

DEPARTMENT OF STATE LANDS

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JUN 19 1992 CAPITAL STATION

STAN STEPHENS, GOVERNOR



STATE OF MONTANA ENVIRONMENTAL QUALITY COUNCIL

(406) 444-2074

1625 ELEVENTH AVENUE
HELENA, MONTANA 59620

June 18, 1992

Dear Reader:

Enclosed for your review is an Environmental Assessment (EA) prepared by the Department of State Lands (DSL). This EA evaluates a proposal by Cominco American Resources, Inc. for a garnet placer mine near Alder, Montana.

Public comment on this EA will be received by the agencies until 5:00 p.m. July 6, 1992. Comments should be about the adequacy of the EA in assessing issues, new information not considered that may influence the analysis, and clarification. Comments should be specific. The DSL will use these comments, the EA, and the application to make a final decision on the permit. The decision may be to approve the proposal, or to deny the proposal.

A public meeting has not been scheduled for this project. Written comments should be sent to:

Bob Winegar
Hard Rock Bureau
Montana Department of State Lands
Capitol Station
Helena, MT 59620

Thank you for your time and consideration. Please call Department of State Lands (444-2074) if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Bob Winegar".

Robert C. Winegar
Environmental Program Supervisor
Hard Rock Bureau
Reclamation Division

JG/ns

Enclosure

ENVIRONMENTAL ASSESSMENT

RECEIVED
JUN 19 1992

**ENVIRONMENTAL
QUALITY COUNCIL**

APPLICANT: Cominco American Resources, Inc.

TYPE OF OPERATION: Placer mining and gravity separation of garnets for abrasive

LOCATION: Sections 4, 9, and 10, T6S, R4W COUNTY: Madison

PERSON PREPARING E.A.: Joe Gurrieri and Robert Winegar

APPLICATION COMPLETE: May 20, 1992 E.A. COMPLETE: June 18, 1992
Date Date

AFFECTED ENVIRONMENT	A	B	C	POTENTIAL IMPACTS		
				LONG TERM	SHORT TERM	AMPLIFICATION
PHYSICAL ENVIRONMENT						
1. <u>TOPOGRAPHY</u>			X	X		X
2. <u>GEOLOGY</u> ; Stability			X			
3. <u>SOILS</u> ; Quality, Distribution			X	X		X
4. <u>WATER</u> ; Quality; Quantity; Distribution			X		X	X
5. <u>AIR</u> ; Quality			X			
6. <u>UNIQUE, ENDANGERED, FRAGILE, or LIMITED</u> environmental resources		X		X		X
BIOLOGICAL ENVIRONMENT						
1. <u>TERRESTRIAL, AVIAN, and AQUATIC</u> ; species and habitats			X	X		X
2. <u>VEGETATION</u> ; quantity, quality, species			X	X		X
3. <u>AGRICULTURE</u> ; grazing, crops production			X			
HUMAN ENVIRONMENT						
1. <u>SOCIAL</u> ; structures and mores			X			
2. <u>CULTURAL</u> uniqueness, diversity			X			
3. <u>POPULATION</u> ; quantity and diversity			X			
4. <u>HOUSING</u> ; quantity and distribution			X			X

AFFECTED ENVIRONMENT	A	B	C	POTENTIAL IMPACTS		
				LONG TERM	SHORT TERM	AMPLIFICATION
5. <u>HUMAN HEALTH & SAFETY</u>			X			
6. <u>COMMUNITY & PERSONAL INCOME</u>			X			
7. <u>EMPLOYMENT</u> ; quantity and distribution			X	X		X
8. <u>TAX BASE</u> ; local and state tax revenue			X			
9. <u>GOVERNMENT SERVICES</u> ; demand			X			
10. <u>INDUSTRIAL, COMMERCIAL</u> and <u>AGRICULTURAL</u> activities			X			
11. <u>HISTORICAL</u> and <u>ARCHAEOLOGICAL</u>		X				X
12. <u>AESTHETICS</u>			X			X
13. <u>ENVIRONMENTAL PLANS</u> and <u>GOALS</u> ; local and regional			X	X		X
14. <u>DEMANDS</u> on <u>ENVIRONMENTAL RESOURCES</u> of land, water, air and energy			X			
15. <u>TRANSPORTATION</u> ; networks and traffic flows			X			

PUBLIC INVOLVEMENT: Public Notice (February 27 - March 12, 1992) Public Comment Period closes: July 6, 1992

ALTERNATIVES CONSIDERED: No Action, Proposed Action

COMPLIANCE STATUS: No violations in past history with Cominco

RECOMMENDATIONS CONCERNING PREPARATION OF AN EIS: Not necessary at this level of disturbance

OTHER GROUPS OR AGENCIES CONTACTED OR WHICH MAY HAVE OVERLAPPING JURISDICTION:
 Ruby Valley Conservation District; Montana Department of Fish, Wildlife & Parks; State Historic Preservation Office; Montana Department of Health and Environmental Sciences – Water Quality Bureau; Army Corps of Engineers

INDIVIDUALS OR GROUPS CONTRIBUTING TO THIS EA: Department of State Lands

- A: Significant Unavoidable Impacts
- B: Insignificant as a result of conditioned mitigation
- C: Insignificant as proposed

Robert C. Winegar

 Signature

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COMINCO AMERICAN RESOURCES, INC.
Amplification of Potential Impacts to the Physical,
Biological and Human Environment Sections
of the Environmental Assessment

BACKGROUND

An application for an Operating Permit was received by the Department of State Lands on February 18, 1992, from Cominco American Resources, Inc. Cominco American Resources, Inc. is a subsidiary of Cominco Resources International, Ltd. a Canadian company headquartered in Vancouver, B. C. The project is a joint venture with Sunwest Abrasives Company.

The proposed Alder Gulch garnet placer mine would be 9 miles west of Virginia City, Montana, in Madison County. The mining includes portions of Sections 4, 9, and 10, T6S, R4W (Figure 1).

Agencies involved in the review of the plan or other permits include the Ruby Valley Conservation District, Department of Fish, Wildlife and Parks, Department of State Lands, Department of Health and Environmental Sciences — Water Quality Bureau, and the Army Corp of Engineers.

