Montana Department of
ENVIRONMENTAL QUALITY

Brian Schweitzer, Governor

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January 30, 2007

Dear Reader:

The Montana Department of Environmental Quality (DEQ) announces the availability of a Draft Environmental Assessment (EA) for the Barretts Minerals Inc. Regal Mine proposed Amendment 005. Barretts Minerals Inc. has applied to the Montana Department of Environmental Quality (DEQ) for an amendment to Operating Permit No. 00013 for the Regal Mine. The Proposed Action would modify the approved pit dewatering system, expand the overburden disposal area, and realign the Sweetwater Road through the operating permit area. The overall disturbance at the mine site would increase by 39.8 acres. No changes in mining methods, mining rate, or number of employees are proposed. Please see the attached Executive Summary of the Draft EA.

The Draft EA analyzes the potential impacts of the Proposed Action as well as the potential impacts of two alternatives: 1) No Action (Denial of Amendment 005) and 2) Agency Modifications to the Proposed Action. The Draft EA addresses issues and concerns raised during agency scoping. The operating permit amendment application is available for review at the DEQ offices in Helena and the Carson library at Western Montana College in Dillon.

DEQ has selected the Agency Modifications to the Proposed Action alternative as the preliminary preferred alternative. **This is not a final decision.** The preferred alternative could change in response to public comment on the Draft EA, new information, or new analysis that might be needed in preparing the Final EA.

The Draft EA is posted on the DEQ website at www.deq.state.mt.us. If you would like a CD or hard copy of the Draft EA, please contact Herb Rolfes at hrolfes@mt.gov or call (406) 444-3841. Public comments concerning the adequacy and accuracy of the Draft EA will be accepted until February 23, 2007. Written comments may be sent to the Montana Department of Environmental Quality, Environmental Management Bureau, PO Box 200901, Helena MT 59620-0901, attn: Herb Rolfes.

Since the Final EA might only contain public comments and responses, and a list of changes to the Draft EA, please keep the Draft EA for future reference.

Warren D. McCullough

Warren McCullough, Chief
Environmental Management Bureau
Department of Environmental Quality

1/30/2007
Date

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DRAFT ENVIRONMENTAL ASSESSMENT

for

BARRETTS MINERALS, INC.
REGAL MINE
OPERATING PERMIT NO. 00013
AMENDMENT 005

Prepared by

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL MANAGEMENT BUREAU

JANUARY 25, 2007

TABLE OF CONTENTS

CHAPTER 1 – INTRODUCTION 1

Relocation of the Sweetwater Road 5
Air Quality 6
Geology 7
Area Seismicity 7
Geochemistry and Asbestiform Minerals 7
Acid Rock Drainage Potential and Metal Mobility 8
Wildlife 8
Fisheries and Aquatics 9
Vegetation 9
Soil 10
Cultural and Paleontological Resources 11
Wetlands 12
Noise 12
Land Use 12
Recreation 12
Socio-economics 13
Employment 13
Taxes 13

CHAPTER 2 – ALTERNATIVES 15

Issue 1: Water Quality and Management 15
Impacts of Infiltration Trench Pit Dewatering Plan 15
Impacts of Overburden Pile Expansion 16
Issue 2: Overburden Pile Reclamation 16
Introduction 16
Location and Land Use 17
Surface and Mineral Ownership 17
Mine and Permit History 17
Permit Area and Existing Permitted Disturbance 18
Mining Operations 18
Overburden Disposal 19
Ore Processing 19
Access, Haul Roads, and Traffic 19
Storm Water Management 20
Dust Control 20
Public Safety and Mine Security 20
Resource Monitoring 21
Water Quality 21
Pit Dewatering Plan 25
Pit Dewatering Plan Monitoring *25*
Reclamation 26
Introduction 26
Soil Salvage 26
Soil Placement 28
Pit 29
Overburden Pile 29
Sweetwater Road 30
Percolation Ponds and Pipeline 30
Revegetation 30

Introduction 31
Permit Area and Existing Permitted Disturbance 32
Overburden Disposal 32
Access, Haul Roads, and Traffic 32
Storm Water Management 33
Resource Monitoring 34
Water Quality 34
Pit Dewatering Plan 34
Pit Dewatering Plan Monitoring 35
Reclamation 35
Introduction 35
Soil Salvage 35
Soil Placement 35
Pit 35
Overburden Pile 36
Sweetwater Road 36
Infiltration Trenches and Pipelines 36
Revegetation 37
Overburden Disposal 37
Resource Monitoring 37
Water Quality 37
Pit Dewatering Plan 38
Pit Dewatering Plan Monitoring 38
Reclamation 38
Overburden Pile 38
Infiltration Trenches and Pipelines 38

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY 39
Alternative Waste Rock Dump Design 39
Alternative County Road Relocation 39

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS 40

AFFECTED ENVIRONMENT 40
Parameter 42
Groundwater 42
Surface Water 42

DIRECT AND INDIRECT IMPACTS 43
No Action 43
Issue 1: Water Quality and Management 44
Impacts of Percolation Pond Pit Dewatering Plan 44
Pit Dewatering Plan Monitoring 46
Impacts of Overburden Pile Expansion 47
Issue 2. Overburden Pile Reclamation 48
Proposed Action 50
Issue 1: Water Quality and Management 50
Impacts of Infiltration Trench Pit Dewatering Plan 50
Pit Dewatering Plan Monitoring 51
Impacts of Overburden Pile Expansion 51
Issue 2. Overburden Pile Reclamation 52
Agency Modifications to the Proposed Plan 52
Issue 1: Water Quality and Management 52
Impacts of Infiltration Trench Pit Dewatering Plan 52
Pit Dewatering Plan Monitoring 53
Impacts of Overburden Pile Expansion 53

Issue 2. Overburden Pile Reclamation 54

CUMULATIVE IMPACTS ---------- 54

REGULATORY RESTRICTIONS ANALYSIS ---------- 55

CHAPTER 4 – CONSULTATION AND COORDINATION 56

PREPARERS ---------- 56

OTHER AGENCIES CONTACTED ---------- 56
State Agencies 56
Federal Agencies 56

PUBLIC INVOLVEMENT ---------- 56

CHAPTER 5 – REFERENCES 57

TABLES

TABLE 1. EXISTING PERMITTED DISTURBED ACRES AND TOTAL PROPOSED NEW DISTURBANCES

TABLE 2. SAMPLING FREQUENCY FOR EXISTING AND PROPOSED SURFACE AND GROUNDWATER SAMPLING SITES AT THE REGAL MINE

TABLE 3. ANALYTICAL PARAMETER, DETECTION LIMITS, AND HOLDING TIMES FOR GROUNDWATER, SPRINGS, AND DEWATERING SYSTEM SAMPLES

TABLE 4. EXISTING PERMITTED DISTURBANCE AND PROPOSED ACTION SOIL BALANCE FOR THE REGAL MINE

TABLE 5. EXISTING PERMITTED AND PROPOSED REVEGETATED AND NON-REVEGETATED ACRES FOR THE REGAL MINE

TABLE 6. SUMMARY OF SURFACE WATER AND GROUNDWATER CHEMISTRY IN VICINITY OF THE REGAL MINE AND APPLICABLE WATER QUALITY STANDARDS

TABLE 7. LIST OF PREPARERS

FIGURES

FIGURE 1. LOCATION MAP

FIGURE 2. EXISTING AND PROPOSED MINE FACILITIES.

FIGURE 3. AMENDMENT 004 PIT DEWATERING SYSTEM-PERCOLATION PONDS AND PIPELINES

FIGURE 4. AMENDMENT 005 PIT DEWATERING SYSTEM:INFILTRATION BASINS AND PIPELINES

FIGURE 2-2 FROM 2000 EIS. POST-MINING TOPOGRAPHY & LANDSCAPING-MIXED DUMP SLOPE, AGENCY MODIFIED ALTERNATIVE

CHAPTER 1 – INTRODUCTION

INTRODUCTION

The Montana Department of Environmental Quality (DEQ) received an application in February 2006 from Barretts Minerals Inc. (BMI) to amend Operating Permit 00013 at its Regal Mine. BMI mines talc ore about 11 miles east of Dillon, Montana (Figure 1). The Proposed Action would result in the expansion of the overburden pile by 60 acres and implement a revised pit dewatering plan. In the Amendment 005 application, BMI has submitted a final design for the permanent relocation of the Sweetwater Road through the mine site. This relocation was stipulated as part of Amendment 004 approval. DEQ would review the final design to ensure it complies with Amendment 004 approval.

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). This draft environmental assessment (Draft EA) analyses the Proposed Action, Amendment 005 to Operating Permit 00113 pursuant to the Montana Environmental Policy Act (MEPA).

Draft and final environmental impact statements (EIS) were prepared by DEQ for Amendment 004, the Life of Mine Expansion Plan, at the Regal Mine (DEQ 2000 and 2001). The EIS analyzed the impacts caused by the operation and expansion of the Regal Mine. The majority of the issues and concerns associated with the EIS have not changed in the years between the Life of Mine Expansion Plan EIS and this Draft EA. Most of the environmental information and the operating and reclamation plan concerning the Regal Mine have not changed. This Draft EA is tiered to the 2000 EIS and addresses only new issues and concerns related to the Proposed Action, Amendment 005. The Draft 2000 and Final 2001 EIS documents can be reviewed on the DEQ website at www.deq.mt.us.

This Draft EA describes and evaluates the environmental consequences of the Proposed Action. The Draft EA also evaluates two alternatives to the Proposed Action: 1) the No Action Alternative and 2) the Agency Modifications to the Proposed Action Alternative. The No Action Alternative would allow BMI to continue operations under the conditions of the approved amendment to Operating Permit 00013 as described in Chapter 2.

Chapter 1 describes the purpose and benefits of the Proposed Action, the role of DEQ and other agencies, and issues. 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 only describes the affected environment in the Regal Mine area and analyzes potential direct, indirect, and cumulative impacts associated with the Proposed Action and the alternatives. Chapter 3 identifies possible plan modifications which could become mitigation measures that could be selected to minimize impacts. Chapter 4 identifies the coordination with local, state, and federal

agencies that occurred during preparation of the Draft EA and contains a list of those who prepared the Draft EA. Chapter 5 contains a list of references cited.

PURPOSE OF THE PROPOSED ACTION

The area within the present operating permit boundary is 160 acres with 150 acres approved for disturbance. Mining has disturbed about 94.5 acres to date (Resource Management Associates, Inc. Personal communication, January 17, 2007). Amendment 005 would disturb another 39.8 acres for a total approved disturbed area of 189.8 acres. The permit area would increase 83.1 acres from 160 to 243.1 acres.

BMI proposes to expand the overburden pile area at the Regal Mine from 63.3 acres to 123.3 acres (Figure 2). This expansion would not increase the tonnage of the overburden pile. It would only increase the area that the overburden pile covers. The approved multi-slope overburden pile is 63.3 acres and is 200 feet higher than the proposed design. BMI has purchased adjacent private property enabling it to potentially expand the overburden pile. This would enhance reclamation potential and reduce aesthetic impacts of the operational and reclaimed overburden pile. Overburden pile expansion would reduce pile height by 200 feet, reduce steep slope length, and create less erosion potential which would make reclamation more achievable and manageable. If the permit amendment is not approved, BMI would complete the operations identified under its existing Operating Permit 00013 Amendment 004 as analyzed in 2000 and 2001 (DEQ 2000 and 2001).

The overburden pile would expand by 60 acres but changes to other facilities and corrected mapping result in a net change of 39.8 acres (See Table 1).

A pit dewatering system was approved in Amendment 004 in 2000 (Figure 3). BMI would pipe pit water to percolation basins and land apply pit water 1 to 2 miles downgradient of the mine. In Amendment 005, BMI proposes to infiltrate the water in three infiltration trenches in drainages near the mine as a method to dispose of pit water (Figure 4). The testing for this method was approved by DEQ as Minor Revision 05-002 to the operating permit in 2005. Based upon the results of the test, BMI seeks approval to implement the revised pit dewatering plan.

The existing Sweetwater Road would be realigned to its permanent location through the mine site (Figure 2). The Sweetwater Road would be moved to an area further away from the post-mine pit lake, as stipulated as part of the Amendment 004 approval in 2001.

There would be no change in the mining and mill production rates or employment level as a result of the Proposed Action.

PREVIOUS ENVIRONMENTAL REVIEWS

Previous environmental reviews were summarized in the 2000 Draft EIS (DEQ 2000) and are updated in Chapter 2 under the Mine and Permit History section.

AGENCY RESPONSIBILITIES

DEQ is responsible for hard rock mine permitting and compliance under the MMRA. An amendment to an operating permit submitted to DEQ may be approved only after a review of the operating, reclamation, and closure plans as required by MMRA, and after an environmental analysis is completed as required by MEPA.

DEQ is also responsible for protecting water quality under the Montana Water Quality Act and air quality under the Clean Air Act of Montana. DEQ must decide to: (1) deny the application, the No Action Alternative, if the proposed operation would violate MMRA, the Clean Air Act, or the Water Quality Act; (2) approve BMI's Proposed Action as submitted; (3) approve the Proposed Action with agency modifications designed to mitigate identified environmental impacts, or 4) require an EIS be completed to disclose and analyze potentially significant impacts.

DEQ must decide whether to approve modifications to BMI's General Discharge Permit for Storm Water (Authorization MTR300136) and the accompanying Storm Water Pollution Prevention Plan (SWPPP).

DEQ must decide whether to approve modifications to BMI's Air Quality Permit #3086-00 for the Regal Mine.

DEQ is responsible for calculating the amount of the reclamation performance bond for the Regal Mine. The purpose of the bond is to ensure the company completes obligations under the MMRA and ensure availability of funds if the operator defaults. Posting of any additional performance bond payable to the State of Montana is a precondition to the approval of an amendment to the operating permit. The amount of the bond is based upon the estimated cost of reclaiming 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 17.24.140). DEQ is required to thoroughly review the bond every 5 years under MMRA (82-4-338, MCA). The current bond calculation for the Regal Mine as of Minor Revision 05-002 is $2,790,059. The total bond held by DEQ is $2,878,300. This leaves an unobligated balance of $88,241 for future revisions to the plan or increases in bond required during mandatory 5-year bond reviews under MMRA.

Through the EA process, the State of Montana ensures the Proposed Action would conform with existing Madison County land use restrictions. The Regal Mine is on private land. The mineral rights are privately owned and either owned by or under lease to BMI.

No federal land management agencies have permitting authority over this project. The US Army Corps of Engineers must review the proposal to decide if a Section 404 Permit

pursuant to the federal Clean Water Act is needed because of potential impacts to wetlands.

The Mine Safety and Health Administration (MSHA) regulates human health and safety practices, including exposure to airborne dust at the Regal 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 Regal Mine are required to receive initial and annual safety training.

The Occupational Safety and Health Administration (OSHA) is responsible for worker health and safety at the Barretts Mill, including exposure to airborne dust.

The haul route from the mine includes roads controlled by Beaverhead and Madison counties. BMI intends to comply with road use conditions imposed by the counties. The permanent Sweetwater Road relocation would comply with conditions imposed by Madison County.

Noxious weeds at the mine are controlled according to a weed management plan approved by Madison County.

At the end of mining, the pit dewatering pumps would be turned off and the wells properly plugged and abandoned, unless the landowner wishes otherwise. DEQ and the Montana Department of Natural Resources and Conservation (DNRC) would have to approve the post-mine well use.

PUBLIC INVOLVEMENT

BMI submitted an application in February 2006 (Resource Management Associates, Inc. 2006). DEQ published a legal notice in the *Dillon Tribune, Madisonian,* and the *Montana Standard* when the application was received. The legal notice was published once a week for three weeks as required by MMRA. DEQ also placed a press release on the state of Montana Newslinks service on February 21, 2006. No public comment letters were received. DEQ reviewed the application and sent a deficiency review on March 6, 2006. BMI responded to the letter on April 3 and again on May 25, 2006. The application is now complete. Additional information on the proposed amendment 005 plan can be found in the project file located in DEQ offices in Helena. A copy of the plan is also located in the Western Montana College library in Dillon.

ISSUES TO BE ANALYZED IN THE DRAFT EA

Based on the agency scoping, the issues studied in detail in this Draft EA concern the specific environmental and management changes that would result from the Proposed Action.

1. Impacts on water quality and management from the:

Infiltration trench pit dewatering disposal plan, and the

Overburden pile

2. Overburden pile reclamation.

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 for various reasons.

Relocation of the Sweetwater Road

The haul route from the mine includes roads controlled by Beaverhead and Madison counties. BMI intends to comply with road use conditions imposed by the counties. The location of the pit lake near the Sweetwater Road could invite trespass. Reclamation must provide sufficient measures to ensure public safety. These issues were addressed in the Amendment 004 EIS (DEQ 2000 and 2001).

Under the current approved plan, a portion of the Sweetwater Road is located in an area that is proposed for life of mine pit development and would be consumed by the pit within the next couple of years. The affected section of Sweetwater Road would be relocated around the west side of the pit. The relocated Sweetwater Road, as shown on Figure 2, would remain as a public road through the reclaimed mine site following the completion of mining activities. A large culvert type underpass would allow public traffic on the relocated road to travel under the active mine road and associated heavy equipment traffic. The culvert would be sized to allow passage of a full-sized semi-truck. The design would follow Montana Department of Transportation standards.

Following road relocation, portions of the old road segment not consumed by the pit would be reclaimed in accordance with the specifications of the Madison County Commissioners, private landowners, and DEQ. The surface would be graded to blend with the adjacent topography, and a minimum of 24 inches of topsoil would be applied and revegetated. The underpass culvert would be removed at the completion of mining and hauling activities, the road would be aligned between the pit and the overburden pile, and a surface roadbed would be established to the county road standards of Madison County. The section of road would pass within 20 feet of the open pit in one location. A talus slope would be constructed in this area from the rim to the highest bench or ramp to reduce the potential for slope failure. The pit would be fenced, gated, and signed to prevent trespass.

The relocated private access road would not be reclaimed and would continue to be used by the landowners following the end of mine life.

