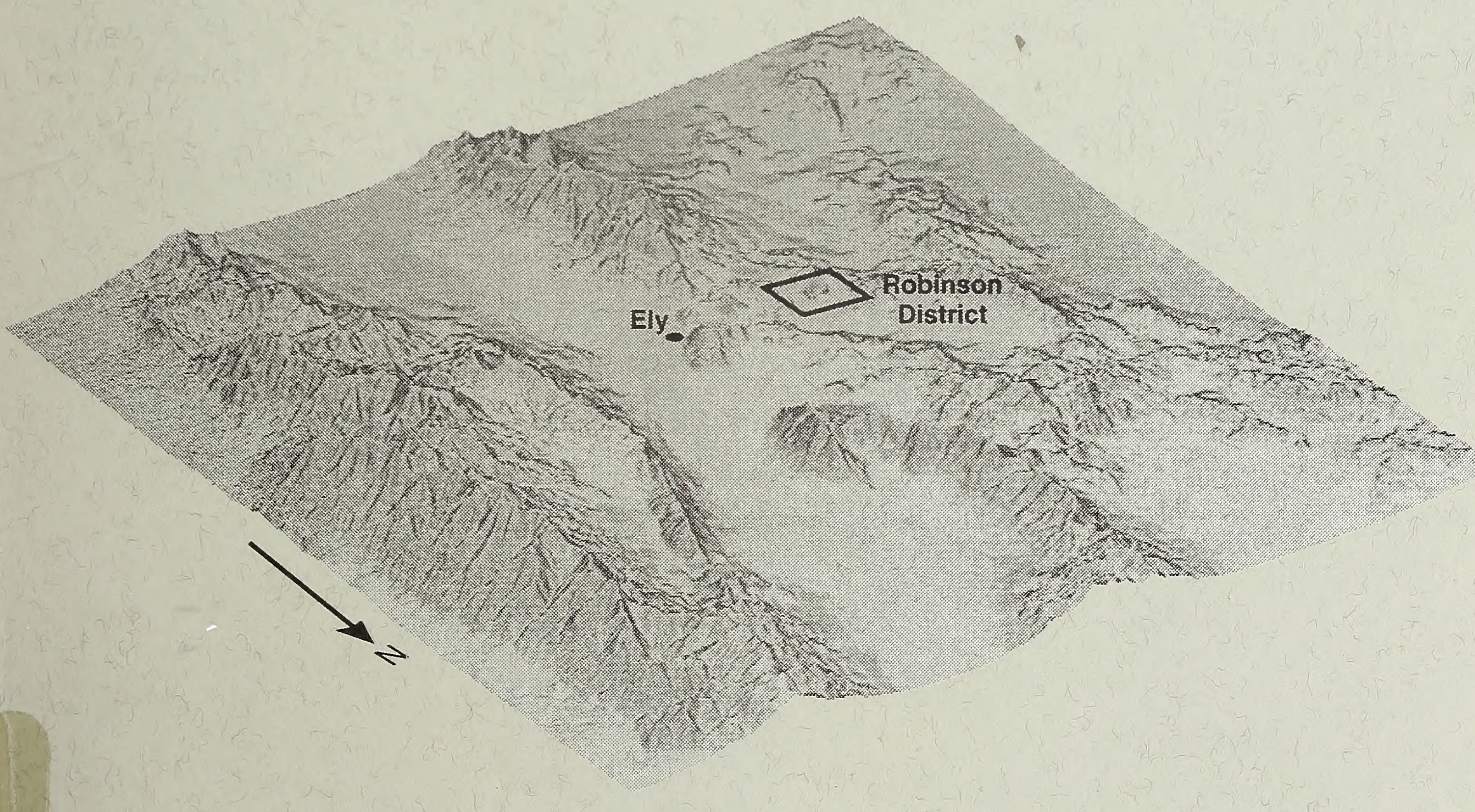
U.S. Department of the Interior
Bureau of Land Management
Ely District Office, Nevada

September 1994

Final
Environmental Impact Statement
Robinson Project



BLM Mission Statement

The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times.

Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife, wilderness, air and scenic, scientific and cultural values.

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United States Department of the Interior

TAKE PRIDE IN AMERICA

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IN REPLY REFER TO:

1793/3809
N46-92-004P
(NV-930.1)
(NV-040)

September 9, 1994

Dear Reader:

Enclosed for your information is the Robinson Project Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Robinson Mining Limited Partnership's (RMLP) proposed Plan of Operations. This project is located in White Pine County, near Ely, Nevada. The Final EIS responds to comments received during the public review period on the Draft EIS and contains in its entirety the analysis originally presented in the Draft EIS with all text changes highlighted. The project incorporates mitigation to minimize impacts to wildlife and other resources. The associated ROD states the decision, identifies alternatives considered, specifies which alternative is environmentally preferable, outlines mitigation and monitoring requirements, and identifies public involvement. The ROD completes the environmental process for this proposal. The FEIS and ROD are being issued simultaneously as provided for in 40 Code of Federal Regulations (CFR) 1506.10(b)(2).

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4. If an appeal is taken, your notice of appeal must be filed at the Bureau of Land Management's Nevada State Office (at the above address) within 30 days after the date the Environmental Protection Agency publishes their Notice of Availability in the Federal Register. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (request) (pursuant to regulation 43 CFR 4.21) for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulations, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

1. The relative harm to the parties if the stay is granted or denied,
2. The likelihood of the appellant's success on the merits,
3. The likelihood of immediate and irreparable harm if the stay is not granted, and
4. Whether the public interest favors granting the stay.

Questions or comments are to be directed to Dan Netcher, EIS Team Leader at Bureau of Land Management, Ely District Office, HC33 Box 33500, Ely, Nevada 89301, telephone (702) 289-4865.

Sincerely,

Ronald B. Wenker

Ronald B. Wenker
Acting State Director, Nevada

COVER SHEET
ROBINSON PROJECT ENVIRONMENTAL IMPACT STATEMENT

( ) DRAFT (X) FINAL

Lead Agency:	U.S. Department of the Interior Bureau of Land Management
Cooperating Agencies:	U.S. Environmental Protection Agency Nevada Division of Environmental Protection Nevada Department of Transportation White Pine County City of Ely
Counties That Could be Directly Affected:	White Pine, Elko, and Eureka Counties, Nevada
EIS Contact:	Correspondence on This Draft EIS Should be Directed to:
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Date Draft EIS filed with EPA: April 20, 1994
Date Final EIS filed with EPA: September 1, 1994

ABSTRACT

In late 1994, the Robinson Mining Limited Partnership (RMLP) proposes to reinitiate copper mining activities in the Robinson Mining District located near Ely, Nevada. The Robinson Project (Proposed Action) would involve construction and operation of new ore crushing facilities, copper and molybdenum concentrator, mill tailings disposal facility, gold and copper heap leach pads and ponds, and a solvent extraction/electrowinning (SX/EW) plant. The Proposed Action also would require the construction of a 230-kV electric transmission line and water production wells; the expansion and continued mining of the Liberty, Veteran-Tripp, Ruth, Kimbley, and Wedge Pits; expanded use of existing waste rock disposal areas; construction of runoff diversion channels, waste rock dump toe protection berms, and runoff catchment channels and basins; and construction and operation of a new tailings slurry pipeline. All mining and most waste rock disposal would take place on private land. Public land would be needed for portions of the waste dumps, copper and gold heap leach facilities, an impoundment for disposal of mill tailings, the well field power and pipeline corridors, and the 230-kV transmission line. Of the nearly 2,140 acres of BLM-managed public land required for the project, 1,941 acres would be newly disturbed. In addition, approximately 3,216 acres of RMLP private land would be used to implement the Proposed Action. Mining would occur 24 hours per day/365 days per year; the mine is expected to have an active life of 15 years, plus several years for reclamation activities. Average daily production is estimated at 690 tons of copper concentrate, 50 tons of cathode copper, and 2 tons of molybdenum concentrate.

This Final Environmental Impact Statement (FEIS) analyzes the environmental effects of the Robinson Project, plus the No Action Alternative and two additional alternatives that would involve different proposed mine design, operation, and reclamation.

Official Responsible for EIS:

Ronald B. Wenker

Ronald B. Wenker
Acting State Director, Nevada

September 9, 1994
Date

SUMMARY

The Robinson Mining Limited Partnership (RMLP) proposes to reinitiate copper mining activities in the Robinson Mining District located near Ely, Nevada. The District, located in the Egan Mountain Range just west of the city of Ely, Nevada, dates back to 1868, when early mining activity in the area centered on small deposits of precious metals. Large-scale copper mining was initiated in 1908. By 1958, the principal operations were consolidated into Kennecott Copper Corporation's (Kennecott) Nevada Mines Division. Kennecott extracted copper ore from a number of underground and open-pit mines until 1978 when it terminated its mining activities in the Robinson District. In 1985, Silver King Mining Company, operating under a lease agreement with Kennecott, initiated gold mining activities within the District. This operation became Alta Gold and then the Alta Bay Joint Venture ***with Magma Nevada Mining Company***. Gold mining continued, and in 1991, RMLP was formed from the Alta-Magma joint venture. Subsequently in November 1991, Alta's interests in the Partnership were redeemed and returned. The Partnership is now comprised of the Magma Nevada Mining Company***, a wholly-owned*** Magma Copper Company subsidiary, and is operated by Magma Nevada Mining Company. RMLP intends to restart copper mining activities by expanding the existing open-pit mines and constructing new concentrating and leaching facilities and to expand gold leaching activities. To date, surface disturbances from historic mining activities have left a total contiguous area of approximately 3,370 acres with little or no natural vegetation, and mining remains the sole land use within this area.

PURPOSE AND NEED

RMLP has economically driven project objectives and believes there is a demand for copper concentrate and gold. RMLP's objectives are to reinitiate copper mining activities in the District; extract economically recoverable copper and other associated metals, such as gold and molybdenum, determined to exist in the area; and optimize ore recovery and minimize new surface disturbances by mining existing ore deposits.

The Bureau of Land Management (BLM) has the responsibility and authority to manage the natural resources of the Egan Resource Area. The BLM Ely District published an Environmental Assessment (EA) for the Robinson Project in February 1993. In June 1993, BLM management determined that an Environmental Impact Statement (EIS) would be required for the project, and a Notice of Intent (NOI) to prepare the EIS was published in the Federal Register on July 2, 1993. ***The Draft EIS was filed with EPA on April 20, 1994.***

This EIS was prepared in compliance with the National Environmental Policy Act (NEPA), and in accordance with BLM Handbook H-1790-1 and Nevada State Office Instruction Memorandum IM-90-435. The proposed use of public lands and NEPA are the driving mechanisms for requiring an environmental analysis and this environmental document. The EIS considers the potential environmental impacts to both public and private lands that may result from reinitiating copper mining activities at the Robinson Mining District.