PROPOSED MINING PLAN¹

The proposed plan is to extract garnet sands, to be used for abrasives, from historic placer mining tailing dredge piles. Life of the mine is estimated to be approximately 30 years. By year seven of the mining operation, mining and processing rates are expected to reach full design capacity and are projected to continue until completion of mining. Mining and processing experience gained during the early years of the mining operation may result in future adjustments to the mining techniques and rate to assure maximum mining efficiency and product recovery.

The mining operation would begin in the western portion of the tailing piles near the main processing plant and progress into the thicker and higher-grade tailing. Mining would begin with the initial excavation of a starting pond. Excavation of tailing material would likely involve the use of a backhoe-type excavator. Screening and pre-concentration facilities would likely be located along the mine pond on the bank opposite the excavator to allow ample space for temporary material stockpiles. During these initial mining years (lower levels of production), the contractor may use trucks for the short haul (about 1,000 feet) around the perimeter of the active mine pond to the screens and portable jig (pre-concentration) facilities.

¹ Modified from Volume 1 - Text and Appendices. Application for an Operating Permit and Proposed Plan of Operations Alder Gulch Mine Project, Madison County, Montana. Cominco American Resources Incorporated with assistance from Hydrometrics, Inc. 1992.

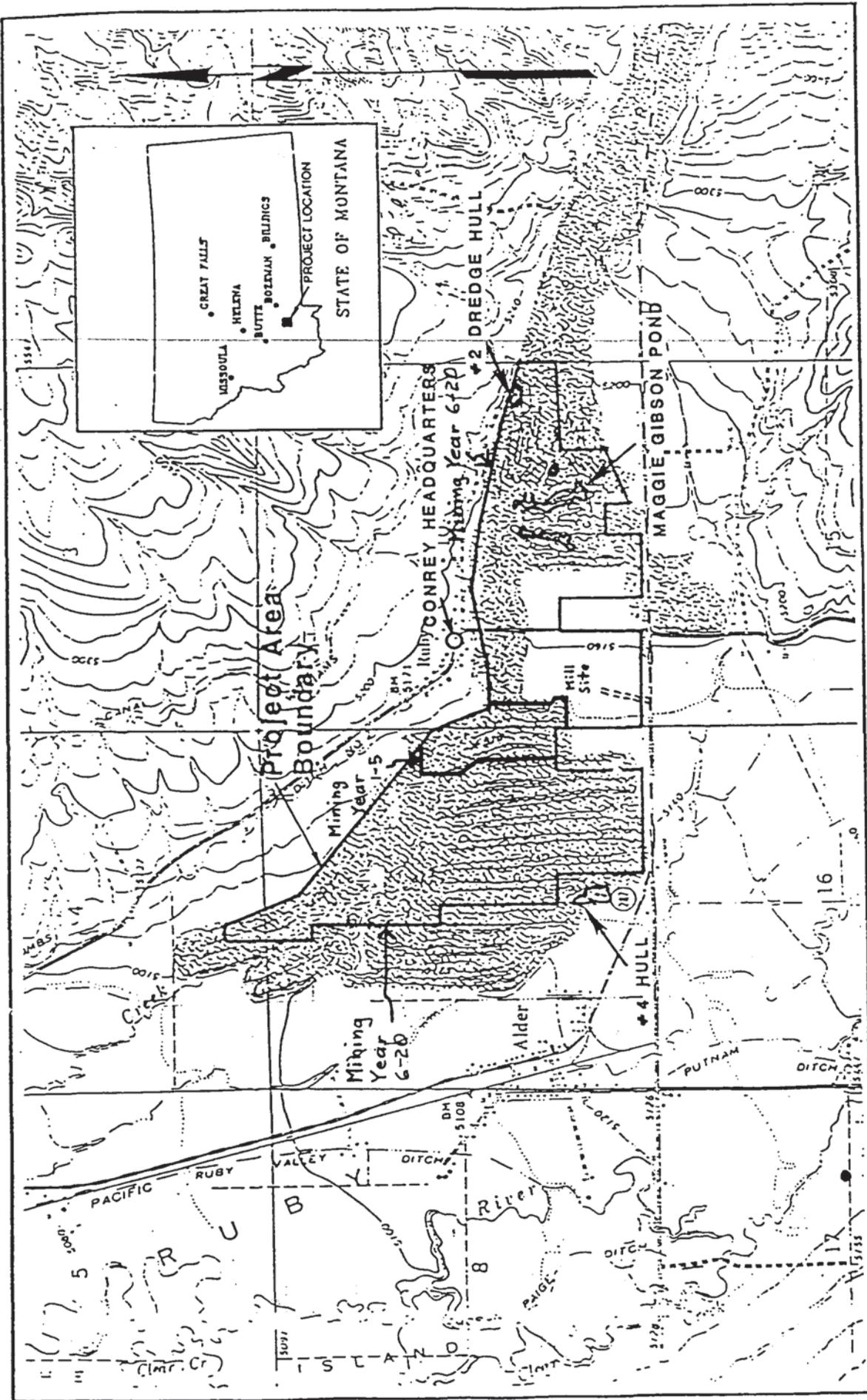
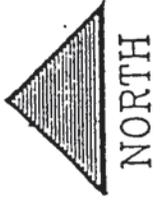


Figure 1. Project Area Location Map

Scale: 1" = 2000 feet



Later in the mine life, the contractor's excavator equipment would be replaced by a dragline, and screening and pre-concentration facilities relocated to the same mine pond bank as the dragline. During full production, the dragline would pass down the far side of the mine pond, and feed the portable screening and jig plant which trails behind.

As the operation advanced along the edge of the pond, +3/16 inch reject material from the screening plant would be discharged from a conveyor to the opposite bank. This sequence would aid in stabilizing the opposite pond shore and minimize rehandling by the dragline on subsequent passes. When the dragline has traversed the entire length of the pond and completed the cut or "panel", it would reverse directions and continue mining to complete another panel. Leveling and recontouring of the redeposited material concurrent with mining, and in compliance with the proposed reclamation plan, would occur and the surface would be prepared for revegetation seeding.

Initial mine pond excavation would begin during month two of the project construction schedule and require approximately 30 days to complete. It is anticipated that approximately 250,000 tons of raw tailing would be mined during the first full year of mining, resulting in the delivery of approximately 17,000 tons of pre-concentrated garnet sand to the main processing facilities.