As part of this overburden pile expansion in Amendment 005, the approved Sweetwater Road relocation would be finalized and moved to an area further away from the post-mine pit lake than the current plan (Figure 2). This relocation was stipulated as part of Amendment 004 approval in 2001. This proposed change would reduce risks to the public and potential liabilities to BMI and Madison County. The Sweetwater Road relocation would comply with conditions imposed by Madison County.

No issues were raised as a result of the proposed realignment final design. Changes in storm water control facilities and reclamation of disturbances as a result of the change would follow the approved storm water control plan and reclamation plan respectively. Issues dealing with the road realignment were considered in the Amendment 004 EIS (DEQ 2000 and 2001). The permanent realignment of the Sweetwater Road will not be carried forward in the analysis.

Air Quality

The primary air pollutants associated with the mine are particulate dust and combustion emissions associated with heavy equipment and haul truck activities. Periodic blasting is also a source of air pollutant emissions. Air quality emission controls and dust abatement would be addressed during construction and operations anticipated by the Proposed Action, especially the expanded overburden disposal area. Air quality pre-construction permits would be obtained as needed. Required dust control would be addressed through engineering or management controls (i.e. best management practices (BMPs)) based on observed air quality conditions and monitoring results. The campaign style of mining (periodic mining in response to customer demand) rather than continuous mining and the open rural setting of the mine site reduce air quality impacts.

An Air Quality Permit application for the Regal Mine (#3086-00) Amendment 004 was submitted to the DEQ Air Resources Management Bureau on January 13, 2000. DEQ issued a preliminary determination on April 4, 2000, and the final permit was issued on May 6, 2000.

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. Hauling distances would increase slightly. BMI 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.

In addition to the Regal 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. No major changes to air quality in the area are anticipated. Because air quality would not change as a result of the Proposed Action, air quality will not be carried forward in the analysis.

Geology

The mine pit, overburden pile, and facilities area are within the Cherry Creek geologic unit. The geology of the deposit was described in the 2000 Draft EIS (DEQ 2000).

Area Seismicity

The Regal Mine is located in seismic zone 3, which has moderate earthquake activity. Although seismic activity is common, most earth tremors register well below 3.0 on the Richter scale and are rarely noticeable. No ground movement (falls, topples, and slides) in the vicinity of the Regal Mine has been identified. None of the faults identified in the vicinity of the mine has been recently active, as evidenced by the lack of fault scarps. The revised overburden pile design would reduce the height of the pile by 200 feet and enhance stability in an earthquake. This issue will not be carried forward in the analysis.

Geochemistry and Asbestiform Minerals

Talc deposits have a variety of associated metamorphic minerals, which may or may not include asbestiform minerals. The Regal Mine ore has been monitored for asbestiform fiber content by BMI's in-house lab for over 20 years. No asbestiform fibers have been found in the ore. Overburden and waste rock were not monitored for asbestiform minerals either in air or solid phase sampling until the summer of 2000. One mineable unit of waste rock (150 feet long, 20 feet wide, and 120 feet thick equaling about 28,000 tons) with asbestiform minerals has been found in the Regal Mine. Geochemistry and asbestiform minerals issues were evaluated in the EIS for Amendment 004 (DEQ 2000 and 2001).

Included in the approved management plan are monitoring, safety, and disposal plans evaluated in the Amendment 004 EIS. BMI would continue to implement the "Non-Ore Rock Management Plan" prepared by Maxim Technologies (2000a), which addresses asbestiform mineralogy specifically at the Regal Mine. These operational non-ore rock monitoring, sampling program, and management plans are described in the Amendment 004 EIS (DEQ 2000 and 2001). The monitoring is a contingency to provide environmental protection in the event that asbestiform minerals are identified during future mining. Samples would be evaluated for the presence of asbestiform mineralization, using polarized light microscopy (PLM) and if appropriate, transmission electron microscopy (TEM).

Because the Regal Mine is operated intermittently, the specific timing and location of sampling events are identified by the mine geologist as part of grade control operations. An ongoing assessment of mined rock would be conducted by the mine geology staff to identify zones where PLM testing is appropriate. This would be based on occurrence of serpentine mineralization, geologic relationships (i.e., proximity to dike or structures), and historical PLM results. Resampling the same section of highwall is not done if it has not been mined during the intervening time period. The sampling goal is a ratio of one sample per 100,000 tons. The Proposed Action would not be expected to have any

affect on the geochemistry and asbestiform mineralogy at the Regal Mine. This issue will not be carried forward in this analysis.

Acid Rock Drainage Potential and Metal Mobility

Acid rock drainage potential and metal mobility impacts were evaluated in the EIS for Amendment 004 (DEQ 2000 and 2001). BMI conducted waste rock geochemical evaluations for the Regal Mine to address agency concerns regarding waste rock, acid rock drainage (ARD) potential, and near neutral (i.e., pH =7) metal mobility. The results of the geochemical analyses showed that land disposal of dolomite and schist waste rock related to the life of mine expansion of the Regal Mine overburden pile would not adversely affect the environment.

BMI has committed to collect a random sample of each non-ore rock type twice annually when operating (Maxim Technologies, Inc., 2000b). An annual sample of ore would be collected from the pit highwall. These analyses would include a Synthetic Precipitation Leachability Procedure (SPLP) test of metal mobility, initially for a full suite of parameters, and later, as data are compiled showing consistent lack of detection for specific parameters that do not occur in these rocks, a select suite tailored to the geochemistry of the site. BMI would continue to implement the operational non-ore rock monitoring sampling program and management plan, as described in the Amendment 004 EIS (DEQ 2000 and 2001). This monitoring is a contingency to provide environmental protection in the event that the potential for acid mine drainage or metal mobility is identified during future operational monitoring. This issue will not be carried forward in the analysis.

Wildlife

The Proposed Action would result in new disturbance of 39.8 acres of native rangeland at the Regal Mine (Table 1). The baseline surveys done for the Life of Mine Expansion Amendment 004 area covered the proposed Amendment 005 expansion area (Appendix D in Hydrometrics 1999). The increase in disturbance associated with the overburden pile expansion could impact wildlife species. Big game in the area includes mule deer, antelope, and elk. Past environmental documents have considered impacts to big game and bat species (Montana Department of State Lands (DSL 1977) (DEQ 2000, Appendix A).

BMI and DEQ did a search of the Montana Natural Heritage Program database to check for potential impacts to sensitive, threatened, and endangered animal species. There are no known threatened or endangered species that occur on or near the Regal Mine site. There are several species of concern that do occur on or in the vicinity of the Regal Mine. The ferruginous hawk has been observed near the Regal Mine site. The ferruginous hawk is listed as sensitive by the Bureau of Land Management. The habitat area that could be affected by the Regal Mine expansion is relatively small compared to the large area of acceptable habitat for the hawk in the area. The greater sage grouse has an inferred extent that brings it within 2 miles of the Regal Mine site, but it has not

been observed on or near the mine itself. The pygmy rabbit has been observed within 10 miles of the Regal Mine.

The westslope cutthroat trout has been observed in two drainages within 5 miles of the Regal Mine site. The expansion and dewatering plan proposed for the Regal Mine would not impact these drainages by either drawdown or runoff.

Bald eagles and gray wolves may occasionally occur in the vicinity of the Regal Mine site. It is theoretically possible but highly unlikely that the whooping crane could migrate through the vicinity of the mine. It may be possible that lynx occur in the area as transients. It is unlikely that the grizzly bear, a threatened species, would occur in the vicinity of the Regal Mine.

The Regal Mine has been in operation since 1972. The wildlife habitats at the Regal Mine are common in the area. The additional 39.8 acres of disturbance in the common rangeland habitat types in the area would not have a major impact on wildlife in the area. Reclamation would reestablish vegetation on the site, but wildlife habitat use would be altered favoring some species over others. This is an unavoidable impact of disturbance of native rangeland.

No springs in the proposed disturbance area would dry up as a result of the proposed mining, as discussed in the Amendment 004 EIS (DEQ 2000 and 2001). If anything, pit dewatering would provide additional habitat for wildlife, while discharge of water was occurring. Wildlife impacts have not been documented to date, and wildlife issues have never been raised at the site because of the private land status and the presence of a major county road through the center of the site. The issue will not be carried forward in the analysis.

Fisheries and Aquatics

Fisheries issues were dismissed in the Amendment 004 EIS (DEQ 2000 and 2001). The Proposed Action does not affect the fish or aquatic species in this area, even with the disposal of pit water in the intermittent drainages, because the pit water would meet all water discharge criteria. If anything, the pit dewatering would provide additional habitat for aquatic species while discharge of water was occurring. This issue will not be carried forward in the analysis.

Vegetation

The Proposed Action would result in new disturbance of 39.8 acres of native rangeland at the Regal Mine (Table 1). The baseline surveys done for the Life of Mine Expansion Plan Amendment 004 area (Appendix D in Hydrometrics 1999) covered the proposed Amendment 005 expansion area. The increase in disturbance associated with the overburden pile expansion would impact plant species and plant communities. Past EAs have analyzed impacts to vegetation (DSL 1977).

No plants considered rare, threatened, or sensitive by any agency have been found within 5 miles of the Regal Mine site (Mincemoyer 2006). Sensitive species that could occur within habitat similar to the Regal Mine site and vicinity, but were not found during field surveys, include Sapphire rockcress, Lemhi penstemon, and showy townsendia.

Several noxious weeds under the County Noxious Weed Control Act (7-22-2101(5), MCA), and listed for Beaverhead and Madison counties, occur within the operating permit area. These include Canada thistle, spotted knapweed, houndstongue, burdock, musk thistle, and field scabious. Disturbance of existing vegetation and the increase in noxious weeds are unavoidable impacts of allowing disturbance. BMI has an approved noxious weed control plan. Weed control activities would be reported in the annual reports.

Important plant communities of the Regal Mine site and adjacent area are typical of rangeland areas in southwestern Montana and consist of dry native grasslands and foothill sagebrush vegetation types. Topography, soil depth over bedrock, and the calcareous nature of soil greatly influence the distribution and species composition of plant communities in the area. Common dominant plants in the area are black and big sagebrush, Idaho fescue, and bluebunch wheatgrass. Other dominant species of lesser distribution include basin wildrye, Kentucky bluegrass, mountain mahogany, limber pine, water birch, and chokecherry.

The dominant native plant community in the area is dominated by black sagebrush and Idaho fescue. The disturbed land would be revegetated with native species, but reclamation would not restore the native plant communities. This is an unavoidable impact of allowing disturbance of native rangeland. Vegetation issues will not be carried forward in the analysis.

Soil

Soil issues were addressed in the EIS for Amendment 004 (DEQ 2000 and 2001). The Proposed Action would result in new disturbance of 39.8 acres at the Regal Mine (Table 1). Disturbance of these soils would be an unavoidable impact of permitting the expansion to occur. The impacts to the soil would result in the loss of many soil properties that have developed over the last 10,000 years, since the last major climate change occurred in the area. Soil structure and loss of organic matter in the upper horizons would be just two of the impacts from soil being disturbed and stockpiled for the life of the Regal Mine.

The soil series classification of this area is Oro Fino, which has a salvageable depth of up to 5 feet. Soil would be salvaged to 3 feet and stockpiled. The upper soil horizon would be separated from the lower soil horizons and placed in designated soil piles. The upper horizon can be replaced on top during final reclamation of the overburden pile. Placing the upper horizon, which had the most organic matter content and most soil development over the last 10,000 years, on top of the subsoil horizon would help revegetation and speed soil redevelopment on the site. Soil would be salvaged as

needed, as the overburden pile advances. This would reduce disturbance at any one time and limit the amount of disturbed area that has to be managed for weeds, runoff, and erosion.

The total amount of soil salvaged at 3 feet would equal 444,796 cubic yards (Table 4 in Chapter 2). This volume of soil, plus the soil already salvaged, would allow for at least a 2-foot replacement depth on all areas to be reclaimed. This level of soil replaced on the overburden pile would replace an acceptable plant productivity potential to the disturbed area and set the stage for soil development to occur again. Redesigning the overburden pile to a lesser slope over a larger area would enhance the reclamation potential of the overburden pile over that analyzed in the EIS for Amendment 004 (DEQ 2000 and 2001). This issue will not be carried forward in the analysis. Soil salvage and replacement depth summaries are provided in Chapter 2 in the description of alternatives and are discussed under sections dealing with reclamation.

Cultural and Paleontological Resources

Cultural resource issues were addressed in the EIS for Amendment 004 (DEQ 2000). The Proposed Action would result in new disturbance of 39.8 acres at the Regal Mine (Table 1). A new cultural survey was performed in May 2005 on the mine overburden area proposed in Amendment No. 005 (Resource Management Associates, Inc. 2006). No important cultural or archaeological resources were found within the expansion area. The majority of the area is dry, sloping land with little to offer in terms of campsite locations or other resources; no prehistoric sites were anticipated. Historic activities in the area, if any, were related to mineral claims and investigations. Previous disturbance from mining-related activities within the existing operating permit and amendment boundaries has obscured anything of historic, pre-1945 vintage.

Historic and prehistoric cultural resources, if encountered during mining operations, would be preserved or mitigated according to applicable statutes. Preservation may include avoidance or surveys and inventories, as necessary. If any cultural properties are identified during the Proposed Action, all work within the immediate area would be halted, and the area secured. An appropriately trained archaeologist and/or other professional in cultural resource management would be contacted by BMI to record the identified cultural property, evaluate the eligibility of the property for listing to the National Register of Historic Places, and take other measures as appropriate to mitigate the impacts of construction on the resources. This issue will not be carried forward in this analysis.

In the event potentially important fossils are discovered within the BMI permit area during any type of activity, BMI 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. This issue will not be carried forward in this analysis.

Wetlands

Wetland issues were addressed in the EIS for Amendment 004 (DEQ 2000). The Proposed Action would result in new disturbance of 39.8 acres at the Regal Mine (Table 1). No seeps, springs, or wetlands would be disturbed by the Proposed Action. The US Army Corps of Engineers has determined that a Section 404 Permit pursuant to the federal Clean Water Act is not needed, as no wetlands would be directly disturbed. If anything, the dewatering proposal would enhance wetlands in the drainages where water would be discharged. As long as water quality meets discharge standards, the increased flows in springs downgradient of the infiltration trenches would be beneficial to wetlands. This issue will not be carried forward in this analysis.

Noise

The Regal Mine operating permit area is located in a rolling, open foothill setting on the western slopes of the Ruby Range with low ambient noise levels typical of undeveloped and sparsely populated rural areas. The major source of existing noise is associated with periodic short-term activities at the Regal Mine, such as transportation of ore from the existing stockpile and periodic blasting of the overburden, and public vehicle use on the Sweetwater Road adjacent to the mine site. Noise associated with blasting is mostly contained within the mine pit. Operation of trucks placing overburden on the pile creates some noise that may be noticeable from adjacent areas. The generally open hillside setting and location on privately owned lands in a semi-remote setting, well separated from the nearest residences or other areas of concentrated human activity, reduces the potential for nuisance noise levels. The noise levels would remain at existing levels. This issue will not be carried forward in this analysis.

Land Use

BMI has purchased the private rangeland adjacent to the existing Regal Mine allowing the potential expansion of the overburden pile. The proposed overburden pile expansion would change land use from grazing land to mine disturbance during mine life and then back to grazing land at closure of the mine. The project area is entirely on private property and fenced. Trespass has not been a problem on the site to date. The Proposed Action would create a much more suitable environment for livestock grazing and/or agriculture than the previous overburden pile plan due to the less steep slopes and overall more natural looking landform (Figure 2). The proposed overburden expansion would expand the overburden pile by 60 acres; but because of acreage overlaps, accurate mapping, and disturbance reductions in other categories, only 39.8 new acres of disturbance would result from the Proposed Action (Table 1). This issue will not be carried forward in this analysis

Recreation

Recreational activities are not allowed within the permit area. The historic recreational use in the area is hunting for big game, mostly mule deer and antelope. The relocated

Sweetwater Road would remain open for public access. The Sweetwater Road would be farther away from the pit than the realignment described in the EIS for Amendment 004 (DEQ 2000b). The mine site would be fenced to prevent access to the pit lake, which would have a 4-foot-high, permanent berm around it. Minimal changes in recreational use would result from the 39.8 acres to be disturbed as a result of the Proposed Action. This issue will not be carried forward in this analysis.

Socio-economics

Socio-economic issues were addressed in the Life of Mine Expansion Plan EIS (DEQ 2000a).

Employment

The BMI work force, which resides primarily in Beaverhead County, is currently comprised of approximately 100 workers. About 90 employees work at the Barretts Mill south of Dillon and 10 work at BMI's Regal and Treasure mines. BMI is the largest private employer in Beaverhead County and is one of the largest private employers in southwest Montana. The estimated wages and benefits paid to BMI employees in 2006 were $8,500,000. In 2005, approximately 3,381 persons in Beaverhead County were employed in part-time or full-time work, indicating that BMI workers made up about 2.9 percent of all employees in the county (Montana Department of Labor and Industry, 2006).

Metal and non-metal mining accounts for 1.4 percent of all part-time and full-time work in Montana and approximately 5.7 percent in Beaverhead County (Montana Department of Labor and Industry, no date; as cited in Hydrometrics 1999). The wages of BMI employees are confidential. The average wage for all types of mining in Montana was $56,071 in 2004 compared to the all industry average of $27,829 for other jobs. BMI employees likely earn more income than they would at the average job in Beaverhead County. Because most of BMI workers live in Beaverhead County, BMI does not contribute a large portion of personal income or employment to Madison County. No changes in employment are proposed as part of Amendment 005. This issue will not be carried forward in the analysis.

Taxes

BMI generates a large percentage of total tax revenue collected in both Beaverhead and Madison counties. It is the largest taxpayer in Beaverhead County and generated $374,231 in taxes in 2005. Only three or four other single entities in 2005 paid total taxes to Beaverhead County over $100,000. The amount of $374,231 represents about 4.1 percent of total tax revenue collected in Beaverhead County in 2005. It is assumed that this amount is close to the average annual tax revenue generated by BMI. In 2005, Beaverhead County collected $9,198,048 in total taxes from all sources (Cathy Allard, Beaverhead County Treasurer).