PROPOSED ACTION

The Robinson Project would involve the construction and operation of new ore crushing facilities, a copper and molybdenum concentrator, a mill tailings disposal facility, gold and copper heap leach pads and ponds, and a solvent extraction/electrowinning (SX/EW) plant. This Proposed Action would also require the construction of a 230-kilovolt (kV) electric transmission line from the Gonder Substation south of McGill, Nevada, to the project site and water production wells in north Robinson Canyon and near Keystone Dump with related power and pipelines to the proposed project area. This action would also include expansion and continued mining of the Liberty, Veteran-Tripp, Ruth, Kimbley, and Wedge Pits; expanded use of existing waste rock disposal areas; construction of runoff diversion channels, waste rock dump toe protection berms, and runoff catchment channels and basins; and construction and operation of a new tailings slurry pipeline. Withdrawal of groundwater at an average rate of 3,500 gallons per minute for milling and leaching activities would occur over 15 years.

The proposed project is located in White Pine County, Nevada, approximately 6 road miles west of the city of Ely. The town of Ruth is directly north of the proposed project area. All mining activity would take place on privately owned land, as would the majority of waste rock disposal. Use of public land would be required for portions of the waste dumps, copper and gold heap leaching facilities, an impoundment for disposal of mill tailings, the well field power and pipeline corridors, and the 230-kV transmission line. Approximately 2,140 acres of public land managed by the BLM, Ely District Office, and approximately 3,216 acres of private land owned by RMLP would be used to implement the proposed project. Approximately 1,941 acres of public lands would be new disturbance as a result of the Proposed Action. The proposed tailings impoundment in Giroux Wash would be constructed in two phases and the facility would ultimately disturb 1,712 acres of public land.

Initiation of mining activities (pre-stripping) is planned for late 1995. Mining operations would begin in 1996 and continue for 15 years (2011). Reclamation would continue for another 7 years (2018). An average daily production of approximately 690 tons of copper concentrate, 50 tons of electrowon cathode copper, and 2 tons of molybdenum concentrate is planned for the facility. However, these figures are subject to change throughout the life of the facility, as milling rates, ore and concentrate grades, leaching efficiencies, potential ore reserves, and other operating parameters change.

ALTERNATIVES

No Action Alternative

Under the No Action Alternative, copper mining at the Robinson Mine would not occur and the proven ore reserves in the area would remain undeveloped. No construction of ore crushing facilities, copper concentrator, mill tailings disposal facility, heap leach pads and ponds, SX/EW plant, and other related facilities would occur. Recovery of gold from existing heap leach facilities would continue until gold values are exhausted, then all operations would cease. Gold facilities would be reclaimed under the existing permits for those activities. However, no reclamation activities would take place on the majority of historically disturbed land in the Robinson Mining District.

Disposal of Mill Tailings or Waste Rock in Liberty Pit

The Liberty Pit disposal alternative would involve use of the Liberty Pit after mining in the pit has been completed (at earliest 7 years). Liberty Pit would be the first pit mined during the project life, so it would be the only reasonable pit for disposal. Upon completion of mining, tailings would be directly deposited into the pit from the concentrator, or waste rock from the

Veteran-Tripp Pit would be placed into the Liberty Pit. Since a suitable tailings disposal site would be required during mining of the Liberty Pit, this alternative includes the construction and operation of at least part of the Giroux Wash tailings disposal facility. Associated facilities, including the embankment, seepage collection pond, impoundment area, access road, electrical distribution line, and tailings pipeline, would still need to be constructed. Six scenarios encompassing various volumes of tailings and waste rock disposal in Liberty Pit were selected for evaluation. These scenarios are described in Section 2.4.

Reclamation Alternative

Within the alternative, any of seven reclamation options, which are independent of one another, could be selected and implemented as part of RMLP's Reclamation Plan. The seven options, described in Section 2.5, include the following:

1) Sideslopes would be reclaimed at a more gradual slope of 3:1 instead of 2.5:1;

2) All surface facilities and structures would be removed;

3) Vegetation cover standards would be based on Range/Woodland Site Descriptions;

4) Seed mixtures would be limited to native species;

5) Weeds could not comprise any percentage of the required cover;

6) Seed sources would be from environments with similar elevation and climatic characteristics; and

7) Specific vegetation diversity requirements for each Range/Woodland Site would be included in the standards for release.

IMPORTANT ISSUES AND IMPACT CONCLUSIONS

A number of important issues were raised during scoping for the Robinson Project EIS. These issues along with their impact conclusions are presented below by resource area. Impact conclusions include the implementation of any mitigation measures that may have been identified. Where the impact conclusion would differ for an alternative compared to the Proposed Action, this difference has been noted. A much more detailed comparison of impacts among alternatives can be found on the summary tables (2-16 through 2-18) presented at the end of Chapter 2.0.

Geology and Minerals

Issue: Loss of access to mineral resources by backfilling Liberty Pit.

Conclusion: 212 million tons of mineral resources would be buried and thus made unrecoverable for future extraction. This impact would apply only to the Liberty Pit Disposal Alternative.

Water Quantity and Quality

Issue: Reduction of flow at Murry and Riepe Springs.

Conclusion: No reduction in flow is anticipated.

Issue: Poor water quality in pit lakes following mining.

Conclusion: Pit lake water quality would improve over present water quality. Water is not expected to be acidic, but would exceed Nevada drinking water standards for certain chemical parameters.

Issue: Contamination of groundwater by infiltration of tailings water.

Conclusion: Effluent flow to groundwater would carry sulfate, but groundwater quality at the downgradient monitoring point established by the Nevada Department of Environmental Protection would be within drinking water standards.

Issue: Acid drainage from waste rock dumps.

Conclusion: None expected. RMLP would design dumps to prevent acid drainage, and carbonate waste rock would neutralize acids generated from the oxidation of pyrite.

Issue: Drawdown of wells and springs in the mine vicinity.

Conclusion: Drawdown of the water table by 520 feet is possible. The water table would rebound (87 percent) 50 years after mining. RMLP would replace any water lost from private wells. No spring flows would be affected.

Soils

Issue: Permanent loss of soils under the Giroux Wash tailings impoundment.

Conclusion: Under the Proposed Action, at most 0.4 million cubic yards (mcy) of soil would be unavailable for reclamation or natural vegetation production. Since the amount of soil remaining under the impoundment is greatly dependent on the soil requirements for construction of the dam, the scenarios analyzed under the Liberty Pit Disposal Alternative would result in varying amounts of soil lost from burial. Volumes lost would range from 0.2 to 1.7 mcy, with the higher value resulting from a straight-line dam.

Wildlife and Fisheries Resources

Issue: Loss of native habitat utilized by migratory birds.

Conclusion: Under the Proposed Action, 3,345 acres of native wildlife habitat would be cleared. Under the Liberty Pit Disposal Alternative, loss of nature habitat would be less since disturbance to Giroux Wash would be less. Reduction in disturbance would range from 57 to 844 acres, depending on the scenario.

Issue: Exposure of birds, and possibly other wildlife, to poor quality water in pit lakes and tailings pools.

Conclusion: Due to the absence of suitable habitat around the pit lakes and tailings pool, the pit lakes or tailings water would not provide long-term or extended use foraging areas for wildlife species, and bioaccumulation of metals is not anticipated.

Issue: Impacts to threatened and endangered species.

Conclusion: No impacts to threatened or endangered species are anticipated.

Social and Economic Values

Issue: Increase in employment in White Pine County.

Conclusion: Construction. Between 103 employees and 180 employees at the peak level of 514 construction workers would come from the local area. Approximately 103 indirect jobs would be created during the construction period, of which 72 are projected to be filled by local area residents.

Operations. Direct and indirect new jobs would total 908. It is projected that 30 to 50 percent of the workers (272 to 454 workers) would come from the local area.

Issue: Increase in demand for housing and services.

Conclusion: Because of the mitigation strategy in the environmental protection measures RMLP has committed to (see Section 2.2.16), impacts to housing and services are not anticipated.

Transport of Process Materials, Products, and Hazardous Wastes

Issue: Increase in truck traffic on area roadways.

Conclusion: Due to primary reliance on the Northern Nevada Railroad for transportation of process materials and products, only a small increase in truck traffic is anticipated.

Issue: Accidents resulting in the spill of a hazardous material.

Conclusion: Based on a statistical estimate, one truck accident resulting in a spill and no train accidents resulting in a spill would occur during the life of the project. If a truck or train spill occurred in a sensitive area (wetland or populated area), significant impacts could occur. The probability of such a spill is estimated to be less than 0.33 over the life of the project.

AGENCY PREFERRED ALTERNATIVE

In accordance with NEPA, Federal agencies are required by the Council on Environmental Quality (40 CFR 1502.14) to identify their preferred alternative for a project in the Final EIS prepared for the project. The preferred alternative is not a final agency decision; it is rather an indication of the agency's preliminary preference. The alternative identified below is the BLM's preferred alternative at the Final EIS stage in the environmental review process. BLM's preference at this time considers all information that has been received and reviewed relevant to the proposed project. The agency preferred alternative is a combination of potential actions that have been analyzed. It consists of the Proposed Action with two major modifications: tailings disposal and reclamation options. The agency preferred alternative for tailings disposal is the Liberty Pit Alternative, Scenario 4 -- construction of a straight-across tailings dam in Giroux Wash and placement of tailings from Liberty Pit in this location while Liberty Pit is being mined, then placement of the remaining tailings into Liberty Pit after it has been economically mined (see description in Section 2.4). The rationale for selection of this alternative for tailings disposal is that it:

- Would not degrade the waters of the State of Nevada;
- Would disturb fewer acres of native vegetation on public land in Giroux Wash than the Proposed Action;
- Would leave open the option of mining additional copper ore from Liberty Pit if economics prove this feasible during the time that Liberty Pit is being mined;
- Would also leave open the option of placing all the tailings in Giroux Wash if RMLP cannot obtain a water pollution control permit for disposal of tailings into Liberty Pit; and
- Would cost less than the Proposed Action.

The agency preferred alternative for reclamation consists of the ***Proposed Action and the*** following ***options***: 3) vegetation cover standards based on Range/Woodland Site descriptions; 5) weeds could not comprise any percentage of the cover; and 7) specific vegetation diversity requirements (see Tables 2-12 and 2-13 in Section 2.5). The rationale for selecting these options is they would realize successful reclamation as similar as possible to pre-existing conditions to support post-mining land uses on public lands, in particular wildlife, and would reduce visual contrasts.

