



Brian Schweitzer, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • [www.deq.mt.gov](http://www.deq.mt.gov)

July 31, 2006

Dear Reader:

Enclosed is the Final Environmental Assessment (EA) for the Yellowstone Mine, Mine Life Extension Amendment to Operating Permit 00005.

Luzenac America, Inc. (Luzenac) filed an application on December 19, 2002 for an amendment to Operating Permit 00005 from the Montana Department of Environmental Quality (DEQ), Environmental Management Bureau (EMB) in Helena. The Proposed Action would extend the mine life by 50 years and disturb an additional 271.3 acres. DEQ published a Draft EA on December 22, 2004. The Draft EA analyzed the potential impacts of the Proposed Action, as well as alternatives: 1) No Action (continuing with the currently approved plan), and 2) Agency Modifications to the Proposed Action Alternative.

Public comments concerning the adequacy and accuracy of the Draft EA were received from six parties and DEQ's responses to the comments are contained in Appendix A attached to this cover letter. The public comments resulted in several edits being made to the Draft EA which are *italicized and underlined* and highlighted in red on the CD copies and black in the paper copies of the Final EA. The public comments did not substantially change the conclusions in the Draft EA. DEQ has decided to approve the Yellowstone Mine, Mine Life Extension Amendment to Operating Permit 00005 with Agency Modifications to the Proposed Action Alternative. The modifications to the Proposed Action are summarized in the responses to public comments in Appendix A.

Questions on the decision to approve the amendment should be directed to Herb Rolfes, Operating Permit Section Supervisor, DEQ/EMB, P.O. Box 200901, Helena, MT 59620-0901, phone 444-3841, or e-mailed to [hrolfes@mt.gov](mailto:hrolfes@mt.gov).

Sincerely,

Warren D. McCullough  
Chief Environmental Management Bureau

File 00005.70

G:\emb\op\MEPA/EA/Luzenac/2006/yellowstonelomfeacoverletter.doc



**YELLOWSTONE MINE**  
**MINE LIFE EXTENSION AMENDMENT TO OPERATING PERMIT 00005**  
**FINAL DRAFT ENVIRONMENTAL ASSESSMENT**

**July 2006 December 2004**

Prepared by  
Montana Department of Environmental Quality  
1520 East Sixth Avenue  
PO box 200901  
Helena, MT 59620-0901



# CHAPTER 1

## INTRODUCTION / PURPOSE AND NEED

### 1.1 INTRODUCTION

The Montana Department of Environmental Quality (DEQ) received an application in May 2003 December 19, 2002 from Luzenac America, Inc. (Luzenac) to amend Operating Permit 00005 at its existing Yellowstone Mine (Figure 1-1) (Luzenac 2002). The Application for the Mine Life Extension - Amendment to Operating Permit 00005 (“Amendment”) describes a proposed extension of mining operations, including an expansion of an open pit and overburden (OB) piles (the Proposed Action) (Luzenac, 2002). The need for the Amendment is based on the ongoing demand for talc products and the identification of new mineable talc ore reserves. The mineable reserves identified to date would support an extended mine life of approximately 50 years, based on current ore production rates of about 300,000 tons of talc per year. The mine would continue to operate 365 days per year. The existing and proposed facilities comprising the Yellowstone Mine are on private land entirely owned by Luzenac in Madison County, MT.

Mine permitting and compliance activities on private land within the State of Montana fall under the jurisdiction of DEQ, principally under the provisions of the Montana Metal Mine Reclamation Act (MMRA) and the Montana Environmental Policy Act (MEPA). Consequently, DEQ must review Luzenac’s proposed application to extend the life of the Yellowstone Mine. This environmental assessment (EA) evaluates the potential impacts of the Proposed Action pursuant to MEPA.

This EA describes the proposed expansion of mining and overburden disposal operations and the extension of the Yellowstone Mine life and evaluates the environmental consequences of the Proposed Action. The EA also looks at the consequences of two alternatives to the Proposed Action: 1) a No Action Alternative, and 2) Agency Modifications to the Proposed Action Alternative. The No Action Alternative for this active mining operation would be to allow mining to continue under the conditions of the existing Operating Permit.

Chapter 1 describes the purpose of and need for this action, the role of DEQ, issues, and public participation in the EA process. Chapter 2 provides a historical perspective of talc mining at the mine site, description of existing mining operations, and description of the Proposed Action and alternatives. Chapter 3 describes the affected environment in the Yellowstone Mine area. Chapter 4 analyzes potential direct, indirect, and cumulative effects associated with the Proposed Action and the alternatives, and identifies possible mitigation measures that could be selected to minimize impacts. Chapter 5 identifies the consultation and coordination with state and federal agencies that occurred during preparation of this EA and contains a list of those who prepared the EA. Chapter 6 contains a list of references cited in developing the EA.







## 1.2 PURPOSE OF AND NEED FOR ACTION

Luzenac proposes to extend the mine life of the currently operating Yellowstone Mine for approximately 50 years at the present production rate of about 300,000 tons of talc per year. This mine life extension is justified based on the need for Yellowstone Mine talc and the recent upgrading of approximately 17 million tons of talc to an ore-grade mineable reserve status. If the permit amendment were not approved, Luzenac would continue to complete the operations identified under its existing Operating Permit 00005. This would allow approximately 8 years of future operations (mining talc reserves and overburden placement) at current production rates.

Talc is mined, milled, and marketed as a filler, coating, and extender for use in paper, paint, plastic, and rubber products. In the paper and cardboard recycling industry talc is used as an additive that absorbs unwanted ink, glue, soap, and pitch. It is also used by the agricultural and cosmetics industries. End products that use talc are commonly designed around talc of a particular composition, color or texture, and therefore, customers have an economic interest in obtaining talc from the same source over a long period of time. The rate at which talc is mined is primarily dependent on market demand. Mining production for Luzenac is, therefore, based on the demand created by the amount of paper, paint, plastics, etc. produced by its customers. Luzenac's customers have an ongoing need for talc obtained specifically from this mine.

## 1.3 AUTHORIZING ACTIONS

A mining proposal or amendment to an operating permit submitted to DEQ may be approved only after a review of the proposal with respect to the reclamation and closure plan as required by MMRA and after an environmental analysis is completed as required by MEPA. DEQ is also responsible for protecting air quality under the Clean Air Act of Montana and water quality under the Montana Water Quality Act. DEQ decision options upon completion of the EA include: denying the application, the No Action Alternative, if the proposed operation would violate MMRA, the Clean Air Act, or the Water Quality Act; approving Luzenac's Proposed Action as submitted; approving the Proposed Action with agency modifications or stipulations designed to mitigate environmental impacts identified; or requiring an environmental impact statement (EIS) be completed to disclose and analyze potentially significant impacts.

DEQ is responsible for calculating the amount of a performance bond for the Yellowstone Mine. The purpose of the bond is to ensure the fulfillment of obligations under the mining reclamation laws and to ensure the availability of funds in the event of a default by the operator. The posting of the performance bond payable to the State of Montana is a precondition to the issuing of a permit or approval of an amendment to an operating permit. The amount of the bond is based upon the estimated cost of restoring the disturbed land, abating pollution, and completing the work described in the reclamation plan (82-4-123, 223, 226, 332, 338 and 433, MCA; ARM 26.4.1102). DEQ is required to thoroughly review the bond every 5 years under MMRA (82-4-338, MCA).



Luzenac's bond for the Yellowstone Mine was reviewed in 2002 in conjunction with the approval of the Consolidated Operating Permit; with additional bond increments submitted since 2003, the current bond is \$13,068,832 and currently stands at \$12,311,426. DEQ is also required to conduct an annual bond oversight for each operating permit under MMRA (82-4-338, MCA). Luzenac has submitted additional bond increments since 2003 and the current bond is now \$13,068,832.

In addition to DEQ, other federal, state, and local agencies may have jurisdiction over certain aspects of the Proposed Action. Table 1-1 provides a listing of agencies and their respective permit/authorizing responsibilities. The primary permits to be obtained by Luzenac from DEQ include an Amendment to its Operating Permit 00005, continuation or modification of Luzenac's Air Quality Permit #1648-11, and the Montana Pollutant Discharge Elimination System (MPDES) Permit MT-0028584, if needed.

The Mine Safety and Health Administration (MSHA) is responsible for overseeing the regulation, monitoring, and compliance with respect to mineworkers' safety.

Some portions of the haul and access roads used by the Yellowstone Mine are under the jurisdiction of Madison County, MT, as is the noxious weed control program.

#### 1.4 RELATIONSHIP TO DEQ POLICIES, PLANS, AND PROGRAMS

Luzenac's Proposed Action has been reviewed for compliance with DEQ policies, plans, and programs. The amendment application was has been reviewed by DEQ for deficiencies and completeness, and the document was has been deemed complete enough to begin the EA process. Through the EA process, the State of Montana and Madison County are evaluating the Proposed Action for conformance with existing land use restrictions.

#### 1.5 ISSUES AND CONCERNS

##### 1.5.1 ISSUES STUDIED IN DETAIL

DEQ conducted scoping to identify potential issues and other concerns with the proposed Amendment, as described in Section 5.2. A summary of these issues is provided in Table 1-2. This table also provides references to sections of this EA that respond to each issue raised.



TABLE 1-1  
Regulatory Responsibilities  
*Amendment to Operating Permit 00005-EA*

ACTION	REGULATORY AGENCY
Completeness Review of Permit Amendment Document	DEQ
Montana Environmental Policy Act	DEQ
Montana Metal Mine Reclamation Act	DEQ
Environmental Assessment	DEQ
Clean Water Act (Section 404)	U.S. Army Corps of Engineers (USACE)
High Explosive License/Permit	U.S. Bureau of Alcohol, Tobacco, & Firearms
Air Quality Permit	DEQ Air Resources Management Bureau
MPDES Waste Water Permit	DEQ Water Protection Bureau
Mine Operating Permit and Bonding	DEQ
Potable Water System Permit	DEQ
Sewer System Approvals	Madison County
County Road Construction, Maintenance, and Land Use	Madison County
Noxious Weeds	Madison County
Safety Plan	MSHA
Endangered Species Act of 1973	U.S. Fish & Wildlife Service (USFWS)

<p>TABLE 1-2 Scoping Issues <i>Amendment to Operating Permit 00005 – EA</i></p>	
Scoping Issue	Concern
Socioeconomics	Examine the duration of the Proposed Action so that socioeconomic impacts on employment and taxes can be evaluated. See Sections 2.2.10, 2.3.10, and 4.1.
Pit Reclamation	Reclaim all pit acres. See Sections 2.2.11.4, 2.3.11.4, 2.4.1.2, and 4.2.
Water Quality	Evaluate impacts to surface water and groundwater quality and quantity, including a surface water drainage plan after mining. See Sections 2.2.8.2, 2.3.8.2, 2.4.1.3, 3.2.3, 4.3.
Visual Impacts	Reclaim overburden piles and pits to diminish visual impact. See Sections 2.5.1.1, 2.5.1.2, 3.2.4, and 4.4.

### 1.5.2 ISSUES CONSIDERED BUT DISMISSED

DEQ has identified resources that would not be affected by the Proposed Action and issues that were considered and eliminated from further review.

#### 1.5.2.1 Air Quality

Mining and ore processing at the Yellowstone Mine produce particulate and gaseous emissions. Most emissions from the mine are particulate matter (PM) resulting from road use, drilling, blasting, loading, and hauling of overburden and ore. Gaseous emissions of combustion by-products from diesel engines and blasting compounds are minor but contribute some sulfur dioxide, nitrogen dioxide, carbon monoxide, and volatile organic compounds.

Particulate matter emissions are controlled at the Yellowstone Mine by engineering and operating practices as described in Section 2.2.7.8. Luzenac monitoreds air quality at the Yellowstone Mine site as specified under the existing air quality permit. Two samplers, one located upwind and another downwind of the mine property monitored PM<sub>10</sub>, particulate matter less than 10 microns in diameter. Data from PM<sub>10</sub> samplers are were collected every 6 days. Monitoring results are were provided to DEQ on a quarterly basis.



Air quality impacts ~~are~~ were evaluated using the state and federal standards for PM<sub>10</sub> of 150 micrograms per cubic meter (µg/m<sup>3</sup>) per 24-hour period or an annual average of 50 µg/m<sup>3</sup> (ARM 17.8.223). Ambient air monitoring conducted at the Yellowstone Mine indicateds mine emissions have historically had little effect on regional air quality and visibility. Recent data from those PM<sub>10</sub> stations indicate d concentrations range d from approximately 10 to 15 µg/m<sup>3</sup>, with maximum concentrations typically 25 to 35 µg/m<sup>3</sup>. The Yellowstone Mine has never exceeded state or federal air quality standards.

Particulate and gaseous emissions would not change appreciably as a result of the Proposed Action. Mining and ore processing methods and rates, the size of the fleet, and types of vehicles to be used would not change. ~~Luzenac would continue air quality monitoring at the Yellowstone Mine site as specified under the existing air quality permit. The air monitoring program (AIRS) was terminated in September 2003. DEQ recommended termination after review of nearly 20 years of data that indicated that results were repeatedly less than 50-80 percent of the enforceable standards (Administrative Rules of Montana 17.8.223).~~

In addition to the Yellowstone Mine, other occasional local sources of air pollutants in the mine area include vehicle traffic on unpaved roads, logging operations, and wood-smoke from wildfires and slash burning.

#### 1.5.2.2 Geologic Hazards

Geologic hazards could occur from implementation of the Proposed Action.

##### 1.5.2.2.1 Area Seismicity

The Yellowstone Mine is located in a seismic zone 4, which has moderate to high earthquake activity. One of the largest earthquakes recorded for the area was the 1959 Hebgen Lake earthquake with a magnitude of 7.3. The historical earthquake record of 126 years for the Yellowstone Mine area lists 133 earthquakes of a magnitude greater than 4.0 on the Richter scale that have occurred within 200 kilometers of the mine site.

Based on the historical data, the maximum expected earthquake that might occur within the next 100 years is a magnitude 7.0+, which would have a horizontal peak particle acceleration of about 8 percent of gravity. Strong ground motions associated with a quake of this magnitude could be expected to last for about 15 seconds and have a predominant period of about 0.4 second.

The maximum credible acceleration for the mine site area would be from a magnitude 7.3 earthquake on the south-central segment of the Madison Valley fault lying directly across the valley about 11 miles from the mine site. An earthquake of this magnitude could be expected to produce horizontal peak particle acceleration of 16 to 44 percent of gravity, with an expected value of 26 percent of gravity. The duration of expected strong motion from such a quake would be approximately 15 seconds with a predominant period of about 0.4 seconds.

Not one of the fault structures mapped in the vicinity of the mine ~~has~~<sup>have</sup> been recently active as evidenced by the lack of fault scarps. An earthquake during mine life could cause operational problems on site. No mine-related off-site impacts would occur because of the lack of large water-impounding structures. An earthquake after mining is completed would cause some settling in the overburden disposal areas (see Section 1.5.2.2.5) and some talus and rock raveling in the reclaimed pits.

#### 1.5.2.2.2 Geochemistry

The rock stripped as overburden is composed primarily of gray dolomite (81.5 percent) with smaller amounts of red dolomite (13.7 percent), and volcanics (4.7 percent). The overburden rock in the area of proposed expansion would be the same as that which has been historically mined and is also composed primarily of gray dolomite with smaller amounts of red dolomite and volcanics.

The mineral goethite occurs as iron oxide coatings on fractures and inclusions associated with both talc ore and overburden materials. Talc and dolomite textural relationships reveal pyrite as the parent mineral of the iron oxide coatings and inclusions. Iron also substitutes for magnesium in the talc crystal structure at a rate of approximately 1 percent. This iron is in a reduced chemical state and is responsible for giving the talc its green color.

Elevated levels of fluorine in the analyses of talc reflect the substitution that takes place between hydroxyl groups and fluorine ions in the talc crystal lattice. Fluorine is considered non-extractable, because it is part of the chemical structure of the talc. Manganese oxides also occur in the crystal lattice and account for the anomalous levels of manganese in multi-element analyses. Water quality sampling to date has not revealed problems with fluorine, manganese, or other elements.

The geologic formations that would be mined are the same as have been mined throughout the mine's 50-year life. No geochemistry problems have ever been identified. This is not likely to change if the Proposed Action is approved.

#### 1.5.2.2.3 Acid Rock Drainage Potential and Metal Mobility

Potential acid rock drainage (ARD) impacts are evaluated through mineralogical and acid/base account analysis. Potential for acid generation and trace element release can also be evaluated through review of monitoring data from historically and currently mined areas. In addition to measured water quality, metal mobility testing can be used to evaluate the potential risk of groundwater contamination by metals dissolved from mined rock and transported in surface water or groundwater.

Special handling or selective placement of the overburden is not necessary, as mineralogic and geochemical analyses have indicated that reactive or otherwise



problematic minerals are not present in either overburden rock or talc (Maxim, 2001; Luzenac, 2002).

An overburden geochemical characterization study was conducted to evaluate ARD potential and the potential for metal release (Maxim, 2001). Eight samples were collected of each of the volcanics, red and gray dolomite, and talc overburden for Acid/Base Accounting (ABA) using the Modified Sobek Method (Sobek et al., 1978) and Synthetic Precipitation Leachability Procedure (SPLP) (EPA Method 1312) analysis. This level of sampling represents approximately one analysis per 4.9 million tons of overburden material.

The ABA data for overburden samples suggest that low levels of sulfide occur in the volcanics, with little risk of ARD production as a result of the high inherent neutralization potential of the dolomite. In addition, pyrite is only reported in talc in localized zones, where oxidation has not occurred. In most cases, pyrite occurs in trace quantities, based on hand specimen descriptions.

Only two samples have an acid neutralization potential/acid generation potential (ANP/AGP) ratio of less than 3:1. These two samples contain no sulfide sulfur and have an AGP of zero (Maxim, 2001). Average net neutralization potentials (NNP) for the red and gray dolomites are 709 tons of  $\text{CaCO}_3$ /1,000 tons of rock and 815 tons of  $\text{CaCO}_3$ /1,000 tons of rock with little acid generation potential, showing the overburden to be net neutralizing. The average NNP for volcanics is lower, averaging 152 tons of  $\text{CaCO}_3$ /1,000 tons of rock. Talc has an average NNP of 230.3 tons of  $\text{CaCO}_3$ /1,000 tons of rock. A weighted average for the overburden, based on the predicted ratio of 81.5 percent gray dolomite, 13.7 percent red dolomite, and 4.7 percent volcanics results in a NNP of 769 tons of  $\text{CaCO}_3$ /1,000 tons of rock. These ABA test results indicate that there is little risk of acid generation within the overburden and ore. Water monitoring indicates pH ranging from 7.3 to 8.3 for all wells and surface water and storm water runoff (Tables 3-1 and 3-3).

The results of the SPLP extraction (digestion in a weak acid water representing an approximation of the acidity of natural rain water) show that metal mobility would be low, with minor release of aluminum, barium, cadmium, chromium, copper, and iron from the volcanics, as well as barium, strontium, and zinc release from both the dolomite and volcanics (Maxim, 2001). Review of the concentrations measured in SPLP extracts, as well as the blending ratio for the proposed operation, indicates that those metals that are dissolved from overburden would occur in concentrations well below Montana and federal water quality standards. These conclusions have been confirmed through an overburden and water verification sampling and analysis program conducted annually since 2001.

The results of the geochemical study and ongoing geochemical and water monitoring show that continued land disposal of overburden related to mining at the Yellowstone Mine would not adversely affect the environment with respect to acid rock drainage or

dissolved metal mobility as measured by impacts to water quality. This would not be likely to change if the Proposed Action is approved.

#### 1.5.2.2.4 Asbestiform Minerals

Asbestiform minerals could impact air quality and pose a human health risk. The geologic association of mafic intrusive dikes with dolomitic marbles at the Yellowstone Mine site is consistent with the possible occurrence of asbestiform minerals in intrusive contact zones. Asbestiform minerals have never been identified in ore or overburden at the Yellowstone Mine during routine mining or milling operations. Search for potential asbestiform rock (PAR) occurrence at the Yellowstone Mine was completed (Maxim, 2001). The report summarized the objectives, technical approach, and results of the asbestiform mineral assessment at the Yellowstone Mine and provided recommendations for operational monitoring during future operations.

No asbestiform minerals were identified at the Yellowstone Mine, based on Polarized Light Microscopy/Transmission Electron Microscopy (PLM/TEM) analysis of 108 samples collected from 20 map-transects specifically located in contact zones. No risk to human health or the environment was identified, and no further study apart from routine operational monitoring of contact zones was deemed warranted. An operational verification plan was defined. An operational rock monitoring sampling program has been implemented, and a management plan has been developed in the current mining permit, as contingencies to provide for environmental protection in the unlikely event that asbestiform minerals are identified during future operational monitoring.

#### 1.5.2.2.5 Overburden Pile Stability

Overburden (OB) disposal (OB) areas were selected and designed for long-term stability. The sites chosen for overburden disposal are located in areas that provide a stable construction base without adverse planar features in the underlying bedrock, poor soil strength characteristics, or water saturation in underlying alluvial and colluvial materials.

Overburden disposal sites with exposed bedrock foundation materials include the South, East, and North OB piles. Bedrock at the North OB Pile location consists entirely of Archean dolomitic marble. Bedrock at the East and South OB piles consists mostly of dolomitic marble with lesser amounts of Archean phyllite, amphibolite, quartzite, and Tertiary rhyolitic tuff.

Approximately 75 percent of the proposed East OB Extension is underlain by bedrock. Luzenac conducted a stability analysis for the East OB Pile, because a colluvial mixture of rock fragments and clay forms about 25 percent of the foundation. This colluvium can be unstable if groundwater is present.

Seven rotary bore holes, spaced 60 to 70 feet apart in a row were drilled across the Johnny Gulch drainage at the toe of the proposed East OB Pile Extension to determine

depth to bedrock, thickness of colluvium and saturated soil, and the presence of water. Two of these holes were completed as monitoring wells JG-1 and JG-2. The depth to bedrock is 100 to 120 feet at the northeast toe of the ultimate East OB Pile.

The first monitoring well (JG-1) was drilled in alluvium to the bedrock contact at 99 feet and was dry. The second well (JG-2) drilled to a total depth of 300 feet and completed in hornblende gneiss bedrock, had a static water level of 215 feet within bedrock. Based on this information, shear strengths of the soil and colluvium foundation material have not been compromised due to the presence of groundwater or saturated conditions. Since unsaturated conditions are anticipated in the colluvial materials, there would be no reduction in the stability of the east slope of the East OB Pile due to pore pressure buoyancy that would reduce the total resistance to movement from friction.

A stability analysis of the proposed East OB Pile Extension and the colluvial foundation material underlying a portion of the proposed overburden disposal area was performed using the modeling program XSTABL (Sharma, no date). Strength parameters of the colluvial foundation material and overburden material to be placed in the dump were compiled from Yellowstone Mine information and published average properties of soils (USDI, 1974).

Factor of Safety (FOS) is a numeric value calculated by the ratio of resisting force (resistance to movement) to driving force (force tending to drive the potential movement). When FOS is equal to 1.00, the resisting force equals the driving force. When FOS is less than 1.00, the driving force overcomes the resisting force, and failure or slip would likely occur. When FOS is greater than 1.00, resisting force is greater than the driving force, and failure would likely not occur. The larger the FOS is above 1.00 the less likely a failure is to occur.

Factors of safety were computed for possible failure surfaces using the Janbu (1973) method. Circular surface analyses with segment lengths greater than 50 feet generated a minimum FOS of 1.58, yet none of the failure surfaces was projected to extend into the foundation materials. The potential for deeper wedge-type failures was examined by forcing linear failure surfaces to be analyzed that passed through the foundation soils. A non-circular surface search with a segment length of 700 feet had to be used in order to generate a set of failure surfaces that passed into the colluvium. The minimum FOS for the non-circular search was 1.93 for 1,166 failure surfaces, well within an acceptable margin for overburden pile design.

Even an earthquake within the next 100 years with a peak acceleration of about 8 percent of gravity would have little impact on the stability of the overburden facilities. Ground accelerations of this magnitude generally reduce FOS by about 0.1 to 0.2. The minimum calculated static FOS for these slopes is about 1.58, so a pseudo-static analysis would likely yield a FOS in the 1.38 to 1.48 range. Liquefaction of the colluvial foundation materials by seismic events is not possible because the soil is not saturated. The maximum credible earthquake acceleration of 26 percent of gravity may be



sufficient to cause slight movement of the reclaimed slopes. A major slope failure is not anticipated under the maximum credible earthquake acceleration.

Experience at the Yellowstone Mine indicates that the OB piles have been stable throughout the mine's 50-year life. The proposed extensions of several OB piles were reviewed, and DEQ has determined that OB pile stability would be unlikely to change.

#### 1.5.2.3 Wildlife

Five threatened or endangered species may occur within the Yellowstone Mine region: two mammals, the grizzly bear and the gray wolf, and three birds, bald eagle, peregrine falcon, and whooping crane. Although grizzly bear may occasionally migrate through the area, the project area is outside of the Yellowstone Grizzly Bear Recovery area, and no important habitat has been identified (BLM, 200~~34~~). The area does not contain an endemic population.

The gray wolf is a protected species that has been recently introduced into the Yellowstone National Park area. Wolves may be attracted to large numbers of big game animals and livestock wintering in the region but in general only migrate through the Yellowstone Mine area. As many as five packs of wolves, including the Ennis Lake pack, and numerous individuals have occupied public lands in southwestern Montana, outside of Yellowstone National Park. USFWS, through various control actions, has eliminated all of the packs due to depredations on livestock (USFWS, 2004). Occurrences and sightings are likely to continue, as would wolf-livestock conflicts.

No areas of migratory bird use have been identified within the project area (Farmer, 1982). A search of the Natural Resource Information System database indicates that the Yellowstone Mine and adjacent area are not important habitat for migratory birds or other species (Maxim, 2004). Desirable habitat is present along the Madison River 1.7 miles east of the Yellowstone Mine. In general, the threatened or endangered bird species are found along the Madison and Big Hole River areas.

Mining operations would remain on private land owned by Luzenac. Grazing is the principal use of the mine area by wildlife; and hunting is not permitted. The Yellowstone Mine area was inventoried for wildlife in 1981 and 1982 (~~Westech 1981~~, Farmer, 1982). Elk, moose, mule deer, white-tailed deer, antelope, black bear, and potential grizzly bear habitats were identified. These studies indicated that the mining operation had apparently not affected wildlife outside of the permit boundary area at that time. No important wildlife use areas were identified. An expansion of mining operations by 271 acres in a larger permit area would not likely have a major effect on wildlife habitat.

The use of rangeland resources by wildlife in the vicinity of the Yellowstone Mine does occur, but is not extensive because the level of mining activity limits wildlife use. Wildlife rangeland is common in the area and includes the 7,067-acre Wall Creek State Wildlife Management Area immediately to the south and east of the mine site. This area was established in 1960 and is managed to provide elk winter range. Range

resources removed from use in the areas of expansion under the Proposed Action would be reestablished under Luzenac's final reclamation program. In all, 271.3 additional acres would be removed from short-term use for wildlife grazing by the Proposed Action, and approximately 260.1 acres would eventually be returned to use for wildlife grazing in the future. Native communities would be replaced by less diverse reclaimed plant communities. The East OB Pile would expand in stages down Johnny Gulch over the next 50 years, such that not all of the potential rangeland would be lost from use at the same time. The only new loss of currently undisturbed wildlife grazing rangeland as the result of the Proposed Action would be 11.2 acres in the proposed pit expansion that would be reclaimed to rock faces and talus slopes (Figure 2-7). The 271 acres of additional disturbance and 50-year mine life would not likely have a major effect on wildlife over those observed in the past 50 years. Loss of wildlife habitat has never been an issue at the Yellowstone Mine.

#### **1.5.2.4 Fisheries and Aquatics**

The Proposed Action would not affect fisheries and aquatic resources. Only upper Johnny Gulch had any water flow during the baseline studies of the project area, and there are no fisheries in the Johnny Gulch drainage basin (Luzenac, 2002). There is no water flow in the drainage from the east project area boundary in Johnny Gulch to the Madison River (approximately 1.7 miles). Only the sedimentation pond at the west edge of Section 9 of upper Johnny Gulch was found to contain a macroinvertebrate community. This sedimentation pond would not be affected by the Proposed Action. Ruby Gulch, south of the project area, contains a diverse community of benthic macroinvertebrates, but this drainage basin is outside of the project area.

#### **1.5.2.5 Soil**

Luzenac proposes to disturb an additional 271.3 acres of soil. Soil would be salvaged and used in reclamation of the site. Approximately 301,000 cubic yards of soil have been salvaged from disturbed areas at the Yellowstone Mine to date and are stored in soil stockpiles. Soils were apparently not salvaged during early mining at the Yellowstone Mine. Luzenac has committed to re-soil as many safely accessible acres as possible that were disturbed before passage of MMRA.

Vegetation, soil, and suitable volcanic and colluvial material would be stripped and stockpiled from each proposed facility expansion area prior to construction. All available soil would be salvaged from construction sites such that a minimum amount of soil would be lost in handling. Soil balance calculations (Section 2.3.11.3) indicate that the amount of soil salvaged would be more than adequate for placement of a minimum of 6-inch thickness of soil on all disturbed areas to ensure the return of the land to wildlife grazing. Soil development would begin again after replacement during reclamation.

#### **1.5.2.6 Vegetation**

Vegetation of the Yellowstone Mine area was studied and quantitatively sampled (EGON Johnson and Ryan, 1982). Six vegetation types were identified. A list of vascular plant species prepared for that report identified 145 taxa, including 18 perennial graminoids, 1 annual grass, 88 perennial forbs, 14 annual forbs, 20 shrubs, and 4 trees. Cordilleran flora dominate the list with some Great Basin and Great Plains flora represented. No rare plants were identified in the study area. Similar baseline vegetation information was collected for the Montana Talc Company's (MTC) Johnny Gulch Mine operating permit (Luzenac, 2002). Inventories of threatened and endangered and sensitive plant species were updated in 2004 (Maxim, 2004). No rare plant taxa were recorded in the study area (Maxim, 2004).

Noxious weeds present within the existing Yellowstone Mine permit boundary are spotted knapweed, henbane, hounds tongue, Canada thistle, musk thistle, and bull thistle. An updated weed map is included in each annual report that Yellowstone Mine submits to DEQ. These maps identify the area, size in acres, and type of infestation. These reports also discuss the method of control used for each species during the previous year.

The Yellowstone Mine area is not suited for cultivation; however, grazing is a historical land use. Range condition was qualitatively estimated as fair to excellent (EGON Johnson and Ryan, 1982) depending on the specific location within the mine area. Grazing on the Yellowstone Mine site is at the discretion of Luzenac and has only been permitted at specific times in specific areas to control dense vegetation in revegetation areas.

Despite the proposal to disturb an additional 271.3 acres of vegetation, no important vegetation species or communities have been identified in the proposed expansion area (Maxim, 2004).

Vegetation production removed from the areas of expansion under the Proposed Action would be reestablished under Luzenac's reclamation program with species that support a similar use. Reclaimed vegetation communities would not be as diverse. Loss of vegetation has never been an issue at the Yellowstone Mine.

#### **1.5.2.7 Other Potential Minerals**

The Proposed Action would have no effect on other potential mineral resources. Occurrences of gold, manganese, and iron are within 2 miles of the Yellowstone Mine (Heinrich and Rabbitt, 1960). The Ruby Mine is located in Section 9, Township 9 South, Range 1 West and produced minor amounts of gold between 1934 and 1936. Iron minerals occur in "banded iron formation" units just southeast of the Yellowstone Mine in Sections 9 and 10, T. 9 S., R. 1 W., and Section 33, T. 8 S., R. 1 W. Based on the resources present and the lack of major development, it is unlikely that these deposits would be developed in the future. Exploration and mining in the Yellowstone Mine area have determined that there are no known potential mineral resources other than talc in the permit area.



#### **1.5.2.8 Paleontological Resources**

It is unlikely that any important fossil resources are present in the vicinity of the Yellowstone Mine. Rocks of the Yellowstone Mine area are predominantly of Archean age (about 2.3 billion years old) and have been metamorphosed (altered at high temperatures and pressures) to marble, schist, and gneiss. Both the age and metamorphism of the rocks preclude major fossil occurrences. Younger rocks in the eastern portion of the mine area are Tertiary volcanics, a rock type that also generally precludes the occurrence of important fossils. Major fossil resources are generally considered to be vertebrate fossils that are of scientific interest from a variety of points of view. Cenozoic rocks of the age likely to contain these fossils are not present in the mine area. Exploration and mining in the Yellowstone Mine area for over 50 years have not identified any paleontological resources.

#### **1.5.2.9 Wetlands**

Luzenac previously submitted a wetlands delineation and functional analysis report and a draft Clean Water Act (CWA) 404 Permit Application to the U.S. Army Corps of Engineers (USACE) seeking authorization to place fill material (overburden) in a portion of Johnny Gulch. Based on the results of that report and a site visit, USACE determined that Johnny Gulch is “isolated” and therefore, not subject to USACE regulatory authorities, and concluded that no permit is required. No other wetland issues have been identified within the Yellowstone Mine permit area.

#### **1.5.2.10 Noise**

The Yellowstone Mine is located in a remote area, and mine-generated noise resulting from equipment operation, blasting, ore handling and processing, would not be expected to increase over existing levels permitted by the Operating Permit (Luzenac, 2002) as a result of the Proposed Action. The noise produced from these activities is limited outside of the permit area, and noise has never been an issue at the Yellowstone Mine.

#### **1.5.2.11 Cultural Resources**

Cultural resources for a 2,000-acre area surrounding the Yellowstone Mine have been inventoried (Hydrometrics, 1982; HRA, 1992). Seven sites were identified, two of which were determined to be significant. All sites were assessed and a narrative report prepared. The Proposed Action would not impact these sites.

#### **1.5.2.12 Land Use and Access**

The Proposed Action would not affect land use or access. The project area is entirely on private property controlled by Luzenac. Grazing of domestic livestock is permitted at

the discretion of Luzenac and has been allowed only to control the development of tall, dense revegetation in reclaimed portions of the mine site.

The only public access is the Johnny Gulch Road, which would remain open under the Proposed Action. This road lies largely adjacent to the expanded permit area, although a few short segments occur within the permit boundary area but outside of proposed disturbance areas.

#### **1.5.2.13 Recreation**

The Proposed Action would not affect recreation. Recreational activities are not permitted within the permit area. Luzenac does not propose to open the Yellowstone Mine property to recreation after mine closure. The Johnny Gulch Road passes through a portion of the expanded permit area, although not in areas proposed for surface disturbances. The road would remain open for public access. Hauling of talc to the Three Forks and Sappington mills would have minimal impacts on recreational activities along the public access corridor as it has for 50 years.

## **CHAPTER 2**

### **DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES**

#### **2.1 INTRODUCTION**

This chapter describes historical mining operations, Luzenac's existing operations in the Yellowstone Mine area (the No Action Alternative), and Luzenac's proposed Amendment. This chapter also describes an alternative that allows for Agency Modifications to the Proposed Action. The proposal to extend the mine life at the Yellowstone Mine is referred to as the Amendment or the Proposed Action throughout the remainder of this document.

Luzenac must secure an amendment to Operating Permit 00005 in order to extend the operating life of the Yellowstone Mine. Luzenac submitted an application in May 2003. The application underwent two completeness and deficiency reviews by DEQ (June and July 2003) and was revised and deemed complete enough to start the EA process (Luzenac, 2003). That document is the basis of the Proposed Action described in this chapter. If the Amendment is approved, the application would be revised to address the findings and recommendations of this EA and would be used to update the Operating Permit. This EA looks in some detail at all of the existing and proposed mining operations, major facilities, ancillary facilities and activities, resource monitoring, and reclamation and closure activities.

All of the components or elements described in Section 2.2 are permitted, approved, and bonded under the existing Operating Permit 00005. Major components of the proposed mine expansion and their respective functions, and potential environmental effects resulting from implementation of these activities, are considered in the development of alternatives. Other alternatives were considered in the review process, as discussed below in Section 2.5. These alternatives were eliminated because they provided no environmental advantage over the Proposed Action and selected alternatives.

#### **2.2 PROJECT SETTING AND EXISTING OPERATIONS (NO ACTION ALTERNATIVE)**

Under the No Action Alternative, the amendment would not be approved. Additional reserves of talc and stripped overburden would not be mined. The pit and overburden disposal areas would not be expanded, and ore processing facilities would not be moved.

Luzenac would complete the mining operations planned and approved under its existing Operating Permit 00005 (Luzenac, 2002). Ongoing, approved, and bonded work under this Operating Permit includes a minor layback of the north and northwest flanks of the South 40 Pit to access ore at depth beneath the northern end of the pit. These operations would require approximately 8 years of future mining operations at current production rates and include mining talc reserves and overburden placement in existing



approved facilities. Mining activity would be followed by implementation of the approved reclamation and closure plan.

### **2.2.1 LOCATION AND LAND USE**

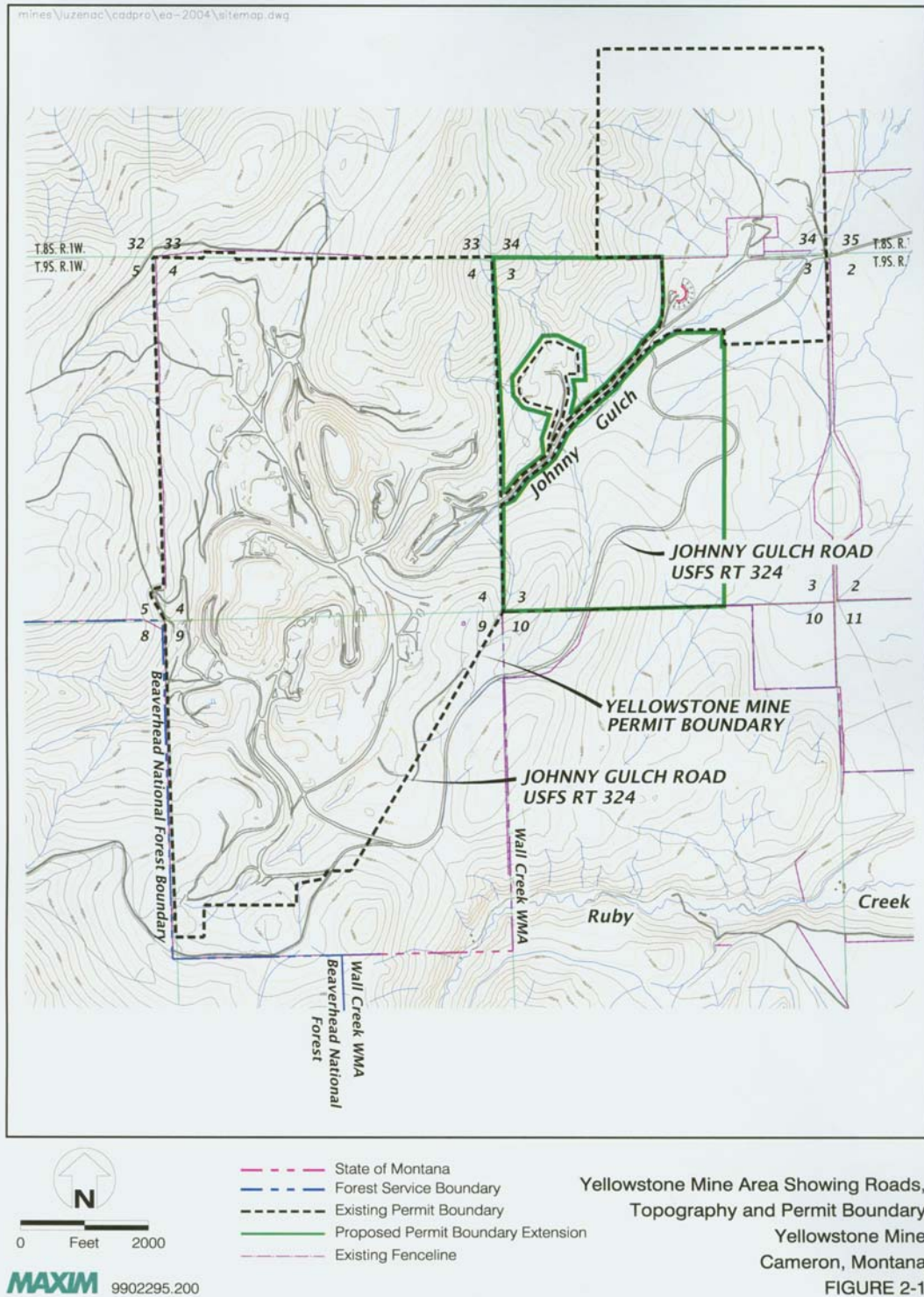
The Yellowstone Mine is located on the eastern slope of the Gravelly Range in southwestern Montana, about 25 miles south of Ennis and 12 miles southwest of Cameron, Montana (Figure 1-1). The mine is located at an elevation of approximately 6,000 feet above mean sea level (amsl) and operates exclusively on private property located within Sections 3, 4, and 9; T. 9 S., R. 1 W. and Sections 33 and 34; T. 8 S., R. 1 W. (Figure 2-1).

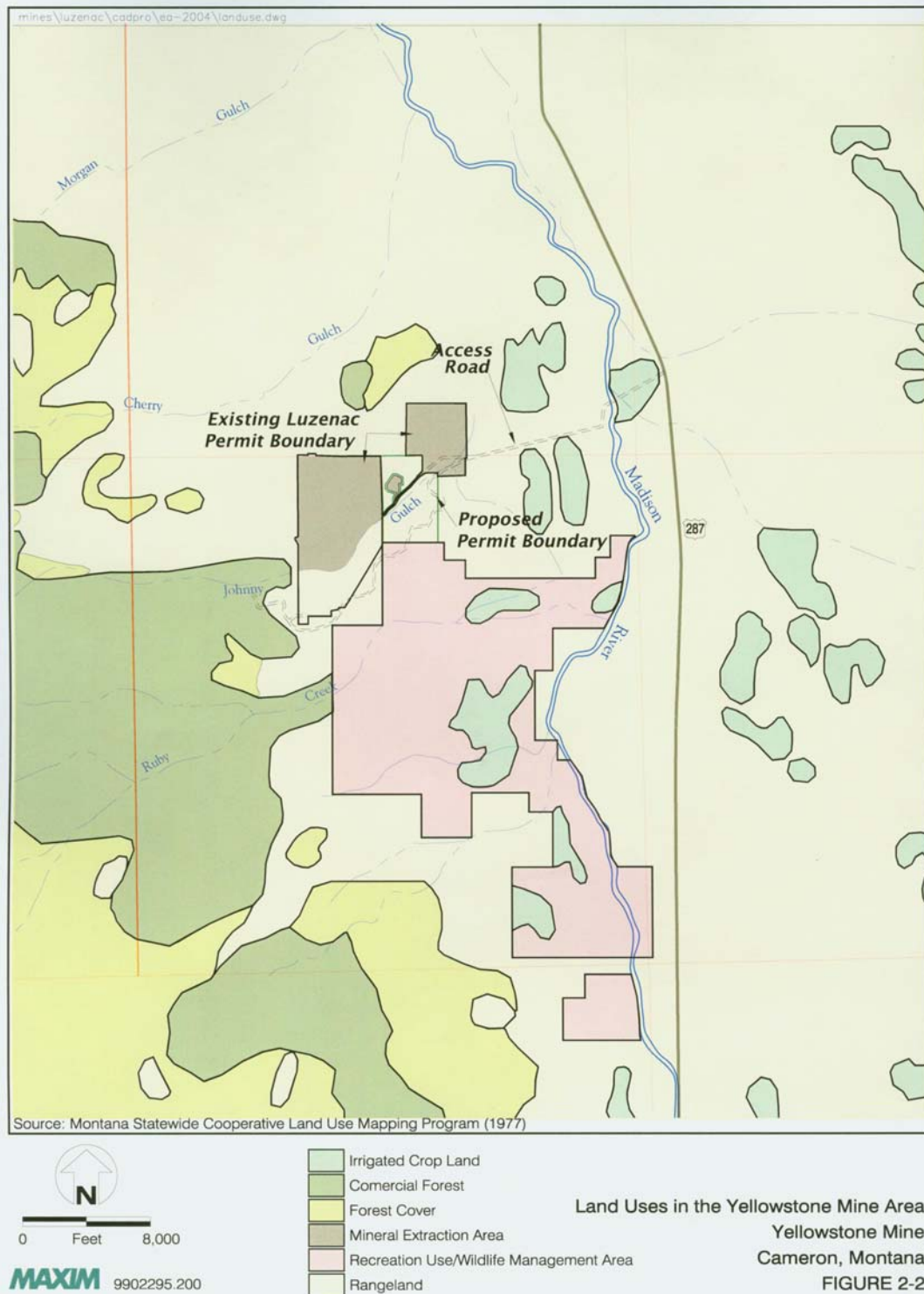
Historic land uses of the south Madison Valley area include both commercial and non-commercial activities. Commercial uses include livestock grazing, hay and wheat production, mineral extraction, and timber production. Non-commercial uses include wildlife habitat, watershed, residential sites, and a variety of recreational activities. Figure 2-2 is a map showing major land uses in the vicinity of the Yellowstone Mine. Over the last 5 to 10 years, the Madison River Valley has experienced a trend toward subdivision for residential use of land that was historically used for grazing and other forms of agriculture.

Land ownership in the proximity of the mine includes both private land and public land. The 7,067-acre Wall Creek State Wildlife Management Area to the south and east of the mine provides elk winter range and is administered by Montana Fish, Wildlife and Parks. The U.S. Forest Service (USFS) manages a 12,600-acre grazing allotment on nearby National Forest System land and the U.S. Bureau of Land Management (BLM) administers the West Madison Recreation Area on the Madison River directly east of the mine as well as several other small grazing allotments (Figure 2-2).

### **2.2.2 MINERAL AND SURFACE OWNERSHIP**

Although Luzenac has unpatented mining claims on federal lands adjacent to the mine site, all of the land within the existing permit boundary (Figure 2-1) is privately owned or controlled by Luzenac. The mineral and surface ownership for the Yellowstone Mine areas was described in detail in the Operating Permit (Luzenac, 2002: Appendix 1.3).





### 2.2.3 MINE AND PERMIT HISTORY AND REQUIREMENTS

Talc was first produced from underground mining operations located in the vicinity of the present Yellowstone Mine beginning in 1942. The Yellowstone Mine has been in operation in Madison County since the early 1950s. Luzenac acquired the Yellowstone Mine from Cyprus Industrial Minerals Co. in July 1992. In April 1994, Luzenac purchased the Montana Talc Company operations, including its adjacent Johnny Gulch Mine (Montana Talc Pit) and the Sappington Mill, about 7 miles southwest of Three Forks. To date, about 73 million tons of rock have been mined at the Yellowstone Mine site, including 6 million tons of talc and 67 million tons of overburden material.

The Yellowstone Mine has been operated under permit numbers 00005 and 00005A since 1971 and 1977, respectively. The Operating Permit 0005A has been modified by minor revisions and amendments many times over the life of the permit (see Luzenac, 2002: Table I-1, Appendix I). Each of these changes to the Operating Permit has required some level of environmental evaluation and approval by DEQ to proceed with the proposed actions (DSL, 1977, 1981, 1986a, 1986b, 1990, 1992). On March 28, 2002, the Consolidated Operating Permit 00005 was approved. This consolidated permit combined Operating Permits 00005 and 0005A into one updated document. The operation of the Sappington Mill remained under its original Operating Permit 00127.

### 2.2.4 PERMIT AREA AND EXISTING DISTURBANCES

The existing mine permit area (1,458 acres) and mine facilities layout (including the open pits, overburden disposal areas, ore-processing, and other miscellaneous facilities) are shown on Figure 2-3. Table 2-1 tabulates the existing disturbances at the Yellowstone Mine site. Figure 2-4 presents the names and shows the locations of historically mined pits at the Yellowstone Mine.

### 2.2.5 GEOLOGIC SETTING

Talc deposits of the Yellowstone Mine occur in an area of folded Precambrian (Archean) dolomitic marble, along the east limb of a large, southwest-plunging fold. The dolomitic marble occurs over a zone about 1.5 miles wide and 3.5 miles long (Figure 2-5). To the southeast and northwest these rocks are in contact with older folded metamorphic schist and gneiss, to the southwest the marble is in contact with younger Paleozoic sediments, and to the east the marble is unconformably overlain by Quaternary gravel. Tertiary volcanic rocks unconformably overlie the marble along the axes of structural grabens and elsewhere in paleo-topographic depressions (Figure 2-5).