BMI generated $365,540 in annual tax revenue for Madison County in 2005. Most of this came from the miscellaneous mines net proceeds taxes. This amount represents about 2.0 percent of total tax revenue collected in Madison County in 2005. In 2005, the total taxes billed in Madison County (including cities, towns, special districts) were $16,963,507 from all sources (Shelly Burke, Madison County Treasurer). Total taxes paid by BMI to Beaverhead and Madison counties in 2005 were approximately $740,000.

The estimated wages and benefits paid to BMI employees in 2006 is $8,500,000. Property taxes paid to Beaverhead and Madison counties in 2005 equaled about $1,000,000. No changes in taxes would result from approval of Amendment 005. This issue will not be carried forward in the analysis.

CHAPTER 2 – ALTERNATIVES

INTRODUCTION

This chapter describes historical mining operations, BMI's existing operations in the Regal Mine area (the No Action Alternative), and BMI's Proposed Action. This chapter also describes the Agency Modifications to the Proposed Action Alternative. DEQ must decide which alternative to approve.

The complete application and commitments made by BMI in the responses to DEQ's deficiency reviews are the basis of the Proposed Action described in this chapter. If the amendment is approved, DEQ would stipulate that BMI revise the application to address the findings and recommendations in the Draft EA and update Operating Permit 00013.

All of the components or elements described in the No Action Alternative are permitted, approved, and bonded under existing Operating Permit 00013 and were analyzed in the Life of Mine Expansion Plan EIS (DEQ 2000 and 2001). Major components of the proposed mine expansion, their respective functions, and potential environmental impacts resulting from implementation of these activities are considered in the development of alternatives. Other alternative components that were considered in the review process are discussed below. These alternative components were eliminated because they provided no environmental advantage over the Proposed Action and selected alternatives.

Important issues raised during scoping are listed in this chapter. A complete list of issues, including those that were eliminated from detailed study, can be found in Chapter 1, in the Issues Considered but Dismissed Section.

ISSUES CARRIED FORWARD IN THE ANALYSIS

Issue 1: Water Quality and Management

Impacts of Infiltration Trench Pit Dewatering Plan

The Regal Mine pit would extend below the water table. The approved pit dewatering plan was analyzed in the Amendment 004 EIS (DEQ 2000 and 2001). To keep the pit dry, BMI would use dewatering wells. The wells would pump groundwater continuously during mining. The current plan allows the groundwater to be piped 1 to 2 miles to percolation ponds, where it would infiltrate or be land applied (Figure 3). Nitrate would be elevated in water collected from the pit sumps. This water would also be routed to the percolation ponds. Leaks from the pipeline to the percolation ponds could cause pollution of surface water or ground water.

BMI has been testing an alternative plan approved in a Minor Revision 05-002 that would pipe the water from the pit to the head of local drainages and infiltrate the water into trenches much closer to the pit (Figure 4). BMI has proposed this new plan as part

of Amendment 005 (Resource Management Associates Inc. 2006). DEQ must evaluate the advantages and disadvantages of this plan, its impacts on water quality and the water management plan, and any modifications to the dewatering plan needed to mitigate potential impacts to surface and groundwater. DEQ must also address the adequacy of the proposed dewatering monitoring plan.

Impacts of Overburden Pile Expansion

The volume of overburden in the pile would not change. The expansion of the overburden pile would create a larger surface area that could erode, produce more storm water runoff carrying sediment and nitrates during mine life, and flush more nitrates to surface or groundwater from blasting residues in the overburden. The expansion would move the overburden pile closer to surface water. DEQ must evaluate the change in size and evaluate and mitigate potential impacts to water quality and the water management plan during operations and at closure.

Issue 2: Overburden Pile Reclamation

The overburden pile reclamation plan was evaluated in the Amendment 004 EIS (DEQ 2000 and 2001). The approved overburden pile reclamation plan requires reclamation of long steep slopes. Erosion must be controlled during mine operation and after reclamation is completed. Storm water must also be controlled using best management practices (BMPs) to prevent discharges off the site. The overburden pile would be very visible during operations and after closure.

BMI has purchased private land adjacent to the current approved overburden pile and proposed expansion of the pile over another 60 acres. There would be no increase in tonnage of overburden reporting to the pile. The pile would be 200 feet lower than the approved pile. DEQ must review the adequacy of the reclamation plan. The overburden pile will still be very visible from a distance. Erosion and storm water issues must also be reviewed as the pile would move closer to a drainage (Figure 2).

NO ACTION: DENIAL OF PROPOSED PLAN

Introduction

Following is a summary of the approved operation and reclamation plan (Hydrometrics 1999) and summary of existing conditions at the Regal Mine. The approved operation and reclamation plan was detailed in the Amendment 004 EIS (DEQ 2000 and 2001). Only the operation and reclamation plan components affected by the Proposed Action will be described in the following sections. Mine facilities are described in the application for Amendment 005 (Resource Management Associates Inc. 2006). Only the facilities that would be affected by the Proposed Action will be described in detail or summarized in the following sections.

Under the No Action Alternative, Amendment 005 would not be approved. The approved Operating Permit 00013, as of Minor Revision 05-001, would be implemented.

The overburden disposal areas would not be expanded, and the pit dewatering plan would not change. The Sweetwater Road would still be realigned as stipulated in Amendment 004 approval.

Ongoing, approved, and bonded mining under this Operating Permit includes 150 acres of permitted disturbance in a 160-acre permit area (Table 1). Approved operations would provide approximately 15 years of future mining operations at current production rates and include mining talc reserves and overburden placement in the existing approved pile. Mining activity would be followed by implementation of the approved reclamation and closure plan.

Location and Land Use

The existing Regal Mine is located in Madison County in Section 35, Township 7 South, Range 7 West, and Section 2, Township 8 South, Range 7 West. Lands immediately surrounding the Regal Mine are privately owned and are used for livestock grazing. These lands also provide wildlife habitat for mule deer, elk, antelope, and small mammals. Ponds scattered along nearby drainages provide water for irrigation and livestock, as well as fishing opportunities for private landowners. The nearest pond is located on Hoffman Creek adjacent to the mine. Three reservoirs located on Carter Creek approximately 1.7 miles downstream from the mine store water for irrigation.

Scattered BLM parcels are located north, east, and southeast of the Regal Mine. A section of State of Montana school trust land is located northeast of the permit area in Section 36, in Township 7 South, Range 7 West. These lands are used primarily for livestock grazing.

The existing 160-acre permit area for the Regal Mine contains the open pit talc mine, an overburden pile, soil stockpiles, haul roads, office and support facilities, a pit dewatering pipeline, and an ore transfer facility on the Sweetwater Road (Figure 2 and Table 1).

Surface and Mineral Ownership

BMI owns or leases the private land and owns the mineral rights.

Mine and Permit History

The mine permit history and past environmental reviews were summarized in the Amendment 004 EIS (DEQ 2000a). Amendment 004, the Life of Mine Expansion Plan, was approved in March of 2001 (DEQ 2001). Amendment 004 added 63 acres of new disturbance and 13 acres of new permit area. The amendment allowed BMI to develop the talc deposit north of the existing pit. It permitted expansion of the pit and overburden pile. It permitted a pit dewatering system and realignment of the Sweetwater Road. Amendment 004 increased mine life by 15 years.

Minor Revision 05-001 was approved on July 8, 2005, and approved a new 6.5 acre Sweetwater Road ore stockpile and transfer site. The old ore stockpile and transfer site would be used by the landowner for his own use. No issues were identified by DEQ.

Minor Revision 05-002 was approved on December 5, 2005, and approved groundwater discharge testing using infiltration trenches in ephemeral drainages around the pit (Figure 4). No issues were identified by DEQ.

Permit Area and Existing Permitted Disturbance

Table 1 lists the existing disturbances permitted at the Regal Mine site and the proposed new disturbances, if Amendment 005 were approved (Figure 2).

Table 1. Existing Permitted Disturbed Acres and Total Proposed New Disturbances.

Facility Component	Permitted Disturbance	Proposed Disturbance
	No-Action	Proposed Action
Overburden Pile	63.3 acres	*123.3 acres
Open Pit	37.2 acres	36.6 acres
Soil Stockpiles	6.6 acres	*11.7 acres
Haul and Old Sweetwater Roads	4.9 acres	2.6 acres
Relocated Sweetwater Road	2.7 acres	0.8 acres
Mine Office and Support Facilities	1.7 acres	1.7 acres
Ore Transfer Site	6.5 acres	6.5 acres
Infiltration Trenches, Wells, Pipelines	0.5 acres	* 6.6 acres
Miscellaneous Disturbances	26.6 acres	0 acres
Undisturbed Area	(10 acres)	**(53.3 acres)
TOTAL DISTURBANCE	**150.0 acres**	**189.8 acres**
TOTAL PERMIT AREA	**160.0 acres**	**243.1 acres**

*represent increases directly based upon approval of the Proposed Action (Figure 2).

**() not included in disturbance totals

Mining Operations

BMI's mining operations would continue as approved in Operating Permit 00013 Amendment 004 and Minor Revision 05-001. Active mining at the Regal Mine was initiated in 1972 under Operating Permit No. 00013, with the removal of overburden and less than 2,000 tons of talc annually. A development program was conducted at the Regal Mine in 1993, which resulted in the removal and storage of an estimated 1.5 million tons of non-talc overburden material in an existing overburden pile. This program exposed the mineable ore system and prepared the mine for future operations. Mining of approximately 178,000 tons of ore and removal of 3.5 million tons of overburden have occurred at the Regal Mine site since approval of Amendment 004 in March of 2001.

Overburden Disposal

The current overburden pile at the Regal Mine is approximately 40 acres in size and is permitted to be 63.3 acres (Figure 2) (Table 1). Under the approved operating plan, it is estimated that an additional 13 million tons of overburden will be removed from the mine pit area during mine life. The approved overburden pile design is a large, steep, multi-slope design (Figure 2-2 from 2000 EIS). The approved overburden pile would be up to 450 feet high and have slopes up to 1,100 feet long. Disposal is accomplished by truck end dumping and dozer grading of the overburden material.

Overburden pile construction would continue on the north edge of the existing pile and would be completed in a counterclockwise direction. The build-out overburden pile would be constructed to the 6,500-foot elevation on the east edge and the 6,560-foot elevation on the west edge. When these elevations are reached, the build-out overburden pile would be graded to the post-mining disturbance line in preparation for final reclamation. The overburden above the 6,560-foot elevation would be placed rather than dumped to the 6,680-foot elevation.

Sedimentation impoundments, basins, and ditches would be constructed, and silt fencing would be installed below the post-mining disturbance line in advance of overburden pile construction and reclamation. A rock catch berm would be constructed from 12-inch or smaller rock to catch boulders and control sediment.

Ore Processing

No changes are proposed to talc handling and transport. The ore is hauled to BMI's Barretts Mill south of Dillon, where it is processed under Operating Permit 00009. The talc is crushed, screened, and processed in wet or dry cycles before it is packaged for shipment by truck or rail.

Access, Haul Roads, and Traffic

The haul route follows Sweetwater Road from the mine site to the ore transfer site (Figure 1) then to the Carter Creek cut-across road, turns right onto Carter Creek cut-across road to Nissen Lane and turns left onto Nissen Lane to Highway 41. From the

intersection of Nissen Lane with Highway 41, the haul route follows the existing haul route from the BMI Treasure Mine which is Highway 41 to Interstate 15, then Interstate 15 to the Barretts Mill south of Dillon.

Ore from the Regal Mine is hauled to the mill in 35-ton open-top highway trucks. The haul rate is dictated by customer demand and mill scheduling, but averages 10 to 20 round trips per day on an intermittent basis.

Employees of the mine use the Sweetwater Road for daily access to the mine site when the mine is operating. Employees may use other roads to drive from home to the Sweetwater Road. The mining operations at the Regal Mine are intermittent. During periods of operation, the estimated daily round trip traffic is six company-owned pickups and/or employee transport vehicles, one vendor, service or regulatory vehicle, and 15 highway legal ore haul trucks. All traffic is directed to use the designated access route.

The Life of Mine Expansion Plan required moving the Sweetwater Road from its original location (Hydrometrics 1999). The last design changes were detailed in the EIS (DEQ 2000 and 2001). In the 2000 EIS, DEQ stipulated that BMI would submit a final design for DEQ, Madison County, and the landowner's review, before the overburden pile is expanded, to move the Sweetwater Road to at least 50 feet from the pit to minimize the potential risks of trespass to the pit and the risk to public safety due to pit wall raveling. The road would be built to Madison County standards. The road has not been moved to date. BMI has proposed that final relocation as part of Amendment 005.

Storm Water Management

The present operations at the Regal Mine are covered by Storm Water Discharge Authorization MTR3000136 and a Storm Water Pollution Prevention Plan (SWPPP) issued by DEQ. The existing storm water handling system of ditches, temporary or permanent sediment basins, and storm water collection ponds controls runoff from disturbed areas. BMPs are used to prevent or mitigate contamination of storm water from the mine site as needed. All life of mine development activities proposed for the Regal Mine would operate in compliance with storm water runoff and sediment control measures contained in the mine's SWPPP.

Dust Control

The existing 8 acres of soil stockpiles at the Regal Mine have been revegetated. New soil stockpiles or additions to existing stockpiles would be revegetated to prevent wind and water erosion. Use of the Sweetwater Road haul route for the transport of talc ore under the provisions of Amendment 003 and 004 to the Operating Permit involved consultation with Madison and Beaverhead County officials. The county utilizes dust suppressants along portions of the haul route nearest to residences.

Public Safety and Mine Security

Public safety along the Sweetwater Road near the mine was addressed in the Amendment 004 EIS (DEQ 2000 and 2001). Portions of the Sweetwater Road nearest to the Regal Mine Pit are closed to assure public safety during periodic blasting episodes. There are cattle fences and gates to control access to the site. Trespass has not been an issue at the Regal Mine.

Resource Monitoring

Water Quality

A water quality monitoring plan was required as a stipulation for approval of Amendment 003 to Operating Permit 00013 in 1998. A baseline water resource monitoring plan for surface water and springs was prepared in April 1998 and later revised in August 1998. The baseline monitoring plan was revised to an operational water monitoring plan and submitted to DEQ in March 2000 (Hydrometrics 1999). The current approved surface water monitoring plan was evaluated in the Amendment 004 EIS (DEQ 2000 and 2001). Monitoring stations for collecting surface water quality samples and documenting streamflow include Hoffman Creek (site RMS-1), Carter Creek (site RMS-2), and three springs (Table 2). These surface water monitoring stations are established sites used to collect baseline data.

Surface water monitoring sites are sampled semi-annually, during spring high-flow and fall low-flow conditions. The list of analytical parameters is evaluated each year to determine if the list of parameters or sampling frequencies need modification. Table 2 and Table 3 list sampling frequency, analytical parameters, detection limits, and holding times for the approved and proposed surface water, springs, groundwater, and pit dewatering system sites. See Chapter 3, Issue1: Water Quality and Management for a summary of existing surface water quality (Table 6).

Table 2. Sampling Frequency for Existing and Proposed Surface and Groundwater Sampling Sites at the Regal Mine.

Type of Monitoring	Site Name	Location	Spring Quarter	Summer Quarter	Fall Quarter	Winter Quarter
Surface Waters						
Streams	RMS-1	Hoffman Creek gauging station	C, NM		C, NM	
	RMS-2	Carter Creek gauging station	C, NM		C, NM	
	CC-U1	Carter Creek upstream of trench 1 tributary	C, NM (2)	C, NM (2)	C, NM (2)	C, NM (2)
	CC-D1	Carter Creek downstream of trench 1 tributary	C, NM (2)	C, NM (2)	C, NM (2)	C, NM (2)
	CC-U2	Carter Creek upstream of trench 2 tributary.	C, NM (2)	C, NM (2)	C, NM (2)	C, NM (2)
	CC-D2	Carter Creek downstream of trench 2 tributary.	C, NM (2)	C, NM (2)	C, NM (2)	C, NM (2)
	HC-U1	Hoffman Creek upstream	C, NM (2)	C, NM (2)	C, NM (2)	C, NM (2)
Springs	SP-1	Head of Hoffman Creek	C, NM		C, NM	
	SP-2	Head of Carter Creek	C, NM	C, NM (2)	C, NM	C, NM (2)
	SP-3	Head of Carter Creek	C, NM		C, NM	

Note: Any additional springs identified while discharging to trenches would be monitored on a monthly basis for C and NM parameters.

Mine Water/						
Groundwater						
Infiltration Trenches	Trench 1	Tributary SW of pit	C, NM (2)	C, NM (2)	C, NM (2)	C, NM (2)
	Trench 2	Tributary NW of pit	C, NM (2)	C, NM (2)	C, NM (2)	C, NM (2)
	Trench 3	Tributary SE of pit	C, NM (2)	C, NM (2)	C, NM (2)	C, NM (2)
Currently Permitted Dewatering Wells	RMW-5	South of pit	C (1) MWL	MWL	C (1) MWL	MWL
	RMW-6	Southeast of pit	C (1) MWL	MWL	C (1) MWL	MWL
	RMW-7	North of pit	C (1) MWL	MWL	C (1) MWL	MWL
Currently Permitted Piezometers	PZ-1 (to be installed)	Upstream piezometer northeast of Carter Creek	MWL	MWL	MWL	MWL
	PZ-2 (to be installed)	Downstream piezometer northeast of Carter Creek	MWL	MWL	MWL	MWL
Current Monitoring Wells	RMW-1	East of pit	MWL	MWL	MWL	MWL
	RMW-2	South-southeast of pit	MWL	MWL	MWL	MWL
	RMW-3	North of pit	MWL	MWL	MWL	MWL
	RMW-4	South of pit	MWL	MWL	MWL	MWL

Abbreviations: C = Complete water quality analysis (See parameter list for surface water, groundwater and springs in Table 3). Sampling includes flow measurements for surface water and springs and groundwater level measurements for groundwater wells.
NM = nitrate plus nitrite analysis, samples collected monthly
MWL= water level measurements
Notes: (1) Newly installed dewatering wells would be sampled semi-annually for one year to collect initial baseline data for each individual dewatering well. (2) Samples associated with infiltration trench testing will be monitored on a monthly basis during periods of discharge.