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1.0 INTRODUCTION

1.1 PROPOSED ACTION

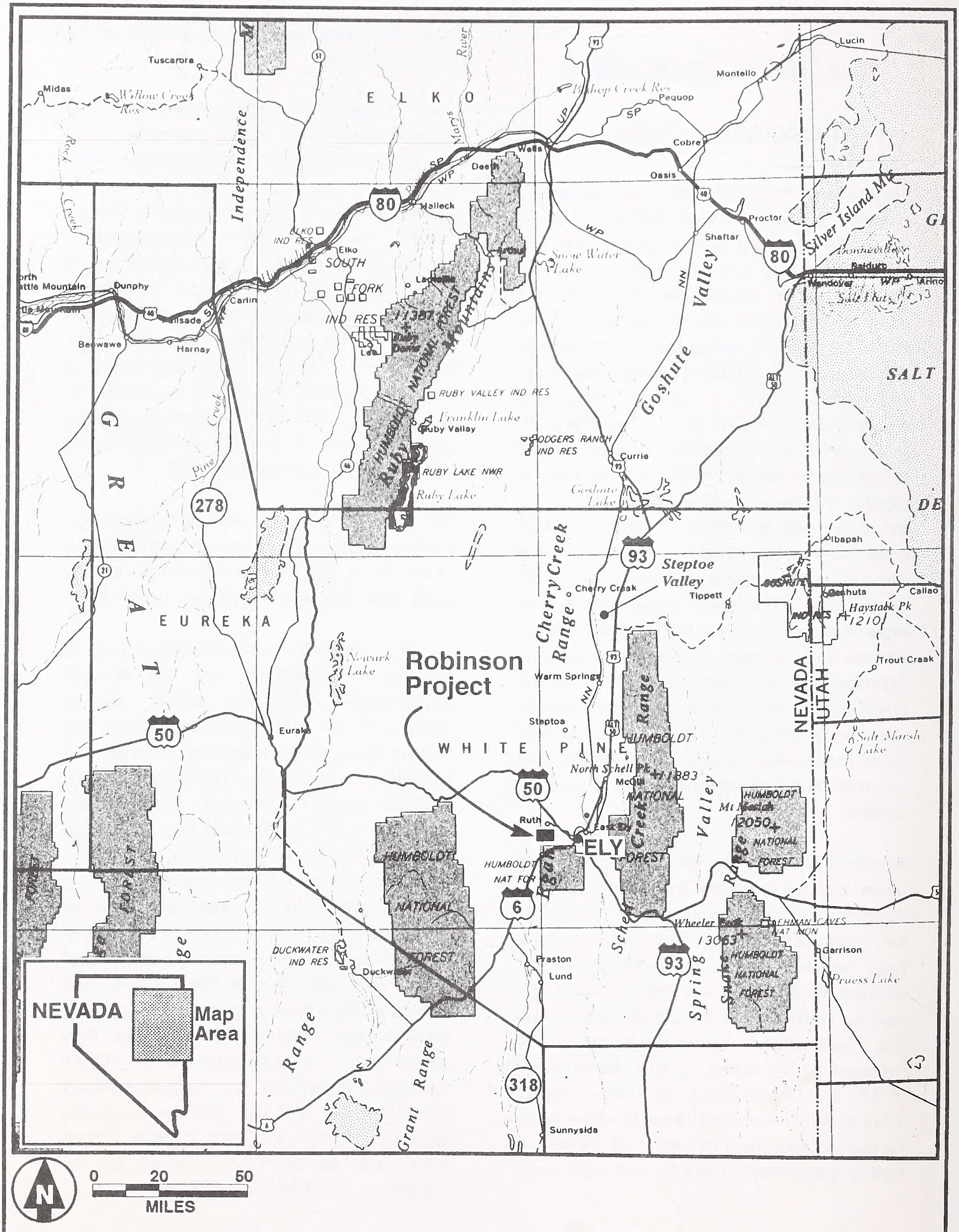
The Robinson Mining Limited Partnership (RMLP) proposes to reinitiate copper mining activities in the Robinson Mining District located near Ely, Nevada (see Map 1-1). The Robinson Project (Proposed Action) would involve construction and operation of new ore crushing facilities, copper and molybdenum concentrator, mill tailings disposal facility, gold and copper heap leach pads and ponds, and a solvent extraction/electrowinning (SX/EW) plant. This Proposed Action would also require the construction of a 230-kilovolt (kV) electric transmission line from the Gonder Substation south of McGill, Nevada, to the project site and water production wells in north Robinson Canyon and near Keystone Dump with related power and pipelines to the proposed project area. This action would also include expansion and continued mining of the Liberty, Veteran-Tripp, Kimbley, Wedge, and Ruth Pits; expanded use of existing waste rock disposal areas; construction of runoff diversion channels, waste rock dump toe protection berms, and runoff catchment channels and basins; and construction and operation of a new tailings slurry pipeline.

All mining activity would take place on privately owned land, as would the majority of waste rock disposal. Use of public land would be required for portions of the waste dumps, gold and copper heap leaching facilities, an impoundment for disposal of mill tailings, the well field power and pipeline corridors, and the 230-kV transmission line. Approximately 2,140 acres of public land managed by the Bureau of Land Management (BLM), Ely District Office, and approximately 3,216 acres of private land owned by RMLP would be used to implement the proposed project. A total of approximately 1,941 acres of public lands would be newly disturbed as a result of the Proposed Action.

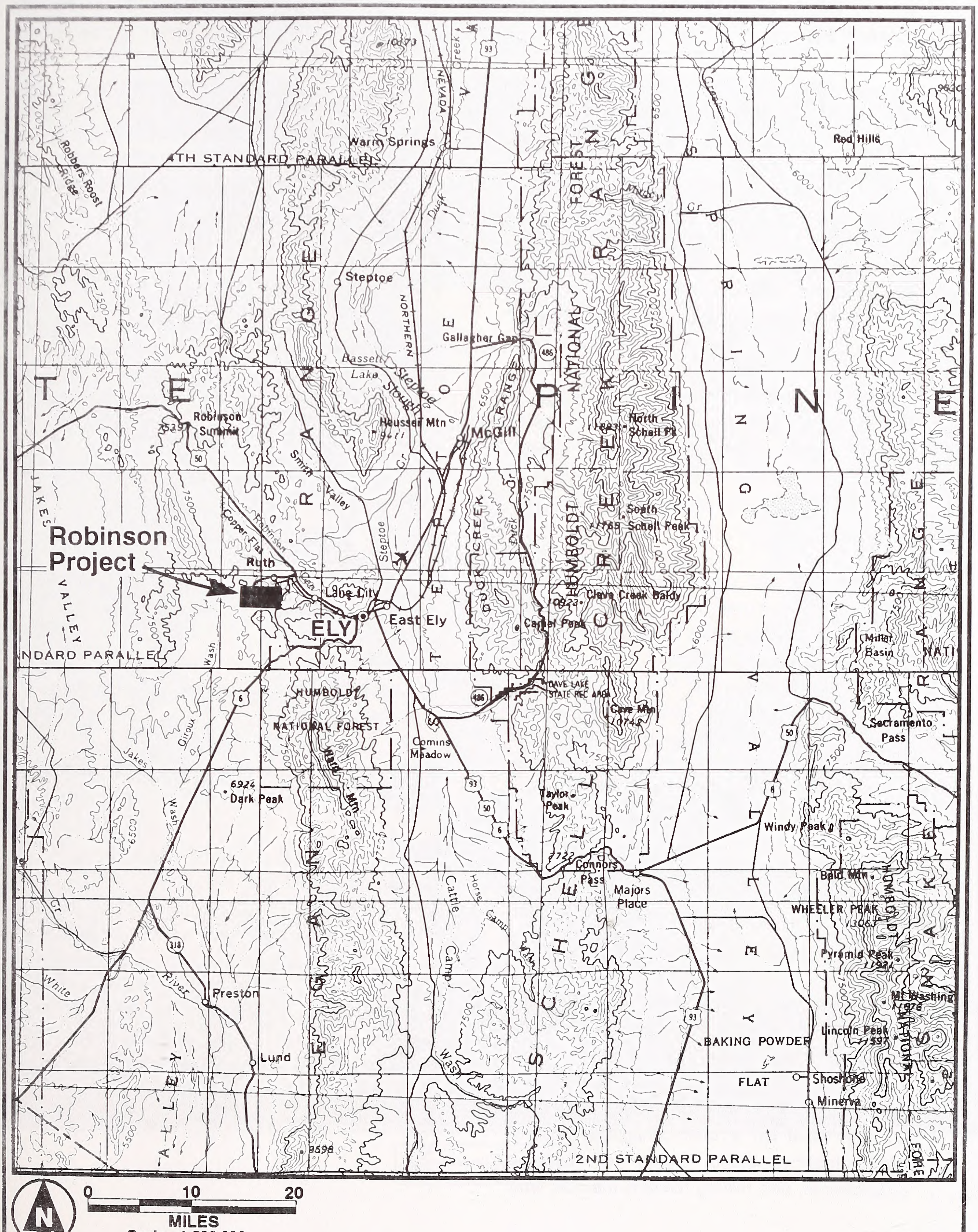
Start of mining operations (pre-stripping) is planned for late 1995. Mining operations would be initiated in 1996 and milling operations in 1997, and would continue for 15 years (2011). Reclamation would continue for another 7 years (2018), which includes post-reclamation monitoring. An average daily production of approximately 690 tons of copper concentrate, 50 tons of electrowon cathode copper, and 2 tons of molybdenum concentrate is planned for the facility. However, these figures are subject to change throughout the life of the facility, as milling rates, ore and concentrate grades, leaching efficiencies, potential ore reserves, and other operating parameters change.

The proposed project is located in White Pine County, Nevada, approximately 6 road miles west of the city of Ely. The town of Ruth is directly north of the proposed project area (Map 1-2).

This Environmental Impact Statement (EIS) is prepared in compliance with the National Environmental Policy Act (NEPA), and in accordance with BLM Handbook H-1790-1 and Nevada State Office Instruction Memorandum NV-90-435 on analysis of cumulative impacts. This EIS considers the quality of the human environment from the physical impacts to both public and private lands that may result from reinitiating copper mining activities at the Robinson Mine. The proposed mining activities located on public lands are subject to review and approval by the BLM pursuant to the Federal Land Policy Management Act (FLPMA) and corresponding surface management regulations (43 CFR 3809). These activities and their approval by the BLM pursuant to FLPMA constitute a Federal action, and are thus subject to NEPA. The BLM has determined that the Robinson Project constitutes a major Federal action and has determined that an EIS be prepared to fulfill NEPA requirements.



Map 1-1. Regional Setting



Map 1-2. Project Vicinity

1.2 RELEVANT HISTORY OF THE ROBINSON MINING DISTRICT

In February 1991, RMLP was formed to develop, construct, and operate copper mining, concentrating, and leaching facilities in the historic Robinson Mining District in central White Pine County. The District, located in the Egan Mountain Range just west of the city of Ely, Nevada, dates back to 1868, when early mining activity in the area centered on small deposits of precious metals. More than 50 mining companies were organized in the District between 1902 and 1907, and in 1908, large-scale copper mining was initiated.

By 1958, all the principal operations were consolidated into Kennecott Copper Corporation's (Kennecott) Nevada Mines Division. Kennecott extracted copper ore from a number of underground and open-pit mines, including the Veteran-Tripp, Liberty, and Ruth Mines. Kennecott terminated its mining activities in the Robinson District in 1978. In 1985, Silver King Mining Company, operating under a lease agreement with Kennecott, initiated gold mining activities within the District. This operation became Alta Gold and then the Alta Bay Joint Venture.

Gold mining continued, but in 1991, RMLP was formed with the Magma Nevada Mining Company (Magma) as the general partner. RMLP intends to restart copper mining activities by expanding the existing open-pit mines and constructing new concentrating and leaching facilities, and expand gold leaching activities. To date, historic mining activities have left a total contiguous area of approximately 3,370 acres of surface disturbances, and mining remains the sole land use within this area (see Figure 1-1). The existing disturbances are shown on Map 1-3.

