POLYONE CORPORATION** ColorMatrix Group Inc. 680 North Rocky River Drive, Berea, Ohio, 44017-1628, USA +1 216 622 0100
Emergency telephone number (with hours of operation)	:	**CHEMTREC 1-800-424-9300 (24hrs for spill, leak, fire, exposure or accident).**

Section 2. Hazards identification

This mixture has not been evaluated as a whole for health effects. Information provided on health effects of this product is based on the individual components. However, some vapors or contaminants may be released upon heating and the end-user (fabricator) must take the necessary precautions (mechanical ventilation, respiratory protection, etc.) to protect employees from exposure. See sections 8 and 11 for special precautions. After handling, always wash hands thoroughly with soap and water.

OSHA/HCS status	:	While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.
Classification of the substance or mixture	:	Not classified.

GHS label elements

Signal word	:	No signal word.
Hazard statements	:	No known significant effects or critical hazards.

Precautionary statements

General	:	Not applicable.
Prevention	:	Not applicable.
Response	:	Not applicable.
Storage	:	Not applicable.
Disposal	:	Not applicable.
Supplemental label elements	:	None known.
Hazards not otherwise classified	:	None known.

Section 3. Composition/information on ingredients

Substance/mixture	:	Mixture
Chemical name	:	Mixture
Other means of identification	:	CC01053986

CAS number/other identifiers

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
Inhalation	:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur. In case of inhalation of decomposition products in a fire, symptoms may be

delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

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

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : In case of fire, use water spray (fog), foam, dry chemical or CO_2.

Unsuitable extinguishing media	:	None known.
Specific hazards arising from the chemical	:	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	:	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides metal oxide/oxides
Special protective actions for fire-fighters	:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	:	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.
For emergency responders	:	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill	:	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	:	Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material

e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures	:	Put on appropriate personal protective equipment (see Section 8).
Advice on general occupational hygiene	:	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities	:	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Appropriate engineering controls	:	Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
Environmental exposure controls	:	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures	:	Wash hands, forearms and face thoroughly after handling chemical

products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : liquid [liquid]
Color : GREEN
Odor : Faint odor.
Odor threshold : Not available.
pH : Not available.
Melting point : Not available.
Boiling point : Not available.
Flash point : Not available.
Burning time : Not available.
Burning rate : Not available.
Evaporation rate : Not available.
Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits	:	**Lower:** Not available. **Upper:** Not available.
Vapor pressure	:	Not available.
Vapor density	:	Not available.
Relative density	:	Not available.
Solubility	:	Not available.
Solubility in water	:	insoluble in water.
Partition coefficient: n-octanol/water	:	Not available.
Auto-ignition temperature	:	Not available.
Decomposition temperature	:	Not available.
SADT	:	Not available.
Viscosity	:	**Dynamic:** Not available. **Kinematic:** Not available.

Section 10. Stability and reactivity

Reactivity	:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	:	Stable under recommended storage and handling conditions (see Section 7).
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Keep away from extreme heat and oxidizing agents.
Incompatible materials	:	Keep away from strong acids. Oxidizer.
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

This mixture has not been evaluated as a whole for health effects. Exposure effects listed are based on existing health data for the individual components which comprise the mixture.

Information on toxicological effects

Acute toxicity

Conclusion/Summary	:	Mixture.Not fully tested.

Irritation/Corrosion

Conclusion/Summary

Skin	:	Mixture.Not fully tested.
Eyes	:	Mixture.Not fully tested.
Respiratory	:	Mixture.Not fully tested.

Sensitization

Conclusion/Summary

Skin	:	Mixture.Not fully tested.
Respiratory	:	Mixture.Not fully tested.

Mutagenicity

Conclusion/Summary	:	Mixture.Not fully tested.

Carcinogenicity

Conclusion/Summary	:	Mixture.Not fully tested.

Reproductive toxicity

Conclusion/Summary	:	Mixture.Not fully tested.

Teratogenicity

Conclusion/Summary	:	Mixture.Not fully tested.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure	:	Not available.

Potential acute health effects

Eye contact	:	No known significant effects or critical hazards.
Inhalation	:	Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Skin contact	:	No known significant effects or critical hazards.
Ingestion	:	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	:	No specific data.
Inhalation	:	No specific data.
Skin contact	:	No specific data.
Ingestion	:	No specific data.

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

Short term exposure

Potential immediate effects	:	Not available.
Potential delayed effects	:	Not available.

Long term exposure

Potential immediate effects	:	Not available.
Potential delayed effects	:	Not available.

Potential chronic health effects

Conclusion/Summary	:	Mixture.Not fully tested.
General	:	No known significant effects or critical hazards.
Carcinogenicity	:	No known significant effects or critical hazards.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	No known significant effects or critical hazards.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Conclusion/Summary	:	Not available.

Persistence and degradability

Conclusion/Summary : Not available.

Bioaccumulative potential
Mobility in soil

Soil/water partition coefficient (KOC) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Acute hazardous waste "P" List: Not listed

United States - RCRA Toxic hazardous waste "U" List: Not listed

Section 14. Transport information

U.S. DOT Classification : Not regulated for transportation.

ICAO/IATA : Not classified as dangerous good under transport regulations.

IMO/IMDG (maritime) : Not classified as dangerous good under transport regulations.

Section 15. Regulatory information

U.S. Federal regulations	:	**United States - TSCA 12(b) - Chemical export notification:** None of the components are listed. **United States - TSCA 4(a) - Final Test Rules:** Not listed **United States - TSCA 4(a) - ITC Priority list:** Not listed **United States - TSCA 4(f) - Priority risk review:** Not listed **United States - TSCA 5(a)2 - Final significant new use rules:** Not listed **United States - TSCA 5(a)2 - Proposed significant new use rules:** Not listed **United States - TSCA 5(e) - Substances consent order:** Not listed **United States - TSCA 6 - Final risk management:** Not listed **United States - TSCA 6 - Proposed risk management:** Not listed **United States - TSCA 8(a) - Chemical risk rules:** Not listed **United States - TSCA 8(a) - Dioxin/Furane precusor:** Not listed **United States - TSCA 8(a) - Chemical Data Reporting (CDR):** Not determined **United States - TSCA 8(a) - Preliminary assessment report (PAIR):** Not listed **United States - TSCA 8(c) - Significant adverse reaction (SAR):** Not listed **United States - TSCA 8(d) - Health and safety studies:** Not listed **United States - TSCA 4(a) - Proposed test rules:** Not listed **United States - EPA Clean water act (CWA) section 307 - Priority pollutants:** Not listed **United States - EPA Clean water act (CWA) section 311 - Hazardous substances:** Not listed **United States - EPA Clean air act (CAA) section 112 - Accidental release prevention - Flammable substances:** Not listed **United States - EPA Clean air act (CAA) section 112 - Accidental release prevention - Toxic substances:** Not listed **United States - Department of commerce - Precursor chemical:** Not listed
Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	:	Not listed
Clean Air Act Section 602 Class I Substances	:	Not listed
Clean Air Act Section 602 Class II Substances	:	Not listed
DEA List I Chemicals (Precursor Chemicals)	:	Not listed
DEA List II Chemicals (Essential Chemicals)	:	Not listed

US. EPA CERCLA Hazardous Substances (40 CFR 302)

not applicable

SARA 311/312

Classification : Not applicable.

Composition/information on ingredients

No products were found.

SARA 313

Not applicable.

State regulations

Massachusetts : None of the components are listed.
New York : None of the components are listed.
New Jersey : None of the components are listed.
Pennsylvania : None of the components are listed.

California Prop. 65

This PolyOne product does not contain any chemical known to the State of California to cause cancer, or birth defects or other reproductive harm, in concentrations that require a warning notice under California's Proposition 65. This statement relies in part on information provided by the buyer of this PolyOne product. PolyOne does not control or have complete knowledge of the end uses to which that buyer or any other entity in the chain of distribution and marketing may put this PolyOne product. Therefore, the buyer of this PolyOne product, each entity that uses this PolyOne product in formulating another product, and each entity in the chain of distribution and marketing of any product that includes the material in this PolyOne product must make its own decision as to giving a Proposition 65 warning.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada inventory : At least one component is not listed in DSL but all such components are listed in NDSL.

International regulations

International lists : **Australia inventory (AICS):** All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.
Malaysia Inventory (EHS Register): Not determined.
EINECS: All components are listed or exempted.
Japan inventory: Not determined.
China inventory (IECSC): All components are listed or exempted.
Korea inventory: Not determined.
New Zealand Inventory of Chemicals (NZIoC): Not determined.
Philippines inventory (PICCS): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals	:	Not listed
Chemical Weapons Convention List Schedule III Chemicals	:	Not listed

Section 16. Other information

History

Date of printing	:	05/12/2015
Date of issue/Date of revision	:	05/11/2015
Date of previous issue	:	00/00/0000
Version	:	1.0
Key to abbreviations	:	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations
References	:	Not available.

Notice to reader

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. Particularly this information may not be valid for such material used in conjunction with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

Revision Date 22-Aug-2013 **Revision Number** 4

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description:	**Potassium nitrite**
Cat No. :	**P/6162/50, P/6162/60, P/6162/65**
Synonyms	Nitrous acid, potassium salt.
CAS-No	7758-09-0
EC-No.	231-832-4
Molecular Formula	K N O2

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

Recommended Use	Laboratory chemicals
Uses advised against	No Information available

1.3. Details of the supplier of the safety data sheet

Company	Fisher Scientific UK Bishop Meadow Road, Loughborough, Leicestershire LE11 5RG, United Kingdom
E-mail address	begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

Tel: 01509 231166
Chemtrec US: (800) 424-9300
Chemtrec EU: 001 (202) 483-7616

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Oxidizing solids	Category 2

Health hazards

Acute oral toxicity	Category 3

Environmental hazards

Acute aquatic toxicity	Category 1

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

Symbol(s)	O - Oxidizing T - Toxic N - Dangerous for the environment
R-phrase(s)	R 8 - Contact with combustible material may cause fire R25 - Toxic if swallowed R50 - Very toxic to aquatic organisms

SECTION 2: HAZARDS IDENTIFICATION

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

2.2. Label elements

Signal Word **Danger**

Hazard Statements

H272 - May intensify fire; oxidizer
H301 - Toxic if swallowed
H400 - Very toxic to aquatic life

Precautionary Statements

P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P273 - Avoid release to the environment

2.3. Other hazards

No information available.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008	DSD Classification - 67/548/EEC
Potassium nitrite	7758-09-0	EEC No. 231-832-4	>95	Acute Tox. 3 (H301) Aquatic Acute 1 (H400) Ox. Sol. 2 (H272)	T; R25 N; R50 O; R8

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

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.

Ingestion Do not induce vomiting. Drink plenty of water. Call a physician immediately. Clean mouth with water. If possible drink milk afterwards.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Immediate medical attention is required.

Protection of First-aiders Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination

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

No information available

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

Notes to Physician Treat symptomatically

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Water spray. Carbon dioxide (CO_2). Dry chemical. Use water spray to cool unopened containers. chemical foam.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

Dust can form an explosive mixture in air. Burning produces obnoxious and toxic fumes. Containers may explode when heated. Oxidizer: Contact with combustible/organic material may cause fire. May ignite combustibles (wood paper, oil, clothing, etc.). Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
Nitrogen oxides (NOx).

5.3. Advice for firefighters

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

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation

6.2. Environmental precautions

Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

6.3. Methods and material for containment and cleaning up

Avoid dust formation. Prevent product from entering drains. Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not flush into surface water or sanitary sewer system. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Sweep up and shovel into suitable containers for disposal.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Do not breathe dust. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Use only in area provided with appropriate exhaust ventilation. Use only in well-ventilated areas. Keep away from clothing and other combustible materials.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Do not store near combustible materials. Keep containers tightly closed in a dry, cool and well-ventilated place.

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

Derived No Effect Level (DNEL) No information available.

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				
Inhalation				

Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Engineering Measures
Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source.

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Natural rubber Nitrile rubber Neoprene PVC	See manufacturers recommendations	-	EN 374	(minimum requirement)

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure

Respiratory Protection	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly.
Large scale/emergency use	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.. **Recommended Filter type:** Particulates filter conforming to EN 143.
Small scale/Laboratory use	Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. **Recommended half mask:-** Particle filtering: EN149:2001 When RPE is used a face piece Fit Test should be conducted.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice
Environmental exposure controls	Prevent product from entering drains. Do not allow material to contaminate ground water system. Local authorities should be advised if significant spillages cannot be contained.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance	Off-white	
Physical State	Solid.	
Odor	odorless	
Odor Threshold	No data available	
pH	7-10	5% aq.sol.
Melting Point/Range	387°C / 728.6°F	
Softening Point	No data available	
Boiling Point/Range	No information available.	
Flash Point	No information available.	**Method -** No information available.
Evaporation Rate	Not applicable	Solid
Flammability (solid,gas)	No information available.	
Explosion Limits	No data available.	
Vapor Pressure	No information available.	
Vapor Density	Not applicable	Solid
Specific Gravity / Density	1.9150	
Bulk Density	No data available	
Water Solubility	3000 g/l water (20°C)	
Solubility in other solvents	No information available.	
Partition Coefficient (n-octanol/water)		
Autoignition Temperature	Not applicable510°C / 950°F	
Decomposition temperature	> 350°C	
Viscosity	Not applicable	Solid
Explosive Properties	No information available.	
Oxidizing Properties	Oxidizer	

9.2. Other information

Molecular Formula	K N O2
Molecular Weight	85.1

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available.

10.2. Chemical stability

Hygroscopic. Oxidizer: Contact with combustible/organic material may cause fire.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions No information available.

10.4. Conditions to avoid

Incompatible products, Exposure to moist air or water, Combustible material, Excess heat.

10.5. Incompatible materials

Organic materials. Acids. Amines. Strong reducing agents. Cyanides. Metals. Powdered metals. Combustible material.

10.6. Hazardous decomposition products

Nitrogen oxides (NOx).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Product Information

(a) acute toxicity;

Oral Category 3
Dermal No data available
Inhalation Based on available data, the classification criteria are not met

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Potassium nitrite			85 g/m³/2H (Mouse)

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;

Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	EU	UK	Germany	IARC
Potassium nitrite				Group 2A

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure;	No data available
Target Organs	No information available.
(j) aspiration hazard;	Not applicable Solid
Other Adverse Effects	See actual entry in RTECS for complete information
Symptoms / effects, both acute and delayed	No information available.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecotoxicity effects	Very toxic to aquatic organisms. The product contains following substances which are hazardous for the environment.

12.2. Persistence and degradability

Persistence	Soluble in water, Persistence is unlikely, based on information available.
Degradability	Not relevant for inorganic substances.
Degradation in sewage treatment plant	Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.

12.3. Bioaccumulative potential	Bioaccumulation is unlikely
12.4. Mobility in soil	The product is water soluble, and may spread in water systems. Will likely be mobile in the environment due to its water solubility. Highly mobile in soils.
12.5. Results of PBT and vPvB assessment	No data available for assessment

12.6. Other adverse effects

Endocrine Disruptor Information	This product does not contain any known or suspected endocrine disruptors
Persistent Organic Pollutant	This product does not contain any known or suspected substance
Ozone Depletion Potential	This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues / Unused Products	Should not be released into the environment. Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.
Contaminated Packaging	Dispose of this container to hazardous or special waste collection point..
European Waste Catalogue (EWC)	According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.
Other Information	Do not dispose of waste into sewer. Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Do not let this chemical enter the environment.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

14.1. UN number	1488
14.2. UN proper shipping name	POTASSIUM NITRITE
14.3. Transport hazard class(es)	5.1
14.4. Packing group	II

ADR

14.1. UN number	1488
14.2. UN proper shipping name	POTASSIUM NITRITE
14.3. Transport hazard class(es)	5.1
14.4. Packing group	II

IATA

14.1. UN number	1488
14.2. UN proper shipping name	POTASSIUM NITRITE
14.3. Transport hazard class(es)	5.1
14.4. Packing group	II
14.5. Environmental hazards	Dangerous for the environment Product is a marine pollutant according to the criteria set by IMDG/IMO
14.6. Special precautions for user	No special precautions required
14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

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

International Inventories X = listed

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	CHINA	AICS	KECL
Potassium nitrite	231-832-4	-		X	X	-	X	X	X	X	X

National Regulations

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Potassium nitrite	WGK 2	

Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment
Take note of Dir 94/33/EC on the protection of young people at work
Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

Full text of R-phrases referred to under sections 2 and 3
R 8 - Contact with combustible material may cause fire
R25 - Toxic if swallowed
R50 - Very toxic to aquatic organisms

Full text of H-Statements referred to under sections 2 and 3
H272 - May intensify fire; oxidizer
H301 - Toxic if swallowed
H400 - Very toxic to aquatic life

Legend

CAS - Chemical Abstracts Service
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japan Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Industrial Hygiene
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
PNEC - Predicted No Effect Concentration
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC - Volatile Organic Compounds

Key literature references and sources for data
Suppliers safety data sheet,
Chemadvisor - LOLI,
Merck index,
RTECS

Training Advice
Chemical incident response training.

Revision Date	22-Aug-2013
Revision Summary	
Reason for revision	Not applicable

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Disclaimer

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

End of Safety Data Sheet

SAFETY DATA SHEET

1. Identification

Product identifier **SILICA SAND, -50+70 MESH, FOR CHROMATOGRAPHY**

Other means of identification

Product code 2796

Synonyms SAND, CHROMATOGRAPHIC

Recommended use professional, scientific and technical activities: other professional, scientific and technical activities

Recommended restrictions Workers (and your customers or users in the case of resale) should be informed of the potential presence of respirable dust and respirable crystalline silica as well as their potential hazards. Appropriate training in the proper use and handling of this material should be provided as required under applicable regulations.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name GFS Chemicals, Inc.

Address P.O. Box 245
Powell, OH 43065
United States

Telephone Phone 740-881-5501
Toll Free 800-858-9682
Fax 740-881-5989

Website www.gfschemicals.com

E-mail service@gfschemicals.com

Emergency phone number Emergency Assistance Chemtrec 800-424-9300

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Carcinogenicity Category 1A

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement May cause cancer.

Precautionary statement

Prevention Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection.

Response If exposed or concerned: Get medical advice/attention.

Storage Store locked up.

Disposal Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
SILICA SAND	SAND, CHROMATOGRAPHIC	14808-60-7	100

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

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

Eye contact Rinse with water. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed Irritation of eyes and mucous membranes. Coughing.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Use extinguishing agent suitable for type of surrounding fire. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Use water spray to cool unopened containers.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up The product is immiscible with water and will sediment in water systems. Stop the flow of material, if this is without risk. Avoid dust formation. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water. Sweep up or vacuum up spillage and collect in suitable container for disposal. For waste disposal, see section 13 of the SDS. Small Dry Spills: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Environmental precautions Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide appropriate exhaust ventilation at places where dust is formed. Keep formation of airborne dusts to a minimum. Do not breathe dust. Avoid prolonged exposure. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-3 (29 CFR 1910.1000)

Material	Type	Value	Form
SILICA SAND (CAS 14808-60-7)	TWA	0.3 mg/m3	Total dust.
		0.1 mg/m3	Respirable.
		2.4 mppcf	Respirable.

US. ACGIH Threshold Limit Values

Material	Type	Value	Form
SILICA SAND (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value	Form
SILICA SAND (CAS 14808-60-7)	TWA	0.05 mg/m3	Respirable dust.

Biological limit values No biological exposure limits noted for the ingredient(s).

Exposure guidelines Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection If contact is likely, safety glasses with side shields are recommended.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Use of an impervious apron is recommended.

Respiratory protection Use a particulate filter respirator for particulate concentrations exceeding the Occupational Exposure Limit.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Granular.

Physical state Solid.

Form Solid.

Color white or tan.

Odor Not available.

Odor threshold Not available.

pH Not available.

Melting point/freezing point 3110 °F (1710 °C)

Initial boiling point and boiling range Not available.

Flash point Not available.

Evaporation rate Not available.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%) Not available.

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure Not available.

Vapor density Not available.

Relative density Not available.

Solubility(ies)

Solubility (water) Insoluble

Partition coefficient (n-octanol/water) Not available.

Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	2.65 g/cm3
Heat of combustion (NFPA 30B)	0 kJ/g
Molecular formula	SiO2
Molecular weight	60.09 g/mol
Specific gravity	2.65

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Powerful oxidizers. Chlorine. This product reacts with hydrofluoric acid.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Irritation of eyes and mucous membranes. Coughing.

Information on toxicological effects

Acute toxicity	Not available.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	May irritate eyes.

Respiratory or skin sensitization

Respiratory sensitization	Not available.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	In 1997, IARC (the International Agency for Research on Cancer) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However in making the overall evaluation, IARC noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicates dust and organic fibres, 1997, Vol. 68, IARC, Lyon, France.) In June 2003, SCOEL (the EU Scientific Committee on Occupational Exposure Limits) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust is silicosis. "There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk..." (SCOEL SUM Doc 94-final, June 2003) According to the current state of the art, worker protection against silicosis can be consistently assured by respecting the existing regulatory occupational exposure limits. May cause cancer. Occupational exposure to respirable dust and respirable crystalline silica should be monitored and controlled.

IARC Monographs. Overall Evaluation of Carcinogenicity

SILICA SAND (CAS 14808-60-7)	1 Carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

SILICA SAND (CAS 14808-60-7)	Known To Be Human Carcinogen.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not available.
Chronic effects	Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

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

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - No
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. Massachusetts RTK - Substance List

SILICA SAND (CAS 14808-60-7)

US. New Jersey Worker and Community Right-to-Know Act

SILICA SAND (CAS 14808-60-7)

US. Pennsylvania Worker and Community Right-to-Know Law

SILICA SAND (CAS 14808-60-7)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

SILICA SAND (CAS 14808-60-7) Listed: October 1, 1988

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date May-25-2015

Version # 01

Disclaimer GFS Chemicals cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Revision Information Composition / Information on Ingredients: Ingredients
Physical & Chemical Properties: Multiple Properties

AMERICAN ELEMENTS
THE MATERIALS SCIENCE MANUFACTURER®

SAFETY DATA SHEET

Date Printed: 01/04/2018
Date Revised: 05/15/2015

SECTION 1. IDENTIFICATION

Product Name: Silicon Carbide

Product Number: All applicable American Elements product codes, e.g. SI-C-02 , SI-C-03 , SI-C-02 , SI-C-05

CAS #: 409-21-2

Relevant identified uses of the substance: Scientific research and development

Supplier details:
American Elements
10884 Weyburn Ave.
Los Angeles, CA 90024
Tel: +1 310-208-0551
Fax: +1 310-208-0351

Emergency telephone number:
Domestic, North America: +1 800-424-9300
International: +1 703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
GHS08 Health hazard
Carc. 2 H351 Suspected of causing cancer.
GHS07
Skin Irrit. 2 H315 Causes skin irritation.
Eye Irrit. 2A H319 Causes serious eye irritation.
STOT SE 3 H335 May cause respiratory irritation.
Classification according to Directive 67/548/EEC or Directive 1999/45/EC
Xn; Harmful
R40: Limited evidence of a carcinogenic effect.
Xi; Irritant
R36/37/38: Irritating to eyes, respiratory system and skin.
Information concerning particular hazards for human and environment: N/A
Hazards not otherwise classified
No data available
Label elements
Labelling according to Regulation (EC) No 1272/2008
The substance is classified and labeled according to the CLP regulation.

Hazard pictograms

GHS07 GHS08
Signal word: Warning
Hazard statements
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
H335 May cause respiratory irritation.
Precautionary statements
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P281 - Use personal protective equipment as required.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations.
WHMIS classification
D2B - Toxic material causing other toxic effects
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)
HEALTH
FIRE
REACTIVITY
1
1
1
Health (acute effects) = 1
Flammability = 1
Physical Hazard = 1
Other hazards
Results of PBT and vPvB assessment
PBT: N/A
vPvB: N/A

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances
CAS No. / Substance Name:
409-21-2 Silicon carbide
Identification number(s):
EC number: 206-991-8

SECTION 4. FIRST AID MEASURES

Description of first aid measures

If inhaled:
Supply patient with fresh air. If not breathing, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
In case of skin contact:
Immediately wash with soap and water; rinse thoroughly.
Seek immediate medical advice.
In case of eye contact:
Rinse opened eye for several minutes under running water. Consult a physician.
If swallowed:
Seek medical treatment.
Information for doctor
Most important symptoms and effects, both acute and delayed
No data available
Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5. FIREFIGHTING MEASURES

Extinguishing media
Suitable extinguishing agents
Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
Special hazards arising from the substance or mixture
If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
Silicon oxide
Advice for firefighters
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Environmental precautions:
Do not allow material to be released to the environment without official permits.
Do not allow product to enter drains, sewage systems, or other water courses.
Do not allow material to penetrate the ground or soil.
Methods and materials for containment and cleanup:
Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Prevention of secondary hazards:
No special measures required.
Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7. HANDLING AND STORAGE

Handling
Precautions for safe handling
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Information about protection against explosions and fires:
No data available
Conditions for safe storage, including any incompatibilities
Requirements to be met by storerooms and receptacles:
No special requirements.
Information about storage in one common storage facility:
Store away from oxidizing agents.
Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well-sealed containers.
Specific end use(s)
No data available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
Control parameters
Components with limit values that require monitoring at the workplace:
409-21-2 Silicon carbide (100.0%)

PEL (USA) Long-term value: 15* 5** mg/m^3
fibrous dust: *total dust **respirable fraction

REL (USA) Long-term value: 10* 5** mg/m^3
*total dust **respirable fraction

TLV (USA) Long-term value: 10* 3** mg/m^3
fibrous dust:0.1 f/cc; nonfibrous:*inh.,**resp.

EL (Canada) Long-term value: 10* 3** mg/m^3
*inhalable, **respirable

EV (Canada) Long-term value: 10* 3** mg/m^3, 0.1f/cc*** ppm
nonfibrous: *inh.,**resp.; ***fibrous, resp.
Additional information: No data
Exposure controls
Personal protective equipment
Follow typical protective and hygienic practices for handling chemicals.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.
Breathing equipment:
Use suitable respirator when high concentrations are present.

Recommended filter device for short term use:
Use a respirator with type P100 (USA) or P3 (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards.
Protection of hands: Impervious gloves
Inspect gloves prior to use.
Suitability of gloves should be determined both by material and quality, the latter of which may vary by manufacturer.
Material of gloves: Nitrile rubber, NBR
Penetration time of glove material (in minutes): 480
Glove thickness: 0.11 mm
Eye protection: Safety glasses
Body protection: Protective work clothing

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
Appearance:
Form: Various forms (powder/flake/crystalline/beads, etc.)
Color: Grey to black
Odor: Odorless
Odor threshold: No data available.
pH: N/A
Melting point/Melting range: 2700 °C (4892 °F)
Boiling point/Boiling range: No data available
Sublimation temperature / start: No data available
Flammability (solid, gas): No data available.
Ignition temperature: No data available
Decomposition temperature: No data available
Autoignition: No data available.
Danger of explosion: No data available.
Explosion limits:
Lower: No data available
Upper: No data available
Vapor pressure: N/A

Density at 20 °C (68 °F): 3.16 g/cm^3 (26.37 lbs/gal)
Relative density: No data available.
Vapor density: N/A
Evaporation rate: N/A
Solubility in Water (H_2O): Insoluble
Partition coefficient (n-octanol/water): No data available.
Viscosity:
Dynamic: N/A
Kinematic: N/A
Other information: No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity: No data available
Chemical stability: Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided:

Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions: Reacts with strong oxidizing agents
Conditions to avoid: No data available
Incompatible materials: Oxidizing agents
Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Silicon oxide

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.
LD/LC50 values that are relevant for classification: No data
Skin irritation or corrosion: Causes skin irritation.
Eye irritation or corrosion: Causes serious eye damage.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: No effects known.
Carcinogenicity: Suspected of causing cancer.
ACGIH A2: Suspected human carcinogen: Agent is carcinogenic in experimental animals at dose levels, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. Available epidemiologic studies are conflicting or insufficient to confirm an increased risk of cancer in exposed humans.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for this substance.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: May cause respiratory irritation.
Aspiration hazard: No effects known.
Subacute to chronic toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
Carcinogenic categories
OSHA-Ca (Occupational Safety & Health Administration)
Substance is not listed.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity: No data available
Persistence and degradability: No data available
Bioaccumulative potential: No data available
Mobility in soil: No data available
Additional ecological information:
Do not allow material to be released to the environment without official permits.
Do not allow undiluted product or large quantities to reach groundwater, water courses, or sewage systems.
Avoid transfer into the environment.
Results of PBT and vPvB assessment

PBT: N/A
vPvB: N/A
Other adverse effects: No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation
Consult official regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation:
Disposal must be made according to official regulations.

SECTION 14. TRANSPORT INFORMATION

UN-Number
DOT, ADN, IMDG, IATA
N/A
UN proper shipping name
DOT, ADN, IMDG, IATA
N/A
Transport hazard class(es)
DOT, ADR, ADN, IMDG, IATA
Class
N/A
Packing group
DOT, IMDG, IATA
N/A
Environmental hazards:
N/A
Special precautions for user
N/A
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
N/A
Transport/Additional information:
DOT
Marine Pollutant (DOT):
No

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).
SARA Section 313 (specific toxic chemical listings)
Substance is not listed.
California Proposition 65
Prop 65 - Chemicals known to cause cancer

Substance is not listed.
Prop 65 - Developmental toxicity
Substance is not listed.
Prop 65 - Developmental toxicity, female
Substance is not listed.
Prop 65 - Developmental toxicity, male
Substance is not listed.
Information about limitation of use:
For use only by technically qualified individuals.
Other regulations, limitations and prohibitive regulations
Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.
Substance is not listed.
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.
Substance is not listed.
Annex XIV of the REACH Regulations (requiring Authorisation for use): Substance is not listed.
REACH - Pre-registered substances: Substance is listed.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. COPYRIGHT 1997-2018 AMERICAN ELEMENTS. LICENSED GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.

SAFETY DATA SHEET

Version 4.7
Revision Date 11/06/2014
Print Date 06/20/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Soda ash

Product Number : 330361
Brand : Sigma-Aldrich
Index-No. : 011-005-00-2

CAS-No. : 497-19-8

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

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Eye irritation (Category 2A), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H319 Causes serious eye irritation.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P280 Wear eye protection/ face protection.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Sodium carbonate, crude

Formula	:	CNa_2O_3
Molecular weight	:	105.99 g/mol
CAS-No.	:	497-19-8
EC-No.	:	207-838-8
Index-No.	:	011-005-00-2

Hazardous components

Component	Classification	Concentration
Sodium carbonate		
	Eye Irrit. 2A; H319	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sodium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

hygroscopic Keep in a dry place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	12 at 106 g/l at 25 °C (77 °F)
e)	Melting point/freezing point	851 °C (1,564 °F)
f)	Initial boiling point and boiling range	1,600 °C (2,912 °F)
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	2.532 g/cm3
n)	Water solubility	217 g/l at 20 °C (68 °F) - completely soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	400 °C (752 °F) -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
hygroscopic
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture.

10.5 Incompatible materials
Strong acids

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 4,090 mg/kg

LC50 Inhalation - Rat - 2 h - 5,750 mg/l

Dermal: No data available

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
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.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: VZ4050000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 300 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 265 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sodium carbonate	497-19-8	

New Jersey Right To Know Components

	CAS-No.	Revision Date

Sodium carbonate	497-19-8

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
H319	Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.7 Revision Date: 11/06/2014 Print Date: 06/20/2016

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 14-May-2010 **Revision Date** 05-Feb-2016 **Revision Number** 2

1. Identification

Product Name **Sodium bisulfite**

Cat No. : **S6543; S654500**

Synonyms Sodium hydrogen sulfite

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed
May cause respiratory irritation

Precautionary Statements
Prevention

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell

Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth

Storage

Store in a well-ventilated place. Keep container tightly closed
Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Contact with acids liberates toxic gas

Other hazards

May produce an allergic reaction. May cause eye, skin, and respiratory tract irritation.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Sodium bisulfite	7631-90-5	100

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Ingestion Do not induce vomiting. Get medical attention.

Most important symptoms/effects May cause allergic skin reaction. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Dry chemical. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Sulfur oxides Sodium oxides
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	2	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid dust formation.

Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Use only in area provided with appropriate exhaust ventilation. Handle under inert gas, protect from moisture. Wear personal protective equipment. Avoid dust formation.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from acids.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium bisulfite	TWA: 5 mg/m³	(Vacated) TWA: 5 mg/m³	TWA: 5 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Sodium bisulfite	TWA: 5 mg/m³		TWA: 5 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	rotten-egg like
Odor Threshold	No information available
pH	4-5 25% aq. sol
Melting Point/Range	150 °C / 302 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	1.480
Solubility	300 g/l
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	H Na O3 S
Molecular Weight	104.06

10. Stability and reactivity

Reactive Hazard Yes

Stability Moisture sensitive. May react with air to form toxic gas.

Conditions to Avoid Avoid dust formation. Excess heat. Exposure to air. Incompatible products. Exposure to moist air or water. Temperatures above 150°C. acids.

Incompatible Materials Acids, Metals

Hazardous Decomposition Products Sulfur oxides, Sodium oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium bisulfite	LD50 = 1310 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation May cause eye, skin, and respiratory tract irritation

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium bisulfite	7631-90-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available
Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium bisulfite	Not listed	LC50: = 240 mg/L, 96h static (Gambusia affinis)	Not listed	EC50: = 119 mg/L, 48h (Daphnia magna)

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Sodium bisulfite	X	X	-	231-548-0	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories

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

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sodium bisulfite	X	5000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sodium bisulfite	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium bisulfite	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

D2B Toxic materials
F Dangerously reactive material

16. Other information

Prepared By

Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 14-May-2010
Revision Date 05-Feb-2016
Print Date 05-Feb-2016
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

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

End of SDS

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 19-Nov-2010 **Revision Date** 03-Jul-2014 **Revision Number** 1

1. Identification

Product Name **Sodium cyanide**

Cat No. : **S284I-100, S284I-500**

Synonyms Hydrocyanic acid, sodium salt; Prussiate of soda; Cyanide of sodium

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Acute oral toxicity	Category 1
Acute dermal toxicity	Category 1
Acute Inhalation Toxicity - Dusts and Mists	Category 1
Specific target organ toxicity (single exposure)	Category 1
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals

Fatal if swallowed
Fatal in contact with skin
Fatal if inhaled
May cause respiratory irritation
May cause drowsiness or dizziness
Causes damage to organs
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not get in eyes, on skin, or on clothing
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection
Keep only in original container
Response
IF exposed: Call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
Immediately call a POISON CENTER or doctor/physician
IF ON SKIN: Gently wash with plenty of soap and water
Remove/Take off immediately all contaminated clothing
Wash contaminated clothing before reuse
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth
Spills
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
Contact with acids liberates very toxic gas
Other hazards
WARNING! This product contains a chemical known in the State of California to cause cancer.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Sodium cyanide	143-33-9	>95

4. First-aid measures

General Advice Immediately call a POISON CENTER or doctor/physician. Show this safety data sheet to the doctor in attendance. Take off contaminated clothing and shoes immediately.