Table 3. Analytical Parameter, Detection Limits, and Holding Times for Groundwater, Springs, and Dewatering System Samples

Parameter	Method[1]	Lab Reporting Limit [2] (mg/L)	Holding Time
FIELD MEASUREMENTS			
pH	field analyzed only	--	analyze immediately
SC	field analyzed only	--	analyze immediately
Temperature	field analyzed only	--	analyze immediately
Flow or SWL[3]	field analyzed	--	--
COMMON CONSTITUENTS AND MAJOR ANIONS			
TDS	160.1	10	7 days
TSS	160.2	10	7 days
Alkalinity	310.1	1	14 days
Bicarbonate	310.1	1	14 days
Carbonate	310.1	1	14 days
Sulfate	375.3	1	28 days
Fluoride	340.2	0.1	28 days
Chloride	300.0	1	28 days
NUTRIENTS			
Nitrate + nitrite	353.2	0.05	28 days
MAJOR CATIONS			
Ca	200.7/215.1	1	6 mos.
Mg	200.7/242.1	1	6 mos.
Na	200.7/273.1	1	6 mos.
K	200.7/258.1	1	6 mos.
TRACE ELEMENTS [4]			
Ag	200.9/200.7	0.003	6 mos.
Al	200.7/200.9/200.15	0.1	6 mos.
As	200.9/206.3	0.003	6 mos.
Ba	200.7/200.15	0.005	6 mos.
Be	200.9/200.7	0.001	6 mos.
Cd	200.9	0.0001	6 mos.
Cr	200.9/200.7/200.15	0.001	6 mos.
Cu	200.7/200.7/200.15	0.001	6 mos.
Fe	200.7/200.9/200.15	0.01	6 mos.
Hg	245.2/245.1	0.0006	6 mos.
Mn	200.7/243.1	0.005	6 mos.
Pb	200.9	0.003	6 mos.
Se	200.9/270.3	0.001	6 mos.
Zn	200.7/200.9	0.01	6 mos.

1. Method numbers from Methods for Chemical Analysis of Water and Wastes (USEPA, 1983).
2. Reporting limits are equivalent to Montana DEQ7 required reporting values (RRV's) (DEQ 2006).
3. Static water level (SWL) would be measured at all groundwater sites.
4. Groundwater samples would be analyzed for dissolved trace elements, and spring samples would be analyzed for total recoverable concentrations of trace elements.

Pit Dewatering Plan

The approved pit dewatering plan was evaluated as part of the Amendment 004 EIS (DEQ 2000 and 2001). Eight to twelve groundwater capture wells would be installed within and around the pit and pumped year round to keep the groundwater potentiometric surface (water level) beneath the bottom of the mine pit to prevent groundwater from entering the pit. Initially, six wells would be constructed as the pit bottom approaches the 6,380-foot elevation. If required, additional wells would be constructed to deepen the pit to 6,280 feet and then to the final elevation of 6,080 feet. The number of wells would depend on the flow rates of the wells, the area of influence of individual wells, observed groundwater flow conditions, and observed groundwater inflows to the pit. If groundwater drawdown due to pit dewatering dries up the office well, replacement with a dewatering well would be permitted.

Sumps would be constructed within the pit to collect groundwater seepage and precipitation runoff that reaches the pit bottom. The size, number, and location of the pit sumps would depend on the pit water volumes and pit excavation activities. Pit inflow quality and flow would be monitored to verify the results of the pit inflow and water quality modeling. Water collected in the pit sumps would be pumped out of the pit and into a settling basin to reduce total suspended sediment (TSS) prior to discharge to the two approved percolation basins (Figure 3).

Water collected by the groundwater capture system wells and mine pit sumps would be routed for disposal via piping. BMI would submit a design for leak detection and automatic shutoff, along with collection sumps, to prevent runoff from a pipeline break in a more sensitive location from getting into surface water. Piping would be in place prior to mining below the water table and would be able to handle a minimum flow of 1,000 gallons per minute (gpm) year round. If the pumping rate of the dewatering wells exceeds 1,000 gpm, BMI would submit to DEQ, for review and approval, a plan to handle the excess water. Water from the capture system and pit sumps would be routed to percolation basins for disposal (Figure 3).

The two percolation basins would be in the Carter Creek drainage. The two percolation basins would each be sized to infiltrate 1,000 gpm. One percolation basin would primarily serve as a backup as needed. The Alternative 1 location is 1.5 miles northwest of the mine and 1,000 feet east of Carter Creek (Figure 3). The Alternative 2 location is 2 miles northwest of the mine and 2,500 feet west of Carter Creek. Studies showed the percolation basins had suitable infiltration rates and enough area for basin construction and expansion. The basins have not been constructed to date. Pumping of the wells would keep the mine dry during the entire year regardless of whether the mine was operating or not.

Pit Dewatering Plan Monitoring

Operation of the groundwater dewatering well capture and disposal system would include routine monitoring of captured and discharged groundwater flow rates and water quality. Following design and final selection of the percolation pond locations, three

groundwater monitoring wells would be installed in the area of the percolation ponds to establish baseline groundwater quality data and to be used for routine monitoring of local groundwater quality during operation of the ponds (Figure 3). If new springs or seeps associated with the percolation basins are identified, they would be added to the monitoring program. Flow rate and water quality would be monitored weekly at these locations, and results would be provided in the annual reports. A revised water quality monitoring plan including the addition of these monitoring wells and the possible addition of nearby surface water or spring/seep monitoring sites would be prepared and submitted to the DEQ for review and approval prior to construction and operation of the ponds.

Groundwater drawdown levels in the area of the open pit would be monitored throughout the operation of the dewatering wells. Water captured by the mine pit sumps and pumped to the settling basin would also be monitored for water quality. Mine pit inflow would be visually monitored, and flow rates would be measured if sufficient flow were present for measurement. Monitoring of the mine pit sump water would focus on the potential for elevated nitrates. If monitoring determines that treatment is required prior to discharge, all discharges would meet regulatory requirements for monitoring and quality.

At the end of mining the pumps would be turned off and the wells properly plugged and abandoned unless the landowner wishes otherwise. DEQ and the Montana Department of Natural Resources and Conservation (DNRC) would have to approve the post-mine well use.

Compliance with the requirements of the existing water quality monitoring plan would continue throughout the life of mine expansion activities. Following the end of mine life, water quality monitoring at all sites would continue for a minimum of 2 years. Then the data would be reviewed, and DEQ would decide about the need for further monitoring.

Reclamation

Introduction

The approved Regal Mine reclamation plan was analyzed in the Amendment 004 EIS (DEQ 2000 and 2001). Only the portions of the approved reclamation plan that would be affected by the Proposed Action expansion of the overburden pile are discussed below. Eight acres of soil stockpiles have been revegetated to date on the Regal Mine site (Barretts Minerals Inc. 2005 Annual Report). A recalculation of the reclamation bond would be completed during a 2007 review of the Operating Permit regardless of the decision on Amendment 005.

Soil Salvage

BMI is required to salvage all soil on up to 50 percent slopes with a coarse fragment content up to 50 percent by volume. Prior to creating any new disturbance, BMI strips

and stockpiles soil or suitable colluvium material for future use in reclamation. Soil from all areas is salvaged. The upper foot of soil is stockpiled separately from subsoil. Soil is salvaged and transported to appropriate stockpiles using scrapers, wheel and track dozers, haul trucks, and loaders. Soil stockpiles are seeded to provide vegetation that would protect soil stockpiles from wind and water erosion.

Existing salvaged and stockpiled soil at the mine site is approximately 195,213 cubic yards for reclamation of the 94.5 acres of existing disturbance. Soil does not need to be placed on the Sweetwater Road through the permit area and soil stockpile locations. There is presently enough salvaged soil at the Regal Mine to reclaim the 94.5 disturbed areas with 2 feet of soil. Table 4 summarizes the soil requirements for the existing permitted disturbance in Amendment 004 and Minor Revisions 05-001 and 002 and contrasts that with soil needs for the Amendment 005 Proposed Action if approved.

Table 4. Existing Permitted Disturbance and Proposed Action Soil Balance for the Regal Mine.

Disturbance Areas	Permitted Disturbance (No Action Alternative) (acres)	Soil Needed 2 ft. Depth (cubic yds) (No Action Alternative	Future Salvage Under Existing Permit at 3 ft Depth (cu yds) (No Action Alternative)	Proposed Disturbance (Proposed Action) (acres)	Soil Needed 2 ft. depth (cubic yds) (Proposed Action)	Proposed Soil Salvage @ 3 ft depth (cubic yds) (Proposed Action)
Overburden Pile	63.3	204,269	***111,804	123.3	397,889	^*402,204
Pit Lake	22.9	0	0	22.9	0	0
Talus Slopes	4.9	0	0	4.9	0	0
Pit Seeded Areas	9.4	30,331	45,496	8.8	28,398	42,592
Soil Stockpiles	6.6	*0	0	11.7	0	0
Haul/Old Sweetwater Roads	4.9	15,812	0	2.6	8,390	0
Mine Office & Support Facilities	1.7	5,486	0	1.7	5,486	0
Ore Transfer Site	6.5	20,976	0	6.5	20,976	0
Infiltration Trenches, Wells, Pipelines	0.5	*0	0	6.6	*0	0
Miscellaneous. Disturbances	26.6	85,838	128,744	**0	0	0
TOTAL	**150.0**	**362,712**	**286,044**	**189.8**	**461,139**	**444, 796**

* Soil stored on site

** This component included in overburden pile disturbance

*** 63.3 acres of permitted disturbance - 40.2 acres (2005 actual disturbed area) = 23.1 acres of soil left to salvage at 3 feet deep.

^* 23.1 acres of soil left to salvage + 60 acres (Proposed Action) = 83.1 acres of future soil salvage at 3 foot deep.

For the No Action Alternative, 362,712 cubic yards are needed for reclamation. There are 195,213 cubic yards already stockpiled. This plus the 286,044 cubic yards left to salvage would produce a surplus of soil equaling 118,545 cubic yards.

About 39,860 cubic yards of soil would be salvaged during construction of the proposed dewatering system percolation basins. This soil would be stored at the percolation basin site. This soil is not listed in the table above.

Soil Placement

Compacted surfaces are scarified or ripped prior to placement of soil. A minimum thickness of 1 to 2 feet of soil, depending on slope, is redistributed over the disturbed area using scrapers, graders, and dozers. On steep slopes, walking the entire slope with dozers provides impressions to allow seed to be trapped.

Pit

The 37.2 acre open pit would be reclaimed to 9.4 revegetated acres, 4.9 rock talus slope acres, and a 22.9-acre pit lake. The area of the pit above the lake surface would be reclaimed with a combination of soiled areas and revegetation, blasting or backfilling to produce talus slopes, or by retaining rock faces. Talus would be placed in the pit on the Sweetwater Road side of the pit to enhance the long-term stability of the pit walls in that area (Figure 2).

The pit lake level elevation would be approximately 6,380 feet as analyzed in the Amendment 004 EIS (DEQ 2000 and 2001). BMI would start reclamation before the pit lake fills. This would speed up the final reclamation process for the pit above the ultimate lake surface by up to 3 years.

The pit lake would be an “attractive nuisance”. A well-designed fence would be utilized to limit access. BMI would submit a final fence design to control trespass, and a safety berm on the pit side along the Sweetwater Road to limit visibility and access into the pit by the public. All highwalls or pit walls would be protected by MSHA berms of 4 feet in height. Berms around the Regal Pit would be permanent and would be soiled and seeded.

Overburden Pile

The approved overburden pile design is a large, steep, multi-slope design (Figure 2-2 in 2000 EIS). The approved overburden pile is 450 feet high and covers 63.3 acres. Overburden pile construction would continue on the north edge of the existing pile and would be completed in a counterclockwise direction. The overburden pile would be constructed to the 6,500-foot elevation on the east edge and the 6,560-foot elevation on the west edge. When these elevations are reached, the overburden pile would be graded to the post-mining disturbance line in preparation for final reclamation. The overburden above the 6,560-foot elevation would be placed on top to the 6,680-foot elevation rather than dumped over the edge.

Reclamation would follow approved soil placement, grading, and revegetation procedures. The existing design does not lend itself to concurrent reclamation until the 6,500- and 6,560-foot elevations are met. After regrading, 12 inches of soil would be placed on slopes steeper than 33 percent, and 24 inches would be placed on slopes less than 33 percent. This mimics soil depths found on undisturbed areas around the mine.

Salvaged soils with high coarse fragment content would be stockpiled separately. Soils with lower rock content would be replaced on slopes shallower than 33 percent. Soils with a higher coarse fragment content would be placed on slopes steeper than 33 percent. The coarse fragment content in soil salvaged for reclamation of steeper slopes would be at least 25 percent by volume, sampled on a 100-by-100-foot grid after application. If sampling indicates that coarse fragment content is less than 25 percent, BMI would submit for review and approval a final design for additional slope breaks, such as benches and cross-slope talus features, to route runoff water from long waste rock dump slopes and to stop sheet erosion from the upper slopes.

Sweetwater Road

The approved realigned Sweetwater Road, as shown on Figure 2, would remain to function as a public access roadway through the reclaimed mine site following the completion of mining activities and is not proposed to be reclaimed. The underpass culvert provided for safe public vehicle use during mining activities would be removed at the completion of mining and hauling activities. The roadbed would be reestablished to the county road standards of Madison County. The realignment has not occurred to date and the final permanent location as stipulated as part of the approved plan has been submitted as part of Amendment 005 (Figure 2).

At closure, the original Sweetwater Road segments would be removed and the surface ripped and graded to blend with the adjacent topography. A minimum of 2 feet of soil would be applied prior to revegetation.

Percolation Ponds and Pipeline

The dewatering system, pipeline, and percolation ponds would be in place from construction to the end of mine life. The dewatering pipeline would be buried. The pipeline corridor would be reclaimed immediately following construction. Soil excavated for the percolation ponds would be stockpiled next to the ponds and revegetated until the ponds are decommissioned at the end of mine life.

At closure, the dewatering wells would be removed and the disturbances reclaimed by pushing the soil back in place. The percolation ponds would be pumped out and backfilled with the original materials stockpiled nearby. Sites would then be revegetated. The pipeline would be left in the ground at closure. Only the inlet and outlet areas and any pump stations or other surface exposures of the pipeline would be removed at closure.

To help control noxious weeds, BMI would submit an interim reclamation plan for DEQ approval for all disturbances associated with the dewatering wells, pipeline, and percolation ponds.

Revegetation

Table 5 summarizes acres to be revegetated in the approved Regal Mine plan and contrasts that with the Proposed Action if approved. The other acres disturbed as part of Amendment 004 and 005 that would not be revegetated would be reclaimed as a pit lake, talus slopes in the pit, and the Sweetwater Road (Table 5).

Table 5. Existing Permitted and Proposed Revegetated and Non-Revegetated Acres for the Regal Mine.

Revegetated Areas	Existing Permitted Disturbance (Acres)	Proposed (Acres)
Overburden Pile	63.3	123.3
Open Pit Seeded Areas	9.4	8.8
Soil Stockpiles	6.6	11.7
Haul and Old Sweetwater Roads	4.9	2.6
Mine Office and Support Facilities	1.7	1.7
Ore Transfer Site	6.5	6.5
Infiltration trenches, wells, pipelines	0.5	6.6
Miscellaneous Disturbances	26.6	0
Subtotal:	119.5	161.2
Non-Revegetated Areas	**Acres**	**Acres**
Sweetwater Road	2.7	0.8
Open Pit Talus Slopes	4.9	4.9
Open Pit Lake	22.9	22.9
Subtotal:	30.5	28.6
TOTAL:	**150.0**	**189.8**

Disturbed areas would be reclaimed to produce variations in the plant community. Only one approved seed mixture would be used, but when combined with different slope aspects, soil depths, soil textures (25 percent rock versus loamy soil), graded drainage patterns, and some talus slopes, would produce numerous different plant communities.

The goal of revegetation at the Regal Mine is to establish a self-sustaining cover of native vegetation with minimum erosion within 2 years of seeding. Revegetated areas would be irrigated with pit sump water during the growing season at a rate not to exceed 35 gpm or 10 acre-feet per year to help limit nitrate impacts in the percolation basins.

Revegetating disturbed areas would limit the amount of chemical weed control needed during mine life. Crested wheatgrass was eliminated from the seed mix as it is too aggressive and would limit plant diversity on the reclaimed slopes (DEQ 2000 and 2001).

PROPOSED ACTION

Introduction

This section describes Amendment 005, which is being evaluated in this EA as the Proposed Action (Figure 2). This amendment would expand the mine overburden pile by 60 acres, implement a new, shorter pit dewatering pipeline and three infiltration trenches (Figure 4), which would disturb 6.1 fewer acres, and realign the Sweetwater

Road (Table 1). Soil stockpiles would expand onto 5.1 more undisturbed acres. The current permitted pit dewatering pipeline and percolation basins would be removed from permitted disturbance totals. Other acreage adjustments have been made based on the overburden pile expanding into other disturbance categories and new mapping since the Life of Mine Expansion Plan EIS was completed (DEQ 2000 and 2001). An actual 39.8-acre overall disturbance increase would result from Amendment 005 after other acreage adjustments are made based on new mapping.

Only operation and reclamation plan components that would change from the approved Operating Permit 00013 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 briefly described if needed.

Permit Area and Existing Permitted Disturbance

The Proposed Action would increase the operating permit area by 83.1 acres, from 160 acres to 243.1 acres, and increase the permitted disturbance area by 39.8 acres, from 150 acres to 189.8 acres (Figure 2 and Table 1).

Overburden Disposal

The Proposed Action would not change the methods of overburden disposal or the amount of overburden. Under the approved and proposed operating plan, it is estimated that an additional 13 million tons of overburden would be removed from the mine pit area. The Proposed Action would change the overburden pile design and reclamation plan at the Regal Mine (Resource Management Associates, Inc. 2006). A mixed-slope design, approximately 200 feet higher than the proposed design, was approved in Amendment 004 (Figure 2-2 in 2000 EIS) (DEQ 2000 and 2001). This mixed slope design would be revised to a maximum 2 horizontal to 1 vertical (2h:1v) (50 percent) slope conceptual design in the Proposed Action (Figure 2).