1.3 PURPOSE AND NEED OF THE PROPOSED ACTION

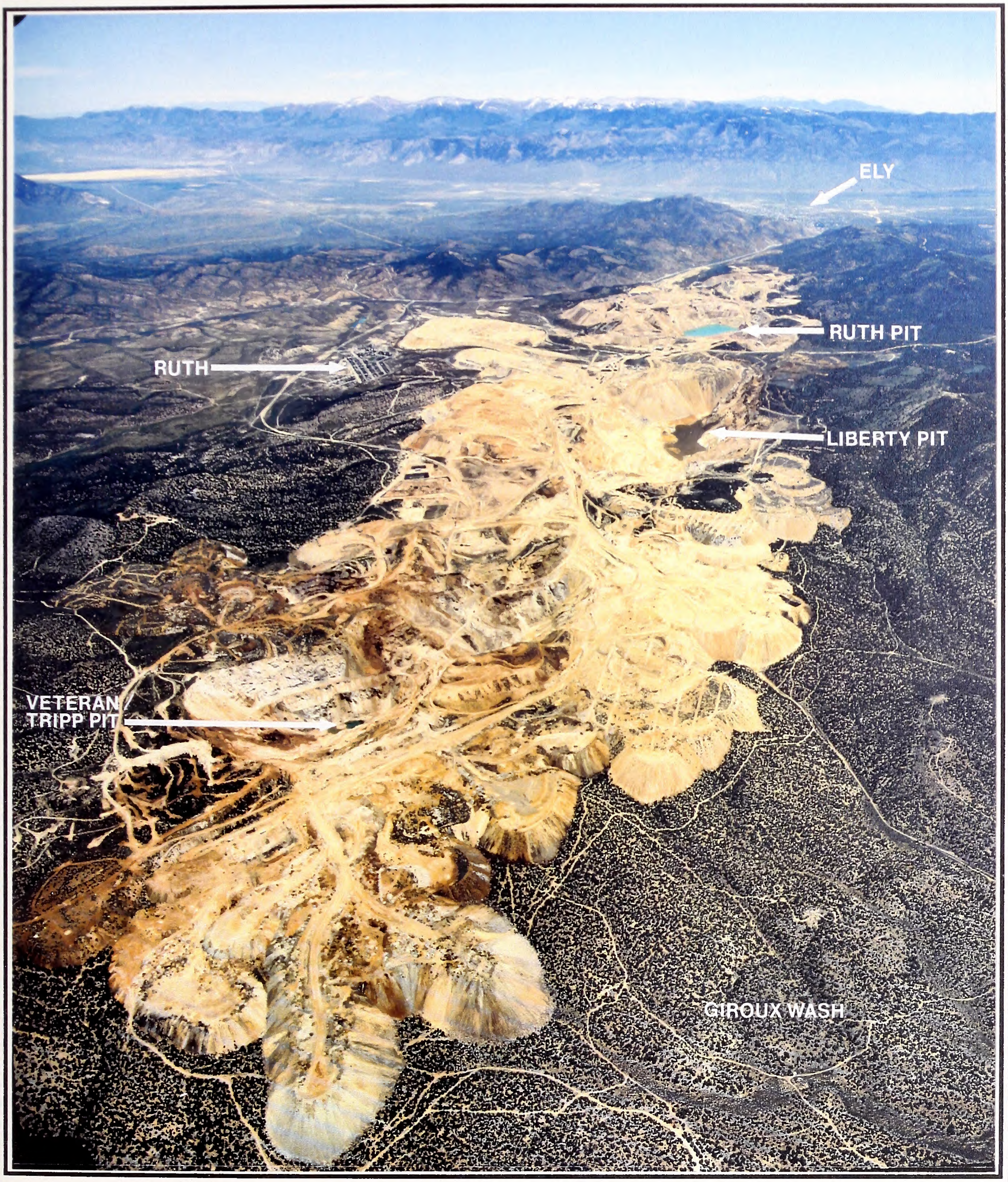
1.3.1 RMLP's Purpose and Need

RMLP has economically driven project objectives and believes there is a demand for copper concentrate and gold. RMLP's objectives are as follows:

- Reinitiate copper and gold mining activities in the Robinson Mining District;
- Extract economically recoverable copper and other associated metals, such as molybdenum and gold, determined to exist in the area; and
- Optimize ore recovery and minimize new surface disturbances by mining existing ore deposits.

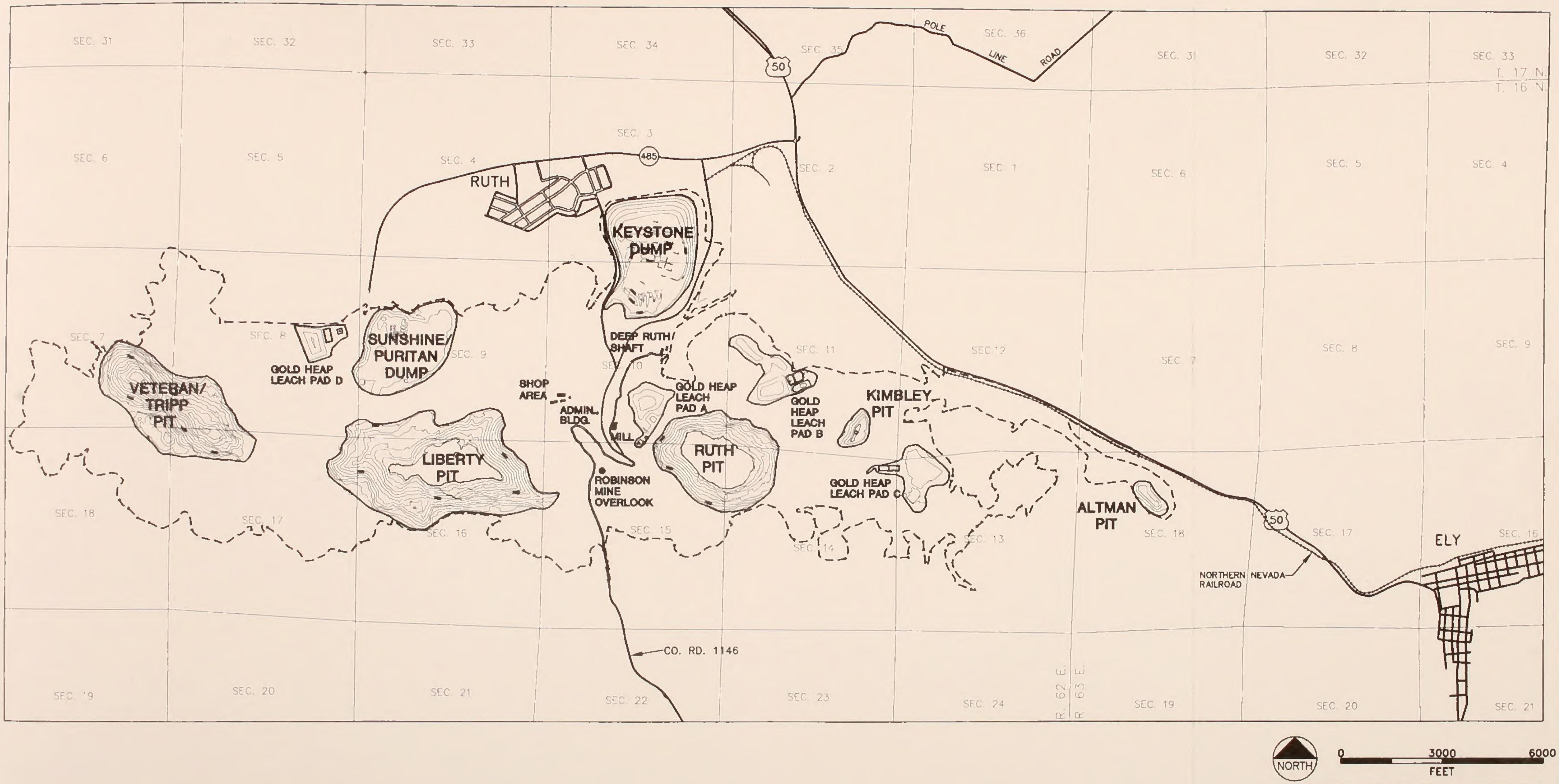
1.3.2 BLM's Responsibilities and Relationship to Planning

The BLM has the responsibility and authority to manage the public land resources of the Egan Resource Area (RA). RMLP's use of public land in the Egan RA requires conformance with BLM's surface management regulations (43 Code of Federal Regulations [CFR], Subpart 3809), as well as various statutes, including the Mining and Mineral Policy Act of 1970 (as amended) (MMPA) and the FLPMA of 1976 (as amended). BLM must review the RMLP's plans for exploration and development to ensure the following:



North

Figure 1-1. Robinson Mining District
June 12, 1993



EXISTING DISTURBANCE BOUNDARY

ROBINSON PROJECT

MAP 1-3
EXISTING CONDITIONS
ROBINSON MINING DISTRICT

- Adequate provisions are in place to prevent unnecessary or undue degradation of Federal lands and to protect the non-mineral resources of the Federal lands;
- Measures to provide for reclamation of disturbed areas; and
- Compliance with applicable state and Federal laws.

Given the large percentage of Federal land in White Pine County, Federal management programs, particularly those administered by the BLM, will continue to significantly influence land use in the area. In addition, since the Robinson Project area includes unpatented mining and millsite claims on lands administered by the BLM, the BLM's land use plans, policies, and regulations have primary jurisdiction over land use activities on these parcels. The BLM has developed the Egan Resource Management Plan (RMP) to guide long-term management of the lands that it manages. The development of the Egan RMP was the result of a planning process that included preparation of the 1984 Egan RMP, Final EIS and 1987 Record of Decision (ROD), in compliance with Sections 201 and 202 of FLPMA.

BLM's Egan Area RMP has no constraints that conflict with the Proposed Action. Management activities for the proposed project area are identified as grazing, wildlife, and recreation. Mineral resource development is in conformance with the RMP, and is consistent with the White Pine County Policy Plan for public lands which states, ..."Recognize that the development of Nevada's mineral resources is desirable and necessary to the Nation, the state, and White Pine County. Retain existing mining areas and promote the expansion of mining operations and areas."