Eye Contact Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Immediate medical attention is required. Wash off immediately with plenty of water for at least 15 minutes.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects Breathing difficulties. Systemic Toxicity: Respiratory disorders: Symptoms may include tightness in the chest, flushing, headache, nausea, vomiting, respiratory depression, weakness, irregular heartbeat, abdominal pain, convulsions, and shock: May cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood): Exposure may result in death

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Dry powder.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature Not applicable
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Non-combustible. Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
Nitrogen oxides (NOx) Hydrogen cyanide (hydrocyanic acid)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
4	0	0	N/A

6. Accidental release measures

Personal Precautions Evacuate personnel to safe areas. Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not touch or walk through spilled material. If spilled, take caution, as material can cause surfaces to become very slippery.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Provide adequate ventilation. Avoid dust formation. Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not expose spill to water.

7. Handling and storage

Handling Use only under a chemical fume hood. Wear personal protective equipment. Do not breathe dust. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Handle in accordance with good industrial hygiene and safety practice. Keep container tightly closed.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep locked-up. Keep away from acids. Keep away from combustible material. Do not store in aluminum containers.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium cyanide	Ceiling: 5 mg/m³ Skin	(Vacated) TWA: 5 mg/m³	IDLH: 25 mg/m³ Ceiling: 4.7 ppm Ceiling: 5 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Sodium cyanide	Ceiling: 10 ppm Ceiling: 11 mg/m³ Skin	TWA: 5 mg/m³ Ceiling: 5 mg/m³	CEV: 5 mg/m³ Skin

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	White
Odor	bitter almond
Odor Threshold	No information available
pH	11-12 20 g/l aq. sol
Melting Point/Range	562 °C / 1043.6 °F
Boiling Point/Range	1497 °C / 2726.6 °F
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available

Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 hPa @ 817 °C
Vapor Density	Not applicable
Relative Density	1.6000
Bulk Density	750 - 950 kg/m³
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition temperature	No information available
Viscosity	Not applicable
Molecular Formula	C N Na
Molecular Weight	49

10. Stability and reactivity

Reactive Hazard Yes

Stability Stable under normal conditions. Hygroscopic.

Conditions to Avoid Incompatible products. Exposure to moist air or water.

Incompatible Materials Acids, Strong oxidizing agents, Carbon dioxide (CO2), Metals

Hazardous Decomposition Products Nitrogen oxides (NOx), Hydrogen cyanide (hydrocyanic acid)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium cyanide	143-33-9	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system Central nervous system (CNS)

STOT - repeated exposure Blood

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Systemic Toxicity: Respiratory disorders: Symptoms may include tightness in the chest, flushing, headache, nausea, vomiting, respiratory depression, weakness, irregular heartbeat, abdominal pain, convulsions, and shock: May cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood): Exposure may result in death

Endocrine Disruptor Information No information available

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Sodium cyanide	Group III Chemical	Not applicable	Not applicable

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium cyanide	Not listed	0.17 mg/L LC50 96 h 0.0712 - 0.0936 mg/L LC50 96 h 0.0558 - 0.0586 mg/L LC50 96 h 0.0391 - 0.0548 mg/L LC50 96 h 0.15 mg/L LC50 96 h 0.066 - 0.0852 mg/L LC50 96 h	Not listed	0.17 mg/L EC50 = 96 h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Sodium cyanide - 143-33-9	-	not otherwise specified

14. Transport information

DOT

UN-No UN1689
Proper Shipping Name SODIUM CYANIDE, SOLID
Hazard Class 6.1
Packing Group I

TDG

UN-No UN1689
Proper Shipping Name SODIUM CYANIDE, SOLID
Hazard Class 6.1
Packing Group I

IATA

UN-No 1689
Proper Shipping Name SODIUM CYANIDE, SOLID
Hazard Class 6.1
Packing Group I

IMDG/IMO

UN-No 1689

Proper Shipping Name	SODIUM CYANIDE, SOLID
Hazard Class	6.1
Packing Group	I

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Sodium cyanide	X	X	-	205-599-4	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Sodium cyanide	143-33-9	>95	1.0

SARA 311/312 Hazardous Categorization

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

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sodium cyanide	X	10 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Sodium cyanide	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sodium cyanide	10 lb	10 lb

California Proposition 65 This product contains the following Proposition 65 chemicals:

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Sodium cyanide	143-33-9	Carcinogen Male Reproductive	-	Carcinogen

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium cyanide	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product contains the following DHS chemicals:

Component	DHS Chemical Facility Anti-Terrorism Standard
Sodium cyanide	2000 lb STQ

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class
D1A Very toxic materials
E Corrosive material
D2A Very toxic materials
F Dangerously reactive material

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 19-Nov-2010
Revision Date 03-Jul-2014
Print Date 03-Jul-2014
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

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

End of SDS

Sodium Fluorosilicate

Sodium Fluorosilicate

Material Safety Data Sheet

Chemical: Sodium Fluorosilicate

NFPA: H=3 F=0 I= 0 S=None
HMIS: H=3 F=0 R=0 PPE= Supplied by user; dependent on conditions

MSDS Number: NaSiF6-1103
Effective Date: 11 October 2003
Issued by: Solvay Chemicals, Inc. Regulatory Affairs Department

Not valid three years after effective date or after issuance of superseding MSDS, whichever is earlier. French or Spanish translations of this MSDS may be available. Check www.solvaychemicals.us or call Solvay Fluorides, LLC to verify the latest version or translation availability.

Material Safety Data Sheets contain country specific regulatory information; therefore, the MSDS's provided are for use only by customers of Solvay Fluorides, LLC in North America. If you are located in a country other than the United States, please contact the Solvay Group company in your country for MSDS information applicable to your location.

1. Company and Product Identification

1.1 Product Name: Sodium Fluorosilicate

Chemical Name: Sodium Silicofluoride

Synonyms: Sodium Fluosilicate, Sodium Fluorosilicate, Sodium Silica Fluoride, Disodium Hexafluoro- Silicate(2-)

Chemical Formula: Na_2SiF_6

Molecular Weight: 188.1

CAS Number: 16893-85-9

EINECS Number: 240-934-8

Grade/Trade Names: N/A

1.2 Recommended Uses: Fluoride source for water

1.3 Supplier:
Solvay Fluorides, LLC
PO BOX 27328 Houston, TX 77227-7328
3333 Richmond Ave. Houston, Texas 77098

1.4 Emergency Telephone Numbers
General: 1-877-765-8292 (Solvay Fluorides, LLC)
Emergencies (USA): 1-800-424-9300 (CHEMTREC®)
Transportation Emergencies (INTERNATIONAL/MARITIME): 1-703-527-3887 (CHEMTREC®)
Transportation Emergencies (CANADA): 1-613-996-6666 (CANUTEC)
Transportation Emergencies (MEXICO-SETIQ): 91-800-00-214-00 (MEX. REPUBLIC)
-0-11-525-559-1588 (elsewhere)

Responsible Care®
Good Chemistry at Work

MSDS No. NaSiF6-1103 Revised 10-11-03
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www.solvaychemicals.us 1.800.765.8292

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SOLVAY

Sodium Fluorosilicate

Material Safety Data Sheet

2. Composition/Information on Ingredients

INGREDIENTS	FORMULA	WT. PERCENT	CAS #
Sodium Silicofluoride	Na_2SiF_6	≥ 98.0%	16893-85-9
Water	H_2O	≤ 0.5%	7732-18-5
Insoluble Matter		≤ 0.5%	

3. Hazards Identification

Emergency Overview:

- Hazardous product for the human health and the aquatic environment.
- Presents hazards from its ionizing fluorine.
- In case of decomposition, releases hydrogen fluoride.

3.1 Route of Entry: Inhalation: Yes Skin: Yes Ingestion: Yes

3.2 Potential Effects of exposure:

- Irritating to mucous membranes, eyes and skin.
- Risk of cardiac and nervous disorders.
- Chronic exposure to the product can cause bone fluorosis.

Inhalation:

- Nose and throat irritation.
- Spasmodic cough and difficulty in breathing.
- At high concentrations, risk of hypocalcemia (possible life-threatening lowering of serum calcium) with nervous problems (tetany) and cardiac arrhythmia (heart irregularity).
- In case of repeated or prolonged exposure; risk of sore throat, nose bleeds, chronic bronchitis.

Eyes: Severe eye irritation, watering, and redness.

Skin contact:

- Irritation, redness and swelling of the skin.
- In case of prolonged contact: risk of burns.

Ingestion:

- Severe irritations, burns, perforation of the gastrointestinal tract accompanied by shock.
- Nausea, vomiting (bloody), abdominal cramps and diarrhea (bloody).
- Risk of hypocalcemia (possible life-threatening lowering of serum calcium) with nervous problems (tetany) and cardiac rhythm disorders.
- Risk of convulsions, loss of consciousness, deep coma and cardiopulmonary arrest.
- Risk of general symptoms having a severe prognosis.

Carcinogenicity: See section 11.3

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4. First-Aid Measures

4.1 General Recommendations: Strict hygiene during and at the end of working shifts

Inhalation:
- Remove the subject from dusty environment.
- Oxygen or cardiopulmonary resuscitation if necessary.
- Consult with a physician in case of respiratory symptoms

Eyes:
- Consult with an ophthalmologist immediately in all cases.
- Take to hospital immediately.
- Flush eyes with running water for 15 minutes, while keeping the eyelids wide open.

Skin:
- Remove contaminated shoes, socks and clothing; while washing the affected skin with soap and water for 15 minutes. Double bag all contaminated clothing for disposal.
- Cover with an anti-bacterial cream.
- Provide clean clothing.
- Consult with a physician in cases of persistent pain or redness.

Ingestion:
- Contact a physician for immediately in all cases.
- Take to hospital.

If the subject is completely conscious:
- Rinse mouth with fresh water.
- Give to drink 3-4 glasses of milk or a 1% aqueous calcium gluconate solution.
- If the subject presents nervous, respiratory or cardiovascular disorders: administer oxygen.

If the subject is unconscious:
- NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSIOUS PERSON
- Classical resuscitation measures.

4.2 Medical Treatment/Notes to Physician: Exposed person should be observed for 48-72 hours for delayed onset of edema.

Inhalation: Pre-existing respiratory diseases may be aggravated including asthma and emphysema.

5. Fire-Fighting Measures

5.1 Flash point: Non flammable

5.2 Auto-ignition Temperature: Not applicable

5.3 Flammability Limits: Not applicable

5.4 Unusual Fire and Explosion Hazards: Formation of dangerous gas/vapors in case of decomposition (see section 10)

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5.5 Extinguishing Methods

Common:

- In case of fire in close proximity, all means of extinguishing are acceptable.
- Use extinguishing media appropriate for surrounding fire.

Inappropriate extinguishing means: No restriction.

5.6 Fire Fighting Procedures:

Specific hazards: Non-combustible

Protective measures in case of intervention:

- Wear self contained breathing apparatus when in close proximity or in confined spaces.
- When intervening in close proximity wear acid resistant over-suit.
- After intervention, proceed to clean the equipment (take a shower, remove clothing carefully, clean and check).

Other precautions: Control the use of water due to environmental risk (see section 6).

6. Accidental Release Measures

6.1 Precautions:

- Follow the protective measures given in section 8.
- Avoid dispersing the dust into a cloud.

6.2 Cleanup methods:

- Collect the product with suitable means avoiding dust formation.
- Place everything into a closed, labeled container compatible with the product.
- For disposal methods, refer to section 13.

6.3 Precautions for protection of the environment:

- Immediately notify the appropriate authorities in case of significant discharge.
- Do not discharge into the environment (sewers, rivers, soils, ...).

7. Handling and Storage

7.1 Handling:

- Use only equipment and materials which are compatible with the product.
- Keep away from heat sources.
- Keep away from reactive products (see section 10)

7.2 Storage:

- Keep in original packaging, and tightly closed.
- Keep away from reactive products (see section 10).

7.3 Specific Uses: See Section 1.2

7.4 Other precautions:

- Warn people about the hazards of the Sodium Silicofluoride.
- Avoid dust and formation of dust clouds.
- Follow the protective measures given in section 8.

7.5 Packaging: Paper lined with PE.

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8. Exposure Controls/Personal Protection

8.1 Exposure Limit Values: Sodium Fluorosilicate

Authorized limit Values	TLV® ACGIH®-USA (2002)	OSHA PEL	NIOSH REL (1994)
Fluorides	2.5 mg/m³ (as F)	2.5 mg/m³ (as F)	None

ACGIH® and TLV® are registered trademarks of the American Conference of Governmental Industrial Hygienists.

8.2 Exposure Controls:

- Follow the protective measures given in section 7.
- Maintain employee exposures to levels below the applicable exposure limits.

8.2.1 Occupational Exposure Controls:

8.2.1.1 Ventilation: Provide local ventilation suitable for the dust risk.

8.2.1.2 Respiratory protection:

- Self/contained breathing apparatus in medium confinement/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.
- Use only respiratory protection that conforms to international/national standards.
- Use only NIOSH approved respirators.
- Comply with OSHA respiratory protection requirements.

8.2.1.3 Hand protection:

- Protective gloves - chemical resistant:
- Recommended materials: PVC, neoprene, and rubber.

8.2.1.4 Eye protection: Dust proof goggles.

8.2.1.5 Skin protection:

- Overalls.
- Apron/boots of PVC, neoprene, rubber in case of dusts.

8.3 Other precautions:

- Do not smoke, eat and drink in the working area.
- Take off contaminated clothing immediately after work.
- Shower and eye wash stations.
- Consult the industrial hygienist or the safety manager for the selection of personal protective equipment suitable for the working conditions.

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Sodium Fluorosilicate

Material Safety Data Sheet

9. Physical and Chemical Properties

9.1 **Appearance:** Free-flowing crystals
Odor: White
Color: Odorless

9.2 **Important Health, Safety and Environmental information:**
pH: Not applicable

Change of state:
Melting point: Decomposes @ 500°C (932°F)
Boiling point: Not applicable
Decomposition Temperature: 500°C (932°F)

Flash Point: Not applicable

Flammability: Non Flammable
(solid, gas)

Explosive Properties: Not available

Oxidizing Properties: Not available

Vapor Pressure: Not available

Relative Density:
Specific gravity (H_2O=1): 1
Bulk Density: 10.8 grams/ml (90 lbs/ft^3)

Solubility: 40 mg/l at 20°C (68°F) Remark: Atmospheric pressure

Partition coefficient: Not applicable

Viscosity: Not applicable

Vapor Density (air=1): Not available

Evaporation Rate: No data

9.3 **Other Information:** No data

Surface Tension: No data

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10. Stability and Reactivity

Stability: Stable under certain conditions (see below).

10.1 Conditions to avoid: Temperatures above decomposition temperature see section 9.

10.2 Materials and substances to avoid:

- Strong acids-reacts
- Strong alkalis-reacts
- Oxidizing agents-reacts
- Metals-reacts

10.3 Hazardous decomposition products:

- Hydrofluoric Acid
- Fluorine

10.4 Hazardous Polymerization: Not applicable

10.5 Other information: None

11. Toxicological Information

11.1 Acute toxicity:
Inhalation: No data available.

Oral: LD_{50}, rat, 125mg/kg (Sodium hexafluorosilicate)

Dermal: No data available.

Irritation: No data available.

Sensitization: No data available.

Comments: No data available.

11.2 Chronic toxicity: No data available.

11.3 Carcinogenic Designation: None

12. Ecological Information

12.1 Acute ecotoxicity: No data available.

12.2 Chronic ecotoxicity: No data available.

12.3 Mobility: No data available.

12.4 Degradation
Abiotic: No data available.

Biotic: No data available.

12.5 Potential for bioaccumulation: No data available.

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Sodium Fluorosilicate

Material Safety Data Sheet

13. Disposal Considerations

13.1 Waste treatment: Consult current federal, state and local regulations regarding the proper disposal of this material.

13.2 Packaging treatment: Consult current federal, state and local regulations regarding the proper disposal of emptied containers.

13.3 RCRA Hazardous Waste: Not listed.

14. Transport Information

Mode	DOT	IMDG	IATA
UN Number	UN 2674	UN 2674	UN 2674
Class	6.1	6.1	6.1
Proper Shipping Name	Sodium Fluorosilicate	Sodium Fluorosilicate	Sodium Fluorosilicate
Hazard label	Toxic	Toxic	Toxic
Subsidiary	Not a marine pollutant	Not a marine pollutant	Not a marine pollutant
Placard	Toxic	Toxic	Toxic
Packing Group	III	III	III
MFAG			
Emergency Info	ERG: 154	EmS: 6.1-04	ERG Code: 6L

15. Regulatory Information

National Regulations (US)

TSCA Inventory 8(b): Yes

SARA Title III Sec. 302/303 Extremely Hazardous Substances (40 CFR355): No

SARA Title III Sec. 311/312 (40 CFR 370):
Hazard Category: None

SARA Title III Sec. 313 Toxic Chemical Emissions Reporting (40 CFR 372): No

CERCLA Hazardous Substance (40CFR Part 302):
Listed: No
Unlisted Substance: No

State Component Listing: No Data.

National Regulations (Canada) Canadian DSL Registration: DSL

WHMIS Classification: D2B - Material causing other toxic effect

This product has been classified in accordance with the hazard criteria of the ***Controlled Products Regulations*** and the MSDS contains all the information required by the ***Controlled Products Regulations.***

MSDS No. NaSiF6-1103 Revised 10-11-03
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www.solvaychemicals.us 1.800.765.8292

Labeling according to Directive 1999/45/EC.

Category	ID	Phrase
Symbols	T	Toxic
Phrases R	23/24/25	Toxic by inhalation, in contact with skin and if swallowed.
Phrases S	1/2	Keep locked up and out of reach of children.
	26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16. Other Information

16.1 Ratings:

NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)

Health = 3 Flammability = 0 Instability = 0 Special = None

HMIS (HAZARDOUS MATERIAL INFORMATION SYSTEM)

Health = 3 Fire = 0 Reactivity = 0 PPE = Supplied by User; dependent on local conditions

16.2 Other Information:

The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations of mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

To our actual knowledge, the information contained herein is accurate as of the date of this document. However, neither Solvay Fluorides, LLC nor any of its affiliates makes any warranty, express or implied, or accepts any liability in connection with this information or its use. This information is for use by technically skilled persons at their own discretion and risk and does not relate to the use of this product in combination with any other substance or any other process. This is not a license under any patent or other proprietary right. The user alone must finally determine suitability of any information or material for any contemplated use, the manner of use and whether any patents are infringed. This information gives typical properties only and is not to be used for specification purposes.

TRADEMARKS: All trade name of products referenced herein are either trademarks or registered trademarks of Solvay Fluorides, LLC or other Solvay Company or affiliate unless otherwise identified.

16.3 Reason for revision:

Supersedes edition: Sodium Fluorides Inc. MSDS dated 3/4/97.
Purpose of revision: Change Company name and MSDS format

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SAFETY DATA SHEET

Creation Date 18-Jun-2009 **Revision Date** 23-Jan-2018 **Revision Number** 4

1. Identification

Product Name **Water**

Cat No. : **AC615150025**

CAS-No 7732-18-5
Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Based on available data, the classification criteria are not met

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	100

4. First-aid measures

Eye Contact	Immediate medical attention is not required.
Skin Contact	Immediate medical attention is not required.
Inhalation	Immediate medical attention is not required.
Ingestion	Immediate medical attention is not required.
Most important symptoms and effects	No information available.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.
Unsuitable Extinguishing Media	No information available
Flash Point	Not applicable
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
None known.

Hazardous Combustion Products
None
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	0	N/A

6. Accidental release measures

Personal Precautions	No special precautions required. If spilled, take caution, as material can cause surfaces to become very slippery.
Environmental Precautions	No special environmental precautions required. See Section 12 for additional ecological information.
Methods for Containment and Clean Up	Soak up with inert absorbent material.

7. Handling and storage

Handling	No special handling advice required.
Storage	No special storage conditions required.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures None under normal use conditions.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection No special protective equipment required.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear, Colorless
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	100 °C / 212 °F
Flash Point	Not applicable
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	17.5 mmHg @ 20 °C
Vapor Density	No information available
Specific Gravity	1.000
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	H2O
Molecular Weight	18.02

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid None known.

Incompatible Materials None known

Hazardous Decomposition Products None

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants.

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility .

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Water	X	X	-	231-791-2	-		X	-	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations Not applicable

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs

Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date	18-Jun-2009
Revision Date	23-Jan-2018
Print Date	23-Jan-2018
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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

End of SDS

SAFETY DATA SHEET

Creation Date 19-Jan-2010 **Revision Date** 11-Apr-2018 **Revision Number** 5

1. Identification

Product Name **Zinc oxide**

Cat No. : **Z50-12; Z50-212; Z50-500; Z52-10; Z52-500**

CAS-No 1314-13-2
Synonyms Chinese White; Zinc White; C.I. Pigment White 4 (Powder/USP/Certified ACS)

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Based on available data, the classification criteria are not met

Label Elements
None required

Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Zinc oxide	1314-13-2	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get

medical attention if symptoms occur.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Get medical attention if symptoms occur.

Ingestion Do not induce vomiting. Get medical attention if symptoms occur.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
None under normal use conditions
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
1	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes and clothing.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Zinc oxide	TWA: 2 mg/m³ STEL: 10 mg/m³	(Vacated) TWA: 5 mg/m³ (Vacated) TWA: 10 mg/m³ (Vacated) STEL: 10 mg/m³ TWA: 5 mg/m³ TWA: 15 mg/m³	IDLH: 500 mg/m³ TWA: 5 mg/m³ STEL: 10 mg/m³ Ceiling: 15 mg/m³	TWA: 5 mg/m³ TWA: 10 mg/m³ STEL: 10 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Off-white
Odor	Odorless
Odor Threshold	No information available
pH	7 50 g/l aq.sol.(susp)
Melting Point/Range	1975 °C / 3587 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	5.600
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	ZnO
Molecular Weight	81.41

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Avoid dust formation. Incompatible products.

Incompatible Materials Strong acids

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Zinc oxide	LD50 > 5000 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Zinc oxide	1314-13-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Mutagenic effects have occurred in experimental animals.

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Proper technical name	(ZINC OXIDE)
Hazard Class	9
Packing Group	III

TDG

UN-No	UN3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Hazard Class	9
Packing Group	III

IATA

UN-No	UN3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*
Hazard Class	9
Packing Group	III

IMDG/IMO

UN-No	UN3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Hazard Class	9
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Zinc oxide	X	X	-	215-222-5	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Zinc oxide	1314-13-2	>95	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Zinc oxide	-	-	X	-

Clean Air Act

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Zinc oxide	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 19-Jan-2010
Revision Date 11-Apr-2018
Print Date 11-Apr-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