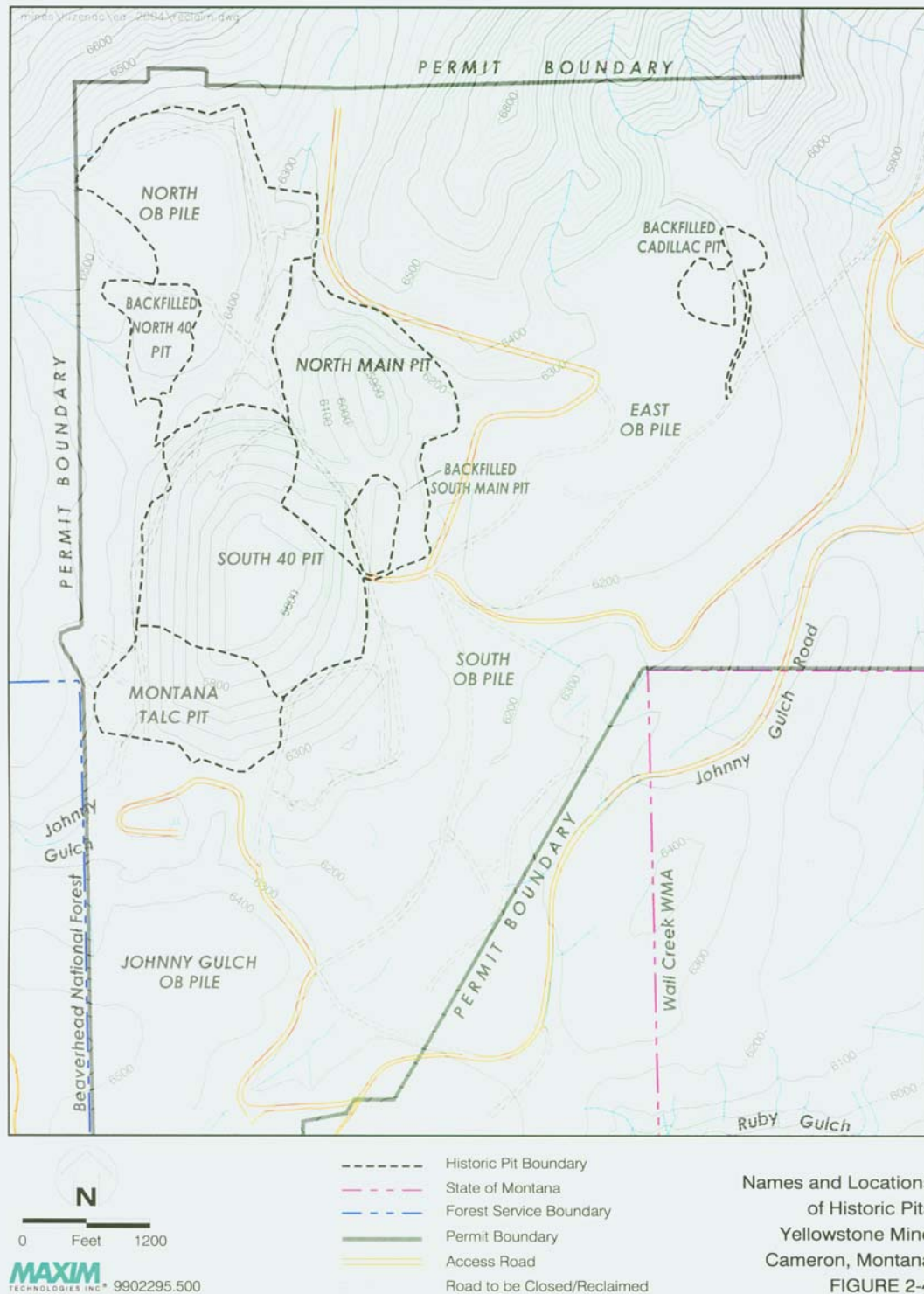




**TABLE 2-1**  
Existing Disturbances at the Yellowstone Mine Site  
*Amendment to Operating Permit 00005 – EA*

TYPE	NAME Facility	Existing Disturbance Acres	COMMENT
Existing Open Pits	North Main Pit	58.4	South Main Pit backfilled
	South 40 Pit	111.0	Includes Montana Talc Pit and Permitted 2A Pushback
	North 40 Pit	Backfilled	15.1 acres
	Cadillac Pit	Backfilled	9.9 acres
Total Existing Pits		169.4	
Existing Overburden	North OB Pile	122.8	Includes PB Fines (5.2) and soil stockpiles
	East OB Pile	123.0	
	Rock drain		6,027.5 feet long, underlies East OB pile
	South OB Pile	157.6	Includes sorter, sorter fines, low grade, Pos Drain <b>A+B</b>
	Johnny Gulch OB	129.8	Many acres reclaimed but not yet released from bonding
Total Existing OB		533.2	
Other Existing	Soil Stockpiles (19)	15.2	
	Gravel Pit	9.9	
	<b>Ponds</b>	<b>0.8</b>	
	Facilities	19.1*	Included in South OB Pile
	Sorter Area	11.3*	Included in South OB Pile
	Roads	7.3*	Included in various OB piles above
	Sorter Fines	18.9*	Included in South OB Pile
	PB Fines	5.2*	Included in South OB Pile
	Positive Drain A+B	19.6*	Included in South OB Pile
Total Other		<b>25.9</b>	
Grand Total Disturbed		<b>728.5</b>	
Existing Permit Area		1458.0	

\* Acres included in disturbed areas above









The talc deposits at the Yellowstone Mine were formed in the early Proterozoic by hydrothermal alteration and replacement of the Archean dolomitic marble. The talc is massive and predominantly light green to light gray in color. Replacement of the dolomite by talc is complete; thus, the talc is easily separated from the host dolomite waste during ore sorting. The talc occurs mainly as tabular veins, but locally, pods and lenses are also found. Most talc veins are parallel or sub-parallel to the metamorphic structural foliation developed in the surrounding dolomite. This is because crosscutting foliation cleavage planes and nearly parallel fault zones provided pathways for silica-rich ore forming fluids to penetrate and interact with the carbonate host rock to produce the calc-silicate talc replacement deposits. The dominant structure associated with the deposit is a major north-south trending fault called the Growth Fault. This fault is over 100 feet wide in places and is locally associated with some karst features.

Yellowstone Mine talc is free of tremolite and other asbestiform minerals and contains only trace amounts of other impurities (iron and graphite). The talc ore bodies of the Yellowstone Mine are among the largest and mineralogically purest of their kind in the world. The presence of iron oxide impurities in a talc ore causes a yellow coloration or “warm” tints in the talc powder after milling. This affects optical properties by lowering the brightness and increasing the yellow index values. Both the brightness and yellow index are used as measurements of talc grade. It is because of these properties that Yellowstone Mine talc is used worldwide in processes designed to incorporate these unique characteristics.

## **2.2.6 EXISTING FACILITIES AND OPERATIONS**

### **2.2.6.1 Mining Operations**

The Yellowstone Mine currently produces approximately 300,000 tons of talc to supply its markets and 2.5 million tons of overburden per year from an open pit mine. The rate at which talc is mined is primarily dependent on market demand.

Since about 1950, talc has been mined predominantly from open pits. Some pits are inactive and have been backfilled with overburden while other open pits have been mined such that they coalesced into larger pits (Figure 2-4).

Open pit operations at the Yellowstone Mine use conventional mining methods including drilling, blasting, and loading and hauling using trucks and shovels. Mining is based upon a standard height between benches of 25 feet. Benches vary from 15 to 50 feet in width (toe to crest) depending upon wall rock competency and requirements of future mining plans. Overburden consisting primarily of dolomite is drilled on a 15 by 15-foot grid to a depth of 28 feet and blasted using ANFO (a mixture of ammonium nitrate and fuel oil). The overall stripping ratio of overburden to ore is approximately 5:1. Overburden is loaded into trucks using hydraulic shovels and hauled to one of the permitted overburden disposal sites. Once exposed, most of the talc is mined using hydraulic shovels, with no blasting required. Run-of-mine talc ore is transported to the

ore sorting facility for processing. Haul roads within the pit are a minimum 60 feet wide with a 4-foot-high berm along the outside edge and a maximum grade of 10 percent.

Overburden stripping and talc mining is permitted for 7 days per week year-round operations, using one 10-hour shift per day. At the present time, mining operations are conducted 4 to 7 days per week, depending upon market demand.

The North Main Pit (Figures 2-3 and 2-4) occupies approximately 54.8 acres (May 2003) (Table 2-1) and has been excavated to an elevation 5,830 feet amsl. Through 2003, a total of approximately 37.3 million tons of overburden has been removed from the pit. At this time, no additional mining of the North Main Pit is proposed, although additional less economically desirable talc resources do extend below the current pit floor.

The South 40 Pit (Figures 2-3 and 2-4) currently covers approximately 111.0 acres (Table 2-1) and has been excavated to a level 5,950 feet amsl. A small area designated as the 2A Pushback has been approved for expansion along the north flank of the South 40 Pit (Luzenac, 2001). Mining of the 2A Pushback is currently underway.

The Montana Talc Pit is the southernmost pit on the Yellowstone Mine property (Figure 2-4). This pit was mined by the MTC and covers approximately 36.7 acres (Tables 2-1 and 2-8). The South 40 pit, as a result of more recent mining, has encroached on the footprint of the older Montana Talc Pit to produce a combined pit. Other open pits mined and now backfilled include the North 40 Pit, South Main Pit, and Cadillac Pit (Figure 2-4).

#### **2.2.6.2 Overburden Disposal**

Four overburden disposal areas have been constructed for use during historical and existing mining operations. These include the North OB Pile (122.8 acres), the East OB Pile (123 acres), the South OB Pile (157.6 acres), and the Johnny Gulch OB Pile (129.8 acres). The existing overburden pile locations are shown on Figure 2-3, and areas are listed on Table 2-1. These overburden piles have been constructed by end-dumping overburden over a bermed bank. The surfaces of the disposal areas are graded during construction to prevent ponding of rainfall and runoff over the face of the pile.

#### **2.2.6.3 Ore Processing**

Talc is visually graded at the mine face before being loaded onto trucks for transport to designated stockpiles adjacent to the processing facility. The existing ore processing facilities are located in the Sorter Area and in the Optical Sorter shown on Figure 2-3. Ore is sized and classified by passing it through an ore sorter that uses a friction technology to separate ore into four sizes: oversize, coarse, small particle, and fines. Oversize material is periodically crushed and reclassified for plant feed. Coarse feed, small particles, and fines are sampled and graded. In 1999, Luzenac constructed and began intermittent operation of a pilot plant-scale Optical Sorter. The feasibility of this

technology is currently being studied. Mechanical and visual sorting techniques account for approximately 70 percent of the marketable talc product processed. Sorted talc is graded and stockpiled for shipment either directly to customers or to an offsite mill facility. An additional 20 percent of the talc is stockpiled as low-grade talc, and the remaining material is discarded with the overburden.

#### 2.2.6.4 Access, Haul Roads, and Traffic

The Yellowstone Mine is accessed by traveling approximately 26 miles south of Ennis, Montana, on U.S. Highway 287. Access from U.S. Highway 287 is on a Madison County road, the Johnny Gulch Road, to the east edge of Section 35, where the road enters private property but is under jurisdiction of the USFS (Forest Road No. 324) to the mine site (Figure 2-1). The Johnny Gulch Road continues on past the mine site to access public lands to the south and west. The Johnny Gulch Road is one of several roads accessing public land west of the Yellowstone Mine. It is the only public road that exists adjacent to the mine and in a few spots the road crosses onto Luzenac's property within the existing permit boundary. Traffic associated with the mine consists primarily of employees traveling to and from work and transport trucks hauling talc. Access to the Yellowstone Mine is shown on Figure 2-2.

Employees commute to the mine site in company vans and pickup trucks via U.S. Highway 287. Employees and vendors, excluding contract hauling, generate approximately 25 commuter trips per day over this route.

The access route for transporting talc product from the mine site to U.S. Highway 287 follows the commuter route described above. The haul route continues north on U.S. Highway 287 approximately 75 miles to the Three Forks Mill or alternatively about 54 miles to the Sappington Mill. Talc is transported from the Yellowstone Mine to the mills by 122,000-pound gross vehicle weight highway trucks (dump trucks with two pup trailers). These truck/trailer units haul approximately 40 tons of talc per load. At a projected production of 300,000 tons per year, an average of 625 round trips per month is required. Contract haulers operate 5 to 7 days per week (depending on weather and production scheduling). Two shifts (a total of 10 drivers, 5 drivers per shift) operate 5 trucks to complete 30 trips per day, or 5 trips per day per truck. During periods of increased production the number of haul truck trips may increase proportionately.

The main access route is also used by vendors to supply gasoline and diesel fuel every other week; provide explosives once a month; and remove used oil and other recyclables about every three months. Regulatory agency personnel, technical contractors, and visitors also use this route. Total mine-related traffic is approximately 30 trucks completing 55 to 60 cycles per day on the access route. Mine related traffic has been higher in the past, during periods of increased production and during periods of construction, with as many as 100 cycles per day along the access route.

Haul roads connecting the mine pit with overburden disposal areas and the plant site are constructed to a nominal width of 60 feet using overburden material. Haul roads are

designed not to exceed grades of 10 percent. Road locations within the pit and overburden dump areas are periodically modified as mining progresses. Haul roads are maintained with graders. Private vehicles are not allowed on pit haul roads without authorization.

## 2.2.7 ANCILLARY FACILITIES AND ACTIVITIES

### 2.2.7.1 Introduction

This section discusses ancillary facilities, miscellaneous ancillary activities, resource monitoring programs, and the reclamation plan.

### 2.2.7.2 Storm Water Handling Facilities

The storm water handling system at the Yellowstone Mine is designed to avoid mixing runoff from undisturbed areas with runoff from disturbed areas, collect storm water runoff from disturbed areas, and contain sediment from storm water runoff events.

The storm water handling system is described in some detail in the Yellowstone Mine's Site-Wide Drainage Plan (CDM, 1997) which was updated in 2002 and is included as Appendix 3.1.11 of the Operating Permit (Luzenac, 2002). The mine's storm water management system is being updated. The primary water pollutants associated with the mine are total suspended solids and settleable solids. The renewed MPDES permit (See Appendix B) requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must be implemented by July 1, 2007 (See Appendix B, MPDES Permit; Appendix C, MPDES Renewal Statement of Basis; Appendix D, MPDES Environmental Assessment; and Appendix E, MPDES Response to Public Comments).

The SWPPP must contain the existing Site-Wide Drainage Plan, including but not limited to large-scale maps showing the location of storm water control structures, and other important storm water management protocols and procedures. One of the primary functions of the SWPPP is implementation and management of Best Management Practices (BMPs) designed to mitigate suspended materials within runoff, at or near the source. The SWPPP requirements in the permit dictate that storm water structures and BMPs are monitored after all storm events of at least 0.5 inches of precipitation to ensure that sediment levels do not exceed design capacity. Sediment control structures are cleaned periodically in order to maintain performance.

Ditches, temporary and permanent sediment basins, and storm water collection ponds are currently used to control runoff from disturbed areas. BMPs to prevent or mitigate contamination of storm water from the mine are employed where appropriate, as well as to ensure control of runoff volume and velocities.

Under the MPDES permit, no storm water may discharge from the mine site property (Outfall 002), except runoff in response to a 1.9-inch precipitation event or equivalent

snow-melt runoff (Appendix E). This event is approximately equal to the 10-year, 24-hour storm event. Precipitation monitoring is required in the permit to demonstrate compliance with this condition. When discharge occurs, a more frequent monitoring frequency is required by the MPDES permit. See Appendices B, C, D and E for more detail regarding the MPDES permit and storm water management conditions.

Runoff diversion ditches are used to channel surface water originating on undisturbed areas away from existing disturbed areas. Most diversion ditches are located upgradient of facilities and roadways in the project area. ~~Updated~~ ~~D~~iversion facilities are sized to accommodate flow from at least a 50-35-year, 24-hour storm event (Maxim 2006 (Appendix A, Attachment 1)). For construction convenience, ditches have a minimum capacity of 5 cubic feet per second (cfs).

Luzenac ~~would~~ conducts periodic monitoring and documentation of the condition of erosion control and sediment collection structures and evaluate s any effects of surface erosion. Annual monitoring ~~would be~~ is conducted to observe and assess the function of erosion control mechanisms and structures that have been constructed, and the overall erosional stability of the area. Upon consultation with and approval by DEQ, appropriate measures would be taken to implement corrective action when required.

#### 2.2.7.3 Hazardous Materials and Wastes

The Yellowstone Mine is a conditionally exempt small quantity generator of hazardous wastes. The term "hazardous materials" is defined in the Code of Federal Regulations (CFR) at 49 CFR 172.101. "Hazardous substances" are defined in 40 CFR 302.4 and the Superfund Amendments and Reauthorization Act Title 111. Luzenac has presented a detailed disclosure of all hazardous materials and substances used and stored at the mine site in the approved Operating Permit 00005 (Luzenac, 2002). Hazardous materials consist of gasoline, diesel fuel, new and used oil, propane, and explosives.

An approved contractor collects and transports accumulated hazardous wastes. The primary route for transporting hazardous materials to or from the Yellowstone Mine area is Johnny Gulch Road to U.S. Highway 287.

U.S. Department of Transportation (USDOT) regulated transporters are used for shipment, and USDOT approved containers for onsite storage and spill containment. Hazardous materials are stored in designated areas on private land.

Small quantities of hazardous materials less than the Threshold Planning Quantity are also managed at the Yellowstone Mine. These include auto and equipment maintenance products, office products, paint, drilling mud, cement, and batteries.

#### 2.2.7.4 Spill Prevention, Control, and Countermeasure Plan

The mine accepts responsibility from suppliers once the product is delivered to bulk storage tanks on the property. The Yellowstone Mine and its product vendors have



emergency response plans. The Yellowstone Mine revised its Spill Prevention, Control, and Countermeasure Plan (SPCC) in 2004, and a copy is on file with DEQ. The Operating Permit (Luzenac, 2002) and the SPCC require that all maintenance facilities and fueling vehicles are equipped with spill response materials. Earth-moving equipment is available from the mining operation for constructing dikes. Above ground tanks and piping associated with these facilities are commonly used. Any physical observation of a leak or release is reported according to the facility operating manual, and a response team is notified to inspect and respond to the leak or spill. Both the mine staff and DEQ conduct scheduled and impromptu inspections of all facilities. Conditions that could result in a leak or spill are presented in the SPCC.

Spill containment basins constructed of curbs/walls of concrete have been constructed around all fixed bulk storage tanks. These containment basins are constructed of materials designed to prevent or minimize spills from extending beyond the limits of the containment basin. The basins have a liner to prevent any spillage from impacting soil and water resources. Mobile or portable oil storage tanks use a combination of secondary containment, when-not-in-use practice (e.g., parking Lube Truck No. 1 in the Lower Shop which has the building floor for secondary containment), and/or physical isolation to prevent spilled oil from reaching surface water.

Yellowstone Mine personnel are trained to operate and maintain equipment to prevent unintentional discharge of fuel and oil. The SPCC provides response training to equipment operators. Known spills, malfunctioning components, and precautionary measures are discussed during routine safety briefings.

#### **2.2.7.5 Support Facilities**

Most mine support facilities are located on historically disturbed ground of the South OB Pile (Figure 2-3). These facilities include: Equipment Maintenance Shop, Optical Sorter/Truck Wash, Land Bridge Plant, Water Supply Building, Core Storage Building, and the Sorter Area. The Lower Shop Area, and Crude Ore Loadout are located near the gravel pit in the northeast corner of the permit area (Figure 2-3).

The Equipment Maintenance Shop is a three bay repair facility with a fuel bay for light duty vehicles. Used oil, antifreeze, and solvents are collected by DEQ-approved recyclers or returned to the vendor for disposal. The maintenance office is attached to the shop with several storage units located north of the shop. A water storage tank for controlling road dust is located adjacent to the shop. An ore storage loadout is situated near the over-the-road truck scale building.

The Optical Sorter (Figure 2-3) is located in the Land Bridge Plant and consists of a screening plant, feeders, conveyors, and a building housing the optical sorting machine. An employee lunchroom, storage building for surplus plant maintenance parts, and a ready line to plug in equipment during cold weather are also located in this area. Approximately 14,000 gallons of diesel fuel and ten 55-gallon drums of lubricants are stored in this area. The Truck Wash is also located in this area.

The Water Supply Building area includes a well, water hydrant, storage tanks, and a building which houses a truck for transporting water to cisterns at the pit and plant lunchrooms. North of the Water Supply Building is the exploration Core Storage Building.

The Sorter Area includes the ore sorting plant, maintenance shop, and an ambulance garage. Two storage buildings and a lunchroom in a mobile trailer are located in this area. The office building is a two-story structure with engineering offices and quality assurance (QA) lab on the first floor, and administrative offices on the second floor.

#### **2.2.7.6 Energy Supply and Source**

An existing 12.47 kilovolt transmission line from a substation in the Madison Valley supplies electrical power for the Yellowstone Mine. The locations of the power lines at the project site are shown in Figure 2-3.

#### **2.2.7.7 Solid Waste Disposal**

Solid waste generated at the Yellowstone Mine is placed in bins and transported to the Gallatin County landfill by an independent contractor. No hazardous or toxic materials are disposed of in the bins. Operations at the maintenance shops generate used tires, used oil, spent antifreeze, used solvents, and paper, steel, and wood refuse. Used oil, antifreeze, and solvents are collected by DEQ-approved recyclers or returned to the vendor for disposal. Steel, paper, and cardboard packaging are transported to a recycler or a licensed Class II solid waste landfill. Luzenac has received approval from DEQ for disposal of tires onsite as mining wastes to be placed within the overburden materials and covered with a minimum of 60 feet of overburden.

#### **2.2.7.8 Dust and Emissions Control**

Dust control is provided with water and chemical stabilizers. The Yellowstone Mine currently uses two small groundwater seeps from precipitation encountered in the mine pits for dust control. Magnesium chloride stabilizer is applied annually for dust control on approximately 5 miles of gravel road between U.S. Highway 287 and the mine entrance. Other operational air quality controls are discussed in Section 1.5.2.1.

#### **2.2.7.9 Water Supply System**

The Yellowstone Mine water supply system consists of water supply wells, runoff capture and containment in ponds, and excess water disposal through discharge of Johnny Gulch Pit water and other runoff under the MPDES permit (See Appendix B).

#### **2.2.7.10 Snow Removal**

Snow removal and disposal are performed on an as-needed basis. Luzenac has the following standard operating procedures with regard to snow removal:

- Snow is typically removed from the entire road surface including turnouts;
- All debris, snow, and ice removed from the access road surface are deposited away from the Madison River;
- During snow removal, banks are not undercut and surface material is not removed from the roadway;
- Snow berms are removed and/or drainage pathways are opened in them at the end of winter operations. Drainage pathways are spaced as necessary to obtain satisfactory surface drainage and to avoid runoff on easily eroded slopes;
- Ditches and culverts are maintained;
- Snow is removed promptly to ensure safe, efficient transportation; and
- Drift fences or snow berms may be used in areas susceptible to heavy drifting.

Snow melt water reports to a series of berms and storm water diversion ditches on its way to Johnny Gulch and must pass through a series of settling ponds before discharging to the ditch beyond the property boundary. Occurrences of snow melt runoff discharge are limited in the MPDES permit. Snow pack runoff discharge events are not allowed by the permit except as a result of melt events, during which, snow pack melt equivalent water content greater than 1.9 inches of water occurs during any continuous 24 hour period (Appendix E). Runoff from a combination of snow pack melt and precipitation, "rain on snow," event is also considered in the permit .

#### 2.2.7.11 Public Safety and Mine Security

The Johnny Gulch Road is one of several roads accessing public land west of the Yellowstone Mine. It is the only public road that exists adjacent to the mine, and in a few spots the road crosses onto Luzenac's property within the existing permit area (Figure 2-1).

The Yellowstone Mine controls public access within the permit boundary through posting of signs, mandatory visitor check-in, and visitor escort procedures. Additionally, visitors and vendors are provided with hazard recognition training, personal protective equipment, and magnetically attached fluorescent vehicle cones, which serve as identification while traveling on mine property. Perimeter gates are locked to control access during non-operating hours.

#### 2.2.7.12 Public Nuisance

In the event that a public nuisance develops, Luzenac would evaluate the situation and develop a program to abate or eliminate the nuisance.

#### 2.2.7.13 Noise

The Yellowstone Mine is located in a remote area where noise resulting from equipment operation, blasting once a week, and ore handling and processing is limited outside of the permit area.

### 2.2.8 RESOURCE MONITORING

#### 2.2.8.1 Air Quality

Operational air quality monitoring is described in Section 1.5.2.1.

#### 2.2.8.2 Water Quality

Routine monitoring of surface water and groundwater is conducted to ensure that mine-related impacts are not adversely affecting water quality and/or quantity in the mine area (Figure 2-6).

##### 2.2.8.2.1 Surface Water

Tables 2-2 and 2-3 describe operational monitoring schedules for surface water and groundwater, respectively. The chemical and physical parameters to be measured for water resource monitoring are listed in Table 2-4. Luzenac monitors water quality semi-annually, once under high flow conditions in April, May, or early June and once under low-flow conditions while access is still good with respect to snow and ice in October or November.

Operational surface water monitoring at the Yellowstone Mine focuses on the following areas:

- Mine Pits – Water that collects in the bottom of the mine pits is sampled on a semi-annual basis. If excess water must be pumped out of the mine pits, sampling is required according to the schedule outlined in the MPDES Permit for Outfall 001. No pit water has been discharged in years.
- Overburden Disposal Areas –Seeps that develop at the base of OB piles are sampled semi-annually. If more than one seep develops at each of the major overburden disposal areas, sampling occurs only at selected representative seeps. Overburden disposal area slopes are periodically inspected to determine if additional BMPs would be required to control erosion and sedimentation.

- Johnny Gulch – Water in Johnny Gulch is sampled periodically both upstream and downstream of the mine disturbance area. If flow is present, water is also sampled near the USFS boundary, but within the mine permit boundary (located where the stream crosses the east section line of Section 8 in T. 9 S., R. 1 W. and immediately south of Soil Stockpile #2 on Figure 2-3) and downstream at the rock drain discharge. In addition, if water discharges from the last sediment collection pond along Johnny Gulch near the northeastern property boundary through MPDES Outfall 002, the Permit requires sampling within the first hour of discharge, then daily for the next six (6) days, and weekly thereafter, until the discharge event ceases (Appendix B).

Should asbestiform minerals be identified as the result of routine sampling of overburden rock as defined by Luzenac's Operational Verification Plan (Maxim, 2001; Luzenac, 2002: Appendix B), Luzenac proposes to filter water samples during operations for Phase Contrast Microscopy (PCM) and TEM analysis, to monitor for potential changes in asbestiform fiber content of water.

#### 2.2.8.2.2 Groundwater

Groundwater quality is monitored at the Yellowstone Mine in accordance with the current operating permit, which has been modified by the addition of wells JG-1 and JG-2 to provide baseline information for the proposed expansion of the East OB Pile. All wells listed below are currently included in the monitoring plan. Groundwater wells routinely monitored at the Yellowstone Mine are listed in Table 2-5 and shown on Figure 2-6. If the Proposed Action is approved JG-1 and JG-2 would continue to be sampled and a new well would be installed to monitor groundwater in lower Johnny Gulch. The well would be installed between Pond 8A and the east property boundary as committed to in the MPDES permit.

Operational groundwater monitoring (Table 2-3) is conducted in seven wells that are located throughout the project area (Figure 2-8). Two of the deeper wells (99-14 and 2001-01) are completed in talc and dolomite in the mine pit area (South 40 Pit and North Main Pit). Two other bedrock wells (SW-1 and JG-2) and one alluvial well (JG-1) are located downgradient (northeast) of the proposed active construction area in the Johnny Gulch drainage. The well completed in Johnny Gulch alluvium (JG-1) has been dry since its installation in September 2000. The final two monitoring wells (Water Barn and 2001-02) are located near the south and east sides of Johnny Gulch and South OB piles. Well 2001-02 may be used as a water supply well during mine expansion activities, if the Proposed Action is approved. There appears to be only one fracture controlled bedrock groundwater aquifer. Depth to water ranges from 130 to 520 feet below ground surface (bgs) and varies as a result of topography.



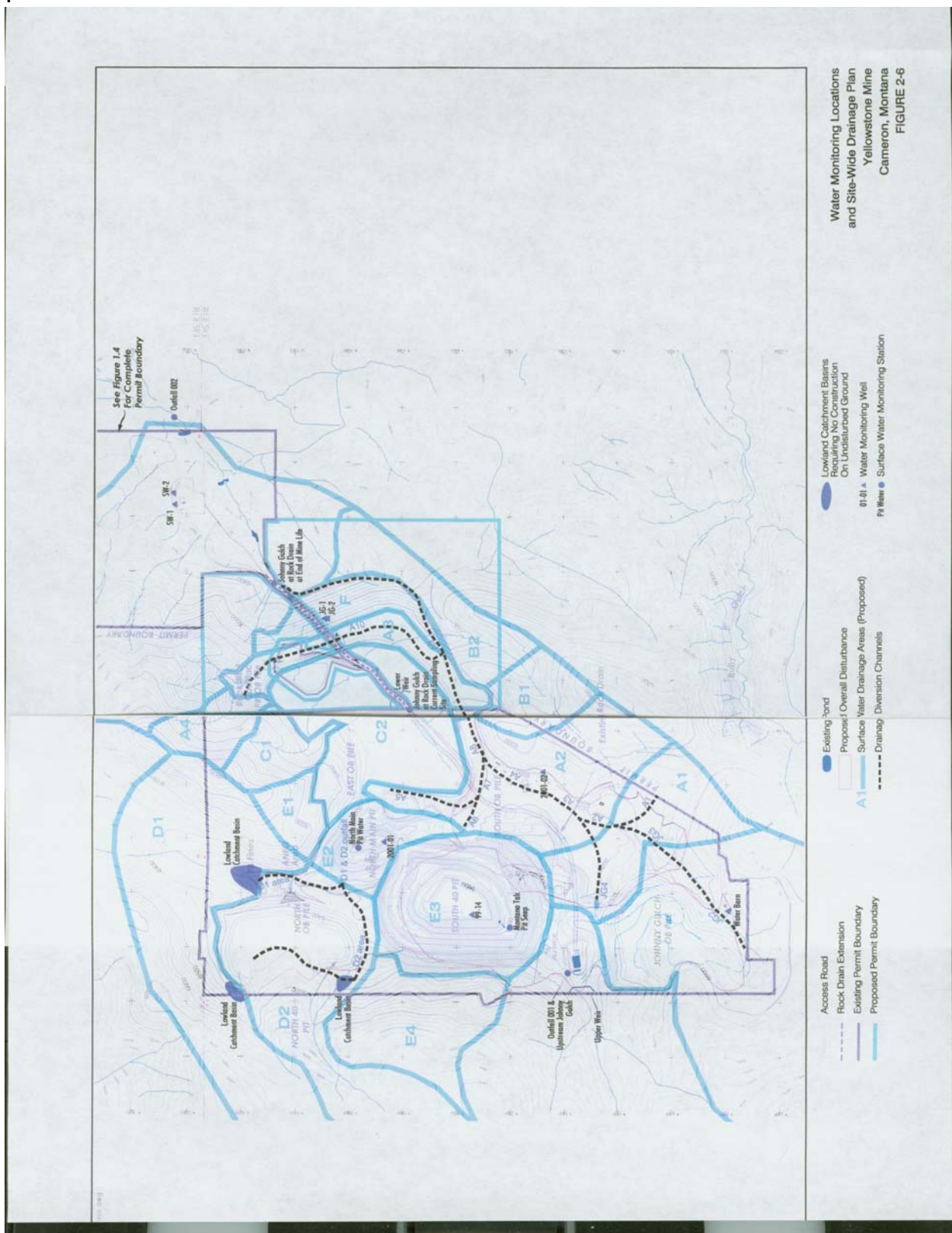


TABLE 2-2  
Operational Surface Water Monitoring Schedule  
*Amendment to Operating Permit 00005 – EA*

Station ID	Location	Sample Frequency	Sample Parameters Total Recoverable (unfiltered)
Pit Water (North Main Pit and Montana Talc Pit Seeps)	Standing water in pit bottom from groundwater seepage <u>and/or direct from</u> precipitation	Semi-Annually	Partial List
Outfall 001	Mine dewatering effluent prior to mixing with natural water in upper Johnny Gulch	Monthly During Discharge	Partial List
Outfall 002	Discharge from sedimentation pond 8A in Johnny Gulch prior to leaving the eastern property boundary	<u>Within First Hour of Discharge, Daily for Next 6 Days, and Weekly Thereafter</u>	Partial List
Overburden Pile Seep	Water seeps that may develop at the toe of any overburden pile	Semi-Annually During Discharge	Complete List
Johnny Gulch Upstream	Streamflow in Johnny Gulch channel above mine site at USFS boundary	Quarterly	Partial List
Johnny Gulch at Rock Drain	Discharge from downstream end of rock drain in Johnny Gulch channel	Quarterly	Complete List

TABLE 2-3  
Operational Groundwater Monitoring Schedule  
Amendment to Operating Permit 00005 – EA

Well ID	Location	Sample Frequency	Sample Parameters Dissolved (filtered)
Well SW-1 (Maintenance Well)	Completed to depth of 277 feet in bedrock near NE side of permit boundary	Semi-Annually	Complete List
Water Supply Building Well	Completed to depth of 460 feet in bedrock near south end of Johnny Gulch OB Pile	Semi-Annually	Complete List
Well 99-14 (South 40 Pit PW-1)	Completed to depth of 640 feet in talc and dolomite in bottom of South 40 Mine Pit	Annually	Complete List
Well 2001-01 (North Main Pit)	Completed to depth of 420 feet in dolomite in bottom of North Main Pit	Annually	Complete List
Well 2001-02 (Land Bridge)	Completed to depth of 745 feet in metamorphic rocks near east side of South OB Pile	Semi-Annually	Complete List
Well JG-1* (Johnny Gulch MW-1)	Completed to depth of 120 feet in Johnny Gulch alluvium downstream from East OB Pile	Quarterly	Complete List
Well JG-2* (Johnny Gulch MW-2)	Completed to depth of 300 feet in metamorphic rocks in Johnny Gulch next to well JG-1 downstream from East OB Pile	Quarterly	Complete List
<u>Well JG-3 (New Lower Johnny Gulch Well)</u>	<u>To be drilled approximately 180 feet in depth in alluvium and bedrock. The water table is approximately 140 feet below the surface.</u>	<u>Quarterly</u>	<u>Complete List</u>

Note: See Figure 2-6 for monitor well locations.

\* Wells only sampled if Proposed Action is approved.

TABLE 2-4  
Water Quality Monitoring Parameter List  
Amendment to Operating Permit 00005 – EA

Field Parameters	Common Ions	Metals	Others
Complete List			
pH (s.u.)	Calcium (1.0)	Aluminum (0.10)	Hardness as CaCO <sub>3</sub> (1.0)
SC (µmhos/cm)	Magnesium (1.0)	Arsenic (0.003)	Alkalinity as CaCO <sub>3</sub> (1.0)
Temperature (C°)	Sulfate (1.0)	Copper (0.001)	Nitrate+Nitrite as N (0.01)
Flow (gpm) [SW]	Carbonate (1.0)	Iron (0.01)	Total Dissolved Solids (1.0)
SWL (feet) [GW]	Bicarbonate (1.0)	Lead (0.003)	Total Suspended Solids (1.0)
Turbidity (NTU)		Manganese (0.005)	Ammonia as N (0.05)
		Zinc (0.01)	Oil & Grease (1.0)
Partial List			
pH (s.u.)	Sulfate (1.0)		Nitrate+Nitrite as N (0.01)
SC (µmhos/cm)			Total Dissolved Solids
Temperature (°C)			Total Suspended Solids

<sup>1</sup> Numbers in parentheses are laboratory detection limits specified in Circular [DEQ-7](#). Montana Numeric Water Quality Standards in milligrams per liter (mg/l) unless otherwise noted. Metals are analyzed as total recoverable for surface water and as dissolved for groundwater.

<sup>2</sup> [SW] = surface water samples only; [GW] = groundwater samples only.

<sup>3</sup> s.u. = standard units; SC = specific conductance; µmhos/cm = micromhos per centimeter; °C = degrees Celsius; gpm = gallons per minute.

The Yellowstone Mine operation currently stores and uses two groundwater seeps from precipitation encountered in the mine pits for dust control and as operational make-up water. After mining, this water would be allowed to evaporate or infiltrate, or would be consumed in evapotranspiration processes by vegetation on reclaimed pit floor sites.

Quality assurance and quality control (QA/QC) measures are used for all water-sampling activities. Sampling procedures follow standard operating protocols that are widely accepted for hydrologic studies. Instruments are properly calibrated and decontaminated as necessary for sample collection. Chain-of-custody procedures are used for the transfer of samples from the field to the laboratory. A state-certified laboratory with internal QA/QC procedures is used for sample analysis. Sample sets

typically include a duplicate and blank sample for QA/QC analysis. All water quality data are validated according to regulatory guidance.

<p style="text-align: center;"><b>TABLE 2-5</b>  <b>Groundwater Monitoring Locations</b>  <i>Amendment to Operating Permit 00005 – EA</i></p>							
Well Name	Location (T9S, R1W)	Completion Date	Well Depth (ft)	Screen Interval (ft)	Depth to Water (ft)	Water Elev. (ft)	Lithology
Maintenance Well (SW-1)	Sec. 34	4/82	277	217 – 277	161	5635	Bedrock
Maintenance Water Tank (SW-2)	Sec. 34	1980	190	Not Reported	135	5655	Bedrock
Water Supply Building	Sec. 9	8/93	460	350 – 450	207	6145	Bedrock
99-14 (S. 40 Pit PW-1)	Sec. 4	7/99	640	615 – 635	488	5490	Talc & Dolomite
2001-01 (North Main Pit)	Sec. 4	5/01	420	380 – 400	402	5468	Dolomite
2001-02 (Land Bridge)	Sec. 9	5/01	745	705 – 745	513	5691	Metamorphic
JG-1 (Johnny Gulch MW-1)	Sec. 3	9/00	120	77 – 97	Dry	<5734	Alluvium
JG-2 (Johnny Gulch MW-2)	Sec. 3	9/00	300	255 – 295	211	5646	Metamorphic
<i>JG-3 (Johnny Gulch MW-3) (New Lower Johnny Gulch Well)</i>	<i>To be drilled in July 2006 Between pond 8A and the east permit boundary.</i>						

Note: See Figure 2-6 for well locations.

#### 2.2.8.3 Reclamation

Luzenac would monitor reclamation success and BMPs, repair eroded areas, and control noxious weeds. DEQ would conduct regular field inspections throughout construction, operation, and reclamation activities. All field compliance inspections would be documented in the project file at DEQ's Helena Office.

#### 2.2.8.4 Operational Rock Monitoring

Luzenac would continue to implement the operational rock monitoring sampling program and management plan as a contingency to provide for environmental



protection in the event that asbestiform minerals or the potential for metals mobility are identified during future operational monitoring, as described in Section 1.5.2.2.4.

#### **2.2.8.5 Cultural Resources**

Historic and prehistoric cultural resources, if encountered during mining operations, are preserved or mitigated according to the applicable statutes, including Section 106 of the National Historic Preservation Act. Preservation may include avoidance, or surveys and inventories, as necessary.

#### **2.2.8.6 Paleontological Resources**

In the event potentially important fossils are discovered within the Luzenac permit area during any type of activity, Luzenac would immediately notify the appropriate authorities. Activities that could be taken after notification include cessation of mining activities in the area of discovery, verification and documentation of discovery, and development and implementation of plans to avoid or recover the fossils.

### **2.2.9 HUMAN HEALTH AND SAFETY**

MSHA regulates human health and safety at the Yellowstone Mine under the Federal Mine Safety and Health Act of 1977. The purpose of these standards is the protection of life, promotion of health and safety, and prevention of accidents. MSHA regulations are codified under 30 CFR Subchapter N, Part 56. Employees at the Yellowstone Mine are required to receive initial and annual training.

#### **2.2.10 SOCIOECONOMICS**

##### **2.2.10.1 Duration of Mining**

Under the current Operating Permit, Luzenac would continue to mine for about 8 years.

##### **2.2.10.2 Employment**

Employment at the Yellowstone Mine is approximately 44 people on a year-around basis. The Yellowstone Mine is permitted for as many as 100 employees, and that level of employment has occurred in the past.

##### **2.2.10.3 Taxes**

In 2003, the Yellowstone Mine paid approximately \$97,500 in property tax, \$513,400 in the net proceeds tax (based on production), and \$64,100 in resource indemnity trust tax. In addition, the Three Forks Mill paid \$282,300 in property tax, and the Sappington Mill paid \$125,700 in property tax. These taxes would continue for another 8 years.

## 2.2.11 RECLAMATION

### 2.2.11.1 Introduction

The Yellowstone Mine reclamation plan is developed to meet the requirements of MMRA and its implementing rules. The current reclamation plan is included as part of Operating Permit 00005 (Luzenac, 2002) and has been approved by DEQ. A recalculation of the reclamation bond was also completed during the 2002 review of the Operating Permit. Specific long-term goals are to ensure public safety, stabilize the site, and establish a productive perennial noxious weed-free vegetation community consistent with possible future land uses of wildlife habitat, livestock grazing, and dispersed recreation. Short-term reclamation goals are to stabilize disturbed areas, as well as to protect disturbed and adjacent undisturbed areas from erosion.

The current reclamation plan would reclaim all 728.5 acres (Table 2-1) of existing disturbances (Figure 2-3), including those acres approved for short-term future disturbance. One hundred eighty-five acres have been revegetated to date. A total of 439.5 acres would be soiled and revegetated. Other areas in the pits would be reclaimed to rock faces and talus slopes. Some roads would be left in the permit area for use after mining.

Reclamation activities include:

- Portions of the mine pit highwalls would be reclaimed as rock faces and talus slopes. The pit bottom, pit roads, and accessible benches on slopes less than 2.5H:1V would be soiled and revegetated;
- Water well, piezometer, and drill hole abandonment;
- Regrading and revegetation of previously backfilled pits;
- Regrading and revegetation of the OB piles;
- Removal of structures after cessation of operations;
- Regrading of disturbed areas including roads and drainage diversions;
- Removal and regrading of stockpile areas;
- Replacement of salvaged soil;
- Revegetation of all disturbed areas except pit highwalls reclaimed as rock faces, talus slopes, and access roads needed after mining; and
- Reclamation monitoring and weed control.

The reclamation schedule would encompass the period between cessation of mining and successful revegetation. Reclamation is concurrent with operations where possible, particularly in the overburden disposal areas.

### 2.2.11.2 General Grading of Disturbed Areas

Prior to replacing soil, facility sites and other disturbed areas would be graded to attain a stable configuration, to establish effective control drainage to minimize erosion, and to

protect surface water resources. To the extent practicable, grading would blend disturbed areas with the surrounding terrain. Compacted areas would be ripped if needed.

#### 2.2.11.3 Soil Salvage

Approximately 301,000 cubic yards of ~~vegetation~~ soil, and suitable colluvium and alluvium have been salvaged at the Yellowstone Mine to date and are stored in stockpiles, as shown on Figure 2-3. Soil balance calculations for existing disturbances at the mine indicate that there is adequate soil volume from existing stockpiles to place a minimum 6-inch-thick soil cap on all disturbed sites (Table 2-6).

TABLE 2-6 Soil Balance Calculations For <u>Existing</u> Reclamation <u>Plan</u> <i>Amendment to Operating Permit 00005 – EA</i>			
Area to Strip	Acres	Cubic Yards	Comment
Existing Stockpiles		301,000	21 existing piles
TOTAL		301,000	
Area to Cover	Acres	Cubic Yards	Comment
North OB Pile	122.8	81,392	Placing 6" soil cover over this area
North 40 Pit	15.1	9,988	Placing 6" soil cover over this area
Northeast OB Pile*	15.3	10,940	Placing 6" soil cover over this area
East OB Pile	123.0	81,360	Placing 6" soil cover over this area
South OB Pile	157.6	104,247	Placing 6" soil cover over this area
Johnny Gulch OB Pile**	5.7	3,370	Placing 6" soil cover over this area
TOTAL	439.5	291,297	
Excess cubic yards		9,703	3 percent

\*40 acres of Northeast OB Pile have been reclaimed.

\*\*145 acres of Johnny Gulch OB Pile have been reclaimed.

#### 2.2.11.4 Pit Reclamation

Pits previously backfilled with overburden material (North 40, South Main, and Cadillac pits, Figure 2-4) would be regraded, soiled, and revegetated along with the overburden disposal areas. The principal goal for reclamation of the North Main and South 40 pits

would be to achieve long-term stability. Portions of the pit highwalls would be reclaimed as rock faces and talus slopes. Where it is safe and access is feasible, catch benches would be reclaimed. The pit bottom, select benches, and haul road slopes in the pit that are 2.5H:1V or shallower would be ripped, if necessary, and soiled and seeded, where accessible. The areas would be seeded with the approved seed mix (Table 2-7).

Monitoring wells in the pit that are no longer needed would also be abandoned according to state regulations and their sites reclaimed.

#### **2.2.11.5 Overburden Pile Reclamation**

Figure 2-3 identifies the existing overburden disposal areas along with permitted footprints. During operations, the slopes of the overburden disposal areas are constructed to approximately 1.5H:1V or angle of repose ( $34^{\circ}$ ). The slopes would be reduced after mining to slopes ranging from 2.5H:1V ( $22^{\circ}$ ) to approximately 4.0H:1V ( $14^{\circ}$ ), depending on the area and requirements to blend in with surrounding topography. Luzenac has successfully reclaimed portions of two overburden piles on the Yellowstone Mine site on slopes up to 2H:1V. These include both the Johnny Gulch OB Pile (145 acres) (Figure 2-3) and 40 acres of the North OB pile.

The upper flat surface of the overburden disposal areas would be contoured to prevent ponding, maximize surface runoff, and divert runoff from overburden slopes. Drainage would be directed off the surface into lateral channels adjacent to the overburden disposal areas. The lateral channels would be designed to carry maximum 50-year, 24-hour flows to storm water settling ponds (CDM, 1997 as revised by Luzenac, 2002). All recontoured surfaces would be capped with soil, a minimum of 6 inches thick, seeded, and if necessary, fertilized to promote plant growth.

#### **2.2.11.6 Ore Processing and Surface Support Facilities Reclamation**

The ore processing areas include the Ore Sorter and related storage bins. Surface support facilities include ancillary structures such as maintenance shops, warehouses, and administrative buildings. At the end of active mining, all structures would be removed from the site. Buildings that cannot be salvaged or relocated would have the interiors scrapped, the shell removed, and the foundation reduced to rubble and buried. All conveyor systems would be salvaged and removed. All underground pipelines would be flushed, disconnected, and left in place.

The maintenance office building on the east property boundary would be maintained and staffed during working hours until the site has been deemed safe for access and vegetation in the reclaimed areas has become established. Gates to the property would be locked at the end of the work shift.

Once the structures are removed, the areas would be ripped and contoured to ensure drainage and capped with a minimum of 6 inches of soil, seeded and, if necessary, fertilized to promote plant growth.

TABLE 2-7  
Approved Seed Mixture  
Amendment to Operating Permit 00005 – EA

Grasses			
Species	Variety	Common Name	Pure Live Seed (lb. per acre)*
<i>Agropyron dasystachyum</i>	Critana	Thickspike Wheatgrass	2
<i>Agropyron spicatum</i>	Secar	Bluebunch Wheatgrass	3
<i>Agropyron trachycaulum</i>	Pryor	Slender Wheatgrass	2
<i>Elymus cinereus</i>	Magnar	Great Basin Wildrye	1
<i>Festuca ovina</i>	Covar	Sheep Fescue	1
<i>Oryzopsis hymenoides</i>	Nezpar	Indian Ricegrass	2
<i>Poa ampla</i>	Sherman	Big Bluegrass	0.5
<i>Agropyron riparium</i>	Sodar	Streambank Wheatgrass	2
<i>Stipa viridula</i>	Lodorm	Green Needlegrass	0.5
	Subtotal:		14
Forbs / Legumes			
Species	Variety	Common Name	Pure Live Seed (lb. per acre)*
<i>Medicago sativa</i>	Ladak	Alfalfa	2
<i>Melilotus officinalis</i>	Madrid	Yellow Sweetclover	2.5
<i>Achillea millefolium</i>		Western Yarrow	0.1
<i>Astragalus cicer</i>	Aski	Cicer Milkvetch	2
<i>Linum lewisii</i>	Appar	Blue Flax	2
	Subtotal:		8.6

\* Application rate is doubled if broadcast or hydroseeding methods are used.

#### 2.2.11.7 Access and Haul Roads

Luzenac has committed to meeting with DEQ at closure to make a final decision as to which roads would be left open for future work and reclamation monitoring. Access and haul roads no longer deemed necessary for mining-related activities would be ripped, contoured, capped with a minimum of 6 inches of soil, and vegetated with the recommended seed mixture. Slopes of all road cuts and fills would not exceed 2H:1V.



Some roads would remain to provide access for monitoring and maintenance activities and as access to public roads. These roads would be regraded to an approximate width of 10 to 15 feet and contoured to approximate existing topography (Luzenac, 2002: Figure 3.1.8).

#### **2.2.11.8 Power and Utility Corridors**

Power and utility corridors would be ripped, contoured, capped with a minimum of 6 inches of soil, and vegetated with the recommended seed mixture. Power transmission lines are the property of NorthWestern Energy, which has responsibility for reclamation.

#### **2.2.11.9 Surface Water and Storm Water Drainage and Maintenance**

Surface water runoff from undisturbed areas would be channeled around mine pits, and diversions would be constructed up gradient of the overburden disposal area, where possible. Diversion channels are described in the Revised Site-Wide Drainage Plan (CDM, 1997 as revised by Luzenac, 2002). All temporary storm water management structures (ditches, ponds, energy reducing structures, etc.) described within the plan would be reclaimed. Slopes on the permanent drainage channels would be 2H:1V or less, which would reduce long-term maintenance.

#### **2.2.11.10 Revegetation**

##### **2.2.11.10.1 Soil Placement**

Compacted surfaces would be scarified or ripped prior to placement of soils. A minimum thickness of approximately 6 inches of soil would be redistributed over the disturbed area using scrapers, graders, and dozers. Dozers would provide grouser impressions to allow seed to be trapped. Soil placed for revegetation purposes would be seeded prior to the next growing season following placement. Luzenac would use soil amendments and stabilizers (e.g., fertilizer, lime, mulch, and jute netting) if these amendments were determined to be necessary for overall reclamation success.

##### **2.2.11.10.2 Seeding**

Seeding would be accomplished either by drill or broadcast methods depending on the steepness of slopes in the area. Luzenac would not hydroseed reclamation slopes less than 2.5H:1V. Seed application rates would be doubled if either broadcast or hydroseeding applications are used. Luzenac would not use mulch or tackifier unless initial revegetation efforts do not yield positive results. The approved seed mix is included in Table 2-7.

##### **2.2.11.10.3 Fertilizer and Mulch**

Soils analyzed to date on the project site contain between 1 percent and 6 percent organic material (average 2.5 percent), which precludes the need for use of organic mulch. Fertilizer application rates would vary according to soil needs determined by nutrient analysis of random samples. Fertilizers and mulches would be applied by either broadcasting or hydromulching. If broadcast applications were used, the fertilizer would be harrowed into the soil.

#### **2.2.11.10.4 Fencing**

Following the cessation of mining, the property boundary fence would be maintained as long as the property is under Luzenac's control. The fence in the pit area would also be maintained, and signs would be posted to reduce trespassing and warn of open pit hazards. In addition to signs, Luzenac would construct 4- to 5-foot berms above highwall areas of the pit to minimize the potential for accidents and ensure public safety.

#### **2.2.11.10.5 Reclamation Monitoring**

Luzenac would continue to establish and monitor vegetation test plots to evaluate the success or failure of reclamation on varying aspects of exposure on disturbance areas. Evaluation for concurrent reclamation success would begin on an annual basis after plant establishment. The following criteria would apply for areas of disturbance, including pits, overburden disposal sites, ore processing areas, surface support facilities, power and utility corridors, and final surface water and storm water diversion structures:

- Sustainability of the vegetation;
- Survival of perennial vegetation species;
- Control of noxious weeds;
- Absence of excessive erosion as evidenced by active rilling and head-ward erosion; and
- Stability and utility of reclaimed areas for post-mining land use.