1.4 ENVIRONMENTAL REVIEW PROCESS

In February 1993, the BLM Ely District published an Environmental Assessment (EA) for the Robinson Project. In June 1993, BLM management determined that an EIS would be required for the project, and a Notice of Intent (NOI) to prepare the EIS was published in the Federal Register on July 2, 1993. BLM had conducted scoping for the EA in December 1991 and held a number of meetings with interested parties during 1992. However, it was necessary to reopen scoping for the EIS process. The NOI invited scoping comments to be sent to the BLM through August 6, 1993. On July 9, 1993, 300 copies of the news release, "Ely BLM Invites Comments on Robinson Copper Mining Facility," were issued statewide to all newspapers, radio and television stations, and major interest groups. The BLM also mailed individual notifications to 148 interested persons, agencies, or groups. As a result of the EIS scoping process, 17 comment letters were received by the BLM. Written comments were received from the following:

U.S. Environmental Protection Agency (USEPA)
U.S. Fish and Wildlife Service (USFWS)
U.S. Bureau of Mines
Nevada Department of Conservation and Natural Resources
  Division of Historic Preservation and Archaeology
  Division of Wildlife (NDOW)
Nye County Board of Commissioners
White Pine County Sheriff's Department
Kennecott Corporation
Mineral Policy Center
Sierra Club
Carter Cattle Company
J.D.L. Construction
Lars L. Wakeman
Thomas M. Clayton

Walter B. Johnson
Steve Sutherland
Loretta Cartner

Wilderness resources would not be affected by the proposed mining area or transportation routes, since none are present in the area, and are not addressed in the EIS. BLM is also required to assess impacts to prime or unique farmlands, floodplains, and areas of critical environmental concern (ACEC); none occur within the proposed mining area. This elimination of nonrelevant issues follows the Council on Environmental Quality (CEQ) policy as stated in 40 CFR 1500.4.

Following issuance of the Draft EIS, public meetings were held in Ely and Reno, Nevada, during the formal 45-day public comment period. Chapter 5.0, Consultation and Coordination, summarizes the comments from the public meetings, and presents the written comments and responses.

The BLM received 34 letters addressing the Draft EIS during the 45-day public comment period. One letter from the U.S. Fish and Wildlife Service was received following the close of the formal comment period; however, this letter has been included in the Final EIS. All letters were reviewed and comments needing a response were identified. Responses were provided to clarify the contents of the Draft EIS, modify or correct the Draft EIS, or provide additional information in the Final EIS. Where changes (modification, correction, or addition) have been made to the text contained in the Draft EIS, these changes are presented in the Final EIS in ***bold-italic type***.

All letters have been reproduced in their entirety in Section 5.4 of the Final EIS, and all material submitted has been reviewed and considered. Responses have been prepared for the comments identified and are presented in this section. All letters have been reviewed and considered by the BLM in determining the agency preferred alternative for the proposed project.

1.5 APPLICABLE REGULATORY REQUIREMENTS AND COORDINATION

The permits shown on Table 1-1 would be required for this Proposed Action. RMLP is responsible for applying for and acquiring these permits.

1.6 ORGANIZATION OF THE ENVIRONMENTAL IMPACT STATEMENT

This EIS follows the CEQ recommended organization (40 CFR 1508.9): Chapter 1.0 describes the purpose and need, the role of the BLM, and summarizes public participation in the EIS process; Chapter 2.0 provides a description of existing operations, and the Proposed Action and Alternatives; Chapter 3.0 describes the affected environment; and Chapter 4.0 describes direct, indirect, and cumulative impacts associated with the Proposed Action and Alternatives and possible mitigation to reduce or minimize impacts. Chapter 5.0 summarizes consultation and coordination for preparation of the EIS, and presents the comments from public meetings, written letters, and responses to comments; Chapter 6.0 presents the list of preparers; and Chapter 7.0 is a list of references. Copies of the Technical Reports and supporting documents are on file in the BLM office in Ely, BLM Nevada State Office in Reno, and the Nevada Division of Environmental Protection office in Carson City.

Table 1-1

Major Permits and Approvals Required for the Robinson Project

Permit/Approval	Granting Agency
Approval of Plan of Operations	Bureau of Land Management
Nationwide Dredge and Fill Permit (Section 404)	Army Corps of Engineers
Water Pollution Control Permits	Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Mining Regulation and Reclamation
Reclamation Permit	Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Mining Regulation and Reclamation
Surface Disturbance Permit (Air Quality)	Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Air Quality
Permit to Construct (Air Quality)	Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Air Quality
Permit to Operate (Air Quality)	Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Air Quality
Artificial Pond Permits	Nevada Department of Conservation and Natural Resources, Nevada Division of Wildlife
Permit to Appropriate Water	Nevada Department of Conservation and Natural Resources, Division of Water Resources
Permit for Dam Construction	Nevada Department of Conservation and Natural Resources, Division of Water Resources
Approval to Operate a Sanitary Landfill	Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Solid Waste
Wastewater Disposal Permit (NPDES)	Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Mining Regulation and Reclamation

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This chapter provides a description of the Robinson Mining Limited Partnership (RMLP) Proposed Action to reinitiate copper mining activities in the Robinson Mining District, alternatives considered but dismissed from detailed analysis, and reasonable alternatives to the Proposed Action.

2.2 RMLP'S PROPOSED ACTION

2.2.1 Overview

The Proposed Action would consist of constructing and operating new ore crushing facilities, copper concentrator, mill tailings disposal facility, gold and copper heap leach pads and ponds, and a solvent extraction and electrowinning (SX/EW) plant to recover copper from leach solution. The concentrator also would produce molybdenum concentrate, which would be marketed without further on-site processing. Map 2-1 shows the overall layout of the proposed facilities. The Proposed Action also would include expanded use of existing waste rock disposal areas; construction of runoff diversion channels; expansion and continued mining of the Liberty, Veteran-Tripp, Ruth, Kimbley and Wedge Pits; construction and operation of a new tailings slurry pipeline, water reclaim pipeline, and power distribution line, as well as the installation of a 230-kV transmission line from the existing Gonder Substation south of McGill to the project area; and water production wells in the Keystone area and north Robinson Canyon, with related power and pipeline corridors to the concentrator area.

All mining activity and the majority of waste rock disposal would take place on land privately owned by RMLP. Private land constitutes the majority of all land required for the project, and the bulk of this private land has been previously disturbed. Table 2-1 provides a summary of the existing and proposed disturbed acreages for various project components. Use of public land managed by the Bureau of Land Management (BLM) would be required for portions of the waste dumps, gold and copper heap leaching facilities, an impoundment for disposal of mill tailings, tailings slurry and water reclaim pipelines, power distribution line, water supply wells, necessary access roads, and the 230-kV transmission line.

The public lands in the proposed project area would include Sections 13, 14, 23-26 in Township (T) 16N, Range (R) 61E; Sections 2-4, 9-15, 17-20, 29-30 in T16N, R62E; and Section 33 in T17N, R62E. The proposed transmission line route across public lands would include portions of Sections 2, 4, and 9 of T16N, R62E; Sections 35 and 36 of T17N, R62E; Sections 13-14, 22, 23, 27-31 of T17N, R63E; and Section 18 of T17N, R64E.

Start of mining operations is planned for sometime in late 1995 and early 1996. Based on currently identified ore reserves and anticipated mining rates, the project is expected to have an active life of approximately 15 years. An average daily production of approximately 690 tons of copper concentrate, 50 tons of cathode copper, and 2 tons of molybdenum concentrate is planned for the facility. However, these figures are subject to change throughout the life of the facility, as milling rates, ore and concentrate grades, potential ore reserves, leaching efficiencies, and other operating parameters change.

Additional information can be found in RMLP's Plan of Operations (POO), which is on file at BLM's Ely District Office, BLM's State Office in

Table 2-1

Total, Redisturbed, and New Surface Disturbance (in acres)

Disturbance Type		Public Lands	Private Lands	Total
Tailings Disposal Area				
Redisturbed Land		0	0	0
New Disturbance	- East Unit	386	256	642
	- West Unit	1,076	183	1,259
Total Disturbance		1,462	439	1,901
Tailings Disposal Area Soil Stockpiles				
Redisturbed Land		0	0	0
New Disturbance	- East Unit	66	5.5	72
	- West Unit	102	2	104
Total Disturbance		169	7	176
Seepage Ponds				
Redisturbed Land		0	0	0
New Disturbance		0.9	0.9	1.8
Total Disturbance		0.9	0.9	1.8
Tailings Disposal Area Access Road				
Redisturbed Land		0	0	0
New Disturbance		18	11	29
Total Disturbance		18	11	29
Rerouted County Road				
Redisturbed Land		0	0	0
New Disturbance	- East Unit	7.5	1.5	9
	- West Unit	20.5	2.5	23
Total Disturbance		28	4	32
Surface Drainage Diversion				
Redisturbed Land		0	0	0
New Disturbance		34.5	0.5	35
Total Disturbance		34.5	0.5	35

Table 2-1 (Continued)

Disturbance Type	Public Lands	Private Lands	Total
Concentrator Area			
Redisturbed Land	0	163	163
New Disturbance	0	4	4
Total Disturbance	0	167	167
Administration Building			
Redisturbed Land	0	0	0
New Disturbance	0	0.2	0.2
Total Disturbance	0	0.2	0.2
Leach Pad D			
Redisturbed Land	0	55	55
New Disturbance	0	37	37
Total Disturbance	0	92	92
Leach Pad E			
Redisturbed Land	0	0	0
New Disturbance	13.5	188.5	202
Total Disturbance	13.5	188.5	202
Leach Pad E Soil Stockpiles			
Redisturbed Land	0	0	0
New Disturbance	0	9	9
Total Disturbance	0	9	9
Veteran-Tripp Pit			
Redisturbed Land	0	331.5	331.5
New Disturbance	0	45.5	45.5
Total Disturbance	0	377	377
Veteran-Tripp Dump			
Redisturbed Land	19	148	167
New Disturbance	73	267	340
Total Disturbance	92	415	507

Table 2-1 (Continued)

Disturbance Type	Public Lands	Private Lands	Total
Liberty Pit			
Redisturbed Land	0	279	279
New Disturbance	0	0	0
Total Disturbance	0	279	279
Liberty Dump			
Redisturbed Land	0	255	255
New Disturbance	42.5	61.5	104
Total Disturbance	42.5	316.5	359
Liberty Dump Soil Stockpiles			
Redisturbed Land	0	13	13
New Disturbance	2	4	6
Total Disturbance	2	17	19
Ruth Pit			
Redisturbed Land	0	250	250
New Disturbance	0	4	4
Total Disturbance	0	254	254
Ruth Dump			
Redisturbed Land	20.5	182	202.5
New Disturbance	13.5	111	124.5
Total Disturbance	34	293	327
Ruth Dump Soil Stockpile			
Redisturbed Land	0	9.5	9.5
New Disturbance	0	1.5	1.5
Total Disturbance	0	11	11
Kimbley/Wedge Pit			
Redisturbed Land	0	82	82
New Disturbance	0	5	5
Total Disturbance	0	87	87

Table 2-1 (Continued)

Disturbance Type	Public Lands	Private Lands	Total
Copper Heap Leaching Facilities			
Redisturbed Land	150	92	242
New Disturbance	18	107	125
Total Disturbance	168	199	367
SX/EW Facility			
Redisturbed Land	0	0	0
New Disturbance	0	29	29
Total Disturbance	0	29	29
Water Line			
Redisturbed Land	9	0	9
New Disturbance	3	9	12
Total Disturbance	12	9	21
Transmission Line			
Redisturbed Land	0	0	0
New Disturbance	63.5	10.5	74
Total Disturbance	63.5	10.5	74
Total Area Disturbed			
Redisturbed	198.5	1,860	2,058.5
New Disturbance	1,941.4	1,356.1	3,297.5
Total	2,139.9	3,216.1	5,356

Reno, and the Nevada Division of Environmental Protection Office in Carson City.