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End of SDS

APPENDIX 21-3

DOMESTIC WELL INFORMATION WITHIN 2 MILES

Wells Within 2 Miles of Leadville Mill - January 2021

Rec.	No.	Permit Number	Permit Status	Assoc Type	Contact Name	PM	TNS	RNG	SEC	Q160	Q40	UTM X	UTM Y	Latitude	Longitude	Location Type	Permit Category	Permit Issued	Date 1st Use	Date Permit Expires	Const Date	Last Pump Install Date	Date Well Plugged	Use(s)	Elevation	Well Depth	Perf. Casing Top	Perf. Casing Bottom	Pump Test Yield	Static Water Level	Static Water Level Date	Modified
0001	001	265986-	Well Constructed	Owner	AUSTIN, DAVID	S	9.0 S	80.0 W	20	SE	SE	383440.7	4344952.1	39.246066	-106.350751	Well (Application/Permit)	Residential	10/13/2005		10/13/2007	9/19/2007	12/12/2008		Domestic, Stock		45	40	45	14			12/12/2008 0:00
0002	002	107592-	Well Constructed	Owner	FORD, MIKE	S	9.0 S	80.0 W	20	SE	SE	383550.3	4345148.3	39.247846	-106.349522	Well (Application/Permit)	Residential	6/19/1979	7/20/1979	6/19/1981	7/20/1979			Domestic		43	26	43				6/21/1995 0:00
0003	003	124862-	Well Constructed	Owner	JOHNSON, P M	S	9.0 S	80.0 W	20	NE	SE	383637.9	4345646.7	39.252353	-106.348589	Well (Application/Permit)	Residential	4/13/1982			5/23/1983			Domestic		69	44	69				3/3/2014 0:00
0004	004	136527--A	Well Constructed	Owner	LONG JANET M & EARL S	S	9.0 S	80.0 W	20	SE	NE	383418.6	4345516.4	39.251144	-106.351104	Well (Application/Permit)	Residential	11/5/1997		11/5/1999	10/9/1997	11/20/1997		Household use only		90	60	90	12			12/6/2016 0:00
0005	005	136527--A	Permit Issued	Owner	LONG, EARL S	S	9.0 S	80.0 W	20	SE	NE	383461.0	4345580.0	39.251726	-106.350628	Well (Application/Permit)	Residential	12/6/2016		12/6/2018				Household use only								12/6/2016 0:00
0006	006	63289-	Well Constructed	Owner	MCKEE, STELLA M	S	9.0 S	80.0 W	20	SE	NW	383133.1	4345517.3	39.251114	-106.354417	Well (Application/Permit)	Residential	8/17/1972	6/4/1974		11/2/1972	6/6/1974		Household use only		186	166	186	12			9/16/2004 0:00
0007	007	215509-	Permit Issued	Owner	S & Z LTD	S	9.0 S	80.0 W	20	SE	NW	383199.7	4345349.7	39.249619	-106.353612	Well (Application/Permit)	Residential	2/3/1999						Commercial								2/3/1999 0:00
0008	008	59122-F	Permit Expired	Owner	S & Z LTD	S	9.0 S	80.0 W	20	SE	NW	383264.0	4345382.0	39.249916	-106.352876	Well (Application/Permit)	General Purpose	2/14/2003		2/14/2004	5/7/2003			Domestic		96	60	96				8/27/2004 0:00
0009	009	61578-F	Well Constructed	Owner	S & Z LTD	S	9.0 S	80.0 W	20	SE	NW	383264.0	4345382.0	39.249916	-106.352876	Well (Application/Permit)	General Purpose	8/27/2004		8/27/2005	5/7/2003	8/3/2005		Irrigation		96	60	96	23			8/3/2005 0:00
0010	010	61579-F	Well Constructed	Owner	S & Z LTD	S	9.0 S	80.0 W	20	SE	NW	382988.3	4345280.3	39.248960	-106.356056	Well (Application/Permit)	General Purpose	8/27/2004		8/27/2005	9/21/2004	8/17/2005		Commercial		118	78	118	12.6			8/17/2005 0:00
0011	011	11045-F	Permit Canceled	Owner	S & Z LTD	S	9.0 S	80.0 W	20	SE	NW	383199.7	4345349.7	39.249619	-106.353612	Well (Application/Permit)	General Purpose	6/30/1966	7/7/1966		7/7/1966			Commercial		66	43	66				2/4/1999 0:00
0012	012	83052-	Well Constructed	Owner	SEPPI ALDO & EDITH MARIE	S	9.0 S	80.0 W	20	SE	NW	383304.5	4345427.0	39.250327	-106.352421	Well (Application/Permit)	Residential		7/6/1977		7/6/1977			Other		57						7/6/1977 0:00
0013	013	3765-AD	Application Denied	Owner	SEPPI, ALDO	S	9.0 S	80.0 W	20	SE	NE	383388.1	4345517.0	39.251149	-106.351463	Well (Application/Permit)	General Purpose							Other								3/3/2014 0:00
0014	014	136527-	Well Constructed	Owner	SEPPI, D	S	9.0 S	80.0 W	20	SE	NE	383418.6	4345516.4	39.251144	-106.351104	Well (Application/Permit)	Residential	8/15/1984			5/30/1985	10/2/1985		Household use only		66	48	66	15			12/6/2016 0:00
0015	015	97427-VE	Permit Issued	Owner	SEPPI, DON	S	9.0 S	80.0 W	20	SE	NE	383418.6	4345516.4	39.251144	-106.351104	Well (Application/Permit)	Unknown	10/3/1997						Household use only								10/6/1997 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 21																																
0016	001	47101-	Well Constructed	Owner	ADAMS, JOSEPH L	S	9.0 S	80.0 W	21	SE	NE	385118.0	4345351.9	39.249892	-106.331391	Well (Application/Permit)	Residential		7/4/1971		7/4/1971			Domestic		108						7/4/1971 0:00
0017	002	217445-	Well Constructed	Owner	AIKMAN JAMES M & MCHALE PADRAIC	S	9.0 S	80.0 W	21	SE	SW	384542.7	4344932.9	39.246042	-106.337981	Well (Application/Permit)	Residential	5/12/1999		5/12/2001	7/1/1999	7/15/1999		Household use only		135	105	135	6			11/3/2005 0:00
0018	003	81181-	Well Constructed	Owner	ALLEN GENE MICHAEL	S	9.0 S	80.0 W	21	SE	SE	385235.0	4345069.0	39.247359	-106.329987	Well (Application/Permit)	Residential		10/21/1975		10/21/1925	10/21/1975		Household use only		118	98	118	15			11/21/2006 0:00
0019	004	37894-	Well Constructed	Owner	ANDERSON, JERRY	S	9.0 S	80.0 W	21	SE	NW	384715.7	4345360.9	39.249920	-106.336053	Well (Application/Permit)	Residential	5/21/1969	6/24/1969		6/24/1969	6/27/1969		Domestic		118			15			10/1/2008 0:00
0020	005	224865-	Well Constructed	Owner	ANDERSON, LINDA	S	9.0 S	80.0 W	21	SE	NW	384755.4	4345274.8	39.249151	-106.335583	Well (Application/Permit)	Residential	4/11/2000		4/11/2002	6/2/2000	9/26/2000		Household use only		127	97	127	10			9/19/2001 0:00
0021	006	70501-	Well Constructed	Owner	ANDREW, JERRY	S	9.0 S	80.0 W	21	SE	SW	384586.9	4344912.7	39.245868	-106.337467	Well (Application/Permit)	Residential	8/9/1973		8/9/1975	7/2/1974	7/23/1974		Household use only		150	120	150	12			1/26/2005 0:00
0022	007	107590-	Well Constructed	Owner	ANGLADE MARIA & SOTO SANTOS	S	9.0 S	80.0 W	21	SE	NW	384862.4	4345394.4	39.250238	-106.334364	Well (Application/Permit)	Residential	6/19/1979	10/8/1979		10/8/1979			Household use only		133	103	133				11/1/2011 0:00
0023	008	110296-	Well Constructed	Owner	ARCHULETA, L I	S	9.0 S	80.0 W	21	SE	SW	384861.7	4345095.6	39.247553	-106.334313	Well (Application/Permit)	Residential	9/17/1979			6/11/1981			Household use only		131	106	131				3/3/2014 0:00
0024	009	197079-	Permit Issued	Owner	ARVIDSON, DALE L	S	9.0 S	80.0 W	21	SE	SW	384701.2	4344894.9	39.245721	-106.336144	Well (Application/Permit)	Residential	8/2/1996		8/2/1998				Household use only								8/2/1996 0:00
0025	010	80201-	Well Constructed	Owner	AUBERTIN, DONALD A	S	9.0 S	80.0 W	21	SE	NE	385173.0	4345253.3	39.249009	-106.330736	Well (Application/Permit)	Residential		10/28/1975		10/28/1975			Household use only		120						2/1/2007 0:00
0026	011	120809-	Well Constructed	Owner	AXEL RONALD & DONNA	S	9.0 S	80.0 W	21	SE	SW	384739.2	4344878.8	39.245582	-106.335701	Well (Application/Permit)	Residential	7/13/1981			9/14/1981			Household use only		130	90	130				7/6/2010 0:00
0027	012	47276-	Well Constructed	Owner	BAILEY JOHN B JR	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Residential		7/14/1971		7/14/1971			Domestic		116						7/14/1971 0:00
0028	013	121519-	Well Constructed	Owner	BAILEY, DONALD	S	9.0 S	80.0 W	21	SE	NW	384770.4	4345167.8	39.248190	-106.335391	Well (Application/Permit)	Residential	8/14/1981		8/14/1983	8/31/1981	8/31/1981		Household use only		125			8			6/5/2015 0:00
0029	014	75647-	Well Constructed	Owner	BAKER, PAX D	S	9.0 S	80.0 W	21	SE	NE	385220.6	4345435.2	39.250655	-106.330211	Well (Application/Permit)	Residential		7/3/1975		7/3/1975			Household use only		120						4/28/2005 0:00
0030	015	131615-	Well Constructed	Owner	BARLOW, J F	S	9.0 S	80.0 W	21	SE	SE	384937.1	4344798.2	39.244879	-106.333393	Well (Application/Permit)	Residential	7/25/1983		10/25/1983	8/15/1983			Household use only		87	87	117				11/1/2006 0:00
0031	016	119988-	Well Constructed	Owner	BARRETT, JOH H	S	9.0 S	80.0 W	21	SW	NW	384085.0	4345228.7	39.248648	-106.343338	Well (Application/Permit)	Residential	5/27/1981		5/27/1983	7/10/1981			Household use only		130	105	130				1/20/1998 0:00
0032	017	217445--A	Well Constructed	Owner	BARRETTE, TARYN M.	S	9.0 S	80.0 W	21	SE	SW	384542.7	4344932.9	39.246042	-106.337981	Well (Application/Permit)	Residential	11/3/2005		11/3/2007		11/22/2005		Household use only		190			12			5/14/2018 0:00
0033	018	119529-	Well Constructed	Owner	BARTIK, B	S	9.0 S	80.0 W	21	SE	SE	385121.5	4344951.5	39.246290	-106.331276	Well (Application/Permit)	Residential	5/5/1981			7/22/1981			Household use only		116	91	116				7/6/2010 0:00
0034	019	216666-	Well Constructed	Owner	BARTZEN EUGENE J & EMILY K	S	9.0 S	80.0 W	21	SE	NE	384923.7	4345542.4	39.251579	-106.333670	Well (Application/Permit)	Residential	4/2/1999		4/2/2001	6/11/1999	7/29/1999		Household use only		176	141	176	7			7/29/1999 0:00
0035	020	26486-MH	Well Constructed	Owner	BATEY, DALLAS	S	9.0 S	80.0 W	21	NE	NW	384717.7	4346172.2	39.257229	-106.336168	Well (Application/Permit)	Monitoring Hole (Notice c	9/14/1995		12/14/1995	9/26/1995			Monitoring/Sampling		127	67	127				11/8/1995 0:00
0036	021	294467-	Well Constructed	Owner	BATZ MICHAEL & SHERRI	S	9.0 S	80.0 W	21	SE	NW	384903.2	4345419.2	39.250468	-106.333893	Well (Application/Permit)	Residential	6/9/2014	3/22/1972					Domestic		110						6/9/2014 0:00
0037	022	77118-F	Well Constructed	Owner	BECKMANN ALFRED & JEAN	S	9.0 S	80.0 W	21	SW	NE	384391.1	4345313.4	39.249445	-106.339807	Well (Application/Permit)	General Purpose	4/8/2013		4/8/2014	6/4/2013	8/9/2013		Household use only		220	180	220	9			8/9/2013 0:00
0038	023	252051--A	Well Constructed	Owner	BENNEY SUZANNE H & CHARLES F	S	9.0 S	80.0 W	21	SE	NE	385014.4	4345220.3	39.248690	-106.332573	Well (Application/Permit)	Residential	8/4/2005		8/5/2007	7/14/2006	7/17/2006		Household use only		200	140	200	15			3/17/2015 0:00
0039	024	241461-	Well Abandoned	Owner	BENNEY, CHARLES F	S	9.0 S	80.0 W	21	SE	SW	384831.2	4345120.7	39.247774	-106.334676	Well (Application/Permit)	Residential	6/3/2002		6/3/2004			2/14/2002	Household use only								6/3/2002 0:00
0040	025	249948-	Well Constructed	Owner	BENNEY, CHARLES F	S	9.0 S	80.0 W	21	SE	NE	385014.0	4345223.0	39.248717	-106.332573	Well (Application/Permit)	Residential	5/5/2003		5/5/2005	6/24/2003			Household use only		136	105	136				8/13/2003 0:00
0041	026	252051-	Well Abandoned	Owner	BENNEY, CHARLES F	S	9.0 S	80.0 W	21	SE	NE	385014.0	4345223.0	39.248717	-106.332573	Well (Application/Permit)	Residential	7/29/2003		7/29/2005	9/11/2003	2/13/2004	7/12/2006	Household use only		140			10			7/12/2006 0:00
0042	027	80389-F	Well Constructed	Owner	BERRIEN, WILLIAM T	S	9.0 S	80.0 W	21	NE	NW	384584.0	4346141.0	39.256930	-106.337712	Well (Construction Report)	General Purpose	11/3/2016		11/3/2018	5/30/2017	5/26/2018		Domestic		110			12	45	5/30/2017	5/26/2018 0:00
0043	028	109195-	Permit Expired	Owner	BILLS DELBERT R & FAYE	S	9.0 S	80.0 W	21	SE	SW	384876.7	4344997.7	39.246672	-106.334122	Well (Application/Permit)	Residential							Household use only								1/11/2012 0:00
0044	029	127193-	Well Constructed	Owner	BLANK, DAVID L.	S	9.0 S	80.0 W	21	NW	SE	384466.9	4345702.8	39.252969	-106.338993	Well (Application/Permit)	Residential	9/10/1982		9/10/1984	6/1/1983	11/10/1983		Domestic		225	180	225	5			10/11/2018 0:00
0045	030	208130-	Well Constructed	Owner	BOONE JOYCE M & MICHAEL TEMPLE	S	9.0 S	80.0 W	21	SE	SE	385226.8	4344852.7	39.245412	-106.330043	Well (Application/Permit)	Residential	2/13/1998		2/13/2000	6/25/1998	11/13/1998		Household use only		111	76	111	12			1/27/2017 0:00
0046	031	133231-	Well Replaced	Owner	BOUSMAN/HISSEM	S	9.0 S	80.0 W	21	NE	NE	385187.4	4346187.0	39.257425	-106.330733	Well (Application/Permit)	Residential	10/19/1985			7/21/1987			Domestic		115	95	115				5/2/2014 0:00
0047	032	312692-	Permit Issued	Owner	BRADFORD, JARYN S.	S	9.0 S	80.0 W	21	SE	SW	384714.7	4344958.5	39.246295	-106.335996	Well (Application/Permit)	Residential	2/26/2019		2/26/2021				Household use only								3/22/2019 0:00
0048	033	121072-	Well Constructed	Owner	BRADLEY, L	S	9.0 S	80.0 W	21	SE	NW	384862.0	4345241.9	39.248868	-106.334338	Well (Application/Permit)	Residential	7/23/1981		7/23/1983	8/3/1981			Household use only		140						10/1/2008 0:00
0049	034	48657-	Well Constructed	Owner	BUSKE, ROBERT	S	9.0 S	80.0 W	21	SE	NE	385238.3	4345432.0	39.250630	-106.330014	Well (Application/Permit)	Residential	9/8/1971	11/3/1971	9/8/1973	11/4/1971			Domestic		112						5/2/2007 0:00
0050	035	273464-	Permit Issued	Owner	CHAVEZ, MICHAEL	S	9.0 S	80.0 W	21	SE	NE	384923.1	4345271.1	39.249138	-106.333636	Well (Application/Permit)	Residential	5/2/2007		5/2/2009				Household use only								4/7/2009 0:00
0051	036	99088-	Well Constructed	Owner	CIRULLO, FRANK	S	9.0 S	80.0 W	21	SE	SE	385273.1	4345080.4	39.247463	-106.329548	Well (Application/Permit)	Residential	6/2/1978	6/27/1978	6/2/1980	6/27/1978	12/11/1978		Household use only		118	98	118	8.5			5/16/2007 0:00
0052	037	107807-	Well Constructed	Owner	CLIFTON CURTIS & CATHY	S	9.0 S	80.0 W	21	SE	SE	385084.0	4344792.5	39.244844	-106.331689	Well (Application/Permit)	Residential	6/25/1979	7/17/1979		7/17/1979			Household use only		126	101	126				4/6/1992 0:00
0053	038		Application Received	Owner	CLIFTON, S	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Unknown							Household use only								6/9/1980 0:00
0054	039	264686-	Well Constructed	Owner	CONNER CRAIG D & LISA F	S	9.0 S	80.0 W	21	SE	SW	384799.0	4344834.0	39.245185	-106.334998	Well (Construction Report)	Residential	8/1/2005		8/1/2007	8/8/2005	2/21/2019		Household use only		166	106	166	7			2/21/2019 0:00
0055	040	313698-	Permit Issued	Owner	CONNER, CRAIG	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Residential	6/6/2019		6/6/2021				Household use only								6/6/2019 0:00
0056	041	78421-	Well Constructed	Owner	COPLEY JOSEPH BYRON JR & JANNE L	S	9.0 S	80.0 W	21	SE	NW	384649.0	4345368.6	39.249984	-106.336827	Well (Application/Permit)	Residential	3/26/1975		3/26/1977	5/27/1975			Household use only		175	155	175				6/15/2005 0:00
0057	042	65180-	Permit Expired	Owner	CORBIN, RAYMOND L	S	9.0 S	80.0 W	21	SE	SE	384983.2	4344922.2	39.246002	-106.332881	Well (Application/Permit)	Residential	10/3/1972						Domestic								11/3/2004 0:00
0058	043	37995-MH	Permit Issued	Owner	COUNTY ROAD 110 LLC	S	9.0 S	80.0 W	21	SE	NW	384715.7	4345360.9	39.249920	-106.336053	Well (Application/Permit)	Monitoring Hole (Notice c	3/30/2000		5/20/2000				Monitoring/Sampling								3/30/2000 0:00
0059	044	235636-	Well Constructed	Owner	CRUM, FRANK R	S	9.0 S	80.0 W	21	SE	NE	385166.7	4345174.2	39.248296	-106.330792	Well (Application/Permit)	Residential	8/21/2001		8/21/2003	8/18/2003	8/9/2004		Household use only		156	116	156	12			8/9/2004 0:00
0060	045	183077-	Permit Issued	Owner	DEBUS, GARY	S	9.0 S	80.0 W	21	SE	NE	385234.4	4345200.1	39.248539	-106.330020	Well (Application/Permit)	Residential	11/2/1994		11/2/1996				Household use only								1/20/1998 0:00
0061	046	100767-	Well Constructed	Owner	DENZEL JASON & SARAH	S	9.0 S	80.0 W	21	SE	SE	384952.4	4344797.9	39.244881	-106.333219	Well (Application/Permit)	Residential	8/3/1978			7/31/1980			Household use only		119	94	119				7/1/2014 0:00
0062	047	167550-	Well Constructed	Owner	DIAZ, CONSEPCION E.	S	9.0 S	80.0 W	21	SE	SW	384882.7	4344988.4	39.246583	-106.334051	Well (Application/Permit)	Residential	11/30/1992			6/24/1993	11/18/1994		Household use only	10100	140	113	140	15			1/8/2018 0:00
0063	048	228605-	Well Constructed	Owner	DILLON, ERIN M.	S	9.0 S	80.0 W	21	SE	SW	384708.8	4344894.7	39.245722	-106.336051	Well (Application/Permit)	Residential	9/6/2000		9/6/2002	10/26/2000	8/13/2001		Household use only		147	112	142	7			4/10/2018 0:00
0064	049	81968-F	Well Constructed	Owner	DITZLER, JOHN	S	9.0 S	80.0 W	21	SW	NW	384056.0	4345321.0	39.249473	-106.343689	Well (Construction Report)	Residential	5/2/2018		5/2/2019	6/22/2018	8/10/2018		Household use only		140			12	40	6/22/2018	8/10/2018 0:00
0065	050	262813-	Well Constructed	Owner	DONNELLY, MICHAEL F.	S	9.0 S	80.0 W	21	SE	SW	384800.8	4345121.3	39.247770	-106.335024	Well (Application/Permit)	Residential	4/13/2005		4/13/2007	5/13/2005	9/13/2005		Household use only		190	130	190	12			10/24/2017 0:00
0066	051	191636-	Well Constructed	Owner	DOUGLAS, ROBERT	S	9.0 S	80.0 W	21	NE	SE	385303.9	4345559.9	39.251792	-106.329271	Well (Application/Permit)	Residential	11/30/1995		11/30/1997		5/17/1996		Household use only		140			10			12/10/2010 0:00
0067	052	26596-MH	Well Constructed	Owner	DOUGLASS, ROBERT	S	9.0 S	80.0 W	21	SE	NE	385118.0	4345351.9	39.249892	-106.331391	Well (Application/Permit)	Monitoring Hole (Notice c	9/26/1995		12/26/1995	9/29/1995			Monitoring/Sampling		143	83	143				11/8/1995 0:00
0068	053	7363-AD	Application Denied	Owner	DUMP, RONALD S	S	9.0 S	80.0 W	21	NE	SW	384606.6	4345618.6	39.252231	-106.337357	Well (Application/Permit)	Residential							Domestic								3/3/2014 0:00
0069	054	109676-	Well Constructed	Owner	DUMP, RONALD S	S	9.0 S	80.0 W	21	NE	SW	384610.9	4345631.4	39.252339	-106.337312	Well (Application/Permit)	Residential	8/21/1979	7/25/1981		6/11/1980			Household use only		199	159	199				3/27/1992 0:00
0070	055	6297-F	Permit Canceled	Owner	EAST, JACK	S	9.0 S	80.0 W	21	SE	NE	385118.0	4345351.9	39.249892	-106.331391	Well (Application/Permit)	General Purpose	10/19/1964						Municipal								7/21/1965 0:00
0071	056	109190-	Well Constructed	Owner	EDDY NATHALIE K & FIELDER JEFFREY B	S	9.0 S	80.0 W	21	SE	SE	384998.7	4345025.5	39.246932	-106.332713	Well (Application/Permit)	Residential	8/2/1979	10/30/1979	8/2/1981	11/19/1979	10/30/1979		Household use only		127	102	127	10			10/20/2011 0:00
0072	057	253832-	Permit Issued	Owner	ESTES GARY & SUSAN	S	9.0 S	80.0 W	21	SE	NE	385289.1	4345384.9	39.250213	-106.329415	Well (Application/Permit)	Residential	10/28/2003						Domestic								10/28/2003 0:00
0073	058	272136-	Permit Expired	Owner	EVERGREEN LAND CO LP	S	9.0 S	80.0 W	21	NW	NE	384493.1	4346337.3	39.258684	-106.338800	Well (Application/Permit)	Residential	1/23/2007		1/23/2009				Domestic								2/17/2010 0:00
0074	059	282670-	Permit Canceled	Owner	EVERGREEN LAND COMPANY LP	S	9.0 S	80.0 W	21	NW	NE	384493.1	4346337.3	39.258684	-106.338800	Well (Application/Permit)	Residential	2/17/2010		2/17/2012				Domestic								11/30/2011 0:00
0075	060	287156-	Well Constructed	Owner	EVERGREEN LAND COMPANY LP	S	9.0 S	80.0 W	21	NW	NE	384515.1	4346136.2	39.256876	-106.338511	Well (Application/Permit)	Residential	11/30/2011		11/30/2013	12/2/2011	12/7/2011		Domestic		100	60	100	15			1/23/2012 0:00
0076	061	85854-	Well Constructed	Owner	FATTOR, JOSEPH	S	9.0 S	80.0 W	21	SE	NE	385173.0	4345253.3	39.249009	-106.330736	Well (Application/Permit)	Residential	8/27/1976	7/25/1978	8/27/1978	9/12/1976			Household use only		47	32	47				5/2/2007 0:00
0077	062	101287-	Well Constructed	Owner	FEHRMANN NATHANIEL P & AMY L	S	9.0 S	80.0 W	21	SE	NE	385075.5	4345298.2	39.249401	-106.331868	Well (Application/Permit)	Residential	8/23/1978	9/7/1978		9/7/1978			Household use only		120	100	120				6/8/2011 0:00
0078	063	165908-	Well Constructed	Owner	FLOYD MARY CHRISTINA	S	9.0 S	80.0 W	21	SE	NE	385136.5	4345301.4	39.249436	-106.331173	Well (Application/Permit)	Residential	9/1/1992			10/8/1992	2/15/1994		Household use only	10200	205	165	205	12			3/18/2015 0:00
0079	064	6141-F	Well Constructed	Owner	FORD, MIKE	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	General Purpose	9/14/1964	9/21/1964		9/21/1964			Municipal		43	20	43				8/1/1995 0:00
0080	065	6142-F	Well Constructed	Owner	FORD, MIKE	S	9.0 S	80.0 W	21	SE	NW	384715.7	4345360.9	39.249920	-106.336053	Well (Application/Permit)	General Purpose	9/14/1964	9/27/1964		9/27/1964			Municipal		50	35	50				8/1/1995 0:00
0081	066	287061-	Well Constructed	Owner	FORMANEK CHRISTOPHER & ERIN	S	9.0 S	80.0 W	21	SE	SE	385209.2	4345128.1	39.247887	-106.330298	Well (Application/Permit)	Residential	11/16/2011	12/31/1969		12/31/1969	12/31/1969		Household use only					10			11/16/2011 0:00
0082	067	210127-	Well Constructed	Owner	FORMANEK CHRISTOPHER A & ERIN	S	9.0 S	80.0 W	21	SE	SW	384647.9	4344934.2	39.246065	-106.336764	Well (Application/Permit)	Residential	6/3/1998		6/3/2000	6/23/1998	9/3/1998		Household use only		146	86	146	10			9/21/2015 0:00
0083	068	121513-	Well Constructed	Owner	FORMANEK, BRIAN J.	S	9.0 S	80.0 W	21	SE	SE	385242.0	4344834.1	39.245243	-106.329866	Well (Application/Permit)	Residential	8/14/1981		8/14/1983	9/14/1981	10/28/1981		Household use only		117	77	117	10			1/9/2020 0:00
0084	069	241461--A	Well Constructed	Owner	FRANK, MICHAEL A.	S	9.0 S	80.0 W	21	SE	SW	384831.3	4345126.8	39.247828	-106.334677	Well (Application/Permit)	Residential	8/29/2002		8/29/2004	9/3/2002	9/20/2002		Household use only		155	117	147	10			11/5/2019 0:00
0085	070	235226-	Well Constructed	Owner	FUNK RYAN ALEXANDER & SONDRA HELAINE	S	9.0 S	80.0 W	21	SW	SW	383897.4	4344912.8	39.245776	-106.345461	Well (Application/Permit)	Residential	8/3/2001		8/3/2003	5/31/2002			Household use only		133	90	130				3/21/2017 0:00
0086	071	47609-	Well Constructed	Owner	GANDY, DANIEL R	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Residential		11/5/1971		11/5/1971			Domestic		116						11/5/1971 0:00
0087	072	111518-	Well Constructed	Owner	GARCIA JEANETTE C & NICHOLAS R	S	9.0 S	80.0 W	21	SE	SW	384876.9	4345089.2	39.247492	-106.334138	Well (Application/Permit)	Residential	11/5/1979		11/5/1981	12/21/1979	2/1/1980		Household use only		126			6.6			3/24/2017 0:00

Wells Within 2 Miles of Leadville Mill - January 2021

Rec.	No.	Permit Number	Permit Status	Assoc Type	Contact Name	PM	TNS	RNG	SEC	Q160	Q40	UTM X	UTM Y	Latitude	Longitude	Location Type	Permit Category	Permit Issued	Date 1st Use	Date Permit Expires	Const Date	Last Pump Install Date	Date Well Plugged	Use(s)	Elevation	Well Depth	Perf. Casing Top	Perf. Casing Bottom	Pump Test Yield	Static Water Level	Static Water Level Date	Modified
0088	073	126589-	Permit Expired	Owner	GARDNER, S	S	9.0 S	80.0 W	21	NE	SW	384808.4	4345914.8	39.254924	-106.335078	Well (Application/Permit)	Residential	8/3/1982		8/3/1984				Domestic								3/3/2014 0:00
0089	074	79882-	Well Constructed	Owner	GCB LAND LLC C/O BOBBI CONNER	S	9.0 S	80.0 W	21	SE	NE	385296.3	4345232.3	39.248836	-106.329308	Well (Application/Permit)	Residential	7/14/1975	9/16/1978	7/14/1977	6/2/1976	9/16/1978		Household use only		120	100	120	10			5/3/2011 0:00
0090	075	228605-	Well Constructed	Owner	GLENN, KAITLIN E.	S	9.0 S	80.0 W	21	SE	SW	384708.8	4344894.7	39.245722	-106.336051	Well (Application/Permit)	Residential	9/6/2000		9/6/2002	10/26/2000	8/13/2001		Household use only		147	112	142	7			4/10/2018 0:00
0091	076	278860-	Well Constructed	Owner	GOHARDERAKHSHAN, SHAHRZAD	S	9.0 S	80.0 W	21	SE	NW	384544.0	4345316.0	39.249493	-106.338035	Well (Application/Permit)	Residential	10/1/2008	5/31/1964					Household use only		100						1/8/2019 0:00
0092	077	125721-	Well Constructed	Owner	GRIMO, F	S	9.0 S	80.0 W	21	SE	NW	384899.1	4345451.5	39.250756	-106.333945	Well (Application/Permit)	Residential	6/9/1982		6/9/1984	8/16/1983			Household use only		130						10/1/2008 0:00
0093	078	64233-	Well Constructed	Owner	HALL, WARREN E	S	9.0 S	80.0 W	21	SE	NE	385096.5	4345154.4	39.248107	-106.331600	Well (Application/Permit)	Residential	9/11/1972	9/7/1973		9/7/1973			Household use only		125						10/6/2004 0:00
0094	079	278533-	Well Constructed	Owner	HANSON, DAVID S	S	9.0 S	80.0 W	21	SE	SW	384604.0	4344960.0	39.246294	-106.337279	Well (Application/Permit)	Residential	8/28/2008		8/28/2010	4/30/2009	5/6/2009		Household use only		160	120	160	13			5/6/2009 0:00
0095	080	195843-	Permit Canceled	Owner	HARDY PAUL & BONNIE	S	9.0 S	80.0 W	21	SE	NW	384839.0	4345173.8	39.248253	-106.334592	Well (Application/Permit)	Residential	6/19/1996		6/19/1998				Household use only								2/11/1998 0:00
0096	081	208118-	Well Constructed	Owner	HARELSON, JANE	S	9.0 S	80.0 W	21	SE	NW	384841.1	4345160.4	39.248127	-106.334567	Well (Application/Permit)	Residential	2/13/1998		2/13/2000	9/11/1998			Household use only		150	80	140				9/11/1998 0:00
0097	082	314254-	Well Constructed	Owner	HARNED, HARRY R.	S	9.0 S	80.0 W	21	SE	NW	384588.0	4345284.0	39.249210	-106.337519	Well (Construction Report)	Residential	7/23/2019			5/31/1969			Domestic		120						12/4/2019 0:00
0098	083	270991-	Well Constructed	Owner	HARRIS, HEATHER E.	S	9.0 S	80.0 W	21	SE	SE	384922.2	4344935.7	39.246120	-106.333590	Well (Application/Permit)	Residential	9/26/2006		9/26/2008	3/16/2007	6/12/2008		Household use only		160	120	160	12			5/3/2018 0:00
0099	084	270991-	Well Constructed	Owner	HARRIS, ROBERT E.	S	9.0 S	80.0 W	21	SE	SE	384922.2	4344935.7	39.246120	-106.333590	Well (Application/Permit)	Residential	9/26/2006		9/26/2008	3/16/2007	6/12/2008		Household use only		160	120	160	12			5/3/2018 0:00
0100	085	108601-	Well Constructed	Owner	HARRIS, W R	S	9.0 S	80.0 W	21	SE	NW	384831.9	4345395.0	39.250243	-106.334711	Well (Application/Permit)	Residential	7/13/1979		7/13/1981	10/9/1979			Household use only		147	107	147				1/5/2007 0:00
0101	086	118434-	Well Constructed	Owner	HAUGE, ERIK S.	S	9.0 S	80.0 W	21	SE	NW	384862.2	4345302.9	39.249418	-106.334348	Well (Application/Permit)	Residential	2/26/1981		2/26/1983	6/24/1981	9/30/1981		Household use only		125						4/10/2018 0:00
0102	087	265373-	Well Constructed	Owner	HAWKINS KEN & MARY	S	9.0 S	80.0 W	21	SE	SW	384666.4	4345007.0	39.246725	-106.336568	Well (Application/Permit)	Residential	8/31/2005		8/31/2007	9/9/2005	9/12/2005		Household use only		175	125	175	10			9/12/2005 0:00
0103	088	318961-	Well Constructed	Owner	HERNANDEZ, EDUARDO	S	9.0 S	80.0 W	21	SE	NE	385216.0	4345513.0	39.251357	-106.330282	Well (Construction Report)	Residential	10/8/2020		10/8/2022	11/11/2020			Household use only		120				60	11/11/2020	11/11/2020 0:00
0104	089	121513-	Well Constructed	Owner	HILD, KATHERINE E.	S	9.0 S	80.0 W	21	SE	SE	385242.0	4344834.1	39.245243	-106.329866	Well (Application/Permit)	Residential	8/14/1981		8/14/1983	9/14/1981	10/28/1981		Household use only		117	77	117	10			1/9/2020 0:00
0105	090	81082-F	Well Constructed	Owner	HILSABECK, JERI	S	9.0 S	80.0 W	21	SW	NW	384100.0	4345371.0	39.249929	-106.343188	Well (Construction Report)	Residential	7/10/2017		7/10/2018	7/27/2017	12/1/2017		Household use only		140			12	87	7/27/2017	12/1/2017 0:00
0106	091	81082-F	Well Constructed	Owner	HILSABECK, WILLIAM	S	9.0 S	80.0 W	21	SW	NW	384100.0	4345371.0	39.249929	-106.343188	Well (Construction Report)	Residential	7/10/2017		7/10/2018	7/27/2017	12/1/2017		Household use only		140			12	87	7/27/2017	12/1/2017 0:00
0107	092	120195-	Permit Issued	Owner	HISSEM/PIGG	S	9.0 S	80.0 W	21	NE	NE	385187.9	4346354.7	39.258938	-106.330750	Well (Application/Permit)	Residential	6/4/1981						Domestic								3/3/2014 0:00
0108	093	121979-	Well Constructed	Owner	HOLT HOWARD & MAUREEN	S	9.0 S	80.0 W	21	NW	NW	384067.3	4346303.0	39.258321	-106.343731	Well (Application/Permit)	Residential	9/3/1981			9/1/1982			Domestic								3/3/2014 0:00
0109	094	234597-	Well Constructed	Owner	HOSKIN, DOUGLAS E	S	9.0 S	80.0 W	21	NE	SW	384689.4	4345574.1	39.251836	-106.336399	Well (Application/Permit)	Residential	7/10/2001		7/10/2003	7/25/2001			Household use only		200	160	200				7/25/2001 0:00
0110	095	108603-	Permit Expired	Owner	INTCHAUSPI, RALPH	S	9.0 S	80.0 W	21	SE	SW	384830.8	4344937.8	39.246126	-106.334645	Well (Application/Permit)	Residential							Household use only								6/6/2000 0:00
0111	096	69781-	Well Constructed	Owner	JANSSEN, DONALD W	S	9.0 S	80.0 W	21	SE	SW	384599.7	4345144.1	39.247951	-106.337356	Well (Application/Permit)	Residential	7/3/1973	7/3/1973		7/20/1973			Household use only		117	92	117				12/22/2011 0:00
0112	097	101293-	Well Constructed	Owner	JARAMILLO, JOSE T	S	9.0 S	80.0 W	21	SE	NW	384676.6	4345442.7	39.250655	-106.336515	Well (Application/Permit)	Residential	8/23/1978	11/2/1979		11/2/1979			Household use only		179	149	179				8/2/1990 0:00
0113	098	114769-	Well Replaced	Owner	JOCHIM MARCIA M & KENNETH J	S	9.0 S	80.0 W	21	SE	SE	385196.8	4345021.1	39.246922	-106.330419	Well (Application/Permit)	Residential	6/25/1980		6/25/1982	8/22/1980	10/13/1980		Household use only		118	93	118	12			7/27/2005 0:00
0114	099	241461--A	Well Constructed	Owner	JOHNSON, LINDSAY L.	S	9.0 S	80.0 W	21	SE	SW	384831.3	4345126.8	39.247828	-106.334677	Well (Application/Permit)	Residential	8/29/2002		8/29/2004	9/3/2002	9/20/2002		Household use only		155	117	147	10			11/5/2019 0:00
0115	100	116074-	Well Constructed	Owner	JOHNSON, R	S	9.0 S	80.0 W	21	SE	SW	384831.0	4345029.2	39.246945	-106.334660	Well (Application/Permit)	Residential	9/9/1980			7/10/1981	8/31/1981		Household use only		130	105	130	4.5			3/3/2014 0:00
0116	101	177960-	Well Constructed	Owner	KAIRIES GUNTER & BARBARA	S	9.0 S	80.0 W	21	NE	SE	385198.8	4345866.7	39.254543	-106.330540	Well (Application/Permit)	Residential	5/17/1994		5/17/1996	8/3/1994	6/19/1996		Domestic		165	85	165	10			6/19/1996 0:00
0117	102	115508-	Permit Expired	Owner	KLAUBER, W	S	9.0 S	80.0 W	21	SW	NW	383947.7	4345383.5	39.250026	-106.344952	Well (Application/Permit)	Residential	8/11/1980		8/11/1982				Domestic, Stock								8/11/1982 0:00
0118	103	144374-	Permit Canceled	Owner	KLAUBER, WILLIAM	S	9.0 S	80.0 W	21	SW	NW	384038.8	4345199.3	39.248371	-106.343865	Well (Application/Permit)	Residential	6/25/1986		6/25/1988	8/15/1986			Domestic, Stock		115	75	115				8/1/2018 0:00
0119	104	305488-	Well Constructed	Owner	KLUVER, KRISTOPHER	S	9.0 S	80.0 W	21	SE	SW	384613.0	4344857.0	39.245367	-106.337157	Well (Construction Report)	Residential	5/10/2017		5/10/2019	6/1/2017			Household use only		170				115	6/1/2017	12/10/2020 0:00
0120	105	81837-	Well Constructed	Owner	KLUVER, KRISTOPHER	S	9.0 S	80.0 W	21	SE	SE	384922.5	4345057.7	39.247219	-106.333599	Well (Application/Permit)	Residential		8/23/1976		8/23/1976			Household use only		124						12/22/2020 0:00
0121	106	114709-	Well Constructed	Owner	KUSHER, MICHAEL N	S	9.0 S	80.0 W	21	SE	SE	385029.2	4345055.3	39.247206	-106.332371	Well (Application/Permit)	Residential				9/12/1980	11/19/1980		Household use only					9.5			8/30/2016 0:00
0122	107	79382-	Well Constructed	Owner	LANTZY, KRIS	S	9.0 S	80.0 W	21	SE	NW	384792.6	4345502.6	39.251210	-106.335182	Well (Application/Permit)	Residential	6/9/1975		6/9/1977	11/18/1975			Household use only		164						12/28/2015 0:00
0123	108	271487-	Well Constructed	Owner	LATORRA, RICHARD	S	9.0 S	80.0 W	21	SE	NE	385296.8	4345433.8	39.250656	-106.329330	Well (Application/Permit)	Residential	11/6/2006	5/1/1967					Household use only		120						11/6/2006 0:00
0124	109	318165-	Permit Issued	Owner	LAWRENCE, ROBERT J.	S	9.0 S	80.0 W	21	SE	SW	384581.2	4345000.4	39.246651	-106.337552	Well (Application/Permit)	Residential	7/30/2020		7/30/2022				Household use only								7/30/2020 0:00
0125	110	84822-F	Permit Issued	Owner	LEVINE, JONAH	S	9.0 S	80.0 W	21	NE	NW	384855.0	4346271.0	39.258137	-106.334594	Well (Application/Permit)	Residential	10/23/2020		10/23/2021				Domestic								10/23/2020 0:00
0126	111	118437-	Well Constructed	Owner	LINDEMAN, D	S	9.0 S	80.0 W	21	SE	NW	384709.9	4345373.4	39.250028	-106.336121	Well (Application/Permit)	Residential	2/26/1981		2/26/1983	6/18/1981			Household use only		124						10/1/2008 0:00
0127	112	200547-	Permit Issued	Owner	LOHMAN, BARBARA	S	9.0 S	80.0 W	21	SE	SW	384892.1	4345088.8	39.247494	-106.333964	Well (Application/Permit)	Residential	1/10/1997		1/10/1999				Household use only								1/10/1997 0:00
0128	113	200548-	Permit Expired	Owner	LOHMAN, BARBARA	S	9.0 S	80.0 W	21	SE	SW	384861.7	4345089.5	39.247499	-106.334312	Well (Application/Permit)	Residential	1/10/1997		1/10/1999				Household use only								8/21/2001 0:00
0129	114	125665-	Permit Issued	Owner	LUJAN, D	S	9.0 S	80.0 W	21	SE	NE	385227.7	4345218.6	39.248710	-106.330093	Well (Application/Permit)	Residential	6/4/1982						Household use only								3/3/2014 0:00
0130	115	112440-	Permit Expired	Owner	MAES, GILBERT	S	9.0 S	80.0 W	21	SE	SE	385068.4	4344886.7	39.245698	-106.331890	Well (Application/Permit)	Residential							Household use only								6/7/2000 0:00
0131	116	115228--A	Well Constructed	Owner	MAGANA, DARIO	S	9.0 S	80.0 W	21	SE	SE	385035.2	4345024.7	39.246937	-106.332296	Well (Application/Permit)	Residential	10/18/2005		10/18/2007	10/20/2005	10/25/2005		Household use only		175	135	175				8/29/2018 0:00
0132	117	121514-	Well Constructed	Owner	MANCHAC, J	S	9.0 S	80.0 W	21	SE	SE	385121.5	4344951.5	39.246290	-106.331276	Well (Application/Permit)	Residential	8/14/1981		8/14/1983	8/5/1981	9/18/1981		Household use only								11/1/2006 0:00
0133	118	105448-	Permit Issued	Owner	MANCHAC, KENNETH L	S	9.0 S	80.0 W	21	SE	NE	385314.6	4345223.9	39.248766	-106.329086	Well (Application/Permit)	Residential	4/5/1979						Household use only								5/22/1991 0:00
0134	119	213588-	Well Constructed	Owner	MARTINEZ DENNIS & DENISE	S	9.0 S	80.0 W	21	SE	SE	385059.3	4344917.4	39.245967	-106.332000	Well (Application/Permit)	Residential	10/30/1998		10/30/2000	9/14/1998	12/7/1998		Household use only	0	140	100	140	10			12/7/1998 0:00
0135	120	106255-	Well Replaced	Owner	MARTINEZ E S JR	S	9.0 S	80.0 W	21	SE	SE	384998.8	4345086.5	39.247481	-106.332724	Well (Application/Permit)	Residential	5/10/1979			9/7/1979			Household use only		126	101	126				9/30/2005 0:00
0136	121	183076-	Well Constructed	Owner	MCCALL JAMES T & DEBORAH L	S	9.0 S	80.0 W	21	SE	NE	385234.5	4345231.2	39.248819	-106.330026	Well (Application/Permit)	Residential	11/2/1994		11/2/1996	7/12/1996			Household use only	10000	140	120	140				6/4/1998 0:00
0137	122	125665--A	Well Constructed	Owner	MCCALL JAMES T & DEBRA L	S	9.0 S	80.0 W	21	SE	NE	385197.3	4345246.7	39.248958	-106.330457	Well (Application/Permit)	Residential	5/11/2005		5/11/2007	5/20/2005	6/6/2005		Household use only		155	105	155	10			6/6/2005 0:00
0138	123	120534--A	Well Constructed	Owner	MCKEAN JOSEPH D JR	S	9.0 S	80.0 W	21	SE	SW	384815.7	4344983.8	39.246538	-106.334827	Well (Application/Permit)	Residential	2/13/2007		2/13/2009	2/15/2007	2/22/2007		Household use only		160	120	160	8.5			2/22/2007 0:00
0139	124	120534-	Well Abandoned	Owner	MCKFAN JOSEPH D JR 1989 REVOCABLE	S	9.0 S	80.0 W	21	SW	SE	384246.7	4344828.8	39.245066	-106.341392	Well (Application/Permit)	Residential	6/18/1981			7/7/1981		3/9/2007	Household use only		132	107	132				3/19/2012 0:00
0140	125	80202-	Well Constructed	Owner	MCMAHON, JAMES A	S	9.0 S	80.0 W	21	SW	SW	383835.3	4344837.9	39.245092	-106.346167	Well (Application/Permit)	Residential	7/31/1975	8/15/1975	7/31/1977	8/15/1975			Household use only		46	31	46				2/1/2007 0:00
0141	126	119755-	Well Constructed	Owner	MEEK, DONALD J	S	9.0 S	80.0 W	21	SE	SE	385044.2	4344966.5	39.246415	-106.332182	Well (Application/Permit)	Residential		8/6/1981		8/6/1981			Household use only		79						8/6/1981 0:00
0142	127	224537-	Well Constructed	Owner	MERIDETH, DEREK W.	S	9.0 S	80.0 W	21	SE	SE	385196.3	4344838.2	39.245273	-106.330399	Well (Application/Permit)	Residential	3/27/2000		3/27/2002	7/27/2000	10/17/2000		Household use only		130	100	130	13			7/20/2017 0:00
0143	128	224537-	Well Constructed	Owner	MERIDETH, SARAH K.	S	9.0 S	80.0 W	21	SE	SE	385196.3	4344838.2	39.245273	-106.330399	Well (Application/Permit)	Residential	3/27/2000		3/27/2002	7/27/2000	10/17/2000		Household use only		130	100	130	13			7/20/2017 0:00
0144	129	82358-F	Well Constructed	Owner	MERZ, SHANE	S	9.0 S	80.0 W	21	SW	NW	384037.0	4345268.0	39.248993	-106.343901	Well (Construction Report)	Residential	8/1/2018		8/1/2019	6/14/2019			Household use only		137				70	6/19/2019	7/26/2019 0:00
0145	130	211526-	Permit Issued	Owner	MEYER, DAVID	S	9.0 S	80.0 W	21	SE	SE	385127.8	4344885.4	39.245688	-106.331195	Well (Application/Permit)	Residential	7/27/1998		7/27/2000				Household use only								7/27/1998 0:00
0146	131	114769--A	Well Constructed	Owner	MONROE, BELINDA	S	9.0 S	80.0 W	21	SE	SE	385211.9	4344975.0	39.246510	-106.330237	Well (Application/Permit)	Residential	7/27/2005		7/27/2007	8/5/2005	8/12/2005		Household use only		175	115	175	9			10/2/2017 0:00
0147	132	114769--A	Well Constructed	Owner	MONROE, RANDALL	S	9.0 S	80.0 W	21	SE	SE	385211.9	4344975.0	39.246510	-106.330237	Well (Application/Permit)	Residential	7/27/2005		7/27/2007	8/5/2005	8/12/2005		Household use only		175	115	175	9			10/2/2017 0:00
0148	133	217445--A	Well Constructed	Owner	MOOR JR, WILLIAM T.	S	9.0 S	80.0 W	21	SE	SW	384542.7	4344932.9	39.246042	-106.337981	Well (Application/Permit)	Residential	11/3/2005		11/3/2007		11/22/2005		Household use only		190			12			5/14/2018 0:00
0149	134	65181-	Well Constructed	Owner	MOORE W J JR	S	9.0 S	80.0 W	21	SE	SE	384983.5	4345056.3	39.247209	-106.332904	Well (Application/Permit)	Residential	10/3/1972	11/25/1972		11/25/1972			Household use only		121	101	121				11/3/2004 0:00
0150	135	69022-	Well Constructed	Owner	MOSHER, MELVON L	S	9.0 S	80.0 W	21	SW	SW	383949.1	4345004.6	39.246612	-106.344875	Well (Application/Permit)	Residential	5/22/1973	5/22/1973		6/14/1973			Household use only		43	28	43				11/3/2006 0:00
0151	136	45857-F	Well Constructed	Owner	MOUTOUX, HEATHER	S	9.0 S	80.0 W	21	NE	NW	384776.2	4346279.9	39.258208	-106.335511	Well (Application/Permit)	General Purpose	12/15/1995	6/5/1996	12/15/1996				Household use only								1/22/2018 0:00
0152	137	45857-F	Well Constructed	Owner	MOUTOUX, RICHARD	S	9.0 S	80.0 W	21	NE	NW	384776.2	4346279.9	39.258208	-106.335511	Well (Application/Permit)	General Purpose	12/15/1995	6/5/1996	12/15/1996				Household use only								1/22/2018 0:00
0153	138	309182-	Permit Issued	Owner	NEWSOM, MELANIE	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Residential	5/1/2018						Household use only								5/14/2018 0:00
0154	139	133231--A	Well Constructed	Owner	NEWTON JERRY & CARRIE	S	9.0 S	80.0 W	21	NE	NE	385187.4	4346187.0	39.257425	-106.330733	Well (Application/Permit)	Residential	5/2/2014		5/2/2016	5/6/2014			Domestic		167	107	167				5/6/2014 0:00
0155	140	84820-	Well Constructed	Owner	NEWTON REX J JR	S	9.0 S	80.0 W	21	SE	NW	384652.9	4345233.5	39.248760	-106.336758	Well (Application/Permit)	Residential	7/12/1976	5/30/1977	7/12/1978	5/30/1977			Household use only		114	75	114				9/21/2011 0:00
0156	141	305488-	Well Constructed	Owner	NURMAHOMED-KLUVER, MOUBAREKA	S	9.0 S	80.0 W	21	SE	SW	384613.0	4344857.0	39.245367	-106.337157	Well (Construction Report)	Residential	5/10/2017		5/10/2019	6/1/2017			Household use only		170				115	6/1/2017	12/10/2020 0:00
0157	142	81837-	Well Constructed	Owner	NURMAHOMED-KLUVER, MOUBAREKA	S	9.0 S	80.0 W	21	SE	SE	384922.5	4345057.7	39.247219	-106.333599	Well (Application/Permit)	Residential		8/23/1976		8/23/1976			Household use only		124						12/22/2020 0:00
0158	143	79220-	Well Constructed	Owner	NUTALL, MYLES A	S	9.0 S	80.0 W	21	SE	NW	384636.9	4345411.6	39.250370	-106.336974	Well (Application/Permit)	Residential	5/22/1975	5/31/1975	5/22/1977	5/31/1975			Household use only		100						10/1/2008 0:00
0159	144	122451-	Permit Expired	Owner	PADILLA, D	S	9.0 S	80.0 W	21	NW	SW	384031.3	4345724.5	39.253100	-106.344048	Well (Application/Permit)	Residential	10/5/1981		10/5/1983				Domestic								10/5/1983 0:00
0160	145	83675-F	Well Constructed	Owner	PAPPAS, CHRISTOPHER	S	9.0 S	80.0 W	21	SW	NE	384117.0	4345434.0	39.250499	-106.343002	Well (Construction Report)	Residential	10/1/2019		10/1/2020	10/22/2019	11/19/2019		Household use only		135			8	60	10/22/2019	11/19/2019 0:00
0161	146	83675-F	Well Constructed	Owner	PAPPAS, LAURA	S	9.0 S	80.0 W	21	SW	NE	384117.0	4345434.0	39.250499	-106.343002	Well (Construction Report)	Residential	10/1/2019		10/1/2020	10/22/2019	11/19/2019		Household use only		135			8	60	10/22/2019	11/19/2019 0:00
0162	147	115511-	Well Constructed	Owner	PATEL, M	S	9.0 S	80.0 W	21	SE	NE	385273.6	4345263.3	39.249112	-106.329568	Well (Application/Permit)	Residential	8/11/1980		8/11/1982	10/1/1980	10/21/1980		Household use only		110						10/1/2008 0:00
0163	148	311365-	Well Constructed	Owner	PAYNE, LAURA	S	9.0 S	80.0 W	21	SE	SW	384635.0	4344872.0	39.245505	-106.336904	Well (Construction Report)	Residential	10/16/2018		10/16/2020	12/20/2018			Household use only		155				100	12/20/2018	12/20/2018 0:00
0164	149	52024-	Well Constructed	Owner	PEABODY, GEO L	S	9.0 S	80.0 W	21	SE	NW	384715.7	4345360.9	39.249920	-106.336053	Well (Application/Permit)	Residential	3/2/1972	11/5/1972		6/13/1972			Domestic		122	102	122				5/4/2004 0:00
0165	150		Application Information Req	Owner	PENNY LOERKE ESTATE OF (LOERKE, ROBERT)	S	9.0 S	80.0 W	21	SE	SW	384876.0	4344821.0	39.245078	-106.334104	Well (Application/Permit)	Residential							Domestic, Irrigation								9/6/2017 0:00
0166	151		Application Information Req	Owner	PERKINS LESTER JR	S	9.0 S	80.0 W	21	NW	NW	383783.6	4346391.5	39.259075	-106.347025	Well (Application/Permit)	Unknown							Domestic								9/6/2000 0:00
0167	152		Application Received	Owner	PIONEER HOMES	S	9.0 S	80.0 W	21	NE	NE	385120.0	4346163.2	39.257201	-106.331506	Well (Application/Permit)	Unknown							Household use only								7/29/1981 0:00
0168	153	212800-	Well Constructed	Owner	POWELL JAMES C I	S	9.0 S	80.0 W	21	SE	NW	384725.3	4345427.9	39.250526	-106.335957	Well (Application/Permit)	Residential	9/24/1998		9/24/2000	10/8/1998	11/23/1998		Household use only	0	180	140	180	10			11/13/2012 0:00
0169	154	275007-	Permit Issued	Owner	PROUTY, ROBERT E	S	9.0 S	80.0 W	21	NW	SW	383878.0	4345845.0	39.254169	-106.345842	Well (Application/Permit)	Residential	8/27/2007		8/27/2009				Domestic, Stock								8/27/2007 0:00
0170	155	84822-F	Permit Issued	Owner	RAAB, JENNIFER	S	9.0 S	80.0 W	21	NE	NW	384855.0	4346271.0	39.258137	-106.334594	Well (Application/Permit)	Residential	10/23/2020		10/23/2021				Domestic								10/23/2020 0:00
0171	156	213836-	Well Constructed	Owner	RAY, EILEEN	S	9.0 S	80.0 W	21	SE	NE	385045.4	4345451.3	39.250775	-106.332253	Well (Application/Permit)	Residential	11/12/1998	12/31/1966					Domestic		125						11/12/1998 0:00
0172	157	11797-F	Permit Canceled	Owner	RAY, EILEEN C	S	9.0 S	80.0 W	21	NE	NE	385047.4	4346266.3	39.258118	-106.332369	Well (Application/Permit)	General Purpose	4/18/1967	8/5/1966		8/5/1966			Municipal		143	100	143				4/18/1967 0:00
0173	158	56551-	Permit Expired	Owner	RIFKIN, WILLIAM B	S	9.0 S	80.0 W	21	NW	SW	383936.8	4345780.6	39.253597	-106.345150	Well (Application/Permit)	Residential	4/10/1972		4/10/1974				Domestic, Stock								5/8/1974 0:00
0174	159	114883-	Permit Issued	Owner	RITCH, R	S	9.0 S	80.0 W	21	SE	SW	384739.6	4345031.2	39.246951	-106.335715	Well (Application/Permit)	Residential	7/1/1980						Household use only								3/3/2014 0:00
0175	160	74264-	Permit Canceled	Owner	ROBERTS, HAROLD L	S	9.0 S	80.0 W	21	SE	NW	384648.8	4345277.2	39.249155	-106.336811	Well (Application/Permit)	Residential	5/10/1974						Household use only								11/3/2006 0:00
0176	161	47275-	Well Constructed	Owner	ROMANYUK, ANATOLIY N.	S	9.0 S	80.0 W	21	SE	SW	384714.7	4344958.5	39.246295	-106.335996	Well (Application/Permit)	Residential		7/9/1971		7/9/1971			Domestic		123						2/6/2018 0:00