Mining activities are anticipated to continue annually during favorable weather conditions (about 6 months). Mining would not be possible during the winter months, and would be suspended pending favorable spring weather conditions.

The proposed mining rate for the life of the Alder Gulch Mine Project is shown in Table 1. It is anticipated that major mining would commence in year one with 250,000 tons of material mined, and increase year by year. In year six, an annual rate of 1,000,000 tons would be reached and continued through the life of the operation.

TABLE 1. MINING RATE - ALDER GULCH MINE PROJECT, MADISON COUNTY, MONTANA

<u>Mine Year</u>	<u>Tons Mined</u>	<u>Acres Mined</u>
1	250,000	3.1
2	500,000	6.1
3	625,000	7.6
4	750,000	9.2
5	750,000	9.2
6-30	15,000,000	326.8
TOTAL:	27,875,000	362.0

* At an annual rate of approximately 1,000,000 tons.

Detailed 5-year mining plans for years 6 through 30 of the Alder Gulch Mine Project will be submitted to the DSL by Cominco at least 12 months in advance of anticipated need. The additional sequential 5-year mining plans will represent a revision to the Operating Permit for the Alder Gulch Mine Project, and will include surface water and groundwater monitoring data, location of reconstructed stream channel segments, mining location sequence for the next 5 years, description of reclamation success, modifications or changes to mining or reclamation for the next 5 years based upon results of the previous 5 years of mining.

PROPOSED RECLAMATION PLAN²

1. GENERAL DESCRIPTION OF RECLAMATION

The proposed Alder Gulch Mine Project is located entirely on previously placer dredge mined lands that are privately owned. These lands were mined prior to the establishment of mining reclamation laws in Montana, and as a result, were not subject to reclamation activities. The current unreclaimed nature of the proposed mine project area has significantly reduced the productivity and usefulness of the area. Past mining within the proposed project area has resulted in the interruption and destruction of the historic Alder Gulch Creek stream channel, and has left an area characterized by barren dredge tailing piles, sparse vegetation, and limited soil. The reclamation activities associated with the proposed placer mining project would provide for the establishment of new surface contours and vegetation, including a reconstructed stream channel for a segment of Alder Gulch Creek. Backfilling, recontouring, topcoating with fines, and seeding would occur concurrent with ongoing mining activities.

2. RECLAMATION PROCEDURES AND PLAN OBJECTIVES

The reclamation plan for the proposed Alder Gulch Garnet Placer Mine Project has been designed in consultation with appropriate state and federal agencies to meet the State of Montana requirements under the Montana Metal Mine Reclamation Act, as well as Section 404 of the Clean Water Act. The objective of the reclamation plan is to restore previously unreclaimed placer mined areas affected by the project to conditions compatible with future desired land uses (as required by state and federal law, as well as requested by private landowners). It is the intent of the reclamation plan to minimize areas affected, to provide for stabilized post-mining slopes and soils, and to protect air, surface, and groundwater resources. The proposed reclamation plan would include reestablishment of wildlife habitat, creation of fish habitat, establishment of a new channel for a segment of Alder Gulch Creek, as well as several post-mining ponds and wetland areas, and improvement of range productivity. At the request of a private landowner, a portion of the structures associated with the processing plant area and the main access road would remain following final project reclamation.

The reclamation plan is based on analysis of baseline environmental information, review of current reclamation literature concerning previously placer mined areas, and

² Modified from Volume 1 - Text and Appendices. Application for an Operating Permit and Proposed Plan of Operations Alder Gulch Mine Project, Madison County, Montana. Cominco American Resources Incorporated with assistance from Hydrometrics, Inc. 1992.

discussions with reclamation personnel of state and federal agencies. Modifications to the plan may be made based on advancements in reclamation technology, operational changes, or results of on-site reclamation evaluations. Changes would be made only after consultation with, and approval by appropriate regulatory agencies.

A. Mine Site

The objective of the proposed mine site reclamation activities would be to provide sequential and concurrent backfilling, contouring, topsoiling, and successful revegetation of each annual mining block throughout the life of the mining operations. This would be accomplished by implementation of the following procedures.

1. Backfilling and Contouring

During the first year of mine site and main processing plant facilities development (year 0 to 1), a small amount of mining would occur in the area designated as the first year mining block, and an initial small mine pond would be established. Since only the portion of the annual mining block necessary to establish the initial mine pond would be affected, no concurrent mine site reclamation activities would occur during year 0-1. The following year (year 1), major mining and processing activities would commence, as would concurrent backfilling, contouring, topsoiling, and revegetation of previously mined areas.

Non-garnet bearing material available for concurrent backfilling of previously mined areas would originate from the grizzly and screens (+ 3/16 inch), and the portable jig facilities (-3/16 inch). This reject material would be mixed during application in the backfill area and be contoured in accordance with the post-mining contour plan. During years 1 to 5 of the operations, amounts of materials handled would be directly proportional to the mining and processing rates. Unlike many other mineral commodities, garnet demand and production would be controlled by sales, and full production would be reached when sales have developed the required market.

B. Main Processing and Support Facilities

The main processing facility (mill building) and support facilities would be constructed during year 0-1 of the project, and would remain functional through the life of the project (approximately 30 years). Construction and operation of the facilities would seek to minimize the area of disturbance. Reclamation of areas disturbed during the construction process, and not necessary for the operation of the facilities, would include ripping of compacted areas and revegetation during the appropriate season following disturbance. Since the main processing facilities and support facilities would be located in soil map unit areas without salvageable soils, no soil salvage or replacement following disturbance is proposed.

The landowner of lands affected by the main processing facilities and support facilities has requested that some major structures not be removed from the site at completion of the proposed project. The determination of which structures the landowner may wish to have remain would be made at the completion of the proposed project, but would likely involve the main processing facility (mill building and the finished product storage area), the repair shop, and perhaps the ore stockpile cover structure. Structures selected by the land owner for retention would not be salvaged and removed during

reclamation. Also likely to be requested for retention by the landowner are the power and communication lines, septic tank and drainfield system, and the main access road.

If, at the completion of project operations, the landowner no longer wishes to retain any of the project-related structures, the structures would be salvaged and all associated construction materials removed from the project site. The areas previously occupied by the structures would be graded to near original contours (generally flat) and compacted surfaces ripped and revegetated with the proposed upland vegetation species mix. As the area of the main processing facilities would be located in a soil map unit without salvageable soils, no previously salvaged soils would be available for redistribution.