2.2.2 Mining/Dewatering

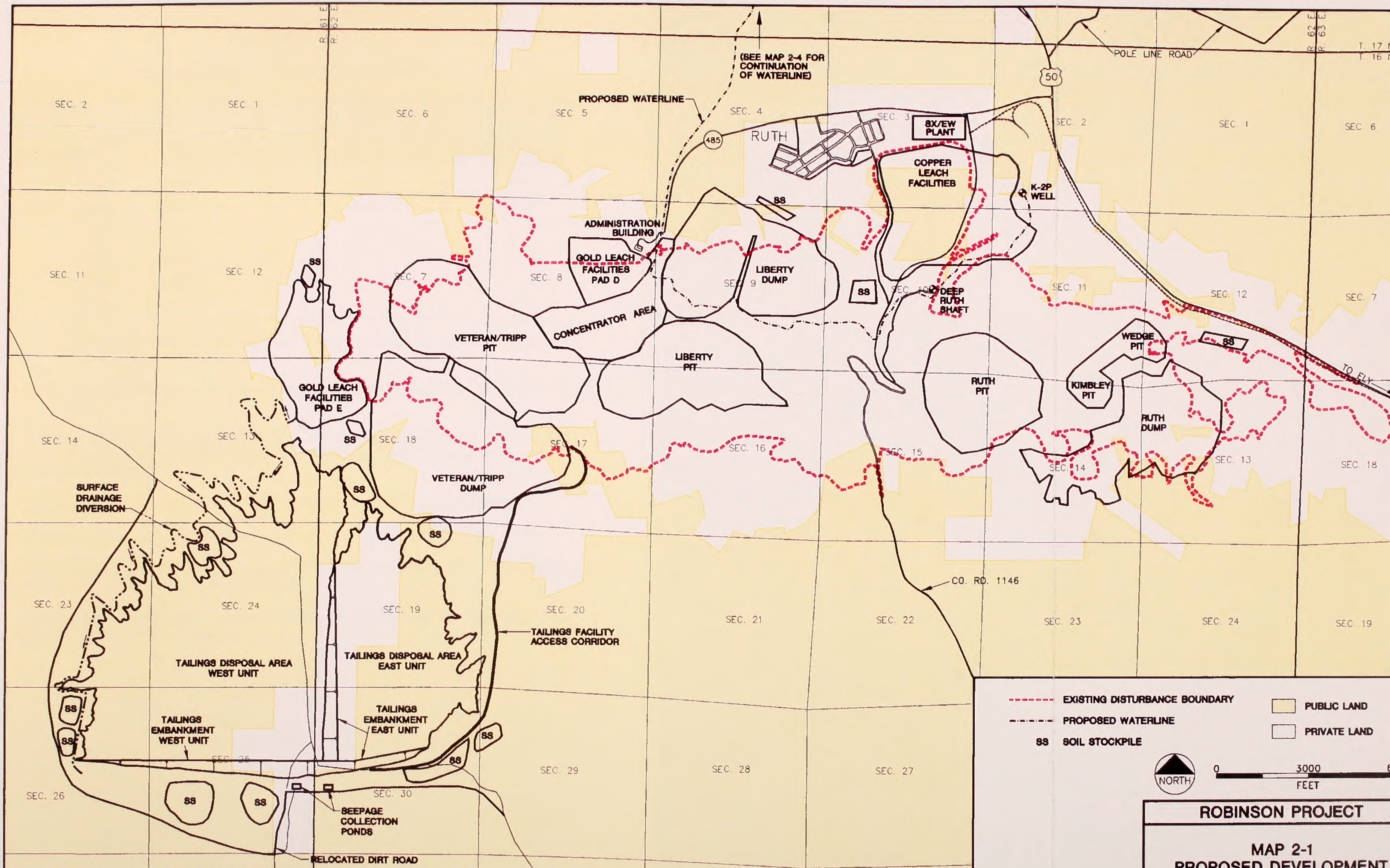
All mining of new ore would be conducted on property owned by RMLP and would entail expansions of the existing Liberty, Veteran-Tripp, Ruth, Kimbley, and Wedge open pits, formerly mined by Kennecott. As currently envisioned, conventional truck and shovel open-pit mining methods would be used. Exact mining rates would depend on economic conditions and operational factors, and waste production would vary with necessary stripping ratios. Mining would proceed 24 hours per day, 365 days per year, at an average rate of 42,500 tons per day sulfide copper ore and a range of 75,000 to 180,000 tons per day waste. Oxide gold and/or acid-soluble copper leach ores also are included in this waste material. Keystone Dump material would be excavated and placed upon the copper leach pad at a rate of 25,000 to 30,000 tons per day.

Current plans call for mining the Liberty Pit first, increasing its depth an additional 150 feet from its current base elevation of 6,525 feet. Final proposed disturbance is 279 acres. The south side of the existing Liberty Pit would not be redisturbed. The Veteran-Tripp Pit would then be mined, lowering the base elevation on the Tripp side from 6,700 feet to 6,450, and on the Veteran side from 6,665 feet to 6,000 feet. The area of the combined Veteran-Tripp Pit would be expanded from about 228 acres to approximately 377 acres, affecting approximately 46 acres of undisturbed land. Mining would then proceed to the Ruth Pit. The pit would expand from approximately 194 acres to 254 acres, including approximately 4 acres of undisturbed land, and its base elevation would drop from the current 6,420 feet to 6,150 feet. The final pits to be mined would be Kimbley and Wedge, which are located entirely on private lands. Final base elevations in Kimbley and Wedge would be 6,650 feet and 6,550 feet, respectively.

Liberty Pit contains approximately 64 million tons of ore; the Veteran-Tripp Pit approximately 97 million tons; the Ruth Pit approximately 33 million tons; and the Kimbley and Wedge Pits approximately 6 million tons. These figures are based on an economic cutoff for mill grade ore and would change with fluctuations in the price of copper, changes in operating costs, or revisions of ore reserve estimates.

Liberty, Ruth, and Kimbley Pits currently impound water from surface and groundwater sources and would require dewatering prior to being mined. The Liberty Pit was dewatered and mined by Kennecott in 1968. The recent dewatering of the Liberty Pit by RMLP, which involved a transfer of water from the Liberty Pit to the Ruth Pit, began in September 1992 and was completed in November 1993. This dewatering activity was authorized by the Nevada Division of Environmental Protection (NDEP) under Permit No. NEV92102. Transfer of Liberty Pit water increased the volume of Ruth Pit water from approximately 1.7 billion gallons to a current approximate volume of 3.0 billion gallons. Addition of Liberty Pit water raised the water level in the Ruth Pit approximately 42 feet, to an elevation of 6,682 feet (see Table 2-2). Water would be stored in the Ruth Pit until it can be used in both the leaching and milling operation. No pit water would be discharged to surface drainages from future mining activities.

RMLP plans to use water from the Ruth Pit for various processing activities, including its copper heap leaching operation as well as for makeup water for the mill. Temporary storage of this water in the Ruth Pit is necessary because the



ROBINSON PROJECT

MAP 2-1
PROPOSED DEVELOPMENT

Table 2-2

Pit Water Elevations, Areas, and Volumes

Pit	Elevation of Water (feet MSL)		Surface Area of Water (acres)		Volume of Water (acre feet)	
	Current	Final	Current	Final	Current	Final
Liberty	6,561	6,685[1]	5	152.6	82	21,660
Veteran	Dry	6,500[4]	0	44.5	0	6,690
Tripp	Dry	Dry	0	0	0	0
Ruth	6,682	6,640[1]	64.9	87.0	9,205	19,790
Kimbley	6,723	6,723[2]	1.1	8.5	[3]	430
Wedge	None	6,723	0	23.3	0	2,175

[1]Assumes that final water elevation would be equal to July 1991 water elevation in Liberty and Ruth Pits.

[2]Assumes that the final water elevation would be equal to the existing water elevation in Kimbley Pit.

[3]The current volume of water in the Kimbley Pit cannot be estimated because the existing depth of the pit is unknown. After mining, the Kimbley Pit was backfilled with an indeterminate amount of waste from the Ruth Pit.

[4]Final water elevation in Veteran and Tripp Pits estimated using the following assumptions:

The water table is just below the existing floor of the Veteran Pit, 6,665 feet MSL;

Inflow occurs across the entire surface of the final pit walls at a rate equal to the average transmissivity of Liberty and Ruth rock types; and

The average annual precipitation is approximately 14 inches and the average annual evaporation is approximately 45 inches.

leach facility and mill would not be initially available to accept this processed water. Dewatering of the Liberty Pit would continue at an approximate rate of 200 to 500 gallons per minute (gpm) through a sump or a series of sumps within the pit and wells located in the pit wall. This water also would be stored in the Ruth Pit until it could be used in the copper production process. Dewatering of the Liberty Pit would be terminated once mining of the pit has been completed.

Based on the current mining plan, activities would then proceed to the Veteran-Tripp Pit. Data indicate that the deepened Veteran-Tripp Pit may intercept groundwater, but only from discrete faults or historic underground mine workings. It may be possible to effectively seal these openings and limit inflow to a volume less than the evaporation rate. However, should there be an inflow of groundwater, the pit would be dewatered during operation.

The Ruth Pit would be the last major pit to be mined under the current plan. The Ruth Pit is expected to have been dewatered during the first years of leaching and milling operations, and to be continuously dewatered for use in the production processes.

During the final years of the Robinson Project, mining would proceed to the Kimbley and Wedge Pits. The Kimbley and Wedge Pits would be dewatered, and the water used in the leaching and milling operations.

Subsequent to mining, the pits would begin to impound water from both surface and groundwater sources, forming pit lakes. Since Liberty, Ruth, and Kimbley Pits currently contain pit lakes, the expansions of these pits would cause the ultimate, post-mining pit lakes to be larger in size and volume. The Veteran-Tripp Pit currently only contains a small pool of water, which is considered to be derived only from surface water sources. However, with expansion, it also is expected to form a pit lake. Table 2-2 summarizes the current status and ultimate elevation and volume of the predicted pit lakes in each of the pits.

The mining sequence presented above could change as further definition of the various ore bodies continues. It also is possible that mining could proceed in more than one pit at a time, particularly if necessary to meet the requirements of the leaching operation. Further, pre-stripping activities would be required in advance of bringing any pit into production, and some overlap and simultaneous mining of multiple pits would also be expected to maintain a constant feed to the mill.

Dewatering of the pits is subject to the permitting requirements of the NDEP, which includes requirements for monitoring surrounding groundwater quality, reporting of monitoring results, as well as contingency actions if monitoring indicates a potential to exceed water quality requirements in the state water pollution control permits.

2.2.3 Haul Roads

For the most part, existing haul roads would be utilized to haul material to the crusher, stockpiles, leach pads, and waste rock disposal areas. Some realignment of these roads would be necessary, and extensions of these roads would be required to bring ore to the new mill site. However, haul roads are not expected to create new disturbances, as they would be constructed on previously disturbed land. Waste rock and ore would be hauled to the disposal areas and mill using 240-ton (net load) haul trucks.