#### **2.2.11.10.6 Concurrent Reclamation**

Concurrent reclamation would occur as soon as possible after completion or abandonment of an affected facility or a large portion of the facility. To date, 185 acres have been reclaimed.

### **2.3 PROPOSED ACTION**

#### **2.3.1 INTRODUCTION**

This section describes the proposed activities Luzenac seeks to permit, which are being evaluated by this EA as the Proposed Action. These activities include:

- Extension of the mine life by 50 years;
- Expansion of the permit area by 490.4 acres;
- Expansion of the existing South 40 Pit to mine an additional 17 million tons of talc ore;
- Extension of overburden piles to dispose of 127 million tons;
- Relocation of ore processing facilities;
- Revision of water quality monitoring and site-wide drainage plans; and
- Revision of the closure and reclamation plan to address the reclamation of all areas disturbed by mining activities.

Discussion of these major elements and other components of the Proposed Action in this section are considered within the framework of the existing Operating Permit (Luzenac, 2002). Only components that would require a change from the approved existing Operating Permit 00005 conditions are discussed in detail. Elements or components of the Proposed Action that require no change from the existing operating permit, or are unaffected by the Proposed Action, are only briefly described.

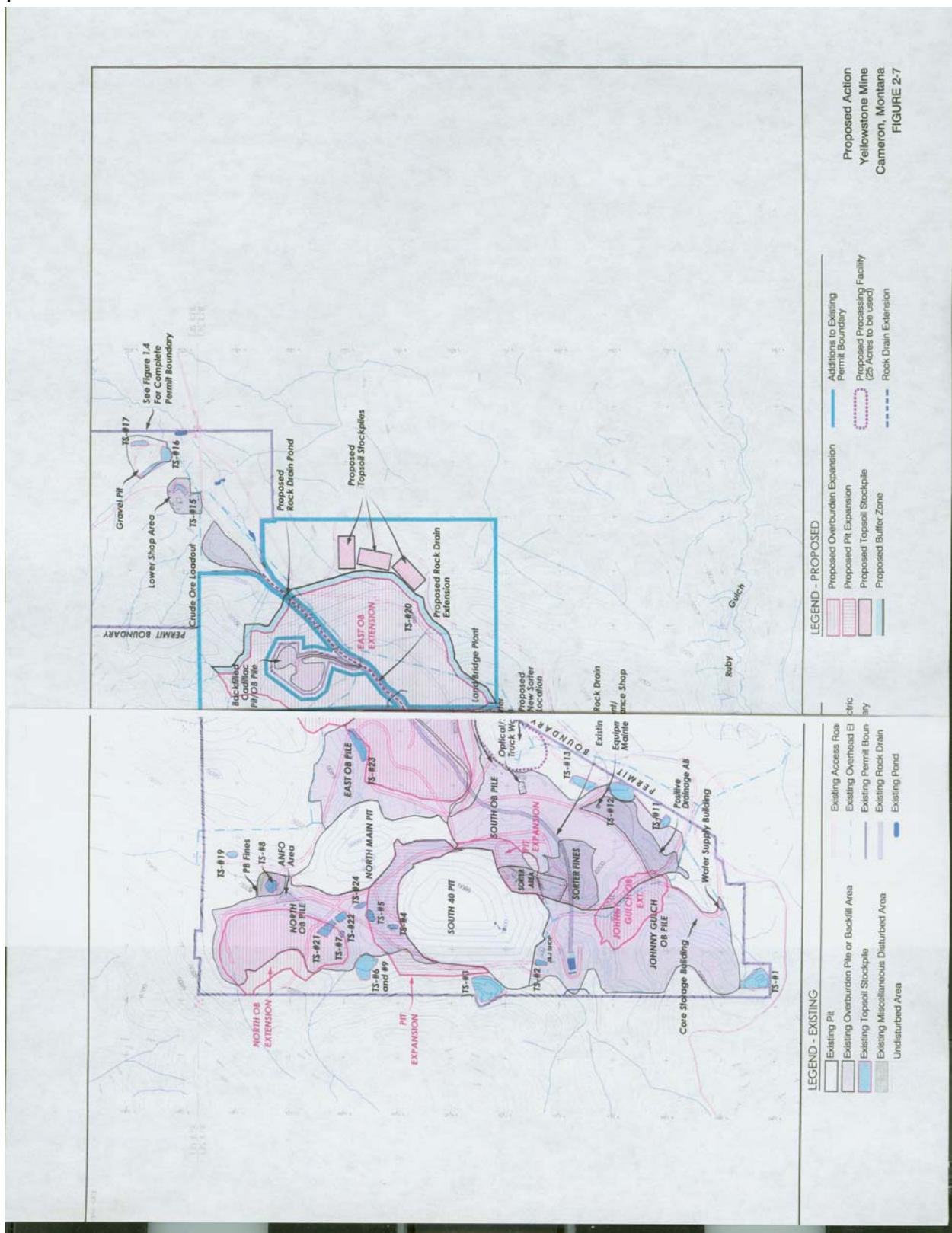
### 2.3.2 PERMIT AREA CHANGES AND SURFACE DISTURBANCE AREA

Luzenac proposes to modify the permit boundary as shown on Figure 2-7 in order to accommodate the expansion of existing facilities as required by the mine life extension. The total area included in the revised Yellowstone Mine permit area would be increased by 490.4 acres, from the existing 1,458 to 1,948 acres, of which a total of 999.8 acres would be permitted for surface disturbance (Table 2-8). This proposed surface disturbance area includes 728.5 acres of existing permitted disturbance associated with the current Operating Permit 00005 (Luzenac, 2002), and 271.3 acres of new disturbance under the Proposed Action (Table 2-8). All of the land within the permit boundary is privately owned.

Areas of new surface disturbance that would result from the Proposed Action are shown on Figure 2-7. The number of acres of proposed disturbances by facility is presented in Table 2-9.

TABLE 2-8 Comparison of Existing and Proposed Permit Areas with Surface Disturbances <i>Amendment to Operating Permit 00005 – EA</i>			
	Disturbed Acres	Undisturbed Acres	Total Acres
Existing Permit Area	728.5	729.5	1458

Proposed Expansions to Permit Area	271.3	219.1	490.4
Grand Total	<u>999.8</u>	<u>948.6</u>	1948.4





### 2.3.3 MINING OPERATIONS

Luzenac proposes to mine ore and overburden from the South 40 Pit at the same rate as it is presently being extracted, approximately 300,000 tons of ore and 2.5 million tons of overburden per year. Luzenac also proposes to use the same mining methods, types of equipment, and number of employees currently in use and permitted under the Operating Permit (Luzenac, 2002). The pit slope angles and bench heights would remain the same, as described in Section 2.2.6.1.

The South 40 Pit would be enlarged and deepened. This proposed expansion of the South 40 Pit would produce a combined pit that includes portions of the North Main, South 40, and Montana Talc pits (Figures 2-7 and 2-8). This new combined pit would include 180.6 acres, of which 169.4 acres are currently disturbed and 11.2 acres would be newly disturbed (Table 2-8). Figures 2-7 and 2-8 show final topography in the vicinity of the pits. Figure 2-9 shows cross sections of the existing and final South 40 Pit. The South 40 Pit expansion would include about 9.8 acres along its western margin, 30 acres along its northern margin, and about 16.5 acres along its eastern margin (Figure 2-7) bringing the total proposed area of expansion of the pit by this amendment to 56.3 acres (Table 2-9). Most expansion of the South 40 Pit would be into previously disturbed areas that are presently covered by overburden. Once completed, the final South 40 Pit size would be 122.2 acres (Figure 2-8). The pit expansion and subsequent laybacks would accommodate mining to a total depth of 5,550 feet amsl. The final North Main cross sections are shown on Figure 2-10.

**TABLE 2-9**  
**Proposed Disturbances at the Yellowstone Mine<sup>1</sup>**

***Amendment to Operating Permit 00005 – EA***

		SIZE IN ACRES						
		Acres Permitted for Disturbance	Change in Use of Existing Disturbances		Proposed Additions <sup>2</sup>	Additions <sup>2</sup> (Previously Undisturbed)	Total Proposed Disturbance	
TYPE	AREA		Subtractions	Additions				COMMENT
Existing Open Pits	North Main Pit	58.4					58.4	
	South 40 Pit	111.0		45.1	56.3	11.2	122.2	Includes Montana Talc Pit (36.7 acres) and permitted 2A Pushback
	North 40 Pit	Backfilled						Backfilled pit 15.1 acres
	Cadillac Pit (9.9 acres)	Backfilled						Backfilled pit 9.9 acres
Total Pits <sup>3</sup>		169.4			56.3	11.2	180.6	Combined North Main and South 40 pits
Existing Overburden	North OB Pile	122.8	30.0		10.1	10.1	132.9	Includes PB Fines (5.2), ANFO Area and Soil Stockpiles
	East OB Pile	123.0			191.2	191.2	314.2	
	Buffer Zone				21.5	21.5	21.5	
	South OB Pile	157.6	8.2		0.0	0.0	157.6	Includes Sorter Area, Sorter Fines, Low Grade Stockpile, Positive Drainage A+B
	Johnny Gulch OB Pile	129.8			0.0	0.0	129.8	Includes Water Supply Building
	OB Extensions							
	North OB Ext			47.1				No new acres disturbed built on existing OB pile
	East OB Ext			152.1				No new acres disturbed built on existing or new OB pile
	Johnny Gulch OB Ext			26.0				No new acres disturbed built on existing OB pile
	Rock Drain	6027.5 ln ft			3688.4 ln ft	3688.4 ln ft	9715 ln ft	Lineal feet of rock drain
Total Overburden		533.2			222.8	222.8	756.0	

**TABLE 2-9 (continued)**  
**Proposed Disturbances at the Yellowstone Mine<sup>1</sup>**  
**Amendment to Operating Permit 00005 – EA**

		SIZE IN ACRES						
		Acres Permitted for Disturbance	Change in Use of Existing Disturbances		Proposed Additions <sup>2</sup>	Additions <sup>2</sup> (Previously Undisturbed)	Total Proposed Disturbance	
TYPE	AREA		Subtractions	Additions				COMMENT
Other Existing	Soil Stockpiles (24)	15.2			12.3	12.3	27.5	Included in "Total Other" sum below
	Gravel Pit	9.9					9.9	Included in "Total Other" sum below
	<i>Ponds</i>	<i>0.8</i>					<i>0.8</i>	Included in "Total Other" sum below
	New Ore Processing	Na			25.0	25.0	25.0	
								Included in South OB Pile includes Optical Sorter/Truck Wash, Land Bridge Plant, Water Supply Building, Core Storage Building, and Equipment Maintenance Shop
	Facilities	19.1 <sup>4</sup>						
	Sorter Area	11.3 <sup>4</sup>	6.9				0.0	Included in South OB Pile
	Roads	7.3 <sup>4</sup>					0.0	Included in various OB piles
	Utilities	7.7 <sup>4</sup>					0.0	Included in South OB Pile
	Sorter Fines	18.9 <sup>4</sup>					0.0	Included in South OB Pile
	PB Fines	5.2 <sup>4</sup>					0.0	Included in North OB Pile
	Positive Drain A+B	19.6 <sup>4</sup>					0.0	Included in South OB Pile
Total Other		25.9			37.3	37.3	63.2	Includes soil stockpiles, gravel pit and ponds
Grand Total Disturbed <sup>3</sup>		<i>728.5</i>			316.4	271.3	<i>999.8</i>	
Total Undisturbed		<i>729.5</i>					<i>948.6</i>	
Total Permit Area		1458.0	45.1	45.1	490.4		1948.4	

<sup>1</sup> Table 2-9 based on measurements from Figure 2-7

<sup>2</sup> Differences in the numbers in the "Proposed Additions" and the "Additions (Previously Undisturbed)" columns reflect expansion of the pits into existing disturbance caused by existing overburden disposal areas

<sup>3</sup> Of the 56.3 acres of proposed South 40 Pit expansion, 45.1 (56.3-11.2) occur in an area of previously permitted disturbance

<sup>4</sup> Acres included in disturbed area above

mines\luzenac\cadpro\ea-2004\plan-sec.dwg



Plan View of the Existing and Final  
South 40 Final Pit  
Yellowstone Mine  
Cameron, Montana  
FIGURE 2-8



Cross Sections of the Existing and Final  
South 40 Pit  
Yellowstone Mine  
Cameron, Montana  
FIGURE 2-9





0 Feet 300

**MAXIM**  
TECHNOLOGIES INC. 9902295.500

Cross-Sections of the North Main Pit  
Yellowstone Mine  
Cameron, Montana  
FIGURE 2-10

## 2.3.4 OVERBURDEN DISPOSAL

### 2.3.4.1 Introduction

Extending the mine life by 50 years at the Yellowstone Mine site under the Proposed Action would require expanded overburden disposal capacity, in order to accommodate the anticipated 127 million tons of overburden to be mined. Waste rock would be transported to existing overburden facilities, which would be expanded by increasing their height and/or enlarging their footprints.

Rock roll berms would be constructed at the base of the lower lift and the base of the upper lift of all OB piles to prevent rock rolling down the slopes and outside the permitted footprint of the facility.

A buffer disturbance area would be established around the proposed East OB Pile to cover miscellaneous disturbances like soil salvage and storage areas, haul roads, equipment staging areas, sediment and erosion control systems, rock roll berms, miscellaneous access and service roads needed to maintain these systems and to control weeds, etc., over the 50-year mine life.

The overburden disposal areas would be accessed by a main haul road from the pit, similar to the road that currently provides access to the existing part of each overburden disposal area. Short, temporary roads would be constructed from the main haul road to access the active part of each disposal area. These roads would be built within the footprint of the disposal areas. Overburden surfaces would be graded during construction to prevent ponding of rainfall, and final slope angles would be reduced from angle of repose to slopes of 2.5H:1V or less to facilitate reclamation and revegetation at closure. Overburden would be placed using haul trucks similar to those currently in use. Selection of the receiving disposal area would be based on proximity of the rock being mined to the disposal sites. Table 2-10 indicates the amount of additional material that is presently designated for storage in each overburden disposal area.

TABLE 2-10 Overburden Placement By Disposal Area <i>Amendment to Operating Permit 00005 – EA</i>						
	Johnny Gulch OB Extension	North OB Pile	North OB Extension	East OB Pile	East OB Extension	Total
Volume (LCY)*	2,481,867	5,237,676	2,876,980	56,920,217	16,110,626	81,145,498
Tons	3,884,662	8,198,101	4,503,099	89,092,513	25,216,632	127,010,345

\*LCY= Loose Cubic Yards

A discussion of the overburden geochemistry can be found in Sections 1.5.2.2.2 and 1.5.2.2.3.

#### **2.3.4.2 East OB Pile**

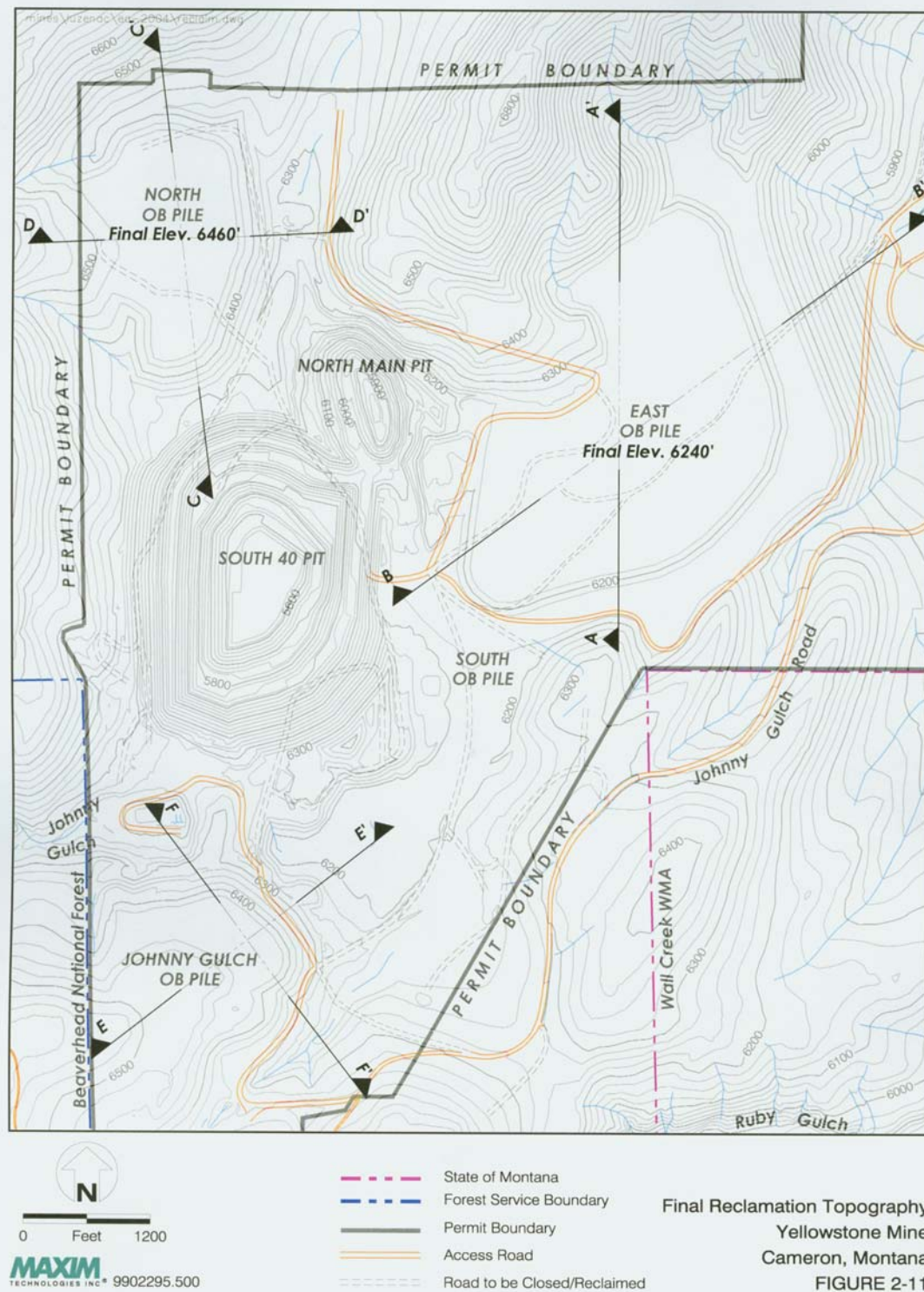
Luzenac proposes an expansion of the East OB Pile further to the northeast down gradient in Johnny Gulch as shown in Figure 2-7. The proposed expansion would disturb approximately 191.2 acres of previously undisturbed ground (Figure 2-7 and Table 2-9). This disposal area would receive approximately 114.3 million tons of overburden material over the proposed mine life extension (Table 2-10). This represents about 90 percent of the total amount of overburden to be removed. The East OB Pile would be constructed in two lifts or layers (upper and lower) by either end-dumping overburden over a bermed bank or end-dumping on the overburden pile top and pushing overburden material over the angle-of-repose face of the pile. The overall average dimensions of the East OB Pile would be approximately 2,500 feet in width and 5,000 feet in length, with an ultimate height of 320 feet above the existing valley floor (Figures 2-11 and 2-12). The surface of the East OB Pile would be graded during construction to prevent ponding of rainfall, reclaimed concurrent with construction, and graded to reduce final slopes from angle of repose to 2.5H:IV or less to facilitate reclamation and revegetation at closure. A safety bench would be constructed on its sloping surfaces at distances of about 200 feet along the slope above the valley floor. This bench would provide a run-out area for material raveling off the slopes and a relatively safe place for work during reclamation and revegetation.

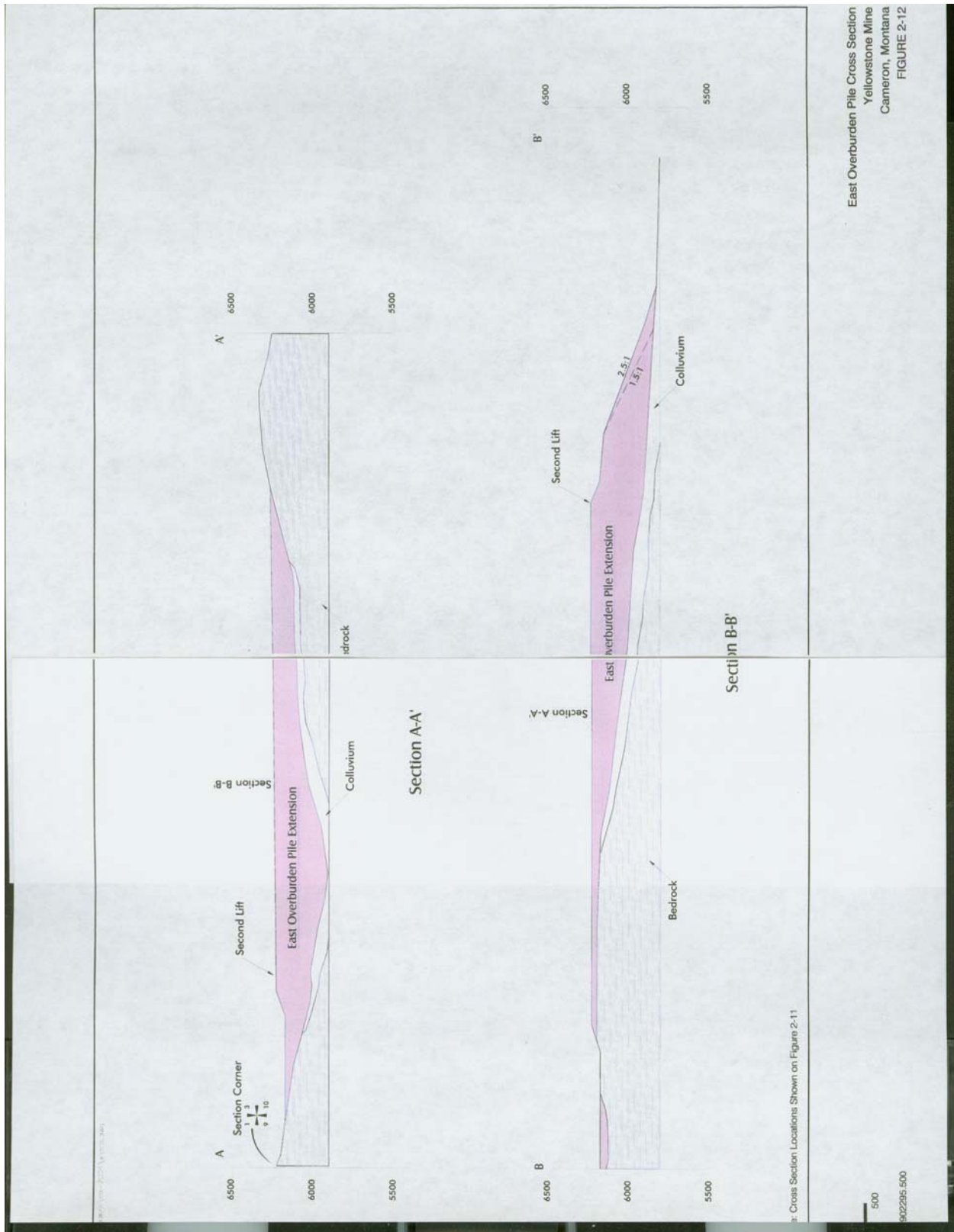
Prior to construction of the proposed East OB Pile Extension, an area of about 20 to 30 acres (equivalent to the storage needs of 5 years of overburden production) would be cleared. Soil and suitable colluvium and volcanic parent material, including existing vegetation, would be salvaged and hauled to the designated soil stockpile areas shown in Figure 2-7. Extension of the East OB Pile would occur in small increments of about 5 acres annually. This construction schedule would result in both a small amount of acreage being prepared to receive overburden at any one time and a slow advance of the overburden toe on a year-by-year basis.

#### **2.3.4.3 North OB Pile**

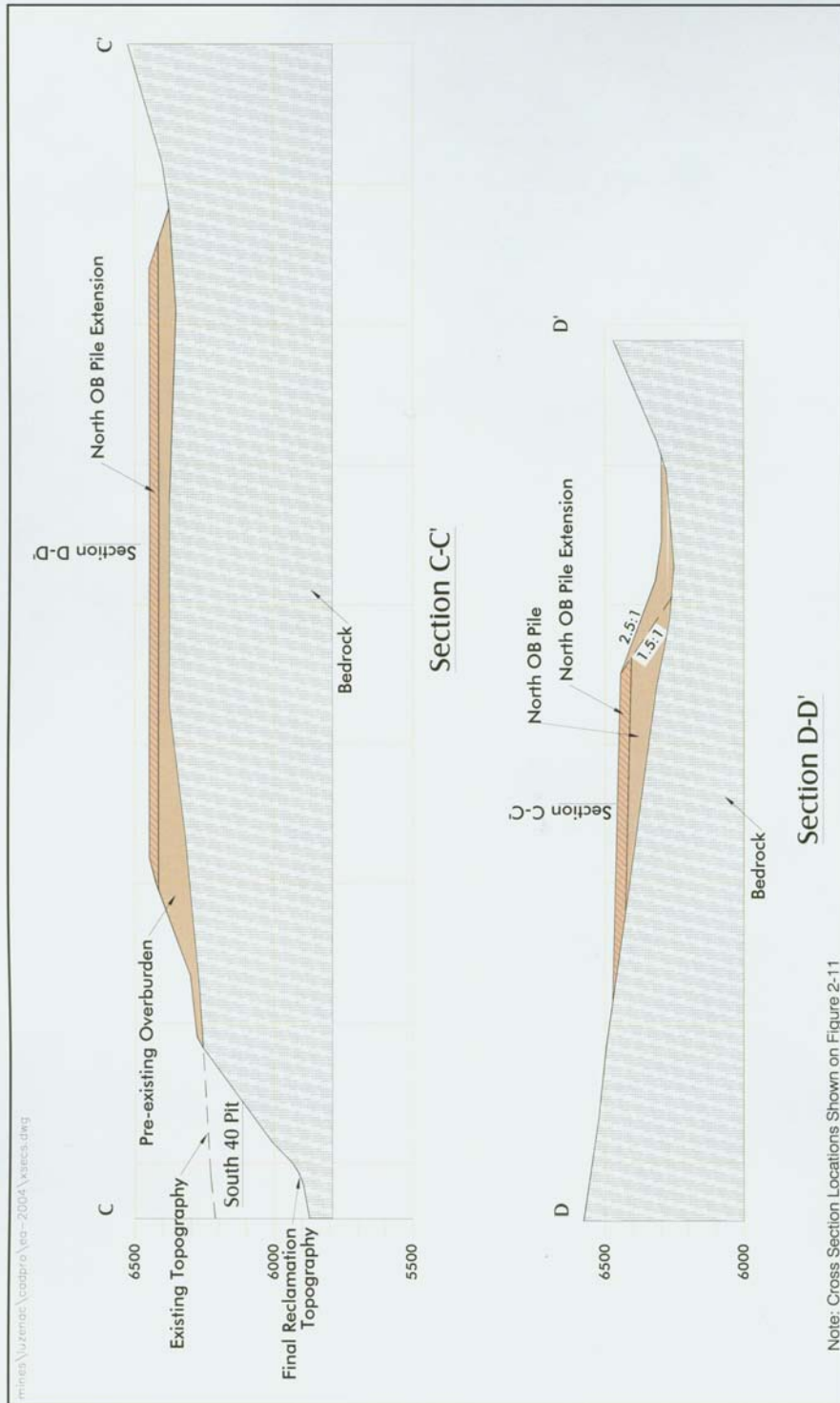
Luzenac proposes to construct a lift of overburden on top of a portion of the existing North OB Pile. The proposed extension would contain 8.2 million tons (5.2 million cubic yards) of overburden and would disturb approximately 10.1 acres of previously undisturbed ground over the life of the mine (Figure 2-7 and Table 2-9). The disposal area would be constructed by end-dumping overburden over a bermed bank. The overall footprint of the North OB Pile would average approximately 1,200 feet in width and 2,300 feet in length. The disposal area would extend to a height of 40 feet above

the existing North OB Pile surface at final build-out (Figures 2-11 and 2-13).









North Overburden Pile Cross Sections  
Yellowstone Mine  
Cameron, Montana  
FIGURE 2-13

#### **2.3.4.4 Johnny Gulch OB Pile**

Luzenac proposes an extension of the Johnny Gulch OB Pile that would involve placing a lift over a small portion of the disposal area along its eastern margin (Figure 2-7). Extension of the Johnny Gulch OB Pile would contain 3.9 million tons (2.5 million cubic yards) of overburden and would cover approximately 26 acres of previously disturbed ground over the extended mine life (Figure 2-7 and Table 2-9). The disposal area would be constructed by end-dumping overburden over a bermed bank (Figures 2-11 and 2-14).

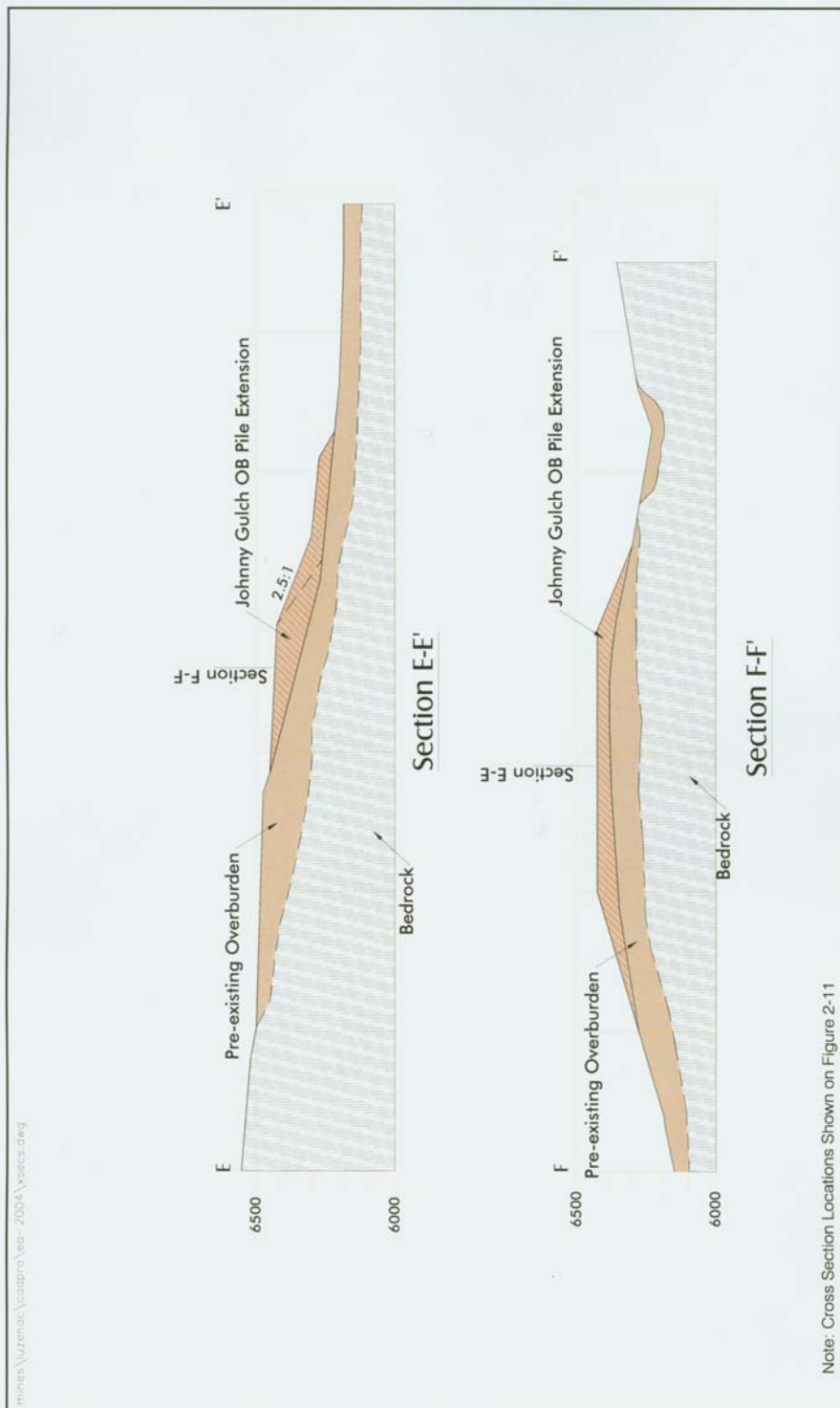
#### **2.3.4.5 Concurrent Reclamation**

Where possible, Luzenac proposes to reclaim portions of the overburden disposal areas concurrently. To date, Luzenac has reclaimed portions of two overburden piles on the Yellowstone Mine site. These include both the Johnny Gulch OB Pile (145 acres) (Figure 2-3) and the north portion of the East OB Pile (40 acres). Both of these areas currently support seasonal grazing.

#### **2.3.5 ORE PROCESSING**

Under the Proposed Action, Luzenac would use the same ore processing methodology and process ore at the same rate as it does under the existing Operating Permit 00005 (Luzenac, 2002).

With the expansion of the South 40 Pit, the pit highwall would encroach on the Sorter Area (Figures 2-3 and 2-7). Approximately midway through remaining mine life, Luzenac proposes to relocate the ore processing facilities. The area proposed for relocation of these facilities is shown on Figure 2-7. This proposed ore processing area would cover approximately 25 acres and lie on previously undisturbed ground along the power line corridor. Because of its location along the existing powerline, it should not be necessary to realign the power line or its corridor.



Johnny Gulch Overburden Pile Cross Sections  
Yellowstone Mine  
Cameron, Montana  
FIGURE 2-14



## 2.3.6 ACCESS, HAUL ROADS, AND TRAFFIC

The Proposed Action would not require any changes to the access road system. Luzenac proposes to use existing roads to access the mine site and anticipates traffic patterns, vehicle types used, and frequency of use to remain at current levels (see Section 2.2.6.4). No changes in production levels, ore hauling, man-hours, or consumption of deliverable items are proposed or anticipated as a result of the Proposed Action. There are no changes to the alignment or use of the existing, approved and permitted access road system, other than a continuation of the same activities over a longer period of time.

Luzenac proposes to use and extend existing haul roads from the South 40 Pit to the overburden disposal facilities. Haul roads currently exist to each of the three current overburden disposal areas that are proposed for expansion. Roads to the Johnny Gulch OB Pile would not change except for minor alignment changes at the actual point of end dumping onto the expanded disposal sites. The haul road to the East OB Pile would require extending the main haul road across overburden as the pile expands, with haul roads developed to the active point of overburden end-dumping. At the end of mine life, the main haul road across the upper surface of the East OB Pile would have been extended some 3,500 feet to the northeast. This amounts to an average advance of about 70 feet per year. Luzenac proposes to construct its own haul road off the upper surface of the East OB Pile and down to the Crude Ore Loadout to avoid placing haul traffic on the Johnny Gulch Road (Figure 2-7). The haul roads are all considered temporary, would be developed on previously deposited overburden materials, and would be reclaimed.

## 2.3.7 ANCILLARY FACILITIES AND ACTIVITIES

### 2.3.7.1 Introduction

This section discusses ancillary facilities, miscellaneous ancillary activities, resource monitoring programs, and the reclamation plan associated with the Proposed Action.

### 2.3.7.2 Storm Water Handling Facilities

As with the existing storm water handling system, ditches, temporary and permanent sediment basins, and storm water collection ponds would be used to control runoff from disturbed areas. The SWPPP required within the MPDES permit must, as a permit condition, be amended whenever there is a change in design, construction, operation, or maintenance of the facility that significantly affects the potential for discharges of pollutants to surface water (See Appendix B). New portions of the storm water handling system would be designed and change with the facility. BMPs to prevent or mitigate contamination of storm water from the mine would be employed and required by

SWPPP where appropriate. Permit conditions requiring no discharge of storm water runoff except in response to events in excess of the design storm as discussed in the MPDES Permit Statement of Basis (Appendix C) would be maintained.

A revised site-wide drainage plan for the mine site, which will be the cornerstone of the SWPPP required by the MPDES permit to be implemented by July 1, 2007, has been prepared for the Proposed Action under the conditions of maximum build-out (Figure 2-6) and is described in detail in the amendment application (Luzenac, 2002). Luzenac has updated the stormwater management system since the Draft EA was released (Maxim 2006). Luzenac would modify the existing storm water handling systems to accommodate the changing conditions resulting from expanding mine facilities as required within the SWPPP conditions of the MPDES permit (Appendix B). New diversion channels and sediment ponds would be added to the existing system to control runoff and runoff from expanded overburden disposal areas and from the relocated ore processing facilities. A field review of the storm water collection system would be performed periodically by Luzenac to identify additional sediment control system and BMP requirements for the evolving mine site and its facilities. Storm water collection, diversion structures and sediment control BMPs would be monitored after all storm events in excess of 0.5 inches of precipitation as required by the MPDES permit SWPPP conditions to ensure that sediment levels are not exceeding design capacity. Sediment control structures would be cleaned periodically in order to maintain performance. These inspection and cleaning schedules would be applied to storm water control structures that result from expanded facilities (pits and overburden disposal areas) proposed under this amendment. Should areas of the site require additional BMPs, Luzenac would install the necessary control systems. Storm water would only be discharged in events exceeding 1.9 inches in a 24 hour period.

#### **2.3.7.3 Hazardous Materials and Wastes**

Under the conditions described in the Proposed Action, Luzenac does not anticipate any changes in the types or quantities of hazardous materials or substances currently used or stored at the Yellowstone Mine site. All hazardous material or substances currently in use at the mine are disclosed in the approved Operating Permit 00005 (Luzenac, 2002). The fleet size and type of equipment designated for use under the Proposed Action is similar to that currently in use. The transportation and onsite storage of hazardous materials are regulated by the USDOT. USDOT certified hazardous material contractors are responsible for the transport of hazardous material both on and off the mine site. In addition, Luzenac has an SPCC in place in the event of any accidental release. There are no changes between the Proposed Action and the existing approved Operating Permit with respect to hazardous materials. The handling and storage of hazardous materials would continue to be regulated by the USDOT.

#### **2.3.7.4 Spill Prevention, Control, and Countermeasure Plan**

Under the Proposed Action, both the Emergency Response Plan and the SPCC plan would remain in place and be revised as needed.

#### **2.3.7.5 Support Facilities**

The support facilities described in Section 2.2.7.5 would continue to be used under the Proposed Action and require no change from the existing condition.

Midway through the proposed mine-life extension, the Sorter Area would be moved to a new location, as described in Section 2.3.5 and shown as the Proposed Processing Facility in Figure 2-7.

#### **2.3.7.6 Energy Supply and Source**

No changes in energy sources or supplies would be required under the Proposed Action. Luzenac does not anticipate an increase in consumption of electrical power nor does Luzenac propose to increase the number of onsite generators to provide backup power for any part of its operations. Power line corridors would not need to be relocated as a result of relocating the Sorter Area to a new site, as the power line runs through the proposed site.

#### **2.3.7.7 Solid Waste Disposal**

No changes to the solid waste disposal handling would be required. The volume of waste generated by the Yellowstone Mine is not expected to increase appreciably on an annual basis as a result of the Proposed Action.

#### **2.3.7.8 Dust and Emissions Control**

Particulate and gaseous emissions would not change appreciably as a result of the Proposed Action. Mining and ore processing methods and rates would not change. Vehicle emissions would not change as a result of the Proposed Action, as the size of the fleet and types of vehicles to be used would be similar to those currently in use.

Air quality emission controls and dust abatement would be addressed during construction and operation of all modified facilities anticipated by the Proposed Action, especially the expanded overburden disposal areas. Air quality pre-construction permits would be obtained as needed. Required dust control would be addressed through engineering or management controls based on observed air quality conditions and monitoring results. Luzenac would continue to conduct air quality monitoring in accordance with the existing air quality permit and would implement corrective action as necessary to maintain compliance.



#### **2.3.7.9 Water Supply System**

The Proposed Action would require no changes to the existing water supply systems. These systems have functioned well in the past to meet the water needs of the Yellowstone Mine. Luzenac is confident the proposed amendment would not increase demand for water beyond the ability of the existing systems to provide it.

#### **2.3.7.10 Snow Removal**

The Proposed Action would require no changes to the existing snow removal practices. These procedures have been used successfully in the past on existing mine roads and operating areas. Luzenac would continue these snow removal practices as necessary on all facilities constructed as part of the Proposed Action.

#### **2.3.7.11 Public Safety and Mine Security**

The Proposed Action would require no changes to the existing public safety and mine security practices. Public safety and mine security practices following mine closure and reclamation described in the Proposed Action are currently employed at other access points on Luzenac's property. The haul road would be modified to avoid haul traffic on the access road, as described in Section 2.3.6.

Under the conditions of the Proposed Action, soil stockpiles and the East OB Pile Extension would lie adjacent to this road. Luzenac would promote public safety along this segment of the existing Johnny Gulch road and would agree not to cross this road for soil salvage operations or ore hauling. Luzenac would use permanent cautionary signs advising of possible mine traffic along this segment of road and supplement this with temporary signs, detours, and flagmen as necessary during potentially hazardous mine activities on or near the Johnny Gulch Road. On its own mine roads, Luzenac would provide signs governing speed, right of way, direction of movement, and use of headlights and would inform operators and drivers of these requirements.

#### **2.3.7.12 Public Nuisance**

The Proposed Action would follow current operational and reclamation procedures approved by DEQ to alleviate public nuisance issues. The Proposed Action would require no changes to the existing practices.

#### **2.3.7.13 Noise**

The Yellowstone Mine is located in a remote area. Mine-generated noise resulting from equipment operation, blasting, ore handling, and processing under the Proposed Action would not be expected to increase over existing levels.

## 2.3.8 RESOURCE MONITORING

### 2.3.8.1 Air Quality

No changes to the air quality monitoring program would be required as a result of the Proposed Action. Luzenac would continue air quality monitoring at the Yellowstone Mine site as specified under the existing air quality permit. DEQ would inspect for fugitive dust. Luzenac would continue to use the existing dust management practices.

### 2.3.8.2 Water Quality

Routine monitoring of surface water and groundwater in the Yellowstone Mine area would continue under the Proposed Action as required by Operating Permit 00005 and the MPDES Permit (Appendix B).

#### 2.3.8.2.1 Surface Water

Only one minor change in the surface water quality monitoring program would be required as a result of the Proposed Action. The actual sampling location at the downstream end of the rock drain beneath the East OB Pile in Johnny Gulch would necessarily move downstream as the toe of the waste rock facility extends downstream during construction. Table 2-2 describes the proposed operational monitoring schedule for surface water. The chemical and physical parameters to be measured for water resource monitoring are listed in Table 2-4. The schedule and scope of monitoring would not change under the Proposed Action and is described in Section 2.2.8.2. 1

#### 2.3.8.2.2 Groundwater

No changes to the groundwater quality monitoring program would be required as a result of the Proposed Action except one new well JG-3 would be installed in Lower Johnny Gulch. Groundwater quality monitoring would continue at the Yellowstone Mine in accordance with the current Operating Permit described in Section 2.2.8.2. 2. New mMonitoring wells JG-1, and JG-2, and JG-3 would continue to be monitored if the Proposed Action is approved.

### 2.3.8.3 Reclamation

Luzenac and DEQ would continue reclamation monitoring, as described in Section 2.2.8.3.

### 2.3.8.4 Operational Rock Monitoring

Luzenac would continue to implement the operational rock monitoring sampling program described in Section 2.2.8.4.

#### **2.3.8.5 Cultural Resources**

No changes to the cultural resource monitoring program would be required as a result of the Proposed Action.

#### **2.3.8.6 Paleontological Resources**

No changes to the paleontological resource monitoring program would be required as a result of the Proposed Action.

### **2.3.9 HUMAN HEALTH AND SAFETY**

Human health and safety at the Yellowstone Mine would continue to be regulated under MSHA.

### **2.3.10 SOCIOECONOMICS**

#### **2.3.10.1 Duration of Mining**

Under the operating plans and projections of the Proposed Action, Luzenac anticipates the Mine Life Extension if approved would extend mine life by 50 years at current production rates.

#### **2.3.10.2 Employment**

Employment at the Yellowstone Mine would remain at approximately 44 people on a year-around basis for up to another 50 years.

#### **2.3.10.3 Taxes**

Taxes paid to the state and Madison County would remain as described in Section 2.2-~~11~~10.3 for another 50 years.

### **2.3.11 RECLAMATION**

#### **2.3.11.1 Introduction**

The Proposed Action reclamation plan would reclaim all existing and proposed disturbances (999.8 acres in Tables 2-8 and 2-9). Figure 2-15 shows the various final landscapes proposed for disturbed areas within the permit boundaries.

Reclamation activities would include reclamation of mine pits, including rock faces, talus slopes, and revegetation of the pit bottom, pit roads, and accessible benches; water well and drill hole abandonment (e.g. water wells, piezometers, etc.); regrading and revegetation of previously backfilled pits; regrading and revegetation of the overburden disposal areas; removal of structures after cessation of operations; regrading of disturbed areas (including roads); drainage control; removal and regrading of stockpile areas; replacement of salvaged soil; revegetation; and reclamation monitoring. The reclamation schedule would encompass the period from cessation of mining through successful revegetation. Reclamation would be concurrent with operations where possible, particularly in the overburden disposal areas. The proposed reclamation topography for the Yellowstone Mine is shown in Figure 2-15. Cross sections through selected portions of the mine pits and reclaimed areas are presented in Figures 2-8, 2-9, 2-10, 2-11, 2-12, 2-13, and 2-14.

#### **2.3.11.2 General Grading of Disturbed Areas**

Compacted surfaces would be scarified or ripped before soil placement. No changes to the general grading of disturbed areas would be required as a result of the Proposed Action.



### 2.3.11.3 Soil Salvage

Prior to creating any new mining disturbance under the Proposed Action, Luzenac would strip vegetation and stockpile vegetation and soil and suitable colluvium and volcanic parent material for future use in reclamation. Soil from all areas with slopes of less than 2:1 would be salvaged. The upper foot of soil would be stockpiled separately from subsoil. Soil would be salvaged and transported to stockpiles (Figure 2-7) using scrapers, wheel and track dozers, haul trucks, and loaders. Soil stockpiles would be seeded to provide vegetation that would protect soil stockpiles from wind and water erosion. This material would be used to provide a minimum of 6 inches of soil and subsoil over mine-related disturbances.

Soil balance calculations for the entire mine site including both existing and proposed disturbances are presented in Table 2-11. These calculations indicate that there would be more than adequate soil volume from existing and proposed soil salvage to place a minimum 6-inch-thick soil cap on all disturbed sites. Based on these calculations there would be an excess of 152,329 cubic yards or about 22 percent more soil available than is needed. This may permit a thicker soil cover to be placed over some disturbed areas during final reclamation.

### 2.3.11.4 Pit Reclamation

Portions of the previously backfilled South Main Pit would be redisturbed by South 40 Pit expansion. Pits previously backfilled (North 40 and Cadillac pits, Figure 2-4) would be regraded, soiled, and revegetated along with the overburden disposal areas that expand over them. Reclamation of the North Main and South 40 pits would achieve long-term stability. Portions of the pits in solid rock would be reclaimed as rock faces and talus slopes (Figure 2-15). Where it is safe and access is feasible, catch benches would be soiled and revegetated. The pit bottom, select benches, and haul road slopes in the pit that are 2.5H:1V or shallower would be ripped, if necessary, and soiled and seeded, where accessible. The ultimate pit bottom of the North Main Pit would be 5,850 feet amsl (Figure 2-10). The ultimate pit bottom of the South 40 Pit would be approximately 5,510 feet amsl (Figure 2-9). The bottoms of these pits would be approximately 250 and 50 feet above groundwater, respectively. Pit floor surfaces would be ripped, recontoured, and capped with soil a minimum of 6 inches thick. The areas would be seeded (Table 2-7). The final configuration of the South 40 Pit is shown in plan view (Figure 2-8) and in cross section in Figure 2-9. Figure 2-15 is a plan view of final reclamation topography.

Monitoring wells in the pit, no longer needed, would also be abandoned and reclaimed according to state regulations (Figure 2-6). In addition, some roads would be left at closure for future access (Figure 2-15).



**TABLE 2-11**  
**Soil Balance Calculations For Existing and Proposed Reclamation**  
***Amendment to Operating Permit 00005 – EA***

Area to Strip	Acres	Cubic Yards	Comment
Existing Stockpiles		301,000	21 existing piles
West Pit Expansion	9.8	15,811	Stripping 1 foot from this area
East Pit Extension	1.4	2,259	Stripping 1 foot from this area
North OB Extension	10.1	16,295	Stripping 1 foot from this area
East OB Extension	191.2	308,469	Stripping 1 foot from this area
Johnny Gulch Extension	26.0	41,947	Stripping 1 foot from this area
TOTAL	238.5	685,780	
Area to Cover	Acres	Cubic Yards	Comment
North 40 Pit	15.1	12,181	Placing 6" soil cover over this area
North OB Pile	122.8	99,059	Placing 6" soil cover over this area
North OB Extension	10.1	8,147	Placing 6" soil cover over this area
Northeast OB Pile*	15.3	12,342	Placing 6" soil cover over this area
East OB Pile	123.0	99,220	Placing 6" soil cover over this area
East OB Extension	191.2	154,235	Placing 6" soil cover over this area
South OB Pile	157.6	127,131	Placing 6" soil cover over this area
Johnny Gulch OB Pile Extension**	5.7	4,598	Placing 6" soil cover over this area
Pit Acres	20.5	16,538	Placing 6" soil cover over this area
TOTAL	661.3	533,451	
Excess cubic yards		152,329	22 percent

\*40 acres of north portion of East OB Pile have been reclaimed.

\*\*135 acres of Johnny Gulch OB Pile have been reclaimed.

#### 2.3.11.5 Overburden Pile Reclamation

Figure 2-7 identifies the existing overburden disposal areas along with proposed extension footprints. During operations, the slopes of the overburden piles would be constructed to approximately 1.5H:1V or angle of repose ( $34^{\circ}$ ). Luzenac would reduce the slopes after mining to slopes ranging from 2.5H:1V ( $22^{\circ}$ ) to approximately 4.0H:1V ( $14^{\circ}$ ), depending on the area and requirements to blend in with surrounding topography. Figures 2-12 to 2-15 depict the final reclamation topography of overburden disposal areas in plan and cross-section views.