Wells Within 2 Miles of Leadville Mill - January 2021

Rec.	No.	Permit Number	Permit Status	Assoc Type	Contact Name	PM	TNS	RNG	SEC	Q160	Q40	UTM X	UTM Y	Latitude	Longitude	Location Type	Permit Category	Permit Issued	Date 1st Use	Date Permit Expires	Const Date	Last Pump Install Date	Date Well Plugged	Use(s)	Elevation	Well Depth	Perf. Casing Top	Perf. Casing Bottom	Pump Test Yield	Static Water Level	Static Water Level Date	Modified
0177	162	47275-	Well Constructed	Owner	ROMANYUK, CHANTEL N.	S	9.0 S	80.0 W	21	SE	SW	384714.7	4344958.5	39.246295	-106.335996	Well (Application/Permit)	Residential		7/9/1971		7/9/1971			Domestic		123						2/6/2018 0:00
0178	163	116055-	Permit Issued	Owner	ROSS, D	S	9.0 S	80.0 W	21	SE	SW	384846.3	4345059.4	39.247218	-106.334492	Well (Application/Permit)	Residential	9/5/1980						Household use only								3/3/2014 0:00
0179	164	72380-	Well Constructed	Owner	ROSS, RICHARD	S	9.0 S	80.0 W	21	SE	NE	384968.4	4345250.8	39.248964	-106.333111	Well (Application/Permit)	Residential	11/8/1973	11/9/1973		11/9/1973			Household use only		117	97	117				2/24/2005 0:00
0180	165	76435-	Well Constructed	Owner	RYAN CLAYTON P & NANCY E	S	9.0 S	80.0 W	21	SW	NW	384019.1	4345309.4	39.249360	-106.344116	Well (Application/Permit)	Residential	9/9/1974	7/19/1976	9/9/1976	7/19/1976			Household use only		116						7/19/1976 0:00
0181	166	81968-F	Well Constructed	Owner	SAITO, AD	S	9.0 S	80.0 W	21	SW	NW	384056.0	4345321.0	39.249473	-106.343689	Well (Construction Report)	Residential	5/2/2018		5/2/2019	6/22/2018	8/10/2018		Household use only		140			12	40	6/22/2018	8/10/2018 0:00
0182	167	234837-	Well Constructed	Owner	SANCHEZ MICHAEL D & RENA	S	9.0 S	80.0 W	21	SE	NE	384984.5	4345452.6	39.250785	-106.332960	Well (Application/Permit)	Residential	7/17/2001		7/17/2003	9/8/2001	10/24/2001		Household use only		136	77	138	7			12/4/2008 0:00
0183	168	268888-	Well Constructed	Owner	SANDOVAL CELESTINO AND JUDY	S	9.0 S	80.0 W	21	SE	NE	384993.0	4345259.0	39.249039	-106.332823	Well (Application/Permit)	Residential	5/11/2006	2/3/1968					Domestic								5/11/2006 0:00
0184	169	268888--A	Well Constructed	Owner	SANDOVAL, CELESTINO	S	9.0 S	80.0 W	21	SE	NE	384993.4	4345258.8	39.249039	-106.332823	Well (Application/Permit)	Residential	5/11/2006		5/11/2008	5/19/2006			Domestic		160	130	160				6/20/2006 0:00
0185	170	246002-	Well Constructed	Owner	SANDOVAL, MARVIN	S	9.0 S	80.0 W	21	SE	NE	384922.8	4345179.6	39.248318	-106.333620	Well (Application/Permit)	Residential	11/26/2002		11/26/2004	1/29/2003			Household use only		147	117	147				1/29/2003 0:00
0186	171	205626-	Well Constructed	Owner	SAUNDERS, ELIZABETH	S	9.0 S	80.0 W	21	SE	NE	384938.9	4345507.0	39.251266	-106.333491	Well (Application/Permit)	Residential	9/26/1997		9/26/1999	9/29/1997			Household use only		140	100	140				3/12/2019 0:00
0187	172		Application Received	Owner	SAUNDERS, J	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Unknown							Household use only								7/14/1980 0:00
0188	173	116125-	Permit Expired	Owner	SAUNDERS, J	S	9.0 S	80.0 W	21	SE	SW	384678.9	4345124.1	39.247781	-106.336438	Well (Application/Permit)	Residential	9/12/1980						Household use only								3/3/2014 0:00
0189	174	107591-	Well Constructed	Owner	SAUNDERS, JACK	S	9.0 S	80.0 W	21	SE	NW	384854.8	4345409.8	39.250381	-106.334447	Well (Application/Permit)	Residential	6/19/1979	9/12/1979		7/18/1979	9/12/1979		Household use only		105	80	105	4			3/16/1992 0:00
0190	175	115228-	Application Received	Owner	SAUNDERS, JACK	S	9.0 S	80.0 W	21	SE	SE	385029.1	4345024.8	39.246936	-106.332366	Well (Application/Permit)	Residential							Household use only								7/14/1980 0:00
0191	176	98211-	Well Constructed	Owner	SAUNDERS, JACK	S	9.0 S	80.0 W	21	SE	SE	385273.1	4345068.2	39.247355	-106.329546	Well (Application/Permit)	Residential	5/3/1978	7/1/1978	5/3/1980	7/1/1978	10/21/1978		Household use only		119	99	119	7			3/29/2007 0:00
0192	177	205626-	Well Constructed	Owner	SAUNDERS, SAMUEL	S	9.0 S	80.0 W	21	SE	NE	384938.9	4345507.0	39.251266	-106.333491	Well (Application/Permit)	Residential	9/26/1997		9/26/1999	9/29/1997			Household use only		140	100	140				3/12/2019 0:00
0193	178	81460-F	Well Constructed	Owner	SCHNEIDER, ANDREW N.	S	9.0 S	80.0 W	21	SW	NE	384313.0	4345370.0	39.249948	-106.340720	Well (Construction Report)	Residential	10/25/2017		10/25/2018	6/21/2018	9/3/2018		Household use only		160			15	52	6/21/2018	11/6/2019 0:00
0194	179	81460-F	Well Constructed	Owner	SCHNEIDER, ANNE L.	S	9.0 S	80.0 W	21	SW	NE	384313.0	4345370.0	39.249948	-106.340720	Well (Construction Report)	Residential	10/25/2017		10/25/2018	6/21/2018	9/3/2018		Household use only		160			15	52	6/21/2018	11/6/2019 0:00
0195	180	77653-F	Well Constructed	Owner	SCHOETTGER, SUZANNE	S	9.0 S	80.0 W	21	SW	NE	384195.2	4345551.9	39.251572	-106.342119	Well (Application/Permit)	General Purpose	10/29/2013		10/29/2014	1/15/2014	5/6/2014		Household use only		160	120	160	10			6/20/2014 0:00
0196	181	122746-	Well Constructed	Owner	SCHUMAN MILES C & MARY ANN	S	9.0 S	80.0 W	21	SE	SE	385211.6	4344868.3	39.245546	-106.330219	Well (Application/Permit)	Residential		11/10/1981		11/10/1981			Household use only		120						11/10/1981 0:00
0197	182	74629-	Well Constructed	Owner	SCOTT, DUANE	S	9.0 S	80.0 W	21	SE	NE	385014.4	4345214.2	39.248636	-106.332572	Well (Application/Permit)	Residential		6/19/1974		6/19/1974			Household use only		116						4/13/2005 0:00
0198	183	76435--A	Well Constructed	Owner	SCOTT, JOHN	S	9.0 S	80.0 W	21	SW	NW	384019.0	4345303.3	39.249306	-106.344115	Well (Application/Permit)	Residential	9/21/2004		9/21/2006	10/21/2004	11/9/2004		Household use only		160	120	160	10			11/9/2004 0:00
0199	184	219286-	Well Constructed	Owner	SEIBEL, ROBERTA L.	S	9.0 S	80.0 W	21	SE	SE	385241.9	4344776.2	39.244721	-106.329856	Well (Application/Permit)	Residential	7/27/1999		7/27/2001	8/11/1999	7/19/2000		Household use only		117	77	117	10			11/7/2019 0:00
0200	185	38481-	Well Constructed	Owner	SHERIDAN, GEORGE	S	9.0 S	80.0 W	21	SE	NW	384715.7	4345360.9	39.249920	-106.336053	Well (Application/Permit)	Residential	7/3/1969			7/10/1969	7/10/1969		Domestic		85			12			10/1/2008 0:00
0201	186	36711-MH	Permit Issued	Owner	SISTI, KEVIN	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Monitoring Hole (Notice c	8/10/1999		11/2/1999				Monitoring/Sampling								9/10/1999 0:00
0202	187	119528-	Well Constructed	Owner	SLACK MICHAEL F & ENDERLIN JODI A	S	9.0 S	80.0 W	21	SE	SW	384591.8	4344767.8	39.244562	-106.337385	Well (Application/Permit)	Residential	5/5/1981			7/16/1981			Household use only		137	112	137				3/3/2014 0:00
0203	188	177847-	Well Constructed	Owner	SLACK, MIKE	S	9.0 S	80.0 W	21	SE	SW	384586.7	4344851.7	39.245319	-106.337457	Well (Application/Permit)	Residential	5/12/1994		5/12/1996	6/24/1994			Household use only		130	90	130				1/20/1998 0:00
0204	189	33930-F	Well Constructed	Owner	SMELTZER THOMAS & DAWN	S	9.0 S	80.0 W	21	SE	NW	384648.8	4345277.2	39.249155	-106.336811	Well (Application/Permit)	General Purpose	7/25/1988	7/25/1988	7/25/1989	9/15/1975			Commercial		120	80	120				8/12/1997 0:00
0205	190	74462-F	Well Constructed	Owner	SMITH ROBERT F & VIRGINIA A	S	9.0 S	80.0 W	21	SW	NE	384286.2	4345315.1	39.249449	-106.341024	Well (Application/Permit)	General Purpose	9/13/2010		9/13/2012	9/13/2011	3/22/2012		Household use only		168	36	168	10.2			3/27/2012 0:00
0206	191	133055-	Permit Expired	Owner	SMITH, C	S	9.0 S	80.0 W	21	NW	NE	384509.7	4346377.1	39.259046	-106.338610	Well (Application/Permit)	Residential	10/7/1983						Domestic								10/7/1985 0:00
0207	192	106255--A	Well Constructed	Owner	SMITH, COLLEEN M.	S	9.0 S	80.0 W	21	SE	SE	385004.9	4345086.3	39.247482	-106.332654	Well (Application/Permit)	Residential	9/30/2005		9/30/2007	10/18/2005	10/21/2005		Household use only		170	135	175	12			9/16/2019 0:00
0208	193	106255--A	Well Constructed	Owner	SMITH, JAMES E.	S	9.0 S	80.0 W	21	SE	SE	385004.9	4345086.3	39.247482	-106.332654	Well (Application/Permit)	Residential	9/30/2005		9/30/2007	10/18/2005	10/21/2005		Household use only		170	135	175	12			9/16/2019 0:00
0209	194	118685-	Well Constructed	Owner	SMITH, JESSICA	S	9.0 S	80.0 W	21	SE	NW	384862.2	4345318.1	39.249553	-106.334351	Well (Application/Permit)	Residential	3/16/1981		3/16/1983	6/29/1981	8/24/1981		Household use only		128			4			4/17/2017 0:00
0210	195	106254--A	Well Constructed	Owner	SODIA JOHN M JR & ETHEL M	S	9.0 S	80.0 W	21	SE	SE	385135.3	4344799.9	39.244923	-106.331099	Well (Application/Permit)	Residential	9/8/2005		9/8/2007	9/28/2005	10/12/2005		Household use only		160	100	160	12			10/12/2005 0:00
0211	196	149393-	Well Constructed	Owner	STARK, FRANCES	S	9.0 S	80.0 W	21	SE	SW	384831.1	4345059.7	39.247225	-106.334666	Well (Application/Permit)	Residential	9/16/1987			9/30/1987	10/2/1987		Household use only		138	118	138	15			3/3/2014 0:00
0212	197	309182-	Permit Issued	Owner	STEELE, SYDNEY L.	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Residential	5/1/2018						Household use only								5/14/2018 0:00
0213	198	128563-	Well Constructed	Owner	STEPHENS, S N	S	9.0 S	80.0 W	21	NE	NW	384718.5	4346357.3	39.258894	-106.336197	Well (Application/Permit)	Residential	12/20/1982			6/27/1983	7/2/1983		Domestic		142	112	142	10			3/3/2014 0:00
0214	199		Application Information Req	Owner	STEPHENS, SONNY	S	9.0 S	80.0 W	21	NE	NW	384617.4	4346045.2	39.256070	-106.337314	Well (Application/Permit)	Unknown							Domestic								3/17/1995 0:00
0215	200		Application Information Req	Owner	STEPHENS, SONNY	S	9.0 S	80.0 W	21	NE	NW	384776.2	4346279.9	39.258208	-106.335511	Well (Application/Permit)	Unknown							Domestic								3/17/1995 0:00
0216	201		Application Information Req	Owner	STEPHENS, SONNY	S	9.0 S	80.0 W	21	NE	NW	384761.9	4346028.3	39.255936	-106.335631	Well (Application/Permit)	Unknown							Domestic								3/17/1995 0:00
0217	202		Application Information Req	Owner	STEPHENS, SONNY	S	9.0 S	80.0 W	21	NE	NW	384854.8	4346271.4	39.258137	-106.334594	Well (Application/Permit)	Unknown							Domestic								3/17/1995 0:00
0218	203		Application Information Req	Owner	STEPHENS, SONNY	S	9.0 S	80.0 W	21	NE	NW	384886.5	4346016.5	39.255844	-106.334192	Well (Application/Permit)	Unknown							Domestic								3/17/1995 0:00
0219	204	221466-	Well Constructed	Owner	SUCHOMEL, BART	S	9.0 S	80.0 W	21	SE	NW	384694.8	4345428.6	39.250531	-106.336304	Well (Application/Permit)	Residential	10/22/1999		10/22/2001	9/23/2000	10/10/2000		Household use only	10300	184	124	184	7			6/13/2017 0:00
0220	205	221466-	Well Constructed	Owner	SUCHOMEL, KAREN	S	9.0 S	80.0 W	21	SE	NW	384694.8	4345428.6	39.250531	-106.336304	Well (Application/Permit)	Residential	10/22/1999		10/22/2001	9/23/2000	10/10/2000		Household use only	10300	184	124	184	7			6/13/2017 0:00
0221	206	109191-	Well Constructed	Owner	SWANSON, GALENE	S	9.0 S	80.0 W	21	SE	SE	385121.5	4344951.5	39.246290	-106.331276	Well (Application/Permit)	Residential	8/1/1979			10/1/1979			Household use only		120	95	120				9/5/2018 0:00
0222	207	102039-	Permit Expired	Owner	TEDLIE, STEVE	S	9.0 S	80.0 W	21	SE	SE	385135.6	4344946.2	39.246238	-106.331113	Well (Application/Permit)	Residential	9/21/1978						Household use only								8/17/1990 0:00
0223	208	81181--A	Well Constructed	Owner	THRASH, FREDERIC P	S	9.0 S	80.0 W	21	SE	SE	385090.2	4345053.9	39.247205	-106.331664	Well (Application/Permit)	Residential	11/21/2006		11/21/2008	3/8/2007			Household use only		135	95	135				2/28/2012 0:00
0224	209	98211--A	Well Constructed	Owner	TORSELL DANIEL V & LESLEE C	S	9.0 S	80.0 W	21	SE	SE	385273.1	4345062.1	39.247301	-106.329545	Well (Application/Permit)	Residential	5/25/2006		5/25/2008		6/2/2006		Household use only		151			7			2/24/2017 0:00
0225	210	86525-	Well Constructed	Owner	TRITZ HOWARD A JR	S	9.0 S	80.0 W	21	SE	SW	384686.4	4345106.5	39.247629	-106.336354	Well (Application/Permit)	Residential		10/10/1977		10/10/1977			Household use only		165						5/16/2005 0:00
0226	211	301247-	Well Constructed	Owner	TRUJILLO, MARTIN	S	9.0 S	80.0 W	21	SE	SE	384931.0	4344868.0	39.245508	-106.333474	Well (Application/Permit)	Residential	5/27/2016		5/27/2018	7/14/2016			Household use only		140	100	140				12/6/2016 0:00
0227	212	264433-	Well Constructed	Owner	TURNER, ROBERTA	S	9.0 S	80.0 W	21	SE	NE	385234.0	4345294.0	39.249386	-106.330036	Well (Application/Permit)	Residential	7/14/2005		7/14/2007	8/3/2005	8/10/2005		Household use only		175	115	175	10			8/10/2005 0:00
0228	213	213823-	Permit Issued	Owner	UNGEHEUER, PATRICIA E	S	9.0 S	80.0 W	21	NE	SW	384796.2	4345915.1	39.254922	-106.335217	Well (Application/Permit)	Residential	11/12/1998		11/12/2000				Domestic								11/16/1998 0:00
0229	214	167550-	Well Constructed	Owner	VALDEZ, JOSE L.	S	9.0 S	80.0 W	21	SE	SW	384882.7	4344988.4	39.246583	-106.334051	Well (Application/Permit)	Residential	11/30/1992			6/24/1993	11/18/1994		Household use only	10100	140	113	140	15			1/8/2018 0:00
0230	215	316081-	Well Constructed	Owner	VALDEZ, MICHAEL	S	9.0 S	80.0 W	21	SE	NW	384881.0	4345264.0	39.249069	-106.334121	Well (Construction Report)	Residential	1/2/2020		1/2/2022	6/2/2020			Household use only		125	62	125		60	6/2/2020	6/2/2020 0:00
0231	216	204070-	Well Constructed	Owner	VALENTINE, RONALD J	S	9.0 S	80.0 W	21	SE	SW	384892.2	4345118.4	39.247755	-106.333969	Well (Application/Permit)	Residential	7/22/1997		7/22/1999	8/4/1997	1/8/1998		Household use only		145	105	145	12			1/8/1998 0:00
0232	217	293477-	Well Constructed	Owner	VANDERVEN, FRANC	S	9.0 S	80.0 W	21	NE	SW	384542.2	4345572.6	39.251804	-106.338100	Well (Application/Permit)	Residential	2/10/2014		2/10/2016	5/29/2014	8/1/2014		Domestic		165	125	165	15			8/1/2014 0:00
0233	218	227462-	Well Constructed	Owner	VANDERWEIT, KERRY	S	9.0 S	80.0 W	21	SE	NW	384633.3	4345186.0	39.248334	-106.336981	Well (Application/Permit)	Residential	7/20/2000	6/1/1968					Household use only		83						7/24/2019 0:00
0234	219	227462-	Well Constructed	Owner	VANDERWEIT, TODD	S	9.0 S	80.0 W	21	SE	NW	384633.3	4345186.0	39.248334	-106.336981	Well (Application/Permit)	Residential	7/20/2000	6/1/1968					Household use only		83						7/24/2019 0:00
0235	220	31671-MH	Permit Issued	Owner	VELASQUEZ, JOSE	S	9.0 S	80.0 W	21	SE	NE	385118.0	4345351.9	39.249892	-106.331391	Well (Application/Permit)	Monitoring Hole (Notice c	9/11/1997		12/10/1997				Monitoring/Sampling								9/26/1997 0:00
0236	221	29413-	Well Constructed	Owner	WALSH, BUD	S	9.0 S	80.0 W	21	SE	NW	384715.7	4345360.9	39.249920	-106.336053	Well (Application/Permit)	Residential	11/30/1966	12/8/1966		12/12/1966	12/12/1966		Domestic		114			7			10/1/2008 0:00
0237	222	32097-	Permit Canceled	Owner	WALSH, BUD	S	9.0 S	80.0 W	21	SE	NE	385118.0	4345351.9	39.249892	-106.331391	Well (Application/Permit)	Residential		10/6/1967		10/6/1967			Domestic		118						5/8/2014 0:00
0238	223	28263-	Permit Canceled	Owner	WALSH, W F	S	9.0 S	80.0 W	21	NW	SE	384314.5	4345772.2	39.253572	-106.340772	Well (Application/Permit)	Residential							Municipal								11/14/2011 0:00
0239	224	39217-	Well Constructed	Owner	WALSH, WERNER	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Residential		10/28/1969		10/28/1969			Domestic		125						10/28/1969 0:00
0240	225	47102-	Well Constructed	Owner	WALSH, WERNER F	S	9.0 S	80.0 W	21	SE	SE	385117.0	4344949.6	39.246268	-106.331334	Well (Application/Permit)	Residential		7/12/1971		7/12/1971			Domestic		123						7/12/1971 0:00
0241	226	68866-	Well Constructed	Owner	WALSH, WERNER F	S	9.0 S	80.0 W	21	SE	SE	385196.8	4345051.6	39.247201	-106.330424	Well (Application/Permit)	Residential	5/8/1973	10/27/1973		10/27/1973			Household use only		117	97	117				1/11/2005 0:00
0242	227	85435-	Well Constructed	Owner	WARDERS, THOMAS D	S	9.0 S	80.0 W	21	SE	NE	385121.3	4345327.6	39.249677	-106.331351	Well (Application/Permit)	Residential	8/16/1976	3/1/1977		9/7/1976			Household use only		120	100	120				2/6/1998 0:00
0243	228	34335-MH	Permit Issued	Owner	WEISS MARTA & RICHARD	S	9.0 S	80.0 W	21	SE	NW	384715.7	4345360.9	39.249920	-106.336053	Well (Application/Permit)	Monitoring Hole (Notice c	9/2/1998		12/2/1998				Monitoring/Sampling								9/28/1998 0:00
0244	229	106254-	Well Abandoned	Owner	WOOD, DONALD M	S	9.0 S	80.0 W	21	SE	SE	385135.2	4344793.8	39.244869	-106.331098	Well (Application/Permit)	Residential	5/10/1979			9/12/1979		10/12/2005	Household use only		108	83	108				10/12/2005 0:00
0245	230	107975-	Well Constructed	Owner	WOOD, DONALD M	S	9.0 S	80.0 W	21	SE	SE	385059.1	4344826.0	39.245147	-106.331984	Well (Application/Permit)	Residential	6/28/1979	9/21/1979		9/21/1979			Household use only		129	104	129				4/17/1992 0:00
0246	231	115227--A	Well Constructed	Owner	WRENHOLT TOM & PATTY	S	9.0 S	80.0 W	21	SE	SE	385119.0	4345046.0	39.247137	-106.331327	Well (Application/Permit)	Residential	5/17/2006		5/17/2008	5/28/2006	5/30/2006		Household use only		190	110	190	6			5/30/2006 0:00
0247	232	115227-	Well Abandoned	Owner	WRENHOLT, T	S	9.0 S	80.0 W	21	SE	SE	385029.1	4344994.3	39.246656	-106.332360	Well (Application/Permit)	Residential	7/22/1980					5/30/2006	Household use only		120						3/7/2014 0:00
0248	233	119529--A	Well Constructed	Owner	YUDNICH, MICHAEL	S	9.0 S	80.0 W	21	SE	SE	385151.3	4345125.7	39.247862	-106.330970	Well (Application/Permit)	Residential	10/19/2005		10/19/2007		11/1/2005		Household use only		175			10			8/28/2020 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 22																															
0249	001	197126-	Permit Canceled	Owner	ALLBRITTON BOYCE & CARRI	S	9.0 S	80.0 W	22	NE	SE	386573.7	4345765.7	39.253815	-106.314590	Well (Application/Permit)	Residential	8/6/1996		8/6/1998	9/10/1996	11/17/1997		Domestic		230	170	230	12			10/12/2000 0:00
0250	002	59160-F	Permit Issued	Owner	AUSTIN MILDRED ELANE	S	9.0 S	80.0 W	22	SW	SE	385806.1	4344927.4	39.246156	-106.323347	Well (Application/Permit)	General Purpose	2/25/2003		2/25/2004				Household use only								2/25/2003 0:00
0251	003	229262-	Permit Expired	Owner	BAKKE ZYSKO LISA	S	9.0 S	80.0 W	22	NE	SW	386223.9	4345813.4	39.254192	-106.318654	Well (Application/Permit)	Residential	10/12/2000		10/12/2013				Household use only								10/13/2013 0:00
0252	004	150755-	Permit Expired	Owner	BARTIK, BRUCE	S	9.0 S	80.0 W	22	NE	NW	386317.1	4346096.0	39.256754	-106.317624	Well (Application/Permit)	Residential	3/24/1988		3/24/1990				Household use only								3/24/1990 0:00
0253	005	119527-	Permit Extended	Owner	BARTIK/KLEIN	S	9.0 S	80.0 W	22	NE	NW	386320.2	4346117.6	39.256952	-106.317593	Well (Application/Permit)	Residential	11/5/1981						Household use only								3/3/2014 0:00
0254	006	64775-F	Permit Canceled	Owner	BENNEY, CHARLES F	S	9.0 S	80.0 W	22	SW	SW	385540.5	4345009.1	39.246859	-106.326431	Well (Application/Permit)	General Purpose	8/29/2006		8/29/2007	10/6/2006	2/14/2007		Household use only		170	120	170	3			7/11/2008 0:00
0255	007	81577-F	Well Constructed	Owner	BENTON, DONALD R.	S	9.0 S	80.0 W	22	SW	SE	385939.0	4345043.0	39.247218	-106.321826	Well (Construction Report)	Residential	12/11/2017		12/11/2018	7/24/2018	11/20/2018		Domestic, Irrigation		153			10	55	7/24/2018	11/20/2018 0:00
0256	008	81577-F	Well Constructed	Owner	BENTON, LEANNE M.	S	9.0 S	80.0 W	22	SW	SE	385939.0	4345043.0	39.247218	-106.321826	Well (Construction Report)	Residential	12/11/2017		12/11/2018	7/24/2018	11/20/2018		Domestic, Irrigation		153			10	55	7/24/2018	11/20/2018 0:00
0257	009	299206-	Permit Extended	Owner	BIFANO, BERNADETTE	S	9.0 S	80.0 W	22	NE	SW	386224.0	4345813.0	39.254192	-106.318654	Well (Application/Permit)	Residential	10/21/2015		10/21/2021				Household use only								10/2/2020 0:00
0258	010	299206-	Permit Extended	Owner	BIFANO, CRAIG	S	9.0 S	80.0 W	22	NE	SW	386224.0	4345813.0	39.254192	-106.318654	Well (Application/Permit)	Residential	10/21/2015		10/21/2021				Household use only								10/2/2020 0:00
0259	011	56607-F	Well Constructed	Owner	BISTRAM, RICHARD	S	9.0 S	80.0 W	22	SW	NE	386081.1	4345171.5	39.248390	-106.320202	Well (Application/Permit)	General Purpose	10/4/2001		10/4/2002	11/7/2001	12/6/2001		Household use only		147	107	147	4			9/25/2002 0:00
0260	012	61033-F	Permit Expired	Owner	BLUM, JOSHUA	S	9.0 S	80.0 W	22	SW	SW	385716.4	4344887.7	39.245792	-106.324383	Well (Application/Permit)	General Purpose	4/22/2004		4/22/2005	9/9/2004	4/28/2005		Household use only		160	120	160	12			8/4/2005 0:00
0261	013	63026-F	Well Constructed	Owner	BLUM, JOSHUA	S	9.0 S	80.0 W	22	SW	SW	385716.4	4344887.7	39.245792	-106.324383	Well (Application/Permit)	General Purpose	8/4/2005		8/4/2006	9/9/2004	4/28/2005		Household use only		160	120	160	12			8/4/2005 0:00
0262	014	126108-	Permit Issued	Owner	BOICE, J T	S	9.0 S	80.0 W	22	NE	NW	386242.3	4346011.4	39.255978	-106.318479	Well (Application/Permit)	Residential	6/22/1982						Household use only								3/3/2014 0:00
0263	015	99086-	Permit Expired	Owner	BONGIRNO, JOHN	S	9.0 S	80.0 W	22	NE	NW	386216.5	4346301.1	39.258587	-106.318829	Well (Application/Permit)	Residential	6/2/1978		6/2/1980				Household use only								5/16/2007 0:00