The proposed 60-acre overburden pile expansion area contains a conceptual buffer area around the perimeter. This buffer area would be used to build rock catch berms, storm water collection basins, service roads, and soil stockpiles.

The buffer area would be disturbed by overburden pile slope reductions at the end of mine life. The entire 123.3 acres may be disturbed during final reclamation of the overburden pile. Reclamation would reduce overburden pile slopes and allow for a more natural reclaimed overburden pile. The conceptual plan would involve recreating natural drainage patterns and densities on the face and top of the reclaimed overburden pile.

Access, Haul Roads, and Traffic

The Proposed Action would require the construction of new haul roads to access the new overburden pile. These roads would be constructed on top of the pile and would

account for minor new disturbance. Access roads for machinery and inspection vehicles would be constructed around the overburden pile in the buffer area. These roads would be rough, unimproved roads, simply to allow access for construction and maintenance of storm water basins, and a rock catch berm ahead of overburden pile advancement. If further road improvements are needed to use this area for soil removal and storage, they would be made as necessary. None of these proposed access roads would be outside of the 60 acres of proposed new disturbance.

As shown on Figure 4, the Sweetwater Road would be relocated as part of the Proposed Action. This move was stipulated as part of Amendment 004 approval (DEQ 2000 and 2001). The Proposed Action would move the Sweetwater Road farther away from the open pit than originally proposed in the Life of Mine Expansion Plan analyzed in the 2000 EIS. This move would assure that the road does not come close to any edge of the open pit that could possibly ravel or slough over time as the rock fractured by blasting weathers. This would also minimize the possibility of a public nuisance attraction. The Proposed Action complies with the stipulation required by DEQ in 2000 and 2001. The original Sweetwater Road would be used as an internal mine access and haul road until it is reclaimed at the end of mine life.

Storm Water Management

The Proposed Action would not affect storm water management other than to add more facilities along the edge of the overburden pile. The SWPPP for the Regal Mine is being updated, in consultation with the DEQ, to reflect the life of mine expansion plan and when completed will be submitted for consideration. All mine expansion operations at the Regal Mine would be conducted in compliance with Montana Water Quality laws.

New portions of the storm water handling system, as a result of the Proposed Action, would be designed and constructed in a manner similar to that used for the existing system. The surface water and storm water control plan would prevent unsettled surface water from leaving the Regal Mine site. New storm water drainage controls, including sediment ponds and storm water catch basins, would be built along drainages exiting the overburden pile created by the Proposed Action. Proposed storm water runoff and surface drainage controls would route storm water away from the mine pit. BMPs to prevent or mitigate contamination of storm water from the mine would be employed where appropriate. These features would remain in place after the end of mining and would be revegetated.

A field review of the existing and new storm water collection system would be performed periodically by BMI to identify additional sediment control features and BMPs for the evolving mine site. Storm water collection and diversion structures would be monitored after all major storm events 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 in the overburden disposal areas proposed under this amendment.

Resource Monitoring

Water Quality

New water quality testing and monitoring would occur as a result of the Proposed Action (Hydrometrics Inc. 2006 Water Resources Monitoring Plan). Groundwater quality monitoring would occur quarterly for 1 year to provide baseline data at the newly constructed well sites and to document spring, summer, fall, and winter groundwater conditions. Quarterly groundwater sampling would consist of groundwater level measurements, measurement of field water quality parameters, collection of grab samples, and collection of field quality control samples. Following the first year, groundwater samples would be collected semi-annually in conjunction with surface water monitoring events during spring high-flow and fall low-flow periods. Table 2 shows the proposed groundwater sampling frequency, and Table 3 shows the analytical parameter list for groundwater samples.

The analytical parameter list for groundwater samples from the new sites would be evaluated after 2 years to determine if the list of parameters can be reduced. BMI, in consultation with DEQ, may reduce the list of parameters if specific trace elements are consistently reported below laboratory reporting values.

Pit Dewatering Plan

BMI has been investigating the feasibility of discharging water from pit dewatering wells as described in the Amendment 004 EIS. The Proposed Action would be the same as the approved plan except the water would report to infiltration trenches in one or more of the three ephemeral drainages northwest, west, and southwest of the mine pit (Hydrometrics Inc. 2006 Water Resources Monitoring Plan). BMI is proposing to implement the infiltration trench plan that has been tested since 2005.

Groundwater capture wells would be installed and pumped on a year-round basis to keep the groundwater potentiometric surface beneath the bottom of the mine pit as it advances downward. Analyses conducted to date indicate that this can be accomplished using eight to twelve pumping wells distributed within and around the perimeter of the mine pit. Presently three wells have been installed for this purpose (Figure 4). Construction of the dewatering well system would proceed in a phased approach.

Initially, six Stage 1 wells would be needed to mine to the 6,280-foot elevation. If required, additional Stage 2 wells would be constructed to deepen the pit to the 6,180-foot elevation and Stage 3 wells would be constructed to lower the pit to the life of mine pit bottom elevation of 6,080 feet. The number of wells would ultimately depend on what flow rates the wells can be pumped at, the area of influence of individual wells, observed groundwater flow conditions over time, and observed groundwater inflows to the pit.

Water collected by the groundwater capture system wells would be routed for disposal by piping. Prior to mining below the water table, a system of piping would be in place to handle a maximum flow of 500 gpm. Piping would be installed so that water can be transported throughout the year. Piping would be located to route water from the capture system to drainages for infiltration (Figure 4) (Resource Management Associates Inc. 2006).

Pit Dewatering Plan Monitoring

Monitoring at up to three infiltration trench locations would be conducted by collecting one grab sample from each infiltration trench to assess nitrogen concentrations in the trenches (Figure 4). Infiltration trench monitoring would be conducted monthly and consist of documenting the flow rates to each trench, estimating the volume of water present in each infiltration trench, measuring field water quality parameters, and collecting water quality samples. Infiltration trench water samples would be analyzed for nitrate plus nitrite concentrations as shown on Table 3 (Hydrometrics, 2006). No monitoring wells are proposed below the trenches to evaluate ground water quality because the water would be sampled before discharge to the trenches.

Reclamation

Introduction

Reclamation plans for the facilities at the Regal Mine would largely remain unchanged from the plans analyzed in the Amendment 004 Life of Mine Expansion EIS (DEQ 2000 and 2001). Only the components of plans that would change are discussed below.

Soil Salvage

Soil salvage practices would continue as described under the No Action Alternative. Soil balance calculations for the entire mine site, including both existing and proposed disturbances, are presented in Table 4 above. Soil needed to reclaim all disturbances would be 461,139 cubic yards. The total soil available at closure would equal the 195,213 cubic yards in existing stockpiles and 444,796 cubic yards left to salvage from future disturbances. This would produce an excess of 178,870 cubic yards. This may permit a thicker soil cover to be placed over some disturbed areas, such as flatter ridge tops, during final reclamation.

Soil Placement

No changes in the soil placement plan have been proposed as part of Amendment 005.

Pit

The only changes to the pit disturbance area have resulted from new mapping since the 2000 EIS was completed. The mine pit disturbance area would decrease from 37.2 to

36.6 acres. This 0.6 acre would be some of the proposed area for reseeding, so the 9.4 acres of revegetated areas in the pit would decrease to 8.8 acres.

Overburden Pile

As shown on Figure 2, the overburden pile would be expanded to the north and west to a maximum depth of 225 feet. The reclaimed surface would be graded to complex slopes of less than 2h:1v and blended with adjacent dry wash drainages and ridges.

No contour benches, trenches, or berms are planned in the final grading of the overburden. Soil with coarse fragments content less than 25 percent by volume would be spread 24 inches deep on slopes less than 33 percent. On slopes greater than 33 percent, soil containing coarse fragments greater than 25 percent by volume, would be spread 12 inches deep. If erosion becomes a problem, fabric log water barriers, as shown on Exhibit 6 (Hydrometrics 1999) would be installed after repair and reseeding the eroded areas. Rip rap and matting may also be considered for erosion control. Constructed drainages in the overburden pile would be lined with 2-inch to 8-inch diameter rock to a minimum depth of 12 inches along the drainage bottom to control run-off erosion.

The proposed conceptual overburden pile design would have a total of 25 feet relief over the 55-acre flat area of the overburden pile to reduce the flat-top look of the overburden pile (Figure 2). Where possible, BMI proposes to reclaim portions of the overburden pile concurrently. The Proposed Action would plan for the construction of the overburden pile in phases. As each phase is completed, those sections not being used for haul roads or soil storage would be reclaimed.

The reclaimed overburden disposal area 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.

Sweetwater Road

No changes to the Sweetwater Road reclamation plan are proposed in the permanent relocation plan.

Infiltration Trenches and Pipelines

The plan for the trenches would be the same as for the percolation basins in the No Action Alternative. The dewatering pipelines would be buried. The pipeline corridors would be reclaimed immediately following construction. Soil excavated for the infiltration trenches would be stockpiled next to the trenches and revegetated until the trenches are decommissioned at the end of mine life, and then replaced and seeded.

This soil has not been added into the soil balance in Table 4. The buried pipeline from the mine to the infiltration trenches would not be removed at mine closure.

Revegetation

No major changes to the revegetation plan were proposed as part of Amendment 005 Resource Management Associates, Inc. 2006). The reclamation and revegetation plans were clarified. Reclamation monitoring with test plots and concurrent reclamation of disturbed areas were also clarified. Cuts and fills associated with new road construction and soil stockpiles would be seeded to stabilize soil. Other areas no longer needed for the active mining operation would be revegetated as soon as possible as part of on-going operations.

AGENCY MODIFICATIONS TO THE PROPOSED ACTION

The Agency Modifications to the Proposed Action Alternative considered in this EA 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. Agency modifications 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 the BMI proposal as modified by DEQ. Only alternative components requiring a modification have been listed.

Overburden Disposal

The only change to the proposed overburden disposal plan would be to develop a plan to deposit overburden during operations to minimize regrading and to establish natural looking drainages at closure. If the Proposed Action is approved, BMI would have to submit a plan by the date of the next annual report showing a conceptual final design for the overburden pile including the plans for natural looking drainages and the overburden that would be placed on top to create the mounded natural look. DEQ would require conceptual 5-year plans to achieve the design. BMI would have to report in each annual report progress towards achieving the current 5-year design plan.

Resource Monitoring

Water Quality

If the Proposed Action is approved, DEQ would require BMI to obtain a Montana Pollutant Discharge Elimination System (MPDES) Permit for the discharge of groundwater from the pit to the infiltration trenches as soon as the process could be completed. BMI would have to comply with discharge limits set in the permit. Until the MPDES permit is approved, BMI could only discharge unaltered groundwater to the trenches.

Pit Dewatering Plan

The MPDES permit would cover the mine pit dewatering system water. In case of potential impacts to surface water from disposal of groundwater, BMI would have to submit a contingency plan for disposal of water from dewatering wells using land application on undisturbed lands in the permit area, in a drainfield, or treatment if necessary.

The report would have to provide a review of the new springs and overland flows observed during the preceding year and a discussion of potential changes to the plan to correct any problems resulting from these flows, if any.

The altered groundwater in the pit sump would not be discharged to the trenches because of water quality concerns, especially nitrogen, TSS and selenium. It would be routed to a lined settling pond, where it would evaporate, be used for dust control on mine roads, or be land applied on surrounding undisturbed areas or on new revegetation. BMI would have to report quality and volumes of water annually.

Pit Dewatering Plan Monitoring

BMI would have to submit in each annual report a summary of the previous year's monitoring data with a trend analysis verifying that predicted water quality from the mine pit dewatering wells is within discharge limits set by the MPDES permit. The report would have to detail pit dewatering volumes and discharges to each infiltration trench.

The annual report would also have to include suggested monitoring changes for pit water, as well as springs and seeps based on the past year's data.

Reclamation

Overburden Pile

BMI would have to monitor storm water and modify the overburden disposal plan to route storm water back to the pit if needed. This would be done until concurrent reclamation limits potential runoff reporting to Carter Creek from the expanded overburden disposal pile.

BMI would have to submit by the date of the first annual report, a conceptual life of mine concurrent reclamation plan for the overburden pile. DEQ would also require conceptual 5-year plans to achieve the plan. BMI would have to report in each annual report progress towards achieving the current 5-year concurrent reclamation plan.

Infiltration Trenches and Pipelines

No changes are proposed for reclamation of the trenches and pipelines.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

Several alternative components were considered but eliminated from further study.

Alternative Waste Rock Dump Design

An alternative design for the life of mine waste rock dump with a flat top and 3h:1v slopes was evaluated during the development of the proposed mixed slope design in the 2000 EIS (DEQ 2000). This evaluation was conducted using the results of a premine slope analysis of the proposed waste rock dump area within the Carter Creek drainage. Based on the premine slope analysis, the construction of a flat topped life of mine waste rock dump with a 3h:1v slope would result in an even greater disturbance footprint than proposed, and portions of the toe of the dump would ultimately extend to and slightly beyond Carter Creek. The proposed design with various slopes up to maximum 2:1 slopes would produce a much more natural landform at closure than all 3:1 slopes.

Alternative County Road Relocation

Two alternatives potentially available for the proposed relocation of the Sweetwater Road in the vicinity of the Regal Mine were considered in the 2000 Draft EIS (DEQ 2000). One route would cross Hoffman Creek a short distance north of the mine site and circle the mine area to the east. The other route would circle to the west, traversing the mine site on a lower hillside below the proposed life of mine waste rock dump. The Hoffman Creek route would require three bridges and could impact wetland areas. In addition, the relocated road would cross a steep hillside and disturb more surface area at a higher construction cost. The second alternative route would require several miles of new road construction, easements from the Christensen Ranch, and cross several ephemeral drainages. These were considered again for Amendment 005 and dismissed for the same reasons.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

This chapter describes the environmental resources that would be affected by the Proposed Action and the alternatives described in Chapter 2. Other resources that either would not be affected by the Proposed Action or are not present in the Regal Mine area are dismissed in Chapter 1.

The potential direct, indirect and cumulative impacts of each alternative are discussed for those issues identified during scoping and considered to be important. Other issues that were raised during scoping, but which are not considered important, are dismissed in Chapter 1.

The Proposed Action could affect:

1. Water quality and management

    Impacts of Infiltration trench pit dewatering disposal plan

    Impacts of overburden pile expansion

2. Overburden pile reclamation.

AFFECTED ENVIRONMENT

Sagebrush and grasses dominate vegetation surrounding the Regal Mine. Widely scattered trees and rock outcrops occur on adjacent hillsides. Higher peaks of the Ruby Range are tree covered, but limber pine and mountain mahogany are the dominant species on the hills in the Regal Mine area. These different vegetation communities provide an intermingled mosaic of color and texture near the Regal Mine site.

The Hanson and Oro Fino soil associations are the two dominant soil types in the proposed disturbance acres. Both soils are deep, well drained, loamy grassland soils with less than 25 percent rock fragments. The Oro Fino soil formed in colluvium and material derived from gneiss and schist. The Hanson soil formed in calcareous alluvium, colluvium, or glacial till derived from limestone. These soils have no physical or chemical limitations and are salvageable to 60 inches. Both soils have a high water erosion potential if disturbed.

Surface and groundwater baseline water quality were described in the Amendment 004 EIS (DEQ 2000 and 2001). Since then, BMI has conducted additional testing and groundwater characterization in the pit area (Water Management Consultants, 2005). Testing of the pit dewatering system is continuing as approved in Minor Revision 05-002 in December 2005.

All groundwater proposed to be discharged from the pit dewatering plan meets discharge standards except for temperature in some seasons of the year and potentially nitrates from the pit sumps. DEQ must evaluate whether the new dewatering plan will cause violations of the Montana Water Quality Act in the ephemeral draws in upper Carter Creek.

Surface water resources in the Regal Mine area consist primarily of two streams: Hoffman Creek, near the east side of the mine pit, and Carter Creek, west of the mine site (Figures 3 and 4). Both streams flow northwest and eventually reach the Beaverhead River just northeast of Dillon. These streams are perennial in their upper reaches near the Regal Mine and become intermittent downstream. Hoffman Creek is approximately 400 feet from the current mine pit, whereas Carter Creek is located about 3,000 feet west of the mine.

In July 1994, streamflow in Hoffman Creek and Carter Creek was 170 gpm and 318 gpm, respectively. Both creeks gain flow in the upper reaches and then lose flow farther downstream (Hydrometrics, Inc. 2000a).

Spring 1, located at the head of a Hoffman Creek tributary channel, discharges at an elevation of about 6,460 feet near the east side of the Regal Mine (Figure 4). This elevation is approximately 80 feet higher than the regional water table in bedrock, indicating that a perched water system may be supplying water to this spring. Hoffman Creek, at its closest location to the mine pit, is approximately 30 feet higher than the regional water table. It is possible that water in Hoffman Creek farther downstream could receive some recharge from the regional water table. Springs 2 and 3 emerge at the base of the hillside on the east side of Carter Creek (Figure 4). Flow of these springs average between 10 and 85 gpm.

Surface water quality samples were collected from Hoffman Creek and Carter Creek and from the springs to provide baseline water quality data for Amendment 004. Each sample was analyzed for common ions, total recoverable and dissolved metals, and nutrients. Table 6 provides a summary of the analytical data for surface water analyses. Results of these surface water quality samples show that the quality of water is good in both streams and is characterized as being a very hard, slightly alkaline, calcium bicarbonate type water with low concentrations of total dissolved solids, sulfate, nutrients, and metals. These waters meet all Montana water quality standards except for iron and manganese.