Benches would be constructed on the reclaimed overburden slope faces as necessary to reduce uninterrupted slope lengths to less than 200 feet. The benches would be approximately 12 feet wide and would slope inward to minimize erosion. Benches and runoff/diversion channels would be graded at a maximum of 2 percent to minimize erosion. Armoring would include jute netting and vegetation. The channel sizes would be based upon the area of the contributing watershed and designed to contain a 50-year, 24-hour storm event. Major diversion structures are shown on the site-wide drainage plan Figure 2-6. Dozer gouges and dozer tracking of the slopes would typically be used to break up the surface and minimize erosion, especially on slopes that approach 2.5H:1V. All recontoured surfaces would be capped with soil, a minimum of 6 inches thick, seeded, and if necessary, fertilized to promote plant growth.

The upper flat surface of the overburden disposal areas would be contoured to prevent ponding, maximize surface runoff, and divert runoff from overburden slopes. Drainage would be directed off the top surface into lateral channels adjacent to the overburden disposal areas and would be designed to carry maximum 50-year, 24-hour flows to storm water settling ponds. Because there are no reactive materials in the overburden, Luzenac is proposing to place soil at a minimum depth of 6 inches over the overburden disposal sites. This cap thickness would allow proposed seed mixes a minimal rooting zone and would provide evapotranspiration, resulting in reduced seepage rates through the overburden piles. Reclamation to date on overburden piles has shown this soil depth provides adequate revegetation.

#### **2.3.11.6 Ore Processing and Surface Support Facilities Reclamation**

No changes would be required to the reclamation plan for ore processing areas and surface support facilities as a result of the Proposed Action. Once the Ore Sorter is moved midway through the mine life, the old site outside of pit encroachment would be reclaimed. The new site would be reclaimed with other facilities at mine closure.

#### **2.3.11.7 Access and Haul Roads**

No changes would be required to the reclamation plan for access and haul roads as a result of the Proposed Action. Luzenac has committed to meeting with DEQ at closure to make a final decision as to which roads would be left open for future work and

reclamation monitoring access. Figure 2-11 shows final reclamation topography and 12.2 acres of conceptual access roads that are likely to remain open.

#### 2.3.11.8 Power and Utility Corridors

No changes would be required to the reclamation plan for power and utility corridors as a result of the Proposed Action.

#### 2.3.11.9 Surface Water and Storm Water Drainage and Maintenance

Changes are proposed to the plan for surface water and storm water drainage and maintenance as a result of the Proposed Action. During reclamation, the MPDES permit and its conditions would remain in effect. The Permit requirements in the SWPPP would continue to implement surface water and storm water controls. Similarly, conditions limiting surface water from leaving the Yellowstone Mine site, except as a result of precipitation or snow melt events in excess of the 1.9 inch design storm, would be continued (Appendix E). The new Pplans are ~~just~~ amendments of the 1997 CDM plan approved in 2002 and changes approved in the MPDES permit since the Draft EA was published in 2004 (Maxim 2006).

#### 2.3.11.10 Revegetation

##### 2.3.11.10.1 Soil Placement, Seeding, Fertilizing, and Fencing

No changes in the plans for soil placement, seeding, fertilizing, or fencing would result from the Proposed Action.

##### 2.3.11.10.2 Organic Matter Amendment

Luzenac would place soil with a minimum of 1 percent organic matter content on disturbed areas. Soils analyzed to date on the project site contain 1 to 6 percent organic matter (average 2.5 percent). If the organic matter content remains this high in soils stripped off of the expansion sites, it may preclude the need for use of organic matter amendment. Luzenac would provide recommendations for weed-free organic matter additions, if any were required, to DEQ prior to actual soil placement.

##### 2.3.11.10.3 Reclamation Monitoring

No changes would be required to the plans for reclamation monitoring as a result of the Proposed Action. Luzenac would continue to establish and monitor vegetation test plots to evaluate the success or failure of reclamation on varying aspects of exposure on disturbance areas.

#### 2.3.11.10.4 Concurrent Reclamation

Concurrent reclamation would continue at the Yellowstone Mine throughout the active mine life. Luzenac would commit to starting concurrent reclamation activities as soon as possible after completion of a large enough portion or abandonment of an affected facility.

Cuts and fills associated with new road construction would be seeded to stabilize soil. Cut and fill slopes associated with the Sorter Area would be removed during the pit layback. Other areas no longer needed for the active mining operation would be reclaimed as soon as possible as part of on-going operations.

Reclaimed overburden disposal sites would be stabilized with vegetation and any excessive rilling or erosion would be corrected to reduce impacts to air and water quality. As the active face moves from year to year, the areas that formed the previous year's upper working surface would become available for reclamation. Placement of soil and subsequent introduction of vegetation on the overburden surfaces would reduce infiltration and increase evapotranspiration from the surface of the site, thereby reducing seepage. Seepage reduction through the disposal area would minimize the risk to water quality of the receiving surface water or groundwater resource. In addition, revegetation would reduce blowing dust on the overburden sites.

### 2.3.12 AGENCY MODIFICATIONS TO THE PROPOSED ACTION ALTERNATIVE

#### 2.3.12.1 Introduction

The Agency Modifications to the Proposed Action Alternative considered in this EA ~~is~~ are based on issues identified by DEQ. Agency Modifications are developed in response to substantive issues and concerns identified during scoping and review of the permit application and are intended to eliminate or minimize potential impacts associated with the Proposed Action.

This section lists and describes recommended Agency Modifications to the Proposed Action. Under this alternative, DEQ would approve Luzenac's proposal as modified by the proposed Agency Modifications.

#### 2.3.12.2 Pit Reclamation

The proposed reclamation of the pit is shown in Figure 2-15. Luzenac would soil and revegetate all safely accessible slopes in the pits that are less than 2H:1V to reduce visual impacts. Overall slope angles of the South 40 Pit highwall in stable dolomitic marble would be left as 340-degree rock faces, as proposed by Luzenac. Luzenac would be required to reduce pit slopes in volcanics by cast blasting or backfilling to 2H:1V. The reduced slopes would be graded, soiled, and revegetated to increase the

number of revegetated acres and reduce any potential for continued instability. This would produce a stable pit and eliminate any major failure that could be a threat to public safety and the environment after mining.

### 2.3.12.3 Water Quality

#### 2.3.12.3.1 Overburden Pile Drainage Systems

All drainage systems would be modified to function more naturally using fluvial geomorphic principles. The channels would be constructed around, and as lined and armored (if needed) channels over, the surface of the existing and proposed expansion of the overburden piles. The drainage systems would provide for controlled surface water flow during storm events or when the ground is frozen and provide habitat similar to that associated with natural ephemeral drainages. The drainage systems would be accessible to maintenance and repair of damage from storm water impacts. The drainage systems would be constructed in addition to the continued use of the existing underdrain and the proposed underdrain extension beneath the overburden piles. The runoff from lined surface water channels would minimize seepage through the overburden piles and enhance plant and wildlife habitat on the reclaimed overburden piles. The MPDES permit and compliance conditions would be continued until the reclamation bond was released and all point sources of mining impacted water were eliminated and ambient water quality was attained.

Luzenac would be required to regrade all OB pile slopes in a dendritic pattern without benches to reduce the engineered appearance and produce a more natural looking drainage system and slopes as viewed from U.S. Highway 287. The crest elevation of the overburden piles would be varied at closure to create a more natural looking topography. Present closure grading of the overburden piles calls for a flat top. This surface should be regraded to provide irregular topography and break up the linear character of the surface.

#### 2.3.12.3.2 Sediment Pond at Toe of East OB Pile

~~As~~ Sediment pond ~~8A would be installed~~ below the ultimate toe of the East OB Pile ~~to produce would be used as~~ a contingency for collecting underdrain seepage if nitrate (measured as nitrate + nitrite) exceeds 7.5 mg/l, or if a discharge occurs from Outfall 002 at a concentration greater than the surface water trigger value of 5.0 mg/l. The pond could be used to collect sediment and seepage emanating from the toe of the East OB Pile. Sediment could be excavated and disposed of onsite, and seepage could be collected for sampling and storage prior to discharge, infiltration, or treatment in a LAD system if necessary at some point in the future. Pond 7A has been constructed and would also be used as a land application disposal (LAD) feed pond if nitrates exceed 7.5 mg/l, or may be required if a discharge occurs from Outfall 002 at a concentration

greater than the surface water trigger value of 5.0 mg/l. LAD operations would be subject to review under the MPDES program. If LAD application rates result in runoff, an additional outfall would likely be required in the MPDES permit including an appropriate compliance monitoring program.

#### 2.3.12.3.3 Reclamation of Lowland Catchment Basins

Lowland catchment basins that collect seasonal runoff water from drainages D-1 and D-2 near the North OB Pile would be left at closure (Figure 2-6). Nitrate in water routed into these basins would be attenuated by vegetation growing in the pond area. The catchment basins should be constructed to provide seasonal water supply and habitat for upland wildlife.

#### 2.3.12.3.4 LAD Pond for Underdrain Seepage and LAD Trigger Value

Luzenac would be required to initiate LAD of underdrain seepage if nitrate exceeds 7.5 mg/l, or if a discharge occurs from Outfall 002 that exceeds the surface water trigger value of 5.0 mg/l. Luzenac would also build a lined storage pond on an OB pile to store underdrain seepage during the winter until it can be land applied. This would ensure that the groundwater quality standard would not be exceeded.

#### 2.3.12.4 Visuals

The two stipulations discussed below in Sections 2.5.1.1 and 2.5.1.2 address visual mitigations to the Proposed Action.

### 2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

Two alternatives were considered during the amendment review process. These alternatives included complete pit backfilling and alternative overburden disposal site locations. Luzenac reviewed and discussed these alternatives in the Amendment application (Luzenac, 2002). These alternatives are discussed below as alternatives considered for this EA but eliminated from further study.

#### 2.4.1 PIT BACKFILLING

DEQ evaluated pit backfilling alternatives to comply with MMRA requirements for reclamation of open pits.

Subsection 82-4-336(9) of MMRA provides that:

“(c) The use of backfilling as a reclamation measure is neither required nor prohibited in all cases. A department decision to require any backfill measure



must be based on whether and to what extent the backfilling is appropriate under the site-specific circumstances and conditions in order to achieve the standards described in subsection (9)(b).”

Subsection 82-4-336(9)(b) provides that the highwall and pit must be reclaimed to a condition:

- (i) of stability structurally competent to withstand geologic and climatic conditions without significant failure that would be a threat to public safety and the environment;
- (ii) that affords some utility to humans or the environment;
- (iii) that mitigates post-reclamation visual contrasts between reclamation lands and adjacent lands; and,
- (iv) that mitigates or prevents undesirable offsite environmental impacts.

#### 2.4.1.1 Pit Stability

Luzenac has backfilled pits with overburden during past operations. These pits include the North 40, Cadillac, South Main, and part of the Montana Talc pits (Figure 2-4). In total, some 25 acres of open pit have been backfilled (Table 2-9). Backfilling of the open pits reduces the volume in the overburden disposal piles and would increase the amount of wildlife habitat.

Luzenac proposes to expand the pits from 169.4 acres to 180.6 acres. Luzenac does not propose to backfill the expanded South 40 and North Main pits because of potential mineable resources.

Luzenac reviewed South 40 Pit stability and completed a study to address unstable conditions on the east pit highwall near the Ore Sorter (Call and Nicholas, 1999). Call and Nicholas made three recommendations to enhance pit highwall stability in this area. Luzenac has committed to implementing these recommendations in the development of the expanded South 40 Pit for all areas of the pit. The Ore Sorter would be relocated to avoid any potential highwall failure during operations.

The proposed reclamation of the pit is shown in Figure 2-15. Overall slope angles of the South 40 Pit highwall in stable dolomitic marble would be left as ~~340~~-degree rock faces, as recommended. DEQ would stipulate that pit slopes in volcanics would be cast blasted to reduce slopes to 2H:1V. The volcanic slopes would be soiled and revegetated to increase the number of revegetated acres and reduce any potential for continued instability. This would promote stability and protection against a major failure that would be a threat to public safety and the environment.

#### 2.4.1.2 Pit Utility

Luzenac has proposed to reclaim the mine pits. Out of 180.6 acres, 20.5 acres would be soiled and revegetated. In the South 40 Pit, Luzenac proposes to reclaim 152.9 acres to rock faces and 12.9 acres to talus slopes (Figure 2-15).

Luzenac would be required to soil and revegetate any safely accessible slopes less than 2H:1V rather than the proposed 2.5H:1V. Luzenac would also be required to reduce volcanic slopes in the pit to 2H:1V. This would increase the number of revegetated acres in the pit.

DEQ believes these measures would increase the revegetated acres by at least 10 percent. This would afford some utility to humans and the environment after mining.

#### 2.4.1.3 Pit Visual Contrast

The two stipulations described in Section 2.~~54~~.1.1 and 2.~~54~~.1.2 would mitigate the visual contrast of reclaimed pits with adjacent lands

#### 2.4.1.4 Potential Offsite Environmental Impacts

Pit stability was addressed in Section 2.~~54~~.1.1. No offsite impacts are anticipated from the reclaimed pit.

#### 2.4.1.5 Other Considerations

Backfilling the expanded South 40 Pit would limit future talc resource accessibility, may affect groundwater quality, and could have potential economic impacts on future mining. Concurrent backfill of the South 40 Pit would reduce the proposed mine life substantially. Backfilling at closure would increase the cost of future mining by increasing the overburden to ore strip ratio. It would take 136 million cubic yards to backfill the South 40 and North Main pits.

Talc ore reserves lie along mineralized structures to the northeast of the existing pit area; and the ore is expected to occur over elevation ranges similar to those mined in the past as well as deeper. Just as enlarging the pits for this proposed mine expansion requires laying back the sides of the pit in order to go deeper, the same would apply to developing future ore reserves. The overburden material used for backfill would need to be removed before mining could begin again. Only about 62.5 percent of the volume of rock would fit back in the pit.

The main risk to water quality at the Yellowstone Mine site is from nitrate leaching from mined overburden material into groundwater. Nitrates are derived from explosive residue left on mined overburden and pit highwalls. Elevated nitrate is already observed in groundwater beneath the pit at levels of about 3 to 4 mg/l, which is below

the standard of 10 mg/l. Backfilling the pits would place nitrate-bearing rock back into the pit where nitrate could be leached by water infiltrating the backfill material and transported to the underlying groundwater system, where it could migrate as a contaminated plume down gradient of the pit. Nitrates would flush out of the backfill over a period of years, and nitrate concentrations could exceed groundwater standards. Once nitrate has migrated to the groundwater system, it would be difficult to remove without an extensive pumping and treatment system. Keeping the overburden in piles enhances seepage collection in the underdrain system.

The advantage to land use that would result from backfilling the pits would be that 180.6 acres currently occupied by the pits would be returned to use as wildlife habitat, rather than 20.5 acres. Because Luzenac privately owns this land, Luzenac only allows domestic livestock grazing to occur at its own discretion. Wildlife could also use this reclaimed rangeland after mine closure, but rangeland for wildlife use is common in the Yellowstone Mine area. A 7,076-acre wildlife management area occurs adjacent to the mine property (Figure 2-2).

#### 2.4.2 ALTERNATIVE OB PILE LOCATIONS

Luzenac evaluated several potential overburden disposal site alternatives that might be used at the Yellowstone Mine site (Luzenac, 2002: Appendix A). One alternative was backfilling the pits as described above, which was dismissed.

The future mining of 17 million tons of talc ore would generate approximately 127 million tons of dolomite overburden that would need to be placed in overburden disposal areas. Three alternatives were reviewed. Each of the three alternatives has three overburden disposal areas in common. These include the East OB Pile Extension, North OB Pile Extension, and the Johnny Gulch OB Pile Extension (Table 2-13; Luzenac, 2002: Appendix A). The alternatives vary in the siting of various satellite overburden disposal areas. These satellite areas include the North Lift Extension #2, MTC South Extension, and the MTC South Lift (Luzenac, 2002: Appendix A figures).

The criteria used to compare overburden disposal area alternatives are presented below. The alternatives are numbered from most favorable to least favorable (Alternative #1 to Alternative #3) based on the analysis presented. The three overburden disposal areas common to all of the alternatives were not analyzed separately in this comparison because their combined storage capacity is required to meet the minimum overburden disposal needs. The analysis required that each alternative reviewed had to meet the minimum storage requirement (127 million tons), and the overburden storage site had to lie on ground owned or controlled by Luzenac.

- **Area of New Disturbance:** This criterion considers the amount of newly disturbed ground required by the alternative, and does not include reclaimed surfaces with unreleased bond or existing public roads. It does not consider existing

disturbances. A difference of 4 acres between Alternative #1 and #2 makes these two very similar (Table 2-13).

- **Storage Efficiency:** This is a calculated value that compares the alternatives by the number of cubic yards of overburden that can be stored for each new acre of ground disturbance. Alternative #1 would have the highest storage efficiency.
- **Haul Economics:** The horizontal and vertical distances from the pit exit to each dump centroid, plus the tonnage capacity in each dump, were used to compute a weighted average of slope distance and grade for each alternative. The product of grade and slope distance was used to indicate the relative economics of each alternative. Alternative #2 would have the best economics, followed by Alternative #1.
- **Air Quality Impacts:** The haul distance for each alternative was used to rank potential impacts to air quality because road length is proportional to the amount of dust created by haul trucks. This alternative analysis assumes that dust prevention mitigations are applied equally to each roadway. Alternative #3 would have the lowest impact followed by Alternative #1.
- **Energy Impacts:** This criterion evaluates the relative efficiency of hauling wastes to the various alternative sites in terms of energy consumption. Alternative #2 would have the lowest energy consumption, followed by Alternative #1.
- **Reclamation Surface Area:** The total surface area of the various overburden storage areas was computed for each alternative. All three alternatives would be similar in area, with Alternative #2 the lowest followed by Alternative #1.
- **Visual Impacts:** Since all three alternatives include the large East OB Pile in Johnny Gulch, which has the most important visual impact, there would be no major difference in visual impact between the alternatives evaluated.
- **Water Quality Impacts:** Surface runoff, runoff, and infiltration are known to increase or decrease as a function of overall surface area. Therefore, for this criterion, overburden disposal surface area is used as a measure of potential relative impacts to water quality. Little if any impact to water quality is likely, however, except from nitrate.
- **Access to Future Talc Resources:** This criterion evaluates the potential for overburden placement to limit access to future mineral resources. Alternative #1 would have the lowest impact. The other two alternatives both include the North Lift Extension #2, which would place overburden over the area of projected strike extension of structures known to control talc mineralization.

- **Wildlife Impacts:** This criterion evaluates the impacts of overburden placement to areas known to have the most wildlife use. Alternative #1 would have the lowest relative impact. The other two alternatives would have overburden piles located in areas with more wildlife use. These locations include the North Lift Extension #2 (Alternatives #2 and #3), and the MTC South Extension and MTC South Lift to the Johnny Gulch OB Pile (Alternative #3).

Table 2-13 evaluates the criteria by alternative. Based on this analysis, Luzenac chose Alternative #1 for the location of overburden storage areas for the amendment to its Operating Permit 00005.

Table 2-13  
Overburden Storage Alternatives Comparison  
*Amendment to Operating Permit 00005 – EA*

	Common Locations <sup>1</sup>	Satellite Locations only			
Criteria	East OB Pile Extension, North OB Pile Extension, Johnny Gulch OB Pile Extension	Alternative #1	Alternative #2	Alternative #3	Comments
Area of New Disturbance (acres)	225	65	61	94	New disturbance acreage only.
Volume (lcy)	76,438,264	11,624,287	10,346,208	13,397,566	Loose cubic yards of overburden storage
Storage Efficiency (cy/acre)	339,726	178,835	169,610	142,527	Per total footprint
Storage (tons)	119,657,588	7,427,659	6,610,995	8,560,745	Each alternative meets minimum storage required
Haul Economics					
Avg weighted grade (%)		3.5%	3.3%	3.6%	
Avg weighted haul dist (ft)		4004	4017	3947	
Product of grade and distance		140	131	144	
Air Quality Impacts		Moderate	Highest	Lowest	Based on haul distance
Energy Impacts		Moderate	Lowest	Highest	Based on grade and haul distance



Table 2-13 (continued)  
Overburden Storage Alternatives Comparison  
*Amendment to Operating Permit 00005 – EA*

	Common Locations <sup>1</sup>	Satellite Locations only			
Criteria	East OB Pile Extension, North OB Pile Extension, Johnny Gulch OB Pile Extension	Alternative #1	Alternative #2	Alternative #3	Comments
Reclamation Surface Area (acres)		432	420	439	Includes common dump locations
Visual Impacts		Moderate	Lowest	Highest	Based on reclamation surface areas
Water Quality Impacts		Moderate	Lowest	Highest	Based on reclamation surface areas
Access to Future Talc Resources		Lowest	Moderate	Moderate	North Lift Extension #2 covers projection of ore
Wildlife Impacts		Lowest	Moderate	Highest	North Lift Extension #2, MTC South Extension, and MTC South Lift would have negative impacts to wildlife

<sup>1</sup>Since the East OB Pile Extension, North OB Pile Extension, and Johnny Gulch OB Pile Extension are common in all three alternatives, the comparison includes the satellite locations only. See Figure 2-7 for the common OB pile locations. See Luzenac, 2002, Appendix A for satellite OB pile locations.

## **CHAPTER 3**

### **AFFECTED ENVIRONMENT**

#### **3.1 INTRODUCTION**

Chapter 3 describes resources that could be affected by the Proposed Action. Other resources that either would not be affected by the Proposed Action or are not present in the Yellowstone Mine area are dismissed in Section 1.5.2.

#### **3.2 POTENTIALLY AFFECTED RESOURCES**

The Proposed Action could affect socioeconomics, pit reclamation, water quality, and visuals.

##### **3.2.1 SOCIOECONOMIC RESOURCES**

Current employment and taxes paid by Luzenac are described in Section 2.2.10.

##### **3.2.2 PIT RECLAMATION**

The approved pit reclamation plan is described in Section 2.2.11 especially Section 2.2.11.4.

##### **3.2.3 WATER QUALITY**

The Yellowstone Mine is located in the Johnny Gulch drainage. Johnny Gulch is a west- to east-trending drainage basin on the east flank of the Gravelly Range. Johnny Gulch flows year round upstream of a point about one mile above the Yellowstone Mine site. Downstream of this location, where the stream channel flows over dolomite, the stream is ephemeral (flows only in response to major rain events and snowmelt). This flow condition is typical of many mountain streams where the source of stream flow occurs at the higher elevations from snowmelt and springs/seeps, with flow declining at lower elevations where the water infiltrates into a greater thickness of alluvium in the valley bottom or on a bedrock contact of dolomite or limestone.

Flow in Johnny Gulch was monitored in two flumes located upstream and downstream of the mine site as part of baseline studies in 1981 and part of 1982. At the upper flume, flow occurred during the entire period of record, ranging from 250 gpm in May-June to 50 gpm in August-September. At the lower flume, the highest flow recorded was 60 gpm in May, with no flow occurring from July through November. In 1999, two weirs were installed for water quality monitoring purposes, one upstream and another

downstream of the mine site. Neither weir sampling site reported any large amount of water quality or flow data because of a lack of flow.

Quality of surface water in the Yellowstone Mine area has been characterized by samples collected and analyzed from various locations along Johnny Gulch and from several ponds in the project area. The latter include two ponds located along Johnny Gulch above the mine site and five ponds located downstream of the mine site (Figure 2.3). The pond system in Lower Johnny Gulch has been revised since the Draft EA was published (See Figure 3 in Maxim 2006 in Appendix A, Attachment 1). Luzenac holds an MPDES permit for mine pit dewatering effluent at Outfall 001 prior to mixing with natural water in the Johnny Gulch pond and discharge from the last sedimentation pond in Johnny Gulch at Outfall 002 (Figure 2-6) prior to leaving the eastern property boundary in the Ruby Creek Ditch. All surface water from disturbed areas within the permit reports to Johnny Gulch. In addition, infiltration through the OB piles reports to Johnny Gulch upgradient of the rock drain outlet and sediment ponds.

Surface water in Johnny Gulch is a calcium-bicarbonate, non-saline type water with slightly basic pH and low concentrations of metals. Elevated nitrate levels have been detected in samples from lower Johnny Gulch, especially from the rock drain that transports water beneath the East OB Pile. Nitrate concentrations generally decrease from the rock drain site to the sedimentation pond located downstream of the rock drain. The rock drain outlet and the downgradient ponds provide a central site to which all surface and underdrain water reports. In the unlikely event that elevated nitrate concentrations exceeding the standards or suspended or settleable solids hindering downgradient beneficial uses occur in surface water, the facility would be directed to return to compliance via installation of additional treatment or water management facilities, and/or changes of water management practices in the MPDES permit and SWPPP. Historic surface water quality data from the facility are summarized in Table 3-1.

Water that collects in the North Main Pit from a seep from precipitation (Figure 2-6) has been periodically sampled and analyzed. Typical concentrations of selected parameters measured in water samples from the mine pit during the period 1992 to 2000 are presented in Table 3-1. A complete set of available surface water quality data was presented in Appendix J of the permit amendment document (Luzenac, 2002).

TABLE 3-1  
Surface Water Quality  
*Amendment to Operating Permit 00005 – EA*

Location	Date	TDS mg/l	pH s.u.	Nitrate+ Nitrite mg/l	Nitrate mg/l	Ammonia mg/l	Nitrite mg/l	TSS mg/l
Upper Johnny Gulch	1981	261	7.8	<0.05	--	--	--	9
	2000	87	7.8	1.43	--	<0.1	<0.05	10
Lower Johnny Gulch Rock Drain	1/97	--	--	5.65	--	--	--	--
	3/98	--	--	5.16	--	--	--	--
	5/98	--	--	1.25	--	--	--	--
	6/99	--	--	1.46	--	--	--	--
	2000	306	8.0	10.1 rerun = 7.0	--	<0.1	<0.05	<10
	<u>4/2002</u>	--	8.2	6.91	--	--	--	28
North Main Pit Seep	1992	239	8.0	3.76	--	--	--	<10
North Main Pit Seep	2000	304	8.3	6.37	--	--	--	11
South 40 Pit Seep	6/98	--	8.1	4.74	--	--	--	--
	8/02	--	8.2	3.24	--	--	--	--

Surface water sampled at the lower Johnny Gulch rock drain within the permit area has nitrate concentrations that are higher than surface water sampled at the upper Johnny Gulch station. Nitrate concentrations have not exceeded drinking water standards with exception of the lower Johnny Gulch rock drain station yielding a concentration of 10.1 mg/l in the year 2000. A repeat of this sample provided an analytical result of 7.0 mg/l.

There is little near-surface groundwater in the vicinity of the Yellowstone Mine, and no important porous aquifer has been identified. The occurrence and distribution of near-surface groundwater in this area is controlled by the local geology. Alluvium derived from weathering of volcanic rock along Johnny Gulch and the small ephemeral tributary in T. 9 S., R. 1 W., Section 9, comprises the uppermost aquifer and is known to locally contain groundwater in small quantities. Surface water from Johnny Gulch seeps into the volcanic-rich alluvium and is locally perched upon underlying impermeable volcanic clay layers. Most deeper bedrock-hosted groundwater is contained in fracture and fault systems associated with altered Precambrian dolomitic marble.

**TABLE 3-2**  
Groundwater Monitoring Locations  
*Amendment to Operating Permit 00005 – EA*

Well Name	Location (T9S, R1W)	Completion Date	Well Depth (ft)	Screen Interval (ft)	Depth to Water (ft)	Water Elev. (ft)	Lithology
Maintenance Well (SW-1)	Sec. 34	4/82	277	217 – 277	161	5635	Bedrock
Maintenance Water Tank (SW-2)	Sec. 34	1980	190	Not Reported	135	5655	Bedrock
Water Barn	Sec. 9	8/93	460	350 – 450	207	6145	Bedrock
99-14 (S. 40 Pit PW-1)	Sec. 4	7/99	640	615 – 635	488	5490	Talc & Dolomite
2001-01 (North Main Pit)	Sec. 4	5/01	420	380 – 400	402	5468	Dolomite
2001-02 (Land Bridge)	Sec. 9	5/01	745	705 – 745	513	5691	Metamorphic
JG-1 (Johnny Gulch MW-1)	Sec. 3	9/00	120	77 – 97	Dry	<5734	Alluvium
JG-2 (Johnny Gulch MW-2)	Sec. 3	9/00	300	255 – 295	211	5646	Metamorphic

Note: See Figure 2-6 for well locations.

To the northeast of the mine site, dolomitic marble is in contact with alluvium in the Madison River Valley. The elevation of the water table in dolomitic marble near the mine pits is about 5,470 to 5,490 feet based on data from two monitoring wells (99-14 and 2001-01) located in the pits (Figure 2-6 and Table 3-2). The elevation of the Madison River near the mine site is about 5,445 feet. Assuming that the elevation of groundwater intersects the elevation of the Madison River, the difference in elevation between the river level and groundwater at the mine site is about 25 to 45 feet, resulting in a relatively flat water table gradient of approximately 0.2 percent (lateral distance of about 3.8 miles between river and mine pits). This suggests that a hydrologic connection may exist between groundwater in dolomitic marble at the mine site and water in the Madison River valley bottom.

Exploration drilling in both the North Main and South 40 pits has failed to intercept a definitive groundwater table. A monitoring well (Well 99-14) constructed in the South 40 Pit established a water elevation of 5,490 feet. In the North Main Pit, monitoring well 2001-01 has a static water elevation of 5,468 feet. That is approximately 20 feet lower than groundwater in Well 99-14. A review of water levels measured by the Montana Bureau of Mines and Geology over the past 10 years in three bedrock wells located in the Madison River Valley shows that water table fluctuations during the period were a maximum of about 10 feet (MBMG Groundwater Information Center website). Completion data for groundwater monitoring wells are presented in the permit amendment document (Luzenac, 2002).

During a pumping test of Well 99-14 (South 40 Pit Area) in December 2000, a water sample was collected and submitted for laboratory analysis of common ions, nutrients, and metals (Table 3-3). Results show water with a near-neutral pH (7.3 standard units), total dissolved solids (TDS) of 250 mg/l, hardness of 186 mg/l, sulfate at 60 mg/l, total suspended solids of 406 mg/l, and turbidity of 195 nephelometric turbidity units (NTU). With respect to nutrients, the nitrate + nitrite concentration was 2.94 mg/l and total nitrogen was 3.5 mg/l. The total nitrogen is elevated and appears to indicate ammonium nitrate, which is a blasting residue.

A water sample collected from Well 2001-01 in July 2001 indicates that groundwater beneath the North Main Pit is similar to water in the South 40 Pit area. This water is characterized by an alkaline pH (7.8 standard units), TDS of 228 mg/l, and comparatively higher hardness (512 mg/l) and lower sulfate (15 mg/l) concentrations than from Well 99-14. Concentrations of nitrate + nitrite (2.42 mg/l) and total nitrogen (3.0 mg/l) are similar to Well 99-14 (Table 3-3). The total nitrogen is elevated and appears to indicate ammonium nitrate.

Water quality data for metals have been collected from Wells 99-14, 2001-01, 2001-02, and JG-2 at the Yellowstone Mine site. Tabulated data for all metals from 2001 and 2002 are presented in Appendix J of the permit amendment document (Luzenac, 2002). Primary maximum contaminant levels (MCLs) were not exceeded, with one exception.



One sample from well JG-2 collected during 2001 had a zinc value of 4.14 mg/l, which exceeds the primary MCL and human health standards as specified in Montana's Numeric Water Quality Standards (DEQ, 2004<sup>46</sup>). All other zinc concentrations were in the range of 0.08 to 0.12 mg/l in samples collected from the wells. It is not known if the well JG-2 zinc concentration was an analytical error. Secondary MCLs were exceeded for iron and manganese in all samples (Luzenac, 2002: Appendix J). Secondary standards are based on aesthetic properties only and not on risk to human health.

Table 3-3  
Groundwater Quality Data from the Pit Area  
*Amendment to Operating Permit 00005 – EA*

	South 40 Pit Well 99-14	North Main Pit Well 2001- 01	South 40 Pit Groundwater Seep	South 40 Pit Groundwater Seep	South 40 Pit Groundwater
	December 2000*	July 2001**	March 1998	April 2000***	April 2002
pH (standard units)	7.3	7.8	7.9	8.0	8.3
TDS (mg/l)	250	228		262	
Hardness (mg/l)	186	512			
Sulfate (mg/l)	60	15			
TSS (mg/l)	406			<10	
Turbidity (NTU)	195				
Nitrate+nitrite (mg/l)	2.94	2.42	3.61	4.14	3.21
Ammonia (mg/l)				<0.1	
Nitrite (mg/l)				<0.05	
Nitrogen (mg/l)	3.5	3.0			
Aluminum (mg/l)	4.4	14.8	0.2		
Arsenic (mg/l)	<u>*&lt;detection limit</u>	0.011	0.004		
Barium (mg/l)	<u>*&lt;detection limit</u>	0.20	0.11		
Beryllium (mg/l)	<u>*&lt;detection limit</u>	0.001	<0.001		
Cadmium (mg/l)	<u>*&lt;detection limit</u>	0.0005	<0.0001		
Chromium (mg/l)	0.009	0.016	<0.001		
Copper (mg/l)	0.042	0.169	0.02		
Iron (mg/l)	28.2	23.9	0.12		
Lead (mg/l)	<u>*&lt;detection limit</u>	0.014	<0.003		
Manganese (mg/l)	0.97	3.32	0.02		

Table 3-3 (continued)  
Groundwater Quality Data from the Pit Area  
*Amendment to Operating Permit 00005 – EA*

	South 40 Pit Well 99-14	North Main Pit Well 2001- 01	South 40 Pit Groundwater Seep	South 40 Pit Groundwater Seep	South 40 Pit Groundwater Seep
	December 2000*	July 2001**	March 1998	April 2000***	April 2002
Molybdenum (mg/l)	<u>*&lt; detection limit</u>	0.007			
Nickel (mg/l)	<u>*&lt; detection limit</u>	0.03			
Zinc (mg/l)	0.08	0.12	0.02		

\*All other metals analyzed (antimony, arsenic, barium, beryllium, boron, cadmium, lead, lithium, mercury, molybdenum, nickel, selenium, silver, and thallium) were below laboratory detection limits

\*\* All other metals analyzed (antimony, boron, lithium, mercury, selenium, silver, and thallium) were below laboratory detection limits.

\*\*\* Other samples collected from the mine pit bottom show similar quality characteristics, including low or non-detectable concentrations of metals.

Shallow perched groundwater from precipitation has been intercepted by the South 40 Pit (old Montana Talc Pit seep) as a seep in the pit highwall at the contact of a clay zone that was formed from alteration of volcanics. Total steady-state flow rate from the seep is 1 to 2 gpm or less. This water typically collects in one or more small depressions in the pit bottom and either evaporates or infiltrates. Samples of this water have been collected and analyzed several times between 1992 and 2002. Analytical results of the most recent sample collected from the seep (April 2002) had a pH of 8.3 and a nitrate + nitrite concentration of 3.21 mg/l. A sample collected in April 2000 showed the following analytical results: TDS was 262 mg/l; pH was 8.0 standard units; nitrate + nitrite was 4.14 mg/l; ammonia was <0.1 mg/l; nitrite was <0.05 mg/l; and TSS was <10 mg/l (Table 3-3). Other samples collected from the North Main Pit bottom show similar water quality characteristics for pH and nitrate + nitrite (Table 3-1).

Groundwater quality data indicate that, with the exception of one zinc analysis for one event and iron and manganese secondary MCLs, no other groundwater quality standards are exceeded by groundwater in the vicinity of historic and active workings in the Yellowstone Mine. Nitrate + nitrite levels are elevated in groundwater beneath the South 40 and North Main Pits at levels between about 3 and 4.14 mg/l, again below the water quality standards.

An aquifer test was conducted at Well 99-14 in 2000, to estimate several hydraulic properties of the aquifer: (1) transmissivity or hydraulic conductivity; (2) rate of water level decline and recovery during pumping; and (3) final elevation of static water level after the test relative to the pretest static level. The well was initially pumped at a rate of 32 gpm; however, the water level declined about 100 feet in the first 6 minutes, and the pumping rate declined rapidly. Therefore, another test was conducted at a rate ranging from about 3 to 6 gpm for a total period of 40 minutes.

Using an average pumping rate of 4 gpm for the second pumping period of 40 minutes, a transmissivity range of about 3 to 7 feet/day was calculated, with a resultant hydraulic conductivity range of 0.1 to 0.3 feet/day. These values are representative of the talc because Well 99-14 is perforated primarily in the talc zone. Based on the rapid draw down rate during the first pumping period (i.e., average of about 17 feet/minute), it is evident that overall permeability is low. The water level in Well 99-14 recovered to its initial static position within a day, indicating that the pretest water level is representative of the local water table surface in the carbonate/talc ore zone.

The Yellowstone Mine has water rights for groundwater use (Luzenac, 2002: Appendix 2.2.2.1). The water is appropriated for sorting, dust control, potable water system, and fugitive dust emissions.

#### 3.2.4 VISUALS

The Yellowstone Mine is located on a terrace in the foothills of the Gravelly Range in a sparsely populated segment of the Madison River Valley. Line-of-sight distance between the mine and Highway 287 is approximately 3 miles at the closest point. Mine overburden storage sites, particularly the East OB Pile, can be distinguished from the surrounding grass-covered hillsides because the overburden storage areas are lighter colored. This color difference is less distinct in the late summer, fall, and winter, when the grasses are dormant.

When traveling south on U.S. Highway 287, the mine site is first visible approximately 1.5 miles north of the mine access road. The mine can be seen from there to a point approximately 2 miles south of the access road. To the north and south of that 3.5-mile segment of highway, the mine cannot be seen because other natural topographic features block it. The closest view of the Yellowstone Mine area that is most heavily traveled by the public is the view seen from U.S. Highway 287, approximately 3 miles to the east (see key observation point (KOP1) in Figure 1-1 and Figure 4-~~13~~, upper). There are no destination communities located along this section of the highway. There are rural residential subdivisions in the area. Visuals have not been a major issue. The mine is visible from the Johnny Gulch Road.

## CHAPTER 4

### CONSEQUENCES OF PROPOSED ACTION AND ALTERNATIVES

Consequences of the No Action Alternative, Proposed Action, and the Agency Modifications of the Proposed Action Alternative are identified, described, and analyzed in this chapter. Mitigation measures addressing the Proposed Action have been identified by DEQ in Section 2.4 for the potentially impacted resources described in this chapter.

The permit area would be expanded by 490 acres from 1,458 to 1,948 acres. The South 40 Pit would only increase by about 56 acres; however, much of that expansion would occur on previously disturbed ground (overburden piles) such that the disturbed area of the pit would expand by about 11 acres from 170 to 181 acres (Figure 2-7 and Table 2-9). Figure 2-7 shows the area and Figure 2-9 shows the cross section of the proposed pit expansion. Pit expansion would require the relocation of the ore processing facility about midway through the extended mine life. This facility would be relocated along the existing powerline on undisturbed ground within the existing permit area (Figure 2-7). This proposed ore processing area would cover approximately 25 acres.

The Proposed Action also includes expanding the existing East OB Pile down Johnny Gulch and adding lifts to the existing Johnny Gulch, North, and East OB piles. Areas of proposed extensions to overburden piles are shown by horizontal red hatching on Figure 2-7. OB piles would increase by a total of about 223 acres from 533 to 756 acres. Overall, over the next 50 years, the total amount of disturbed ground would increase by 271.3 acres, from 728.5 to 999.8 acres. All existing and proposed disturbance would be reclaimed under the reclamation plan discussed in Section 2.3.11. The reclamation bond currently covers 799.2 acres of disturbance.

#### 4.1 SOCIOECONOMICS

##### 4.1.1 NO ACTION ALTERNATIVE

Existing employment and taxes paid by Luzenac are described in Section 2.3.10. Negative impacts under the No Action Alternative would include increased unemployment, reduced wages spent in the local economy, decreased revenues to local and state jurisdictions, increased stress on public assistance programs, and decreased quality-of-life of some residents. None of these things would change for at least 8 years.

##### 4.1.2 PROPOSED ACTION ALTERNATIVE

Impacts to socioeconomic resources occur if a large number of workers and their families move into an area as a result of jobs either directly or indirectly created by mine development and operations.

Luzenac anticipates no increase in the mine-related work force or secondary jobs with suppliers of material or services to result from the Proposed Action. The Proposed Action would continue to provide employment in the mining industry and secondary jobs in retail and service sectors. Payment of property and net proceeds taxes to state and local jurisdictions would continue for up to another 50 years.

#### **4.1.3 AGENCY MODIFICATIONS TO THE PROPOSED ACTION ALTERNATIVE**

No modifications to the Proposed Action are required.

### **4.2 PIT RECLAMATION**

#### **4.2.1 NO ACTION ALTERNATIVE**

Luzenac has backfilled pits with overburden during past operations. These pits include the North 40, Cadillac, South Main, and part of the Montana Talc pits (Figure 2-4). In total, some 25 acres of open pit have been backfilled (Table 2-9). Backfilling of the open pits reduces the volume of the overburden piles and increases wildlife habitat.

The operational pit highwall design for the shallow, near-surface volcanic units in the South 40 Pit accommodates the lower strength of certain ash and clay layers that are part of the volcanic sequence. The pit highwall stability study described in Section 2.5.1.1 concluded that based on the available data, the risk of a large-scale pit slope failure appeared to be low (Call and Nicholas, 1999).

A conventional slope stability analysis was also conducted for the upper slope pit highwalls comprised of the volcanic units (Call and Nicholas, 1999). Call and Nicholas recommended taking steps to reduce the potential for a progressive series of minor failures that could develop near the crest of the pit. Each of these three recommendations by Call and Nicholas has been and would continue to be employed in pit highwall development in the east highwall area of the South 40 Pit.

The risk of an overall slope failure developing from the bottom of the pit through the talc and dolomite, and undercutting the volcanics at the top of the slope, is low. The scope of the Call and Nicholas study focused on the stability of the ground in the vicinity of the Ore Sorter and the adjacent pit slopes along the east highwall. Call and Nicholas recommend maximum 30-degree slope angles for highwalls composed of talc on the east side of the pit. In spite of the limited area proposed for application of this design criterion, their recommendations have been applied consistently for all areas and for all



pit slopes in the existing mining design. Reclamation of the pit would be as described in Section 2.11, especially Section 2.2.11.4.

There is little potential risk to human life and infrastructure. Call and Nicholas concluded that there was no indication that the mine is at risk for an overall pit slope failure.

#### **4.2.2 PROPOSED ACTION**

Luzenac proposes to expand the pits from 169.4 acres to 180.6 acres. Luzenac does not propose to backfill the expanded South 40 and North Main pits because of potential mineable resources at greater depth.

Luzenac has proposed to reclaim the mine pits. Of the 180.6 acres, 20.5 acres would be soiled and revegetated. In the South 40 Pit, Luzenac proposes to reclaim 152.9 acres to rock faces and 12.9 acres to talus slopes.

The recommendations of Call and Nicholas would be applied to the mine design for the Proposed Action (Figures 4-1 and 4-2). Deepening the pit by 200 feet, as in the Proposed Action, should not affect operational stability as long as the same design criteria continue to be employed, which Luzenac has proposed to do. However, Luzenac has not proposed to modify the approved pit reclamation plan to enhance pit reclamation and improve long-term stability of the volcanic units.

#### **4.2.3 AGENCY MODIFICATIONS TO THE PROPOSED ACTION ALTERNATIVE**

To increase the amount of pit reclamation, Luzenac would soil and revegetate all safely accessible slopes in the pits that are less than 2H:1V to reduce visual impacts. Overall slope angles of the South 40 Pit highwall in stable dolomitic marble would be left as 340-degree rock faces, as proposed by Luzenac. Luzenac would be required to reduce pit slopes in volcanics by cast blasting or backfilling to 2H:1V (Figure 4-2). The reduced slopes would be graded, soiled, and revegetated to increase the number of revegetated acres and reduce any potential for continued instability of the volcanic slopes. This would promote stability and protection against a major failure that could be a threat to public safety and the environment after mining. This would increase the number of revegetated acres in the pit. DEQ believes this measure would increase the revegetated acres by at least 10 percent. This would afford some utility to humans and the environment after mining.

### **4.3 WATER QUALITY**

#### **4.3.1 NO ACTION ALTERNATIVE**

The Yellowstone Mine is located in an area of ephemeral drainages. These drainages are tributary to Johnny Gulch. ~~In addition, t~~These drainages, including Johnny Gulch, flow only as a result of major precipitation events or snow melt, which produces sufficient water to accumulate and flow down the relatively small channels. Surface water flow, when it occurs, exits the Johnny Gulch underdrain system and collects in a series of ponds located downstream of the East OB Pile in Johnny Gulch. Water from these ponds infiltrates, and there is no discharge of surface water from the Yellowstone Mine site, except as allowed and monitored in accordance with the conditions of the MPDES permit.

Elevated nitrate levels in surface water and groundwater resources have been associated with past mining activity at the Yellowstone Mine (Section 3.2.3). Nitrogen-bearing compounds are residues from explosive materials used in blasting from the mining of ore and waste. The residues are found on the pit highwalls and on the surfaces of overburden material. They can be concentrated in seepage through overburden piles into receiving surface water or groundwater. Water that comes in contact with either overburden material or rock exposed in the open pit(s) could also contain nitrate levels elevated above background levels.

Impacts to water quality are compared with the State of Montana's Numeric Water Quality Standards (Circular WQB-DEQ-7, January 2004). Surface water sampled at the Lower Johnny Gulch Rock Drain within the permit area has nitrate concentrations that are higher than surface water sampled in Johnny Gulch upstream of the mine site. Nitrate concentrations in the Lower Johnny Gulch Rock Drain have not exceeded drinking water standards, with the exception of one event in 2000. A laboratory rerun of this sample indicated a concentration below the standard (Table 3-6).

Surface water that has come in contact with mine overburden or pit highwalls does not leave the permit area during major storm events. Concentrations of regulated constituents above pertinent standards have not been observed in association with past mining of the Yellowstone Mine talc deposits.

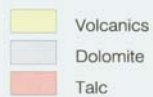
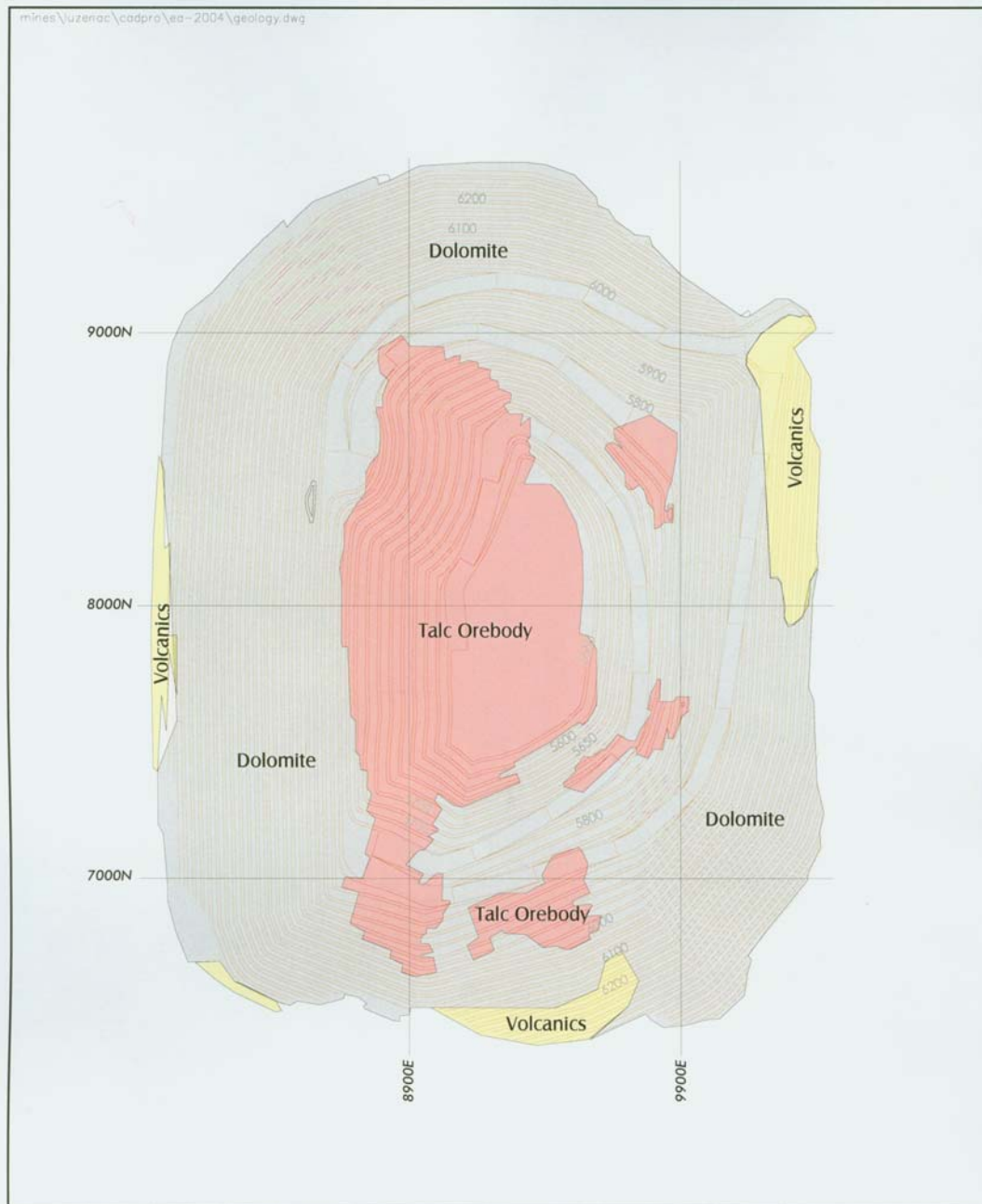
The North Mine Pit Seep has also been sampled, and nitrate concentrations have not exceeded drinking water standards. Perched groundwater from precipitation and deep groundwater monitoring in the area of the South 40 and North Main pits indicates the occurrence of nitrate in groundwater, although these concentrations also have not exceeded the drinking water standard of 10 mg/l.

Under the No Action Alternative, the amendment would not be approved. Ore and overburden mining would continue for approximately the next 8 years at the same rate as currently permitted under Operating Permit 00005. ~~Water~~ Precipitation would continue to infiltrate through existing pit highwalls and benches and through overburden materials and produce seepage that reports to the Johnny Gulch underdrain, or infiltrates into bedrock. Runoff would be permitted to leave the property as a result of a

precipitation event or snow melt in excess of the design conditions. A SWPPP will be implemented at the facility by July 1, 2007, which will continue to evolve to provide a mechanism for source control of sediment and other runoff management tools, as a condition of the MPDES permit. Monitoring of groundwater quality would continue.