Wells Within 2 Miles of Leadville Mill - January 2021

Rec.	No.	Permit Number	Permit Status	Assoc Type	Contact Name	PM	TNS	RNG	SEC	Q160	Q40	UTM X	UTM Y	Latitude	Longitude	Location Type	Permit Category	Permit Issued	Date 1st Use	Date Permit Expires	Const Date	Last Pump Install Date	Date Well Plugged	Use(s)	Elevation	Well Depth	Perf. Casing Top	Perf. Casing Bottom	Pump Test Yield	Static Water Level	Static Water Level Date	Modified
0264	016	56653-F	Well Constructed	Owner	BRENNEMAN, CHRISTOPHER	S	9.0 S	80.0 W	22	SW	SE	385760.6	4344995.9	39.246771	-106.323880	Well (Application/Permit)	General Purpose	10/9/2001		10/9/2002	1/31/2002	5/1/2002		Household use only		130	90	130	8			12/26/2018 0:00
0265	017	56653-F	Well Constructed	Owner	BRENNEMAN, KIRSTIN	S	9.0 S	80.0 W	22	SW	SE	385760.6	4344995.9	39.246771	-106.323880	Well (Application/Permit)	General Purpose	10/9/2001		10/9/2002	1/31/2002	5/1/2002		Household use only		130	90	130	8			12/26/2018 0:00
0266	018	80457-F	Well Constructed	Owner	BROWN PHILIP & STEPHANIE	S	9.0 S	80.0 W	22	SW	NE	385761.2	4345232.1	39.248897	-106.323920	Well (Application/Permit)	General Purpose	11/29/2016			8/8/2006	1/24/2007		Domestic		143	103	143	10			11/29/2016 0:00
0267	019	64258-F	Permit Canceled	Owner	BROWN PHILIP CHRISTOPHER & STEPHANIE	S	9.0 S	80.0 W	22	SW	NE	385761.2	4345232.1	39.248897	-106.323920	Well (Application/Permit)	General Purpose	5/11/2006		5/11/2007	8/8/2006	1/24/2007		Household use only		143	103	143	10			11/29/2016 0:00
0268	020	147832-	Well Constructed	Owner	CARLSON NANCY & DALE	S	9.0 S	80.0 W	22	NW	NE	385785.2	4346311.7	39.258630	-106.323825	Well (Application/Permit)	Residential	5/14/1987			11/27/1987			Household use only		185	125	185				5/16/1994 0:00
0269	021	84490-F	Well Constructed	Owner	CAVES, JEREMY	S	9.0 S	80.0 W	22	SW	SW	385546.0	4344934.0	39.246184	-106.326361	Well (Construction Report)	Residential	7/7/2020		7/7/2021	9/9/2020	11/30/2020		Domestic		125			7	45	9/9/2020	11/30/2020 0:00
0270	022	63025-F	Well Replaced	Owner	COMCOWICH, WILLIAM J	S	9.0 S	80.0 W	22	SW	SW	385394.4	4344805.0	39.245002	-106.328100	Well (Application/Permit)	General Purpose	8/4/2005		8/4/2006	8/30/2005			Household use only		170	110	170				8/30/2005 0:00
0271	023	67147-F	Well Constructed	Owner	DINES LAUREN TEW	S	9.0 S	80.0 W	22	SE	NW	386203.0	4345246.0	39.249081	-106.318801	Well (Application/Permit)	General Purpose	5/14/2008		5/14/2009	6/3/2008	8/1/2008		Domestic		180	116	180	10			8/1/2008 0:00
0272	024	59293-F	Permit Expired	Owner	DUDAS ELLEN & BILL	S	9.0 S	80.0 W	22	SW	SW	385622.6	4344835.5	39.245312	-106.325452	Well (Application/Permit)	General Purpose	3/26/2003		3/26/2004				Household use only								5/30/2007 0:00
0273	025	21857-	Well Constructed	Owner	DUNN, DAVID	S	9.0 S	80.0 W	22	NW	NE	385940.0	4346156.5	39.257249	-106.322002	Well (Application/Permit)	Residential		10/6/1964		10/6/1964			Domestic		164						10/6/1964 0:00
0274	026	52495-F	Permit Expired	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	385755.2	4345483.6	39.251167	-106.324032	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						10/10/2000 0:00
0275	027	52496-F	Permit Issued	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	385990.2	4345503.6	39.251378	-106.321313	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						9/23/1999 0:00
0276	028	52497-F	Permit Issued	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	385958.6	4345433.5	39.250734	-106.321660	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						9/23/1999 0:00
0277	029	52498-F	Permit Canceled	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	386097.4	4345421.4	39.250644	-106.320059	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						11/1/2000 0:00
0278	030	52499-F	Permit Issued	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	385783.9	4345372.0	39.250161	-106.323677	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						9/23/1999 0:00
0279	031	52500-F	Permit Expired	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	385833.3	4345264.2	39.249195	-106.323091	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						10/4/2001 0:00
0280	032	52501-F	Permit Expired	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	385935.2	4345306.1	39.249587	-106.321917	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						10/4/2001 0:00
0281	033	52502-F	Permit Expired	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	386018.6	4345295.8	39.249508	-106.320942	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						10/2/2002 0:00
0282	034	52503-F	Permit Expired	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SE	NW	386147.2	4345275.2	39.249335	-106.319455	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000	3/13/2000	4/1/2000		Household use only		500	375	500	8			10/4/2001 0:00
0283	035	52504-F	Permit Issued	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SE	NW	386265.6	4345264.6	39.249261	-106.318075	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						12/27/1999 0:00
0284	036	52505-F	Permit Issued	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SE	NW	386302.3	4345174.4	39.248446	-106.317642	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						9/23/1999 0:00
0285	037	52506-F	Permit Issued	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SE	NW	386173.4	4345181.3	39.248492	-106.319138	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						9/23/1999 0:00
0286	038	52507-F	Permit Issued	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	386072.5	4345177.6	39.248452	-106.320308	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						9/23/1999 0:00
0287	039	52508-F	Permit Issued	Owner	EGS DEVELOPMENT GROUP LLC	S	9.0 S	80.0 W	22	SW	NE	385961.2	4345194.8	39.248590	-106.321597	Well (Application/Permit)	General Purpose	9/23/1999		9/23/2000				Household use only		0						9/23/1999 0:00
0288	040	32861-MH	Well Constructed	Owner	EGS DVLP	S	9.0 S	80.0 W	22	SW	SE	386086.9	4345070.9	39.247490	-106.320116	Well (Application/Permit)	Monitoring Hole (Notice c	3/12/1998		6/12/1998	3/21/1998			Monitoring/Sampling	10000	151	61	151				11/14/2001 0:00
0289	041	229263-	Well Constructed	Owner	ELLIS TOYA A & TAYLOR MATTHEW R G	S	9.0 S	80.0 W	22	NE	SE	386573.7	4345765.7	39.253815	-106.314590	Well (Application/Permit)	Residential	10/12/2000		10/12/2002	9/10/1996	11/17/1997		Domestic		226	170	230	12			7/25/2014 0:00
0290	042	56818-F	Well Constructed	Owner	ELLIS, PATRICK M	S	9.0 S	80.0 W	22	SW	SE	386071.6	4345061.7	39.247407	-106.320288	Well (Application/Permit)	General Purpose	11/14/2001		11/14/2002	3/21/1998			Household use only		151	61	151				12/9/2015 0:00
0291	043	62089-F	Well Constructed	Owner	FULLER BRANDON & KIMBERLY	S	9.0 S	80.0 W	22	SW	NE	385776.5	4345284.0	39.249368	-106.323744	Well (Application/Permit)	General Purpose	12/20/2004		12/20/2005	1/17/2005	1/31/2005		Household use only		145	105	145	12			10/18/2010 0:00
0292	044	63025-F-R	Well Constructed	Owner	GOOCH, CRAIG	S	9.0 S	80.0 W	22	SW	SW	385394.3	4344804.4	39.244993	-106.328099	Well (Application/Permit)	General Purpose	6/22/2006		6/22/2007	7/18/2006	8/18/2006		Household use only		161	121	161	8			10/10/2017 0:00
0293	045	62486-F	Well Constructed	Owner	HALVERSON, ROBERT	S	9.0 S	80.0 W	22	SW	SE	386014.4	4345110.5	39.247831	-106.320968	Well (Application/Permit)	General Purpose	4/18/2005		4/18/2007	5/25/2006	9/30/2006		Household use only		190	150	190				9/30/2006 0:00
0294	046	80997-F	Well Constructed	Owner	HAMMES, DAN	S	9.0 S	80.0 W	22	SW	SW	385383.0	4344884.0	39.245712	-106.328240	Well (Construction Report)	Residential	6/5/2017		6/5/2018	7/7/2017	10/12/2017		Household use only		150	84	134	15	70	7/7/2017	10/12/2017 0:00
0295	047	80997-F	Well Constructed	Owner	HAMMES, SUE	S	9.0 S	80.0 W	22	SW	SW	385383.0	4344884.0	39.245712	-106.328240	Well (Construction Report)	Residential	6/5/2017		6/5/2018	7/7/2017	10/12/2017		Household use only		150	84	134	15	70	7/7/2017	10/12/2017 0:00
0296	048	114768-	Well Constructed	Owner	HAWKINS LARRY & KITTY	S	9.0 S	80.0 W	22	NE	NW	386307.4	4346270.1	39.258320	-106.317769	Well (Application/Permit)	Residential		10/1/1980		10/1/1980			Household use only		117						10/1/1980 0:00
0297	049	67375-F	Well Constructed	Owner	HIRSHEIMER LAMBERT & KAREN	S	9.0 S	80.0 W	22	NW	SE	385890.7	4345867.0	39.254635	-106.322521	Well (Application/Permit)	General Purpose	7/29/2008		7/29/2009	8/25/2008	1/12/2009		Domestic		200	150	190	2			1/12/2009 0:00
0298	050		Application Information Req	Owner	HIRSHEIMER, LAMBERT	S	9.0 S	80.0 W	22	NW	SE	385933.5	4345749.7	39.253584	-106.322009	Well (Application/Permit)	Unknown							Household use only								2/1/2007 0:00
0299	051	60876-F	Well Constructed	Owner	KABELE, MEGAN	S	9.0 S	80.0 W	22	SE	SW	386134.8	4345019.1	39.247028	-106.319551	Well (Application/Permit)	General Purpose	3/19/2004		3/19/2005	8/5/2004	8/31/2004		Household use only		177			11			8/31/2004 0:00
0300	052	107806-	Well Constructed	Owner	KENNEDY, BILL	S	9.0 S	80.0 W	22	NE	NW	386307.7	4346285.3	39.258455	-106.317760	Well (Application/Permit)	Residential	6/25/1979	7/28/1979		7/28/1979			Household use only		163	138	163				4/6/1992 0:00
0301	053	66784-F	Permit Issued	Owner	KESKIMAKI MARY ELLEN & KURT	S	9.0 S	80.0 W	22	SW	SW	385715.1	4345094.9	39.247657	-106.324430	Well (Application/Permit)	General Purpose	1/29/2008		1/29/2009				Domestic								1/29/2008 0:00
0302	054	66853-F	Well Constructed	Owner	KETCHELL ROBERT D & DEBORAH	S	9.0 S	80.0 W	22	NW	SW	385540.0	4345563.0	39.251850	-106.326537	Well (Application/Permit)	General Purpose	2/21/2008		2/21/2009	4/17/2008	5/8/2008		Household use only		135	90	135	10			10/25/2016 0:00
0303	055	150754-	Permit Expired	Owner	KLEIN, THOMAS	S	9.0 S	80.0 W	22	NE	NW	386351.5	4346338.4	39.258938	-106.317259	Well (Application/Permit)	Residential	3/24/1988		3/24/1990				Household use only								3/24/1990 0:00
0304	056	133561-	Well Constructed	Owner	KLEIN, THOMAS S	S	9.0 S	80.0 W	22	NE	NW	386227.6	4346294.0	39.258526	-106.318689	Well (Application/Permit)	Residential	11/9/1983		11/9/1985	7/25/1984	4/1/1986		Household use only		108	85	108	7			7/28/1993 0:00
0305	057	194508-	Well Constructed	Owner	KOEHLER, ANDREA M.	S	9.0 S	80.0 W	22	NW	SE	385768.2	4345605.6	39.252267	-106.323902	Well (Application/Permit)	Residential	4/24/1996		4/24/1998	11/14/1996	12/23/1996		Domestic								10/2/2017 0:00
0306	058	65563-F	Well Constructed	Owner	KOZINSKI DIXIE A & PETER	S	9.0 S	80.0 W	22	SW	NW	385593.4	4345192.3	39.248515	-106.325860	Well (Application/Permit)	General Purpose	5/1/2007		5/1/2009	6/11/2008	7/16/2008		Domestic		124	74	124	10			4/17/2017 0:00
0307	059	113021-	Well Constructed	Owner	KRAMP, KELLY	S	9.0 S	80.0 W	22	NE	NW	386516.4	4346025.1	39.256140	-106.315294	Well (Application/Permit)	Residential	3/3/1980			9/26/1980			Household use only		130	105	130				7/6/2010 0:00
0308	060	80665-F	Permit Issued	Owner	KRAUS, JOHN K.	S	9.0 S	80.0 W	22	SW	NW	385521.4	4345347.4	39.249905	-106.326716	Well (Application/Permit)	General Purpose	3/7/2017		3/7/2019				Household use only								1/23/2018 0:00
0309	061	83189-F	Permit Issued	Owner	KRAUS, JOHN K.	S	9.0 S	80.0 W	22	SW	NW	385521.4	4345347.4	39.249905	-106.326716	Well (Application/Permit)	Residential	5/13/2019		5/13/2020				Household use only								5/13/2019 0:00
0310	062	60561-F	Well Constructed	Owner	KRENKE, DANIEL	S	9.0 S	80.0 W	22	SW	SW	385376.3	4344894.9	39.245811	-106.328323	Well (Application/Permit)	General Purpose	12/17/2003		12/17/2004	3/5/2004			Household use only		193	153	193				3/5/2004 0:00
0311	063	60847-F	Well Constructed	Owner	KROSCHEL BARRY & CARRIE	S	9.0 S	80.0 W	22	SW	SW	385683.9	4344790.1	39.244905	-106.324737	Well (Application/Permit)	General Purpose	3/15/2004		3/15/2005	8/7/2003	3/25/2004		Household use only		145	105	145	12			3/25/2004 0:00
0312	064	59161-F	Permit Expired	Owner	KROSCHEL CARRIE & BARRY	S	9.0 S	80.0 W	22	SW	SW	385683.9	4344790.1	39.244905	-106.324737	Well (Application/Permit)	General Purpose	2/25/2003		2/25/2004	8/7/2003			Household use only		145	105	145				3/15/2004 0:00
0313	065	180862-	Well Constructed	Owner	LADTKOW VERA & RICHARD	S	9.0 S	80.0 W	22	NW	NW	385443.5	4346183.4	39.257422	-106.327766	Well (Application/Permit)	Residential	8/22/1994		8/22/1996	8/26/1994			Domestic		165	160	165				8/26/1994 0:00
0314	066	185988-	Well Constructed	Owner	LARSEN MIKE L & ADAMS BOBBIE D	S	9.0 S	80.0 W	22	NW	NE	386035.2	4346344.8	39.258960	-106.320934	Well (Application/Permit)	Residential	4/7/1995		4/7/1997	9/25/1995	12/11/1995		Household use only		160	100	160	8			2/14/2017 0:00
0315	067	56651-F	Well Constructed	Owner	LEADVILLE REALTY GROUP	S	9.0 S	80.0 W	22	SW	NE	385929.0	4345323.7	39.249748	-106.321989	Well (Application/Permit)	General Purpose	10/9/2001		10/9/2002	11/6/2001	2/7/2002		Household use only		132			9			2/7/2002 0:00
0316	068	56652-F	Permit Issued	Owner	LEADVILLE REALTY GROUP	S	9.0 S	80.0 W	22	SW	NE	386050.7	4345201.9	39.248665	-106.320555	Well (Application/Permit)	General Purpose	10/9/2001		10/9/2002				Household use only								10/9/2001 0:00
0317	069	56654-F	Permit Expired	Owner	LEADVILLE REALTY GROUP	S	9.0 S	80.0 W	22	SW	SW	385494.2	4345109.9	39.247763	-106.326993	Well (Application/Permit)	General Purpose	10/9/2001		10/9/2002				Household use only								5/16/2017 0:00
0318	070	56655-F	Permit Expired	Owner	LEADVILLE REALTY GROUP	S	9.0 S	80.0 W	22	SW	NE	385791.8	4345293.1	39.249451	-106.323571	Well (Application/Permit)	General Purpose	10/9/2001		10/9/2002				Household use only								12/23/2004 0:00
0319	071	56656-F	Permit Expired	Owner	LEADVILLE REALTY GROUP	S	9.0 S	80.0 W	22	SW	NE	385860.1	4345178.9	39.248433	-106.322764	Well (Application/Permit)	General Purpose	10/9/2001		10/9/2002				Household use only								5/30/2006 0:00
0320	072	58400-F	Permit Expired	Owner	LEADVILLE REALTY GROUP	S	9.0 S	80.0 W	22	SW	NE	386050.9	4345314.7	39.249683	-106.320574	Well (Application/Permit)	General Purpose	10/3/2002		10/3/2003				Household use only								9/29/2008 0:00
0321	073	59162-F	Permit Issued	Owner	LEADVILLE REALTY GROUP	S	9.0 S	80.0 W	22	SW	NE	385807.3	4345384.6	39.250282	-106.323413	Well (Application/Permit)	General Purpose	2/25/2003		2/25/2004				Household use only								2/25/2003 0:00
0322	074	64935-F	Well Constructed	Owner	LINDH, HEATHER M	S	9.0 S	80.0 W	22	SE	NW	386221.7	4345301.2	39.249579	-106.318591	Well (Application/Permit)	General Purpose	10/10/2006		10/10/2007	11/2/2006	6/15/2007		Domestic		175	135	175	10			6/15/2007 0:00
0323	075	64397-F	Well Constructed	Owner	LOCKE, ANDY	S	9.0 S	80.0 W	22	SE	NW	386309.9	4345286.0	39.249456	-106.317568	Well (Application/Permit)	General Purpose	6/12/2006		6/12/2007	6/7/2007	8/1/2007		Household use only		190	150	190	10			8/1/2007 0:00
0324	076	58790-F	Well Constructed	Owner	MAHLER THOMAS S & MARILYN G	S	9.0 S	80.0 W	22	SW	SW	385630.6	4344988.0	39.246682	-106.325385	Well (Application/Permit)	General Purpose	1/31/2003		1/31/2004	12/12/2003			Household use only		135	95	135				8/4/2010 0:00
0325	077	75519-F	Well Constructed	Owner	MAHLER THOMAS S & MARILYN G	S	9.0 S	80.0 W	22	SW	SW	385630.0	4344988.0	39.246682	-106.325396	Well (Application/Permit)	General Purpose	9/6/2011			12/12/2003	1/14/2005		Domestic		135	95	135				9/6/2011 0:00
0326	078	64388-F	Well Constructed	Owner	MAIRS ROBERT G REVOCABLE TRUST	S	9.0 S	80.0 W	22	SW	NE	385959.2	4345201.8	39.248653	-106.321621	Well (Application/Permit)	General Purpose	6/8/2006		6/8/2007	12/6/2006	6/7/2007		Household use only		180	140	180	7			4/17/2015 0:00
0327	079	83676-F	Well Constructed	Owner	MARRUFFO, JENNIFER	S	9.0 S	80.0 W	22	SE	NW	386335.0	4345168.0	39.248396	-106.317259	Well (Construction Report)	Residential	10/1/2019		10/1/2020	11/14/2019	9/9/2020		Domestic		190	150	190	7	100	11/14/2019	9/9/2020 0:00
0328	080	83676-F	Well Constructed	Owner	MARRUFFO, JSON	S	9.0 S	80.0 W	22	SE	NW	386335.0	4345168.0	39.248396	-106.317259	Well (Construction Report)	Residential	10/1/2019		10/1/2020	11/14/2019	9/9/2020		Domestic		190	150	190	7	100	11/14/2019	9/9/2020 0:00
0329	081	153364-	Permit Expired	Owner	MARTIN, THOMAS N	S	9.0 S	80.0 W	22	NE	NW	386258.8	4346333.8	39.258890	-106.318336	Well (Application/Permit)	Residential	2/2/1989		2/2/1991	4/21/1989			Household use only		360	260	360				2/2/1991 0:00
0330	082	207091-	Permit Canceled	Owner	MATTHEWS, PEGGY J	S	9.0 S	80.0 W	22	NE	SW	386511.0	4345659.4	39.252842	-106.315302	Well (Application/Permit)	Residential	12/15/1997		12/15/1999	12/30/1997	1/20/1998		Household use only		180	100	180	5			6/19/2018 0:00
0331	083	83938-F	Permit Issued	Owner	MIAO, YUXIN	S	9.0 S	80.0 W	22	SW	SW	385388.8	4345099.6	39.247659	-106.328208	Well (Application/Permit)	Residential	1/10/2020		1/10/2021				Household use only								1/10/2020 0:00
0332	084	54797-F	Well Constructed	Owner	MICHAEL L FORNEY TRUST	S	9.0 S	80.0 W	22	SW	NE	386097.4	4345421.4	39.250644	-106.320059	Well (Application/Permit)	General Purpose	11/1/2000		11/1/2001	8/22/2001	10/25/2001		Household use only		200	160	200	12			10/29/2001 0:00
0333	085	235668--A	Well Constructed	Owner	MISSEY, MATTHEW A	S	9.0 S	80.0 W	22	NE	SE	386677.3	4345619.5	39.252513	-106.313372	Well (Application/Permit)	Residential	3/31/2003		3/31/2005	5/7/2003	6/10/2003		Household use only		96	65	96	2			9/27/2011 0:00
0334	086	75953-F	Permit Expired	Owner	MOELLER, DON	S	9.0 S	80.0 W	22	SW	NW	385521.4	4345347.4	39.249905	-106.326716	Well (Application/Permit)	General Purpose	4/18/2012		4/18/2013				Household use only								7/10/2017 0:00
0335	087	81079-F	Well Constructed	Owner	MOELLER, DON	S	9.0 S	80.0 W	22	SW	NW	385690.0	4345286.0	39.249374	-106.324752	Well (Construction Report)	Residential	7/10/2017		7/10/2019	8/10/2017	1/18/2019		Domestic		106	55	105	10	50	8/10/2017	1/18/2019 0:00
0336	088	81079-F	Well Constructed	Owner	MOELLER, JO ANN	S	9.0 S	80.0 W	22	SW	NW	385690.0	4345286.0	39.249374	-106.324752	Well (Construction Report)	Residential	7/10/2017		7/10/2019	8/10/2017	1/18/2019		Domestic		106	55	105	10	50	8/10/2017	1/18/2019 0:00
0337	089	235668-	Well Replaced	Owner	MOSS III CHARLES J	S	9.0 S	80.0 W	22	NE	SE	386677.8	4345626.8	39.252576	-106.313362	Well (Application/Permit)	Residential	8/23/2001		8/23/2003	11/9/2001	8/30/2002		Household use only		147	92	147	15			8/30/2002 0:00
0338	090	235668--A	Well Constructed	Owner	MOSS III CHARLES J	S	9.0 S	80.0 W	22	NE	SE	386677.7	4345611.6	39.252441	-106.313359	Well (Application/Permit)	Residential	9/4/2002		9/4/2004	5/7/2003	6/10/2003		Household use only		110	65	96	8.7			6/10/2003 0:00
0339	091	80917-F	Well Constructed	Owner	MULCEY, JAMES D	S	9.0 S	80.0 W	22	SW	SW	385519.0	4345109.0	39.247757	-106.326703	Well (Construction Report)	General Purpose	5/16/2017		5/16/2019	11/15/2017	5/3/2019		Household use only		120			10	50	11/15/2017	5/3/2019 0:00
0340	092	194508-	Well Constructed	Owner	MUZIK, ROSS C.	S	9.0 S	80.0 W	22	NW	SE	385768.2	4345605.6	39.252267	-106.323902	Well (Application/Permit)	Residential	4/24/1996		4/24/1998	11/14/1996	12/23/1996		Domestic								10/2/2017 0:00
0341	093	65780-F	Well Constructed	Owner	NAIR RAVI & URBAN MONICA	S	9.0 S	80.0 W	22	SW	SW	385635.2	4344809.8	39.245079	-106.325308	Well (Application/Permit)	General Purpose	5/30/2007		5/30/2009		5/30/2008		Household use only			60	180	10			10/28/2020 0:00
0342	094	58791-F	Well Constructed	Owner	NEWELL, JAMES R.	S	9.0 S	80.0 W	22	SW	SE	386018.7	4344789.5	39.244949	-106.320856	Well (Application/Permit)	General Purpose	1/31/2003		1/31/2004	8/19/2003	11/19/2003		Household use only		135	95	135	15			12/19/2019 0:00
0343	095	58791-F	Well Constructed	Owner	NEWELL, KERRY F.	S	9.0 S	80.0 W	22	SW	SE	386018.7	4344789.5	39.244949	-106.320856	Well (Application/Permit)	General Purpose	1/31/2003		1/31/2004	8/19/2003	11/19/2003		Household use only		135	95	135	15			12/19/2019 0:00
0344	096	83938-F	Permit Issued	Owner	OCHEL, RALF	S	9.0 S	80.0 W	22	SW	SW	385388.8	4345099.6	39.247659	-106.328208	Well (Application/Permit)	Residential	1/10/2020		1/10/2021				Household use only								1/10/2020 0:00
0345	097	126113-	Well Constructed	Owner	PARETI, MELANIE B	S	9.0 S	80.0 W	22	NE	NW	386227.4	4346035.9	39.256201	-106.318657	Well (Application/Permit)	Residential	6/22/1982		6/22/1984	7/30/1982	9/3/1982		Household use only		137	112	137	3			9/29/2014 0:00
0346	098	67319-F	Well Constructed	Owner	PIERCE JR, FRANK R.	S	9.0 S	80.0 W	22	SW	SW	385540.0	4345009.0	39.246859	-106.326443	Well (Construction Report)	General Purpose	7/14/2008			10/6/2006	6/10/2019		Domestic					4			6/10/2019 0:00
0347	099	67319-F	Well Constructed	Owner	PIERCE, NANCY A.	S	9.0 S	80.0 W	22	SW	SW	385540.0	4345009.0	39.246859	-106.326443	Well (Construction Report)	General Purpose	7/14/2008			10/6/2006	6/10/2019		Domestic					4			6/10/2019 0:00
0348	100	59582-F	Well Constructed	Owner	REAP, RONALD	S	9.0 S	80.0 W	22	SW	SW	385485.9	4344835.6	39.245294	-106.327039	Well (Application/Permit)	General Purpose	5/14/2003		5/14/2004	8/13/2003	9/16/2003		Household use only		150	110	150	7			4/12/2004 0:00
0349	101	67035-F	Well Constructed	Owner	RENNO SCOTT L & ERIN E	S	9.0 S	80.0 W	22	SW	NW	385642.0	4345408.0	39.250467	-106.325329	Well (Application/Permit)	General Purpose	4/18/2008		4/18/2009	5/22/2008	6/4/2008		Household use only		122	82	126	15			12/9/2014 0:00
0350	102	83623-F	Well Constructed	Owner	ROBBINS, RON	S	9.0 S	80.0 W	22	SW	SE	385908.0	4344844.0	39.245421	-106.322151	Well (Construction Report)	Residential	9/18/2019		9/18/2020	4/22/2020	5/25/2020		Domestic		142			15	90	4/22/2020	5/25/2020 0:00
0351	103	108602-	Well Constructed	Owner	ROMERO, J A	S	9.0 S	80.0 W	22	NE	NW	386472.9	4346132.0	39.257098	-106.315822	Well (Application/Permit)	Residential	7/13/1979			11/14/1979			Household use only		130	100	130				3/3/2014 0