1. First Year Stripping Stockpile

The first year stripping stockpile would remain in place through the life of the project, and be processed as a portion of the final year of processing plant operation. Reject material from the processing of the stockpile (+3/16 inch and -3/16 inch) would be used as the final backfilling source for the last mining year's excavation area. Following its creation in year 0-1 of the mining operations, the stockpile would be stabilized and revegetated. After removal of the stockpile in the final year of the project operations, non-salvageable soil (initially used to construct a 1- to 2-foot high berm around the stockpile for the control of surface runoff) would be regraded over the site and soil initially salvaged from the site and stored in the soil stockpile spread and revegetated with the proposed upland vegetation species.

2. Ore Stockpile

At the conclusion of the project, the ore stockpile would be consumed by the final year of processing operations. The stockpile enclosure and associated conveyor system would be salvaged and removed from the permit area. The area formerly occupied by the stockpile would be graded and revegetated with the proposed upland vegetation species mix. As the stockpile area would be located in a soil map unit without salvageable soils, no previously salvaged soil would be available for reapplication.

3. Settling Ponds and Settling Ponds Stockpile

Following completion of the project, and final removal and salvage of silts and clays (fines) from the settling ponds for use in mine site reclamation, each of the four ponds would be backfilled to slightly above the original contours (allowance for settlement) with the excavation material previously stored in the adjacent settling ponds stockpile. The backfilled ponds would be graded and revegetated with the proposed upland vegetation species mix. The area of the settling pond stockpile would be graded and revegetated. As neither the settling ponds or settling ponds stockpile would be located in a soil map unit with salvageable soils, no previously salvaged soil would be available for reapplication during reclamation.

4. +6 Mesh and -100 Mesh Stockpiles

Retention of the proposed +6 and -100 mesh stockpiles beyond the early years of the proposed project operations would be determined by success in finding a market for these sizes of garnet product. If an acceptable market is found, the stockpiles may remain

for the life of the operations, and would be consumed during the final year of product sales. The stockpile site would be graded and revegetated as a part of final project reclamation. If an acceptable market is not found during the early years of the project operations, the stockpiled material would be hauled to the mine site for use in backfilling, and the previous stockpile site would be graded and revegetated. Once removed to the mine site, there would be no future need for this stockpile, and all future material of these sizes would be direct truck hauled to the mine site. Since the stockpile would be located in soil map unit without salvageable soils, no previously salvaged soil would be available for reapplication during reclamation.

5. Fine Sand (waste) Stockpile

As part of the final reclamation activities for the proposed project, the fine sand stockpile would be consumed for mine site reclamation. The area previously occupied by the stockpile would be graded and revegetated with the proposed upland vegetation species mix. Since the stockpile would be located in a soil map unit without salvageable soil, no previously salvaged soil would be available for reapplication.

6. Soil Stockpile

Following creation of the soil stockpile in year 0-1 of the proposed project operations, the stockpile would be revegetated for stabilization and control of erosion. The stockpile would remain through the life of the operations and, as part of the final reclamation activities, would be reapplied to the area of the previous first year stripping stockpile. Following its use in reclamation, the area previously occupied by the soil stockpile would be revegetated with the proposed upland vegetation species mix.

7. Plant Site Recycle Pond

Following completion of project processing activities, the PVC lining of the plant site recycle pond would be removed and the pond backfilled to near original contour with material excavated and stored in the settling ponds stockpile during year 0-1. The backfilled pond area would be graded and revegetated with the proposed upland vegetation species mix. As the pond would be located in a soil map unit without salvageable soils, no previously salvaged soil would be available for reapplication.

8. Office Trailer

At the completion of project reclamation activities, the office trailer would be removed from the project site and the previous site would be graded and revegetated with the proposed upland vegetation species mix. Since the office trailer would be located in a soil map unit without salvageable soils, no previously salvaged soil would be available for reapplication.

9. Repair Shop

At the completion of project activities, the repair shop may be requested to be retained by the private landowner. If the facility is requested for retention, it would remain in place, and would not be removed or salvaged as part of the proposed reclamation. If the private landowner does not request the facility be retained, the structure would be

salvaged and all construction-related materials removed from the project site. The site previously occupied by the repair shop would be graded and revegetated with the proposed upland revegetation species mix. As the site of the repair shop would be located in a soil map unit without salvageable soils, no previously salvaged soils would be available for reapplication.

10. Equipment Yard

At the completion of project operations, all equipment previously stored or located within the equipment yard would be salvaged and removed from the project site. The site would be graded and revegetated with the proposed upland vegetation species mix. As the equipment yard site would be located within a soil map unit without salvageable soils, no previously salvaged soils would be available for reapplication.

11. 50-Ton Storage Bin and Conveyor

The 50-ton storage bin and conveyor associated with the ore stockpile and main processing facility would be salvaged and removed from the project site at the completion of processing activities. Areas disturbed by the operation of these facilities would be reclaimed in association with reclamation of the ore stockpile area.

12. Fuel Storage Facilities

Fuel storage facilities would be salvaged and removed from the project site following completion of project activities. Prior to grading and seeding with the proposed upland vegetation species mix, the site would be inspected for contaminated soil associated with small fuel or other petroleum product spills. Any soil with potential contamination would be removed to an appropriate off-site disposal area.

C. Roads, Parking, Utilities, and Pipelines

Gravel used in surfacing parking areas during project operations would be removed and likely salvaged for use by the private landowner. The areas would then be graded, ripped, and revegetated with the proposed upland vegetation species mix. As the parking areas would be located in soil map units without salvageable soils, no previously salvaged soils would be available for reapplication.

The private landowner affected by the main access road has requested that the main access road be retained following project completion. As a result, the main access road is not included in proposed site reclamation.

Many temporary interior mine access and haul roads would be used for only one year of mining, and would be sequentially reclaimed as part of annual mining reclamation activities. The private landowner has expressed an interest in possibly retaining some interior access roads for future private access at the end of project operations. The location and extent of these roads is unknown at this time, and will likely not be known until the late years of the mining operation. When these roads are known, they will be identified and excluded from final reclamation activities.