When the mining permitted under the Operating Permit 00005 ceases, the existing approved reclamation and mine closure plan would be implemented. During reclamation and post- closure, water quality would be protected via the MPDES permit and SWPPP; until such time potential impacts to water quality have been permanently mitigated.





Plan Map of Ultimate Pit Geology  
Yellowstone Mine  
Cameron, Montana  
FIGURE 4-2

#### 4.3.2 Proposed Action Alternative

The Proposed Action would increase the surface area and volume of material exposed to precipitation and resultant seepage in both the expanded pit and expanded overburden piles. The area of the pit would be increased by 11.2 acres (from 169.4 to 180.6 acres), and the area of the overburden facilities would be increased by 222.8 acres (from 533.2 to 756.0 acres). An additional 127 million tons of overburden would be added to the overburden disposal facilities over the proposed expanded life of the mine.

Under the Proposed Action, Luzenac would continue to mine and process ore, and dispose of overburden at the same rates as it has in the past. Most of the overburden mined would be placed in the East OB Pile in Johnny Gulch. Operational water quality monitoring would be continued under the Proposed Action. The purpose of this monitoring would be to determine if mining-related impacts of the Proposed Action are adversely affecting water quality in the mine area. The chemical and physical parameters to be measured for water resource monitoring on a semi-annual basis are listed in Table 2-4. Monitoring sites for surface water are shown on Figure 2-6.

The limited annual rainfall of 11.3 inches and the establishment of a stable, graded, and revegetated surface would limit runoff and increase evapotranspiration, which would limit seepage from the overburden and pit areas after reclamation. Seepage rates for the East OB Pile have been calculated (Luzenac, 2002: Appendix C) using a historic precipitation rate of 11.3 inches that was increased by 25 percent to 14.13 inches. Under these conditions, seepage is calculated to be about 0.17 gpm operationally and about 1.5 gpm 100 years after closure. Similarly, calculations were made for the effect of the overburden lift being placed on the North OB Pile, with the results being about 0.22 gpm seepage operationally and about 2.4 gpm 100 years after closure. These relatively low seepage rates suggest that much of the water flowing periodically through the underdrain system is surface water diverted through the underdrain. Based on historic data and low seepage rates, groundwater quality with respect to nitrates is not expected to exceed water quality standards.

Direct and indirect impacts on water resources would result from the Proposed Action. These impacts would be associated primarily with disturbance to natural drainage channels due to the expansion of the open pit and overburden disposal facilities, and with nitrate loading to groundwater and surface water.

Should water quality standards for nitrate be exceeded, a contingency plan exists for treating the surface water that is captured from the entire site and collected in the rock drain beneath the East OB Pile and in ponds in lower Johnny Gulch. Water would be pumped from the underdrain and/or ponds and treated using a LAD system. Land application can only occur during the growing season. Currently, Luzenac does not have enough storage capacity for the amount of water expected during the winter.



Mine pits at the Yellowstone Mine have historically remained dry, except for intermittent pooling from snowmelt and precipitation which form two small seeps that pool water in the pit bottoms. Exploration drilling in both the North Main and South 40 pits has not intercepted a definitive groundwater table. However, groundwater elevations in monitoring wells within and in the vicinity of the pits indicate that a post-mine pit lake would not form in the ultimate pit described in the Proposed Action (i.e., groundwater level would be 60 to 80 feet below the proposed ultimate pit floor). Reviews of water levels measured by the Montana Bureau of Mines and Geology over the past 10 years in three bedrock wells located in the Madison River Valley indicate that water table fluctuations during the period were a maximum of about 10 feet (MBMG Groundwater Information Center website).

Placement of a second lift or tier of overburden materials on the North OB Pile would require changes to surface water drainage channels in that area. At the present time, water draining from sub-basins D-1 and D-2 on Figure 2-6 flows into lowland areas where the existing drainage pathways are blocked by overburden materials. Flow of surface or storm water into these lowland areas was intended to provide a temporary area to pond excess water during periods of high runoff. As a result of the Proposed Action, runoff from the east side of the North OB Pile (adjacent to the North Main pit highwall) would be routed into engineered surface water diversion channels and discharged into two natural lowland catchment basins at the north and south ends of the overburden pile that would act as natural sediment ponds (Figure 2-6). Water draining the area to the north and west of the North OB Pile would also report to these (and one additional) lowland catchment basins (Figure 2-6). Outflows, if any, from these lowland catchment basins would be monitored to determine if armored overflow spillway channels need to be constructed either operationally or in preparation for closure.

Portions of Johnny Gulch in the South and East OB piles currently have a rock drain constructed beneath them along the buried channel of Johnny Gulch. The existing buried rock drain is approximately 6,027.5 feet in length. An additional 3,688.4 feet of the Johnny Gulch drainage channel is proposed within the expanded footprint of the East OB Pile (Figure 2-7). Although the hydrology and water quality studies conducted to date suggest that no new ponds are needed, Luzenac would commit to constructing a sediment pond in Johnny Gulch at or immediately below the outlet for the rock drain and downgradient from the ultimate toe of the East OB Pile, should a pond be deemed desirable or necessary. A conceptual pond is shown on Figure 2-7. The final design and size of the pond would need to be determined. No acres have been added to Table 2-8 for this disturbance; however, the pond would be small enough to be included as a miscellaneous or ancillary disturbance at the toe of the east face of the East OB Pile (at full build-out).

Surface water runoff would be controlled by a permanent diversion ditch constructed upgradient, along the southeast edge of the active East OB Pile.



Best Management Practices (BMPs) would continue to be employed to prevent runoff of surface water into the open pits and onto overburden disposal facilities. It is expected that some erosion of the pit slopes and material stockpiles would occur. Sediment may accumulate in the pit bottoms and adjacent to any berms or stockpiles. Sediment transport from mined areas and overburden disposal facilities would be controlled through use of BMPs (e.g., erosion prevention measures and revegetation) as implemented via the SWPPP indigenous to the MPDES permit during mining, reclamation, and after reclamation.

#### 4.3.3 AGENCY MODIFICATIONS TO THE PROPOSED ACTION

Luzenac would modify the Proposed Action to minimize the risk of water quality impacts by modifying overburden pile drainage systems, constructing a sediment pond at the toe to the East OB Pile, modifying reclamation of lowland catchment basins, constructing a LAD storage pond to capture underdrain seepage, and implementing the LAD if nitrate values exceed 7.5 mg/l.

##### 4.3.3.1 Overburden Pile Drainage Systems

All drainage systems would be modified to be more natural using fluvial geomorphic principles. The channels would be constructed around, and as lined and armored (if needed) channels over, the surface of the existing and proposed expansion of the overburden piles. The drainage systems would provide for controlled surface water flow during storm events or when the ground is frozen and provide habitat similar to that associated with natural ephemeral drainages. The drainage systems would be accessible to maintenance and repair of damage from storm water impacts. The drainage systems would be constructed in addition to the continued use of the existing underdrain and the proposed underdrain extension beneath the overburden piles. The runoff from lined surface water channels would minimize seepage through the overburden piles and enhance plant and wildlife habitat on the reclaimed overburden piles.

Luzenac would be required to regrade all OB pile slopes in a dendritic pattern without benches to reduce the engineered appearance and produce a more natural looking drainage system and slopes as viewed from U.S. Highway 287. The crest elevation of the overburden piles would be varied at closure to create a more natural looking topography. Present closure grading of the overburden piles calls for a flat top. This surface should be regraded to provide irregular topography and break up the linear character of the surface.

##### 4.3.3.2 Sediment Pond at Toe of East OB Pile

Ponds 5A, 7A, and 8A have been constructed or upgraded since 2004. Sediment pond 7A exists below the ultimate toe of the East OB Pile and additional water management ponds are required by the compliance schedule of the MPDES permit to provide a contingency for collecting underdrain seepage if nitrate exceeds 7.5 mg/l. The ponds will continue to be used to collect sediment and seepage emanating from the toe of the East OB Pile. Sediment would also be managed via BMPs inherent to the required MPDES SWPPP. Ponds would be maintained in accordance with the MPDES Operation and Maintenance permit standard conditions and runoff BMPs would be maintained and changed in accordance with the SWPPP. Surface water could be collected for sampling and storage prior to discharge, infiltration, or treatment in a LAD system if necessary at some point in the future.

#### 4.3.3.3 Reclamation of Lowland Catchment Basins

Lowland catchment basins that collect seasonal runoff water from drainages D-1 and D-2 near the North OB Pile would be left at closure (Figure 2-6). Nitrate in water routed into these basins would be attenuated by vegetation growing in the pond area. The catchment basins should be constructed to provide seasonal water supply and habitat for upland wildlife.

#### 4.3.3.4 LAD Pond for Underdrain Seepage and LAD Trigger Value

Luzenac would be required to initiate LAD of underdrain seepage if nitrates exceed 7.5 mg/l, and may be required to implement LAD if a discharge from MPDES Outfall 002 occurs with concentration in excess of the surface water trigger value of 5.0 mg/l. Luzenac would also build a lined storage pond on an OB pile to store underdrain seepage during the winter until it can be land applied. This would ensure that the groundwater quality standard would not be exceeded. Any proposal to implement LAD would require review under the MPDES permit.

### 4.4 VISUALS

Visual impacts have been evaluated using procedures set forth in the Visual Resource Contrast Rating Handbook (BLM, 1986). This method looks at changes to the landscape that in this case would principally result from the expansion in size and increased visibility of the overburden piles. The proposed changes are compared with the characteristic landscape of the Yellowstone Mine site to determine the degree of contrast in form, line, color, and texture.

#### 4.4.1 NO ACTION ALTERNATIVE

Additional minor visual impacts would result from the No Action Alternative, as mining would continue for another 8 years under the current Operating Permit 00005.

Additions would include a small expansion of the northwestern portion of the South 40 Pit with all of the overburden material scheduled for placement in the East OB Pile. The East OB Pile would extend an additional 100 to 200 feet downstream along Johnny Gulch from its present location but remain within the disturbed footprint.

Major portions of the pit highwalls would be reclaimed to 30-degree rock faces and talus slopes, as described in Section 2.2.11.4, which would increase the visual contrast with surrounding lands.

Luzenac would reclaim the existing overburden piles with flat surfaces and 2.5H:1V slopes, as described in Section 2.2.11.5. The 2.5H:1V slopes would incorporate a bench as a slope break to limit slope length and control runoff. The relatively straight lines of the overburden pile crests would contrast with the irregular land forms in the surrounding area.

#### 4.4.2 PROPOSED ACTION

The proposed expansion of the overburden piles would be the only obvious visual change seen from U.S. Highway 287. The principal impact or consequence of the Proposed Action with respect to visual resources would be the large landform resulting from construction of the East OB Pile within Johnny Gulch. The shape of the advancing slope would appear linear in the view from the highway and would therefore contrast with the irregular features of the surrounding landscape (Figure 4-3, middle). Color of the overburden material would range from medium-tan or beige, to flat white and would vary through this color range as the slope advances with the placement of new overburden material. A computer-generated view of the mine site from the east (KOP-1, Figure 4-3) at maximum build-out, prior to full reclamation, is shown on Figure 4-3 (middle).

The upper surface of the East OB Pile would be regraded, soiled, and revegetated as the construction face advances. Figure 2-11 shows the final reclamation topography. Revegetation of this upper surface would provide some operational mitigation of visual impacts, and the reclaimed and revegetated surfaces would gradually acquire the color and texture of the surrounding landscape. During final reclamation, the angle of repose slopes of the advancing face of the East OB Pile would be regraded to a slope of 2.5H:1V or less, and the surface covered with soil and revegetated. Slope lengths longer than 200 feet would be broken up with a wide bench during regrading to reduce slope length and control runoff. The relatively straight lines of the overburden pile crests and benches would contrast with the irregular land forms in the surrounding area. A computer-generated view of the reclaimed mine site from the east at closure is shown in Figure 4-3 (bottom).

Other mine facilities, including overburden disposal facilities, open pit(s), and support facilities, would also be seen from off-road sites and secondary roads by a small

number of area residents and recreationists. Visual impacts would be mitigated through reclamation to include grading, application of soil, and revegetation of all mine related facilities. Reclamation would result in the color and texture of the reclaimed sites blending in with the color and texture of the surrounding landscape. The reclaimed mine site would continue to appear as a man-made feature.

#### **4.4.3 AGENCY MODIFICATIONS TO THE PROPOSED ACTION ALTERNATIVE**

Luzenac would modify the Proposed Action to minimize visual impacts. The crest elevation of the overburden piles would be varied at closure to create a more natural looking topography. Present closure grading of the overburden piles calls for a flat top. This surface should be regraded to provide irregular topography and break up the linear character of the surface. This would be done as part of constructing the overburden piles and natural drainage systems as described in Section 4.3.3.1. This would reduce the visual impacts of overburden piles from U.S. Highway 287 and the Johnny Gulch Road.



Existing



Proposed



Reclaimed

Visual simulation of Yellowstone Mine from KOP 1,  
approximately 1.5 miles south of access road on Highway 287  
Luzenac Yellowstone Mine  
FIGURE 4-3

Luzenac would be required to regrade all OB pile slopes in a dendritic pattern without benches to reduce the engineered appearance and produce a more natural looking drainage system and slopes, as viewed from U.S. Highway 287. The crest elevation of the overburden piles would be varied at closure to create a more natural looking topography. Present closure grading of the overburden piles calls for a flat top. This surface should be regraded to provide irregular topography and break up the linear character of the surface.

#### 4.5 REGULATORY RESTRICTIONS ANALYSIS

MEPA, as amended, requires state agencies to evaluate any regulatory restrictions they propose on the use of an applicant's private property (75-1-201 (1)(b)(iv)(D), MCA). Actions proposed by the applicant and alternatives and mitigation measures designed to make the project meet the minimum requirements of state laws and regulations are excluded from evaluation.

Selection of the No Action Alternative would impose restrictions on Luzenac's use of its private property with respect to future mining operations. The Proposed Action contains measures imposed by DEQ that were not agreed to by Luzenac during the deficiency review process. The changes to the Proposed Action included in the Agency Modifications are needed to ensure that the Proposed Action would comply with state statutes and rules.

#### 4.6 CUMULATIVE IMPACTS

Cumulative impacts are the effects of the Proposed Action added to the impacts of past and present activities in the area along with the potential impacts of actions under consideration by the state any agency. Cumulative impact analyses help to determine whether an action would result in significant impacts when added to other activities.

The Yellowstone Mine is the only mine in the immediate area, and no other large or medium scale commercial enterprises exist within the area. Evaluation of the area's economic geology and the absence of other known resources in the area suggest that it is unlikely that other mines or major commercial undertakings would be developed in the area.

Historic land uses of the south Madison Valley cumulative impact area include both commercial and non-commercial activities (Figure 2-2). Commercial uses include livestock grazing, hay and wheat production, mineral extraction, and timber production. Non-commercial uses include wildlife habitat, watershed, residential sites, and a variety of recreational activities. Over the last 5 to 10 years, the Madison River Valley has experienced a trend toward subdivision for residential use of land that was historically used for grazing and other forms of agriculture.



Cumulative impacts from the Proposed Action would be negligible for all resources except visual resources (described above in Section 4.4).

The subdivision of land and selling of individual residential sites is likely to continue in the Madison Valley area. Transmission line and substation construction, access roads, and home sites may become more important in the future as a result of the development of residential properties. These developments would also impact visual resources and would probably impact water quality, by nitrate loading to groundwater from septic systems, and wildlife habitat resources as residential development increases in density in the future.

#### **4.7 UNAVOIDABLE ADVERSE EFFECTS**

Residual impact from the Proposed Action would include irreversible commitments of privately owned land resources. Developed soil would be lost from 271.3 acres. Soil would be salvaged and replaced, but thousands of years of development would have to begin again.

Plant communities dominated by native plants would be replaced by less diverse reclaimed plant communities on 271.3 acres. Noxious weeds would increase. Wildlife habitat on the 271.3 acres would be replaced with less diverse reclaimed habitat.

The reclaimed mine site would continue to appear as a man-made feature.

Talc would be removed from the geologic resource under the Proposed Action. Some portions of the mine pits and future access roads that are not revegetated during reclamation (160 acres) would represent a loss of vegetation and wildlife habitat. The landscape characteristics would change as a result of the Proposed Action (pits and overburden disposal deposits) and reclamation activities. Although the disturbed areas would be reclaimed, reseeded, revegetated, and a program implemented to inventory and treat noxious weeds, weeds would increase as is occurring across Montana. Some sediment control structures would remain.

Talc mining from open pits at the Yellowstone Mine began in about 1950 and has been continuous at different annual production rates since that time. Mining to date has generated approximately 72 million tons of overburden material from six pits (Figure 2-4) three of which have been backfilled. The three unreclaimed pits (North Main, South 40, and Montana Talc pits) are somewhat overlapping and contain about 170 acres of disturbed ground. Four overburden disposal areas (Figure 2-3) currently cover about 533 acres of ground within the existing permit area of 1,458 acres.

Under the Proposed Action ore and overburden would continue to be extracted from an expanded South 40 Pit (Figure 2-7) over the next 50 years. The total tonnage mined

would be 144 million tons including 17 million tons of talc and 127 million tons of overburden. Therefore, production over the next 50 years would be approximately twice the amount of overburden and about three times the amount of talc as has been mined in the last 50 years.

Drilling has indicated that talc ore continues below the ultimate pit level of the Proposed Action as well as along trend to the north and northeast of the existing South 40 and North Main pits. Therefore, the known talc resource would not be entirely removed under the Proposed Action, and there is the potential for future mining to expand into these areas. No other substantial geologic mineral resources of any kind have been identified in the vicinity of the Yellowstone Mine site.

## CHAPTER 5 CONSULTATION AND COORDINATION

### 5.1 PREPARERS

DEQ staff members involved in the preparation of this EA are listed in Table 5-1.

<p style="text-align: center;">Table 5-1 List of Preparers <i>Amendment to Operating Permit 00005 – EA</i></p>			
Name	Responsibility	Credentials	Years Experience
Patrick Plantenberg	Vegetation Soils Reclamation	BS, Agricultural Science/Recreation Area Management MS, Range Science/Reclamation	25
Charles Freshman	Engineering	BA, Geology BS, Civil/Environmental Engineering MS, Mining/Geological Engineering	20
Greg Hallsten	Coordination	BS, Wildlife Biology BS & MS, Range Management	25
Warren McCullough	Reviewer	BA, Anthropology MS, Economic Geology	28
George Furniss	Hydrology	BS & MS, Geology PhD, Hydrogeology (pending)	25
<u>Paul Skubinna</u>	<u>Water Quality</u>	<u>BS, Geological Engineering/Hydrogeology</u> <u>MS, Geology/Geochemistry</u>	<u>5</u>

### 5.2 OTHER AGENCIES CONTACTED

Other agencies contacted for information for, or review of, this EA are:

#### 5.2.1 STATE AGENCIES

Montana Fish, Wildlife and Parks – Wall Creek Wildlife Management Area  
Montana Department of Natural Resources and Conservation, Water Resources Division

## Montana State Historic Preservation Office – Cultural resources

### 5.2.2 FEDERAL AGENCIES

U.S. Army Corps of Engineers – Wetlands issues

U. S. Fish and Wildlife Service – Winter Range

### 5.3 PUBLIC INVOLVEMENT

DEQ published a statement acknowledging the receipt of the amendment application in May 2002. Later, in January 2004, DEQ issued a press release stating its intent to prepare an EA under MEPA and asking the public to provide issues or concerns about the proposal in order to guide the EA process. DEQ indicated it would accept public comments through February 23, 2004. Copies of the amendment application were placed at DEQ's office in Helena, MT, and in the Ennis Public Library in Ennis, MT. No public scoping meeting was held.

Two public comments were received, one from the Ennis Chamber of Commerce and one from Representative Diane Rice, House District #33. Both were in support of the amendment and raised no substantive issues.

*Since, the Draft EA was published, DEQ has met with the adjacent landowner to discuss his concerns over the mine expansion, stormwater problems, and other issues.*

## CHAPTER 6

### REFERENCES

- Bureau of Land Management. 1986. BLM Manual Handbook 8431-1, Visual Resource Contrast Rating. USDI BLM, January 17.
- \_\_\_\_\_. 2004. Draft Dillon Resource Management Plan. Dillon, MT
- Call and Nicholas, Inc. 1999. Luzenac America Yellowstone Mine mill facility site study. 31pp.
- Camp Dresser and McKee. 1997. Site-wide drainage and sediment control plan. Report to Luzenac America, Inc., Yellowstone Mine. 15pp.
- Farmer, P.J. 1982. Wildlife reconnaissance, Cyprus Yellowstone Mine. Technical report prepared for CIMC by Westech, Helena, MT. 69 pp.
- Heinrich, E.W., and J.C. Rabbitt. 1960. Pre-Beltian geology of the Cherry Creek and Ruby Mountains areas, southwestern Montana. Montana Bureau of Mines and Geology Memoir 38. Butte, MT. 40 pp.
- Historical Research Associates, Inc. 1992. Report of test excavation at the Icy Pond Site (24MA286). Madison County, MT, June 3. 13 pp and appendix. Missoula, MT.
- Hydrometrics, Inc. 1982. Cultural resource inventory and assessment, Cyprus Industrial Minerals, Co., Yellowstone Talc Mine, Ennis, MT. March 19. 53 pp and appendix. Helena, MT.
- Janbu, N. 1973. Slope Stability Computations. Pages 47-86 in: Hirshfield and Poules, eds., Embankment Dam Engineering, Casa Grande Memorial Volume. John Wiley and Sons, New York.
- Johnson, P. and J. Ryan. 1982. Vegetation survey, Cyprus Yellowstone Mine. Technical report prepared for CIMC by ECON, Inc. Helena, MT. 39 pp.
- Luzenac America, Inc. 2001. Minor revision for 2A Pushback. March 7, 2001.
- Luzenac America, Inc. 2002. Consolidated Operating Permit 00005 Document, 78p. and appendices. Approved by Montana Department of Environmental Quality on March 8, 2002.

. 2002. Mine Life Extension Amendment to Operating Permit 00005. Luzenac America's Yellowstone Mine. December 19, 2002.

, Luzenac America, Inc. 2003. Mine Life Extension, Amendment to Operating Permit 00005, Luzenac America's Yellowstone Mine, First Deficiency Review Response. Submitted to Montana Department of Environmental Quality. Dated June 6, 2003.

Maxim Technologies, Inc. 2001, Waste Rock Geochemical Evaluation, Report to Luzenac America Inc. Yellowstone Mine, April 2001, 10p. and Appendices.

\_\_\_\_\_. 2002. Seepage Analysis of Expanded Overburden Disposal Areas Yellowstone Mine; Report to Luzenac America Inc. Yellowstone Mine, April 2002, 4p. and Appendices.

\_\_\_\_\_. 2004. Species of special concern in proximity to Yellowstone Mine. August 12. 3 pp.

. 2006. Technical Memorandum "Sediment / Storm Water Retention Pond Design and Infiltration Testing Luzenac America, Inc. Yellowstone Mine Life of Mine Amendment EA". March 14, 2006.

Montana Bureau of Mines and Geology. Groundwater Information Center website <http://mbmggwic.mtech.edu>.

Montana Department of Environmental Quality. 2004, Yellowstone Mine – Mine Life Extension Amendment to Operating Permit 00005, Draft Environmental Assessment. December 2004.

Montana Department of Environmental Quality. 20046. Circular WQBDEQ-7, Montana Numeric Water Quality Standards. January.

Montana Department of State Lands. 1977. Preliminary environmental review for proposed granting of a hard rock operating permit to Cyprus Industrial Minerals, Co., Yellowstone Mine, Madison County. 14 pp. February 14.

\_\_\_\_\_. 1981. Preliminary environmental review, Cyprus Industrial Minerals, Co., talc mine expansion, dump expansion, road construction. 8 pp and appendices. September 1.

\_\_\_\_\_. 1986a. Preliminary environmental review, Cyprus Industrial Minerals, Co. 2 pp. August 25.



- \_\_\_\_\_. 1986b. Preliminary Environmental Review, Amendment 003 to Cyprus Industrial Minerals, Inc. Operating permit 0005A, Yellowstone Talc Mine. 5 pp. September 1.
- \_\_\_\_\_. 1990. Environmental Assessment, Cyprus Industrial Minerals, Co., amendment 006 to operating permit 0005A, Yellowstone Mine. 81 pp and appendix. July 30.
- \_\_\_\_\_. 1992. Environmental Assessment, Luzenac America talc mine temporary increase in waste rock production. 2 pp. January 4.
- Sharma, S. No date. An integrated slope stability analysis program for personal computers. Interactive Software Designs, Inc. Moscow, ID.
- Sobek, A.A., W.A. Schuler, J.R. Freeman, and R.M. Smith. 1978. Field and Laboratory Methods Applicable to Overburden and Minesoils, EPA-600/2-78-054.
- U.S. Fish and Wildlife Service. 2004, Gray Wolf Recovery Status Reports, <http://westerngraywolf.fws.gov/wk0312204.htm> , May 17, 2004, 4 p.
- U.S.D.I. Bureau of Reclamation. 1974. Design of Small Dams. Washington, DC.

G:/emb/op/mepa/ea/luzenacminelifextensionfinalea0702606.doc

**APPENDIX A**  
**RESPONSE TO PUBLIC COMMENTS ON DRAFT EA**  
**AND**  
**ATTACHMENT 1**  
**MAXIM TECHNICAL MEMO 2006**

DEQ published a Draft EA in December 2004 for the Life of Mine Permit Amendment Application for Luzenac America, Inc.'s (Luzenac) Yellowstone Mine, Operating Permit 00005. DEQ received comments from six parties on the Draft EA. Four of these comments were in support of the proposed amendment and/or Luzenac's ongoing operation at the Yellowstone Mine site. Letters were submitted by the Ennis Chamber of Commerce, Madison County Board of County Commissioners, Representative Diane Rice of House District #33 and by the mining company. The letter from the mining company and a letter and an e-mail from the public contained comments that require a written response.

A down gradient property owner is concerned that the proposed mine expansion would result in contaminated water flowing from the storm water and sediment retention ponds across the Yellowstone Mine operating permit boundary. This water may impact surface water or groundwater and decrease the down-gradient property owner's property interests. The comments and responses to comments are presented below.

**Comment 1:** The Commenter suggested that "Luzenac be required to purchase the Walsh property."

***Response:*** *DEQ cannot require the mining company to purchase the neighbor's property.*

**Comment 2:** The Commenter suggested that "waters contained in or near the last pond in the series of ponds located along the border between the mine property and the Walsh property be contained in a manner that does not allow overflow into the Johnny Gulch drainage or any ditch systems located on the Walsh property. This may include construction of additional ponds away from the Mine/Walsh property border along with a pumping plan to pump water contained in the boundary pond to a location away from the Walsh property."

***Response: Luzenac has an approved Montana Pollutant Discharge Elimination System (MPDES) permit from DEQ which allows runoff to leave the operating permit boundary. Luzenac voluntarily agreed to upgrade the storm water management plan after the comment was received. Luzenac contracted a consulting firm to conduct field studies that provided engineering data to support upgrades to the storm water management plan for the Yellowstone Mine. This work included designing four new storm water and sediment control ponds in the lower Johnny Gulch drainage on the Yellowstone Mine Property. A technical memorandum, "Sediment / Storm Water Retention Pond Design and Infiltration Testing Luzenac America, Inc. Yellowstone Mine Life of Mine Amendment EA" is included as an attachment to this Appendix (Maxim 2006) (Attachment 1). A detailed description of pond locations and a comparison of pond volumes and infiltration rates to calculated storm runoff volumes are shown on Figure 3 contained in Attachment 1.***

***Most of the new ponds have been constructed. The effective total storage of the designed ponds, not including pond 10A at the property boundary, is 59 acre-feet. Of that, 40 acre-feet is in-pond storage, while the remaining 19 acre-feet is in-pond infiltration capacity.***

***The runoff expected from an area-weighted soil curve for lower Johnny Gulch for the 10-year, 24-hour storm event is 35.9 acre-feet. The in-pond storage capacity of 40 acre-feet exceeds the 10-year event. The 59 acre-feet of total effective storage corresponds to the 35-year, 24-hour storm event.***

***Pond 10A could be upgraded as an emergency pond with a sump and pumping system. This pond had been used to provide stock water under a prior grazing agreement. Luzenac and the adjacent property owner have discussed upgrades to this pond. DEQ will not require Luzenac to have a pumping plan to pump water from the last pond during a major storm event unless nitrates are elevated (See response to Comment 4 below). DEQ believes that Luzenac's upgrades are adequate to continue compliance with DEQ MPDES permit discharge requirements.***

***The Draft EA was updated to reflect the updated storm water management plans, construction of the new ponds, and changes in disturbance acres since the Draft EA was published. The changes are italicized and underlined and highlighted in red on the CD copies and black in the paper copies of the Final EA. The new location for MPDES Outfall 002 would be at pond 8A. Luzenac upgraded this pond to allow irrigation water from the Ruby Creek Ditch to follow its historic course.***

**Comment 3:** The Commenter suggests that “additional surface water and groundwater monitoring requirements be imposed which may include additional wells to specifically monitor water quality of surface waters and groundwater near the Walsh property.”

***Response:*** As mentioned above, the Yellowstone Mine currently has a MPDES permit (MT-0028584) administered by DEQ. This permit contains specific effluent limits for surface water discharges.

***In 2005, Luzenac submitted to DEQ a revision to the MPDES permit for the site. Specifically, Luzenac proposed to move the lower outfall and compliance point, Outfall 002, further away from the operating permit boundary. The new location for Outfall 002 would be at pond 8A, which Luzenac upgraded in 2005 to allow irrigation water from the Ruby Creek Ditch to follow its historic course (Figure 3 in Attachment 1). The renewal permit has been issued.***

***In addition, DEQ has previously required Luzenac to install four groundwater monitoring wells in lower Johnny Gulch. These wells are sampled quarterly and results are filed with DEQ. A new groundwater monitoring well will be constructed between pond 8A and the property boundary to measure water in the unconsolidated alluvium down-gradient of pond 8A. This well will be sampled quarterly for the same parameters as other groundwater wells on the Yellowstone Mine property. This monitoring well will be drilled after DEQ approves the location.***

**Comment 4:** The Commenter suggested implementation of “any other mitigation measures that are developed after a site inspection(s) and solutions developed as a result of discussions between the parties”.

***Response: Luzenac, DEQ, and the neighbor met in spring 2005 and since then, Luzenac has completed several storm water management improvement projects (See Figure 3 in Attachment 1) including:***

- Reconstruction of pond 8A to allow the Ruby Creek irrigation ditch to follow its historic course crossing mine property and through a section of pond 8A. This was another pond that had historically been used for stock water;***
- Engineering and construction of a new retention and infiltration pond 7A immediately upstream of pond 8A. The embankment for the new pond was seeded and re-vegetated;***
- Installation of a culvert to capture runoff from the east side of the Crude Ore Loadout Facility and divert it to pond 7A.***
- Removal of the fine ore stock pile from the Crude Loadout area. This area was regraded and seeded in fall 2005.***
- Construction of several check dams near the Crude Loadout area as well as further upstream in Johnny Gulch.***

***In the Draft EA, DEQ required Luzenac to develop a plan for the design of a Land Application Disposal (LAD) system to limit the potential for nitrate in groundwater to leave the operating permit boundary. A LAD system was investigated as a means of attenuating potentially elevated concentrations of nitrate in runoff reporting to the proposed storm water / sediment control ponds.***

***Such a system could be employed in the unlikely event that nitrate-rich runoff occurred in excess of the capacity of the ponds to contain the flow. Monitoring and sampling of the seepage from the overburden storage site would indicate if and when the LAD system would be necessary.***

***During the mine inspection, the neighbor suggested that contaminated runoff from the mine had historically reached ponds on his property. Runoff may have reported to the neighbor's ponds at some time during the mine life. DEQ has observed runoff leaving the mine permit boundary, but the runoff infiltrated before reaching the landowner's ponds. The landowner***

***suggested that talc deposition on the property could cause some health problems for the horses grazing in the area.***

***To check how often runoff may have crossed the permit boundary and to check the amount of deposition of talc sediment on the neighbor's property, DEQ checked for evidence of sedimentation in the drainage on the landowner's property immediately below the mine permit boundary. There was no evidence of repeated deposition and accumulations of sediment and talc. were not found.***

***The neighbor also expressed concern about air quality impacts on the surrounding vegetation. Shrubs and trees downwind of the mine site are sick and/or dead. DEQ observed the same vegetation condition on the return trip to Helena in similar plant communities not adjacent to the mine. Limber pine (Pinus flexilis) has been suffering from insect and drought damage in the region for years. This is the most obvious plant species down wind of the mine site.***

**Comment 5: The mining company suggested several edits to the Draft EA.**

***Response: The air quality permit number has been updated in the Final EA. The air quality PM-10 monitoring has been discontinued and this update was made in the Final EA.***

***DEQ clarified in the Final EA that the North Main Pit pond is from precipitation and not from a groundwater seep.***

***DEQ clarified in the Final EA that highwalls in dolomitic marble would be left at 40 degrees at closure.***

***DEQ clarified how the Call and Nicholas pit stability report applies to the existing pit design in the Final EA.***

**Comment 6: One resident from Cameron commented on how the mine overburden piles are becoming more visible. He suggested that they should be blended in with the scenery. He also suggested that the mining stay in the valleys and not in the higher areas where it would be most more visible.**

***Response: In the Draft EA, DEQ addressed the visual impacts from the proposed expansion of the mine waste rock dumps in section 4.4. The expansion will produce more visual impacts during mine life because of its size and the color of the rock reporting to the dump.***

***DEQ added modifications to the design of the waste rock dump reclamation plan in Section 4.4.3. The crest of the flat topped waste rock dump would be varied to produce irregular topography and break up the linear character of the surface. Figure 4-3 in the Draft EA shows what the Proposed Action Waste rock dump would look like at closure. The soil and alluvium being salvaged for reclamation would cover the waste rock and make it less visible. Vegetation on the reclaimed surface of the waste rock dump would then help blend the waste rock dump into the surrounding area. The waste rock dumps would also be graded with dendritic drainage patterns to mimic the surrounding drainages. This would also help make the waste rock dump blend in with the surrounding area.***

***The mining company has no control over where the ore body lies. Fortunately, it does not occur in the higher areas where mining would be more visible.***

**G:/emb/op/mepa/ea/Luzenac/2006/yellowstonefeaappendixa**



## ATTACHMENT 1

# TECHNICAL MEMORANDUM

---

TO:	Chuck Buus Luzenac America Inc.	CC:
FROM:	Allan Kirk Larry Cawlfeld	
DATE:	March 14, 2006	
RE:	Sediment / Storm Water Retention Pond Design and Infiltration Testing Luzenac America, Inc. Yellowstone Mine - Life of Mine Amendment EA	

---

**NOTE:** As a result of site specific infiltration testing conducted on materials in the lower Johnny Gulch drainage, this document is intended to replace a Document entitled, "*Sediment / Storm Water Retention Pond Design, Luzenac America, Inc. Yellowstone Mine - Life of Mine Amendment EA*" dated April 19, 2005.

### Summary

Maxim Technologies recently completed an evaluation of stormwater components of the Yellowstone Mine facility, owned and operated by Luzenac America Inc. {Rio Tinto Minerals}. NOAA weather statistics, SCS runoff curves and site specific infiltration tests were used to model storm events, runoff components and effective storage capacities of stormwater/sediment control ponds in lower Johnny Gulch.

Montana DEQ guidance recommends that stormwater facilities such as this be designed to accommodate the 10-year 24-hour storm event. A series of ponds have been proposed to control sediment, store peak storm flow, and allow infiltration and evaporation. The proposed ponds have in-pond storage of 40 acre-feet along with 19 acre-feet of infiltration capacity. This equals a total of 59 acre-feet of effective storage, which approximates the 35-year 24-hour storm event (Table 5). In fact it should be able to store nearly all of the volume of the 50-year, 24-hour storm event (60.3 acre feet). Without an allowance for infiltration, the 40 acre-feet of in-pond storage would accommodate the 15-year 24-hour storm.

---

## Introduction

As a means of upgrading the storm-water run-off retention plan for the Yellowstone Mine, Mr. Chuck Buus, the Environmental Manager requested that Maxim Technologies (Maxim) investigate potential locations for, and design new stormwater / sediment control pond(s) capable of storing a range of statistically credible storm events in the lower Johnny Gulch drainage on the Yellowstone Mine Property. Maxim was also asked to conduct site specific testing of infiltration rates in the footprint of some proposed sediment ponds and on the upper surface of overburden disposal facilities in order to predict infiltration and run-off rate components from storm events.

In addition, Mr. Buus asked Maxim to review Best Management Practices (BMPs) to control sediment discharge from the property to the ponds. Finally, Maxim was asked to consider a Land Application Disposal (LAD) system (as was proposed in the Life of Mine Permit Amendment document, Luzenac 2003) and other possible techniques to prevent an uncontrolled release of either contaminated water or sediment from the pond(s). One of the objectives of these tasks was to begin to define a long-term solution to minimize or eliminate potential water quality impacts at mine closure.

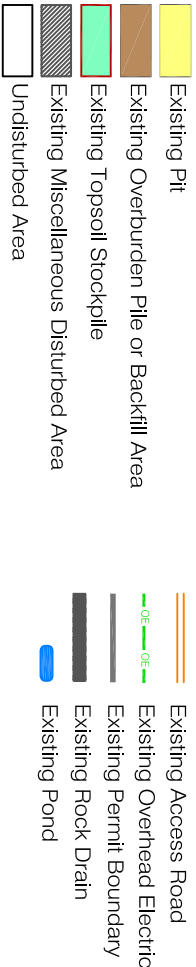
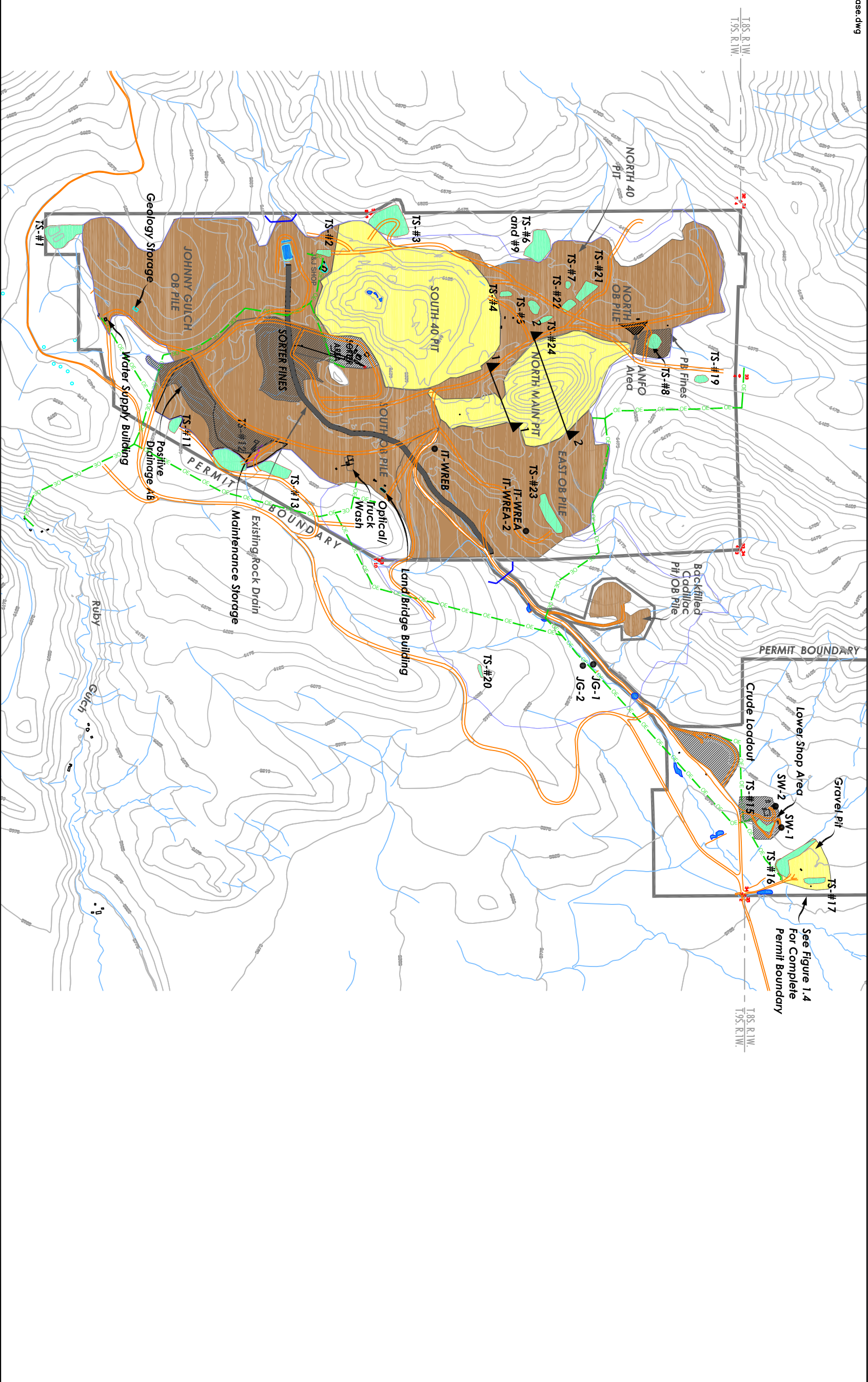
Allan Kirk and Larry Cawfield of Maxim conducted a one-half day field review of potential pond locations and sediment sources in the lower Johnny Gulch area with Mr. Buus on February 22, 2005. Maxim also discussed the proposed pond construction and possible LAD system design with Mr. George Furniss of the Montana Department of Environmental Quality (MDEQ). A field crew from Maxim conducted seven (7) double ring infiltrometer tests over a three day period from June 1 through 3, 2005 on various materials in the lower Johnny Gulch Drainage.

## Background

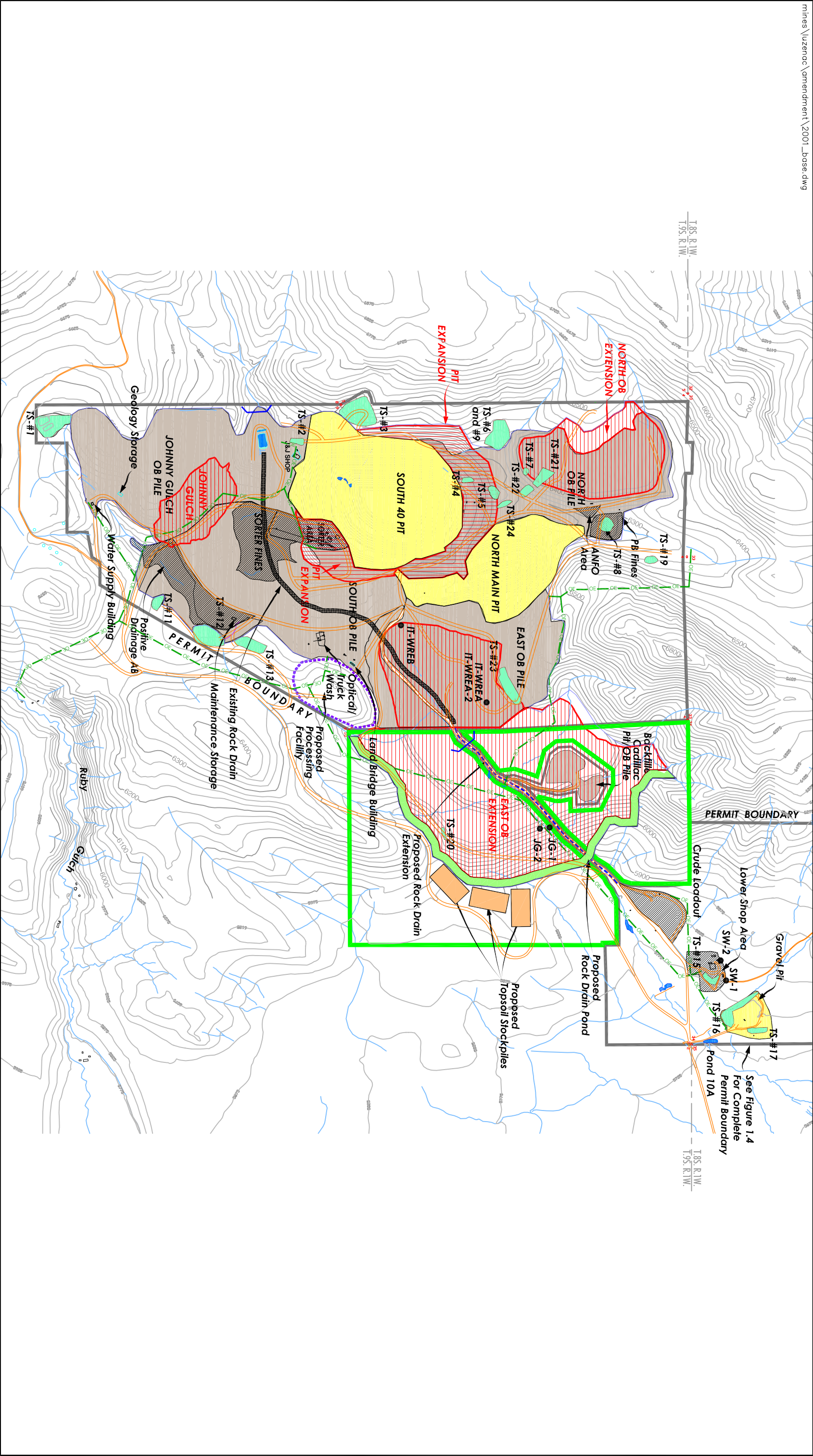
In February 2005, Luzenac had a series of five ponds providing a capacity for storm water retention and sediment deposition as well as acting as infiltration basins. These ponds are located along lower Johnny Gulch and extend from below the outfall of the overburden pile underdrain, to the northeast boundary of the Yellowstone Mine's property. These ponds are shown on **Figure 1**, a figure showing existing mine facilities at the Yellowstone Mine. **Figure 2** shows proposed conditions at the Yellowstone Mine at final mine build-out. There are three components to flow entering these ponds:

- Stormwater runoff from disturbed areas such as the overburden pile and mine roads;
- Runoff from undisturbed native soils and vegetation, and reclaimed mine facilities; and,
- Flow from the overburden pile underdrain.

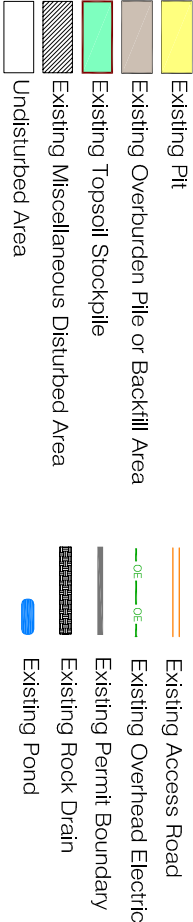
These components of flow are discussed in greater detail below in the section entitled "Run-off Components".



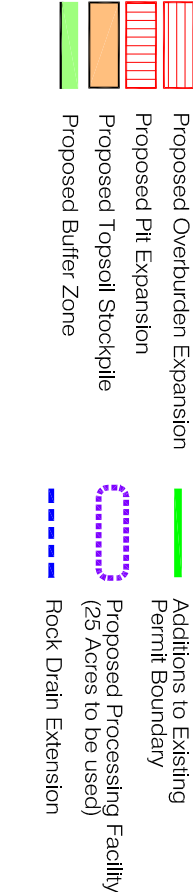




LEGEND - EXISTING



LEGEND - PROPOSED



Luzenac's furthest downstream sediment control pond (10A, **Figure 1**) was included in a 1997 renewal of their Montana Pollutant Discharge Elimination System Permit (MPDES Permit Number MT-0028584) from the MDEQ to discharge water from the lowest sediment pond (Outfall 002) into Johnny Gulch (MDEQ 2004, draft Environmental Assessment, section 2.2.8.2.1). At this time, DEQ has not deemed the renewal complete, and has requested an update (June 10, 2005) to the current permit that includes the changes proposed within this document. The existing discharge permit contains strict and specific water quality standards that must be maintained if a discharge were to occur.

The draft EA stated that *"no storm water would be discharged from the mine site"* and that in the future, changing conditions might warrant the construction of diversion channels and a new sediment pond (MDEQ EA section 2.3.7.2). This conflicts with the provisions of Luzenac's MPDES discharge permit cited above. Luzenac's storm water management goal is to maximize on-site water storage capacities and reduce the risk and minimize the volume of an uncontrolled surface water discharge off the property.

The MDEQ currently regulates the discharge (if any) from the lower-most pond as well as the quality of water discharged under a site-specific MPDES permit. In addition, the MDEQ requires monitoring of impacts to surface water under a surface and groundwater monitoring plan that calls for routine sampling of the existing ponds (which are typically dry) and routine monitoring of four groundwater wells located down-gradient of the Johnny Gulch overburden disposal area. Furthermore, contingencies for possible degradation of water quality in the future have been considered as a possibility, and the Permit Amendment Application document proposes to construct new diversion channels and a new storm water / sediment retention pond along with other potential mitigation methods to be employed should this unlikely situation become an issue. Finally, the Permit Amendment document states (Section 2.5.4.5 Operational Mitigation) that:

*"Mitigation for potential impacts to water resources at the Yellowstone Mine site will include a continuation of BMPs to control potential surface water run-on and run-off at disturbance areas. Diversion structures include ditches, berms, and sediment ponds/traps. During the mine expansion, additional BMPs may be implemented to reduce erosion potential and sedimentation. If nitrate concentrations in the rock drain water consistently reach levels that are >10 mg/l, or if other monitored parameters exceed water quality standards, then one or more mitigation measures could be implemented. These measures include: 1) infiltration pond with demonstrated natural attenuation; 2) land application system with water sprayed on nearby undisturbed land or on a revegetated upper surface of an overburden disposal area; and 3) collect and treat the water using an engineered biodegradation system. Due to the low flow rates and considerable distances to potential ground and surface receiving waters, there will be sufficient time to implement mitigation measures if and when a water quality problem is identified." (Luzenac 2003, Executive Summary)*

Luzenac's goal is to reduce the risk of sediment transport and minimize the volume of storm related surface or groundwater migration offsite. In doing so, they will comply with State of Montana Laws and MDEQ regulations.