During operation of the Robinson Project, water trucks would be used, as needed, to control emissions of fugitive dust from the haul roads, as well as other roads within the project area. Wetting agents and binding agents, such as magnesium chloride, also may be used, if needed, to further control dust emissions.

2.2.4 Waste Rock Disposal Areas

No new waste rock disposal sites are proposed for RMLP's activities. Some of the existing dumps created by Kennecott's historic mining in the Robinson District would be used and expanded, while others would not be used by RMLP. The expansions would result in disturbances to approximately 569 additional acres. The Veteran-Tripp Dump on the western end of the site would be expanded by 340 acres to the west and south, the Liberty Dump on the north (formerly the Sunshine-Puritan-Juniper Dumps) would be extended 104 acres, and on the southeastern end of the project site, the Ruth Dump (formerly the Ada-Twin Peaks Dumps) would be extended approximately 125 acres.

Prior to the expansions of existing dumps to undisturbed areas, soil would be removed and stockpiled for future use in reclamation. The topography in some of these areas, particularly the eastern corner of the Veteran-Tripp Dump and the southern extensions of the Ruth Dump, seriously limits the availability of soil material. Soil would be recovered to a depth greater than 1 foot where practicable to generate growth medium. However, nearly half of the dump construction would occur on previously disturbed areas, which seriously limits the amount of soil or growth medium that could be pre-stripped for subsequent use in revegetation.

A series of diversion ditches would be constructed to convey the 24-hour, 100-year storm event. They would intercept natural stormwater flows in natural, intermittent drainages at points upstream of respective waste dumps, redirect that flow around the waste dumps, and return that flow into natural drainages downstream of the waste dumps. Protection berms and retention ponds would be built below the waste rock dumps to control runoff coming off the waste rock dumps. These runoff controls would be constructed to contain runoff both from the proposed waste rock dumps to be expanded as well as those which would not be subject to additional or continued disturbance. Conceptual designs were developed using a 24-hour, 100-year storm event. Runoff from disturbed areas would either be contained, or controlled pursuant to surface water quality standards for stormwater runoff, prior to discharge to natural water courses, including Gleason Creek. Stormwater pollution prevention practices and procedures would be developed, and revised and improved, if necessary, during the life of the project as specified in approved stormwater pollution prevention plans as required by Federal and state regulations.

The U.S. Army Corps of Engineers (COE) HEC-1 Rainfall-Runoff Model was used to estimate peak discharges and runoff volumes for sizing of the diversion ditches and retention ponds. Channel alignments were selected to minimize potential mixing of runoff from undisturbed areas with runoff from disturbed areas, and to minimize diversion channel size while optimizing retention pond locations. Preliminary channel sizing was based on trapezoidal channel cross-sections with 10-foot bottom widths, 2:1 side slopes, and bedslopes ranging from 0.1 percent to 13 percent. The channels would be riprapped as needed to limit erosion and would be inspected and maintained after major storm events.

The proposed retention ponds would be sized to accommodate the estimated runoff from the 24-hour, 100-year storm event. Sediment transported from the waste dumps to the ponds would be removed regularly and disposed of within the waste dumps. Several of the retention ponds would be constructed against mine waste dumps. In these areas, the side slopes of the retention ponds would be lined to prevent pond water from seeping through the waste rock material. RMLP would inspect the runoff containment system after major precipitation events, when substantial volumes of runoff are retained in the collection system. Sampling and analysis of water in retention ponds would be performed to identify any water quality problems.

Representative waste rock that would be removed from pits has been subjected to static testing to determine net carbonate values (NCV), and kinetic, humidity cell testing to determine acid-generating potential (PTI 1994). Based upon the results of these tests and the ore/waste rock evaluations to be performed continuously during mining operations, determinations would be made on the specific handling, placement, and mixing of waste rock. Waste rock with acid-generating potential would be placed in disposal areas in a manner to preclude infiltration by rain and air. Several procedures would be utilized, including isolating the waste rock in the interior of disposal areas by covering it with nonacid-generating waste rock. Tests have shown that limestones and sandstones have high NCVs with no potential to generate acid. These characteristics were confirmed with humidity cell tests, which are detailed in the technical report (PTI 1994). These materials would be used to the maximum extent on dump surfaces. Other materials (e.g., Chainman Shale) with very low or slightly negative NCVs could be acid-generating. Although humidity cell tests performed on these materials have not demonstrated acid-generating potential, if ore/waste rock evaluation identifies any of this material as having acid-generating potential, it would be placed at least 5 feet below the dump surface to prevent exposure to air and infiltrating precipitation, or would be mixed with high NCV waste rock.

Rock types which have demonstrated acid-generating potential, based upon static and humidity cell testing (rhyolite, porphyries), would also be isolated 5 or more feet below ground surface within the dumps. Also, material is present in Liberty, Ruth, and Kimbley Pits that was subjected to historical leaching activities and is acidified. Since this material would be removed from the pits early in the mining process, it would be isolated well within the interior of the proposed dumps, from 20 to 100 feet below the surface and would be isolated from infiltrating precipitation and air. Samples would be taken and analyzed more frequently based on the type of material being mined and evidence of its potential to degrade waters of the state. Quarterly samples of each major waste rock type characteristic of waste rock being mined would be analyzed by the NDEP's Meteoric Water Mobility Procedure and subjected to static acid-generation testing to determine the rock's potential to degrade waters of the state.

2.2.5 Concentrating

RMLP proposes to construct a concentrator for sulfide ore north of the Liberty Pit (Map 2-1). The average production rate would be 42,500 tons per day. The process would include crushing, semi-autogenous and ball mill grinding, flotation, thickening, filtration, and concentrate loading. Ore from the mines would be trucked to a gyrator crusher, which would reduce the rock to less than 6 inches in diameter. The crusher has been permitted to operate 24 hours per day, at a rate of 3,500 dry tons per hour, but would normally operate only 19 hours per day at an average rate of approximately 2,210 tons per hour; the annual maximum provided for in the present air quality permit is 23,772,000 tons. Particulate emissions would be collected and controlled by a dust control system capable of meeting applicable New Source Performance Standards (NSPS).

The crushed ore would be transported through a covered conveyor system and deposited in a 245,000-ton ore stockpile adjacent to the concentrator building. Dust emissions from the drop point would be controlled by a pneumatic water spray dust suppression system. Ore would be drawn from the stockpile and fed to a 32-foot-diameter semi-autogenous grinding mill and then to two ball mills at a maximum permit rate of 2,710 tons per hour, with an annual cap of 23,772,000 tons. Emissions from the ore reclaim system would be collected and controlled with a dust control system.

Permits to construct the sources of particulate emissions have been issued by the NDEP Bureau of Air Quality. Permitted emission rates are below the threshold that requires a permit under Prevention of Significant Deterioration (PSD) regulations.

After crushing and grinding, the ore would be fed to a series of flotation cells and aerated with flotation reagents, causing the copper-bearing sulfide minerals to float to the top of the cell. A list of the flotation reagents that may be used in the concentrator is found on Table 2-3. The "rougher" concentrate would then be skimmed from the cells and reground in tower mills to further reduce the particle size and liberate unwanted constituents. The concentrate would again be floated, and the resultant "cleaner" concentrate would be thickened, pressure filtered, and loaded into rail cars for transport to Magma Copper Company's smelter in San Manuel, Arizona, or to some other smelting facility, for further processing. Gold, silver, and other by-product metals contained in the concentrate would be recovered off-site after final refining activities.

The underflow from the flotation cells would be thickened to a density of 45 to 55 percent solids in two 230-foot-diameter thickeners and sent to the tailings impoundment for deposition of the solids and recycling of the water.

The molybdenum recovery circuit would subject the "cleaner" concentrate to an additional flotation step, where sodium cyanide may be added to depress the copper and allow a molybdenum sulfide concentrate to be recovered separately. The molybdenum sulfide concentrate would then be dried and packaged in drums for shipment off-site. Based on Magma Copper Company's experience at its Arizona facilities, if sodium cyanide is used, then 0.5 pound of cyanide per ton of copper concentrate would be added in the molybdenum flotation cells. The majority of the cyanide remains with the copper concentrate and is degraded or destroyed prior to or during the smelting process. A low cyanide concentration remains in the solution, which is recovered during thickening of the copper concentrate. This solution is recycled to the milling process, and results in a total cyanide concentration in the range of 1 part per million (ppm) or less in the tailings.

The concentrator complex would also include a truck shop, warehouse, and office building. A fire truck would be located on the property for use in fighting fires on the property. RMLP would train an in-house fire brigade in the proper use of this equipment. Except as required for safety and health considerations, buildings in the concentrator complex would be painted in natural

Table 2-3

Potential Mill Reagents

Copper Flotation Reagents				
Chemical Name	**Trade Name**	**Use**	**Usage Rate (lbs/ton ore)**	**Maximum Concentration Tailings (in mg/l)[1]**
Sodium isopropyl xanthate	AX343	Collector	0.1	0.88
Potassium amyl xanthate	AX350	Collector	0.1	0.88
Sodium diisobutyl dithiophosphate	AERO 3477	Collector	0.04	0.35
Mercaptobenzothiazol	AERO 404	Collector	0.05	0.44
Methyl Isobutyl carbinol	MIBC	Frother	0.1	17.54
Diaryl dithiophosphoric acid	AERO 242	Collector	0.03	0.26
Alkoxy carbonyl alkyl thiourea	AERO 5500	Collector	0.06	0.53
Methyl N-butyl thionocarbamate	MINEREC 1331	Collector	0.06	0.53
M-Dodeyl mercaptan	CO 125	Collector	0.05	0.44
Anionic acrylic polymer	DP-6	Dispersant	0.2	17.54
Polypropylene glycol methyl ether	AEROFROTH 65	Frother	0.05	8.77
Sodium silicate	--	Dispersant	1.1	96.49
Lime	--	pH control		
Reagents	**Molybdenum Flotation**		**(lbs/ton concentrate)**	
Sodium hydrosulfide	--	Depressant	40 to 50	--
Ammonium hydrosulfide	--	Depressant	40 to 50	--
Ferrocyanide	--	Depressant	0.5	--
Sodium cyanide	--	Depressant	0.5	--

[1]Maximum theoretical tailings concentrations have been estimated based on anticipated dosage rates and suppliers' estimates of percentages that may remain in tailings. For these calculations, a mill water to ore solids ratio of 2.85:1 was used, and 5 percent of collectors, 50 percent of dispersants, and 100 percent of frothers were assumed to remain in the liquid phase of the flotation circuit. The estimated values for reagents in tailings water are considered to be much higher than those anticipated under operational conditions because they do not account for oxidation, chemical or biological degradation of the reagents, or attenuation/adsorption on tailings solids.

shades to limit strong contrasts with the surrounding environment.