Other support facility roads, including necessary operational and maintenance access to the equipment yard and settling ponds would remain for the life of the operations, and would be graded and revegetated as a part of final reclamation. Since these roads would be located in soil map units without salvageable soils, no previously salvaged soil would be available for reapplication during reclamation.

It is likely that the private landowner would request that proposed power and telephone lines (from Ruby Road to the main processing facility), and the septic tank and drainfield system remain at the end of project operation for future private use. As a result, the proposed powerline, telephone line, and septic system are not included in proposed site reclamation.

Following completion of mining at the end of the life of operations, the silty water pipeline from the mine pond to the settling ponds would be removed and any remaining surface disturbance associated with the pipeline reclaimed. Since the pipeline would be located on the ground surface (except for road and stream crossings), surface disturbance and reclamation would be minimal. The buried pipeline segment that would underlie the main access road would not be removed during reclamation, since the landowner has requested the main access road be retained following project completion. Support structures associated with the pipeline crossing of Alder Gulch Creek would be removed and related surface disturbance graded and reclaimed.

D. Reestablishment of Surface Water Features

Prior to its destruction by past placer dredge mining activities, Alder Gulch Creek within the proposed permit boundary was a meandering, shrub and willow-lined stream. Past mining activities have destroyed the stream channel from an area just downstream from the northwestern-most portion of the proposed permit boundary, through the proposed project site, and considerably beyond the eastern (upstream) boundary of the proposed permit area.

Since destruction of the stream channel earlier this century, the occurrence of surface water features (ponds and discontinuous linear surface flows) within the proposed permit area has been determined by the location and orientation of tailing piles, topographic lows, and seasonal groundwater levels. The existing surface water feature system within the proposed permit area is complex and discontinuous, seasonal in some locations, and influenced by significant large seasonal irrigation water diversions outside the proposed permit area.

1. Reestablishment of a Portion of the Alder Gulch Creek Channel

Although this action is not required for the Alder Gulch Mine Project to meet reclamation requirements within the Montana Metal Mine Reclamation Act for previously disturbed sites, this activity has been included in the projects' proposed Reclamation Plan. This has been done in recognition of an opportunity to significantly enhance the long-term productivity of the reclaimed permit area.

Reclamation concepts and objectives supported by state, federal, and local agencies concerning the proposed reestablishment of a segment of the Alder Gulch Creek channel,

and included as a portion of the proposed Alder Gulch Mine Project Reclamation Plan include the following:

1. Reestablishment of a segment of the Alder Gulch Creek channel as a portion of the Alder Gulch Mine Project. This reclamation would significantly enhance the post-mining fisheries and wildlife values of the permit area.
2. Stream channel segments would be sequentially established as annual concurrent reclamation activities (within the area proposed for channel establishment) progress through the life of operation.
3. The objectives of stream channel reestablishment would be to ultimately provide a surface flow connection with the existing downstream channel of Alder Gulch Creek (which flows out of the northwest corner of the proposed permit area) to the existing stream channel that flows into the flat tailing area in the south-central portion of the proposed permit area.
4. The reestablished channel segment would be constructed of the +3/16 inch and -3/8 inch tailing reject from the mine site backfilling activities, with the channel bottom below the post-mining water table through a sufficient length of the channel to assure that perennial surface flow would occur. Material used for the construction of the uppermost 1 foot of the channel would be +3/16 inch tailing reject.
5. Since most or all of the reestablished stream channel bottom would be below the post-mining water table, no special channel sealing or lining activities would be necessary to prevent surface flow from infiltrating into the ground and potentially reducing the stream's flow.
6. Establishment of a wetland/riparian vegetation zone adjacent to the reestablished stream channel would be included in the revegetation portion of the reclamation plan.
7. The proposed 30-year life of the operations would provide ample opportunities for observation and monitoring of the success of the proposed channel design, and future revision if necessary.

Approximately 1,600 feet of new active stream channel (0.73 acre) would be established through proposed reclamation activities during years 1 through 5. Final design and location of the new stream channel will be provided to DSL as a portion of each subsequent 5-year mining plan. Following completion of mining activities within that portion of the proposed permit area affected by the establishment of the new stream channel, approximately 4,000 feet of new channel (1.83 acres) would be established, and a surface connection to downstream Alder Gulch Creek provided.

The channel design is based on recommendations in the "Handbook for Reclamation of Placer Mined Stream Environments in Western Montana" which was prepared in 1991 for Region VIII of the U.S. Environmental Protection Agency (EPA) by Inter-Fluve, Inc. of Bozeman, Montana. The proposed design uses a two-stage channel, including an active channel section, and a floodplain section. Both sections are trapezoidal in shape. When

combined, this results in a trapezoidal active channel, a flat transition zone between the active channel and floodplain channel, and a gently sloped, trapezoidal floodplain. The active channel incorporates a 2H:1V side-slope and is designed to contain the peak of a 5-year, 24-hour runoff event with 0.5 foot of freeboard. The floodplain section incorporates a gently sloping 30H:1V side-slope which is within the range recommended by the Inter-Fluve, Inc design handbook. The combination of the active channel and the floodplain channel are designed to accommodate the peak of a 50-year, 24-hour runoff event with 0.5 foot of freeboard.

2. Reestablishment of Ponds and Associated Wetland

Within the proposed permit area, ponds and small wetland areas are present as a result of the interception of groundwater in topographically low areas created by past placer mining activities. Proposed reclamation for the Alder Gulch Mine Project includes reestablishment of several ponds and associated wetland areas within the proposed permit area in response to requirements of the Clean Water Act, as well as requests of permit area landowners concerning post-mining land use of reclaimed areas. This proposal incorporates the regulatory agencies' goal of improving existing conditions, including a stream channel, and surpasses the comparable stability and utility requirements of **82-4-336, MCA**.

At completion of the project's reclamation activities, approximately 8.47 acres of ponds (open water), and 8.92 acres of pond associated wetland would be reestablished. This would be in addition to establishment of 1.83 acres of new Alder Gulch Creek channel and 3.67 acres of new wetland/riparian vegetation communities associated with the new channel. Table 2 identifies the area of existing ponds and wetland that would be consumed by mining activities in the first five years of operation, as well as reestablished acres of ponds and wetland, and a segment of the Alder Gulch stream channel during this same period. In response to requests from proposed permit area landowners, several of the ponds would be constructed to a depth sufficient to allow survival of fish (about 10 feet or greater).