### Storage Sites Available and Pond Designs

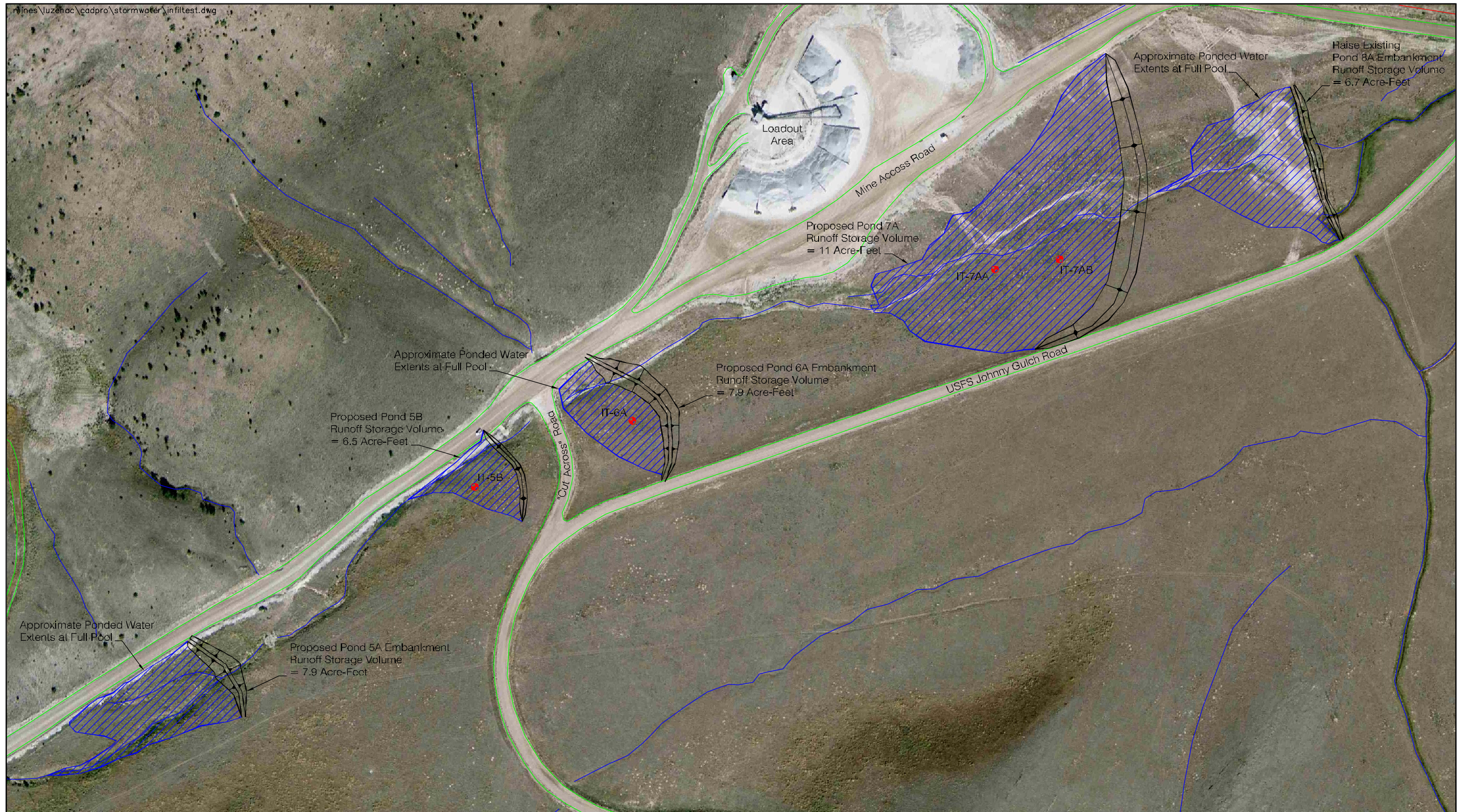
Several sites for storage of stormwater run-off in lower Johnny Gulch have been identified for construction over the next one to two years. The dam at an existing pond referred to as 8A could be easily raised and otherwise improved to contain additional run-off as shown on **Figure 3**. A series of ponds extending from 8A upstream in lower Johnny Gulch are also proposed. These include ponds 5A, 5B, 6A, and 7A (**Figure 3**). Each of these pond sites are bounded on the north and south by existing roads. For preliminary design purposes, it was assumed that embankments could be constructed at these locations and stormwater stored up to the elevation of the bounding roads. The calculated water storage capacity of each of these ponds is shown in **Table 1**. A small additional volume might be gained at each site by excavation in the storage basin. The reason for relatively small storage volumes available at these sites is because the areas generally have low relief and the existing roads restrict the lateral extent and the height of the proposed embankments.

<b>Table 1</b> <b>Pond Storage Capacities</b>	
<b>Pond Number</b>	<b>Storage Capacity * (Acre-feet)</b>
8A	6.7
7A	11.0
6A	7.9
5B	6.5
5A	7.9
<b>Subtotal (ponds 8A to 5B)</b>	<b>40</b>

\* As-Built drawings will be provided to DEQ after pond construction

One site, referred to as 5A, is upstream (west) of the 'cut across' road in an area that is slightly more confined by canyon walls than the downstream ponds (**Figure 3**) and can, therefore, store water in a deeper pool. This location may eventually be buried by overburden at final mine build-out, so this site could only be used temporarily (perhaps 25 to as much as 40 years). This site would hold about 7.9 acre-feet assuming that the embankment would be built up to the elevation of the mine access road to the north at this location. The total storage volume of these five ponds along lower Johnny Gulch is about 40 acre feet (**Table 1**), and the ponds have a combined footprint of about 11 acres.







## Storm Water Run-off Volume

### Rainfall and Run-off Modeling

The predicted run-off volumes from the mine site after it reaches final build-out as described in the Life of Mine – Permit Amendment Document (Luzenac, 2003) were estimated. Volume estimates were computed using the size of the drainage area, total storm precipitation and SCS run-off curve numbers to estimate total direct run-off from various facilities. The run-off volumes were predicted for several different rainfall events ranging from the 10-year, 24-hour storm to the 100-year, 24-hour storm.

Run-off volume from storm events depends on several factors. These include the depth (number of inches) of precipitation from the particular event, the relative amounts of the precipitation that infiltrates or is otherwise detained, as opposed to that portion that directly runs off, and the tributary area that contributes run-off to a particular drainage.

Precipitation depths for storms are based on National Weather Service Maps (NOAA, 1973). Precipitation depths are listed in **Table 2**.

<b>Table 2</b> <b>Estimated Run-off Volume for Various Storm Events and Curve Numbers</b>				
<b>Storm Recurrence Interval and Duration</b>	<b>Rainfall-Run-off Curve Number</b>	<b>Precipitation Depth (Inches)</b>	<b>Direct Run-off Depth (Inches)</b>	<b>Estimated Volume of Run-off <sup>1</sup> (Acre-Feet)</b>
10-year, 24-hour	61	1.9	0.06	7.1
	74	1.9	0.30	39
	80	1.9	0.50	64
25-year, 24-hour	61	2.1	0.10	12
	74	2.1	0.40	51
	80	2.1	0.62	80
50-year, 24-hour	61	2.3	0.14	18
	74	2.3	0.50	64
	80	2.3	0.75	96
100-year, 24-hour	61	2.7	0.26	33
	74	2.7	0.72	92
	80	2.7	1.03	132

<sup>1</sup> Based on the curve numbers and precipitation shown and a contributing area of 1540 reclaimed acres with a 'good' stand of vegetation

A method that uses soil curve numbers and relies on soil and vegetation indices was used to partition total precipitation into components that become direct run-off and the remainder that either percolates into the soil or is otherwise detained (SCS, 1982). The soils that will be on reclaimed slopes at final build-out will be manufactured from stockpiled native soils and sub-soils that covered the site prior to mining. The reclamation soils should be reasonably hydrologically similar to the native soils that existed prior to mining. Native soils on the area that will contribute to a potential containment pond are variable (SCS, 1989). Some are more permeable and would have less run-off associated with them while others are less permeable and would have higher run-off volumes. It was also assumed that all soils would be reclaimed and vegetated and that the vegetation would be in good condition so as to aid in reducing the amount of precipitation that becomes direct run-off. To illustrate the range of run-off volume that might be expected, a range of run-off curve numbers was used (**Table 2**). A curve number of 61 was used to simulate run-off volume from soils assuming that the entire site was covered with more permeable soils, a curve number of 74 to simulate run-off assuming that the entire site was covered with moderately permeable soils, and a curve number of 80 assuming that low permeability soils cover the entire site. In reality, the site will likely be covered by a complex mixture of soil types that range from higher permeability to lower permeability but the range of curve numbers selected should represent the response of the actual site.

To determine the tributary area that contributes run-off, maps provided by Luzenac (Luzenac 2003, Figures 2.1 Proposed Condition; and 2.5 Site-wide Drainage Plan) of the predicted topography of the mine at final build-out were used. At closure, the portion that will contribute run-off to lower Johnny Gulch consists of some undisturbed slopes as well as large portions of reclaimed overburden piles. Mine pits and areas that drain to the pits were not considered to contribute run-off to lower Johnny Gulch. Upper Johnny Gulch has been blocked off by mine overburden with a coarse rock underdrain. Run-off originating from the upper portion of the drainage will flow through the underdrain at a much slower rate and therefore would not contribute immediately to direct run-off from major rainfall events to potential pond sites.

For peak stormwater management purposes, a drainage area of approximately 2.4 square miles (1,540 acres) was calculated to contribute run-off to lower Johnny Gulch. This is to a point in Johnny Gulch opposite the center of the existing crude ore load-out (**Figures 1 and 3**). Potential storage sites upstream or downstream of this point would have somewhat lower or higher tributary areas.

Based on the soil curve numbers, precipitation depths and tributary areas described above, predicted run-off volumes are listed in **Table 2**. As can be seen from this table, run-off volumes can represent a very large volume of water to have to store under all but the most conservative estimates. This is because run-off volumes show a large range in values depending on the characteristic of the soils that may exist on the reclaimed mine surfaces at final build-out. As such, the range of values estimated for infiltration vs. run-off for the area, as a whole, necessarily reports a wide range of run-off volumes for each of the return rainfall event periods. For example, the 10-year 24-hour return event generates volumes in the range of 7 to 64 acre feet. It was decided that a more representative and accurate run off volume needed to be determined by actual percolation or infiltration testing of alluvial and overburden materials in the lower Johnny Gulch drainage (see "Infiltration Testing" section below).

---

## Run-off Components

During a typical 24 hour storm event, precipitation is expected over the entire 24 hour period, with most of the total volume of precipitation occurring over a 6 to 10 hour period during the middle of the event. If a significant storm such as a 25-year, 24-hour event were to occur at the Yellowstone Mine site, there would be direct run-off from the storm that reports to a series of proposed ponds in lower Johnny Gulch (**Figure 3**). Concurrent flow from the overburden pile underdrain system is not expected, due to the lag time between passage of the storm and when water discharges from the underdrain.

The underdrain collects surface water run-off from upper Johnny Gulch located to the west of Luzenac's westernmost property boundary (**Figure 1**). A flow of about 55 cfs has been calculated (Camp, Dresser and McKee, 1997) for the 10-year 24-hour storm event for this upper portion of the Johnny Gulch basin. Water flows from upper Johnny Gulch into a storm water pond with a storage capacity of approximately 5 acre-feet (**Figure 1**). Water flows from the pond into the rock drain that is designed to transport water beneath the Overburden Piles.

Year-round flow in upper Johnny Gulch has only been observed down to a point about one mile west of the Yellowstone Mine site. Downstream of this location, the stream channel flows over dolomite and a fault, and below this point the stream flow becomes ephemeral (flows only in response to major rain events and snowmelt). This flow condition is typical of many mountain streams where the source of stream flow occurs at higher elevations from snowmelt and springs/seeps, with flow declining at lower elevations where the water infiltrates into a greater thickness of alluvium in the valley bottom. In addition, much of the water that flows into the underdrain will infiltrate into bedrock or buried alluvium instead of passing through the underdrain and becoming a surface water expression in lower Johnny Gulch below the outfall of the underdrain.

In 1981, two flumes were installed in Johnny Gulch – upper flume (F-1) above the mine area, and lower flume (F-2) below the mine area. Continuous flow data were recorded at these two flumes from early May through September 1981, with the F-2 record extending to mid-November. At the upper flume, flow occurred during the entire period of record, ranging from 250 gpm in May-June to 50 gpm in August-September. At the lower flume, the largest flow recorded was 60 gpm in May, with no flow occurring from July through November. At the time these stations were monitored no overburden had been placed in Johnny Gulch. In addition, two weirs were installed in 1999, one upstream and another downstream of the mine site. The stations were monitored continuously through 2001. No discharge over the lower weir was reported through out this period of time. Overburden had been placed in Johnny Gulch prior to this sampling period. Since that time water flows have been measured at the lower weir during spring run-off and following storm events. The maximum flow measured has been about 100 gpm. Over this most recent period of measurement, it was noted that the lower weir site was dry greater than 90% of the time (flows are measured about 30 days per year), and that high flows following storm events were typically observed at the weir one to several days after the actual storm event. This suggests that water passing through the rock drain must be infiltrating into alluvial materials beneath the overburden piles or saturating the overburden in order to

show a reduced flow at the weir relative to the upstream site. In addition, the delay in peak flow reporting to the lower weir suggests that the material in the drain severely retards the flow of water through the 6000 foot long drain.

A 25-year, 24-hour event would certainly produce an increase in the drainage emanating from the rock drain. However, it is assumed that any increase in flow from the rock drain would occur well after the peak flow period of the actual 25-year, 24-hour event. As we shall see below (pond infiltration section), with a one or more day delay in the flow reporting to the lower storm water retention ponds, infiltration rates from the ponds are sufficient to create the additional volume needed to store the anticipated flow emanating from the rock drain.

In order to estimate the additional storage volume that might be necessary to contain flow from the rock drain, Maxim used a predicted rock drain flow of 1.5 gallons per minute which is the estimated rock drain flow that will occur from overburden seepage at the end of a hypothetical 100-year post-reclamation period (Maxim 2002). In addition, short term duration flows from the underdrain are anticipated to be as large as those historically measured at 100 gpm. The inflow rate into the ponds during the 25-year, 24-hour storm event is about 57 cfs, or 26,650 gpm. The combined flow rates from the rock drain, if they were to accumulate in the proposed pond concurrently with direct run-off from a major storm with duration of 24 hours would amount to a volume of somewhat less than 0.12 acre-feet (**Table 3**). This volume is negligible in comparison to the volumes and to the estimated uncertainty in volumes that result from variable soil curve numbers shown in **Table 2**. Even if the flow volume is off by a factor of 10, this still represents an insignificant proportion of the total run-off from the site for the given storm event. For this reason and at this stage of planning, it is not necessary to add additional volume in a proposed pond to account for flow from the rock drain.

Of the approximately 2.4 square miles that would drain to lower Johnny Gulch at final closure, about two-thirds would consist of reclaimed rock piles. Most of the remaining third consists of undisturbed, native ground from which run-off flows into constructed channels that cross the reclaimed rock piles. Only about 140 acres or 0.22 square miles will consist of native, undisturbed ground that will contribute run-off directly to lower Johnny Gulch without first contacting overburden rock. This small area lies downstream (east) of the toe of the overburden rock pile at final build-out (**Figure 2**). The relative amount of run-off from this small area that does not contact overburden rock is also small and will depend on the nature of the soils on these areas in comparison to reclamation soils over the remainder of the site. Native, undisturbed ground consists of mixed soils some of which have higher infiltration rates and some of which have lower infiltration rates. A curve number of 74 was used to simulate the runoff from these. Under this simplifying assumption, the relative amount of run-off that does not contact overburden rock before reaching a proposed pond, is  $0.22/2.4$  or 9% of the total run-off (**Table 3**). The remaining 91% of the total run-off volume comes from overburden piles that would be reclaimed in closure (**Table 3**).

**Table 3**  
**Estimated Run-off Components, 25-year, 24 hour Event<sup>1</sup>**

<b>Run-off Components</b>	<b>Percent of Total Run-off</b>	<b>Estimated Run-off Volume (acre-feet)</b>
Johnny Gulch Rock Drain	0%	0.12
Overburden Piles	91%	46.29
Native Undisturbed Ground	9%	4.59
<b>TOTAL</b>	<b>100%</b>	<b>51.00</b>

<sup>1</sup> Assumes a uniform Rainfall-Run-off Curve of 70

Looking at water quality through time, it is likely that if elevated nitrate levels were to develop that this would occur in flow from the rock drain that collects seepage from the Johnny Gulch Overburden Pile. This component could easily be separated or segregated for storage and treatment if necessary; however the other two surface run-off components would be very difficult to separate from one another. Because of the large volume of water that runs off from the surface during major storm events, it is unlikely that the surface run-off from the overburden pile would contain elevated nitrate levels near the 10 ppm standard or the proposed trigger value of 7.5 ppm. This is because the large volume of rainfall dilutes the initial rinse of nitrate from the overburden rock. The larger flow associated with storm events would, however, likely contain suspended sediment that needs to be captured and controlled by the check dams and sedimentation ponds to allow settling of suspended material before discharging into the stormwater infiltration basins.

---

## Run-off from Operational (Unreclaimed) Overburden Rock Pile Surfaces

It is also instructive to consider run-off that might occur at intermediate stages of mining before final reclamation is complete (Figure 2). One intermediate stage of interest occurs just before the overburden rock is covered by a reclamation cover and revegetated. The surface of the overburden rock pile in this scenario would consist of a coarse rock and would generally be unvegetated. It seems likely that reclamation of the overburden rock might proceed in a piecemeal process. That is, one part or parts of the overburden rock might have a reclamation cover with vegetation established while other parts are still under construction. However, for the purpose of determining run-off for this scenario, it was assumed that the overburden rock pile would be fully built and the entire pile surface would be a bare overburden rock surface. The character of the material in the overburden piles consist predominantly of coarse rock material with a considerable amount of interstitial or interclast fine- to very fine-grained limestone material.

The rainfall-run-off response from a bare overburden rock surface would differ from that of a reclaimed surface due to several factors. The largest of these factors is the lack of vegetation and a reclamation soil cover. The lack of vegetation and soil cover would tend to increase run-off from the overburden rock surface in comparison to the reclaimed surface. But because of the large amount of the coarse rock within the overburden pile, more rainfall may tend to infiltrate leading to less run-off when compared to a reclaimed surface.

The HELP model was used to estimate the rainfall-run-off response of the overburden rock surface. The HELP model is a model that calculates the percolation of precipitation through any arrangement of soil and rock layers. It was developed for applications to sanitary landfills but has also been used for mining applications. Previously, the HELP model has been used to estimate the discharge from the rock drain that will be built under the overburden rock pile (Maxim 2002). One component of the model estimates rainfall-run-off curve numbers for a particular surface given information about the gradation of materials in the surface and the state of vegetation on that surface. Based on observation, it was assumed for modeling purposes that the gradation of the overburden rock pile surface ranges from rock, gravel and coarse sand to locally fine- clayey material. It was also assumed for modeling purposes that the surface would be unvegetated. Based on these assumptions, the HELP model estimated that the curve number ranges from about 67 to 71, which falls within the range of values that is shown on **Table 2**. Because the relative magnitude of the two off-setting effects of vegetative cover vs. potentially high infiltration rates in the coarse grained overburden piles is not known it was decided to include the overburden materials in the site specific infiltration testing program.

---

## Site Specific Infiltration Testing

### Introduction

Maxim conducted seven (7) double ring infiltrometer tests on various materials in the vicinity of the proposed pond sites (**Figure 3**) and on material in the East Overburden pile in the lower Johnny Gulch drainage (**Figure 1**) to determine infiltration/run-off characteristics. All testing followed the standard ASTM protocol D-3385-88 for "*Double Ring Infiltrometer Testing*".

The following sites and materials were tested:

- 1) Four (4) tests of soils underlying the proposed sediment ponds (**Figure 3**); approximately the upper 4 to 24 inches of vegetation, and shallow topsoil was removed prior to testing to simulate an excavated pond base
- 2) Three (3) tests of overburden material from the existing East Overburden Pile (**Figure 1**); the areas selected for testing were selected to avoid areas of ponding that may have collected fine grained materials at the surface and areas compacted by equipment

Depth to the regional groundwater table in the entire lower Johnny Gulch area is over 210 feet below the surface and occurs in bedrock. In two monitor wells drilled along the valley axis in lower Johnny Gulch (JG-1 and JG-2, **Figure 1**) the entire 100+ feet of alluvial materials is dry. For the most part, overburden materials in the East Overburden Pile (**Figure 1**) have been placed over this dry alluvial material.

The data recorded during infiltration testing and graphical representations of these data are presented in **Appendix A** for each site tested. It should also be recognized that infiltration rates from infiltrometer testing are affected by and corrected for hydrostatic head by normalizing the data, however, in a typical rain storm event no significant head is developed. The areas tested under the proposed pond locations will be operating under a head produced by water standing in the ponds. However, for overburden pile materials infiltration will not be driven by a head and therefore infiltration values measured by testing only approximate values of the actual infiltration rates.

### East Overburden Pile Infiltration Testing

Infiltration rates on the East Overburden Pile were measured at three sites denoted WREA, WREA-2 (at the northeast end of the East Overburden pile) and WREB (at the west end of the East Overburden Pile) (**Figure 1**). Results were somewhat variable.

At WREA2, infiltration rates initially were about 2.2 in/hour and ranged from as much as 2.9 in/hour to as little as 2.1 in/hour during the test (**Appendix A**). Rapidly decreasing initial infiltration rates normally observed during infiltration tests were not observed at this site and is attributed to heavy rains prior to testing which caused near saturated shallow soil conditions. For purposes of the analysis, a conservative long term infiltration rate at this site of 2.1 inches per hour was used.



At WREA, very slow infiltration necessitated conducting the test overnight in the absence of regular infiltration rate measurements. Prior to leaving the site for the night, a sufficient volume of water was added to the infiltrometer rings to allow measurement of the remaining water level the following morning. Additional infiltration rate measurements were made after the overnight measurement. It appears that infiltration at this site was much slower than at WREA2 (located only about 3 meters away). The minimum infiltration rate recorded prior to leaving the site overnight was approximately 0.12 inches per hour (**Appendix A**). Subsequent measurements indicate that infiltration rates increased however it is unclear whether this was because of increased head produced by additional water added to sustain the test overnight or due to a breach of the bentonite needed to seal the infiltrometer rings in the coarse overburden material. The conservative 0.12 inches per hour value was used for further analysis.

At WREB, test results exhibited rather a more typical pattern of infiltration than at either of the first two sites. At this site, unlike the others, an approximately 3-inch thick surface layer of somewhat compacted clay-rich material was excavated prior to installation of the infiltrometer rings. Infiltration started out high (approximately 16 inches/hour) and decreased in a smooth curve to approximately 2.15 inches per hour after about 4.7 hours of the test (**Appendix A**). The rate appeared to be decreasing slightly at the end of the test so a curve of the form

$$F = F_c + (F_0 - F_c)^{(-kt)}$$

Where F = Infiltration Rate at any time t after test initiation

F<sub>0</sub> = Initial Infiltration Rate

F<sub>c</sub> = Final infiltration rate at infinite time after test initiation

K = a constant derived from the visual fitting process

t = time after test initiation

exp = The naperian exponential operator (e)

was fit to the data from the test and predicted the infiltration rate for larger storm periods. Based on this fit curve, the long-term infiltration rate at this site will approach 1.5 inches per hour. This value was used in further analysis.

To determine a curve number that would be representative for each of these results, we first found the storm depth for the site that had a peak rainfall rate which was the same as the estimated infiltration rate at each site. Then the curve number which produces zero runoff for that storm event was determined. **Table 4** table below summarizes these results.

<b>Table 4</b> <b>Long Term Infiltration Rates and SCS Curve Numbers for</b> <b>Overburden Materials</b>				
<b>Site</b>	<b>Estimated Long-Term Infiltration Rate (in/hr)</b>	<b>Storm Depth with same Peak intensity as Infiltration at Left (inches)</b>	<b>24-hour Storm Recurrence Interval with Depth at Left</b>	<b>Curve Number that Produces zero Runoff for this event</b>
WREA	0.12	0.09	< 2-year	92
WREA2	2.1	1.5	>5-year and < 10 year	60
WREB	1.5	1.1	2-year	66
			<b>Average</b>	<b>72.7</b>

As can be seen from **Table 4**, the infiltration rate variability measured in the field is reflected in the runoff expected. At one site (WREA), runoff could be expected frequently from storms with as little precipitation as 0.09 inches. At the other extreme, runoff from site WREA-2 would not be expected except from fairly extreme storms with a total precipitation of 1.5 inches or more and these would tend to occur infrequently (with a return interval of greater than 5 years).

For purposes of estimating the overall runoff from the East Overburden Pile site, the average of the curve numbers for the three infiltration test sites, 72.7 was used (**Table 4**).

The scenario of interest in this case is one in which a bare overburden pile exists over most of the drainage area, except where native ground will be left in the basin, and will drain to the proposed storm water ponds. Native, undisturbed ground has been discussed previously and a curve number of 74 was used to simulate the runoff from materials.

The total drainage area that will contribute to storm water ponds at final build-out is approximately 2.4 square miles acres (assuming a series of storm water ponds centered about and opposite of the existing load-out structure). Of this, a maximum of approximately two thirds could exist as bare overburden. Of the remaining third, most would be native ground that would drain across bare overburden pile surfaces before reaching Johnny Gulch and the remainder (approximately 140 acres) would lie downstream of the East Overburden Pile. Runoff from areas downstream of the overburden pile would not contact the overburden rock.

An area-weighted curve number for the entire lower Johnny Gulch site was calculated based on the average curve number for the three measured overburden infiltration sites (72.7) and the

and the curve number for native surfaces (74). The weighted curve number is 73.1. **Table 5** below summarizes volume of runoff expected based on this weighted curve number.

<b>Table 5</b> <b>Run-off Expected from Area Weighted Soil Curve for Lower Johnny Gulch</b>				
<b>Storm</b>	<b>Precipitation Depth (inches)</b>	<b>Runoff Depth (inches)</b>	<b>Runoff Volume (acre-feet)</b>	<b>Notes</b>
5-year, 24-hour	1.4	0.10	12.8	
10-year, 24-hour	1.9	0.28	35.9	MDEQ minimum requirement
15-year 24-hour	2.01	0.31	40.0	Total in-pond storage of proposed pond system
25-year, 24-hour	2.1	0.37	47.5	
35-year, 24-hour	2.2	0.42	53.9	
50-year, 24-hour	2.3	0.47	60.3	
100-year, 24 hour	2.7	0.68	87.3	

Knowing that the estimated storage capacity of the five lower Johnny Gulch ponds was 40 acre feet, back calculations were used to determine that a 15 year 24-hour return event could be stored in the ponds without a discharge from the lowermost pond. This calculation does not take into account any infiltration from the lower ponds.

## Pond Infiltration Testing

Infiltration rates measured within pond areas were also variable (**Appendix A** and **Table 6**). Rates reported in **Table 6** are those observed at or near the end of the test period. In most cases, rates appeared to be decreasing even at the end of the test so these rates should be considered as maximum values.

Based on conceptual drawings of the ponds, at full pool there would be about 11 acres inundated in the 5 ponds. Within these ponds there would be about 40 acre-feet total available storage and the average depth at full pool would be about 4 feet.

<b>Table 6</b> <b>Infiltration Rates for Storm Water / Sediment</b> <b>Retention Ponds</b>	
<b>Site</b>	<b>Infiltration Rate End of</b> <b>Test (inches per hour)</b>
Pond 5A	1.33
Pond 5B	0.43
Pond 6A	0.47
Pond 7A	1.74
<b>Average</b>	<b>0.99</b>

Using the average infiltration rate per foot from **Table 6** above and multiplying by the average full pool head of 4 feet and multiplying again by the combined surface area of the ponds, gives a maximum infiltration rate of 46.5 cubic feet per second – a significant rate.

## Peak Inflow and Infiltration Rates

Given the fact that there are such high infiltration rates out of the bottom of the collective ponds, 46.5 cfs, it would seem desirable to calculate the increase in storage capacity gained by this high infiltration rate for a given storm event, in particular the one that can store the entire volume without a discharge from the lowermost pond. Peak inflow rates were calculated for various storm events in cfs, and the results are presented in **Table 7**. **Table 5** indicates that the 15 year storm event will yield about 40 acre feet of water. It is also known that the rate of infiltration from the collective pond bottom is driven by hydrostatic head and that it will take a certain amount of time to completely fill all of the collective ponds to an average 4-foot head (just before overflowing the lowermost pond).

The inflow rate is also expected to be variable over time throughout the storm event. To simplify the calculations it was assumed that because it takes time to fill the ponds and reach

the maximum infiltration rate that the effective infiltration rate over the storm event is only about half of the maxim rate or about 23.3 cfs. So for the 15 year, 24-hour storm event that balances a variable inflow rate peaking at 46.5 cfs (**Table 7**) with an infiltration rate of about 23.3 cfs, one can calculate that the combined volume of maximum inflow (40 acre feet) added to the amount of infiltration (about 19 acre feet, assuming infiltration would occur during a 10-hour period coinciding with the period of peak rainfall intensity) produces a total effective storage capacity of approximately 59 acre feet. This effective storage capacity suggests that the ponds can store the 35-year, 24-hour event (total volume 53.9 acre feet) without overflowing the lowermost pond. In fact it should be able to store nearly all of the volume of the 50-year, 24-hour storm event, 60.3 acre-feet. Therefore one would statistically anticipate that the lowermost pond might overflow only once during the projected 50-year mine life at the Yellowstone Mine site.

For storms beyond the 15-year, 24-hour storm, peak inflows were estimated using a method developed by the USGS (Omang 1992) that relies on drainage area and portion of the basin with an elevation above 6000 feet. This analysis conservatively assumes that all of the drainage basin lies above 6000 feet. Peak inflows for the 15, 25, 35, 50, and 100-year events are presented in **Table 7**.

<b>Table 7</b> <b>Peak Inflow for Various Storm Event Recurrences</b>	
<b>Storm Event Recurrence</b>	<b>Peak Inflows (cfs)</b>
15-year 24-hour	46.5
25-year 24-hour	57
50-year 24-hour	70
100-year 24-hour	85

### **Residence Time**

Residence time, the amount of time it takes to move a given volume of water through all 5 sediment ponds in the series, is dependent on peak inflows. From **Table 5** above listing estimated runoff volumes from various storms and the combined effective capacity of the sediment ponds (approximately 57 acre-feet), it is apparent that for storms up to about the 25-year, 24-hour storm, all runoff is contained within the sediment ponds and retention time for these or smaller storms can be considered to be infinite.

The residence time for larger storm events in the combined series of sediment ponds can be obtained by dividing combined volume of the ponds (approximately 40 acre-feet) by the peak inflow rate. Doing so yields the result that residence time during the 50-year event is approximately 8 hours, and the residence time during the 100 year event is approximately 6.5 hours. Settling efficiency in a series of small ponds is less than in a single large pond with the

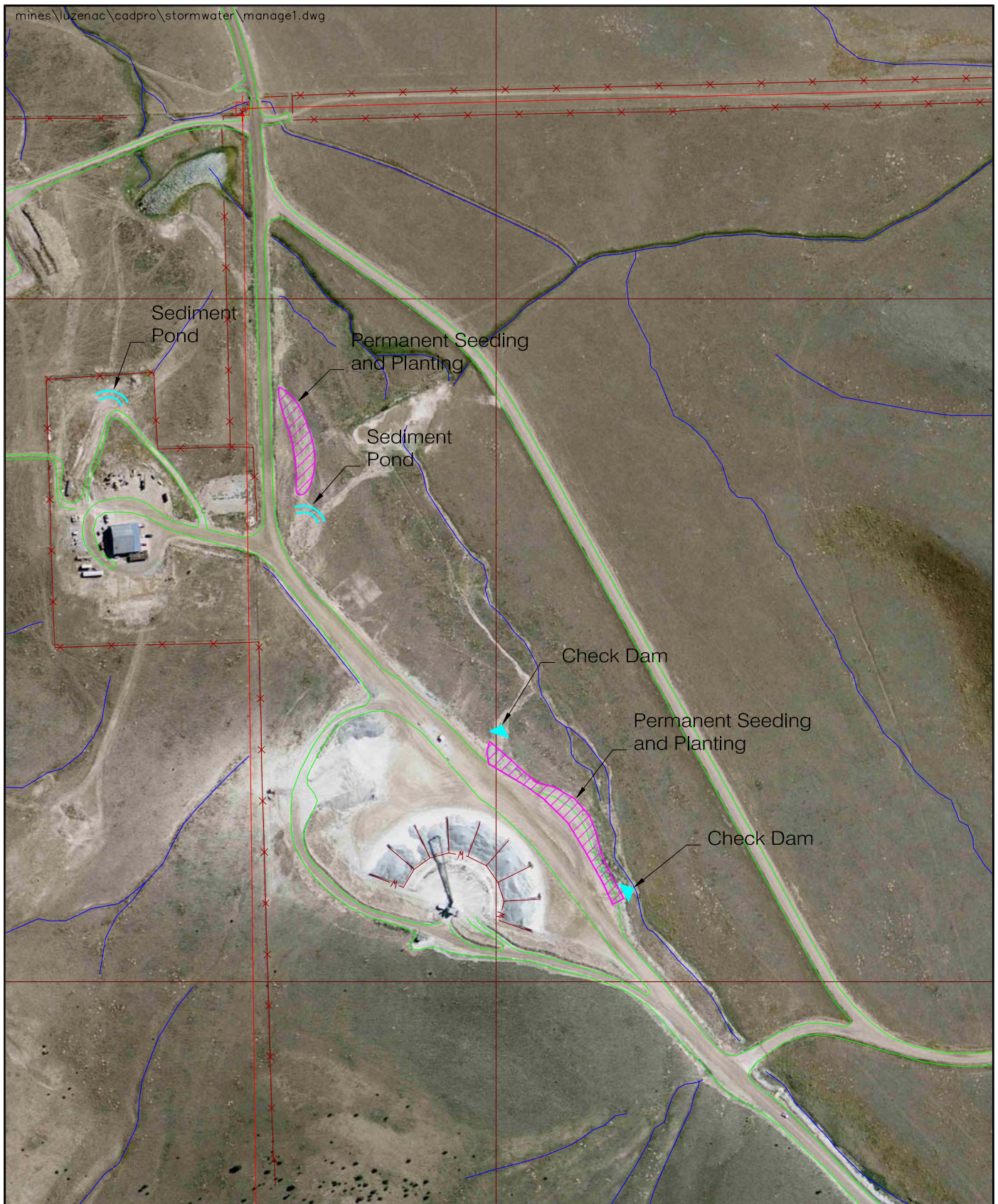
same volume as the combined series. The most efficient settling of smaller particles will occur in the largest of the ponds within the series. In this instance the largest sediment pond planned will contain approximately 11 acre-feet of storage. Residence time in this single pond during the 50-year event would be approximately 1.9 hours and during the 100-year event it would be approximately 1.6 hours.

### **Best Management Practices for Source Control of Sediment**

Luzenac has implemented the following Best Management Practices (BMPs) in the lower portion of Johnny Gulch on Yellowstone Mine property in order to minimize the potential for sediment transport off of disturbed sites into sediment / storm water collection ponds. The location of these BMP sites is shown on **Figure 4**.

- 1) Regrading, soil amendment, fertilization and seeding (using the established and approved seed mix; Luzenac, 2003, Table 3.2) of two disturbed fill-slope areas. One adjacent to and southeast of the ore Load-out Facility and the other south of the mine access road and south of the Visitor's Reception and Maintenance Facilities (**Figure 4**). The objective here is to provide a permanent vegetative cover (completed Fall – 2005).
- 2) Constructed two check dams in areas of sediment transport off of the southeast side of the mine access road and the Crude Ore Load-out Facility (**Figure 4**). These check dams were constructed to filter sediment, but allow the passage of water through the structures. Routine maintenance of the structures and cleaning the basins behind the check dams will be provided (completed Fall – 2005).
- 3) Constructed two sediment ponds, one south of the mine access road and adjacent to pond 8A, and the other on the east side of the Visitor's Reception and Maintenance Facilities (**Figure 4**). Routine maintenance of the sediment pond embankments and cleaning the basins behind the embankments will be provided (completed Fall – 2005).
- 4) Removed the fine-grained talc storage pile at the Crude Ore Load-out facility (**Figure 4**). The fines were identified as a source of sediment with the potential to be transported to the lower ponds during significant storm events. Following the removal of the fines, the area was top-soiled and seeded to stabilize the area (completed Summer – 2005).





0 Feet 400

**MAXIM**  
TECHNOLOGIES

9902295.580

Proposed Stormwater Best Management Practices  
Luzenac Stormwater Management Design  
Yellowstone Talc Mine  
**FIGURE 4**

---

## LAD System Designs

A method of removing excess water from the retention ponds may be necessary at some point in the future. While sediment can likely be controlled through a series of smaller ponds working in series, the potential for nitrate contaminated water in the future, however remote, may require discharge to a Land Application Discharge (LAD) system. The required materials should be assembled, dedicated, and kept on site to operate an LAD system on an emergency basis. As a minimum this should include a portable (perhaps trailer- mounted) pump with a capacity to pump 250-500 gpm (the Yellowstone Mine currently has a portable pump with a 500 gpm capacity) and sufficient solid pipe to reach an area (probably south of the USFS Johnny Gulch road or on reclaimed portions of the overburden piles). This solid pipe should probably discharge through agricultural irrigation pipe with sprinkler heads (although other designs are possible). A good location for the potential LAD discharge area might be in the large grass covered area south of the USFS Johnny Gulch road on **Figure 3**. This area extends considerably farther to the south than is indicated on this figure.

It is anticipated that the MDEQ may request that if open land (rather than overburden piles) is used for the land application system that the area to be used be percolation-tested to determine reasonable sustained infiltration rates.

The risk of a discharge of mine water exceeding the standard for nitrate is estimated to be low. Furthermore, if future nitrate levels were to be elevated above the surface and groundwater standards, this would occur very slowly over a long period of time (months to years). The recommended monitoring would identify the rise in nitrate concentration as it approached the standard (10 ppm) or some arbitrary threshold value (7.5 ppm has been suggested in the Permit Amendment Document) and would allow for time to design and permit an LAD system to distribute the water. Under these circumstances, the MDEQ will likely require soil attenuation testing to determine the ability of the soils and vegetation to remove nitrate from the waters being applied.

### Other Nitrate Source

One of two down-gradient monitor wells located in the Lower Shop Area and completed in bedrock (well SW-1), has recorded elevated nitrate concentrations in groundwater (6.18 ppm 4/2002), but levels are well below the human health standards (10 ppm). This well was drilled next to an abandoned septic drain field, which most likely accounts for the anomalous nitrate levels. In support of this, nitrate levels in well SW-1 have been decreasing over time.

## Wetland Treatment Designs

A combination of infiltration and designed wetlands may be a viable solution for long term passive treatment for the storm water collected in retention ponds. However, no specific designs will be submitted until final pond configurations are selected. If existing conditions continue into the future (little water in the ponds and no surface discharge from the ponds) keeping the wetland wet enough to support growth may be the biggest difficulty to overcome for long-term sustainability of the wetland vegetation.

## Monitoring

Additional monitoring should be conducted over the life of the mine to determine if the backup water disposal (LAD) system should be constructed or not. It is recommended that pond 8A, the furthest downstream of the new ponds proposed for construction be sampled at the same frequency as the outlet at pond 5A (monthly during discharge, otherwise semi-annually), using the same protocol and the same suite of parameters as those of the existing pond 5A (**Table 8**, complete list). Luzenac may want to consider relocating its MPDES discharge point to a location below pond 8A at some point in the future.

In addition, it is further recommended that the construction of a new groundwater monitoring well designed to measure water in the unconsolidated alluvial materials (above the bedrock contact) either down-gradient of pond 10A or between ponds 8A and 10A. This well should be sampled quarterly, at the same frequency and for the same parameters (**Table 8**, complete list) as other groundwater wells on the property. Two down-gradient bedrock wells already exist and are sampled at the Visitor Registration and Maintenance Facility (wells SW-1 and SW-2, Luzenac, 2003, Table 2.16).

<b>Table 8</b> <b>Surface<sup>1</sup> and Groundwater<sup>2</sup> Quality Monitoring Parameter List</b>			
Field Parameters	Common Ions	Metals	Others
Complete List			
pH (s.u.)	Calcium (1.0)	Aluminum (0.10)	Hardness as CaCO <sub>3</sub> (1.0)
SC (µmhos/cm)	Magnesium (1.0)	Arsenic (0.003)	Alkalinity as CaCO <sub>3</sub> (1.0)
Temperature (C°)	Sulfate, SO <sub>4</sub> (1.0)	Copper (0.001)	Nitrate+Nitrite as N (0.01)
Flow (gpm) [SW]	Carbonate, CO <sub>3</sub> (1.0)	Iron (0.01)	Total Dissolved Solids (1.0)
SWL (feet) [GW]	Bicarbonate, HCO <sub>3</sub> (1.0)	Lead (0.003)	Total Suspended Solids (1.0)
Turbidity (NTU)		Manganese (0.005)	Ammonia as N (0.05)
		Zinc (0.01)	Oil & Grease (1.0)
Partial List			
pH (s.u.)	Sulfate, SO <sub>4</sub> (1.0)		Nitrate+Nitrite as N (0.01)
SC (µmhos/cm)			Total Dissolved Solids
Temperature (C°)			Total Suspended Solids
Flow (gpm) [SW]			
SWL (feet) [GW]			
Turbidity (NTU)			

<sup>1</sup> Surface water samples are unfiltered and analyzed for total metals, as per the standards.

<sup>2</sup> Groundwater samples are filtered and analyzed for dissolved metals, as per the standards.

---

## Recommendations

The following recommendations are made:

- 1) Reconstruct pond 10A (Figure 1) to operate in series with other proposed upstream storm water / sediment retention ponds and redirect Ruby Gulch Ditch to by-pass pond 10A.
- 2) Ensure that no water from the Ruby Gulch Ditch be allowed to enter pond 8A (or pond 10A).
- 3) Reconstruct ponds 8A and 5B relatively soon as storm water /sediment retention ponds.
- 4) Construct other ponds (6A, 5A and 5B) to operate in series with ponds 7A, 8A and 10A on a time frame to be established by Luzenac in cooperation with the MDEQ.
- 5) Provide for monitoring of surface and groundwater. Include the furthest downstream of the new ponds, pond 8A in the routine surface water sampling events and analyze for the complete set of surface water constituents (**Table 8**). Add an additional alluvial/colluvial monitoring well downstream of pond 10A or between ponds 8A and 10A. Monitor the new well water quality using the groundwater monitoring protocol and the complete set of constituents (**Table 8**).
- 6) Provide the capability for constructing an emergency LAD system with pump and pipe materials stored on site.
- 7) If surface water quality is consistently above 7.5 ppm nitrate, begin the design and permitting of an LAD system in cooperation with the MDEQ. This will likely require percolation and soil column testing for nitrate attenuation to determine the rate and area required for application of stored water.
- 8) It is recommended that Luzenac consider active construction of the remaining portion of the Johnny Gulch underdrain system just prior to overburden area construction (rather than end dumping of material over the embankment) using large diameter boulders of dolomite placed in an excavated channel-way (not volcanic rock that is easily weathered to smaller sized material). This will maximize flow through the remaining portion of the underdrain, minimize surface area of overburden in contact with water in the drain, and minimize water saturation of nitrate-laden overburden and potential for remobilization of nitrate from overburden material.

## References

- Camp, Dresser, and McKee, 1997. Sitewide Drainage and Sediment Control Plan, Report to Luzenac America, Inc. Yellowstone Mine. April 1997. 15p. appendices and plates.
- Luzenac America, Inc., 2003. *Mine Life Extension, Amendment to Operating Permit 00005*, Luzenac America's Yellowstone Mine, First Deficiency Review Response. Submitted to Montana Department of Environmental Quality. Dated June 6, 2003.
- Montana Department of Environmental Quality, 2004, Draft Environmental Analysis of the Luzenac Yellowstone Mine – Life of Mine Permit Amendment December 2004.
- NOAA, 1973. NOAA Atlas 2, Precipitation Frequency Atlas of the Western United States, Volume I – Montana, Dept of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, MD, 1973.
- Omang, 1992. Analysis of the Magnitude and Frequency of the Floods and Peak Flow Gauging Networks in Montana, Water Resources Investigation Report 92-4048. U.S. Geological Survey, Helena, Montana.
- SCS, 1982. TR-55 Computer Program User's Manual, Second Ed., United States Department of Agriculture, Soil Conservation Service, June, 1986.
- SCS, 1989. Soil Survey of Madison County Area, Montana, United States Department of Agriculture, Soil Conservation Service, 1989.

**APPENDIX B**  
**MPDES MT0028584 PERMIT**



## MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

### AUTHORIZATION TO DISCHARGE UNDER THE MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with Montana Water Quality Act, Title 75, Chapter 5, Montana Code Annotated (MCA) and the Federal Water Pollution Control Act (the "Clean Water Act"), 33 U.S.C. § 1251 *et seq.*,

**Luzenac America, Inc.**

is authorized to discharge from its Yellowstone Mine

located within Sections 3, 4, 5 and 9 Township 9 South, Range 1 West; and, Sections 32, 33 and 34 of Township 8 South, Range 1 West

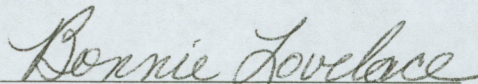
to receiving waters named, Johnny Gulch and unnamed irrigation ditch

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit. The wasteload allocation specified herein support and serve to define the total maximum daily load for affected receiving water.

This permit shall become effective: July 1, 2006

This permit and the authorization to discharge shall expire at midnight, June, 30, 2011.

FOR THE MONTANA DEPARTMENT OF  
ENVIRONMENTAL QUALITY



Bonnie Lovelace, Chief  
Water Protection Bureau  
Permitting & Compliance Division

Issuance Date: May 9, 2006



## **MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY**

### AUTHORIZATION TO DISCHARGE UNDER THE MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with Montana Water Quality Act, Title 75, Chapter 5, Montana Code Annotated (MCA) and the Federal Water Pollution Control Act (the "Clean Water Act"), 33 U.S.C. § 1251 *et seq.*,

**Luzenac America, Inc.**

is authorized to discharge from its Yellowstone Mine

located within Sections 3, 4, 5 and 9 Township 9 South, Range 1 West; and, Sections 32, 33 and 34 of Township 8 South, Range 1 West

to receiving waters named, Johnny Gulch and unnamed irrigation ditch

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit. The wasteload allocation specified herein support and serve to define the total maximum daily load for affected receiving water.

This permit shall become effective: July 1, 2006

This permit and the authorization to discharge shall expire at midnight, June, 30, 2011.

FOR THE MONTANA DEPARTMENT OF  
ENVIRONMENTAL QUALITY

---

Bonnie Lovelace, Chief  
Water Protection Bureau  
Permitting & Compliance Division

Issuance Date: \_\_\_\_\_

## TABLE OF CONTENTS

Cover Sheet--Issuance and Expiration Dates

<b>I.</b>	<b>EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS &amp; OTHER CONDITIONS .....</b>	<b>3</b>
A.	Description of Discharge Points and Mixing Zone .....	3
B.	Effluent Limitations .....	3
C.	Monitoring Requirements .....	4
D.	Special Conditions .....	6
E.	Compliance Schedule.....	13
<b>II.</b>	<b>MONITORING, RECORDING AND REPORTING REQUIREMENTS .....</b>	<b>14</b>
A.	Representative Sampling.....	14
B.	Monitoring Procedures.....	14
C.	Penalties for Tampering .....	14
D.	Reporting of Monitoring Results .....	14
E.	Compliance Schedules .....	14
F.	Additional Monitoring by the Permittee .....	15
G.	Records Contents .....	15
H.	Retention of Records.....	15
I.	Twenty-four Hour Notice of Noncompliance Reporting .....	15
J.	Other Noncompliance Reporting .....	16
K.	Inspection and Entry .....	16
<b>III.</b>	<b>COMPLIANCE RESPONSIBILITIES.....</b>	<b>18</b>
A.	Duty to Comply.....	18
B.	Penalties for Violations of Permit Conditions.....	18
C.	Need to Halt or Reduce Activity not a Defense .....	18
D.	Duty to Mitigate .....	18
E.	Proper Operation and Maintenance.....	18
F.	Removed Substances.....	19
G.	Bypass of Treatment Facilities.....	19
H.	Upset Conditions.....	20
I.	Toxic Pollutants .....	20
J.	Changes in Discharge of Toxic Substances .....	20
<b>IV.</b>	<b>GENERAL REQUIREMENTS .....</b>	<b>22</b>
A.	Planned Changes.....	22
B.	Anticipated Noncompliance.....	22
C.	Permit Actions .....	22
D.	Duty to Reapply .....	22
E.	Duty to Provide Information .....	22
F.	Other Information .....	22
G.	Signatory Requirements .....	22
H.	Penalties for Falsification of Reports.....	24
I.	Availability of Reports.....	24
J.	Oil and Hazardous Substance Liability .....	24
K.	Property or Water Rights .....	24
L.	Severability .....	24
M.	Transfers .....	24
N.	Fees .....	25
O.	Reopener Provisions .....	25
<b>V.</b>	<b>DEFINITIONS .....</b>	<b>27</b>

I. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS & OTHER CONDITIONS

A. Description of Discharge Points and Mixing Zone

The authorization to discharge provided under this permit is limited to those outfalls specially designated below as discharge locations. Discharges at any location not authorized under an MPDES permit is a violation of the Montana Water Quality Act and could subject the person(s) responsible for such discharge to penalties under the Act. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge within a reasonable time from first learning of an unauthorized discharge could subject such person to criminal penalties as provided under Section 75-5-632 of the Montana Water Quality Act.

Outfall

Description

001

**Location:** At the end of the ditch, discharging into Johnny Gulch located at 45° 4' 45" N latitude, 111° 44' 6" W longitude.

**Mixing Zone:** None

**Treatment Works:** The treatment works consists of settling in a sump in the Yellowstone Mine pit bottom and pond 1A.

002

**Location:** At the end of the spillway discharging into the unnamed irrigation ditch, herein referred to as the Ruby Creek Irrigation Ditch (RCID), located at 45° 5' 24" N latitude, 111° 42' 0" W longitude.

**Mixing Zone:** None

**Treatment Works:** Treatment works consist of settling in series of ponds named 2A – 8A and run-off sediment control BMPs located near the crude ore load-out facility.

B. Effluent Limitations

**Outfall 001**

Beginning on the effective date of this permit and lasting through the term of the permit, the quality of effluent discharged by the facility shall, as a minimum, meet the limitations as set forth below:

Numeric Discharge Limitations: Outfall 001 <sup>1</sup>			
Parameter	Units	Average Monthly	Daily Maximum
Total Suspended Solids	mg/L	25	45
Footnotes: 1. See Definitions section at end of permit for explanation of terms.			