Table 6. Summary of 2006 surface water and groundwater chemistry in vicinity of the Regal Mine and applicable water quality standards. (Results in mg/L [3] except pH and conductance)

Parameter	Groundwater				Surface Water						
	RMW-5 & -6 Composite			Standard	Carter Creek			Hoffman Creek			Standard
	Avg	Min	Max		Avg	Min	Max	Avg	Min	Max	
pH	6.16	5.36	7.17	---	7.51	7.03	8.04	7.79	7.48	7.94	**6.5 to 8.5**
Conductance	456	412	523	**1000**	384	357	416	334	313	360	---
Calcium	54	52	57	---	40	36	44	47	44	53	---
Magnesium	20	18	21	---	25	22	29	14	12	16	---
Chloride	22	21	22	---	5	4	7	4	2	8	---
Sodium	12	12	13	---	8	7	9	7	6	8	---
Potassium	5	5	6	---	3	2	3	2	2	3	---
Alkalinity	170	170	170	---	200	200	200	177	170	180	---
Sulfate	37	35	39	**250**	18	16	24	11	8	17	**250**
Total Nitrogen	1.37	1.11	1.60	**7.5**	0.18	0.15	0.23	0.22	0.05	0.48	**Narrative**
Phosphorus	<0.01	<0.01	<0.01	---	<0.01	<0.01	<0.01	0.01	0.01	0.01	**Narrative**
Aluminum	<0.1	<0.1	<0.1	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.087**
Antimony	NA	NA	NA	**0.006**	NA	NA	NA	NA	NA	NA	**0.006**
Arsenic	<0.003	<0.003	<0.003	**0.02**	0.0030	<0.003	0.0030	<0.003	<0.003	<0.003	**0.018**
Barium	0.0320	0.0310	0.0350	**2**	0.0183	0.0160	0.0210	0.0223	0.0210	0.0240	**2**
Cadmium	0.0002	<0.0001	0.0003	**0.005**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**0.00044**
Chromium	<0.001	<0.001	<0.001	**0.1**	0.0018	<0.001	0.0030	<0.001	<0.001	0.0010	**0.152**
Copper	<0.001	<0.001	<0.001	**1.3**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.017**
Iron	0.016	0.010	0.030	**0.3**	0.2640	0.1900	**0.4600**	0.0367	<0.03	0.0400	**0.3**
Lead	<0.003	<0.003	<0.003	**0.015**	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	**0.008**
Manganese	<0.006	<0.005	<0.010	**0.05**	0.0322	0.0190	**0.0510**	<0.005	<0.005	<0.005	**0.05**
Mercury	<0.0006	<0.0006	<0.0006	**0.002**	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	**0.0005**
Selenium	0.0050	0.0040	0.0060	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	**0.005**
Zinc	0.0460	0.0300	0.0700	**2.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.216**

[1] s.u. = Standard Units
[2] µS/cm = microSiemens/centimeter
[3] mg/L = milligrams/Liter

Groundwater wells at the Regal Mine office and the Regal Mine Pit provide geologic and water level information for characterizing the hydrogeologic setting at these locations. The Regal Mine office well (RMG-1) was drilled for domestic water in 1991 to a total depth of 420 feet. The pit dewatering wells (RMW-5-7) were drilled between 2002 and 2006 to depths of 410 to 480 feet.

The general hydrostratigraphy within the operating permit boundary consists of soil material overlying Precambrian talc bearing dolomite and marble. Precambrian gneiss, schist, and amphibolite are also present as localized outcrops. The static groundwater level is located within fractured dolomite and marble at approximately 103 feet below ground surface (bgs), or 6,382 feet above mean sea level (AMSL) at the office well and 91 feet bgs (6,380 feet AMSL) at the mine pit well.

Bedrock monitoring wells (RMW-1 through RMW-4) and the office well (RMG-1) were used for collection of hydrogeologic data at the mine site (Figure 4). These wells show a regional groundwater table at an elevation of approximately 6,380 feet (~100 feet bgs) in the pit area, with groundwater moving from southeast to northwest under a relatively flat gradient (0.002 ft/ft).

Groundwater is present within fractured schist and gneiss on the footwall side of the mine pit (i.e., upgradient south side) and within fractured dolomitic marble on the hanging wall side of the mine pit (i.e., downgradient north side). The talc ore body is exposed in the center of the mine pit, generally striking southwest to northeast and dipping northwest. The talc itself does not appear to yield significant amounts of water. An intrusive dike would be exposed in a portion of the west side of the ultimate pit surface; however, this rock unit where exposed would be above the saturated zone in the pit wall. Groundwater is under unconfined to semi-confined conditions in this area (Hydrometrics, Inc. 1999b).

Aquifer tests have been conducted in monitoring wells at the Regal Mine to determine hydraulic characteristics of bedrock material surrounding the mine pit area. During the 5-day pumping test of well RMW-1, a streamflow stage in nearby Hoffman Creek was monitored to assess possible interconnection between bedrock groundwater and surface water. No obvious interconnection was observed during the test.

Groundwater samples collected from the four wells installed during this groundwater characterization study showed that groundwater quality is good and similar to previously collected samples from groundwater wells and to surface water in Hoffman and Carter creeks. Groundwater quality in the Regal Mine area is a hard, calcium bicarbonate type water with moderate concentrations of total dissolved solids and low concentrations of sulfate, nutrients, and metals. Concentrations of dissolved metals were generally below or slightly above laboratory detection limits. Concentrations of all parameters were lower than Montana Numeric Water Quality Standards. Table 6 shows a summary of the analytical results for all groundwater samples collected at the Regal Mine.

During the pumping test, samples for common ions analysis were collected at well RMW-1 to evaluate whether groundwater common ion chemistry would change during the test as a result of recharge from Hoffman Creek. The results show that common ion chemistry at the conclusion of pumping was similar to that at the start of testing, and it does not appear that groundwater quality was altered during the test by recharge from Hoffman Creek.

DIRECT AND INDIRECT IMPACTS

No Action

Under the No Action Alternative the overburden pile would not be expanded and the pit dewatering plan using infiltration trenches would not be implemented. The pit dewatering plan using the percolation ponds that is approved for the Regal Mine would

be implemented. This plan would pump the water continually during mine life through buried pipelines to two 4-acre percolation ponds.

Issue 1: Water Quality and Management

Surface water quality is generally in compliance with water quality standards. No exceedances of any standards have been documented to date except for iron and manganese (Table 6).

Impacts of Percolation Pond Pit Dewatering Plan

In the 2000 EIS, the assessment of impacts and issues for the proposed pit expansion and associated dewatering focused on 1) drawdown related impacts and 2) water quality impacts. The primary drawdown issues involve mine development plans for groundwater capture and handling and the potential to dewater area springs and reduce streamflows in Hoffman and Carter creeks. Water quality issues involve water quality degradation from disposal of mine water during the active life of the mine. No changes to the dewatering and drawdown analysis in the Amendment 004 EIS should occur as a result of the Proposed Action (DEQ 2000 and 2001)

Groundwater investigations at the Regal Mine have shown that the proposed expansion of the mine pit to an elevation of 6,080 feet could encounter substantial groundwater inflows to the pit. A water management plan was prepared to provide a conceptual approach for capturing, handling, and disposing of groundwater and mine pit water that would be encountered during pit advancement into the regional aquifer system. Groundwater quality at the Regal Mine is very good, and disposal of groundwater captured outside of the pit should not pose any water quality problems except occasional exceedances of selenium if the groundwater gets to surface water. Groundwater captured in the pit sump may have elevated concentrations of total suspended solids (TSS), nitrate and possibly selenium.

The purpose for collecting mine site groundwater from dewatering wells around the pit is to keep the pit as dry as possible during mining and to limit the amount of groundwater that could become contaminated with nitrates from blasting agents or turbidity. Several hundred gallons per minute of unaltered groundwater would be intercepted by capture wells located outside of the mine pit and routed via piping to one or more percolation basins for disposal (Figure 3).

Groundwater that escapes the capture wells would be collected in the pit sump. Water collected within pit sumps would be altered groundwater and stormwater. This water would be pumped to a settling pond before being disposed of in the percolation basins. An accurate premining estimate of groundwater flow to the pit is not possible. For analysis purposes in the 1999 EIS, it was assumed that 15 percent of the total groundwater flow passed by the capture system and reported to the pit. The anticipated groundwater influx to the pit would be approximately 165 gpm when the pit bottom reaches the 6,280-foot elevation, 250 gpm at the 6,180-foot elevation, and 330 gpm at

the 6,080-foot elevation. The estimate of 15 percent was considered conservative provided the groundwater capture system lowered the potentiometric surface below the pit bottom. This estimate was considered a reasonable upper estimate for purposes of water management facility design and impact assessment. In addition to groundwater inflow, direct precipitation may account for short term flows of 10 to 20 gpm to the pit that would periodically add to the volume to be managed from the pit sump. New water studies completed since 1999 have lowered the estimates of flow that would enter the pit while the dewatering wells are functioning (Water Management Consultants 2005).

Pit operations would affect the quality of sump water removed from the pit and would influence disposal options. Based on the water quality sampling results that show high quality ambient groundwater, the main parameters of concern would be potentially elevated concentrations of TSS associated with the talc, elevated nitrate concentrations derived from explosive agents and potential selenium concentrations above surface water standards. Because perimeter dewatering wells are proposed rather than direct dewatering in the pit, problems with these parameters would be minimized except for selenium. The relatively high bedrock permeability and degree of interconnectedness lends itself to use of perimeter dewatering wells.

Captured groundwater from the dewatering wells is not anticipated to require treatment prior to disposal in the percolation basins. The mine pit should encounter minimal water since the water table is being lowered in advance of the pit. Water collected in pit sumps is expected to be generally good. The pit sump water would be pumped to a settling basin and then to the percolation basins. The only potential impacts would be from nitrite plus nitrate nitrogen (NO_2 + NO_3), TSS and selenium if the water gets to surface water. Low levels of selenium are present in groundwater in some areas, but selenium is not expected to be a problem in runoff in the pit sumps. The TSS and selenium would potentially be removed through infiltration. TSS would be filtered out in the soils. Monitoring would identify if selenium is not removed.

Pit sump water monitoring at BMI's Treasure Mine, which is developed in a similar deposit, typically has NO_2 + NO_3 concentrations ranging from 2 to 4 milligrams/liter (mg/L). TSS concentrations at the Treasure Mine vary depending on pit activities and runoff conditions. TSS in pit water at the Treasure Mine is reduced to less than 25 mg/L by settling prior to discharge. Selenium is typically not present in pit water at the Treasure Mine (Hydrometrics 2006).

Under the approved water management plan, water discharged to the percolation basins would be a combination of captured groundwater (an estimated 1,000 gpm to as high as 2,200 gpm) and a lesser amount of pit inflow water (up to 330 gpm). BMI installed additional wells and conducted extended pumping tests in 2003 and concluded that the maximum pumping rate for dewatering would be on the order of 500 gpm (Water Management Consultants 2005). The original water management plan called for blending of pit inflow water with water from the dewatering system. The actual pit inflows would also be less.

Data suggest that nitrate plus nitrite concentrations in the blended percolation water would be approximately 1.5 mg/L to 6.5 mg/L, depending on the effectiveness of the capture wells, the amount of seepage into the pit, and the pit water nitrate concentration. This estimated percolation water concentration is less than the nondegradation trigger value of 7.5 mg/L for an industrial source of nitrate discharged to groundwater. TSS and selenium would potentially be removed by infiltration.

Water handling investigations identified two potential areas near the mine where percolation basins could feasibly be constructed for disposal of waters encountered during mine expansion (Figure 3). The Alternative 1 location is 1.5 miles northwest of the mine and 1,000 feet east of Carter Creek. The Alternative 2 location is 2 miles northwest of the mine and 2,500 feet west of Carter Creek. The evaluation of percolation basins as a disposal method concluded that percolation sites had suitable infiltration rates and substantial area for basin construction and expansion (DEQ 2000 and 2001).

Potential problems associated with the approved water handling system include:

- capture system failure,
- pipeline leakage or breaks,
- sedimentation of percolation facilities,
- equipment failure, and
- seep or spring development.

Failure of the capture system could occur if power to the pumping system is disrupted due to a power failure or equipment malfunction. Extreme cold and snowy winter weather could cause equipment problems and hamper general operation and maintenance of the capture system. Partial or entire failure of the capture system would result in additional groundwater seepage to the pit, increasing the volume of mine pit sump water that would need to be removed. Resultant pit inflows from capture system failure would depend on the depth of dewatering and aquifer recovery rates.

Pipeline failure could cause a discharge of water out of the pipeline that could run across the land surface and get to surface water causing erosion along the way. Even though the groundwater in the pipeline would be good quality with limited nitrates, some impacts to surface water could occur from sediment, nitrates, TSS and selenium.

The percolation basins could eventually plug from sediment over the mine life. Equipment failure in the pit dewatering system and pipelines also could cause unexpected problems especially in the wintertime. New seeps and springs could develop as part of the pit water disposal system. The water is of good quality, and impacts from the seep and spring development would produce beneficial impacts if water quality meets standards.

Pit Dewatering Plan Monitoring

A water resources monitoring plan (Hydrometrics, 2000a) has been approved for the Regal Mine (DEQ 2000 and 2001). The plan includes ambient surface water and groundwater monitoring, as well as operational monitoring of pit waters, the dewatering system, and the water disposal system (Tables 2 and 3). A regular maintenance program and inspection of the groundwater capture system would be conducted to assure the system operates consistently and properly. Capture well pumping systems would also be instrumented with totalizer/flow meters to evaluate capture system operation and maintenance needs. In addition, piping and percolation ponds would be inspected weekly for potential problems. Regular monitoring of water levels with in-pit piezometers and monitoring wells surrounding the pit would be used to evaluate dewatering effectiveness and track the drawdown of the water table around the pit.

Groundwater quality would be monitored in wells around the percolation basins (Figure 3). As mentioned above, there is some potential for springs and seeps to develop downgradient of the basins. The area surrounding the percolation basins would be inspected routinely for new springs or seeps. The inspection would focus on the steep topography along Carter Creek and in the ephemeral drainages near the basins. Based on the monitoring data, the construction, management, and location of percolation facilities would be re-evaluated. Carter Creek has been shown to be a losing stream in its lower reach near the proposed percolation basins (Hydrometrics, Inc. 2000b) meaning that groundwater does not recharge the stream, and that the percolation basins are not hydrologically connected to the creek**.**

Possible influences to water quality under the No Action Alternative could result from the percolation ponds plan, because it requires the water to be pumped through a piping system up to 13,200 feet long. Even though the groundwater is of good quality, this system would have a risk for an accidental break or leak in the system that could cause erosion or unwanted springs or seeps to develop along the pipeline length. An automated leak detection system was stipulated as part of Amendment 004 approval in 2000 when this system is put in place (DEQ 2000 and 2001). This would limit the potential impacts from a pipeline leak.

The percolation ponds were designed based on the most likely expected flows according to groundwater characterization studies. The ponds might not be able to handle high water flows. If the pumping rate of the dewatering wells exceeds pipeline or pond capacity, BMI would submit to DEQ, for review and approval, a plan to handle the excess water using land application disposal or other approved methods.

If groundwater drawdown due to pit dewatering dries up the office well (RMG-2), replacement with a dewatering well would be permitted.

To minimize potential nitrate problems at the percolation pond area, revegetated areas at the mine site would be irrigated with the pit sump water during the growing season at a rate not to exceed 35 gpm or 10 acre-feet per year.

Impacts of Overburden Pile Expansion

The No Action Alternative would affect water quality from runoff and seepage from the overburden pile. The No Action Alternative would create an overburden pile that is 450 feet high and has a maximum slope length of 1,100 feet. The slope length would produce runoff and have a high erosion potential from the overburden pile, which could influence water quality. The Oro Fino soils to be used for reclamation are highly erodible when disturbed. Storm water controls and monitoring would be used to control erosion and water quality as detailed in the 2000 EIS (DEQ 2000 and 2001). BMI has an approved storm water plan approved by DEQ. Seepage from the overburden pile would be minimized by the steep slopes and limited flat areas on the top of the pile.

Issue 2. Overburden Pile Reclamation

The Regal Mine operating permit area is located in a rolling, open, foothill setting on the western slopes of the Ruby Range in southwest Montana. Immediately adjacent lands are undeveloped and are used for livestock grazing. These lands are generally characterized by grassland with sparse tree and shrub cover, and some rock outcrops. Views from the mine site west towards Dillon (approximately 11 miles distant) provide expansive views of the Beaverhead Valley.

The 160-acre mine permit area, with its open pit, overburden, soil stockpiles and mine offices, would be highly visible to travelers on the Sweetwater Road. Mine facilities would dominate immediate foreground views from the Sweetwater Road for approximately 1/2 mile immediately above the mine. The No Action Alternative overburden pile plan would create a landform of up to 450 feet high with slopes of up to 1,100 feet long. At the completion of the life of mine activities, a large reclaimed overburden pile with a mixture of 2h:1v and 3h:1v slopes would remain. This feature would occupy about 63 acres within the head of a small draw. The mine's overburden pile would be visible as a background element in views from the lower Sweetwater Road and surrounding Beaverhead Valley east of Dillon. Though the gray color of the waste rock dump would contrast with adjacent grass-covered slopes, the pile would not be a dominant feature in the viewed landscape.

The nearest residence is located approximately 1 mile from the mine site, and large topographic features prevent the mine site from being visible from this residence. Other ranches and residences located along the lower Sweetwater Road would view the mine from miles away. These residences and ranches would also have views of the reclaimed overburden pile following the completion of mining. From these viewpoints, the pile would be visible as a subordinate element in the viewed landscape. These visual impacts would continue through operation and reclamation under the existing permit.

The overburden pile would be topographically similar to the surrounding area. The original overburden design was deemed stable in a 1996 engineering study by Call and Nicholas (Hydrometrics 1999, Appendix K).

Soil stockpiles at full build-out of the No Action Alternative would provide approximately 2 feet of soil for reclamation of the permitted disturbance. Coppinger *et al*. (1993) found that 9 to 33 inches of soil produced acceptable reclamation results in various reclamation studies. Soil would be salvaged to a minimum depth of 12 inches for Hanson soil to 18 inches for Oro Fino soil. A minimum of 12 inches of soil with high coarse fragment content would be spread on slopes greater than 33 percent. Soil with low coarse fragment content would be placed 24 inches deep on slopes less than 33 percent. These replaced soils mimic the two major soil types that occur naturally on the site. The coarse fragments in the soil would provide natural armoring against erosion on steep slopes.