TABLE 2. ACRES OF ON-SITE PONDS AND WETLAND DISTURBED AND PROPOSED FOR REESTABLISHMENT ALDER GULCH MINE PROJECT MADISON COUNTY, MONTANA

	Years	Year/Life of Operations	
	<u>1-5</u>	<u>6 - 30</u>	<u>Total</u>
Ponds (openwater) Disturbed	0.22	12.83	13.05
Ponds (openwater) Reestablished	0.40	8.07	8.47
New Segments for Alder Gulch Creek *	<u>0.73</u>	<u>1.10</u>	<u>1.83</u>
Subtotal: (Reestablished acres)	1.13	9.17	10.30
Wetland Disturbed	0.57	9.40	10.58
Pond Wetland Reestablished	0.30	8.62	8.92
New Alder Gulch Creek Wetland/Riparian established **	<u>1.47</u>	<u>2.20</u>	<u>3.67</u>
Subtotal: (Reestablished acres)	1.77	10.82	12.59

* proposed 20-foot channel bottom width

** 20-foot wetland/riparian vegetation community along each side of new channel.

Ponds constructed as part of proposed reclamation would have bottoms established below the post-mining water table to assure year-long presence of water (as is the present setting for some of the area's ponds), and to provide the best opportunity for in-kind replacement of existing wetland functions and values affected by the mining project. The objectives of the new wetland establishment portion of the project's reclamation plan are to:

Provide required mitigation for unavoidable wetland impacts associated with the proposed Alder Gulch Mine Project on a slightly greater than "one-for-one" average basis.

Provide on-site mitigation by replacing and enhancing existing wetland functions and values.

Provide a sufficient water supply to establish and sustain natural hydrophytic plant growth.

Provide functioning wetland within 2 to 5 years of reclamation.

Replace and enhance wildlife habitat associated with affected wetland.

Minimize required long-term maintenance of replacement wetland to the greatest extent possible.

Monitor the success of wetland establishment.

Prior to commencement of the proposed Alder Gulch Mine Project, a Wetland Mitigation Plan would be prepared as a part of the Alder Gulch Mine Project Dredge and Fill Permit

Application submittal to the U.S. Army Corps of Engineers in compliance with Section 404 of the Clean Water Act.

Since the proposed mining activities would excavate well below the existing groundwater level, no additional excavation or removal of material would be necessary for the reestablishment of post-mining ponds. Small islands would be constructed in several ponds to provide waterfowl nesting habitat. Shoreline areas proposed for the establishment of new wetland would assure seasonal saturation conditions required to sustain hydrophytic vegetation.

A herbaceous wetland seed mixture would be broadcast seeded and raked in on the shoreline, islands, and other areas meeting seasonal saturation conditions. In addition, viable seed from local wetland plant species would be hand collected in late summer and autumn, and be broadcast seeded on new wetland areas. Cattail rhizomes would be excavated from wetland disturbed by mining, and be transplanted into new wetland areas having surface water from 6 inches to 12 inches deep. It is anticipated that local submergent wetland vegetation species from nearby sources may invade portions of the newly established ponds, as well as the proposed segments of Alder Gulch Creek.

Hydric soils present in existing wetland that would be consumed by the mining activities would be salvaged and direct hauled for placement in proposed wetland areas 1) if the hydric soil in these locations is present in sufficient amounts to reasonably salvage, and 2) if safe access to these soils is possible by salvage equipment prior to mining. Field observations have shown that safe access to, and amount of, hydric soils potentially salvageable within the proposed permit area is limited. The use of existing hydric soils, if possible, would provide an existing source of wetland plant species.

A wetland monitoring program would be initiated after establishment of new wetland areas to assess vegetation growth, hydrologic conditions, wildlife use, and integrity of the new wetland. Vegetation growth would be monitored in June and August following the first growing season for new wetland areas. Species composition and canopy cover would be recorded. If seeded or planted plant species do not become established following the first growing season, supplemental seedings and plantings would be conducted. The wetland status of reclaimed plant communities would be assessed following the methodology described in the Federal Manual for Identifying and Delineating Jurisdictional Wetland, 1987.

3. DESCRIPTION OF RECLAIMED TOPOGRAPHY

Prior to disturbance from historic placer dredge-mining activities, old photographs show that the proposed project area was a gently sloping alluvial fan that consisted of hayfields adjacent to the meandering channel of Alder Gulch Creek. A comparison of land surface elevation differences across the proposed mining project indicates the original undisturbed ground slope was likely about + 1.25 percent going from west to east.

Overall, the objective of proposed reclamation would be to approximate the original ground slope conditions prior to original dredge mining. This would not be difficult, as this profile is essentially already in existence. Although historic mining left large piles of segregated gravel and large rocks overlying sands, past mining did not displace the

materials any great distance laterally. As the proposed mining project would remix and concurrently deposit approximately 92 percent of these materials (non-garnet bearing waste) at the mine site as a portion of the pre-concentration process, there would be no new significant displacement of these materials during mining.

Backfilling activities concurrent with mining activities would generally leave gently sloping terraces with the final surface configuration controlled using standard surveying techniques. Contouring work following backfilling would be minimal. With the exception of areas proposed for new pond and stream channel segment establishment, the current amount of material swell remaining from historic mining activities in the proposed project area is estimated to be about six percent. Based upon projections of the original versus present topography, less the four percent garnet product that would be recovered, reworking the placer deposit would result in a six to ten percent total net material swell. A ten percent material swell over a tailing thickness of approximately 40 feet would yield a gain of about four feet in elevation. Thus, the proposed change in elevation (in comparison to the original historic topography) would be minor and would not impair surface water flows or the esthetics of the area.

A. Main Processing and Support Facilities

Construction and operation of the main processing and support facilities would not significantly alter the existing topography of the flat tailing area, with the exception of excavation necessary for the settling ponds and recycle pond and the establishment of several stockpiles. Areas proposed to be occupied by the main processing and support facilities would not be reclaimed until completion of the proposed mining project (approximately year 30). Excavated ponds (settling ponds and recycle pond) within the flat tailing area would be backfilled with originally excavated material stored in the settling ponds stockpile, and be graded into the surrounding topography (generally flat). All other stockpiles would be either be consumed during the last year of project operations, or be used as a portion of the final reclamation activities. Following the removal of facilities not requested to be retained by the private landowner, all remaining areas would be graded to blend with the adjacent topography and would be revegetated.