Wells Within 2 Miles of Leadville Mill - January 2021

Rec.	No.	Permit Number	Permit Status	Assoc Type	Contact Name	PM	TNS	RNG	SEC	Q160	Q40	UTM X	UTM Y	Latitude	Longitude	Location Type	Permit Category	Permit Issued	Date 1st Use	Date Permit Expires	Const Date	Last Pump Install Date	Date Well Plugged	Use(s)	Elevation	Well Depth	Perf. Casing Top	Perf. Casing Bottom	Pump Test Yield	Static Water Level	Static Water Level Date	Modified
0353	105	154734-	Permit Expired	Owner	RUSSELL, LES	S	9.0 S	80.0 W	22	NW	NE	385991.4	4346332.8	39.258846	-106.321441	Well (Application/Permit)	Residential	7/19/1989		7/19/1991												7/19/1991 0:00
0354	106	58695-F	Well Constructed	Owner	SADLER, JILL	S	9.0 S	80.0 W	22	SW	SE	386042.4	4344958.1	39.246466	-106.320618	Well (Application/Permit)	General Purpose	11/21/2002		11/21/2003	6/18/2003	7/23/2003		Household use only		178	136	178	12			7/23/2003 0:00
0355	107	54683-F	Well Constructed	Owner	SANCHEZ KEITH & TAMI	S	9.0 S	80.0 W	22	SW	NE	385755.2	4345483.6	39.251167	-106.324032	Well (Application/Permit)	General Purpose	10/11/2000		10/11/2001	10/25/2000	8/6/2001		Household use only		131	85	125	10.8			8/6/2001 0:00
0356	108	236534-	Well Constructed	Owner	SAUNDERS, JACK	S	9.0 S	80.0 W	22	SE	NE	386684.0	4345515.0	39.251568	-106.313274	Well (Construction Report)	Residential	9/26/2001		9/26/2003	11/14/2001	10/21/2017		Domestic		103	63	103	15			10/21/2017 0:00
0357	109	236534--A	Permit Issued	Owner	SAUNDERS, JACK	S	9.0 S	80.0 W	22	SE	NE	386684.0	4345516.5	39.251586	-106.313274	Well (Application/Permit)	Residential	9/11/2002		9/11/2004				Domestic								7/6/2010 0:00
0358	110	194509-	Permit Expired	Owner	SCHATZMAN, BETH	S	9.0 S	80.0 W	22	NW	NE	385967.2	4345985.5	39.255708	-106.321661	Well (Application/Permit)	Residential	4/24/1996		4/24/1998				Domestic								7/6/2010 0:00
0359	111	84929-F	Permit Issued	Owner	SESSEL, DEBORAH	S	9.0 S	80.0 W	22	NE	SW	386335.8	4345749.8	39.253637	-106.317348	Well (Application/Permit)	Residential	12/2/2020		12/2/2021				Domestic								12/2/2020 0:00
0360	112	67564-F	Well Constructed	Owner	SLATTERY, LAURA	S	9.0 S	80.0 W	22	SW	NE	386060.0	4345309.0	39.249630	-106.320469	Well (Application/Permit)	General Purpose	9/29/2008		9/29/2009	5/9/2009	4/28/2009		Household use only		148	100	148	7			5/9/2009 0:00
0361	113	54230-F	Permit Canceled	Owner	SPOSI, MARY B	S	9.0 S	80.0 W	22	SW	NE	386074.1	4345445.8	39.250866	-106.320330	Well (Application/Permit)	General Purpose	7/20/2000		7/20/2001				Household use only								11/1/2000 0:00
0362	114	120471-	Well Constructed	Owner	SWITALA, J E	S	9.0 S	80.0 W	22	NE	NW	386382.2	4346178.3	39.257501	-106.316885	Well (Application/Permit)	Residential	6/16/1981			8/22/1981			Household use only		143	103	143				3/3/2014 0:00
0363	115	65902-F	Well Constructed	Owner	THOMAS, ELIZABETH	S	9.0 S	80.0 W	22	SW	NW	385502.2	4345283.7	39.249331	-106.326930	Well (Application/Permit)	General Purpose	7/3/2007		7/3/2008	8/21/2007	2/7/2008		Domestic		154	104	154	13			3/4/2020 0:00
0364	116	65902-F	Well Constructed	Owner	THOMAS, TYSON	S	9.0 S	80.0 W	22	SW	NW	385502.2	4345283.7	39.249331	-106.326930	Well (Application/Permit)	General Purpose	7/3/2007		7/3/2008	8/21/2007	2/7/2008		Domestic		154	104	154	13			3/4/2020 0:00
0365	117	106490-	Permit Expired	Owner	TRUJILLO, JOE C	S	9.0 S	80.0 W	22	NE	NW	386366.9	4346178.3	39.257499	-106.317058	Well (Application/Permit)	Residential	5/15/1979						Household use only								11/15/1991 0:00
0366	118	82187-F	Well Constructed	Owner	VRBA, MAGDALENA	S	9.0 S	80.0 W	22	NE	SW	386511.0	4345659.0	39.252842	-106.315302	Well (Construction Report)	Residential	6/19/2018			12/30/1997	1/20/1998		Domestic		180			5	100	12/30/1997	7/3/2018 0:00
0367	119	82187-F	Well Constructed	Owner	VRBA, STANISLAV	S	9.0 S	80.0 W	22	NE	SW	386511.0	4345659.0	39.252842	-106.315302	Well (Construction Report)	Residential	6/19/2018			12/30/1997	1/20/1998		Domestic		180			5	100	12/30/1997	7/3/2018 0:00
0368	120	78456-F	Well Constructed	Owner	WALKER, SHARON	S	9.0 S	80.0 W	22	SW	SW	385622.8	4344896.4	39.245852	-106.325462	Well (Application/Permit)	General Purpose	9/10/2014		9/10/2015	9/16/2014	10/2/2014		Domestic		140	100	140	9			10/23/2014 0:00
0369	121	62086-F	Permit Expired	Owner	WEISKIRCH TOM & KELLY	S	9.0 S	80.0 W	22	SW	SW	385715.1	4345094.9	39.247657	-106.324430	Well (Application/Permit)	General Purpose	12/16/2004		12/16/2005				Household use only								1/28/2008 0:00
0370	122	102385-	Well Constructed	Owner	WELCH GARY D & IRENE E	S	9.0 S	80.0 W	22	NE	NW	386259.1	4346281.7	39.258422	-106.318327	Well (Application/Permit)	Residential	10/4/1978	12/18/1978	10/4/1980	10/14/1978	12/18/1978		Household use only		158	135	158	9			8/24/1993 0:00
0371	123	64343-F	Well Constructed	Owner	WILEY THOMAS H & CLAUDIA A	S	9.0 S	80.0 W	22	SW	NE	385867.8	4345201.7	39.248641	-106.322675	Well (Application/Permit)	General Purpose	5/30/2006		5/30/2007	10/4/2006	10/12/2006		Household use only		160	120	160	5			5/12/2008 0:00
0372	124	161485-	Permit Issued	Owner	WOOD, DONALD M	S	9.0 S	80.0 W	22	NE	NW	386383.6	4346269.7	39.258330	-106.316877	Well (Application/Permit)	Residential	9/6/1991						Household use only								9/6/1991 0:00
0373	125	222930-	Well Constructed	Owner	ZWERDLINGER, LISA P	S	9.0 S	80.0 W	22	NW	NE	385900.4	4346059.0	39.256366	-106.322450	Well (Application/Permit)	Residential	1/20/2000		1/20/2002	5/5/2000	10/27/2000		Domestic		161	141	161	12			8/23/2007 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 23																																
0374	001	14978-MH	Permit Issued	Owner	AMOCO CORP	S	9.0 S	80.0 W	23	NE	NE	388157.4	4345935.1	39.255543	-106.296272	Well (Application/Permit)	Monitoring Hole (Notice c	4/18/1989		7/17/1989				Monitoring/Sampling								1/27/2004 0:00
0375	002	77443-F	Well Constructed	Owner	BISSONNETTE CRAIG & LAUREN	S	9.0 S	80.0 W	23	NW	SE	387745.7	4345539.0	39.251922	-106.300973	Well (Application/Permit)	General Purpose	8/6/2013		8/6/2014	11/13/2013	11/18/2013		Domestic		135	85	135	8			11/18/2013 0:00
0376	003	21856-	Well Constructed	Owner	CAMP RICHARD H & VICTORIA J	S	9.0 S	80.0 W	23	NW	NW	387083.2	4346172.9	39.257547	-106.308761	Well (Application/Permit)	Residential		9/30/1964		9/30/1964			Domestic		152						9/3/2009 0:00
0377	004	99623-	Well Constructed	Owner	DUNN, DAVID J.	S	9.0 S	80.0 W	23	NW	NW	387105.8	4346118.8	39.257064	-106.308485	Well (Application/Permit)	Residential	6/22/1978	10/9/1964					Domestic, Stock		164						6/28/2007 0:00
0378	005	297441-	Well Constructed	Owner	FARBER, ZECHARIAH L.	S	9.0 S	80.0 W	23	NW	NW	387064.0	4345995.0	39.255941	-106.308951	Well (Application/Permit)	Residential	5/1/2015		5/1/2017	9/24/2015			Household use only		200	160	200				9/4/2019 0:00
0379	006	210060-	Well Constructed	Owner	HAUSER ALBERT A JR	S	9.0 S	80.0 W	23	NW	NW	387007.6	4346021.7	39.256177	-106.309605	Well (Application/Permit)	Residential	6/2/1998		6/2/2000	7/2/1998	11/5/1998		Household use only	0	180	135	180	5			11/5/1998 0:00
0380	007	210129-	Well Constructed	Owner	JOHNSON, ANNETTE G	S	9.0 S	80.0 W	23	NW	NW	386981.5	4346107.5	39.256940	-106.309920	Well (Application/Permit)	Residential	6/3/1998		6/3/2000	4/5/1999	6/17/1999		Household use only		190	150	190	12			1/7/2013 0:00
0381	008	21764-MH	Permit Issued	Owner	MALLETTE, JOHN	S	9.0 S	80.0 W	23	NW	NW	387150.7	4346151.6	39.257363	-106.307972	Well (Application/Permit)	Monitoring Hole (Notice c	10/21/1993		1/21/1994				Monitoring/Sampling								10/25/1993 0:00
0382	009	10989-	Well Constructed	Owner	MARTINEZ MIGUEL M & CAMP KELLY E Q	S	9.0 S	80.0 W	23	NW	NW	387150.7	4346151.6	39.257363	-106.307972	Well (Application/Permit)	Residential		4/2/1962		4/2/1962			Domestic		157						11/2/2009 0:00
0383	010	21290-	Well Constructed	Owner	MCGUIRE, MICHAEL D	S	9.0 S	80.0 W	23	NW	SE	387550.9	4345741.1	39.253717	-106.303267	Well (Application/Permit)	Residential		7/24/1964		7/24/1964			Domestic		152						7/24/1964 0:00
0384	011	170107-	Permit Expired	Owner	OELZE BRIAN LEE	S	9.0 S	80.0 W	23	NW	NW	387044.6	4346047.0	39.256407	-106.309180	Well (Application/Permit)	Residential	5/21/1993		5/21/1995				Commercial								5/4/2015 0:00
0385	012		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	23	NE	SE	388393.8	4345609.6	39.252645	-106.293476	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0386	013		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	23	NW	SW	387021.7	4345873.9	39.254846	-106.309418	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0387	014		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	23	SE	NW	388065.7	4345210.6	39.249009	-106.297211	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0388	015	177053-	Well Constructed	Owner	SAUNDERS, JACK	S	9.0 S	80.0 W	23	SW	SW	387143.2	4344975.6	39.246772	-106.307865	Well (Application/Permit)	Residential	3/31/1994		3/31/1996	8/5/1994	7/1/1996		Household use only		165	85	165	12			7/1/1996 0:00
0389	016	5439-	Well Constructed	Owner	SMITH, A K	S	9.0 S	80.0 W	23	NW	NW	387150.7	4346151.6	39.257363	-106.307972	Well (Application/Permit)	Residential		4/10/1960		4/10/1960			Domestic		197						4/10/1960 0:00
0390	017	5847-	Well Constructed	Owner	SMITH, A K	S	9.0 S	80.0 W	23	NW	NW	387150.7	4346151.6	39.257363	-106.307972	Well (Application/Permit)	Residential		5/23/1960		5/23/1960			Domestic		178						5/23/1960 0:00
0391	018	34996-MH	Permit Issued	Owner	UNION PACIFIC RAILROAD	S	9.0 S	80.0 W	23	NE	NE	388361.6	4346132.9	39.257352	-106.293939	Well (Application/Permit)	Monitoring Hole (Notice c	11/6/1998		2/6/1999				Monitoring/Sampling								11/12/1998 0:00
0392	019	9781-	Well Constructed	Owner	WILSON, KATHRYN	S	9.0 S	80.0 W	23	NW	NW	387150.7	4346151.6	39.257363	-106.307972	Well (Application/Permit)	Residential		10/28/1961		10/28/1961			Domestic		184						2/7/2018 0:00
0393	020	9781-	Well Constructed	Owner	WILSON, MICHAEL	S	9.0 S	80.0 W	23	NW	NW	387150.7	4346151.6	39.257363	-106.307972	Well (Application/Permit)	Residential		10/28/1961		10/28/1961			Domestic		184						2/7/2018 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 26																																
0394	001	32960-	Well Constructed	Owner	ADAMICH, W V	S	9.0 S	80.0 W	26	NW	SW	387126.8	4344116.3	39.239025	-106.307909	Well (Application/Permit)	Residential		2/3/1968		2/3/1968			Domestic		42						2/3/1968 0:00
0395	002	117357-	Permit Expired	Owner	BARREGO, ANDREW J	S	9.0 S	80.0 W	26	NW	SE	387442.4	4344267.2	39.240424	-106.304283	Well (Application/Permit)	Residential							Household use only								7/11/2000 0:00
0396	003	73510-	Well Constructed	Owner	DIEDRICH, W D	S	9.0 S	80.0 W	26	NW	SW	387257.8	4344038.1	39.238337	-106.306376	Well (Application/Permit)	Residential	3/6/1974	6/11/1974		6/11/1974			Household use only		35	20	35				3/22/2005 0:00
0397	004	102447-	Permit Issued	Owner	FRENCH, TOM	S	9.0 S	80.0 W	26	SE	NE	388322.8	4343597.7	39.234511	-106.293966	Well (Application/Permit)	Residential	10/5/1979						Household use only								6/20/1990 0:00
0398	005	6845-	Well Constructed	Owner	MATEKEL, JOE	S	9.0 S	80.0 W	26	NW	SW	387126.8	4344116.3	39.239025	-106.307909	Well (Application/Permit)	Residential		9/30/1960		9/30/1960			Domestic		38						9/30/1960 0:00
0399	006	22764-MH	Well Constructed	Owner	RESURRECTION, MINING	S	9.0 S	80.0 W	26	NW	SE	387532.9	4344110.9	39.239029	-106.303204	Well (Application/Permit)	Monitoring Hole (Notice c	5/3/1994		8/3/1994	6/28/1994			Monitoring/Sampling	9957	76	33	43				8/26/1994 0:00
0400	007	23050-MH	Well Constructed	Owner	RESURRECTION, MINING	S	9.0 S	80.0 W	26	NW	SW	387126.8	4344116.3	39.239025	-106.307909	Well (Application/Permit)	Monitoring Hole (Notice c	6/21/1994		9/21/1994	6/24/1994			Monitoring/Sampling	9922	30	8	28				8/26/1994 0:00
0401	008	23986-MH	Well Constructed	Owner	RESURRECTION, MINING	S	9.0 S	80.0 W	26	NW	SE	387532.9	4344110.9	39.239029	-106.303204	Well (Application/Permit)	Monitoring Hole (Notice c	8/4/1994		11/4/1994	6/29/1994			Monitoring/Sampling	9557	29	18	28				5/11/1998 0:00
0402	009		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	26	NW	SE	387687.0	4343968.6	39.237771	-106.301395	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0403	010	195019-	Well Constructed	Owner	RUZICKA KIM & KAREN	S	9.0 S	80.0 W	26	NW	SE	387440.9	4344283.1	39.240568	-106.304297	Well (Application/Permit)	Residential	5/15/1996	10/1/1955					Domestic		47						5/15/1996 0:00
0404	011	29904-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	26	NW	SW	387108.6	4344185.0	39.239642	-106.308127	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0405	012	29905-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	26	NW	SW	387108.6	4344185.0	39.239642	-106.308127	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0406	013	29915-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	26	NW	SW	387078.0	4344075.7	39.238656	-106.308468	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0407	014	17123-	Well Constructed	Owner	VIGIL, FRANK	S	9.0 S	80.0 W	26	NW	SE	387532.9	4344110.9	39.239029	-106.303204	Well (Application/Permit)	Residential		7/19/1963		7/19/1963			Domestic		35						7/19/1963 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 27																																
0408	001	2011-F	Well Constructed	Owner	DIEDRICH, W O	S	9.0 S	80.0 W	27	SW	NE	385916.6	4343731.3	39.235398	-106.321864	Well (Application/Permit)	General Purpose		2/11/1959		2/11/1959			Industrial		477						2/11/1959 0:00
0409	002	13165-F		Owner	DIEDRICH, W O	S	9.0 S	80.0 W	27	SW	NE	385916.6	4343731.3	39.235398	-106.321864	Well (Application/Permit)	General Purpose							Industrial								
0410	003	70395-	Well Constructed	Owner	FAVDIGA, CHARLES W	S	9.0 S	80.0 W	27	SE	SW	386117.6	4343527.3	39.233585	-106.319496	Well (Application/Permit)	Residential	8/1/1973	8/30/1973		8/30/1973			Household use only		50	25	50				1/26/2005 0:00
0411	004	18165-MH	Permit Issued	Owner	HECLA MINING CO	S	9.0 S	80.0 W	27	NW	NE	385717.8	4344342.6	39.240879	-106.324270	Well (Application/Permit)	Monitoring Hole (Notice c	9/19/1991		12/18/1991				Monitoring/Sampling								6/10/2004 0:00
0412	005	84934-F	Well Constructed	Owner	LAKE COUNTY CONCRET & EXCAVATING LLC	S	9.0 S	80.0 W	27	SW	NE	385914.9	4343734.0	39.235423	-106.321882	Well (Application/Permit)	General Purpose	12/2/2020			2/11/1959	2/11/1959		Commercial, Industrial		477			180			12/2/2020 0:00
0413	006	24473-	Well Constructed	Owner	LUJAN, JOHN	S	9.0 S	80.0 W	27	SE	NE	386721.2	4343719.5	39.235398	-106.312542	Well (Application/Permit)	Residential		6/14/1965		6/14/1965			Domestic		33						6/14/1965 0:00
0414	007	227037-	Well Constructed	Owner	MEDLEY, MARY R	S	9.0 S	80.0 W	27	SE	NE	386678.6	4343878.7	39.236829	-106.313057	Well (Application/Permit)	Residential	7/6/2000	06/01/1880					Domestic		300						7/6/2000 0:00
0415	008	16278-	Well Constructed	Owner	MESTAES, JUAN	S	9.0 S	80.0 W	27	SE	NW	386318.9	4343725.4	39.235398	-106.317203	Well (Application/Permit)	Residential		9/17/1963		9/17/1963			Domestic		34						9/17/1963 0:00
0416	009	6508-	Well Constructed	Owner	MESTAS, JUAN	S	9.0 S	80.0 W	27	SE	NW	386318.9	4343725.4	39.235398	-106.317203	Well (Application/Permit)	Residential		7/26/1960		7/26/1960			Domestic		62						7/26/1960 0:00
0417	010	64361-	Well Constructed	Owner	PACHECO, RAY O	S	9.0 S	80.0 W	27	SE	NW	386495.8	4343896.7	39.236967	-106.315180	Well (Application/Permit)	Residential	9/12/1972	9/14/1972		9/14/1972			Household use only		39	17	39				10/8/2004 0:00
0418	011	47061-	Well Constructed	Owner	PADILLA, SANTIAGO	S	9.0 S	80.0 W	27	SE	NE	386721.2	4343719.5	39.235398	-106.312542	Well (Application/Permit)	Residential		6/30/1971		6/30/1971			Domestic		34						6/30/1971 0:00
0419	012		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	27	NW	NW	385597.2	4344382.2	39.241218	-106.325676	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0420	013		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	27	SE	NE	386841.9	4343717.8	39.235400	-106.311142	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0421	014		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	27	SE	SW	386286.7	4343484.6	39.233228	-106.317531	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0422	015		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	27	SE	NW	386134.0	4343889.2	39.236848	-106.319372	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0423	016		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	27	SW	NE	385793.3	4343652.9	39.234677	-106.323282	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0424	017	29415-	Well Constructed	Owner	SHOBER, FRANK	S	9.0 S	80.0 W	27	SE	NW	386318.9	4343725.4	39.235398	-106.317203	Well (Application/Permit)	Residential		12/17/1966		12/17/1966			Domestic		90						12/17/1966 0:00
0425	018	17119-	Well Constructed	Owner	TRUJILLO, ALFRED	S	9.0 S	80.0 W	27	SE	NW	386318.9	4343725.4	39.235398	-106.317203	Well (Application/Permit)	Residential		9/5/1963		9/5/1963			Domestic		34						9/5/1963 0:00
0426	019	29906-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	27	SE	SW	386360.2	4343368.3	39.232184	-106.316666	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0427	020	29908-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	27	NW	NE	386095.1	4344497.9	39.242329	-106.319926	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0428	021	29909-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	27	NE	NE	386736.8	4344373.6	39.241296	-106.312468	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0429	022	29910-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	27	SW	NE	386021.6	4343559.2	39.233860	-106.320613	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0430	023	29917-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	27	SW	NW	385712.3	4343563.8	39.233864	-106.324205	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 28																																
0431	001		Application Information Req	Owner	BARTHELS, GREG	S	9.0 S	80.0 W	28	NW	SE	384334.1	4344156.1	39.239015	-106.340269	Well (Application/Permit)	Unknown							Household use only								6/8/2001 0:00
0432	002		Application Information Req	Owner	BARTHELS, MATT	S	9.0 S	80.0 W	28	NW	SW	384085.2	4344112.9	39.238594	-106.343146	Well (Application/Permit)	Unknown							Household use only								6/8/2001 0:00
0433	003	195589-	Well Constructed	Owner	BENSON GEORGE A & ELIZABETH L	S	9.0 S	80.0 W	28	SE	SW	384664.1	4343440.8	39.232618	-106.336324	Well (Application/Permit)	Residential	6/10/1996		6/10/1998	6/26/1996			Domestic		140	80	140				7/5/2016 0:00
0434	004	16268-	Well Constructed	Owner	EATON, T W	S	9.0 S	80.0 W	28	SW	SW	383896.0	4343360.1	39.231786	-106.345205	Well (Application/Permit)	Residential		8/6/1963		8/6/1963			Domestic		60						8/6/1963 0:00
0435	005	16267-	Well Constructed	Owner	FLOR, W E	S	9.0 S	80.0 W	28	SW	SW	383896.0	4343360.1	39.231786	-106.345205	Well (Application/Permit)	Residential		8/3/1963		8/3/1963			Domestic		53						8/3/1963 0:00

Wells Within 2 Miles of Leadville Mill - January 2021

Rec.	No.	Permit Number	Permit Status	Assoc Type	Contact Name	PM	TNS	RNG	SEC	Q160	Q40	UTM X	UTM Y	Latitude	Longitude	Location Type	Permit Category	Permit Issued	Date 1st Use	Date Permit Expires	Const Date	Last Pump Install Date	Date Well Plugged	Use(s)	Elevation	Well Depth	Perf. Casing Top	Perf. Casing Bottom	Pump Test Yield	Static Water Level	Static Water Level Date	Modified
0436	006	283678-	Well Constructed	Owner	FRITZ, ROBERT	S	9.0 S	80.0 W	28	SE	NW	384729.9	4343707.1	39.235023	-106.335605	Well (Application/Permit)	Residential	8/2/2010		8/2/2012	10/3/2011	4/23/2013		Domestic		95	54	95	12			6/14/2013 0:00
0437	007	271566-	Well Constructed	Owner	HAYNES EDWARD A & TERESA	S	9.0 S	80.0 W	28	NE	SE	385186.1	4344182.0	39.239362	-106.330403	Well (Application/Permit)	Residential	11/15/2006		11/15/2008	6/6/2007	11/21/2008		Domestic, Stock		190	135	190	6			12/29/2008 0:00
0438	008	15949-MH	Permit Issued	Owner	LEADVILLE MINING & MILLING	S	9.0 S	80.0 W	28	NE	SW	384508.4	4343958.1	39.237255	-106.338214	Well (Application/Permit)	Monitoring Hole (Notice (	3/12/1990		6/10/1990				Monitoring/Sampling								2/11/2004 0:00
0439	009	12073-AD	Application Denied	Owner	LEADVILLE MINING & MILLING CORP	S	9.0 S	80.0 W	28	SE	SE	384950.8	4343203.5	39.230512	-106.332959	Well (Application/Permit)	Residential							Domestic								2/5/1990 0:00
0440	010	10907-AD	Application Denied	Owner	LEADVILLE, GOLD	S	9.0 S	80.0 W	28	SE	NE	385128.5	4343779.9	39.235733	-106.330995	Well (Application/Permit)	General Purpose							Industrial								3/3/2014 0:00
0441	011	319445-	Permit Issued	Owner	MUELLER, ABBY	S	9.0 S	80.0 W	28	SW	SE	384302.7	4343353.7	39.231783	-106.340494	Well (Application/Permit)	Residential	11/10/2020		11/10/2022				Household use only								11/10/2020 0:00
0442	012	319445-	Permit Issued	Owner	MUELLER, TIMOTHY	S	9.0 S	80.0 W	28	SW	SE	384302.7	4343353.7	39.231783	-106.340494	Well (Application/Permit)	Residential	11/10/2020		11/10/2022				Household use only								11/10/2020 0:00
0443	013	220535-	Permit Expired	Owner	NICKLE, FRANK	S	9.0 S	80.0 W	28	NW	NW	383824.0	4344481.5	39.241875	-106.346233	Well (Application/Permit)	Residential	9/17/1999		9/17/2001				Domestic		0						9/12/2002 0:00
0444	014	243995-	Well Constructed	Owner	NICKLE, FRANK M	S	9.0 S	80.0 W	28	NW	NW	383827.0	4344566.8	39.242650	-106.346213	Well (Application/Permit)	Residential	9/12/2002		9/12/2004	5/12/2003	8/15/2003		Domestic		148	108	140	13			8/15/2003 0:00
0445	015	246993-	Permit Issued	Owner	NICKLE, FRANK M	S	9.0 S	80.0 W	28	NE	NW	384660.5	4344409.2	39.241337	-106.336536	Well (Application/Permit)	Residential	1/13/2003		1/13/2005				Domestic								1/13/2003 0:00
0446	016	246994-	Permit Issued	Owner	NICKLE, FRANK M	S	9.0 S	80.0 W	28	NW	NE	384179.5	4344365.6	39.240886	-106.342089	Well (Application/Permit)	Residential	1/13/2003		1/13/2005				Domestic								1/13/2003 0:00
0447	017	246995-	Permit Issued	Owner	NICKLE, FRANK M	S	9.0 S	80.0 W	28	NW	NE	384410.5	4344360.5	39.240872	-106.339412	Well (Application/Permit)	Residential	1/13/2003		1/13/2005				Domestic								1/13/2003 0:00
0448	018	246992-	Permit Issued	Owner	NICKLE, FRANK M	S	9.0 S	80.0 W	28	NE	NE	385226.4	4344595.4	39.243088	-106.330010	Well (Application/Permit)	Residential	1/13/2003		1/13/2005				Domestic								11/22/2011 0:00
0449	019	281112-	Well Constructed	Owner	NICKLE, FRANK M	S	9.0 S	80.0 W	28	NE	NW	384891.0	4344485.0	39.242053	-106.333872	Well (Application/Permit)	Residential	7/7/2009		7/7/2011		6/23/2009		Domestic		160		15				7/7/2009 0:00
0450	020		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	28	SE	SE	385227.1	4343218.7	39.230692	-106.329765	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0451	021		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	28	SW	NE	384425.3	4343810.3	39.235910	-106.339155	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0452	022	117842-	Well Constructed	Owner	SALEM MINERALS, INC	S	9.0 S	80.0 W	28	SE	NE	385128.5	4343779.9	39.235733	-106.330995	Well (Application/Permit)	Residential	1/13/1981			2/26/1981			Domestic								6/25/2019 0:00
0453	023	269503-	Well Constructed	Owner	SMITH BRAD & DIANE	S	9.0 S	80.0 W	28	SW	NE	384331.9	4343948.0	39.237141	-106.340256	Well (Application/Permit)	Residential	6/22/2006		6/22/2008	8/9/2006	6/14/2007		Household use only		140	100	140	13			6/14/2007 0:00
0454	024	293115-	Well Constructed	Owner	SMITH, BRAD	S	9.0 S	80.0 W	28	NW	SE	384453.0	4344034.3	39.237932	-106.338869	Well (Application/Permit)	Residential	12/20/2013		12/20/2015	5/18/2015	8/30/2015		Domestic		122	82	122	10			8/30/2015 0:00
0455	025	295654-	Well Constructed	Owner	UNION MILLING COMPANY LLC	S	9.0 S	80.0 W	28	SE	SE	385066.5	4343203.8	39.230536	-106.331627	Well (Application/Permit)	Monitoring/Observation	9/11/2014		9/11/2016	10/14/2014			Monitoring/Sampling		74	56	66				10/14/2014 0:00
0456	026	228611-	Well Constructed	Owner	YEAKEL CECILE A LIVING TRUST	S	9.0 S	80.0 W	28	NW	SW	384046.5	4344132.0	39.238760	-106.343589	Well (Application/Permit)	Residential	9/6/2000		9/6/2002	7/2/2001	2/14/2002		Domestic		151	105	155	14.8			8/8/2005 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 29																																
0457	001	151946-	Permit Expired	Owner	DEAN, EARL H	S	9.0 S	80.0 W	29	NE	NW	383255.5	4344360.9	39.240717	-106.352792	Well (Application/Permit)	Residential	8/4/1988		8/4/1990				Household use only								8/4/1990 0:00
0458	002	258524-	Well Constructed	Owner	FLAUM, JAMES G	S	9.0 S	80.0 W	29	SE	NE	383391.0	4343705.1	39.234826	-106.351115	Well (Application/Permit)	Residential	8/4/2004		8/4/2006	9/8/2004			Domestic		92	51	92				9/8/2004 0:00
0459	003	11164-F	Well Constructed	Owner	MT MASSIVE GOLF CLUB	S	9.0 S	80.0 W	29	NW	SE	382725.5	4344150.5	39.238749	-106.358901	Well (Application/Permit)	General Purpose		10/4/1966		10/4/1966			Irrigation		148						10/4/1966 0:00
0460	004	16265-	Well Constructed	Owner	MT MASSIVE GOLF CLUB	S	9.0 S	80.0 W	29	NW	NE	382733.6	4344571.6	39.242544	-106.358880	Well (Application/Permit)	Residential		6/26/1963		6/26/1963			Domestic		59						6/26/1963 0:00
0461	005	162760-	Well Constructed	Owner	TRUJILLO DANIEL & CHRISTY LYNN	S	9.0 S	80.0 W	29	SW	SE	382682.5	4343226.7	39.230424	-106.359233	Well (Application/Permit)	Residential	1/21/1992			6/29/1992	6/30/1992		Domestic	9100	45	25	45	12			4/6/2011 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 32																																
0462	001	177940-	Well Constructed	Owner	BEARD, DON	S	9.0 S	80.0 W	32	SW	NW	382420.0	4342230.8	39.221416	-106.362106	Well (Application/Permit)	Residential	5/17/1994		5/17/1996	6/22/1994	7/2/1994		Domestic	9500	45	25	45	15			7/20/2017 0:00
0463	002	99862-	Well Constructed	Owner	BECK, HARRY J	S	9.0 S	80.0 W	32	SW	NW	382327.6	4342041.6	39.219701	-106.363138	Well (Application/Permit)	Residential		7/20/1978		7/20/1978			Domestic		33						7/20/1978 0:00
0464	003	96065--A	Well Constructed	Owner	CASIAS, N L	S	9.0 S	80.0 W	32	SE	NE	383575.5	4342285.9	39.222067	-106.348739	Well (Application/Permit)	Residential	1/12/1978			3/26/1978			Domestic, Stock		51	33	51				3/3/2014 0:00
0465	004	96065-	Well Constructed	Owner	CASIAS, NEMECINO L	S	9.0 S	80.0 W	32	SE	NE	383575.5	4342285.9	39.222067	-106.348739	Well (Application/Permit)	Residential		3/26/1978		3/26/1978			Domestic, Stock		51						12/6/2005 0:00
0466	005	11188-F	Permit Issued	Owner	FALCON/WESTMINSTER 2 PARTNERSHIP	S	9.0 S	80.0 W	32	SE	SW	383052.2	4341758.1	39.217241	-106.354702	Well (Application/Permit)	General Purpose	9/9/1966						Municipal								8/14/2009 0:00
0467	006	15242-F-R	Permit Issued	Owner	FALCON/WESTMINSTER 2 PARTNERSHIP	S	9.0 S	80.0 W	32	SE	NW	383025.9	4341968.6	39.219138	-106.355042	Well (Application/Permit)	General Purpose	1/28/1997		1/28/1998				Commercial, Irrigation								2/24/1999 0:00
0468	007	18166-MH	Permit Issued	Owner	HECLA MINING CO	S	9.0 S	80.0 W	32	NE	SE	383274.9	4342762.4	39.226319	-106.352297	Well (Application/Permit)	Monitoring Hole (Notice (	9/19/1991		12/18/1991				Monitoring/Sampling								6/15/2004 0:00
0469	008	100966-	Permit Expired	Owner	HINTON, JOHN A	S	9.0 S	80.0 W	32	SW	SE	382591.0	4341681.3	39.216485	-106.360030	Well (Application/Permit)	Residential	8/9/1978		8/9/1980				Domestic								8/9/1980 0:00
0470	009	89342-	Well Constructed	Owner	KASLER CORP/L H WOOD& SON	S	9.0 S	80.0 W	32	SW	NW	382460.3	4342352.5	39.222512	-106.361664	Well (Application/Permit)	Residential		4/20/1977		4/20/1977			Domestic, Stock		36						7/20/2005 0:00
0471	010	175194-	Well Constructed	Owner	LAKE FORK RANCH COMPANY	S	9.0 S	80.0 W	32	NW	NW	382249.4	4342840.2	39.226879	-106.364192	Well (Application/Permit)	Residential	12/13/1993	7/1/1900					Household use only		38						9/16/2002 0:00
0472	011	175194--A	Well Constructed	Owner	LAKE FORK RANCH COMPANY	S	9.0 S	80.0 W	32	NW	NW	382173.2	4342838.9	39.226860	-106.365072	Well (Application/Permit)	Residential	9/16/2002		9/16/2004	2/5/2003	2/7/2003		Domestic, Stock		75	40	75	13			2/7/2003 0:00
0473	012	278813-	Permit Canceled	Owner	LEADVILLE MHC LLC	S	9.0 S	80.0 W	32	SE	SW	383057.1	4341949.0	39.218962	-106.354680	Well (Application/Permit)	Monitoring/Observation	9/25/2008		9/25/2010	10/11/2008			Monitoring/Sampling		85	56	76				4/30/2009 0:00
0474	013	11188-F-R	Well Constructed	Owner	LEADVILLE MHC LLC	S	9.0 S	80.0 W	32	SE	SW	383057.0	4341949.0	39.218962	-106.354680	Well (Application/Permit)	General Purpose	4/30/2009		4/30/2010	10/11/2008	12/30/2008		Commercial		85	56	76	100			5/13/2014 0:00
0475	014	15242-F	Well Constructed	Owner	LEADVILLE MHC, LLC	S	9.0 S	80.0 W	32	NE	SW	383142.0	4342679.8	39.225559	-106.353822	Well (Application/Permit)	General Purpose	10/23/1970	11/14/1970		11/16/1970			Commercial		49	18	49				9/18/2014 0:00
0476	015	245225-	Well Constructed	Owner	LENHARD, TANYA	S	9.0 S	80.0 W	32	NE	SE	383653.8	4342384.1	39.222961	-106.347841	Well (Application/Permit)	Residential	10/22/2002		10/22/2004	12/6/2002	4/22/2003		Household use only		97	65	95	15			12/10/2010 0:00
0477	016	5227-	Well Constructed	Owner	MARKSHEFFEL, D A	S	9.0 S	80.0 W	32	SE	NW	383060.8	4342160.3	39.220866	-106.354672	Well (Application/Permit)	Residential		2/14/1960		2/14/1960			Domestic		26						2/14/1960 0:00
0478	017	270594-	Well Constructed	Owner	MCMILLEN JIM & LEXIE	S	9.0 S	80.0 W	32	NE	SE	383676.0	4342715.0	39.225946	-106.347643	Well (Application/Permit)	Residential	9/11/2006		9/11/2008	9/20/2006	11/25/2008		Household use only		80	50	80	12			2/14/2012 0:00
0479	018	246080-	Well Constructed	Owner	NICKLE, FRANK M	S	9.0 S	80.0 W	32	NE	SE	383579.6	4342474.4	39.223762	-106.348713	Well (Application/Permit)	Residential	12/6/2002		12/6/2004	12/20/2002	1/7/2003		Commercial		80	45	80	12			1/22/2003 0:00
0480	019		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	32	NE	NE	383318.4	4342914.7	39.227699	-106.351824	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0481	020		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	32	NE	NW	383195.6	4342816.4	39.226791	-106.353220	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0482	021		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	32	NE	NE	383355.5	4342770.5	39.226398	-106.351359	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0483	022	65708-	Well Constructed	Owner	SEPPI ALDO & EDITH MARIE	S	9.0 S	80.0 W	32	SE	NW	383156.9	4342315.2	39.222273	-106.353585	Well (Application/Permit)	Residential	10/18/1972	9/30/1974		11/13/1972	9/30/1974		Household use only		39	27	39	15			11/15/2004 0:00
0484	023	29914-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	32	SE	NW	383166.4	4342051.7	39.219905	-106.353435	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0485	024	16266-	Well Constructed	Owner	WALKER RANCH	S	9.0 S	80.0 W	32	SE	NW	383060.8	4342160.3	39.220866	-106.354672	Well (Application/Permit)	Residential		7/13/1963		7/13/1963			Domestic		30						7/13/1963 0:00
0486	025	177939-	Well Constructed	Owner	WORKMAN MARC & MENNIFER	S	9.0 S	80.0 W	32	SW	SW	382354.3	4341591.0	39.215642	-106.362759	Well (Application/Permit)	Residential	5/17/1994		5/17/1996	6/24/1994	7/3/1994		Domestic	9500	45	25	45	15			7/8/2014 0:00
0487	026	29205-MH	Well Constructed	Owner	ZEPPELIN, MICKEY	S	9.0 S	80.0 W	32	SE	SW	383052.2	4341758.1	39.217241	-106.354702	Well (Application/Permit)	Monitoring Hole (Notice (	9/16/1996		12/16/1996	10/9/1996			Monitoring/Sampling		75						1/28/1997 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 33																																
0488	001	132745-	Well Constructed	Owner	CHASE, H L	S	9.0 S	80.0 W	33	NW	NW	383923.2	4342853.5	39.227231	-106.344806	Well (Application/Permit)	Residential	9/15/1983			9/23/1983			Household use only		92	77	92				3/3/2014 0:00
0489	002	62698-	Well Constructed	Owner	FLANK OIL COMPANY	S	9.0 S	80.0 W	33	NW	NE	384469.9	4342759.7	39.226457	-106.338454	Well (Application/Permit)	Residential	8/2/1972	8/18/1972		8/18/1972			Domestic		55	35	55				9/8/2004 0:00
0490	003	28242-	Well Constructed	Owner	GUTIERREZ WALTER ROBERT	S	9.0 S	80.0 W	33	SW	SW	383860.6	4341751.8	39.217294	-106.345339	Well (Application/Permit)	Residential	7/27/1966	8/1/1966		8/1/1966			Domestic		45	21	45				5/24/1995 0:00
0491	004	6616-	Well Constructed	Owner	HODSON, HARRY E	S	9.0 S	80.0 W	33	NE	NE	385100.9	4342939.7	39.228160	-106.331177	Well (Application/Permit)	Residential		8/15/1960		8/15/1960			Domestic		42						8/15/1960 0:00
0492	005	28018--A	Well Constructed	Owner	LAKE COUNTY MMI LLC	S	9.0 S	80.0 W	33	SW	SW	383731.0	4341751.0	39.217269	-106.346840	Well (Application/Permit)	Residential	3/24/2005		3/24/2007	4/5/2005	4/19/2005		Domestic		120	80	120	12			4/19/2005 0:00
0493	006	15950-MH	Well Constructed	Owner	LEADVILLE MINING & MILLING	S	9.0 S	80.0 W	33	SW	NE	384479.3	4342346.0	39.222729	-106.338275	Well (Application/Permit)	Monitoring Hole (Notice (	3/12/1990		6/10/1990	3/16/1990			Monitoring/Sampling	9706	25						2/11/2004 0:00
0494	007	65394-	Well Constructed	Owner	MOLLEUR MARCEL & CHERYL	S	9.0 S	80.0 W	33	NW	SE	384310.8	4342451.2	39.223652	-106.340243	Well (Application/Permit)	Residential	10/6/1972	10/25/1972		10/25/1972	12/12/1972		Household use only		120	85	120	15			11/8/2004 0:00
0495	008	72878-	Well Constructed	Owner	MOLLEUR, MARCEL	S	9.0 S	80.0 W	33	NW	SW	383947.7	4342578.8	39.224757	-106.344469	Well (Application/Permit)	Residential	12/31/1973	9/20/1974		8/16/1974	9/20/1974		Stock		100	65	100	15			3/7/2005 0:00
0496	009	65248-	Well Constructed	Owner	PONZIE, LOUIS D	S	9.0 S	80.0 W	33	NW	SW	384038.5	4342546.9	39.224481	-106.343421	Well (Application/Permit)	Residential	10/4/1972	10/12/1972		10/12/1972			Domestic		110	85	110				11/4/2004 0:00
0497	010	28018-	Well Constructed	Owner	SCHMIDT ANDREW C & CORA V	S	9.0 S	80.0 W	33	SW	SW	383860.6	4341751.8	39.217294	-106.345339	Well (Application/Permit)	Residential		7/13/1966		7/13/1966			Domestic		55						3/24/2005 0:00
0498	011	143700-	Permit Issued	Owner	SMRDU, WILLIAM J	S	9.0 S	80.0 W	33	NW	SE	384291.5	4342408.9	39.223271	-106.340456	Well (Application/Permit)	Residential	5/1/1986						Domestic								3/3/2014 0:00
0499	012	6617-	Well Constructed	Owner	STAPLETON, MYRON	S	9.0 S	80.0 W	33	NE	NE	385100.9	4342939.7	39.228160	-106.331177	Well (Application/Permit)	Residential		8/8/1960		8/8/1960			Domestic		45						8/8/1960 0:00
0500	013	295655-	Well Constructed	Owner	UNION MILLING COMPANY LLC	S	9.0 S	80.0 W	33	NE	NE	384987.9	4343027.4	39.228931	-106.332500	Well (Application/Permit)	Monitoring/Observation	9/11/2014		9/11/2016	10/1/2014			Monitoring/Sampling		53	42	52				10/1/2014 0:00
0501	014	29911-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	33	NW	NW	384086.9	4343091.8	39.229397	-106.342947	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0502	015	29912-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	33	NW	SE	384108.0	4342660.1	39.225508	-106.342630	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0503	016	29913-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	33	NW	SE	384108.0	4342660.1	39.225508	-106.342630	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00
0504	017	83329-	Well Constructed	Owner	WOOD, CHRISTINA	S	9.0 S	80.0 W	33	NE	NW	384801.6	4343047.2	39.229087	-106.334658	Well (Application/Permit)	Residential		8/8/1976		8/8/1976			Household use only		76						1/13/2020 0:00
0505	018	83329-	Well Constructed	Owner	WOOD, DERRICK	S	9.0 S	80.0 W	33	NE	NW	384801.6	4343047.2	39.229087	-106.334658	Well (Application/Permit)	Residential		8/8/1976		8/8/1976			Household use only		76						1/13/2020 0:00
0506	019	112200-	Well Constructed	Owner	ZADRA FRANKLIN DENNIS	S	9.0 S	80.0 W	33	SW	SE	384349.3	4341699.1	39.216883	-106.339674	Well (Application/Permit)	Residential		10/11/1981		10/11/1981			Household use only		178						10/11/1981 0:00
TOWNSHIP 9S - RANGE 80W - SECTION 34																																
0507	001	64918-	Well Constructed	Owner	LAKE COUNTY AIRPORT	S	9.0 S	80.0 W	34	NE	SW	386383.0	4342435.1	39.223782	-106.316243	Well (Application/Permit)	Residential	9/28/1972	9/3/1973			9/3/1973		Other		200	170	200	3			10/27/2004 0:00
0508	002	260709-	Well Constructed	Owner	LAKE COUNTY BOARD OF CNTY COMMISSIONERS	S	9.0 S	80.0 W	34	NE	SE	386530.4	4342460.4	39.224026	-106.314544	Well (Application/Permit)	Residential	12/7/2004		12/7/2006	1/14/2005	2/4/2005		Commercial		260	220	260	8			2/4/2005 0:00
0509	003		Application Information Req	Owner	ROY F WESTON CONSULTANTS	S	9.0 S	80.0 W	34	NW	SE	385777.5	4342647.2	39.225612	-106.323297	Well (Application/Permit)	Unknown							Other								8/27/1990 0:00
0510	004	29907-M	Permit Issued	Owner	US ENVIRONMENTAL PROTECTION AGENCY	S	9.0 S	80.0 W	34	NW	NW	385614.0	4343039.5	39.229122	-106.325251	Well (Application/Permit)	Monitoring/Observation	4/11/1986						Monitoring/Sampling								3/3/2014 0:00