The proposed soil salvage and replacement depth would produce acceptable forage for livestock and wildlife in the post-mine environment. Only 20 acres of disturbance would receive 12 inches of soil in the life of mine expansion plan, and 122 acres would receive 24 inches of soil. This would mimic the soil depths on native slopes in the area.

Dominant plant species would change and the diversity (i.e., number of plant species) of reclaimed communities would be less than in native communities. This is largely an unavoidable impact of disturbances to native communities.

A minimum of 12 inches of soil would produce marginal but acceptable comparable stability and utility on revegetated areas in the existing reclamation plan for slopes. Revegetation community production would be similar to plant community production currently found in the area on shallow soils over fractured bedrock on slopes greater than 33 percent.

The post-mine land use of rangeland forage for livestock and wildlife would be compromised by these replacement depths using impacted soils, especially on slopes less than 33 percent that typically have more developed soils in the area.

The coarse fragment content in soil salvaged for reclamation of steeper slopes would be at least 25 percent by volume, sampled on a 100-by-100-foot grid after application. If sampling indicates that coarse fragment content is less than 25 percent, BMI would submit for review and approval a final design to develop additional slope breaks such as benches and cross slope talus features. These slope breaks would route runoff water off the reclaimed surface on the long overburden pile slopes and reduce the overall slope length to approximately 225 feet. This would also stop sheet erosion from the upper slopes. BMI would also plan for other measures. Less than 10 percent of the total surface of the steeper portions of the overburden pile could be left as linear cross slope talus features that would provide slope breaks and stop any sheet erosion from the upper slopes. These measures, as well as other erosion control techniques, would provide the additional assurance that erosion would not be excessive in the first few years after reclamation commences.

Water bars would be constructed no more than 225 feet apart on the overburden pile slopes. Between the water bars, log water barriers 4 to 8 inches in diameter and 10 to 20 feet long would be installed at intervals of no more than 50 feet. The native soils

have a high water erosion hazard if disturbed. The erosion potential for reclaimed slopes of 25 to 44 percent was evaluated (Winking and Dollhopf, 2000). The proposed plan, incorporating water bars, log barriers, and coarse fragments in the soil, would achieve an acceptable erosion rate of 0.5 ton/year after 10 years. Reclaimed plant communities can take 3 to 5 years to develop an erosion-controlling canopy that compares favorably with native vegetation. Additional erosion control measures would be needed in the first few years until revegetation develops adequately. BMI would be required to patch eroded areas and reseed the disturbed areas as needed. DEQ concluded in the Amendment 004 EIS that reclamation would work on the final regraded landform (DEQ 2000 and 2001).

Phased revegetation of the overburden pile with native grasses would reduce its contrast with adjacent grass and sage covered hillsides during operations. A mixed slope design for the waste rock pile would help restore a natural-appearing landscape to the mined area following the completion of mining.

Proposed Action

The Proposed Action would implement the pit dewatering plan using infiltration trenches (Resource Management Associates, Inc. 2006). In the Proposed Action, BMI would discharge groundwater from pit dewatering wells and pit sumps to infiltration trenches in one or more of the three ephemeral drainages northwest, west, and southwest of the mine pit (Figure 4). Three ephemeral drainages on the Carter Creek side of the mine have been identified as potential trench locations for reinfiltration of groundwater removed by pit dewatering wells. DEQ must evaluate the potential change in flow and water quality to surface and groundwater resulting from the change in groundwater management. The pit dewatering plan and surface and groundwater resource monitoring plans described in Chapter 2 include monitoring and management designed to detect and mitigate any possible contamination of water resources.

BMI would create an expanded overburden pile with the same amount of overburden resulting in a larger, lower landform with shorter slopes than the approved overburden pile (Figures 2 and 4)

Issue 1: Water Quality and Management

Impacts of Infiltration Trench Pit Dewatering Plan

The infiltration trench plan for disposing of pit dewatering well water would be similar to the approved plan, except BMI would pump the water collected from the wells and pit sump water into infiltration trenches in ephemeral drainages closer to the Regal Mine pit (Figure 4). BMI conducted additional pit dewatering investigations in 2002 and 2004 (Water Management Consultants 2005). This testing showed that predictions of drawdown and impacts to surface and groundwater were less than those predicted in the Amendment 004 EIS.

BMI has been testing the infiltration trench plan since approval of Minor Revision 05-002 in 2005. BMI continued with infiltration testing in 2006 to evaluate potential sites for reinfiltration of water from the mine's pit dewatering wells and pit sumps. Two sites were evaluated, one in a tributary drainage to Carter Creek and one near Hoffman Creek (Figure 4). The test site located south of the pit in a tributary drainage to Carter Creek (Test Site 1) was found to have the best conditions for infiltration. During testing, there was some increase in spring flow noted near the lower end of this tributary drainage (Figure 4). There were no important changes in water quality in the springs in Carter Creek during the test. BMI is in the process of preparing an application for an MPDES permit to formalize this discharge site (John Parks, BMI. Personal communication, January 17, 2007).

The soils at the Hoffman Creek test site had insufficient permeability to infiltrate large quantities of water. The proximity of the site to the pit raised concerns about the potential for recirculation of infiltrated water. BMI would not apply for this discharge site in its MPDES permit application. BMI is proposing to conduct additional testing during 2007 at alternative locations in the Hoffman Creek drainage with the objective of establishing a second infiltration outfall in that drainage. BMI would have to submit a minor revision to the operating permit to conduct the test.

It appears from the testing that the infiltration trench plan would function as designed once alternative sites are tested. The infiltration trench plan closer to the pit would also limit regional drawdown of the water table away from the immediate pit area, minimize pipeline length and the potential for pipeline leaks, and improve monitoring ability.

Testing has raised concerns about discharge of pit sump water to the trenches because of the connection to surface water. Potential impacts could occur from discharging pit sump water because it would be mine discharge water and not unaltered groundwater. BMI could not discharge this water without a review and approval by DEQ as part of the MPDES permit application process.

Pit Dewatering Plan Monitoring

Monitoring of these sites would commence as described in the No Action Alternative. BMI would modify the Proposed Action to minimize the risk of water quality impacts by providing hydrological evidence that the pit lake would not cause springs or seeps to develop on the overburden face. BMI would also modify the standard operating procedure for field pH sampling to include periodic calibration checks.

Impacts of Overburden Pile Expansion

The overburden pile would be 200 feet lower than the No Action Alternative. The slope length of the overburden pile would be reduced from a maximum of 1,100 feet to 500 feet. Storm water controls as well as monitoring would be implemented as part of this proposed plan. Slope gradients on the reclaimed pile would be variable, and the steepest slopes would be 2h:1v. The expanded overburden pile would be closer to

Carter Creek than the approved overburden pile. BMI would implement storm water controls as needed to keep all storm water on the site.

Issue 2. Overburden Pile Reclamation

The visual improvement of the Proposed Action should be readily apparent. Instead of a mixed slope, 450-foot high overburden pile, the Proposed Action would create a visually mitigated design with maximum slopes of 2h:1v that are 200 feet lower than the approved design. This design would be easier to reclaim and manage due to its reduced height and slope. With reduced height and shorter slopes, the proposed design would have greater stability than the presently approved design. This plan would eliminate any potential overburden stability concerns and decrease runoff and erosion. The shorter slope length and lower elevation would improve reclamation, reducing erosion potential.

The flatter slopes on the overburden pile would reduce runoff, increase potential infiltration, and increase potential seepage from the pile. Placement of soil and subsequent establishment of vegetation on the overburden surfaces would reduce infiltration and increase evapotranspiration from the surface of the site, thereby reducing potential seepage. Seepage from the Proposed Action pile would be potentially more than from the steep, longer slope No Action Alternative. Seepage reduction through the disposal area by revegetation would minimize the risk to water quality of the receiving surface water or groundwater resource. In addition, concurrent revegetation would reduce blowing dust on the overburden sites.

Agency Modifications to the Proposed Plan

Issue 1: Water Quality and Management

Impacts of Infiltration Trench Pit Dewatering Plan

A hydrologic connection between the infiltration trenches and Carter or Hoffman creeks would be created as documented in the infiltration testing program in 2006 (John Parks, BMI. Personal communication, January 17, 2007). The unaltered groundwater in the dewatering wells contains selenium levels that approximate or occasionally exceed surface water standards (Table 6). BMI is preparing a MPDES permit application which would be submitted to DEQ in the first quarter of 2007. The MPDES permit would cover the mine pit dewatering system water. DEQ would approve the infiltration trench plan, contingent on the MPDES permit review indicating that the discharge quality would comply with permit limits. Until the MPDES permit is approved, BMI could only discharge unaltered groundwater to the trenches. BMI would have to develop contingency plans for land application of water, disposal of groundwater in a drainfield, or water treatment in case quality of water reporting to the trenches exceeded expected MPDES effluent limits.

The infiltration trenches could eventually plug from sediment over the mine life. BMI would have to clean out the trenches periodically to maintain infiltration rates. This would keep the trenches functional over mine life and reduce potential impacts from overtopping of the trenches and overland flow.

The mine pit sump water would not be pumped to the infiltration trenches. It would be pumped to a lined pond where it would evaporate, be used to control dust on mine roads, be land applied on undisturbed land in the mine permit boundary, or used to irrigate reclamation on the mine site. This would minimize the potential for plugging the trenches with sediment and for nitrate, TSS, and selenium impacts to surface water.

Pit Dewatering Plan Monitoring

BMI would have to submit in each annual report a summary of water discharged from the wells to each trench and the quality. BMI would have to submit in each annual report to DEQ a summary of the previous year's monitoring data with a trend analysis verifying that predicted water quality from the mine pit dewatering wells was within discharge limits set by the MPDES permit. The report would have to detail pit dewatering volumes and discharges to each infiltration trench, to undisturbed land application disposal areas or reclaimed areas, disposal of the water in a drainfield during summer and/or winter, or other approved methods.

The report would have to provide a review of the new springs and overland flows observed during the preceding year and a discussion of potential changes to the plan to correct any problems resulting from these flows.

BMI would have to report spring and seep locations, quality and flows. BMI would have to suggest management changes to limit any impacts so that the plan complies with MPDES permit limits.

The report would also have to detail the volumes and quality of water from the mine pit sump that is pumped to the lined settling pond, and used for dust control, or land applied to undisturbed or reclaimed areas. BMI would have to submit a plan for land application of the pit sump water on surrounding native rangeland or treatment of water if necessary. Annual monitoring would identify the potential need. Any changes in monitoring would be specified in the MPDES permit and reviewed annually based on the previous years monitoring.

Impacts of Overburden Pile Expansion

BMI would add more BMPs to limit erosion and runoff from the larger overburden pile area (Figure 2). BMI would have to provide a modification in the drainage plan to route the water back to the pit during operations and at closure if necessary until reclamation limits runoff to acceptable levels. This would limit potential runoff impacts to Carter Creek.

Issue 2. Overburden Pile Reclamation

BMI would develop a plan to deposit overburden during operations to minimize regrading and to establish natural looking drainages at closure. If the Proposed Action is approved, BMI would have to submit a plan by the date of the next annual report on April 22, 2007 showing a conceptual final design for the overburden pile including the plans for natural looking drainages and the overburden that would be placed on top to create the mounded natural look. DEQ would require conceptual 5-year plans to achieve the design. BMI would have to report in each annual report progress towards achieving the current 5-year design plan.

BMI has supplied a conceptual phased build-out of the overburden pile (Resource Management Associates, Inc. 2006, Exhibit D). BMI would provide a plan for the size and shape of the overburden pile if operations cease before final build-out. BMI has committed to providing an updated reclamation plan should operations cease before end of mine life. DEQ would stipulate that BMI prepare a 5-year conceptual, concurrent overburden reclamation plan. BMI would have to submit by the date of the first annual report a conceptual life of mine concurrent reclamation plan for the overburden pile. DEQ would also require conceptual 5-year plans to achieve the plan. BMI would have to report in each annual report progress towards achieving the current 5-year concurrent reclamation plan. This would help identify the extent of concurrent reclamation that could be achieved over the life of mine. DEQ would be assured that the amount of overburden exposed in the pile would be minimized.

CUMULATIVE IMPACTS

The cumulative impacts of the Proposed Action would not change from the Amendment 004 EIS prepared by the DEQ. Other than the possibility of sediment, TSS, nitrate, and selenium impact to Carter Creek, there are no other impacts to this area as the result of cumulative impacts associated with agriculture or grazing from other land users. No other major land use changes are proposed in the immediate area that would add impacts to area vegetation and soils.

The Sweetwater Garnet Mine was reclaimed in 2000, and the Dillon Vermiculite Project has not operated under a Small Miner Exclusion Statement (SMES). Neither of these projects have affected either stream.

UNAVOIDABLE ADVERSE IMPACTS

Residual impact from the Proposed Action would include irreversible commitments of privately owned land resources. Developed soil would be changed in 39.8 acres. Soil would be salvaged and replaced, but soil development and erosion potential would change from natural conditions.

Plant communities dominated by native plants would be replaced by less diverse reclaimed native plant communities on 39.8 acres. Although the disturbed areas would

be reclaimed, and most acres would be reseeded and revegetated, and a program implemented to inventory and treat noxious weeds, weeds would increase without treatment. Wildlife habitat on the 39.8 acres would be replaced with a less diverse reclaimed habitat.

The landscape characteristics would change as a result of the Proposed Action because of overburden pile expansion. The disturbed areas would be reclaimed and would comply with MMRA reclamation requirements. The reclaimed areas would always look like they were man made. This is an unavoidable impact of disturbing lands by mining.

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 not impose any new restrictions on BMI's use of its private property. The Proposed Action contains no new measures imposed by state agencies. The changes to the Proposed Action included in the Agency Modifications are needed to ensure that the Proposed Action will comply with state statutes and rules. Therefore, none of the alternatives contain regulatory restrictions on BMI's use of its private property.

CHAPTER 4 – CONSULTATION AND COORDINATION

PREPARERS

DEQ staff involved in the preparation of this EIS are listed in Table 7.

Table 7. List of Preparers

Name	Responsibility	Credentials	Years Experience
Patrick Plantenberg	Vegetation Soils Reclamation	BS, Agricultural Science/Recreation Area Management MS, Range Science/Reclamation	30
Herb Rolfes	Reviewer	BA, Earth Space Science MS, Land Rehabilitation	25
Charles Freshman	Engineering	BA, Geology BS, Civil/Environmental Engineering MS, Mining/Geological Engineering Professional Engineer	25
Greg Hallsten	Reviewer	BS, Wildlife Biology BS & MS, Range Management	30
Warren McCullough	Reviewer	BA, Anthropology MS, Economic Geology	33
Jeff Blend	Socioeconomics	BS & MS, Economics Ph.D., Environmental Economics	9

OTHER AGENCIES CONTACTED

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

State Agencies

Natural Heritage Program, Montana State Library
State Historic Preservation Office

Federal Agencies

U.S. Army Corps of Engineers

PUBLIC INVOLVEMENT

A summary of this EA was sent to persons and agencies that expressed interest in receiving a copy of the 2000 Amendment 004 EIS. A copy of the EA in paper or CD format can be obtained by DEQ. The EA is also on the DEQ web site at www.deq.state.mt.us

CHAPTER 5 – REFERENCES

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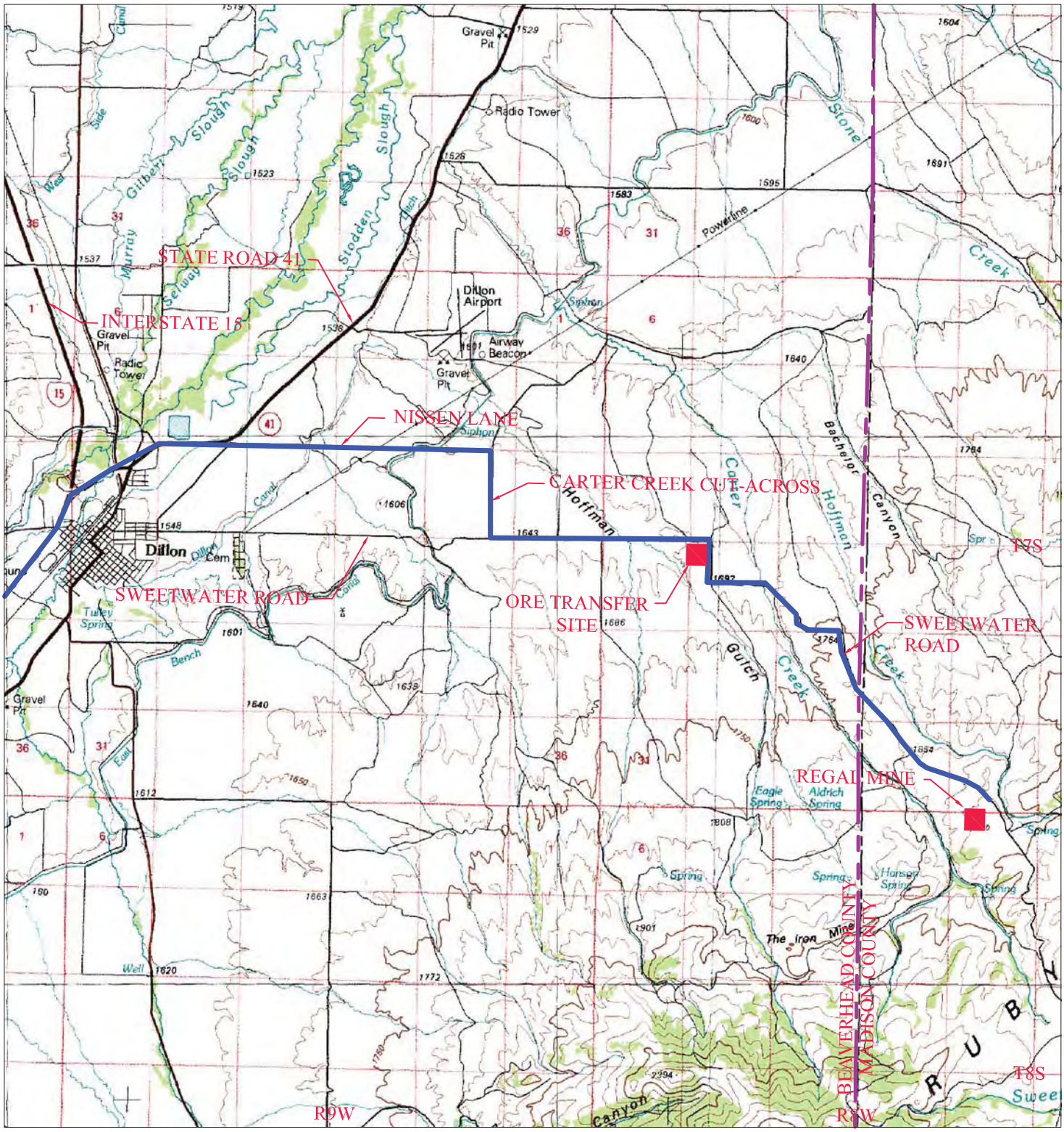