Following final reclamation, the post-mining topography of the main processing and support facilities would not differ significantly from the present topography.

4. RECLAMATION SCHEDULE

Beginning in mining year two, concurrent reclamation would begin on lands disturbed by mining and temporary access and haul road construction in the previous year. Acres of reclamation completed each successive year of the mining operation would equal the acres disturbed during the year, with possible exceptions for small areas of temporary access or haul roads determined necessary for the following year. Allowing a one year to two year period following initiation of reclamation activities as reasonable for meeting the standards of successful reclamation, acres considered as fully reclaimed would be accrued (at the same rate as they were disturbed) two to three years following their disturbance by mining. A life of operations reclamation summary is outlined in Table 3.

At the end of five years of mining and project operations, 57.1 acres would have been disturbed for mining and processing-related activities. Of this total, 16.8 acres would be reclaimed, 18.4 acres would be under reclamation. Acres disturbed for the main processing plant and support facilities, and main access road (21.9 acres) during the initial year of project construction (year 1) would not be scheduled for reclamation activities until following the final year of mining and processing activities (approximately year 30). It should be noted that at the present private landowners request, the main access road (0.7 acres) and an unknown portion of the processing and support structures would be left after final reclamation. At the end of the final year of project operations, approximately 48.3 (mine and processing/support facilities) acres would remain to be reclaimed. Of this amount 13.2 acres would attain completed reclamation status (1 to 2 years following initial reclamation) in year 31, 13.2 acres would attain completed reclamation status in year 32, and the final 8.7 acres in year 33.

TABLE 3. RECLAMATION SCHEDULE ALDER GULCH MINE PROJECT
MADISON COUNTY, MONTANA

Year	Mined (acres)	Plant and Stockpile (acres)	Total Area Disturbed (acres)	Under Reclamation (acres)	Reclaimed (acres)
1	3.1	21.9	25.0	0	0
2	6.1	0	6.1	3.1	0
3	7.6	0	7.6	6.1	3.1
4	9.2	0	9.2	7.6	6.1
5	9.2	0	9.2	9.2	7.6
6	10.7	0	10.7	9.2	9.2
7	12.2	0	12.2	10.7	9.2
8	13.2	0	13.2	12.2	10.7
9	13.2	0	13.2	13.2	12.2
10-30	13.2*	0	13.2*	13.2*	13.2*
31	0	0	0	21.9	13.2
32	0	0	0	8.7	13.2
33	0	0	0	0	8.7**
	362.0				387.0

* per year

** 8.7 acres includes access roads and facilities to be potentially transferred to landowner.

AMPLIFICATION OF AFFECTED ENVIRONMENTAL FACTORS

1. Topography

Prior to disturbance from historic placer dredge-mining activities, old photographs show that the proposed project area was a gently sloping alluvial fan adjacent to the meandering channel of Alder Gulch Creek. The objective of the proposed reclamation would be to approximate the original ground slope conditions. This will not involve a great amount of earthmoving because past mining did not displace materials any great distance laterally. Past placer mining activities have left the area with an extremely irregular surface covered with dredge tailing piles. The proposed mining and subsequent reclamation activities will significantly alter the existing tailing pile micro-topography but not the overall slope of the land. Backfilling and contouring of the annual mining blocks would result in a relatively smooth ground surface. The smooth surface will facilitate topsoiling and revegetation efforts.

2. Soils

Most of the proposed permit area is composed of dredge tailing consisting of gravels, cobbles, and boulders. In most locations the tailing is devoid of topsoil as a result of early placer mining techniques that placed the coarse cobble waste over the fine waste. A small amount of salvageable topsoil is present and would be stockpiled for reclamation use. The majority of replacement soil, however, will consist of the -3/16 inch sand reject from the processing plant and silt from the settling/exfiltration ponds. The fine texture of the replacement soil will greatly enhance vegetation growth.

3. Water

Mining and reclamation activities, as proposed, are not expected to adversely affect on-site or off-site, surface water or groundwater quality. Increased turbidity in the active mine pit during excavation would have the potential to migrate downgradient in the shallow groundwater system. To prevent turbid mine pond water from migrating away from the excavation, the Alder Gulch Mine Project would implement a mine pond pumping mitigation measure that would limit turbid water from infiltrating into the surrounding shallow aquifer.

Mining and reclamation activities should not adversely affect domestic wells in the area. There are no domestic wells completed within the principal groundwater flow path of the shallow alluvial aquifer. Domestic wells in the Gilman Subdivision are completed below the clay layer separating the placer alluvium and deeper sands and gravels. Domestic wells in Alder Village, Ruby Village, and along Route 287 are outside of the path of influence of groundwater flowing through the proposed permit area where disturbance is planned. If the project activities are found to cause turbidity problems in domestic wells, the Alder Gulch Mine Project would be required to provide filtration units for these wells as well as other alternative operational procedures.

Because historic placer mining operations frequently used mercury for gold recovery, and the possibility for remobilization of mercury, the Alder Gulch Project baseline water quality sampling program included an analysis for mercury. The laboratory detection limit

used was 0.001 mg/L. No mercury was detected in surface water or groundwater samples. Although the maximum contaminant limit (MCL) for mercury is 0.002 mg/L, the human health criterion is 0.000144 mg/L and the freshwater chronic criterion is 0.000012 mg/L. The reason for these low limits is the property of mercury to bioaccumulate in the food chain. The detection limit that analytical laboratories can routinely achieve for mercury is 0.0002 mg/L. Therefore, the agencies will require a mercury detection limit of 0.0002 mg/L or less for all future water quality monitoring.

Impacts to post-operational water levels in nearby ponds, irrigation canals, and Alder Gulch Creek are unlikely. However there is a potential for the temporary lowering of water levels in ponds immediately adjacent to the active mine pit. Most of these ponds were created by past placer operations and would ultimately be consumed by the Alder Gulch Mine Project.

The mining operation would destroy 13.05 acres of open water and 10.58 acres of wetland. The reclamation plan calls for the reestablishment of 10.30 acres of open water and 12.59 acres of wetland. Included in the open water acreage is approximately 4,000 feet of Alder Gulch Creek channel that will be constructed through the permit area.