APPENDIX 21-4

STANDARD OPERATING PROCEDURES

SOP's

Standard Operating Procedures

TABLE OF CONTENTS

1.0 ORE TOLLING 1-1
1.1 STEP 1: INITIAL APPLICATION 1-1
1.2 STEP 2: ACCEPTANCE CRITERIA 1-3
1.2.1 CONTRACT WITH SUPPLIER 1-3
1.2.2 ACCEPTANCE CRITERIA 1-3
1.3 STEP 3: ORE DELIVERY PROCEDURES 1-4
1.3.1 RESPONSIBILITY 1-4
1.3.2 REQUIREMENTS 1-4
1.3.3 PROCEDURES & PROCESSES 1-6
1.3.4 STANDARD OPERATING PROCEDURE 1-8
2.0 SURFACE WATER & SEEP SAMPLING 2-1
2.1 PURPOSE & SCOPE 2-1
2.2 RESPONSIBILITIES & QUALIFICATIONS 2-1
2.3 RELATED STANDARD OPERATING PROCEDURES 2-1
2.4 EQUIPMENT LIST 2-1
2.5 PROCEDURES FOR SURFACE WATER & SEEP SAMPLING 2-2
2.5.1 STREAM SAMPLING PROCEDURES 2-2
2.5.2 SEEP & SPRING SAMPLING PROCEDURES 2-2
2.5.3 STORM EVENT & SEASONAL EVENT SAMPLING 2-3
2.5.4 WATER TOXICITY SAMPLING 2-3
2.5.5 FIELD QUALITY ASSURANCE/QUALITY CONTROL SAMPLES 2-3
2.5.6 SAMPLE HANDLING 2-3
2.6 DOCUMENTATION 2-3
2.6.1 FIELD SAMPLING DATA SHEET 2-4
2.6.2 FIELD NOTES 2-4
3.0 WATER TABLE LEVEL MEASUREMENTS 3-1
3.1 PURPOSE & SCOPE 3-1
3.2 RESPONSIBILITIES & QUALIFICATIONS 3-1
3.3 RELATED SOPS 3-1
3.4 EQUIPMENT LIST 3-1
3.5 PROCEDURE 3-2
3.5.1 MEASUREMENT PROCEDURE 3-2
3.5.2 DECONTAMINATION 3-2
3.6 DOCUMENTATION 3-2
4.0 PURGING & SAMPLING MONITORING WELLS 4-1
4.1 PURPOSE & SCOPE 4-1
4.2 RESPONSIBILITIES 4-1

4.3 EQUIPMENT LIST 4-1
4.4 PROCEDURE 4-1
4.5 QUALITY ASSURANCE/QUALITY CONTROL 4-2
4.6 DOCUMENTATION 4-2
4.7 REFERENCES 4-3
5.0 NEAR SURFACE SOIL SAMPLING 5-4
5.1 PURPOSE & SCOPE 5-4
5.2 RESPONSIBILITIES & QUALIFICATIONS 5-4
5.3 RELATED STANDARD OPERATING PROCEDURES 5-4
5.3.1 EQUIPMENT 5-4
5.4 PROCEDURES FOR NEAR SURFACE SOIL SAMPLING 5-5
5.4.1 SURFACE MATERIAL 5-5
5.4.2 SUB-SURFACE MATERIAL 5-6
5.4.3 FIELD QA/QC CONTROL PROCEDURES & SAMPLES 5-7
5.5 SAMPLE HANDLING 5-7
5.6 DOCUMENTATION 5-7
5.6.1 FIELD SAMPLING DATA SHEET 5-7
5.6.2 FIELD NOTES 5-8

1.0 ORE TOLLING

The Mill will treat material from CJK-owned environmental remediation sites and will also treat ore from third-party mines and environmental remediation sites. All third parties wishing to have CJK treat their material shall be subject to the following:

1.1 STEP 1: INITIAL APPLICATION

Applicant will receive a letter on CJK Milling Company LLC letterhead containing the following information, and edited as appropriate for the applicant:

Sample Letter format

Name, Title
Street Address
City, State, Zip
Phone
email

RE: Initial Application to Treat Ore at the Leadville Mill

Dear [name],

Thank you for your interest in an Ore purchase agreement with Union Milling Contractors (UMC).

To move forward with the contract process, you must fill out and return an Initial Application for Ore Purchase Consideration form (attached). Before returning the application, be aware of the requirements listed below including Rejection of Ore criteria (attached), and Outside Ore Delivery Standard Operating Procedure (included).

Before you will be allowed to deliver any material, you must be compliant with ALL of the requirements.

Note that written authorization is required from CJK Milling Company LLC (CJK) prior to publishing dealings related to CJK or the Leadville Mill in the public domain including but not limited to; newspapers, publications, television, radio, social media or with any other media.

CJK shall negotiate a Contract with the Supplier under the following general terms and conditions. CJK understands that these terms are subject to negotiation.

Criteria for Receiving Ore:

- Ownership - Supplier must provide proof of ownership of the ore.
- Permits – Supplier must show; (1) Ore has been mined under an active permit from State of Colorado (or State where ore was mined), and (2) as applicable, Ore has been transported according to all Colorado Department of Transportation (CDOT) regulations.
- Specification: Delivered Ore must be crushed and screened to minus xx-inch.
- ICP Analysis: An ICP analysis for each shipment of ore must be provided from a certified laboratory.

Received Ore:

- Ore delivery times are currently from 7:30 AM to 3:30 PM, Monday through Friday and 7:30 AM to 3:00 PM, Saturday and Sunday.
- UMC requires that loads of ore be covered during shipment from the time the trucks are loaded until they are at the designated location on the LEADVILLE MILL site where loads will be dumped. Covers for the loads must be removable from ground level.
- All equipment that will enter the LEADVILLE MILL is required to be inspected and approved by designated personnel before it is allowed to access the site.
- The trucking company is required to supply a copy of their liability and workman's comp insurance as well as copies of their auto insurance to Mill Manager.
- All personnel, including truck drivers who are accessing the mill site are subject to the Murphy Contractor Drug and Alcohol Policy, which requires that the trucking company provide a written affirmation that the individuals on the roster have satisfactorily passed a drug screening and alcohol test within the last six (6) months. If you progress past the initial inquiry, a Murphy Contractor Handbook will be provided to you.
- All truck drivers will be required to be current with their MSHA Surface Metal Training. In addition, all truck drivers will be required to attend mill site specific hazard training, which is a 3-hour class, provided by mill designated personnel at no cost.

CJK Initial Payment:

- Estimated recovered metal is calculated as:

  Truck weight (dry tons) x Assay of truck (oz/ton Au) x Gold Pay For
  Truck weight (dry tons) x Assay of truck (oz/ton Ag) x Silver Pay For

  Bases for calculations:
  -Moisture on received truck samples.
  -Assay on received truck samples.
  -Recovery on bottle roll test of truck sample composite minus x%, a maximum of xx% Au recovery, and yy% Ag recovery
- Ore that does not meet the contractual minimum gold and silver grade shall be rejected.
- Ore meeting all the above criteria shall be considered "Spec-Ore".
- CJK will only pay for gold and silver in Spec-Ore. No payment will be made for any other Ore value.
- Supplier will receive initial payment for Spec-Ore per contract terms within x days of receiving

Processing:

- Processing will be via agitated cyanide leach. This process will determine gold and silver recovery of the Spec-Ore.
- Supplier Ore may be comingled with other ores. This may result in an adverse effect on gold and silver recovery.
- Ore that result in high reagent consumption rates shall be subject to additional fees.

CJK Final Payment:

- Final payment shall be net of fees as determined by the Contract.

If you agree to the above terms, please submit the application and ICP analysis via e-mail to UMC. The information may also be mailed to

CJK Milling Company LLC
PO Box 620490
Littleton, CO 80162-0490

Please feel free to contact Steven Craig at scraig@unionmilling.com for questions about the information listed above.

Sincerely,
Steven Craig, Member
Union Milling Contractors, LLC

1.2 STEP 2: ACCEPTANCE CRITERIA

The toll ore buying program will fill mill capacity with high quality ores which will meet metallurgical criteria summarized in this section.

1.2.1 Contract with Supplier

The Ore buying process will generally adhere to the following but modified for each specific Supplier to account for ore processing requirements (within the operating parameters of the Mill).

1. Supplier and CJK agree to "Economic Terms". E.g. payment based on toll ore grade, process recovery, market prices, treatment costs, etc.
2. Batch of toll ore to be processed is identified. This may, for example, be a specific stope in a mine, or a stockpile on the surface.
3. The batch is surveyed to determine quantity and to collect a representative sample.
4. A representative ore sample is collected under established chain of custody protocols and laboratory tested for ore grade.
5. Economic or performance test will validate ore grades which will be used to determine toll ore purchase price.

1.2.2 Acceptance Criteria

Acceptance Criteria will also include:

- Bill of Lading documenting the ore has been analyzed and approved for mill processing.
- Truck and ore deliveries are pre-approved and scheduled.
- Truck and driver are CDOT certified.
- Insurance is current.
- Ore location is identified,
- Tarps are securely covering delivered ore.
- Ore is minus 4 inches.
- Ore is free of organic debris.
- Ore is dumped in designated areas.

- Truck drivers are site safety trained in; communication protocols, noise and dust mitigation, scale and traffic management procedures, speed limits, emergency response, inclement weather operating procedures, site restrictions, and PPE.
- On- and off-site transportation activities conform with CDRMS, CDOT and Lake County regulations.

1.3 STEP 3: ORE DELIVERY PROCEDURES

Ore deliveries shall be subject to the following procedures.

1.3.1 Responsibility

Employees and Contractor responsibilities:

- Participate in training and implementation of this policy
- Participate in site and vehicle risk assessments
- Operate consistently with the policy and procedures
- Refuse unsafe work

1.3.2 Requirements

General
Risk Assessment:

- All vehicles used for work shall be evaluated prior to use to consider fit for purpose. This inspection can be scheduled through the mill manager or his designated representative.

Insurance Requirements, Contractor Handbook, and Training Requirements:

- The trucking company is required to supply a copy of their liability, workman's comp, and auto insurance to the mill manager before they bring any loads of ore to site.
- The trucking company and the ore supplier are required to review and sign the Leadville Mill Handbook and supply a roster of personnel that will be accessing the site. In the Handbook, it is stated that all personnel who are accessing the Leadville mill site are subject to the Mill Operator's Drug and Alcohol Policy which requires that the trucking company provide a written affirmation that the individuals on the roster list have satisfactorily passed a drug screening and alcohol test within the last six (6) months.
- All personnel performing work at the Leadville Mill site, including truck drivers, will be required to be current with their MSHA Surface Metal training. For those that do not have the MSHA training, a 24-hour course is required, which consists of 16 hours of class time and 8 hours of on-the-job training.
- All personnel performing work at the Leadville mill site, including truck drivers, will be required to attend the Mill's site-specific hazard training provided by the Mill Manager or his designated representative.

Environmental
It is the policy of Leadville mill to comply with all environmental laws, regulations and permits as well as applicable UMC'S policies. Responsibilities include:

- Manage spills regardless of size, and immediately have been completely cleaned up.

- Terminate any activity if excessive airborne emission is present.
- Operate all air emission control devices within the specified operating parameters or terminate activity.
- Activity should not result in degradation of storm water quality including incidental releases of pollutants during a storm event.
- Hazing of wildlife is not permitted.
- It is every employee and/or contractor's right and responsibility to refuse an assignment that through reasonably foreseeable circumstances could result in unnecessary harm to the environment or violation of environmental regulations or permits.

Spill Reporting:

Hydrocarbon and Glycol Spills (This includes the Outside Ore Mill storage area.)

- Report all spills to the outside ore sampler at the mill storage area. If for some reason the sampler is not available, report the spill immediately to the mill manager or his designated representative and they will coordinate spill cleanup activity.
- REPORTABLE QUANTITY – 25 gallons
- An incident report must be filled out before the end of that shift for hydrocarbons and glycol spills greater than 25 gallons in size occurring outside of the mill affected areas.
- All spills are to be contained and cleaned up immediately, no matter the size.
- A spill report is to be filled out for any spill at the outside ore mill storage area.

Immediately Reportable Spills:

The following spills must be immediately reported to the mill manager or his designated representative

- A spill of any amount of hydrocarbon or glycol that is in or immanently threatens surface water or groundwater.
- Any spill of any amount of a hazardous material (other than hydrocarbons).
- Mill spills that leave containment.
- Solution or slurry spills outside of the tailing storage facility.

Mill Manager Contact Gary Slifka, Telephone Number 720-412-8838. Leave a message on the Mill Manager if no one can be reached directly.

Fugitive Dust Emissions:

Leadville mill has operational controls to reduce the emissions from activities that have the propensity to generate excess fugitive dust. Controls such as watering of roads, ore, and ore stockpiles are SOPs.

If for any reason these SOPs cannot be **EFFECTIVELY** implemented and maintained, the activity generating the fugitive dust must be immediately discontinued until such time as the controls can be made effective. This applies to processes where terminating the activity will abate the emission.

Equipment

All Mobile Equipment shall have the minimum:

- Seatbelts for every occupant.
- Fire extinguishers suitable for the size of the equipment. The fire extinguisher has to have a tag showing it was serviced in the past 12 months.
- Wheel chocks.
- 2-way radio communication must be maintained if entering heavy equipment areas.
- Appropriate brakes, lights, horn, wipers, and mirrors must be in good working order.

- Window glass free of cracks and/or large chips.
- High visibility markings or reflectors will be in place on both the truck and trailer.
- Means to secure loads and/or prevent loads from entering the occupant's compartment on impact.
- Access supporting three-point contact and a separate method of emergency egress.
- Guarding to prevent contact with pinch points.
- Automatic back-up alarm, **of a type specified by the Mill Manager**.

1.3.3 Procedures & Processes

- Wheel chocks of appropriate size will be used anytime the driver is out of the cab and not in a designated parking area.
- Parking brake will be engaged, and transmission placed in neutral any time operator is to exit the cab.
- Equipment with manual transmissions may put truck in gear, engage parking brake and shut down engine.
- Operators will obey the 10 miles per hour speed limit throughout the Mill property.
- Operators will travel in the appropriate gear for the grade traveling.
- Pre-use inspections will be completed on equipment for each shift and documentation of such will be available in the operator's cab if an inspection is requested.
- Start-up and movement signals to warn others of intended actions will be used: One horn for startup, two horns for forward movement, and three horns for reverse movement.
- It is the intent of the mill to haul the outside ore to the crusher during off hours when trucks are not coming in, if circumstances change then the above communication protocol will take effect.
- The Mill Manager or his designated representative will communicate when two-way radio communication is required.

It is CJK's policy that when people are approaching mobile equipment operators must:

- Position and Park equipment so it can be approached safely.
- Ground all implements; ensure machine is in neutral and set parking brake.
- Acknowledge and grant permission when ready for anyone requesting to enter your work area or approach your equipment.
- For large heavy equipment, operator will exit the cab after permission is granted if anyone is to approach your equipment.
- For semi-trucks, once the operator has granted permission for someone to approach the vehicle. The person can approach the vehicle once it is parked and can step up on the access steps to pass information, tags, etc. if three points of contact are maintained.
- Make visual contact with anyone allowed in your work area.
- Not move equipment or implements until all clear is communicated.
- Use proper parking procedures, i.e., wheel chocks, berms, etc.

Heavy equipment (loaders, haul trucks, water trucks, etc.) operators are to contact the person sampling at the outside ore mill storage area for permission before entering the ore mill storage area. Heavy equipment is to be parked if someone is on the ground at the ore mill storage area.

It is the responsibility of all employees and contractors around mobile equipment to ensure the operator of the equipment is aware of their presence.

It is the responsibility of any person approaching equipment to ensure operator is stopped and has all implements on the ground and has granted permission to approach the equipment.

It is UMC's policy that all employees and contractors approaching mobile equipment must:

- Make verbal contact with the operator and get confirmation.
- Make visual contact with the operator and get confirmation.
- Approach the equipment where visual contact can be maintained whenever possible.
- Be wearing the proper personal protective equipment (PPE) including fluorescent/reflective vests or reflective coveralls.
- Have heavy equipment operators exit the cab unless needed for operating purposes. Semi-truck operators can stay in the cab and the person can step up on the access steps if three points of contact can be maintained.
- When an operator is needed in the cab, verbal (radio) and visual (spotter) contact must always be maintained.
- When work is complete, or you no longer need to be in an operator work area contact must be made that you are all clear and that work may resume.
- In situations when equipment can continue to operate and work is required in the footprint of their work area, communication must be made.

Visibility Policy:

- It is CJK's policy that all employees and contractors working on the ground in the vicinity of heavy equipment must be wearing a vest, or coat either lime green or fluorescent orange that has reflective tape on the vest or coat.
- Contractors will provide vest or coats for their employees
- No employee or contractor will use a cutting torch or weld with a vest or coat that is not cotton because of the risk of them igniting.

Visibility for Mobile Equipment including Light Vehicles:

- Contractor's vehicles will have flashing light, back up alarm and lights on during operation.
- All vehicles shall have appropriate lights, wipers, and mirrors to maintain visibility.
- All light vehicles and heavy equipment while in operation during both daytime and nighttime hours will have headlights on for increased visibility.
- High visibility markings or reflectors will be in place on both the truck and trailer.

Personal Protective Equipment (PPE)
Requirements and Guidelines:

- All employees and contractors must possess and wear the basic personal protective equipment, which shall include hardhat, safety glasses, and safety toe footwear. Visitors to the Leadville Mill are required to wear hardhats and safety glasses; requirements for safety toe footwear will be determined on an individual basis. If safety toe footwear is not required for the visit, these visitors will be limited to office areas or staying in the cab.

- **Hardhats** must comply with ANSI Z89.1-2015 standards and must be worn at all times while on mill property, including welding, except in designated lunch-break areas, office areas, control rooms, change rooms, restrooms, or the enclosed cabs of heavy equipment or light vehicles. Note: Some tasks performed in designated exception areas may also require appropriate PPE usage.
- **Safety Eyewear** must comply with ANSI Z87.1-2015 standards and must be worn at all times while on mill property including operating/riding in heavy equipment or light vehicles. Exceptions are in designated lunch-break areas, office areas, restrooms, and change rooms.
- **Safety Toe Footwear** must comply with ANSI Z41 2015, Class 75 standards and must be worn at all times while on mill property except in designated office areas, change rooms, or restrooms.
- **Dress standards**: Loose, ragged, or ill-fitting clothing must not be worn around moving machinery or equipment. UMC'S'S employees and contractors shall not wear cut-off jeans or shorts on-shift.
- **Personal Grooming**: Long hair and/or beards that create a hazard shall be restrained by a net or other means.
- Certain areas of the mill have posted signs that require additional PPE above the basic site requirement of hard hats, steel-toed shoes, and safety glasses. All employees, contractors and visitors must comply with posted PPE requirements. Additional PPE may also be required for specific tasks or job duties. Employees are required to follow established practices and use the required PPE for performing the task.

Following Distances:
The following are minimal distances that are permissible between trucks.

- Loaded or empty truck – up or down a grade = 200 ft.
- Loaded or empty truck on the flat = 200ft.
- Parking behind a parked truck = 50ft (When parking behind another parked truck, position your truck so that you are off set of the other truck, this ensures that you can be seen in the other truck's driver side mirror.

Weather Conditions:
Adverse weather procedures, i.e., "go/no go" criteria for abnormal road conditions (e.g., rain, snow, high winds) Follow guidelines posted at the bottom of the mill access road, it is your responsibility to chain up when conditions require it.

Fall Protection:
falling and attachment points must be in place for persons working at heights, this applies but is not limited to when manually removing or placing tarps on the trailer on Leadville mill's property. The Leadville mill's property starts where the mill access road connects to highway 24.

1.3.4 Standard Operating Procedure

- Before any delivery trucks enter Leadville milling property, they must be inspected by a designated CJK employee or Contractor to ensure the vehicle meets Leadville mill's standards.
- When arriving on the access road to the mill; operators will assess the road conditions and follow the posted recommendations to chain up if conditions require it.
- Before beginning up the access road you must contact the Mill Manager to gain clearance.

- The speed limit on the access road is 10 mph. There are some narrow corners, so the driver must be aware of oncoming traffic and stay on their side of the road.
- CJK's cell phone policy is that you must be safely parked and not driving while on a cell phone.
- Loads are required to be tarped during the entire haul and the tarp is to stay on until you arrive at the unloading area.
- All trailers must have a manual or automated system in the cab or at ground level to remove or roll up any tarps.
- If a tarp must be dealt with where there is the possibility of falling, you must follow our fall protection guidelines.
- All trucks arriving on site will go across our scale to be weighed and will receive a weigh ticket.
- Use caution when pulling on the scale and follow light signals.
- Before exiting the cab, ensure truck is in neutral and parking brake is set. Put the wheel chalk in place anytime you leave the cab of the vehicle.
- When circumstances require the engine to be shut down with a manual transmission, place transmission in low gear or park, whichever is applicable, set parking brake and set wheel chalk when leaving the cab of the vehicle.
- When leaving the scale use proper horn signals and ensure your pathway is clear.
- When arriving at the dumping location, pull up to the sample attendant area for directions for where to dump, to pick up a sample tag to give to the mill manager or designated representative, and to pick up a flag to put in the ore pile.
- After meeting with the sample attendant, park in a safe area and remove any tarps that need to be removed from the load. If you need to access the tarps from an elevated area, ensure that you wear a harness and are properly tied off.
- After tarps are safely removed proceed to your designated dumping area.
- Since the sample attendant will be at the stockpile location, it is important to watch out for him/her while they are on the ground or while they are in the equipment pushing the piles up.
- The sample attendant must stay aware of his surroundings and stay clear of the trucks while they are dumping.
- Ensure you are in the proper dumping area as requested by the sample attendant.
- Use caution when dumping on uneven ground or if there is other equipment in the area.
- Place the flag from the sample attendant in the ore pile from your load. Be sure to set the parking brake and place the wheel chalk when exiting the cab to place the flag.
- After dumping use caution returning to the haul road going back to the scale, watch for loaded traffic and be sure to obey the traffic signs when getting back on the haul road.
- Trucks will be weighed empty after every trip.
- When leaving the truck scale and entering the main access road to the highway, follow the posted speed limit signs of 10 miles per hour.

Responsibilities:

- It is the responsibility of all operators to remain alert and aware of their surroundings.
- It is the responsibility of all operators to make sure that their travel way is clear prior to moving the equipment.
- It is the responsibility of all operators to know, understand and follow this procedure.

2.0 SURFACE WATER & SEEP SAMPLING

2.1 PURPOSE & SCOPE

This standard operating procedure (SOP) describes procedures to be used in the collection of water samples from streams, and seeps. This procedure sets forth methods for collection of samples at any specific site based upon physical characteristics and dimensions of the water body.

This SOP addresses the collection of representative ambient water quality samples that meet applicable regulations and appropriate sampling protocols. Sampling locations, sampling frequencies and a list of analytes is specified in the stormwater permit.

Some surface water sampling stations may also be designated for toxicity testing. Surface water samples for toxicity testing should be collected in accordance with laboratory guidelines.

Normally, CJK does not conduct lake sampling, but if the need arises the following SOP will be followed.

2.2 RESPONSIBILITIES & QUALIFICATIONS

The Mill manager or his designated representative has the overall responsibility for implementing this SOP. They will be responsible for assigning appropriate staff to implement this SOP and for ensuring that the procedures are followed by all personnel.

All personnel performing these procedures are required to have the appropriate health and safety training. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP and receive specific training regarding these procedures, if necessary.

The mill manager or his designated representative and assay laboratory staff are responsible for reporting deviations from this SOP to the mill manager or their designated representative.

2.3 RELATED STANDARD OPERATING PROCEDURES

The procedures for surface water and seep sampling set forth in this SOP are intended for use with the Field Parameter Measurements (including Instrument Calibration) requirements.

2.4 EQUIPMENT LIST

Sample bottles with preservatives added will be obtained from the analytical laboratory. Equipment that may be used during surface water and seep sample collection will include:

- pH/temperature meter
- Electrical conductivity meter
- Dissolved oxygen meter
- Oxidation Reduction Potential Meter
- Turbidity Meter
- Polyethylene or glass jar for field measurement samples
- Measuring tape with weighted end

- Plastic sheeting
- Appropriate health and safety equipment (including life jackets for lake sampling)
- Strapping tape
- Sample bottles with preservatives
- Cooler with sufficient ice to maintain a temperature of 4°C

2.5 PROCEDURES FOR SURFACE WATER & SEEP SAMPLING

2.5.1 Stream Sampling Procedures

There are no "typical" streams on the mill property. However, an ephemeral stream exists on the property and only flows during prolonged rain events. This stream will be sampled using the Seep & Stream Procedures discussed in subsection 2.5.2.

2.5.2 Seep & Spring Sampling Procedures

The field sampling crew will obtain samples from seeps by placing sample containers near the center flow of the seep taking care to minimize solid matter being transferred from the soil or rock face. However, if the flow conditions are slow, a polyethylene, stainless steel, or glass bowl or pan can be placed near the center flow of the seep until sufficient volume has accumulated for analysis.

If slow flow conditions are present and adequate sample volume cannot be collected immediately using a sample container but can be obtained within 2 hours, the following procedure will be used:

1. Dig a small depression in the soil within the flow path, if necessary
2. Place the rim of a polyethylene, stainless steel, or glass bowl or pan below the surface flow sampling point
3. Allow the bowl or pan to fill
4. Transfer the water into an appropriate laboratory container
5. Repeat steps 2 through 5 until adequate sample volume is obtained

Alternatively, the following procedure may be used for low flow seeps and should be used for circumstances in which adequate volume cannot be collected within 2 hours.

1. A funnel or similar sample collection device is placed within the flow path.
2. The stem of the funnel is positioned such that the flow of water passes directly into a relatively closed sample collection device such as a sample bottle. The funnel stem may also be connected to tubing which in turn transfers the water into a relatively closed sample collection device such as a sample bottle.
3. If the sample collection device is the sample bottle containing preservative, do not allow the sample bottle to overflow.
4. When collecting a seep sample for dissolved metals analysis, the sample will be field (if required), per the procedures outlined in equipment manufacturer handbook.
5. Field parameters (pH, temperature, specific conductivity, dissolved oxygen, and turbidity readings) will be measured on an aliquot of the sample and recorded for each sample location.
6. If flow conditions are so low that a sample cannot be collected, the sampler will record on the Field Sampling Data Sheet (Figure 1) that the seeps flow conditions prevented sample collection at that location.

After samples are collected, all sample bottle exteriors will be decontaminated prior to placing them into a cooler with ice.

2.5.3 Storm Event & Seasonal Event Sampling

Storm events and Seasonal event samples (i.e., rising limb of spring snowmelt) will be collected.

- Samples collected during storm events will be analyzed for chemical parameters (metals and inorganics.
- Samples collected during the seasonal event will be analyzed for chemical parameter. Seasonal event samples will be collected on days 1, 3, and 5 of the events (chemical analysis will be conducted on each of the three samples).

2.5.4 Water Toxicity Sampling

Acute - During each storm event, a one-gallon sample will be collected for the acute water toxicity test. This sample will be collected manually as a grab sample if project personnel are available. The contents of the bottles would be composited and submitted for the acute toxicity test. Field parameters (pH, temperature, specific conductivity, and turbidity) will be measured and recorded for the composite sample for each sampling location.

Chronic - During the seasonal event (rising limb of spring snowmelt), a 3-gallon sample will be collected from each sampling point for the chronic toxicity test. However, 1-gallon aliquots for toxicity testing may be collected manually each day once the beginning of the event has been identified by the water sampler.

2.5.5 Field Quality Assurance/Quality Control Samples

QA/QC samples are designed to help identify potential sources of sample contamination to evaluate potential error introduced by sample collection and handling. All QA/QC samples are labeled and sent to the laboratory with other samples for analysis.

2.5.6 Sample Handling

Sample containers, preservatives and analyses are specified by the laboratory. Samples will also be labeled and handled as described by the laboratory.

2.6 DOCUMENTATION

Documentation of observations and data acquired in the field will provide information on the activities concluded and also provide a permanent record of field activities. The observations and data will be recorded with waterproof ink in a permanently bound weatherproof field logbook with consecutively numbered pages, and on field data sheets.

2.6.1 Field Sampling Data Sheet

A field sampling data sheet will be completed at each sample location (See template below). Items not applicable to the sampling will be labeled as not applicable (NA). The information on the data sheet includes the following:

- Sampling location (and depths)
- Date and time of sampling
- Person(s) performing sampling
- Type of sample (grab or composite)
- Conductivity, temperature, dissolved oxygen, oxidation reduction potential and pH during sampling
- Color (describe), odor (describe), turbidity
- Sample description
- Sample identification number
- Analyses required
- Number of sample bottles taken for each analysis
- Preservation of samples
- Record of any QC samples from the site
- Any irregularities or problems which may have a bearing on sampling quality.

2.6.2 Field Notes

Field notes will also be kept during sampling activities. The following information will be recorded in the bound field logbook using waterproof ink:

- Names of personnel
- Weather conditions
- Date and time of sampling
- Locations, depths, and sample station numbers
- Times that procedures and measurements are completed
- Calculations, if required

Template for Field Sampling Data Sheet for Surface Water Samples

Location Identification: _____ Date: _____

Samplers' Signature: _____ Time: _____

Weather: _____

Type of Sample: Composite _____ Grab _____

Sample Depth: _____

Sample Identification: _____

pH	_____
Specific Conductivity	_____
Temperature	_____
Dissolved Oxygen	_____
Oxidation Reduction potential	_____
Turbidity	_____

Description of Water: _____

Color:
Odor:
Turbidity: Yes _____ No_____

Containers	Analysis	Number	Preservatives
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

QA/QC Samples Collected: _____

Comments:

3.0 WATER TABLE LEVEL MEASUREMENTS

3.1 PURPOSE & SCOPE

The purpose of this document is to define the SOP for measuring water elevations in monitoring wells at the Leadville Mill. This procedure describes equipment and field procedures necessary to collect water level measurements. Well locations and configurations, and frequency of measurement are specified in the applicable work plan.