The instantaneous maximum limitation for oil & grease in any grab sample shall not exceed 10 mg/L.

There shall be no discharge which causes visible oil sheen in the receiving stream.

There shall be no acute toxicity in the effluent discharged by the facility.

#### **Outfall 002**

There shall be no discharge from this outfall except as a result of a precipitation event in excess of 1.9 inches in 24 hour period or the equivalent snow melt.

The permittee shall develop and implement a storm water pollution prevention plan (SWPPP) in accordance with Part I D. of this permit.

There shall be no discharge which causes a visible oil sheen in the receiving water or causes or concentrations of oil and grease at in excess of 10 mg/L in the discharge. ARM 17.30.637(1)(b)

#### **C. Monitoring Requirements**

As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

#### **Outfall 001**

Effluent monitoring requirements for Outfall 001 are summarized below.

### EFFLUENT MONITORING REQUIREMENTS OUTFALL 001

Parameter	Frequency	Type <sup>1</sup>
Effluent Flow Rate, gpm	Monthly	Instantaneous
Total Suspended Solids, mg/L	Monthly	Grab
Oil and Grease, mg/L	Monthly	Grab
pH, SU	Monthly	Instantaneous
Nitrate + Nitrite as N, mg/L	Monthly	Grab
Total Kjeldahl Nitrogen, mg/L	Monthly	Grab
Total Nitrogen, mg/L	Monthly	Calculated
Iron, Total Recoverable, mg/L	Monthly	Grab
Zinc, Total Recoverable, mg/L	Monthly	Grab
Hardness, mg/L	Monthly	Grab
Footnote: 1. See Definitions section at end of permit for explanation of terms		

### Outfall 002

Because discharge from Outfall 002 will be precipitation induced, effluent monitoring will be required within the first hour of any discharge event, followed by daily for the following 6 days and weekly thereafter until the discharge event ceases.

### EFFLUENT MONITORING REQUIREMENTS OUTFALL 002

Parameter	Frequency <sup>2</sup>	Type <sup>1</sup>
Effluent Flow Rate, gpm	Daily	Instantaneous
Total Suspended Solids, mg/L	Daily	Grab
Oil and Grease, mg/L	Daily	Grab
pH, SU	Daily	Instantaneous
Nitrate + Nitrite as N, mg/L	Daily	Grab
Total Kjeldahl Nitrogen, mg/L	Daily	Grab
Total Nitrogen, mg/L	Daily	Calculated
Iron, Total Recoverable, mg/L	Daily	Grab
Zinc, Total Recoverable, mg/L	Daily	Grab
Hardness, mg/L	Daily	Grab
Footnote: 1. See Definitions section at end of permit for explanation of terms 2. Discharge monitoring is required within the first hour of any discharge event, followed by daily for the next 6 days, and weekly thereafter until the discharge event at Outfall 002 ceases.		

## **Precipitation Monitoring**

To demonstrate compliance with permit conditions that describe when discharge is allowed to occur at Outfall 002 the accumulated precipitation within any continuous 24 hour period that caused discharge to occur at Outfall 002 must be reported; or, an equivalent snow pack melted within any continuous 24 hour period. Precipitation events must be measured using a rain gauge or equivalent device capable of measuring precipitation depth to an accuracy of 0.1 inches. Precipitation monitoring shall be conducted at either the lower shop and gatehouse facilities, or the offices and ore sorting facilities.

### **D. Special Conditions**

#### **1. Storm Water Management:**

The permittee shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) which achieves the objectives and the specific requirements listed below. A copy of the Plan shall be submitted to the Department in accordance with the requirements of Part II of this permit. The Plan shall be implemented as soon as possible but no later than twelve months from the effective date of the permit.

#### *General SWPPP Requirements*

- a. The SWPPP and associated documentation, as well as BMPs developed and implemented, must be accomplished using good standard engineering practices.
- b. The SWPPP must be retained onsite at the facility that generates the stormwater discharge. Provided no permanent offices/buildings are located at the facility site, a copy of these documents shall be retained at the office of the contact person identified in the permit application, at the office of the primary individual responsible for the implementation of the SWPPP, and shall be brought to the site at all times with these identified personnel. Should the identity of these responsible contacts/individuals change during the permit period, the permittee shall ensure measures are in place to transfer, and familiarize replacement personnel with the requirements pertaining to the SWPPP.
- c. The SWPPP must be signed in accordance with the signatory requirements of this permit.
- d. The SWPPP must be made available upon request of Department staff, such as during inspections.
- e. The Department may notify the permittee that the SWPPP does not meet one or more of the minimum requirements of this permit. After such notification

from the Department, the permittee shall make changes to the SWPPP and shall submit to the Department a written certification that the requested changes have been made. Unless otherwise stated by the Department, the permittee shall have 30 days after such notification to make the required changes. When the Department makes such notification, the permittee shall provide the Department with a copy of revisions to the SWPPP.

- f. The permittee shall amend the SWPPP whenever there is a change in design, construction, operation, or maintenance that has significant effect on the potential for the discharge of pollutants to surface waters, or if the SWPPP proves to be ineffective in achieving the general objective of controlling pollutants in a stormwater discharge covered under this permit. When such revisions are made to the SWPPP based upon this permit condition, the permittee shall provide the Department with a copy of revisions to the SWPPP.
- g. The SWPPP must identify the name of receiving surface waters. If there is a distinguishable point source discharge or outfall, the SWPPP must include a description of the size, type, and location of each point source discharge or outfall. A description of stormwater runoff flow and drainage patterns into the receiving surface waters must be provided.
- h. The SWPPP must identify a specific person or persons at the facility who are responsible for SWPPP development, implementation, maintenance, and revision. The SWPPP must clearly identify the responsibilities of each person. The activities and responsibilities of the person(s) must address all aspects of the SWPPP.
- i. The SWPPP must identify facility personnel training programs used to inform personnel responsible for implementing activities identified in the SWPPP or otherwise responsible for stormwater management of the components and goals of the SWPPP. Training should address topics such as spill response, good housekeeping, and material management practices. A schedule must identify the frequency for such training.
- j. The SWPPP must address preventative maintenance measures which include the inspection and maintenance of stormwater management BMPs. Qualified personnel shall be identified in the SWPPP to inspect the facility site and stormwater management BMPs following each significant stormwater rainfall event resulting in 0.5 inches of precipitation or more, or after significant snowmelt events. Inspections must be documented and maintained with the SWPPP. Inspections and their respective records must include tracking or follow-up procedures to ensure adequate response and corrective actions have been taken based on any problems or deficiencies observed during the inspection.
- k. The SWPPP must address good housekeeping measures to help maintain a clean, orderly, facility. Measures could include a routine schedule for the



managing/removal of waste materials, as well as routine inspections of potential problem areas.

- l. The SWPPP must include a General Location Map (such as a USGS topographic quadrangle map), extending one mile beyond the property boundaries of the facility, with enough detail to identify the location of the facility, any storm water discharges, and the receiving surface waters. The facility site must be clearly delineated on this map. The permittee may use the topographic map submitted with the application provided it indicates this information with respect to storm water discharges.
- m. The SWPPP must identify procedures and protocols to be implemented and used to meet the monitoring requirements of this permit.

#### *Identification of Potential Pollutant Sources*

The SWPPP must provide a description of potential pollutant sources which may reasonably be expected to affect the quality of storm water discharges. The SWPPP must identify all significant activities and materials that could potentially be significant pollutant sources. To accomplish this, the SWPPP must include, at a minimum:

- a. For each area of the facility with storm water discharges from regulated activities that have a reasonable potential to contain significant amounts of pollutants, a prediction of the direction of flow, and an identification of the types of pollutants and parameters of concern that are likely to affect the storm water discharge. Factors to consider include the toxicity of chemicals; quantity of chemical used, produced or discharged; the likelihood of contact with storm water; the history of any MPDES permit violations; and the characteristics and uses of the receiving surface waters. In the identification of potential pollutants, and depending on the type of facility, items to identify and assess may include:
  - i. Areas and management practices used for the storage, treatment, or disposal of wastes;
  - ii. Areas where significant spills and leaks of hazardous substances may have occurred;
  - iii. Areas and management practices used for the loading or unloading of dry bulk materials and liquids;
  - iv. Areas and management practices used for the outdoor storage of materials and/or products;
  - v. Areas and management practices used for outdoor manufacturing or processing activities;
  - vi. Areas and management practices used for vehicle fueling, washing, and maintenance;
  - vii. Dust or particulate-generating processes;
  - viii. Illicit connections and/or management practices;

- ix. Areas more susceptible to erosion; and,
- x. Areas with unstabilized sediment due to ground disturbance activities.

The permittee must evaluate these potential pollutant sources back at least three years prior to the date permit coverage is applied for the respective stormwater discharge.

- b. A summary of existing stormwater quality sampling test results which characterize historical pollutants in stormwater discharges.
- c. Estimate and define area(s) of relatively impervious surfaces (including paved areas and facility structural roofs) with respect to the total area drained by each point source discharge of stormwater.
- d. An evaluation of how the quality of any potential stormwater running onto the facility site would impact the facility's stormwater discharge.

*Stormwater Management Best Management Practices*

- a. SWPPPs must include a description of stormwater management Best Management Practices (BMPs) appropriate for the facility, including those used to divert, infiltrate, reuse, or otherwise manage stormwater runoff, that reduces pollutants in stormwater discharges from the site. The appropriateness and priorities of BMPs in a SWPPP shall reflect the identified potential sources of pollutants to stormwater at the facility in Part I.D.
- b. Reasonable and appropriate BMPs may include: reuse of collected stormwater (such as for process water or as an irrigation source); inlet controls (such as oil/water separators); snow management activities; infiltration devices, detention/retention devices (including constructed wetlands); run-on/runoff controls; diversion structures; flow attenuation by use of open vegetated swales, natural depressions, and other practices; and, ponds. Where practicable, industrial materials and activities could be protected by a storm resistant shelter to prevent exposure to rain or snow.
- c. The location and description of any treatment to remove pollutants that stormwater receives.
- d. The SWPPP must provide a description of measures to ensure the ongoing implementation and maintenance of BMPs. Inspections and maintenance activities, such as cleaning oil and grit separators or catch basins, must be documented and recorded. Incidents such as spills, leaks, other releases of potential pollutants, and/or other material/waste management problems, must also be documented and recorded.
- e. The SWPPP must address Spill Prevention and Response Measures as follows:

- i. Areas where potential spills may occur that could contribute pollutants to stormwater discharges, and their accompanying drainage points, must be identified clearly in the SWPPP.
  - ii. Where appropriate, specific material-handling procedures, storage requirements, and use of equipment, such as diversion valves, should be considered in the SWPPP.
  - iii. Procedures and necessary equipment for cleaning up spills must be identified in the SWPPP and made available to the appropriate personnel.
  - iv. Emergency spill/response contact and/or notification numbers must be listed in the SWPPP.
  - v. SWPPP records of spills must be updated when a significant spill or leak of hazardous substances occurs and must include a description of the specific origin and location of the release, a description of the materials released, an estimate of the quantity of the release, and a description of any remediation or cleanup measures which were taken.
- f. The SWPPP must address Sediment and Erosion Control BMPs as follows:
- i. The SWPPP must describe sediment and erosion control BMPs including various structural, vegetative, and/or stabilization measures.
  - ii. The SWPPP must allow for BMPs to be implemented as necessary.
  - iii. The SWPPP must address areas which have a higher potential for erosion due to topography, slope characteristics, facility activities, and/or other factors.
  - iv. An assessment of the nature of any fill material to be used, the existing soils located at the site, and the erodibility (high, moderate, or slight) of such soils must be provided in the SWPPP.
  - v. Stormwater discharges associated with construction activity at the facility site may be included under this permit provided the SWPPP is developed or revised to address these discharges as follows:
    - The SWPPP must identify and locate the BMPs to be used during and after the construction project to control sediment discharges to surface waters;
    - Final stabilization of disturbed areas must be ensured;
    - This Sediment and Erosion Control section of the SWPPP must be updated with a SWPPP modification to reflect new construction activity as necessary; and,
    - The SWPPP modification must be submitted to the Department prior to the start of construction.Provided these items are addressed, coverage for stormwater discharges associated with construction activity under this permit would commence on the date stated in the SWPPP or when construction starts.
  - vi. The SWPPP may include the use of BMPs such as sediment basins, detention/retention structures, berms, barriers, filter strips, covers, diversion structures, sediment control fences, straw bale dikes, seeding, sodding, and/or other control structures. Any SWPPP elements that

require engineered structures, such as detention ponds or diversion structures, must be prepared by a qualified individual using good standard engineering practices.

*SWPPP Site Map or Plan*

The SWPPP must include a site map or plan which indicates the following:

- a. An identification of each point source discharge of stormwater with a delineated outline of the respective drainage area;
- b. The sampling location of Outfall 002;
- c. Delineated drainage patterns which clearly indicate the stormwater runoff flow patterns (such as using arrows or detailed topographic contours to show which direction stormwater will flow);
- d. The "areas" identified in Part I.D.;
- e. The "BMPs" identified in Part I.D.;
- f. Major permanent facility structures;
- g. Each well where liquids associated with the facility are injected underground including any stormwater conveyances;
- h. Location and source of runoff from adjacent property containing significant quantities of pollutants of concern to the facility as discussed in Part I.D.;
- i. Location of all surface waters on or near to the construction activity site (including perennial and intermittent waterbodies, ephemeral streams, springs, wetlands with standing water, etc.);
- j. A map scale;
- k. A north arrow; and,
- l. For construction activities:
  - i. Areas of total development and, at a minimum, areas of "disturbance" related to construction activity (including support activities related to a construction site such as concrete or asphalt batch plants, equipment staging areas, material storage areas, soil stockpile areas, material borrow areas, etc.);
  - ii. Location of all erosion and sediment control BMPs;
  - iii. Location of impervious structures (including buildings, roads, parking lots, outdoor storage areas, etc.) after construction is completed;

- iv. Areas where vegetative BMPs are to be implemented;
- v. Approximate slopes anticipated after major grading activities; and,
- vi. The boundary of the 100-year floodplain, if determined.

*Comprehensive Site Inspection and Compliance Evaluation Report*

- a. For stormwater discharges that are associated with industrial, mining, oil and gas, and construction activity with construction-related disturbance of five acres or more of total land area, a Comprehensive Site Inspection must be performed annually to identify areas contributing to the regulated stormwater discharge and to evaluate whether BMPs to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented in accordance with the terms of this permit. For inactive mining operations, if annual inspections are impracticable, then a certification once every three years by a registered professional engineer that the facility is in compliance with the permit, or alternative requirements, can be performed instead of an annual Comprehensive Site Inspection.
- b. A Comprehensive Site Inspection must assess the following:
  - i. Whether the description of potential pollutant sources is accurate as required under Part I.D. of this document;
  - ii. Whether the site map has been updated or otherwise modified to reflect current conditions;
  - iii. Whether the BMPs to control potential pollutants in stormwater discharges as identified in the SWPPP and Part I.D. are being effectively implemented; and,
  - iv. Whether any SWPPP revisions such as additional BMPs are necessary.
- c. Based on the results of the Comprehensive Site Inspection, the description of potential pollutant sources and BMPs identified in the SWPPP must be revised as appropriate within 14 days of such inspection and must provide for implementation of the changes to the SWPPP in a timely manner.
- d. A Compliance Evaluation Report must be submitted to the Department addressing the Comprehensive Site Inspection performed during each calendar year.
  - i. The report must identify personnel making the inspection and the date(s) of the inspection.
  - ii. The report must summarize observations made based on the items stated in Part I.D.
  - iii. The report must summarize actions taken in accordance with Part I.D.
  - iv. The report must be retained with the SWPPP.
  - v. The permittee shall submit a copy of the report to the Department by January 28<sup>th</sup> of each year for the preceding calendar year's inspection.
  - vi. The report must identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report

must contain a certification that the facility is in compliance with the SWPPP and this permit.

- vii. The report must be signed in accordance with the signatory requirements stated in the permit.
- e. A tracking or follow-up procedure, including a schedule for implementation, must be used and identified in the Report which ensures adequate response and corrective actions have been taken in response to the Comprehensive Site Inspection and/or noncompliances.
- f. Records of the Comprehensive Site Inspection, the Compliance Evaluation Report, and any related follow-up actions must be maintained by the permittee.

E. Compliance Schedule

The permittee shall construct and implement the following water management facilities and BMPs by the date indicated below.

Water Management Facility	Minimum Storage Capacity	Date of Completion
Proposed Pond 5B	6.5 acre-feet	December 31, 2006
Proposed Pond 6A	7.9 acre-feet	December 31, 2007
All Proposed BMP Sediment Traps	NA	May 15, 2006

In accordance with Part I.D.1. of this permit, the permittee shall submit a SWPPP by January 1, 2007. The components of the Plan shall be implemented no later than July 1, 2007.

## II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

### A. Representative Sampling

Samples taken in compliance with the monitoring requirements established under Part I of the permit shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

### B. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under Part 136, Title 40 of the Code of Federal Regulations, unless other test procedures have been specified in this permit. All flow-measuring and flow-recording devices used in obtaining data submitted in self-monitoring reports must indicate values within 10 percent of the actual flow being measured.

### C. Penalties for Tampering

The Montana Water Quality Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than six months, or by both.

### D. Reporting of Monitoring Results

Self-Monitoring results will be reported monthly. Monitoring results obtained during the previous reporting period shall be summarized and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. Whole effluent toxicity (biomonitoring) results must be reported on forms from the most recent version of EPA Region VIII's "Guidance for Whole Effluent Reporting" with copies of the laboratory analysis report. If no discharge occurs during the reporting period, "no discharge" shall be reported. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the "Signatory Requirements" (see Part IV.G of this permit), and submitted to the Department and the Regional Administrator at the following address:

Montana Department of Environmental Quality  
Water Protection Bureau  
PO Box 200901  
Helena, Montana 59620-0901  
Phone: (406) 444-3080

### E. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.



F. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using approved analytical methods as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

G. Records Contents

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The initials or name(s) of the individual(s) who performed the sampling or measurements;
3. The date(s) analyses were performed;
4. The time analyses were initiated;
5. The initials or name(s) of individual(s) who performed the analyses;
6. References and written procedures, when available, for the analytical techniques or methods used; and
7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

H. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this MPDES permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting

1. The permittee shall report any serious incidents of noncompliance as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the Water Protection Bureau at (406) 444-3080 or the Office of Disaster and Emergency Services at (406) 841-3911. The following examples are considered serious incidents:

- a. Any noncompliance which may seriously endanger health or the environment;
  - b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G of this permit, "Bypass of Treatment Facilities"); or
  - c. Any upset which exceeds any effluent limitation in the permit (see Part III.H of this permit, "Upset Conditions").
2. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:
    - a. A description of the noncompliance and its cause;
    - b. The period of noncompliance, including exact dates and times;
    - c. The estimated time noncompliance is expected to continue if it has not been corrected; and
    - d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
  3. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Water Protection Bureau, by phone, (406) 444-3080.
  4. Reports shall be submitted to the addresses in Part II.D of this permit, "Reporting of Monitoring Results".

J. Other Noncompliance Reporting

Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.D of this permit are submitted. The reports shall contain the information listed in Part II.I.2 of this permit.

K. Inspection and Entry

The permittee shall allow the head of the Department or the Director, or an authorized representative thereof, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

### III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the Department or the Regional Administrator advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance.

B. Penalties for Violations of Permit Conditions

The Montana Water Quality Act provides that any person who violates a permit condition of the Act is subject to civil or criminal penalties not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates permit conditions of the Act is subject to a fine of not more than \$50,000 per day of violation, or by imprisonment for not more than 2 years, or both, for subsequent convictions. MCA 75-5-611(a) also provides for administrative penalties not to exceed \$10,000 for each day of violation and up to a maximum not to exceed \$100,000 for any related series of violations. Except as provided in permit conditions on Part III.G of this permit, "Bypass of Treatment Facilities" and Part III.H of this permit, "Upset Conditions", nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

F. Removed Substances

Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard.

G. Bypass of Treatment Facilities

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.G.2 and III.G.3 of this permit.
2. Notice:
  - a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.
  - b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.I of this permit, "Twenty-four Hour Reporting".
3. Prohibition of bypass:
  - a. Bypass is prohibited and the Department may take enforcement action against a permittee for a bypass, unless:
    - 1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
    - 2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
    - 3) The permittee submitted notices as required under Part III.G.2 of this permit.
  - b. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three conditions listed above in Part III.G.3.a of this permit.

H. Upset Conditions

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of Part III.H.2 of this permit are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review (i.e. Permittees will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with technology-based permit effluent limitations).
2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
  - a. An upset occurred and that the permittee can identify the cause(s) of the upset;
  - b. The permitted facility was at the time being properly operated;
  - c. The permittee submitted notice of the upset as required under Part II.I of this permit, "Twenty-four Hour Notice of Noncompliance Reporting"; and
  - d. The permittee complied with any remedial measures required under Part III.D of this permit, "Duty to Mitigate".
3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

I. Toxic Pollutants

The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

J. Changes in Discharge of Toxic Substances

Notification shall be provided to the Department as soon as the permittee knows of, or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
  - a. One hundred micrograms per liter (100 mg/L);

- b. Two hundred micrograms per liter (200 mg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 mg/L) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
  - c. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or
  - d. The level established by the Department in accordance with 40 CFR 122.44(f).
2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following “notification levels”:
- a. Five hundred micrograms per liter (500 mg/L);
  - b. One milligram per liter (1 mg/L) for antimony;
  - c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or
  - d. The level established by the Department in accordance with 40 CFR 122.44(f).



#### IV. GENERAL REQUIREMENTS

A. Planned Changes

The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutant discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit.

B. Anticipated Noncompliance

The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application must be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for revoking, modifying and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

F. Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Department, it shall promptly submit such facts or information with a narrative explanation of the circumstances of the omission or incorrect submittal and why they weren't supplied earlier.

G. Signatory Requirements

All applications, reports or information submitted to the Department or the EPA shall be signed and certified.

1. All permit applications shall be signed as follows:

a. For a corporation: by a responsible corporate officer:

- b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;
  - c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.
- 2. All reports required by the permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is considered a duly authorized representative only if:
  - a. The authorization is made in writing by a person described above and submitted to the Department; and
  - b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or an individual occupying a named position.)
- 3. Changes to authorization. If an authorization under Part IV.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2 of this permit must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.
- 4. Certification. Any person signing a document under this section shall make the following certification:

“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 directly 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.”

H. Penalties for Falsification of Reports

The Montana Water Quality Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more that \$25,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports

Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. As required by the Clean Water Act, permit applications, permits and effluent data shall not be considered confidential.

J. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

K. Property or Water Rights

The issuance of this permit does not convey any property or water rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

L. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

M. Transfers

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Department at least 30 days in advance of the proposed transfer date;
2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them;
3. The Department does not notify the existing permittee and the proposed new permittee of an intent to revoke or modify and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part IV.M.2 of this permit; and
4. Required annual and application fees have been paid.

N. Fees

The permittee is required to submit payment of an annual fee as set forth in ARM 17.30.201. If the permittee fails to pay the annual fee within 90 days after the due date for the payment, the Department may:

1. Impose an additional assessment consisting of 15% of the fee plus interest on the required fee computed at the rate established under 15-31-510(3), MCA, or
2. Suspend the processing of the application for a permit or authorization or, if the nonpayment involves an annual permit fee, suspend the permit, certificate or authorization for which the fee is required. The Department may lift suspension at any time up to one year after the suspension occurs if the holder has paid all outstanding fees, including all penalties, assessments and interest imposed under this sub-section. Suspensions are limited to one year, after which the permit will be terminated.

O. Reopener Provisions

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.
2. Water Quality Standards are Exceeded: If it is found that water quality standards or trigger values in the receiving stream are exceeded either for parameters included in the permit or others, the department may modify the effluent limits or water management plan.
3. TMDL or Wasteload Allocation: TMDL requirements or a wasteload allocation is developed and approved by the Department and/or EPA for incorporation in this permit.
4. Water Quality Management Plan: A revision to the current water quality management plan is approved and adopted which calls for different effluent limitations than contained in this permit.
5. Toxic Pollutants: A toxic standard or prohibition is established under Section 307(a) of the Clean Water Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit.

6. Toxicity Limitation: Change in the whole effluent protocol, or any other conditions related to the control of toxicants have taken place, or if one or more of the following events have occurred:
  - a. Toxicity was detected late in the life of the permit near or past the deadline for compliance.
  - b. The TRE/TIE results indicated that compliance with the toxic limits will require an implementation schedule past the date for compliance and the permit issuing authority agrees with the conclusion.
  - c. The TRE/TIE results indicated that the toxicant(s) represent pollutant(s) that may be controlled with specific numerical limits, and the permit issuing authority agrees that numerical controls are the most appropriate course of action.
  - d. Following the implementation of numerical controls on toxicants, the permit issuing authority agreed that a modified whole effluent protocol is needed to compensate for those toxicants that are controlled numerically.
  - e. The TRE/TIE revealed other unique conditions or characteristics which, in the opinion of the permit issuing authority, justify the incorporation of unanticipated special conditions in the permit.

V. DEFINITIONS

1. **"30-day (and monthly) average"**, other than for fecal coliform bacteria, means the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.
2. **"7-day (and weekly) average,"** other than for fecal coliform bacteria, means the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria. The 7-day averages are applicable only to those effluent characteristics for which there are 7-day average effluent limitations. The calendar week which begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks in the month that has at least four days. For example, if a calendar week overlaps two months, the weekly average is calculated only in the month that contains four or more days of that week.
3. **"Acute Toxicity"** means when 50 percent or more mortality is observed for either species (See Part I.C of this permit.) at any effluent concentration. Mortality in the control must simultaneously be 20 percent or less for the effluent results to be considered valid.
4. **"Annual Average Load"** means the arithmetic mean of all 30-day or monthly average loads reported during the calendar year for a monitored parameter.
5. **"Arithmetic Mean"** or **"Arithmetic Average"** for any set of related values means the summation of the individual values divided by the number of individual values.
6. **"BOD<sub>5</sub>"** means the five-day measure of pollutant parameter biochemical oxygen demand.
7. **"Bypass"** means the intentional diversion of waste streams from any portion of a treatment facility.
8. **"CBOD<sub>5</sub>"** means the five-day measure of pollutant parameter carbonaceous biochemical oxygen demand.
9. **"Chronic Toxicity"** means when the survival, growth, or reproduction, as applicable, for either test species, at the effluent dilution(s) designated in this permit (see Part I.C.), is significantly less (at the 95 percent confidence level) than that observed for the control specimens.
10. **"Composite samples"** shall be flow proportioned. The composite sample shall, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first

sample and the last sample shall not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

- a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;
  - b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;
  - c. Constant sample volume, time interval between samples proportional to flow (i.e. Sample taken every "X" gallons of flow); and,
  - d. Continuous collection of sample, with sample collection rate proportional to flow rate.
11. **"Daily Maximum Limit"** means the maximum allowable discharge of a pollutant during a calendar day. Expressed as units of mass, the daily discharge is cumulative mass discharged over the course of the day. Expressed as a concentration, it is the arithmetic average of all measurements taken that day.
  12. **"Department"** means the Montana Department of Environmental Quality (MDEQ).
  13. **"Director"** means the Director of the United States Environmental Protection Agency's Water Management Division.
  14. **"Discharge"** means the injection, deposit, dumping, spilling, leaking, placing, or failing to remove any pollutant so that it or any constituent thereof may enter into state waters, including ground water.
  15. **"EPA"** means the United States Environmental Protection Agency.
  16. **"Grab"** sample, for monitoring requirements, means a single "dip and take" sample collected at a representative point in the discharge stream.
  17. **"Instantaneous"** measurement, for monitoring requirements, means a single reading, observation, or measurement.
  18. **"Load limits"** are mass-based discharge limits expressed in units such as lb/day.
  19. **"Minimum Level"** (ML) of quantitation means the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration point for the analyte, as determined by the procedure set forth at 40 CFR 136. In most cases the ML is equivalent to the Required Reporting Value (RRV) unless other wise specified in the permit. (ARM 17.30.702(22))



20. **"Mixing zone"** means a limited area of a surface water body or aquifer where initial dilution of a discharge takes place and where water quality changes may occur. Also recognized as an area where certain water quality standards may be exceeded.
21. **"Nondegradation"** means the prevention of a significant change in water quality that lowers the quality of high-quality water for one or more parameters. Also, the prohibition of any increase in discharge that exceeds the limits established under or determined from a permit or approval issued by the Department prior to April 29, 1993.
22. **"Regional Administrator"** means the administrator of the EPA Region with Jurisdiction over federal water pollution control activities in the State of Montana.
23. **"Severe property damage"** means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
24. **"Sewage Sludge"** means any solid, semi-solid or liquid residue that contains materials removed from domestic sewage during treatment. Sewage sludge includes, but is not limited to, primary and secondary solids and sewage sludge products.
25. **"TIE"** means a toxicity identification evaluation.
26. **"TRE"** means a toxicity reduction evaluation.
27. **"TMDL"** means the total maximum daily load limitation of a parameter, representing the estimated assimilative capacity for a water body before other designated uses are adversely affected. Mathematically, it is the sum of wasteload allocations for point sources, load allocations for non-point and natural background sources, and a margin of safety.
28. **"TSS"** means the parameter total suspended solids.
29. **"Upset"** means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

**APPENDIX C,**  
**MPDES RENEWAL STATEMENT OF BASIS**  
**PERMIT FACT SHEET**  
**MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)**

Department of Environmental Quality  
Permitting and Compliance Division  
Water Protection Bureau  
P.O. Box 200901, Helena, MT 59620-0901

**Permit Fact Sheet**  
**Montana Pollutant Discharge Elimination System (MPDES)**

PERMITTEE: Luzenac America, Inc. (LAI)

Permit No.: MT0028584

Receiving Water: Johnny Gulch and Unnamed Irrigation Ditch

Facility Information

    Name: Yellowstone Mine

    Mailing Address: Luzenac America, Inc. (LAI)  
    Yellowstone Mine  
    P.O. Box 130  
    Cameron, MT 59720

    Contact: Jade Stokke, Mine Manager

    Phone: (406) 682-4882 ext. 232

Fee Information

    Number of Outfalls: 2

    Outfall – Type: 001 – Surface Water  
    002 – Surface Water

---

I. Permit Status

LAI's Yellowstone Mine currently has an existing Montana Pollutant Discharge Elimination System (MT0028584) permit to discharge mine dewatering wastewater to unnamed tributary in Johnny Gulch, which ultimately discharges to Cherry Gulch via an unnamed irrigation ditch.

Montana Pollutant Discharge Elimination System (MPDES) Permit # MT0028584 was originally issued to Montana Talc Company in 1987. The permit was renewed by Montana Talc Company in 1992 and expired August 31, 1997. In 1994 LAI purchased the Johnny Gulch mine from Montana Talc Company and combined it with its holdings at the Yellowstone mine.

On July 1, 1997 the Department received a MPDES permit renewal and modification application for the coalesced Johnny Gulch/Yellowstone mine from LAI. LAI requested an additional Outfall, 002, at the last of a series of sedimentation ponds in lower Johnny Gulch. In 2002, LAI submitted a Mine Life Extension Amendment to Operating Permit 00005 application to the Department. In response to the application the Department drafted an Environmental Assessment (EA). The draft EA was submitted for public comment on December 22, 2004. During the public comment period the Department received a significant comment, regarding discharge of mine drainage from the mine property. In response to this information the Department's Water Protection Bureau conducted an inspection at the facility on February 24, 2005, to assess compliance of mine drainage discharges from the facility. The facility was found to be in compliance with the permit. Based on observations made during the inspection and the status of the water management plan, the facility was instructed to submit an updated MPDES permit application.

On June 10, 2005 the Department received an updated renewal application that modified the 1997 permit renewal/modification application. On June 10, 2005 the Department requested additional information via a notification of deficiencies for the renewal modification application. On June 27, 2005 the Department received the requested additional information from LAI. The Department deemed the application complete on July 27, 2005.

Other DEQ permits currently in effect at the Yellowstone/Johnny Gulch Mine include Montana Metal Mine Reclamation Act Operating Permit 00005 and Air Quality Permit 1968-12.

## II. Facility Information

The LAI Yellowstone/Johnny Gulch Mine (YJGM) is an open-pit talc mining and sorting operation located within Sections 3, 4, 5 and 9, Township 9 South, Range 1 West and Section 34, Township 8 South, Range 1 West, and Sections 32, 33 and 34 Township 8 South, Range 1 West, Madison County, Montana. The mine is located within the Johnny Gulch drainage of the Gravelly Mountain Range approximately 10 miles south of Cameron. The mine began operation in the '40s and has been operating continuously since late 1951 utilizing conventional hard rock mining methods. Accordingly, the facility is not a "new discharger" (17.30.1304(36)).

Currently, the MPDES permit includes one outfall, Outfall 001 (Attachment – 1: Current Water Management Line Diagram). Outfall 001 receives mine dewatering wastewater from the bottom of the YJGM pit. The water is collected in a sump pump area located in the bottom of the pit. From the pit bottom, dewatering wastewater is pumped over the south pit-wall of the South 40 pit, to a sedimentation pond, named pond 1A. Pond 1A over-tops into Johnny Gulch pond (pond 2A) where it mixes with Johnny Gulch base flows as existing Outfall 001. No discharge from Outfall 001 has been reported since 1994 and base flow in Johnny Gulch above the mine has not been observed in the past three years (Luzenac, 2005a).

From pond 2A water infiltrates the rock drain under the waste rock dump called the Johnny Gulch Overburden (OB) pile, which has been emplaced in the drainage and reclaimed. The commingled pit dewatering wastewater and Johnny Gulch base flow water continue to flow down the rock drain along the pre-mining drainage under the un-reclaimed South OB Pile and

the East OB Pile. The rock drain flow emerges within the lower Johnny Gulch drainage, approximately 5,150 ft to the northeast of pond 2A along the eastern border of the current East OB Pile.

Mine drainage from the rock drain continues down Johnny Gulch drainage and commingles with storm water and/or snowmelt run-off from the mine road, and mine drainage run-off from waste rock piles and the crude ore load-out facility. The waste stream receives primary treatment as it passes through sedimentation ponds 3A, 4A, 5A, 7A and 8A (Luzenac 2005a and 2005b).

Pond 8A discharges to the Ruby Creek Irrigation Ditch (RCID) waterworks through proposed Outfall 002 and the water flows into an additional existing irrigation network pond named, pond 10A. The water flows from pond 10A into irrigation channel and ultimately to Cherry Gulch and Madison River, approximately 4-miles to the north (Montana River Basins map).

The permittee has proposed to modify to the previously permitted water management structures and add a new outfall, Outfall 002. The modifications to the water management structures include construction of a number of additional storage pond/settling ponds in lower Johnny Gulch to capture, detain and provide primary treatment for storm water run-off and mine drainage from the mine road, overburden piles, the coarse ore load-out and other disturbed areas. The applicant estimates that the addition of the ponds will provide sufficient storage capacity to retain a 15 year-24 hour storm event of 2.01 inches precipitation that will result in approximately 40 acre-feet of run-off, upon full implementation (Luzenac/Maxim, 2005a and b). Outfall 002 is proposed where pond 8A outlets to the RCID. The proposed Outfall 002 is a new source (ARM 17.30.702(18); therefore, it is subject to nondegradation significance review under ARM 17.30.701 *et seq.* (ARM 17.30.705). Attachment 2 presents a flow line diagram of the proposed water management plan in lower Johnny Gulch (Luzenac, 2005a).

a.) Effluent Characteristics

*Outfall 001*

Outfall 001 originates from ground water infiltration into the mine pit along with any storm water which enters the pit. This water is pumped from a sump in the pit to Pond 1A. After settling in Pond 1A, the effluent discharges through Outfall 001 into Johnny Gulch. Additional settling is provided by Pond 2A. The overflow from Pond 2A infiltrates into the overburden pile and eventually emerges in lower Johnny Gulch above Outfall 002.

Historically, water quality parameters that have been monitored at Outfall 001 include flow rate, total suspended solids (TSS), oil and grease (O&G), pH, nitrate + nitrite and ammonia. The current permit includes numeric effluent limits at Outfall 001 for TSS, O&G and pH; and narrative limits for visible foam and floating solids. According to discharge monitoring reports (DMRs), no discharge has been reported from Outfall 001 since November 1993.

The following is a summary of historic effluent water quality and quantity from Outfall 001 for parameters reported on DMRs for a period of record (POR) from 1992 to 2005 and data from the permit application materials (Luzenac, 2005a and 2005b).

<b>Parameter (mg/L unless noted)</b>	<b>Average<sup>1</sup></b>	<b>Number of Samples</b>	<b>Minimum Value</b>	<b>Maximum Value</b>
Effluent, gpm	79.6 <sup>2</sup>	7	0	140
pH, s.u.	8.16	9	7.9	8.4
TSS	8.1	9	<10	11
Oil and Grease	0.67	9	<1	2
NO <sub>3</sub> + NO <sub>2</sub> , as N	1.0	13	<0.05	5.71
Ammonia, as N	0.08	12	<0.1	0.17
Calcium	30	1	30	30
Magnesium	28	1	28	28
Hardness as CaCO <sub>3</sub>	189	1	189	189
Zinc	0.039	5	<0.01	0.13
Iron	0.975	2	0.04	1.91

1. Non-detection data are assumed to be half the reported detection limit for computing average values.

2. Only values reported during periods of discharge are used in calculating the average.

### *Outfall 002*

Sources of wastewater to Outfall 002 include the combined flows of Outfall 001, base flow emanating from the rock drain, snow melt run-off, mine drainage from waste rock piles, mine drainage from the coarse ore load out, storm water run-off from the mine road cut-outs and storm water run-off from other undisturbed areas of the property.

The applicant studied the hydrology up gradient of the mine and performed predictive calculations of potential Johnny Gulch peak flow/run-on to the facility. The estimated peak flow for a 10-yr 24-hr recurring storm from Johnny Gulch run-on into the rock drain would be approximately 55 cfs (Luzenac, 2005a). The method used for these calculations resulted in a conservative estimate (over estimation of actual flows), as it assumes no infiltration.

In 2005 applicant performed storm water outfall predictive calculations for the disturbed areas of the mine. Infiltration testing along various flow regimes and planned storage areas of the property was incorporated into the study. The hydrologic study concluded that run-off volumes for the 5-year 1.4 inch, 10-year 1.9 inch and 15-year 24-hr 2.01 inch, precipitation events would result in 12.8, 35.9 and 40.0 acre-feet of run-off to lower Johnny Gulch, not including infiltration at the proposed pond sites (Luzenac\Maxim, 2005a).

Water quality data submitted for the 1997 (Luzenac, 1997) application and the current (Luzenac, 2005a and b) application was used to create the following summary as an estimate of effluent to Outfall 002.

<b>Parameter (mg/L unless noted)</b>	<b>Average</b>	<b>Number of Samples</b>	<b>Minimum Value</b>	<b>Maximum Value</b>
Effluent, gpm	0.76	NA	0	5.6
pH, SU	7.8	4	6.5	8.7
Temperature, °F	55.1	3	43.7	60.8
TSS	485.5	2	<10	966
Oil and Grease	<1	3	<1	<1
NO <sub>3</sub> + NO <sub>2</sub> , as N	2.05	2	<0.05	4.07
Ammonia, as N	<0.1	3	<0.1	<0.1
Total Nitrogen	2.47	2	0.8	4.14
Sodium	19	1	19	19
Calcium	33	1	33	33
Magnesium	46	1	46	46
Hardness as CaCO <sub>3</sub>	272	1	272	272
Sodium Adsorption Ratio	0.51	1	0.51	0.51
Zinc	0.017	3	<0.01	0.04
Iron	0.028	2	<0.01	0.05

### III. Proposed Technology-Based Effluent Limits

#### *Outfall 001*

Effluent limitation guidelines (ELG's) have not been promulgated for this industrial subcategory. Title 40, CFR, Sub-part AJ (Talc, Steatite, Soapstone, and Pyrophyllite Subcategory) is designated as "reserved." Technology based effluent limits for Total Suspended Solids (TSS) developed and applied in the previous permit and will be carried forward in this permit. Proposed TBEL for TSS at Outfall 001 are summarized as follows in table 1.

Table 1. Technology Based Effluent Limits for Outfalls 001.

<b>Parameter</b>	<b>Maximum Daily Limit</b>	<b>Average Monthly Limit</b>
Total Suspended Solids, mg/L	45	25

#### *Outfall 002*

Discharge from Outfall 002 results from precipitation events or snowmelt which exceed the capacity of the storm water management system. ARM 17.30.1345 in accordance with 40 CFR 122.44(k) requires that the permit contain effluent limits, standards or prohibitions for each outfall or discharge point including best management practices where other numeric effluent limitations are infeasible. Because of the intermittent and precipitation driven nature of this discharge the department believes numeric effluent limitations at this outfall are not feasible. The permittee will be required as a special condition (Part XII) of the permit to develop and implement a Storm Water Pollution Prevention Plan.



#### IV. Water Quality-Based Effluent Limits

##### a) Receiving Water

Outfall 001 discharges to Johnny Gulch above the mine. At the point of discharge Johnny Gulch is an ephemeral drainage. Approximately one mile above the point of discharge Johnny Gulch is perennial, however, there has been no flow observed in Johnny Gulch where it enters the mine permit boundary in the past three years (Luzenac, 2005a). Past monitoring indicates that observed flows onto the mine property are generally in response to precipitation events and/or snow melt. Johnny Gulch above the mine was classified as waters of the U.S. by the Army Corps. Of Engineers (COE) in 1996; however, it was described as “isolated” headwaters drainage. Limited historic water quality data from 1981 exists for Johnny Gulch base flow onto the mine property, the data is summarized in Table 2 (Luzenac, 1986).

Table 2. Johnny Gulch base flow water quality.

<b>Parameter (mg/L unless noted)</b>	<b>Average</b>	<b>Number of Samples</b>	<b>Minimum Value</b>	<b>Maximum Value</b>
Effluent, gpm	92	7	22	220
pH, SU	7.9	2	7.8	8.0
Specific Conductivity, $\mu$ mhos/cm	336.5	2	313	360
TSS	11.9	4	<1	35
Turbidity, JTU	9.95	2	1.9	18
Total Dissolved Solids	245.5	2	230	261
Calcium	60.5	2	56	65
Magnesium	10.5	2	8	13
Sodium	3.5	2	3	4
Potassium	3	2	3	3
Bicarbonate	235.5	2	232	239
Carbonate	0	2	0	0
Sulfate	3	2	3	3
Chloride	2.5	2	2	3
Flouride	<0.1	1	<0.1	<0.1
Boron	0.28	2	0.21	0.35
Hardness as CaCO <sub>3</sub>	194	2	173	216
Sodium Adsorption Ratio <sup>(1)</sup>	0.41	NA	0.38	0.45
NO <sub>3</sub> + NO <sub>2</sub> , as N	<0.05	1	<0.05	<0.05
Ortho-Phosphorus	0.03	1	0.03	0.03
Manganese, Total Recoverable	0.02	1	0.02	0.02
Zinc, Total Recoverable	<0.01	2	<0.01	0.01
Iron, Total Recoverable	0.20	1	0.20	0.20

(1) SAR calculation assumes activity is equal to concentration for fresh water with TDS below 1000 mg/L.

Outfall 002 discharges to Ruby Creek Irrigation Ditch (RCID) within the mine permit boundary. The duration and volume of flow in the RCID is controlled by local entities based on water rights. Generally, flows in the RCID occur seasonally from late spring to late summer. The

RCID is a tributary to Cherry Gulch and the Madison River. This drainage is classified as B-1 surface waters. Water quality data was submitted for the RCID receiving water as part of the 2005 (Luzenac, 2005b) permit application materials and is summarized in Table 3.

Neither the RCID or Johnny Gulch has a Reach number nor Hydrologic Unit Code (HUC) assigned to them. Cherry Gulch is listed as Reach number 0320000, which reports to the Madison River along its Reach number 0310000 (Montana River Basins map). Neither Cherry Gulch nor the Madison River (along reach number 0310000) are included on the 1996, 2002 or 2004 303(d) list of water bodies in need of total maximum daily load (TMDL).

Ground water levels at the mine site have been documented to be well below surface expressions of base flows in the Johnny Gulch drainage and the RCID.

Table 3. Ruby Creek Irrigation Ditch water quality.

<b>Parameter (mg/L unless noted)</b>	<b>2005 Analytical Results</b>
Flow, gpm	500
pH, s.u.	8.3
Temperature, °F	45
Total Suspended Solids	15
Oil and Grease	<1
NO <sub>3</sub> + NO <sub>2</sub> , as N	0.09
Ammonia, as N	<0.1
Total Kjeldahl as N	0.6
Total Nitrogen	0.69
Calcium	34
Magnesium	10
Sodium	1
Hardness as CaCO <sub>3</sub>	126
SAR <sup>(1)</sup>	0.05
Antimony	<0.05
Arsenic	<0.005
Cadmium	<0.001
Chromium	<0.01
Copper	<0.01
Iron	<0.03
Lead	<0.01
Mercury	<0.001
Nickel	<0.001
Selenium	<0.005
Silver	<0.005
Thallium	<0.1
Zinc	0.06

(1) SAR calculation assumes activity is equal to concentration for fresh water with TDS below 1000 mg/L.

b) Applicable Water-Quality Standards

*Outfall 001*

At the point of discharge for Outfall 001 Johnny Gulch is ephemeral. ARM 17.30.637(6) states that ephemeral streams are not subject to the specific water quality standards of 17.30.620 through 17.30.629 but are subject to the General Treatment Standards (ARM 17.30.635) and General Prohibition (ARM 17.30.637), as well as the provisions of ARM 17.30.641, 645 and 646.

ARM 17.30.637 requires that state surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will:

- settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
- create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;
- produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
- create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and
- create conditions which produce undesirable aquatic life.

*Outfall 002*

At the point of discharge from Outfall 002 the RCID is B-1 state water. Waters classified B-1 are to be maintained suitable for drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply (ARM 17.30.623). Montana water quality standards require that no discharge may commence that either alone, or in combination with other wastes or activities, will violate, or can reasonable be expected to violate any water quality standard (ARM 17.30.637(2)). Therefore, the water discharged from Outfall 002 must not cause an exceedance of aquatic life and human health standards listed: (1) in Circular DEQ-7, Montana Numeric Water Quality Standards (February 2006), (2) the standards at ARM 17.30.623 and (3) general prohibitions of ARM 17.30.637 in the receiving water.

Additionally, Outfall 002 is a new source (ARM 17.30.1304(36)) and therefore is subject to Montana's Nondegradation policy at 75-5-303, MCA as implemented by ARM 17.30.701 *et seq.*

c) Basis for Proposed Water Quality-Based Effluent Limits

*Outfall 001*

Water quality-based effluent limits (WQBEL) must be developed for parameters of concern (POC) when there is a “reasonable potential” for the discharge to cause or contribute to an exceedance of water quality standards (40 CFR 122.44(i) and (ii)). Because the specific water quality standards of ARM 17.30.620 through 629 do not apply at Outfall 001 a conventional mass based loading analysis is not feasible, however the narrative prohibitions of ARM 17.30.635 are applicable to both Outfall 001 and 002. Effluent limits based on narrative prohibitions discussed in the next section will be included in the permit.

*Outfall 002*

The numeric water quality standards of DEQ-7 (2006) apply to the RCID. However, due to the lack of sufficient and representative analytical data and the intermittent nature of the proposed discharge from Outfall 002, the Department has determined that the development and implementation of a SWPPP is sufficient to attain and maintain compliance with the applicable water quality standards. The permittee will be required to monitor and report the quality of the effluent discharged from Outfall 002. If the Department determines that the discharge contributes to a violation of water quality standards, the permit is subject to the reopener provisions of Part IV of the permit in accordance with ARM 17.30.1344(1)(b) and 40 CFR 122.44.

d) Proposed Water Quality Based Effluent Limits (WQBEL)

*Outfall 001*

In addition to the technology based effluents for Outfall 001 the following limits will be included in the permit:

- There shall be no discharge which causes a visible oil sheen in the receiving water or causes the concentration of oil and grease in excess of 10 mg/L in the discharge. ARM 17.30.637(1)(b)

*Outfall 002*

In addition to the technology based effluents for Outfall 002 the following limits will be included in the permit:

- There shall be no discharge from this outfall except as a result of a precipitation event in excess of 2.01 inches in 24 hour period or the equivalent snow melt.
- The permittee shall develop and implement a storm water pollution prevention plan (SWPPP) in accordance with Part I of the permit.

- There shall be no discharge which causes a visible oil sheen in the receiving water or causes or concentrations of oil and grease at in excess of 10 mg/L in the discharge.  
ARM 17.30.637(1)(b)

## V. Mixing Zone

No mixing zone has been requested for Outfall 001 or 002.

## VI. Final Effluent Limits

### *Outfall 001*

Parameter	30-Day Average	Instantaneous Maximum
Total Suspended Solids, mg/L	25	45

- There shall be no discharge which causes a visible oil sheen in the receiving water or causes or concentrations of oil and grease at in excess of 10 mg/L in the discharge.  
ARM 17.30.635(1)(b)

### *Outfall 002*

- There shall be no discharge from this outfall except as a result of a precipitation event in excess of 2.01 inches in 24 hour period or the equivalent snow melt.
- The permittee shall develop and implement a storm water pollution prevention plan (SWPPP) in accordance with Part I of the permit.
- There shall be no discharge which causes a visible oil sheen in the receiving water or causes or concentrations of oil and grease at in excess of 10 mg/L in the discharge.  
ARM 17.30.635(1)(b)

## VII. Monitoring Requirements

### a) Effluent Monitoring

Effluent monitoring will be conducted at a sampling point located at the discharge outlet of both Outfalls 001 and 002. Sample collection, preservation, holding times and test procedures for the analysis of pollutants must conform to current regulation as published in 40 CFR 136 or other method approved by the Department. Samples or measurements shall be representative of the volume and nature of the monitored discharge, in accordance with Part I of the permit.

Flow monitoring at Outfall 001 and 002 will be completed using a partial flume, weir, or other appropriate meter or device capable of measuring flows with accuracy within 10% of actual flow rate. Visual estimation, bucket and stopwatch or pump run-time methods of effluent flow rate measurement are not acceptable.