To protect surface water and ground water resources from contamination, fuels, lubricating oils, and antifreeze would be handled and stored in a manner to avoid spills. Fueling and servicing of vehicles and mine equipment would occur only in designated areas. Fuel storage facilities would be set on a 12 inch compacted clay pad bordered by an 18 inch high spill containment berm.

4. Unique Environmental Resources

The present character of the proposed permit area is unique in that the tailing pile "windrows" make the area relatively inaccessible to human intrusion or development. For this reason the area has become home to many types of wildlife including deer, beaver, coyotes, eagles and waterfowl. Some of the ponds between the tailing piles support fish and are surrounded by mature cottonwoods and willows.

5. Terrestrial, Avian, and Aquatic Wildlife

Wildlife species diversity within the proposed permit area has been greatly influenced by habitat alteration from historic placer mining. Plant communities now providing wildlife habitat have low species diversity and productivity and consequently, have limited wildlife values for food, cover, and breeding. Most wildlife species are transients or occupy portions of the area along with adjacent agricultural land as their home range. Concurrent reclamation of mined lands and the small annual amount of land proposed for mining, would help to assure that off-site fauna currently using the area would not be adversely affected. The proposed reclamation plan for the project, including the replacement of largely barren or sparsely vegetated tailings piles with gently sloping benches of upland vegetation, and pond/wetland areas, would benefit off-site fauna.

Fish populations in the project area are restricted to ponds in depressions between the tailing piles, and a short section of Alder Gulch Creek that flows through the area of flat tailing. This stream section has moderate trout habitat. In general, the ponds have

limited potential to provide suitable year round habitat for game fish, however several of the ponds do support small populations of game fish. In response to requests from area landowners, several of the reestablished ponds proposed in the reclamation plan would be constructed to a depth sufficient to allow survival of fish (about 10 feet or greater).

Small islands would be constructed in several ponds to provide waterfowl nesting habitat.

6. Vegetation

Vegetation of the proposed permit area reflects a history of disturbance resulting from past placer gold mining periods. Vegetation is sparse and occurs predominantly on microsites with higher moisture availability, such as in depressions between the tailing piles. Species that have colonized the area are stress tolerant.

The revegetation plan for the Alder Gulch Mine Project would enhance the productivity of the presently unreclaimed lands; prevent erosion and sedimentation; reestablish diversity of vegetation cover; meet post-mining land use objectives of private landowners for livestock forage production; and improve the wildlife/fish habitat. In addition, a zone of riparian vegetation would be created along the newly established segment of Alder Gulch Creek in the western portion of the permit area. Wetlands constructed as part of the proposed reclamation would be monitored in June and August following the first growing season. If vegetation has not become established, supplemental plantings and seedings would be conducted.

Several species of noxious weeds are present in the proposed permit area. A weed control plan would be submitted to the Madison County Weed Board before being implemented in the project permit area. Noxious weeds would be controlled by spraying with herbicides. No herbicides would be applied within 25 feet of surface water bodies. Weed control in the proposed permit area would benefit off-site flora by assuring that activities within the project area do not contribute to the increase of noxious weed infestation of adjacent lands.

7. Housing

Housing is not considered to be a major concern associated with the proposed mining operation, as the project employment need is small (approximately 34 employees at full production capacity), and most employees would be recruited from the local area. It is anticipated that most employees will reside within short commuting distances, eliminating much of the need for local vacant housing.

8. Employment

The majority of the proposed 34-person work force for the mine project would be hired locally.

9. Historical

The Alder Gulch Mine Project has performed a historical inventory and assessment of the proposed site as part of the project's baseline investigations. The remains of the No. 2 Conrey Dredge and the No. 4 Conrey Dredge were the two features identified as historically significant. Avoidance of identified cultural features is the primary method of mitigation included in the Alder Gulch Mine Project's mine plan. Dredge remains would be avoided, and their setting and association maintained by an unmined buffer zone. In addition, any significant artifacts uncovered by the mining activities would be salvaged. These artifacts would remain the property of the private landowners.

10. Aesthetics

The dredge tailing piles, characterizing much of the proposed permit area, offer stark contrast to the adjacent irrigated farmland, and benches and foothills of the Tobacco Root and Ruby Ranges. While the dredge piles may be perceived by visitors to the area as visually interesting, local landowners generally perceive the areas unreclaimed and sparsely vegetated dredge piles in a negative visual context.

11. Environmental Plans and Goals

The Alder Gulch Project proposal incorporates the regulatory agencies' goal of improving the existing environmental conditions in the area including the reconstruction of a segment of Alder Gulch Creek within the high tailing area. The proposed reclamation will significantly enhance the long-term productivity of the reclaimed permit area.

ALTERNATIVES

The alternatives to be considered are either permit approval or permit denial. Denial would result in the area remaining in its present condition. Approval would provide an opportunity to reclaim the proposed permit area and return it to its pre-mining condition.

During early project development, the Alder Gulch Mine Project consulted with appropriate state, federal, and local agencies concerning appropriate reclamation activities. This consultation included several meetings, and an on-site visit with personnel from the Montana Department of State Lands, Montana Department of Health and Environmental Sciences - Water Quality Bureau, Montana Department of Fish, Wildlife and Parks, Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and the Ruby Valley Conservation District. Agency representatives strongly support the development of a reclamation plan by the Alder Gulch Mine Project that incorporates the reestablishment of surface water features, including ultimate establishment of a segment of the stream channel for Alder Gulch Creek within the high tailing area of the western portion of the proposed permit area. The proposed reestablishment of surface water features as a portion of the reclamation plan for the Alder Gulch Mine Project has been developed in recognition of the project capabilities and agencies' objectives.

GLOSSARY

2H:1V	Slope angle designation expressed as a ratio of horizontal distance (H) to verticle distance (V).
Freeboard	In water containment structures it is the distance between the maximum anticipated water level and the top of the structure. Usually included in structure design for safety factors and wave action.
82-4-336 MCA	Montana Metal Mine Reclamation Act, title 82, chapter 4, part 3, section 336. Reclamation plan and requirements.
Hydric Soils	Wet soils.
Mg/L	Milligram per liter.