Decontamination of Sampling Equipment describes decontamination procedures that are applicable to this SOP.

3.2 RESPONSIBILITIES & QUALIFICATIONS

The Mill Manager has the overall responsibility for implementing this SOP. He/she will be responsible for assigning appropriate staff to implement this SOP and for ensuring that all personnel follow procedures accurately.

Personnel performing these procedures are required to have appropriate health and safety training. In addition, they are required to have a complete understanding of the procedures described within this SOP and to receive specific training regarding these procedures, if necessary.

All sampling personnel are responsible for documenting deviations from this SOP and reporting them to the Mill Manager

3.3 RELATED SOPS

The procedures set forth in this SOP are intended for use with the following SOPs:

- Purging and Sampling Monitoring Well

3.4 EQUIPMENT LIST

The equipment to be used to measure water levels includes:

- Electric water level indicator capable of producing measurements to a precision of 0.01 feet
- 5 gallon buckets or equivalent for decontamination
- Brushes for decontamination
- Field data sheets
- Field notebook
- Chemical-free paper towels
- Alconox soap or suitable alternative
- Potable water
- Garden-type sprayer or suitable alternative filled with deionized or distilled water
- Appropriate health and safety equipment

3.5 PROCEDURE

Generally, water elevation measurements are used to construct potentiometric surface maps. Therefore, they are temporal and as such water level measurements at a given site should be collected within a 24-hour period.

3.5.1 Measurement Procedure

Before any measurement is taken, don the appropriate health and safety gear and decontaminate the water level probe. Make sure the monitoring well is labeled and the location ID is visible on the protective casing.

After opening the well cover, measure the depth of the static water level and the total depth of the well using an electric water level indicator. The measuring point for the wells is at the top of the steel well casing cap access hole.

The static water level and the depth of the well shall be measured with the indicator, written down on the field data sheet or field notebook, and immediately rechecked before the indicator is removed from the well. Note any significant changes in water level, by comparing the most recent measurement with past measurements, if appropriate.

The water level depth below the measuring point (in feet) will be subtracted from the measuring point elevation to determine the elevation of the static water level. If measuring point elevations are available at the time of water level measurement, the calculated water elevation should be checked in the field to see that it is reasonable and the subtraction was performed correctly. If there is a discrepancy, the well should be measured again.

3.5.2 Decontamination

The water level indicator must be decontaminated before using between wells and at the conclusion of measurements. The probe will be decontaminated.
Probe decontamination can be completed at the wells.

3.6 DOCUMENTATION

The observations and data will be recorded with waterproof ink in a permanently bound weatherproof field logbook with consecutively numbered pages, and on field data sheets.

4.0 PURGING & SAMPLING MONITORING WELLS

4.1 PURPOSE & SCOPE

This Standard Operating Procedure (SOP) describes the method by which a groundwater monitoring well is to be evacuated and sampled to obtain a representative sample of formation water at the Leadville Mill. Wells are purged to remove stagnant water from the casing. Excessive purging can also yield non-representative results. Wells with slow recovery rates (low-yield) create a logistical problem because of the time required for purging, whereas a high-yield well recovers almost immediately after water purging. The procedure addresses the types of equipment, field purging and sampling procedures, and field data collection and personnel responsibilities.

4.2 RESPONSIBILITIES

The Mill Manager or their designated representative will be responsible for implementing this SOP.

4.3 EQUIPMENT LIST

- Pump & Tubing (permanently installed at each well)
- Portable electric generator
- Water level indicator
- Water quality meter to collect the following field parameters: temperature, conductivity, pH, and oxygen-reduction potential.
- Sample bottles/40 ml vials
- Knife
- Sample gloves
- Paper towels
- Waste containers (gallon jug and trash bag)
- Pump and suction hose

Groundwater Level Measurements

4.4 PROCEDURE

Note that these procedures are similar to the Groundwater Level Measurement SOP. Note also that each CJK-owned well has a permanent electric well pump installed.

1. Verify locations of wells, media to be sampled, and parameters to be analyzed for as specified in the sampling plan.
2. Prepare field logbook with description of site, weather, participants, and other relevant observations, including all sampling data necessary to complete the groundwater monitoring data log Inspect the well for soundness of protective casing and surface ground seal.
3. Measure the casing inside diameter (CID) and record in inches. From the top of the casing, measure the depth (in feet) to water (DTW) with an electronic water level indicator and record in the field logbook. Static water level measurements must be recorded from the surveyor's mark at the top of the casing if present. If no mark is present, mark a location with a metal

file or indelible marker to the north on the casing for future reference. Measure and record the total depth (in feet) (TD) of the well once a quarter.

4. If necessary, monitoring wells should be sampled by starting with the up-gradient (or clean wells) and proceeding down gradient (in the order from most to least contaminated wells) for the remaining monitoring wells.
5. Determine the volume of water in gallons in one well casing:

For a 2-inch well:
Vol = [(TD – DTW) * 0.16]
For a 4-inch well:
Vol = [(TD – DTW) * 0.65]
For a 5-inch well:
Vol = [(TD – DTW) * 1.03]
For a 6-inch well:
Vol = [(TD – DTW) * 1.48]

Or calculate the volume using the following formula:

Vol = (TD – DTW)(CID)2(0.041)

Where TD = total well depth (ft), DTW = depth to water (ft), CID = casing inner diameter (in).

6. To determine the number of gallons required to purge the well, multiply the number of gallons in one well volume (calculations above) by three. Record the minimum purge volume in the field logbook.
7. Purge the well using pump (see below for equipment-specific instructions).
8. Affix a sample label to each sample container and complete all required information (sample no., date, time, sampler's initials, analysis, preservatives). Place clear tape over label. Record sample number, well number, date, time, and the sampler's initials in the field book.
9. Collect the groundwater samples after purging is complete.
10. Complete chain-of-custody forms with appropriate sampling information.

Pumping

11. Ensure that fine sediment has been removed.
12. Determine the volume of water per well casing.
13. Refer to the user's manual for pump operating instructions.
14. Start pump.
    a. Attach pump to electric power supply.
    b. Begin pumping.
    c. Collect water quality parameters.
    d. As pumping continues, take water level readings periodically and lower pump as necessary to ensure the pump does not run dry.
15. Remove three well volumes before sampling.
16. Collect the groundwater samples after purging is complete.

4.5 QUALITY ASSURANCE/QUALITY CONTROL

The activities conducted under this SOP are subject to quality assurance and quality control audits. Corrective action will be implemented immediately.

4.6 DOCUMENTATION

All actions will be documented in accordance with SOP.

4.7 REFERENCES

EPA, March 2001, Guidance for Preparing Standard Operating Procedures (SOPs) EPA QA/G-6, EPA/240/B-02/004, Office of Environmental Information, Washington, D.C.

EPA, March 2001, EPA Requirements for Quality Management Plans, EPA A/R-2, EPA/240/B-02/002, Office of Environmental Information, Washington, D.C.

EPA, November 2002, Guidance on Environmental Verification and Data Validation, EPA QA/G-8, EPA/240/R-02/004, Office of Environmental Information, Washington, D.C.

EPA, December 2002, Guidance for Quality Assurance Project Plans, EPA AQ/G-5, EPA/240/R-2/009, Office of Environmental Information, Washington, D.C.

5.0 NEAR SURFACE SOIL SAMPLING

5.1 PURPOSE & SCOPE

This Standard Operating Procedure (SOP) provides technical guidance and methods that will be used in collection of surface material and subsurface material samples for chemical analysis. This procedure gives descriptions of equipment, field sampling procedures, field data collection, personnel responsibilities, and quality assurance/quality control (QA/QC) procedures.

The SOP describes procedures for collection of surface material and subsurface material samples. For the purposes of this SOP, and unless governed by other project documents (for example, activity-specific SAPs), the term "surface material" refers to the top five centimeters of soil following removal of surface vegetation, non-decomposed plant litter, and other debris from the sampling area and "subsurface material" refers to soil from 5 to 20 cm below ground surface. In addition, the SOP describes the procedures to be followed for collection of root-zone soil samples to be collected as part of the plant sampling program.

Some near surface soil locations may also be selected for soil toxicity testing.

5.2 RESPONSIBILITIES & QUALIFICATIONS

The RI Project Manager or Field Manager have the overall responsibility for implementing this SOP. They will be responsible for assigning appropriate environmental staff to implement this SOP and for ensuring that the procedures are followed.

All personnel performing these procedures are required to have the appropriate health and safety training. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP, and receive specific training regarding these procedures, if necessary.

All environmental staff and assay laboratory staff are responsible for reporting deviations from this SOP to the RI Project Manager or Field Manager.

5.3 RELATED STANDARD OPERATING PROCEDURES

The procedures set forth in this SOP are intended for use with the following SOPs:

Decontamination of Sampling Equipment
Sample Management Surveying (Land and GPS)
Utility Clearance

5.3.1 Equipment

The following materials and equipment may be necessary for surface material sampling:

- Sample containers
- Bound field logbook
- Sampling site location maps
- 300-foot and 100-foot tape measures and Brunton Compass
- Field Sampling Data Sheets for Surface Materials (Attachment A)

- Surveying stakes or flags for marking of grid nodes and/or sampling locations
- Monitoring equipment and personal protective equipment (PPE),.
- Decontamination equipment and supplies (e.g., high pressure sprayer/washer, wash/rinse tubs, brushes, Alconox, plastic sheeting, paper towels, sponges, baby wipes, garden-type water sprayers, large plastic bags, potable water, distilled water and/or deionized water)
- Stainless steel hand augers, scoops or spoons, knife, pick, and mixing bowls
- Sample collection supplies (e.g., plastic recloseable plastic bags or equivalent, waterproof markers, sample labels, chain of custody [COC] forms, cooler for sample storage, ice or ice substitute, clear plastic and strapping tape, custody seals, trash bags)
- No. 10 mesh sieve
- GPS Unit
- Shovel
- Camera
- Site Plans, Topographic Maps, or Aerial Photographs

Other site-specific materials and equipment may be needed based on field conditions.

5.4 PROCEDURES FOR NEAR SURFACE SOIL SAMPLING

5.4.1 Surface Material

Surface material samples for human health evaluations may be collected as grab or composite samples. Such samples should be collected from the depth range of 0 to 6 inches. Prior to sampling, it is important to calculate the total volume of sample material to be collected at each increment sample location to ensure that the volume required for each analysis is available for completely filling each sample container. The analysis-specific volumes are specified in the QAPP. Sampling locations will be identified and marked using surveying stakes, lath, or flags.

For grab samples, one surface material will be collected at each proposed sample location. Grab sample material will be homogenized in a stainless-steel bowl before filling sample containers.

For composite samples, unless specified differently. composite surface material samples will be comprised of five increment sub-samples collected from each of the corners and center point of a 1-meter square. All or a portion of the increment samples are mixed together to create a composite sample representative of average constituent concentrations within the area to be characterized. For a given composite sample, the volume of each increment sample must be the same and must equal 1/n of the required composite sample volume, where n equals the number of increment samples making up the composite sample.

Surface material samples will be collected as follows:

1. At each sample location (for grab samples) or sub-sample location (for composite samples), clear an area approximately 30 centimeters in diameter of surface vegetation, non-decomposed plant litter, and debris.
2. Use a decontaminated stainless-steel spoon or hand auger to collect surface material to a depth of five centimeters. A stainless-steel pick may be used as needed to loosen the soil. To the extent possible, eliminate gravel-size or larger particles and debris based on visual observation.
3. Visually describe the material and record observations on the soil sample field data sheet.

4. Sieve the increment sample through a No. 10 mesh and place the fine fraction into a decontaminated stainless-steel mixing bowl. Mix thoroughly.
5. For composite samples, repeat Steps 1 through 4 at each increment sample location for a given composite sample, adding each successive increment sample to the mixing bowl.
6. Thoroughly mix the sample material in the stainless-steel bowl using a decontaminated stainless-steel spoon. To homogenize, divide the sample into four quarters and mix each quarter, then combine the four quarters and mix the entire sample. Place mixture into appropriate laboratory-supplied sample containers.
7. Label and handle the containers.

Sample increment locations will be surveyed using a GPS Unit.

5.4.2 Sub-Surface Material

Sub-surface material samples for use in ecological evaluations should be collected from a depth range of 0 to 2 feet. Prior to sampling, it is important to estimate the total volume of sample material to be collected at each increment sample location to ensure that the volume required for each analysis is available for completely filling each sample container. The analysis-specific volumes are specified in the QAPP. Sampling locations will be identified and marked using surveying stakes, lath, or flags.

Sub-surface material samples will be collected as follows:

1. At each sample location, clear an area approximately 30 centimeters in diameter of surface vegetation (non-decomposed plant litter) and debris.
2. Use a decontaminated stainless-steel spoon, shovel, or hand auger to collect subsurface material from the surface to a depth of 2 feet below ground surface. A stainless-steel pick may be used as needed to loosen the soil. To the extent possible, eliminate gravel-size or larger particles and debris based on visual observation. Place the material in a stainless-steel mixing bowl. The material placed in the bowl should be representative of the entire depth horizon (i.e., 0 to 2 feet).
3. Visually describe the material and record observations on the soil sample field data sheet.
4. Sieve the increment sample through a No. 10 mesh and place the fine fraction into a decontaminated stainless-steel mixing bowl. Mix thoroughly.
5. Thoroughly mix the sample material in the stainless-steel bowl using a decontaminated stainless-steel spoon. To homogenize, divide the sample into four quarters and mix each quarter, then combine the four quarters and mix the entire sample. Place mixture into appropriate laboratory-supplied sample containers.
6. Label and handle the containers as specified in SOP No. **, Sample Handling, Shipping, and Documentation.
7. Sample increment locations will be surveyed using a GPS Unit.
8. At each sample location, clear an area approximately 30 centimeters in diameter of surface vegetation (non-decomposed plant litter) and debris.
9. Use a decontaminated stainless-steel spoon, shovel, or hand auger to collect subsurface material from the surface to a depth of 2 feet below ground surface. A stainless-steel pick may be used as needed to loosen the soil. To the extent possible, eliminate gravel-size or larger particles and debris based on visual observation. Place the material in a stainless-steel mixing bowl. The material placed in the bowl should be representative of the entire depth horizon (i.e., 0 to 2 feet).
10. Visually describe the material and record observations on the soil sample field data sheet.

11. Sieve the increment sample through a No. 10 mesh and place the fine fraction into a decontaminated stainless-steel mixing bowl. Mix thoroughly.
12. Thoroughly mix the sample material in the stainless-steel bowl using a decontaminated stainless-steel spoon. To homogenize, divide the sample into four quarters and mix each quarter, then combine the four quarters and mix the entire sample. Place mixture into appropriate laboratory-supplied sample containers.
13. Label and handle the containers.

Sample increment locations will be surveyed using a GPS Unit.

5.4.3 Field QA/QC Control Procedures & Samples

QA/QC samples are designed to help identify potential sources of sample contamination to evaluate potential error introduced by sample collection and handling. All QA/QC samples are labeled and sent to the laboratory with other samples for analysis.

5.5 SAMPLE HANDLING

Sample containers, preservatives, and analyses as specified. Samples will also be labeled and handled.

5.6 DOCUMENTATION

Documentation of observations and data acquired in the field will provide information on the activities concluded and also provide a permanent record of field activities. The observations and data will be recorded with waterproof ink in a permanently bound weatherproof field logbook with consecutively numbered pages, and on field data sheets.

5.6.1 Field Sampling Data Sheet

A field sampling data sheet (included as Attachment A) for surface material samples will be completed for each grab or composite sample. The data sheet will be completely filled in. If items on the sheet do not apply to a specific sample or location, the item will be labeled as not applicable (NA). The information on the sheet will include the following:

- Date and Time of sampling
- Personnel and Samplers Signature
- Sample identification number.
- Type of Sample
- Weather
- Type and size of container used
- Analysis requested
- Number of sample containers filled for each analysis
- Preservation of samples
- Record of any QA/QC samples
- Any irregularities or problems that may have a bearing on sampling quality

5.6.2 Field Notes

Field notes will also be kept during sampling activities. The following information at a minimum will be recorded in a bound field logbook using waterproof ink:

- Names of personnel
- Weather conditions
- Date and time of sampling
- Location of sampling, including GPS coordinates
- Description of samples, and analyses to be performed
- Description of QA/QC samples
- Decontamination information
- Number of sample containers
- Sample handling and method of shipment

Attachment A

Field Sampling Data Sheet for Surface Material Samples

FIELD SAMPLING DATA SHET FOR SURFACE MATERIAL SAMPLES

Sample Identification:		Date:
Samplers' Signature:		Time:
Type of Sample:	Surface:	Subsurface:
	Composite:	Grab:
Sample Location Coordinates:		
Type of Surface Cover:		
Depth Interval:		
Weather Conditions:		
Sample Description:		
Field Soil Description		
USCS Abbreviation		
Color		
Staining		
Odor		
Moisture		

Containers	Number	Preservatives

QA/QC Samples Collected:
Comments:

DRAFT 12.31.2020

APPENDIX 21-5

GROUNDWATER MONITORING DATA

FIELD MEASUREMENTS

Period	Sample Date	Units	Time Sampled	Water Depth (ft)	Outside Temp (°C)	Water Temp (°C)	Resistivity (ms/cm)	Dissolved Oxygen (%)	Dissolved Oxygen mg/L)	pH	pH (mV)	ORP	Pressure (mmHg)
LM-MW2 MILL SITE													
2022-Q4	**29-Dec-22**	-	4:00pm	50.5	6	5.98	0.979	163.6	6.40	7.57	28.3	(20.3)	21.6
2023-Q1	**16-Jan-23**	-	1:48pm	50.7	(4)	-	-	-	-	-	-	-	-
2023-Q2		-											
2023-Q3		-											
2023-Q4		-											
2024-Q1		-											
2024-Q2		-											
2024-Q3		-											
2024-Q4		-											
LM-MW3 MILL SITE													
2022-Q4	**29-Dec-22**	-	3:24pm	63.3	6	6.34	0.874	8.3	7.90	6.63	33.1	11.3	
2023-Q1	**16-Jan-23**	-	1:25pm	62.3	(4)	6.99	0.467	67.3	8.71	7.06	(1.9)	87.0	522.8
2023-Q2		-											
2023-Q3		-											
2023-Q4		-											
2024-Q1		-											
2024-Q2		-											
2024-Q3		-											
2024-Q4		-											
BMW-1 UPGRADIENT BACKGROUND													
2022-Q4	**29-Dec-22**	-	2:45pm	19.9	6	6.92	0.204	no stable	7.29	6.48	135.0	(83.1)	
2023-Q1	**16-Jan-23**	-	2:34pm	17.9	(3)	7.40	0.147	27.6	3.28	9.62	(143.3)	120.2	517.8
2023-Q2		-											
2023-Q3		-											
2023-Q4		-											
2024-Q1		-											
2024-Q2		-											
2024-Q3		-											
2024-Q4		-											
PZ-4 UPGRADIENT BACKGROUND (aka BMW-1A)													
2022-Q4(3)	**08-Jan-23**	-											
2023-Q1	**16-Jan-23**	-	3:47pm	102.3	(3)	5.44	0.314	71.1	8.91	8.37	(73.8)	18.3	518.5
2023-Q2		-											
2023-Q3		-											
2023-Q4		-											
2024-Q1		-											
2024-Q2		-											
2024-Q3		-											
2024-Q4		-											
MW-13 DOWN GRADIENT BACKGROUND													
2022-Q4	**29-Dec-22**	-	12:37pm	26.3	(8)	6.70	1.050	66.7	8.09	7.91	(49.1)	127.1	5.8
2023-Q1	**16-Jan-23**	-	12:27pm	24.1	(4)	8.10	0.877	54.4	6.41	7.80	(43.0)	143.0	625.4
2023-Q2		-											
2023-Q3		-											
2023-Q4		-											
2024-Q1		-											
2024-Q2		-											
2024-Q3		-											
2024-Q4		-											
MW-13A DOWN GRADIENT BACKGROUND													
2022-Q4	**29-Dec-22**	-	1:30pm	21.0	(8)	7.30	no stable	69.0	6.60	no stable	no stable	no stable	
2023-Q1	**16-Jan-23**	-	12:57pm	20.0	(4)	7.05	1.144	40.0	4.75	6.57	25.1	244.0	525.6
2023-Q2		-											
2023-Q3		-											
2023-Q4		-											
2024-Q1		-											
2024-Q2		-											
2024-Q3		-											
2024-Q4		-											

Notes: (1) A "0" value denotes NOT DETECTABLE laboratory result, (2) A "blank" cell in the table denotes no data collected, (3) Pump failed on 29-Dec on well PZ-4. Sample collected using bailer.

EPA 200.7 REV 4.4 - METALS (ICP) - TOTAL RECOVERABLE

Period	Sample Date	Units	Aluminum (Al)	Boron (B)	Calcium (Ca)	Iron (Fe)	Sodium (Na)
LM-MW2 MILL SITE							
2022-Q4	**29-Dec-22**	ug/L	400	0	130,000	26,000	23,000
2023-Q1	**16-Jan-23**	ug/L	Dry well				
2023-Q2		ug/L					
2023-Q3		ug/L					
2023-Q4		ug/L					
2024-Q1		ug/L					
2024-Q2		ug/L					
2024-Q3		ug/L					
2024-Q4		ug/L					
LM-MW3 MILL SITE							
2022-Q4	**29-Dec-22**	ug/L	710	0	110,000	3,400	19,000
2023-Q1	**16-Jan-23**	ug/L	260	0	110,000	6,100	18,000
2023-Q2		ug/L					
2023-Q3		ug/L					
2023-Q4		ug/L					
2024-Q1		ug/L					
2024-Q2		ug/L					
2024-Q3		ug/L					
2024-Q4		ug/L					
BMW-1 UPGRADIENT BACKGROUND							
2022-Q4	**29-Dec-22**	ug/L	0	0	6,900	0	31,000
2023-Q1	**16-Jan-23**	ug/L	0	0	7,100	0	30,000
2023-Q2		ug/L					
2023-Q3		ug/L					
2023-Q4		ug/L					
2024-Q1		ug/L					
2024-Q2		ug/L					
2024-Q3		ug/L					
2024-Q4		ug/L					
PZ-4 UPGRADIENT BACKGROUND (aka BMW-1A)							
2022-Q4(3)	**08-Jan-23**	ug/L	13,000	0	110,000	12,000	6,300
2023-Q1	**16-Jan-23**	ug/L	36,000	0	120,000	38,000	7,000
2023-Q2		ug/L					
2023-Q3		ug/L					
2023-Q4		ug/L					
2024-Q1		ug/L					
2024-Q2		ug/L					
2024-Q3		ug/L					
2024-Q4		ug/L					
MW-13 DOWN GRADIENT BACKGROUND							
2022-Q4	**29-Dec-22**	ug/L	7,000	0	150,000	11,000	13,000
2023-Q1	**16-Jan-23**	ug/L	1,100	0	150,000	1,600	13,000
2023-Q2		ug/L					
2023-Q3		ug/L					
2023-Q4		ug/L					
2024-Q1		ug/L					
2024-Q2		ug/L					
2024-Q3		ug/L					
2024-Q4		ug/L					
MW-13A DOWN GRADIENT BACKGROUND							
2022-Q4	**29-Dec-22**	ug/L	11,000	0	150,000	4,900	16,000
2023-Q1	**16-Jan-23**	ug/L	2,000	0	140,000	690	16,000
2023-Q2		ug/L					
2023-Q3		ug/L					
2023-Q4		ug/L					
2024-Q1		ug/L					
2024-Q2		ug/L					
2024-Q3		ug/L					
2024-Q4		ug/L					

Notes: (1) A "0" value denotes NOT DETECTABLE laboratory result, (2) A "blank" cell in the table denotes no data collected, (3) Pump failed on 29-Dec on well PZ-4. Sample collected using bailer.

EPA 200.8 REV 4.4 - METALS (ICP/MS) - TOTAL RECOVERABLE

Period	Sample Date	Units	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Lead (Pb)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Thallium (Th)	Uranium (U)	Vanadium (V)	Zinc (Zn)
LM-MW2 MILL SITE																			
2022-Q4	**29-Dec-22**	ug/L	0.0	0.0	29.0	0.0	0.0	110.0	0.0	0.0	120.0	0.0	2.9	0.0	0.0	0.0	11.0	0.0	23.0
2023-Q1	**16-Jan-23**	ug/L	**Dry Well**																
2023-Q2		ug/L																	
2023-Q3		ug/L																	
2023-Q4		ug/L																	
2024-Q1		ug/L																	
2024-Q2		ug/L																	
2024-Q3		ug/L																	
2024-Q4		ug/L																	
LM-MW3 MILL SITE																			
2022-Q4	**29-Dec-22**	ug/L	0.0	0.0	50.0	0.0	0.0	0.0	0.0	13.0	45.0	0.0	3.2	0.0	0.0	0.0	5.8	0.0	280.0
2023-Q1	**16-Jan-23**	ug/L	0.0	0.0	45.0	0.0	0.0	0.0	0.0	17.0	40.0	0.0	3.2	0.0	0.0	0.0	6.2	0.0	300.0
2023-Q2		ug/L																	
2023-Q3		ug/L																	
2023-Q4		ug/L																	
2024-Q1		ug/L																	
2024-Q2		ug/L																	
2024-Q3		ug/L																	
2024-Q4		ug/L																	
BMW-1 UPGRADIENT BACKGROUND																			
2022-Q4	**29-Dec-22**	ug/L	0.0	0.0	110.0	0.0	0.0	0.0	0.0	0.0	3.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2023-Q1	**16-Jan-23**	ug/L	0.0	0.0	110.0	0.0	0.0	0.0	0.0	0.0	4.8	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2023-Q2		ug/L																	
2023-Q3		ug/L																	
2023-Q4		ug/L																	
2024-Q1		ug/L																	
2024-Q2		ug/L																	
2024-Q3		ug/L																	
2024-Q4		ug/L																	
PZ-4 UPGRADIENT BACKGROUND (aka BMW-1A)																			
2022-Q4(3)	**08-Jan-23**	ug/L	0.0	0.0	340.0	0.0	0.0	4.0	4.2	20.0	360.0	4.6	4.8	0.0	0.0	0.0	15.0	8.5	53.0
2023-Q1	**16-Jan-23**	ug/L	0.0	17.0	560.0	1.9	0.0	18.0	8.1	69.0	500.0	2.9	19.0	0.0	0.0	0.0	17.0	30.0	120.0
2023-Q2		ug/L																	
2023-Q3		ug/L																	
2023-Q4		ug/L																	
2024-Q1		ug/L																	
2024-Q2		ug/L																	
2024-Q3		ug/L																	
2024-Q4		ug/L																	
MW-13 DOWN GRADIENT BACKGROUND																			
2022-Q4	**29-Dec-22**	ug/L	0.0	11.0	140.0	1.2	0.0	17.0	6.1	32.0	330.0	0.0	8.9	6.1	4.6	0.0	14.0	16.0	160.0
2023-Q1	**16-Jan-23**	ug/L	0.0	0.0	36.0	0.0	0.0	3.2	3.7	3.9	42.0	0.0	0.0	6.0	0.0	0.0	11.0	0.0	24.0
2023-Q2		ug/L																	
2023-Q3		ug/L																	
2023-Q4		ug/L																	
2024-Q1		ug/L																	
2024-Q2		ug/L																	
2024-Q3		ug/L																	
2024-Q4		ug/L																	
MW-13A DOWN GRADIENT BACKGROUND																			
2022-Q4	**29-Dec-22**	ug/L	0.0	44.0	1,200	6.5	260.0	37.0	27.0	200.0	16,000	3.8	110.0	0.0	3.3	0.0	18.0	58.0	38,000
2023-Q1	**16-Jan-23**	ug/L	0.0	23.0	740.0	3.0	240.0	16.0	14.0	97.0	######	2.4	85.0	0.0	1.6	0.0	6.7	27.0	37,000
2023-Q2		ug/L																	
2023-Q3		ug/L																	
2023-Q4		ug/L																	
2024-Q1		ug/L																	
2024-Q2		ug/L																	
2024-Q3		ug/L																	
2024-Q4		ug/L																	

Notes: (1) A "0" value denotes NOT DETECTABLE laboratory result, (2) A "blank" cell in the table denotes no data collected, (3) Pump failed on 29-Dec on well PZ-4. Sample collected using bailer.

EPA 245.1 - MERCURY (CVAA)

Period	Sample Date	Units	Mercury (Hg)		
LM-MW2 MILL SITE					
2022-Q4	29-Dec-22	ug/L	0		
2023-Q1	16-Jan-23	ug/L	Dry Well		
2023-Q2		ug/L			
2023-Q3		ug/L			
2023-Q4		ug/L			
2024-Q1		ug/L			
2024-Q2		ug/L			
2024-Q3		ug/L			
2024-Q4		ug/L			
LM-MW3 MILL SITE					
2022-Q4	29-Dec-22	ug/L	0		
2023-Q1	16-Jan-23	ug/L	0		
2023-Q2		ug/L			
2023-Q3		ug/L			
2023-Q4		ug/L			
2024-Q1		ug/L			
2024-Q2		ug/L			
2024-Q3		ug/L			
2024-Q4		ug/L			
BMW-1 UPGRADIENT BACKGROUND					
2022-Q4	29-Dec-22	ug/L	0		
2023-Q1	16-Jan-23	ug/L	0		
2023-Q2		ug/L			
2023-Q3		ug/L			
2023-Q4		ug/L			
2024-Q1		ug/L			
2024-Q2		ug/L			
2024-Q3		ug/L			
2024-Q4		ug/L			
PZ-4 UPGRADIENT BACKGROUND (aka BMW-1A)					
2022-Q4(3)	08-Jan-23	ug/L	0		
2023-Q1	16-Jan-23	ug/L	0		
2023-Q2		ug/L			
2023-Q3		ug/L			
2023-Q4		ug/L			
2024-Q1		ug/L			
2024-Q2		ug/L			
2024-Q3		ug/L			
2024-Q4		ug/L			
MW-13 DOWN GRADIENT BACKGROUND					
2022-Q4	29-Dec-22	ug/L	0		
2023-Q1	16-Jan-23	ug/L	0		
2023-Q2		ug/L			
2023-Q3		ug/L			
2023-Q4		ug/L			
2024-Q1		ug/L			
2024-Q2		ug/L			
2024-Q3		ug/L			
2024-Q4		ug/L			
MW-13A DOWN GRADIENT BACKGROUND					
2022-Q4	29-Dec-22	ug/L	0		
2023-Q1	16-Jan-23	ug/L	0		
2023-Q2		ug/L			
2023-Q3		ug/L			
2023-Q4		ug/L			
2024-Q1		ug/L			
2024-Q2		ug/L			
2024-Q3		ug/L			
2024-Q4		ug/L			

Notes: (1) A "0" value denotes NOT DETECTABLE laboratory result, (2) A "blank" cell in the table denotes no data collected, (3) Pump failed on 29-Dec on well PZ-4. Sample collected using bailer.

GENERAL CHEMISTRY

Period	Sample Date	Units	Chloride	Nitrate as N	Flouride	Nitrite as N	Sulfate	Nitrogen Kjeldahl	Nitrate Nitrite as N	Cyanide, Total SW846	Alkalinity	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity	Hydroxide Alkalinity	Total Disolved Solids	Nitrogen, Total (EPA Total)
LM-MW2 MILL SITE																
2022-Q4	**29-Dec-22**	ug/L	33.0	2.3	0.0	0.0	330.0	0.0	1.9	0.0	190.0	190.0	0.0	0.0	680.0	1.9
2023-Q1	**16-Jan-23**	ug/L	**Dry Well**													
2023-Q2		ug/L														
2023-Q3		ug/L														
2023-Q4		ug/L														
2024-Q1		ug/L														
2024-Q2		ug/L														
2024-Q3		ug/L														
2024-Q4		ug/L														
LM-MW3 MILL SITE																
2022-Q4	**29-Dec-22**	ug/L	23.0	2.7	0.0	0.0	300.0	0.0	5.4	0.0	130.0	130.0	0.0	0.0	620.0	5.4
2023-Q1	**16-Jan-23**	ug/L	21.0	4.4	0.0	0.0	310.0	0.0	4.8	0.0	130.0	130.0	0.0	0.0	610.0	4.8
2023-Q2		ug/L														
2023-Q3		ug/L														
2023-Q4		ug/L														
2024-Q1		ug/L														
2024-Q2		ug/L														
2024-Q3		ug/L														
2024-Q4		ug/L														
BMW-1 UPGRADIENT BACKGROUND																
2022-Q4	**29-Dec-22**	ug/L	0.0	0.0	0.0	1.0	15.0	0.0	140.0	0.0	96.0	96.0	0.0	0.0	140.0	0.0
2023-Q1	**16-Jan-23**	ug/L	0.0	0.0	0.0	0.0	17.0	0.0	0.0	0.0	94.0	94.0	0.0	0.0	130.0	0.0
2023-Q2		ug/L														
2023-Q3		ug/L														
2023-Q4		ug/L														
2024-Q1		ug/L														
2024-Q2		ug/L														
2024-Q3		ug/L														
2024-Q4		ug/L														
PZ-4 UPGRADIENT BACKGROUND (aka BMW-1A)																
2022-Q4(3)	**08-Jan-23**	ug/L	28.0	3.5	0.0	0.0	85.0	0.0	3.7	0.0	200.0	200.0	0.0	0.0	380.0	
2023-Q1	**16-Jan-23**	ug/L	26.0	3.8	0.0	0.0	87.0	0.0	3.8	0.0	200.0	200.0	0.0	0.0	410.0	3.8
2023-Q2		ug/L														
2023-Q3		ug/L														
2023-Q4		ug/L														
2024-Q1		ug/L														
2024-Q2		ug/L														
2024-Q3		ug/L														
2024-Q4		ug/L														
MW-13 DOWN GRADIENT BACKGROUND																
2022-Q4	**29-Dec-22**	ug/L	7.8	2.5	0.0	0.0	440.0	0.0	5.0	0.0	120.0	120.0	0.0	0.0	740.0	5.0
2023-Q1	**16-Jan-23**	ug/L	8.0	2.3	0.0	0.0	400.0	0.0	5.0	0.0	120.0	120.0	0.0	0.0	760.0	5.0
2023-Q2		ug/L														
2023-Q3		ug/L														
2023-Q4		ug/L														
2024-Q1		ug/L														
2024-Q2		ug/L														
2024-Q3		ug/L														
2024-Q4		ug/L														
MW-13A DOWN GRADIENT BACKGROUND																
2022-Q4	**29-Dec-22**	ug/L	16.0	4.1	0.0	0.0	620.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	900.0	3.6
2023-Q1	**16-Jan-23**	ug/L	15.0	3.5	0.0	0.0	650.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	1,000.0	3.5
2023-Q2		ug/L														
2023-Q3		ug/L														
2023-Q4		ug/L														
2024-Q1		ug/L														
2024-Q2		ug/L														
2024-Q3		ug/L														
2024-Q4		ug/L														

Notes: (1) A "0" value denotes NOT DETECTABLE laboratory result, (2) A "blank" cell in the table denotes no data collected, (3) Pump failed on 29-Dec on well PZ-4. Sample collected using bailer.