LEGEND

ORE HAUL ROUTE

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MILES

Resource Management Associates

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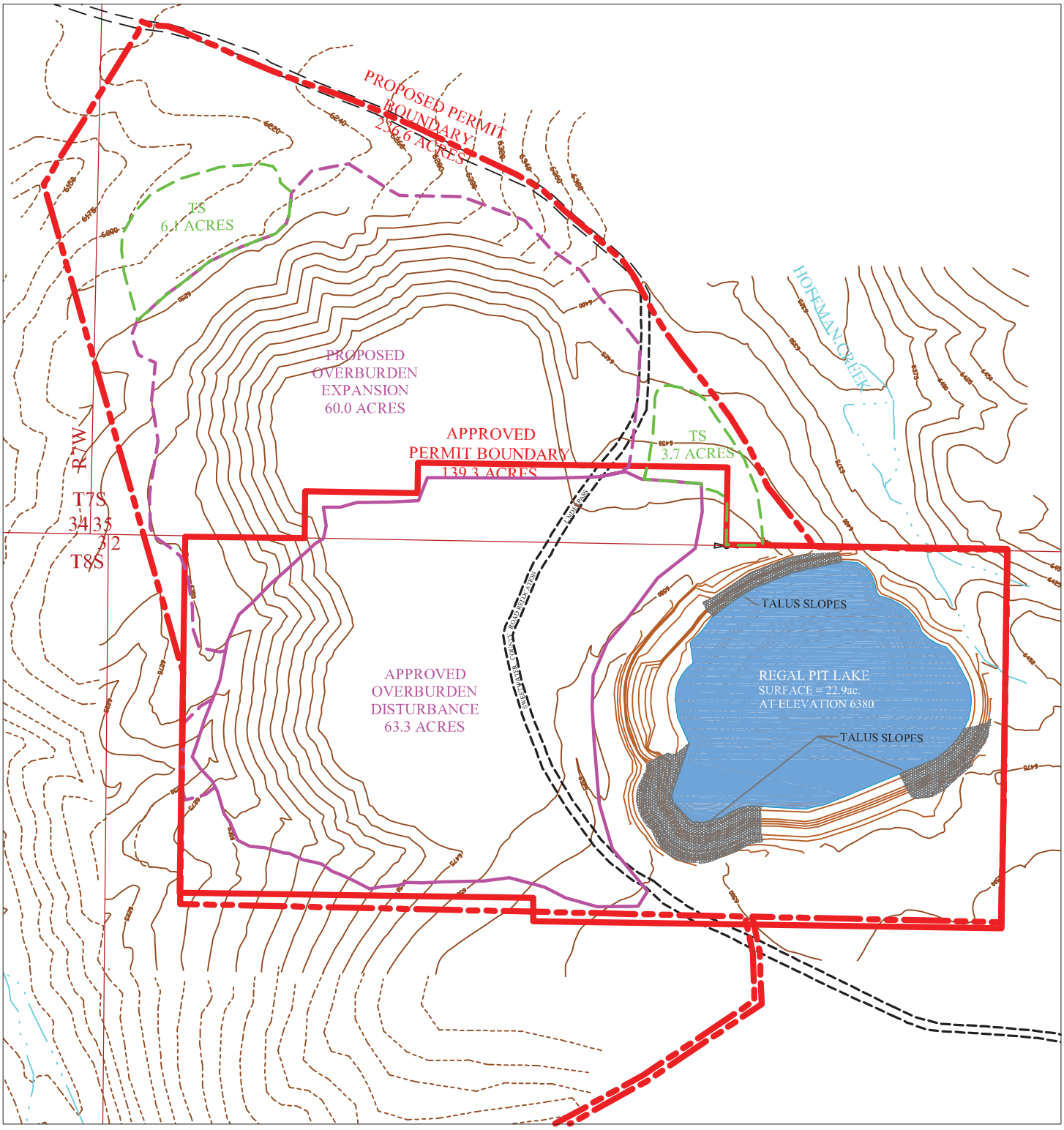
MINERALS TECHNOLOGIES

BARRETTS MINERALS INC.
REGAL MINE

GENERAL LOCATION AND HAUL ROUTE

FIGURE 1



LEGEND

- APPROVED PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- APPROVED OVERBURDEN DISTURBANCE
- PROPOSED OVERBURDEN DISTURBANCE
- PROPOSED TOPSOIL STORAGE

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600 300 0 600 1200

Feet

Resource Management Associates

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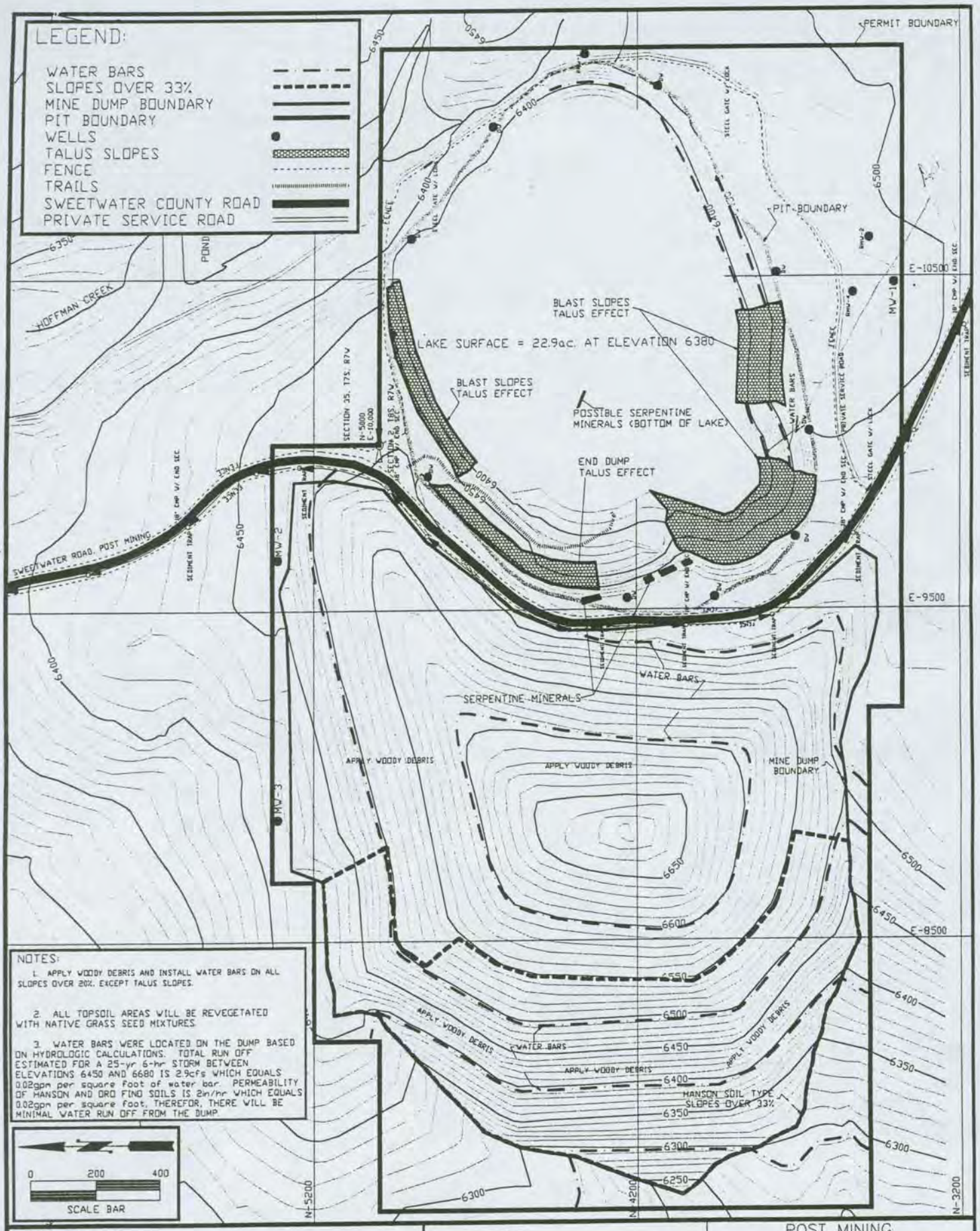
MINERALS TECHNOLOGIES

BARRETTS MINERALS INC.
REGAL MINE

POST MINE TOPOGRAPHY

FIGURE 2



NOTES:

1. APPLY WOODY DEBRIS AND INSTALL WATER BARS ON ALL SLOPES OVER 20%, EXCEPT TALUS SLOPES.

2. ALL TOPSOIL AREAS WILL BE REVEGETATED WITH NATIVE GRASS SEED MIXTURES.

3. WATER BARS WERE LOCATED ON THE DUMP BASED ON HYDROLOGIC CALCULATIONS. TOTAL RUN OFF ESTIMATED FOR A 25-yr 6-hr STORM BETWEEN ELEVATIONS 6450 AND 6680 IS 2.9cfs WHICH EQUALS 0.02gpm per square foot of water bar. PERMEABILITY OF HANSON AND ORO FINO SOILS IS 2in/hr WHICH EQUALS 0.02gpm per square foot, THEREFOR, THERE WILL BE MINIMAL WATER RUN OFF FROM THE DUMP.

MINERALS TECHNOLOGIES

BARRETTS MINERALS INC.
REGAL LIFE OF MINE
EXPANSION EIS

ANDERSON
Consulting Engineers

33 EAST HELENA, P.O. BOX 1333 DILLON, MT 59725
PHONE (406) 683-2314 FAX (406) 683-2227

POST MINING
TOPOGRAPHY & LANDSCAPING
MIXED DUMP SLOPE
AGENCY MODIFIED ALTERNATIVE
FIGURE 2-2

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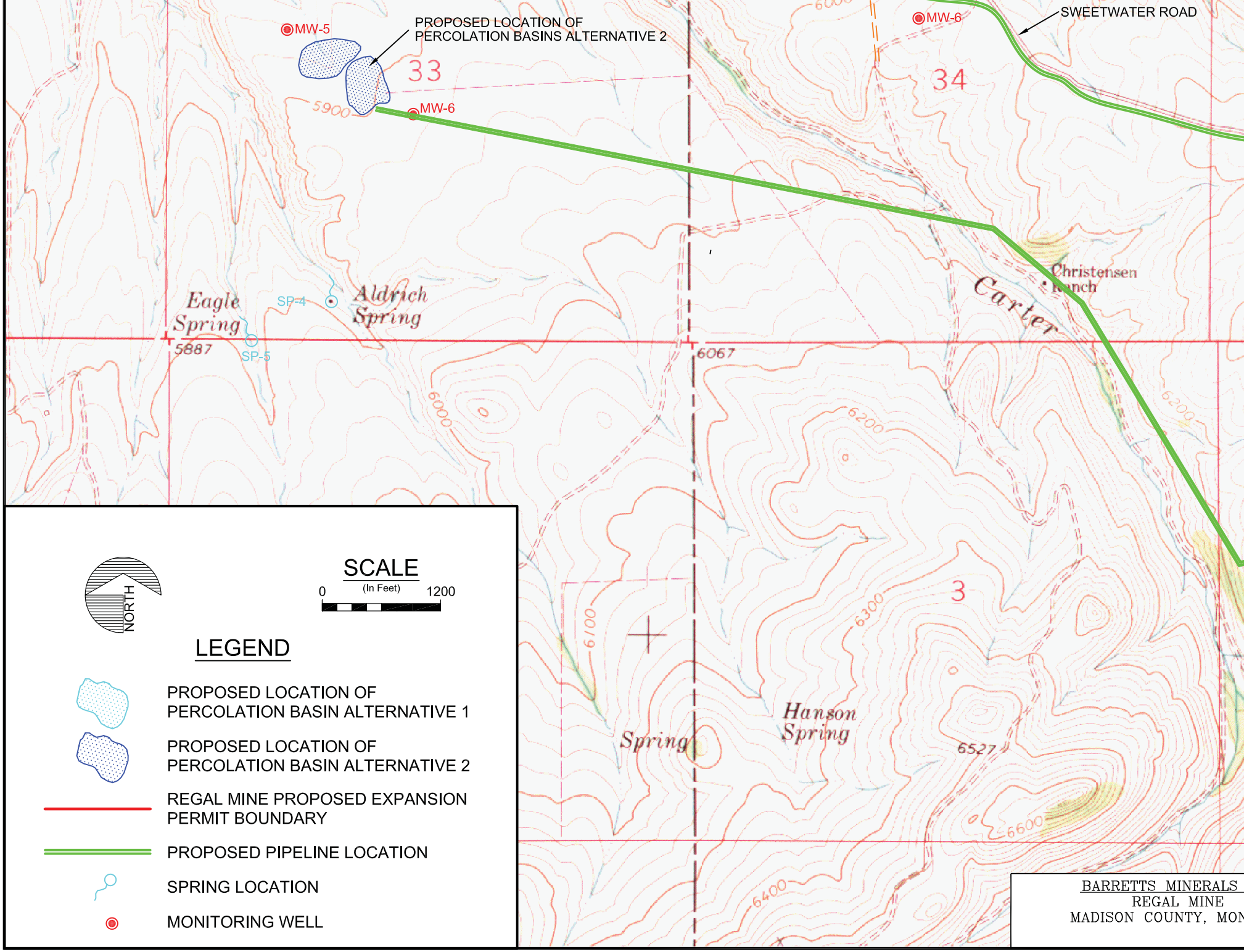

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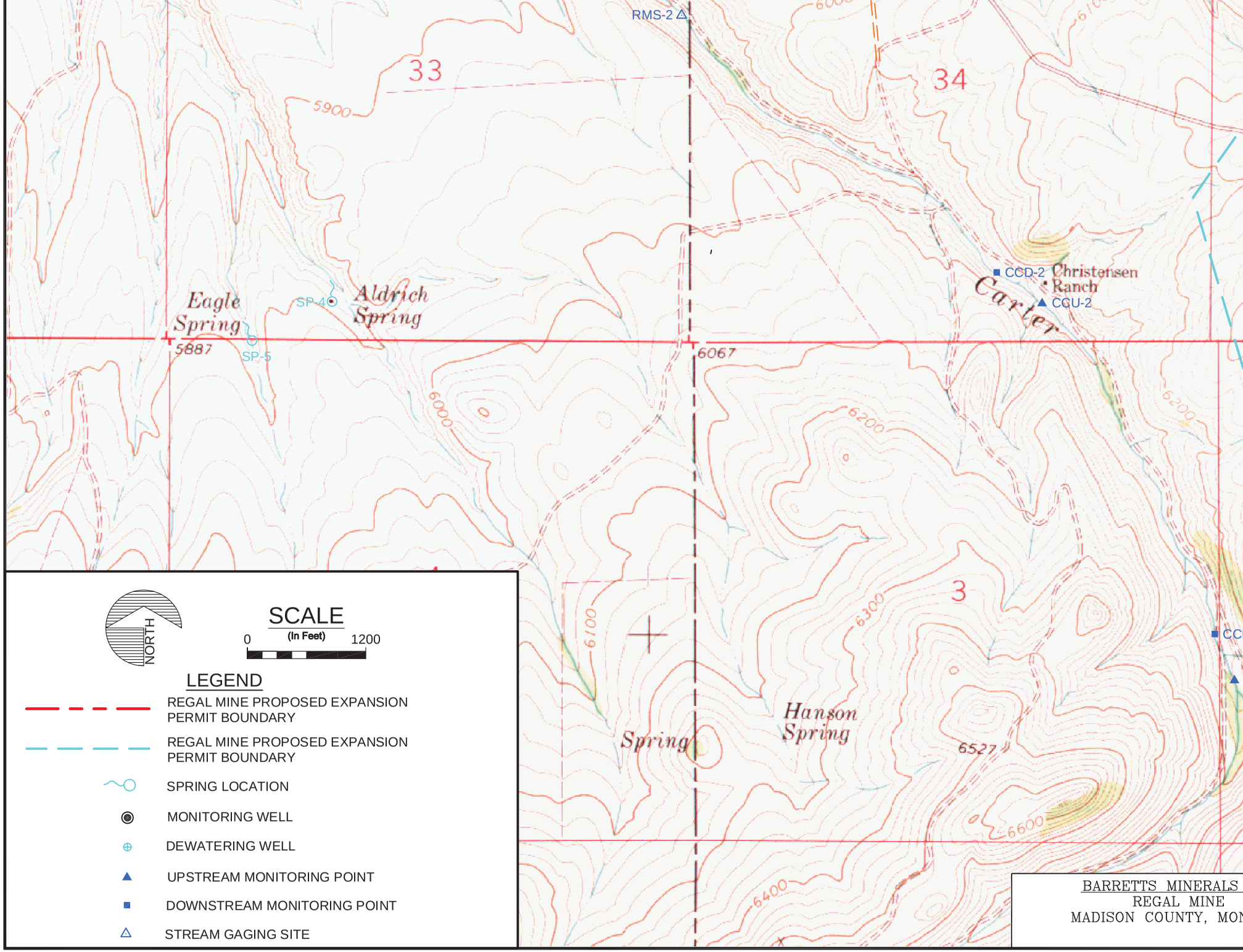

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