### *Outfall 001*

Mining operations conduct blasting within the mine pit; therefore, monitoring for nitrogen parameters at Outfall 001 is required because it is a result of incomplete combustion of blasting agents and the water discharged from Outfall 001 comes from pit dewatering operations. Additionally, the local host rock and limited water quality data suggests the presence of zinc and iron. Mining operations may cause concentrations of these parameters to be elevated within the discharge; therefore, zinc and iron monitoring is also required at Outfall 001 to ensure compliance with ARM 17.30.637(1)(d). Effluent monitoring requirements at Outfall 001 are listed in table 6.

Table 6. Monitoring requirements for Outfall 001.

<b>Parameter</b>	<b>Frequency</b>	<b>Sample Type<sup>(1)</sup></b>
Effluent Flow Rate, gpm	Monthly	Instantaneous
Total Suspended Solids, mg/L	Monthly	Grab
Oil and Grease, mg/L	Monthly	Grab
pH, SU	Monthly	Instantaneous
Nitrate + Nitrite as N, mg/L	Monthly	Grab
Total Kjeldahl Nitrogen, mg/L	Monthly	Grab
Total Nitrogen, mg/L	Monthly	Calculated
Iron, Total Recoverable, mg/L	Monthly	Grab
Zinc, Total Recoverable, mg/L	Monthly	Grab
Hardness, mg/L	Monthly	Grab

(1) See definitions in Part I of the permit for sample type.

### *Outfall 002*

Because discharge from Outfall 002 will be intermittently precipitation induced, effluent monitoring will be required for flow rate, settleable solids, Oil and Grease, and pH within the first hour of any discharge event, followed by daily monitoring for the following 6 days and weekly thereafter until the end of the discharge event. For reasons listed above under Outfall 001 monitoring requirements the effluent shall be monitored for pH, Nitrogen parameters, Total Recoverable Iron, Total Recoverable Zinc and Hardness within the first 12 hours of the discharge event, and weekly thereafter until the end of the discharge event. Effluent monitoring at Outfall 002 has been designed to determine compliance with ARM 17.30.637(1)(d) in the context of ARM 17.30.635(1)(d) and ARM 17.30.623. Effluent monitoring requirements at Outfall 002 are listed in table 7.

Table 7. Effluent monitoring requirements for Outfall 002.

Parameter	Frequency	Sample Type <sup>(1)</sup>
Effluent Flow Rate, gpm	(2)	Instantaneous
Settleable Solids	(2)	Grab
Oil and Grease, mg/L	(2)	Grab
pH, SU	(3)	Instantaneous
Nitrate + Nitrite as N, mg/L	(3)	Grab
Total Kjeldahl Nitrogen, mg/L	(3)	Grab
Total Nitrogen, mg/L	(3)	Calculated
Iron, Total Recoverable, mg/L	(3)	Grab
Zinc, Total Recoverable, mg/L	(3)	Grab
Hardness, mg/L	(3)	Grab

(1) See definitions in Part I of the permit for sample type.

(2) Discharge monitoring is required within the first hour of discharge event, followed by daily for seven days and weekly thereafter until the discharge event ends.

(3) Discharge monitoring is required within the first 12 hours of the discharge event, followed by weekly thereafter until the discharge event has ended.

#### b) Instream Monitoring

Instream monitoring is required within the RCID, and had been designed in conjunction with effluent monitoring to demonstrate compliance pursuant to ARM 17.30.623(k) and 75-5-306(1), MCA. Turbidity and pH shall be monitored at two locations, each within two ditch widths both above and below Outfall 002 within the first 12 hours of discharge and weekly thereafter until the discharge event ends. Total Recoverable Zinc, Total Recoverable Iron, and hardness shall be monitored within the RCID at a location within two ditch widths above Outfall 002 within the first 12 hours of discharge and weekly thereafter until the end of the discharge event. Instream flow measurement may be estimated based on wetted cross sectional area of the RCID and measured flow velocity. Required instream monitoring is summarized in table 8.

Table 8. Instream monitoring requirements for RCID.

Parameter	Frequency	Sample Type <sup>(1)</sup>
Flow, gpm	(2)	Instantaneous
Turbidity, NTU	(2)	Instantaneous
pH, SU	(2)	Instantaneous
Iron, Total Recoverable, mg/L	(2)	Grab
Zinc, Total Recoverable, mg/L	(2)	Grab
Hardness, mg/L	(2)	Grab

(1) See definitions in Part I of the permit for sample type.

(2) Instream monitoring shall be conducted within the first 12 hours of discharge and weekly thereafter until the end of the discharge event.

#### c) Precipitation Monitoring

To demonstrate compliance with permit condition describing when discharge is allowed to occur at Outfall 002 the accumulated precipitation within any continuous 24 hour period must be reported; or, an estimate of equivalent snow pack melted within a 24 hour period, which caused Outfall 002 to discharge. Precipitation events must be measured using a rain gauge or equivalent



device capable of measuring precipitation depth to an accuracy of 0.1 inches. Precipitation monitoring shall be conducted at either the lower shop and gatehouse facility or the offices and ore sorting facility.

#### VIII. TMDL

On September 21, 2000, a U.S. District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment (WQLS), the State is not to issue any new permits or increases under the MPDES program. The order was issued in the lawsuit Friends of the Wild Swan v. U.S. EPA, et al. (CV 97-35-M-DWM), District of Montana and Missoula Division.

The Department finds that issuance of this permit does not conflict with Judge Molloy's Order (CV 97-35-M-DVM) because the receiving waters are not listed on any of the 303d lists as being WQLS.

#### IX. Nonsignificance Determination

The Department has determined that the proposed action will cause not cause a significant change in water quality pursuant to ARM 17.30.715(3) and 75-5-317, MCA because:

- 1) The facility water management plan is designed to be non-discharging for precipitation events less than a 15 yr 24 hour storm event.
- 2) Reasonable land, soil and water conservation practices are being applied and existing and anticipated beneficial uses will be fully protected via implementation of the updated SWPPP (75-5-317 (2)(b), MCA).

#### X. Standard Conditions

All standard conditions as stated in ARM 17.30.1342 will be in effect in the permit. A listing of all standard conditions pertaining to all MPDES permits will be included in the draft permit.

#### XI. Compliance Schedule

LAI shall construct and implement the following water management facilities and BMPs by the date indicated below.

Water Management Facility	Minimum Storage Capacity	Date of Completion/On-line
Proposed Pond 5B	6.5 acre-feet	December 31, 2006
Proposed Pond 6A	7.9 acre-feet	December 31, 2007
All Proposed BMP Sediment Traps	NA	May 15, 2006

(Table modified from Luzenac, 2005a)

## XII. Special Conditions

For regulated storm water discharges from the facility that commingle with process wastewater prior to discharge from the site, this commingled storm water discharge can be covered under this permit. In order for this discharge to be regulated under this permit, a Storm Water Pollution Prevention Plan (SWPPP) must be developed and implemented. The purpose of the SWPPP is to identify sources of pollution to storm water and to select Best Management Practices (BMPs) to eliminate or minimize pollutant discharges at the source and/or to remove pollutants contained in storm water runoff. Facilities must implement the provisions of the SWPPP required under this part as a condition of this permit.

### 1. General SWPPP Requirements

- a. The SWPPP and associated documentation, as well as BMPs developed and implemented, must be accomplished using good standard engineering practices.
- b. The SWPPP must be retained onsite at the facility that generates the stormwater discharge. Provided no permanent offices/buildings are located at the facility site, a copy of these documents shall be retained at the office of the contact person identified in the permit application, at the office of the primary individual responsible for the implementation of the SWPPP, and shall be brought to the site at all times with these identified personnel. Should the identity of these responsible contacts/individuals change during the permit period, the permittee shall ensure measures are in place to transfer, and familiarize replacement personnel with the requirements pertaining to the SWPPP.
- c. The SWPPP must be signed in accordance with the signatory requirements of this permit.
- d. The SWPPP must be made available upon request of Department staff, such as during inspections.
- e. The Department may notify the permittee that the SWPPP does not meet one or more of the minimum requirements of this permit. After such notification from the Department, the permittee shall make changes to the SWPPP and shall submit to the Department a written certification that the requested changes have been made. Unless otherwise stated by the Department, the permittee shall have 30 days after such notification to make the required changes. When the Department makes such notification, the permittee shall provide the Department with a copy of revisions to the SWPPP.
- f. The permittee shall amend the SWPPP whenever there is a change in design, construction, operation, or maintenance that has significant effect

on the potential for the discharge of pollutants to surface waters, or if the SWPPP proves to be ineffective in achieving the general objective of controlling pollutants in a stormwater discharge covered under this permit. When such revisions are made to the SWPPP based upon this permit condition, the permittee shall provide the Department with a copy of revisions to the SWPPP.

- g. The SWPPP must identify the name of receiving surface waters. If there is a distinguishable point source discharge or outfall, the SWPPP must include a description of the size, type, and location of each point source discharge or outfall. A description of stormwater runoff flow and drainage patterns into the receiving surface waters must be provided.
- h. The SWPPP must identify a specific person or persons at the facility who are responsible for SWPPP development, implementation, maintenance, and revision. The SWPPP must clearly identify the responsibilities of each person. The activities and responsibilities of the person(s) must address all aspects of the SWPPP.
- i. The SWPPP must identify facility personnel training programs used to inform personnel responsible for implementing activities identified in the SWPPP or otherwise responsible for stormwater management of the components and goals of the SWPPP. Training should address topics such as spill response, good housekeeping, and material management practices. A schedule must identify the frequency for such training.
- j. The SWPPP must address preventative maintenance measures which include the inspection and maintenance of stormwater management BMPs. Qualified personnel shall be identified in the SWPPP to inspect the facility site and stormwater management BMPs following each significant stormwater rainfall event resulting in 0.5 inches of precipitation or more, or after significant snowmelt events. Inspections must be documented and maintained with the SWPPP. Inspections and their respective records must include tracking or follow-up procedures to ensure adequate response and corrective actions have been taken based on any problems or deficiencies observed during the inspection.
- k. The SWPPP must address good housekeeping measures to help maintain a clean, orderly, facility. Measures could include a routine schedule for the managing/removal of waste materials, as well as routine inspections of potential problem areas.
- l. The SWPPP must include a General Location Map (such as a USGS topographic quadrangle map), extending one mile beyond the property boundaries of the facility, with enough detail to identify the location of the facility, any stormwater discharges, and the receiving surface waters. The

facility site must be clearly delineated on this map. The permittee may use the topographic map submitted with the application provided it indicates this information with respect to stormwater discharges.

- m. The SWPPP must identify procedures and protocols to be implemented and used to meet the monitoring requirements of this permit.

## 2. Identification of Potential Pollutant Sources

The SWPPP must provide a description of potential pollutant sources which may reasonably be expected to affect the quality of stormwater discharges. The SWPPP must identify all significant activities and materials that could potentially be significant pollutant sources. To accomplish this, the SWPPP must include, at a minimum:

- a. For each area of the facility with stormwater discharges from regulated activities that have a reasonable potential to contain significant amounts of pollutants, a prediction of the direction of flow, and an identification of the types of pollutants and parameters of concern that are likely to affect the stormwater discharge. Factors to consider include the toxicity of chemicals; quantity of chemical used, produced or discharged; the likelihood of contact with stormwater; the history of any MPDES permit violations; and the characteristics and uses of the receiving surface waters. In the identification of potential pollutants, and depending on the type of facility, items to identify and assess may include:
  - i. Areas and management practices used for the storage, treatment, or disposal of wastes;
  - ii. Areas where significant spills and leaks of hazardous substances may have occurred;
  - iii. Areas and management practices used for the loading or unloading of dry bulk materials and liquids;
  - iv. Areas and management practices used for the outdoor storage of materials and/or products;
  - v. Areas and management practices used for outdoor manufacturing or processing activities;
  - vi. Areas and management practices used for vehicle fueling, washing, and maintenance;
  - vii. Dust or particulate-generating processes;
  - viii. Illicit connections and/or management practices;
  - ix. Areas more susceptible to erosion; and,
  - x. Areas with unstabilized sediment due to ground disturbance activities.

The permittee must evaluate these potential pollutant sources back at least three years prior to the date permit coverage is applied for the respective stormwater discharge.

- b. A summary of existing stormwater quality sampling test results which characterize historical pollutants in stormwater discharges.
- c. Estimate and define area(s) of relatively impervious surfaces (including paved areas and facility structural roofs) with respect to the total area drained by each point source discharge of stormwater.
- d. An evaluation of how the quality of any potential stormwater running onto the facility site would impact the facility's stormwater discharge.

3. Stormwater Management Best Management Practices

- a. SWPPPs must include a description of stormwater management Best Management Practices (BMPs) appropriate for the facility, including those used to divert, infiltrate, reuse, or otherwise manage stormwater runoff, that reduces pollutants in stormwater discharges from the site. The appropriateness and priorities of BMPs in a SWPPP shall reflect the identified potential sources of pollutants to stormwater at the facility in Part XII.2.
- b. Reasonable and appropriate BMPs may include: reuse of collected stormwater (such as for process water or as an irrigation source); inlet controls (such as oil/water separators); snow management activities; infiltration devices, detention/retention devices (including constructed wetlands); run-on/runoff controls; diversion structures; flow attenuation by use of open vegetated swales, natural depressions, and other practices; and, ponds. Where practicable, industrial materials and activities could be protected by a storm resistant shelter to prevent exposure to rain or snow.
- c. The location and description of any treatment to remove pollutants that stormwater receives.
- d. The SWPPP must provide a description of measures to ensure the ongoing implementation and maintenance of BMPs. Inspections and maintenance activities, such as cleaning oil and grit separators or catch basins, must be documented and recorded. Incidents such as spills, leaks, other releases of potential pollutants, and/or other material/waste management problems, must also be documented and recorded.
- e. The SWPPP must address Spill Prevention and Response Measures as follows:

- i. Areas where potential spills may occur that could contribute pollutants to stormwater discharges, and their accompanying drainage points, must be identified clearly in the SWPPP.
  - ii. Where appropriate, specific material-handling procedures, storage requirements, and use of equipment, such as diversion valves, should be considered in the SWPPP.
  - iii. Procedures and necessary equipment for cleaning up spills must be identified in the SWPPP and made available to the appropriate personnel.
  - iv. Emergency spill/response contact and/or notification numbers must be listed in the SWPPP.
  - v. SWPPP records of spills must be updated when a significant spill or leak of hazardous substances occurs and must include a description of the specific origin and location of the release, a description of the materials released, an estimate of the quantity of the release, and a description of any remediation or cleanup measures which were taken.
- f. The SWPPP must address Sediment and Erosion Control BMPs as follows:
- i. The SWPPP must describe sediment and erosion control BMPs including various structural, vegetative, and/or stabilization measures.
  - ii. The SWPPP must allow for BMPs to be implemented as necessary.
  - iii. The SWPPP must address areas which have a higher potential for erosion due to topography, slope characteristics, facility activities, and/or other factors.
  - iv. An assessment of the nature of any fill material to be used, the existing soils located at the site, and the erodibility (high, moderate, or slight) of such soils must be provided in the SWPPP.
  - v. Stormwater discharges associated with construction activity at the facility site may be included under this permit provided the SWPPP is developed or revised to address these discharges as follows:
    - The SWPPP must identify and locate the BMPs to be used during and after the construction project to control sediment discharges to surface waters;
    - Final stabilization of disturbed areas must be ensured;
    - This Sediment and Erosion Control section of the SWPPP must be updated with a SWPPP modification to reflect new construction activity as necessary; and,
    - The SWPPP modification must be submitted to the Department prior to the start of construction.Provided these items are addressed, coverage for stormwater discharges associated with construction activity under this permit would commence on the date stated in the SWPPP or when construction starts.

- vi. The SWPPP may include the use of BMPs such as sediment basins, detention/retention structures, berms, barriers, filter strips, covers, diversion structures, sediment control fences, straw bale dikes, seeding, sodding, and/or other control structures. Any SWPPP elements that require engineered structures, such as detention ponds or diversion structures, must be prepared by a qualified individual using good standard engineering practices.

#### 4. SWPPP Site Map or Plan

The SWPPP must include a site map or plan which indicates the following:

- a. An identification of each point source discharge of stormwater with a delineated outline of the respective drainage area;
- b. The sampling location of Outfall 002;
- c. Delineated drainage patterns which clearly indicate the stormwater runoff flow patterns (such as using arrows or detailed topographic contours to show which direction stormwater will flow);
- d. The "areas" identified in Part XII.2.a. and c.;
- e. The "BMPs" identified in Part XII.3.;
- f. Major permanent facility structures;
- g. Each well where liquids associated with the facility are injected underground including any stormwater conveyances;
- h. Location and source of runoff from adjacent property containing significant quantities of pollutants of concern to the facility as discussed in Part XII.2.d.;
- i. Location of all surface waters on or near to the construction activity site (including perennial and intermittent waterbodies, ephemeral streams, springs, wetlands with standing water, etc.);
- j. A map scale;
- k. A north arrow; and,
- l. For construction activities:
  - i. Areas of total development and, at a minimum, areas of "disturbance" related to construction activity (including support



- activities related to a construction site such as concrete or asphalt batch plants, equipment staging areas, material storage areas, soil stockpile areas, material borrow areas, etc.);
- ii. Location of all erosion and sediment control BMPs;
- iii. Location of impervious structures (including buildings, roads, parking lots, outdoor storage areas, etc.) after construction is completed;
- iv. Areas where vegetative BMPs are to be implemented;
- v. Approximate slopes anticipated after major grading activities; and,
- vi. The boundary of the 100-year floodplain, if determined.

5. Comprehensive Site Inspection and Compliance Evaluation Report

- a. For stormwater discharges that are associated with industrial, mining, oil and gas, and construction activity with construction-related disturbance of five acres or more of total land area, a Comprehensive Site Inspection must be performed annually to identify areas contributing to the regulated stormwater discharge and to evaluate whether BMPs to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented in accordance with the terms of this permit. For inactive mining operations, if annual inspections are impracticable, then a certification once every three years by a registered professional engineer that the facility is in compliance with the permit, or alternative requirements, can be performed instead of an annual Comprehensive Site Inspection.
- b. A Comprehensive Site Inspection must assess the following:
  - i. Whether the description of potential pollutant sources is accurate as required under Part XII.2. of this document;
  - ii. Whether the site map has been updated or otherwise modified to reflect current conditions;
  - iii. Whether the BMPs to control potential pollutants in stormwater discharges as identified in the SWPPP and Part XII.3. are being effectively implemented; and,
  - iv. Whether any SWPPP revisions such as additional BMPs are necessary.
- c. Based on the results of the Comprehensive Site Inspection, the description of potential pollutant sources and BMPs identified in the SWPPP must be revised as appropriate within 14 days of such inspection and must provide for implementation of the changes to the SWPPP in a timely manner.
- d. A Compliance Evaluation Report must be submitted to the Department addressing the Comprehensive Site Inspection performed during each calendar year.

- i. The report must identify personnel making the inspection and the date(s) of the inspection.
  - ii. The report must summarize observations made based on the items stated in Part XII.5.b.
  - iii. The report must summarize actions taken in accordance with Part XII.5.c.
  - iv. The report must be retained with the SWPPP.
  - v. The permittee shall submit a copy of the report to the Department by January 28<sup>th</sup> of each year for the preceding calendar year's inspection.
  - vi. The report must identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report must contain a certification that the facility is in compliance with the SWPPP and this permit.
  - vii. The report must be signed in accordance with the signatory requirements stated in the permit.
- e. A tracking or follow-up procedure, including a schedule for implementation, must be used and identified in the Report which ensures adequate response and corrective actions have been taken in response to the Comprehensive Site Inspection and/or noncompliances.
- f. Records of the Comprehensive Site Inspection, the Compliance Evaluation Report, and any related follow-up actions must be maintained by the permittee.

### XIII. Information Sources

ARM Title 17, Chapter 30, Sub-chapter 6, *Montana Surface Water Quality Standards and Procedures*.

ARM Title 17, Chapter 30, Sub-chapter 7, *Nondegradation of Water Quality*, November 2004.

ARM Title 17, Chapter 30, Sub-chapter 13, *Montana Pollutant Discharge Elimination System*, August 2003.

Code of Federal Regulations, Chapter 40, Part 436, Subpart AJ, *Talc, Steatite, Soapstone and Pyrophyllite Subcategory*.

EPA, 1986, EPA/440/5-86-001, *Quality Criteria for Water*, Office of Water Regulations and Standards, , May 1, 1986.

Luzenac, 1996, *Johnny Gulch Drainage Summary*, Luzenac America Inc., October 2, 1996.

Luzenac, 1997, Renewal Application for MPDES Permit No. MT 0028584, June 27, 1997.

Luzenac, 2005a, MPDES Permit Modification and Permit Application, Luzenac America Inc., June 10, 2005.

Luzenac, 2005b, Deficiency Response to MPDES Permit No. MT-0028584 Modification, Luzenac America Inc., June 23, 2005.

MCA Title 75-5-101 *et seq.*, *Montana Water Quality Act*, MCA 2003.

Montana 303(d) List, *A Compilation of Impaired and Threatened Waterbodies in Need of Water Quality Restoration*, 1996, 2002, 2004.

Montana River Basins map, <http://nr.is.state.mt.us/wis/pdf/10020007.pdf>.

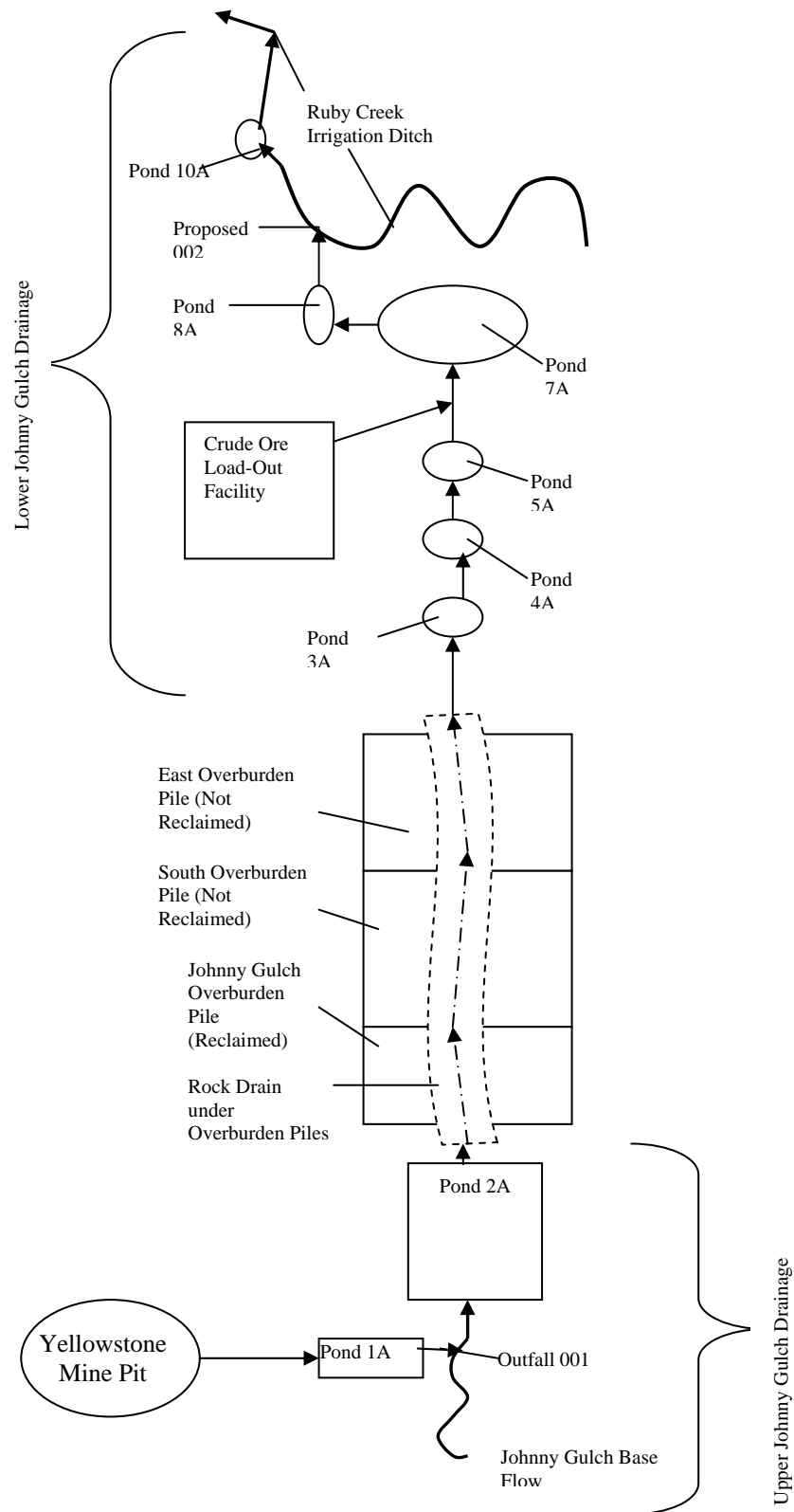
MPDES Permit # MT0028584 File.

DEQ-7, Circular, *Montana Numeric Water Quality Standards*, February 2006.

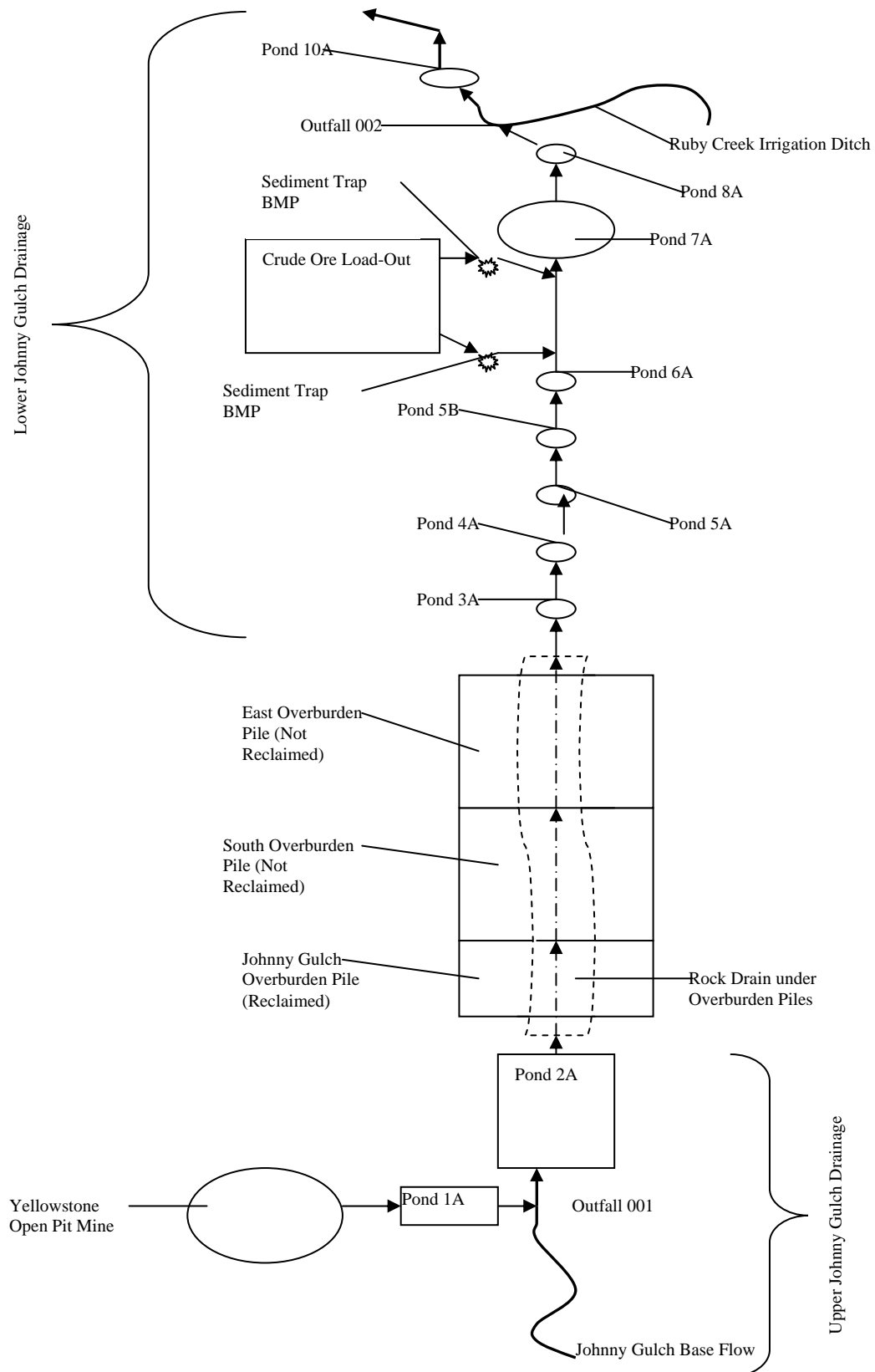
Prepared by: Paul A. Skubinna

Date: February 2006

Attachment 1: Current Water Management Line Diagram.



## Attachment 2: Proposed Wastewater Treatment and Management System



**APPENDIX D**

**MPDES ENVIRONMENTAL ASSESSMENT**

**DEPARTMENT OF ENVIRONMENTAL QUALITY**  
**Environmental Assessment**

**PERMITTING AND COMPLIANCE DIVISION – WATER PROTECTION BUREAU**

**Name:** Luzenac - Yellowstone Mine

**Type of Activity:** Open Pit Talc Mining

**Location:** Sections 3, 4, 5 and 9, Township 9 South, Range 1 West and Sections 32, 33 and 34 of Township 8 South, Range 1 West

**City/Town:** 10 miles south of Cameron, MT

**County:** Madison

**Description of Project:**

Luzenac America Inc.'s Yellowstone Mine currently has an existing individual Montana Pollutant Discharge Elimination System (MT0028584) permit to discharge mine pit dewatering wastewater, to Johnny Gulch Drainage via permitted Outfall 001. The permittee has proposed to modify the previously permitted water management structures and add a new outfall, Outfall 002 to accommodate planned life of mine expansion. Sources of wastewater contributing to flows at Outfall 002 will include Johnny Gulch run-on, discharge from Outfall 001 and stormwater and mine drainage run-off from other disturbed and undisturbed areas at the facility. Modifications to water management facilities include increase in wastewater storage capacity, such that the facility is not expected to discharge from Outfall 002 except after a 15 year 24 hours storm event of 2.01 inches precipitation (or equivalent snow melt event).

**Agency Action and Applicable Regulations:**

The pending Agency action is renewal and modifications of the existing MPDES permit number MT0028584. Regulations to this permit renewal and modification include Section 318, 402, and 405 of the Federal Clean Water Act (CWA); 40 CFR, Parts 122-125, 129, 133, 136, 400-471 and 503; Montana Water Quality Act (WQA) at 75-5-101 *et seq.*; Administrative Rules of Montana (ARM) 17.30.601-670, 701-718, 1201-1209, 1301-1387; and, the Montana Numeric Water Quality Standards, Department Circular DEQ-7.

**Summary of Issues:**

The primary issue of concern within this permit modification and renewal is the potential for storm water run-off to discharge from the mine facilities during current operations and/or life of mine expansion activities. The permittee has proposed to retain all run-off resulting from precipitation events up to the 15 yr 24 hour storm event. The permit requires the permittee to update and modify the site wide drainage plan; and, maintain and submit to the Department the site wide drainage plan in the form of a Storm Water Pollution Prevention Plan. This has been implemented to ensure that reasonable land, soil, and water conservation practices are applied pursuant to 75-5-317, MCA, such that existing and anticipated beneficial uses will be fully protected in the event a discharge from the mine property occurs via Outfall 002.



## Affected Environment & Impacts of the Proposed Project:

Y = Impacts may occur (explain under Potential Impacts). *Include frequency, duration (long or short term), magnitude, and context for any significant impacts identified. Reference other permit analyses when appropriate (ex: statement of basis). Address significant impacts related to substantive issues and concerns. Identify reasonable feasible mitigation measures (before and after) where significant impacts cannot be avoided and note any irreversible or irretrievable impacts. Include background information on affected environment if necessary to discussion.*

N = Not present or No Impact will likely occur. *Use negative declarations where appropriate (wetlands, T&E, Cultural Resources).*

IMPACTS ON THE PHYSICAL ENVIRONMENT	
RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are soils present which are fragile, erosive, susceptible to compaction, or unstable? Are there unusual or unstable geologic features? Are there special reclamation considerations?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
2. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?	[N] The proposed permit renewal requires the permittee to update and modify the existing site wide drainage plan; and, maintain and submit to the Department the site wide drainage plan in the form of a Storm Water Pollution Prevention Plan. This permit condition has been implemented to ensure that reasonable land, soil, and water conservation practices are applied pursuant to 75-5-317, MCA, such that existing and anticipated beneficial uses will be fully protected in the event a discharge from the mine property occurs via Outfall 002.
3. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)?	[N] Some increase in particulate pollutants may be expected during construction of additional water management facilities. No significant air quality impacts are expected. See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
4. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be significantly impacted? Are any rare plants or cover types present?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
5. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
6. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.

<b>IMPACTS ON THE PHYSICAL ENVIRONMENT</b>	
habitat present? Any wetlands? Species of special concern?	
7. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
8. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
9. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project? Will new or upgraded powerline or other energy source be needed?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES: Are there other activities nearby that will affect the project?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.

<b>IMPACTS ON THE HUMAN ENVIRONMENT</b>	
11. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[N] Upon occasion Outfall 002 may discharge to the Ruby Creek Irrigation Ditch, the frequency of effluent monitoring has been designed such that any potential impacts to agricultural beneficial uses of the water are detected. The re-opener provision within the discharge permit allows for re-evaluation and placement of limits on this outfall to ensure agricultural beneficial uses are protected if necessary.
13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so, estimated number.	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
14. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
15. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc.) be needed?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential

<b>IMPACTS ON THE HUMAN ENVIRONMENT</b>	
GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	impacts and mitigations.
17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
19. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities possible?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
20. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
21. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
22(a). PRIVATE PROPERTY IMPACTS: Are we regulating the use of private property under a regulatory statute adopted pursuant to the police power of the state? (Property management, grants of financial assistance, and the exercise of the power of eminent domain are not within this category.) If not, no further analysis is required.	[N] See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) for potential impacts and mitigations.
22(b). PRIVATE PROPERTY IMPACTS: Is the agency proposing to deny the application or condition the approval in a way that restricts the use of the regulated person's private property? If not, no further analysis is required.	[ ]
22(c). PRIVATE PROPERTY IMPACTS: If the answer to 21(b) is affirmative, does the agency have legal discretion to impose or not impose the proposed restriction or discretion as to how the restriction will be imposed? If not, no further analysis is required. If so, the agency must determine if there are alternatives that would reduce, minimize or eliminate the restriction on the use of private property, and analyze such alternatives. The agency must disclose the potential costs of identified restrictions.	[ ]



23. Description of and Impacts of other Alternatives Considered:
- A. No Action: Potential for unmonitored run-off discharges from lower Johnny Gulch mine facilities.
- B. Approval with modification: Not applicable.
24. Summary of Magnitude and Significance of Potential Impacts: See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) and EIS for potential impacts and mitigations.
25. Cumulative Effects: See Mine Life Extension Amendment to Operating Permit 00005 Draft Environmental Assessment (December 2004) and EIS for potential impacts and mitigations.
26. Preferred Action Alternative and Rationale: Issue MPDES permit renewal and modification as described in the 2006 Statement of Basis and Draft Permit.

**Recommendation for Further Environmental Analysis:**

☐ EIS    ☐ More Detailed EA    ☐ No Further Analysis

Rationale for Recommendation: The proposed modification will not impact water quality if wastewater discharge meets permit effluent limits.

27. Public Involvement: A 30-day public notice of the proposed MPDES permit renewal and modification was issued beginning March 24, 2006 and ending April 24, 2006.
28. Persons and agencies consulted in the preparation of this analysis: See Statement of Basis for references cited during technical analysis of the proposed action.

**EA Checklist Prepared By:**

Paul Skubinna

March 15, 2006

Date

**Approved By:**

Ms. Bonnie Lovelace, Chief, Water Protection Bureau

Bonnie Lovelace

Signature

May 9, 2006

Date



**APPENDIX E**

**LUZENAC MPDES  
RESPONSE TO PUBLIC COMMENTS  
ON  
ENVIRONMENTAL ASSESSMENT**

## Luzenac America, Inc., MPDES Permit renewal – Response to Public Comment

On March 24, 2006, the Department issued Public Notice MT-06-05 presenting a tentative determination to issue a wastewater discharge permit renewal and modification to Luzenac America Inc. The public notice stated that the Department had prepared a draft permit and statement of basis and that it was available for public review and comment. The notice required that all comments received or postmarked by April 24, 2006 would be considered in formulation of a final determination and issuance of the permit.

The Department received two sets of written comments and has prepared a response to each significant comment as required by ARM 17.30.1377. Comments were received from Davis, Warren and Hritsco legal counsel for adjacent land owners Eugene and Lois Walsh and Luzenac America, Inc., applicant. The Department has considered these comments in preparation of the final permit and decision, and provided the following responses.

1. Comment: On the face of the Permit Fact Sheet and throughout the document and proposed permit, the *Receiving Water* is rather innocuously identified as “Johnny Gulch and Unnamed Irrigation Ditch.” In fact, the ditch has a well recognized name, i.e., the Ruby Ditch. Mr. and Mrs. Walsh are the owners of all of the flow of Ruby Ditch, as represented by DNRC Water Right Nos. 41F-132908, 132911, 132912, 132920 and 132926. Walshes irrigate their bench lands immediately adjacent to and downstream of Luzenac’s mine with the Ruby Ditch water. As a result of the 1981 Settlement Agreement referenced above, Luzenac may not release any waste or pollution upon Walsh lands. As a result of the 2005 Stipulation resolving the recent litigation, Luzenac may not interfere in any manner with the flow of Walshes’ Ruby Ditch in Lower Johnny Gulch, which Luzenac has formally recognized with a recorded easement. Yet in the Permit Fact Sheet, the DEQ acknowledges that the Walshes’ Ruby Ditch may be receiving runoff water from the Yellowstone Mine. The DEQ is respectfully requested to demonstrate to the Walshes how waste and pollution to Walsh lands can be avoided, when runoff from the mine is specifically anticipated and allowed by the permit.

Response: There are two distinctly different state waters receiving discharge from the Yellowstone Mine referenced in the Statement of Basis (SOB) and draft permit, as proposed by the applicant. The receiving water for Outfall 001 is Johnny Gulch, which does not contain a named creek or river. The receiving water for the proposed Outfall 002 is the irrigation ditch described in the SOB as the Ruby Creek Irrigation Ditch (RCID), which is materially one and the same with the receiving water the commenter has described as the Ruby Ditch.

The referenced 1981 agreement between Luzenac America, Inc. (LAI) and the Walshes is not pertinent to the proposed Permit. The Montana Department of Environmental Quality (DEQ) does not have the authority to maintain or enforce private agreements between private land owner(s) and a permittee(s) under Montana Pollutant Discharge

Elimination System (MPDES) permits. As delineated at 75-5-402(1) the DEQ shall issue, suspend, revoke, modify, or deny permits to discharge sewage, industrial wastes, or other wastes into state waters consistently with rules made by the board. The applicable rules and statutes are delineated in the SOB and draft Permit. The draft Permit contains effluent limits, monitoring requirements and compliance conditions designed to limit pollution and degradation, and preserve the quality of the state water receiving the industrial discharge, in accordance with the applicable rules made by the board and the statute.

2. Comment: Under Section I, Permit Status, the DEQ reports that currently, mine dewatering wastewater (and presumably surface runoff water) discharges to Cherry Gulch (and ultimately to the Madison River) via an unnamed ditch. Again the ditch is Walshes' Ruby Ditch, and the water in fact discharges to Walshes' bench lands down gradient of the mine through a series of flood irrigation ditches, not to Cherry Gulch as stated. Although it is possible to divert the water to Cherry Gulch, it would not normally flow in such a manner.

Response: The referenced description presented in Section I, Permit Status, of the SOB is an introductory and general description intended to familiarize the reader with the most direct, potential and likely path of water currently discharged from Outfall 001 to the nearest state water having a Hydrologic Unit Code assigned to it.

3. Comment: In Section III, Proposed Technology-Based Effluent Limits, the DEQ concluded that it is not feasible to establish numeric effluent limitations for the proposed outfall 002 which is located in Lower Johnny Gulch near the Luzenac/Walsh border. Instead, it appears the DEQ merely requires Luzenac (as a "special condition") to develop and implement a Storm Water Pollution Prevention Plan at some future point in time. Our clients are concerned that such a plan will not be developed in a timely manner, or even at all, until the next significant storm event brings the matter back into focus. How can the DEQ issue the proposed MPDES permit without first reviewing and approving the proposed Storm Water Pollution Prevention Plan? Our clients respectfully request that Luzenac be required to provide the Storm Water plan for review, approval and public comment before the MPDES permit is issued.

Response: The SWPPP has not been proposed by the permittee, the requirement for the facility to develop a SWPPP is a condition of the permit. Thus, the requirement/condition is not effective until the permit is issued.

The permittee is required to submit the SWPPP within 6 months (on or before January 1, 2007) of the effective date of the permit, and implemented within 12 months (on or before July 1, 2007). SWPPP submittal and implementation time requirements have been added to the permit within Sections I.D. and E.

The DEQ MPDES permit files are open to the public during normal business hours. Copies of file documents may be requested and public comments on said documents are welcome at any time.

4. Comment: Likewise, in Section IV, Water Quality-Based Effluent Limits, particularly for proposed Outfall 002, the DEQ appears willing to wait until water quality standards are violated before re-opening the permit process and establishing water-quality standards for the outfall nearest the Walsh lands. Not only will Walsh lands be harmed by this approach, but nowhere is the zero-tolerance standard imposed on Luzenac by the 1981 Settlement Agreement addressed.

Response: As discussed on page 9 of the SOB, the DEQ believes that the storm water controls required in the permit including the requirement to develop a SWPPP will be sufficient to maintain compliance with all applicable water quality standards.

The re-opener provision in the permit is a standard conditions included in all MPDES permits. Accordingly, if new data becomes available that indicates discharge from Outfall 002 causes or contributing to an excursion from a water quality standard the permit may be re-opened and the situation addressed.

As discussed in the response to comment number one, above, the DEQ does not have the authority to implement or enforce Settlement Agreements between private parties.

5. Comment: In Section VII, Monitoring Requirements, the fact that the mine personnel currently work 4-day work weeks is ignored. Our clients do not believe that monitoring of water quality at the proposed Outfall 002 can be effectively accomplished if a storm event occurs during the three-day weekends at the mine site. Such was the case during the June 10-11, 2004 storm event, when the photos which are attached were taken. At the hearing held in May of 2005, no mine personnel could recall seeing the sediment-laden water roaring down the gulch and overwhelming the two lower ponds, likely because it occurred during a three-day weekend.

Response: Suspended sediment, settleable solids and other potentially harmful suspended material are generally observed at their highest concentration within the initial discharge that is induced from run-off type events. Thus, sampling within the first hour of discharge is a commonly practiced storm water monitoring protocol/requirement critical in assessing potential maximum concentrations of pollutant parameters discharged and consequently compliance with water quality standards. Automated automatic sampling apparatus technology is available for domestic, commercial and industrial wastewater sampling applications. It is feasible for the permittee to meet the monitoring requirements of the permit. Section I.D. of the draft permit requires the permittee to identify within the SWPPP document procedures and protocols to be implemented and used to satisfy the monitoring requirements of the permit.

6. Comment: The above comments related to the absence of any reference to the contractual obligations represented by the 1981 Settlement Agreement apply to the Environmental Assessment throughout.

Response: See response to comment number one, above.



7. Comment: An analysis based only on the 15 year, 24 hour storm event alone is insufficient. 25, 50 and 100 year storm events should also be evaluated given the life-of-mine expansion planned for this site.

Response: Analysis based on the 15 year, 24 hour design storm event is adequate. The talc mining and processing industry is listed within the Standard Industrial Classification (SIC) code 1499, which is within Major Group 14. As discussed in the SOB effluent limitation guidelines (ELG) have not been promulgated for the talc industry; however, for other industries included in Major SIC Group 14, ELGs have been established. These ELGs generally contain provisions such that the design storm for these types of facilities is the 10 year 24 hour storm event.

Storms less than, and in excess of the 15 year 24 hour storm event have been considered. It has been determined that storms in excess of the 15 year 24 hour event will likely result in a discharge as authorized by the permit. LAI is required to monitor any discharge as described by the permit.

8. Comment: Under the section entitled "Impacts on the Human Environment" it is recognized that proposed Outfall 002 may discharge to the Ruby Ditch. However, the DEQ leaves it to the "re-opener" provisions within the proposed permit to re-evaluate the necessity of setting limits on Outfall 002 to ensure agricultural beneficial uses are protected. Of course, the Walshes are the agricultural entity immediately affected by discharge to their Ruby Ditch, and they are not satisfied to wait until the harm has occurred before the permit is "re-opened" and limitations established. Limitations should be considered now, especially in light of the zero-tolerance discharge requirements of the 1981 Settlement Agreement.

Response: The re-opener provision within the permit is misconstrued in the comment as the primary regulatory mechanism of the permit. That is not the case. The re-opener provision within the permit is a standard condition to allow for re-evaluation of permit conditions, if warranted, when and if new data becomes available that indicates this analysis is required.

Potential parameters of concern believed to be present in the discharge that may negatively affect agricultural beneficial uses include suspended and settleable solids. BMPs and other facilities have been installed and proposed by the applicant to control suspended materials and the permittee is required to develop a SWPPP, which generally focuses on control of suspended and settleable solids at the source.

With regard to the 1981 Settlement Agreement, see response to comment number one above.

9. Comment: Part I Page 4 of 29 under Outfall 002 states: "There shall be no discharge from this outfall except as a result of a precipitation event in excess of 2.01 inches in 24 hour period or the equivalent snow melt." Luzenac feels the language of "no discharge" is not reasonable. Pond capacity may be lowered as a result of smaller earlier events. Assumptions from the hydrologic interpretations (such as frozen ground) may change the volume of water reporting to the ponds.

In additions, Luzenac would point out that the 2.01 inches is from a model and subject to some level of inaccuracy, i.e. a 1.8 inch event may cause discharge or a 2.2 inch event may not cause discharge. Luzenac would offer that “discharge is not anticipated from this outfall except as a result of a precipitation event in excess of 2.01 inches in 24 hours or the equivalent snow melt.”

Response: For all industrial subcategories regulated under 40 CFR Part 436, which storm water retention and/or treatment ELGs have been developed, run-off over-flows are not subject to the numeric water quality ELGs if the facilities are designed, constructed and maintained to contain or treat the volume of wastewater that would result from a 10-year 24-hour precipitation event (see 40 CFR Part 436 Subparts B, C, D and R). The 10-year 24-hour precipitation event is defined at 40 CFR Part 436, Subparts B, C, D and R as being the maximum 24 hour precipitation event with a probable reoccurrence interval of one in 10 years. The definition goes on to state this information is available in “Weather Bureau Technical Paper No. 40,” May 1961 and “NOAA Atlas 2,” 1973 for the 11 Western States. Luzenac’s application materials and NOAA Atlas 2 data indicate the 10 year 24 hour precipitation event is equivalent to 1.9 inches. Accordingly, the referenced language at Part I, Page 4 of 29 has been changed in the permit to the following.

“There shall be no discharge from this outfall except as a result of a precipitation event in excess of 1.9 inches in a 24 hour period or the equivalent snow melt.”

10. Comment: Part I Page 5 of 29 under Outfall 002 states: “Because discharge from Outfall 002 will be precipitation induced, effluent monitoring will be required within the first hour of any discharge event, followed by daily for the following 6 days and weekly thereafter until the discharge even ceases.” The Yellowstone Mine operating schedule is 20 hours per day Monday through Thursday. Luzenac feels that sampling a discharge within one hour when the location is not staffed may be unachievable (especially during a holiday when the operation may not be staffed for up to 5 days) and at best an individual may be at least 30 minutes away from the property. Luzenac would offer that monitoring could occur within 8 hours following initial discharge. Luzenac would offer that discharge characteristics may not change after 3 days and sampling daily for 6 days seems excessive. Therefore, Luzenac would recommend sampling daily for 3 days and then weekly until the discharge has ceased.

Response: See response to comment 5 above. If Luzenac has water quality data to substantiate its claim that discharge may not change after 3 days of sampling, it is requested that Luzenac bring such data forward as an estimate of Outfall 002 water quality under discharge conditions.

11. Comment: Part I Page 5 of 29 last paragraph states: After one year of monitoring, the permittee may reduce or eliminate sampling for phosphorus and nitrogen compounds after notifying the Water Protection Bureau.” The table above does not include phosphorus, and Luzenac would agree that phosphorus would not be present.

Response: The referenced language was included in the permit by error and has been removed from the proposed permit.

12. Comment: Part I Page 6 of 29 Precipitation Monitoring states: "Precipitation events must be measured using a rain gauge or equivalent device capable of measuring precipitation depth to an accuracy of 0.1 inches." Luzenac feels that accuracy of a rain gauge more precise than +/- 0.3 inches is not reasonable considering an estimate of equivalent snow pack. Events will most likely be a result of rain on snow, and accuracy would not be a factor except only for direct rain.

Response: The word "estimate" has been removed when referring to snow-pack melt measurement as a condition pertaining to when discharge from Outfall 002 is allowed. Note that Part I, Subpart D.1.m of the permit, requires the permittee to identify procedures and protocols to be implemented and used to meet the monitoring requirements of this permit. This includes snow pack and precipitation monitoring requirements performed to demonstrate compliance with permit conditions.

13. Comment: Part I Page 7 of 29 section j. states: "Qualified personnel shall be identified in the SWPPP to inspect the facility site and stormwater management BMPs following each significant stormwater rainfall event resulting in 0.5 inches of precipitation or more, or after significant snowmelt events." Luzenac would like to clarify that 0.5 inches would be in 24 hours.

Response: The permit condition requires the permittee to inspect storm water BMPs after any discrete storm water event resulting in 0.5 inches of precipitation regardless of duration of the storm. Thus, a continuous drizzle resulting in 0.1 inches of precipitation during the calendar day of Monday, 0.1 inches on the calendar day of Tuesday, 0.1 inches on Wednesday and so on would require inspection of BMP calendar day Friday, after a accumulated total of 0.5 inches of precipitation. Similarly, if it rained for 1 hour on Monday morning resulting in 0.75 inches of precipitation followed by a distinctly separate 2-hour 0.5-inch rain on Monday afternoon, BMPs would need to be inspected two times on Monday, once after each event.

14. Comment: In regards to the SWPPP all references to Part XII is from the statement of basis.

Response: Typos referencing Part XII of the permit have been revised.