2.2.6 Tailings Disposal Facility

RMLP proposes to construct a new tailings disposal facility in Giroux Wash consisting of an embankment and a tailings impoundment area (Map 2-1). Tailings would be transported from the mill to the impoundment via a pipeline in a slurry of water and fine solids and deposited in the impoundment. The tailings disposal facility would also involve ancillary facilities, including an access road, power line, tailings slurry delivery system, tailings solution reclaim and recycling system, surface water diversions, embankment seepage return system, groundwater monitoring wells, and an embankment stability monitoring system.

The facility would be constructed in two phases. The East Unit would have a capacity of approximately 80 million tons and cover approximately 753 acres of land. Construction of the East Unit would begin immediately upon approval of the project, estimated to be in late 1994. At current projected mill production rates, the East Unit could contain tailings generated during the first 5 years of the project. The West Unit would have a capacity of approximately 200 million tons and cover approximately 1,422 acres of land. Construction of the West Unit would begin 12 to 18 months prior to filling of the East Unit. At current projected mill production rates, the West Unit would contain tailings generated during the final 10+ years of the project. Combined, both phases would have the capacity to store in excess of 280 million tons of mill tailings and cover an area of approximately 2,174 acres, including 1,712 acres of public land administered by the BLM and 462 acres of private land owned by RMLP.

Prior to construction of the embankment or deposition of tailings within the impoundment, the native surface soils would be removed and stockpiled for future reclamation of those areas. An average depth of 12 inches of native surface soils would be recovered in the area of the tailings disposal facility. However, it is expected that the depth of soil will vary; some areas, such as ridges and slopes, have no soil cover, while others, primarily in the drainages, have more than 12 inches. In the latter areas, soils would be salvaged to a depth greater than 12 inches to provide a sufficient volume of salvaged soil for use as growth medium at an average depth of 12 inches over the entire tailings disposal facility. Native soils would only be removed prior to construction and deposition of tailings to reduce the potential for windblown dust or fugitive emissions. Stockpiles would be graded and seeded with an interim seed mix to minimize wind and water erosion. Stockpile locations are shown on Map 2-1.

Construction and operation of the tailings disposal facility is authorized by Water Pollution Control Permit NEV92105 granted by the NDEP. A copy of the permit and the detailed permit application, including a complete set of design drawings, is on file at the BLM Ely District office and the NDEP in Carson City. A permit to construct the dam has been issued by the Nevada Department of Water Resources (NDWR), Nevada State Engineer.

Approximately 3.5 acres of intermittent stream channel within the area of the tailings disposal facility are subject to regulation by the COE pursuant to Section 404 of the Clean Water Act (CWA). Regulations (33 CFR 330.7 [b]) require that the COE be notified of this activity and a permit obtained. Since the total surface area of the stream course affected would be less than 10 acres, this activity would be covered under a Nationwide Permit. In November 1992, RMLP submitted to COE an Amended Notice of Intent to be covered under a Nationwide Permit.

Construction of the West Unit of the tailings disposal facility would eliminate a section of the Old Lincoln Highway, as well as an existing, unimproved dirt road that is used for access in this area. The Old Lincoln Highway has already been severed by historic mining activities in the Robinson District. RMLP proposes to reroute the unimproved dirt road to maintain access as shown in Map 2-1.

2.2.6.1 Tailings Embankment

The tailings embankment would be constructed in two phases, each corresponding to the respective phased impoundment areas. The East embankment would be L-shaped. The West embankment would extend east-west only and be connected to the southwest corner of the East embankment, where it has the 90-degree bend. In addition, three saddle dams would be constructed on the southeastern edge of the East embankment to contain tailings that would otherwise overflow through low areas along the ridge line. These components of the embankment are shown on Map 2-1.

Both phases of the embankment would be built by first constructing a starter dam from native subsurface soil materials excavated from within the impoundment area. Construction of the starter dams would require 3.3 million cubic yards of soil materials. Subsequently, the height of the embankment would be raised by successive deposition of the tailings on top of the starter dam. The starter dam would vary in height, up to a maximum of 65 feet. From this starter dam, the embankment would be constructed to its ultimate height of approximately 190 feet by placement of successive lifts of tailings, using a centerline construction method. In this method, tailings are separated into a drained coarse sand fraction, referred to as underflow, and a slurry of fines and water, referred to as overflow or slimes. Cyclones or other particle-sizing equipment is used to accomplish this separation. The coarse sands from underflow would be used to construct the downstream face of the embankment, while the fines and tailings solution water are deposited on the upstream face.

The downstream face of the starter dam would be constructed at a 2.5:1 slope, and cycloned tailings would be placed at a slope of 2.5:1. Catchment berms would be placed in advancing stages at the downstream toe of the embankment to contain any sands that are eroded from the face.

2.2.6.2 Embankment Seepage Collection System

The starter dam and ultimate embankment would be placed on a constructed, low-permeability (10^{-5} centimeters/second) layer of compacted soils. This layer collects and directs seepage from the embankment into seepage collection ponds located on the downstream side of the embankment. Collection and conveyance of seepage is facilitated by a drainage blanket of high-permeability soils -- produced by mechanical screen separation of the coarse fraction of natural subsurface soil materials excavated from within the impoundment area -- which is placed on the low-permeability soils. In addition, perforated pipes are integrated into the drain blanket, both of which drain into the seepage collection ponds. There would be two separate seepage collection ponds, one for each phase of the tailings disposal facility.

This seepage collection system is designed to transmit water from the embankment into the seepage collection ponds. This water would drain from tailings placed on and immediately behind the embankment. Water in the seepage collection ponds would be pumped back into the tailings impoundment pool for eventual use as process makeup water.

Each pond would be lined with a single synthetic membrane liner. No leak detection and recovery system is planned for these ponds. Water in the ponds would be sampled periodically to monitor quality. The seepage collection ponds would be enclosed with an 8-foot mesh fence.

Each pond would have a capacity of 1,450,000 gallons, representing the maximum combined volume resulting from seepage through the embankment area, plus the precipitation falling into the ponds from a 24-hour, 25-year storm event, plus 2 feet of freeboard, combined with a 10-hour power outage. The latter accounts for the amount of water that would normally be pumped out of the seepage collection pond during that 10-hour period. In addition, an auxiliary generator would be available to recycle water into the tailings impoundment in the event a power outage lasted more than 10 hours.

The West Unit seepage collection pond would double the holding capacity of the seepage collection system. Since cessation of tailings deposition into the East Unit and its subsequent closure would reduce and eventually eliminate seepage through that section of the embankment, this effectively doubles the holding capacity of the seepage collection system, extending the power outage contingency beyond 10 hours.

The method of construction, utilizing a starter dam followed by raising the embankment with tailings and seepage collection within the embankment, provides for a structurally stable embankment, which is more efficient and cost-effective than an embankment constructed of solely excavated earthen materials. The embankment has been designed to sustain a seismic event measuring 6.8 on the Richter scale.

2.2.6.3 Tailings Impoundment and Solution Recycling Systems

As previously noted, the tailings impoundment would consist of two phases, located in two distinct areas. Tailings would be deposited in the East Unit area during the first 5 years and in the West Unit during the subsequent 10 years. The method of tailings deposition would be the same for both phases--the overflow of fine tailings and tailing solution water would be pumped through multiple spigots placed on the crest of the embankment. As this tailings slurry flows into the impoundment, the solids settle out and form beaches. The water flows into a pool that forms within the impoundment area.

Tailings solution water placed into the impoundment would form a pool of water. In addition, surface water resulting from precipitation, both from within the impoundment and that portion of the watershed that is not diverted, would contribute to the volume of water in this pool. The height of the embankment is designed to contain the normal operating volume of water, completely within the impoundment, combined with the amount of surface water runoff from the 24-hour, 100-year precipitation event. Water from this pool would be recycled back to the mill to be used as makeup water in the mineral processing operation.

The size and location of the impoundment pool would vary during the life of the project. The size of the pool would be affected by the amount of tailings deposited, precipitation, evaporation rates, seepage rates into the designed embankment seepage collection system, infiltration into underlying soils, and water recycling rates. The location of the pool would migrate within the impoundment area as tailings beaches form. Tailings deposition would be managed to force the pool away from the embankment toward the upstream reaches of the impoundment. Barge-mounted pumps would be located within the pool to recycle water back to the processing facilities.

2.2.6.4 Tailings Slurry Delivery System

Tailings would be delivered from the processing facilities to the tailings disposal facility via a system of pipes, tanks, and pumps consisting of three sections. The first section would transport tailings from the processing facilities into a break tank located near the crest of the existing Veteran-Tripp waste rock dump. This section would consist of two rubber-lined steel and/or high-density polyethylene (HDPE) pipelines, approximately 20 to 22 inches in diameter. The tailings slurry would be pumped through these pipes from the processing facilities to the break tank. In the event of a power outage or other pump failure, tailings in this section of the line would gravity-drain back into the thickener tanks in the processing facilities, which would be designed with adequate capacity to contain these tailings. Sensors would be installed on the tailings pump motors to sound an alarm and/or shut down the pumps if the pipeline ruptured. Secondary containment would be accomplished with ditches, berms, and catchment basins, also designed with adequate capacity to contain tailings should the line rupture.

The second section of the delivery system would consist of a single, HDPE pipeline, approximately 22 inches in diameter, from the break tank to a cyclone feed tank on the eastern edge of the tailings disposal facility. This section of the line would operate by gravity flow. In the event of a power outage or other tailings line failure, tailings in this section of the line would gravity-drain into the tailings impoundment. Secondary containment would be accomplished with ditches and berms, which would also drain into the tailings impoundment.

The third section of the delivery system would consist of three 20-inch HDPE pipelines from the cyclone feed tank to the embankment. Tailings would first be mixed with reclaim water from the impoundment pool in an agitated repulp tank and then cycloned for embankment construction and deposition into the impoundment.

2.2.6.5 Ancillary Facilities for the Tailings Disposal Facility

The pipelines and electrical distribution line would be installed along an access road running from the mill to the tailings disposal facility. The access road would be an average width of 15 feet; the corridor (utilities and road) would be a maximum of 85 feet wide. Culverts would be installed at drainage crossings. The electrical distribution line for pumping of reclaim water would be a 13.8-kV line installed on wooden poles with standard raptor-protective design. The tailings pipelines and tailings water reclaim lines would be located in a secondary containment ditch within the 85-foot-wide corridor. The locations of these facilities are shown on Map 2-1.

No surface runoff diversion would be built during construction and operation of the East Unit of the tailings disposal facility. The watershed upgradient of the East Unit impoundment area would be approximately 2.5 square miles, which includes undisturbed areas and waste rock dumps. Because of the small size of the watershed, any runoff could be adequately contained within the impoundment. In addition, runoff and sediment from the dumps would then be contained within the impoundment.

Runoff would be diverted around the West Unit impoundment area. A ***permanent*** diversion channel would be constructed around the west side of the impoundment just prior to construction of the West Unit embankment. It would be approximately 34,000 feet long, with 2:1 side slopes, an average gradient of approximately 0.1 to 0.2 percent, and range in depth from 8.5 feet at the head to 10.3 feet at the mouth. Because the diversion channel would have a gentle slope and high capacity, the channel substrate would be predominantly composed of the natural, in-place, subsurface soils. At the confluence of the diversion channel and the natural downstream drainage, riprap would be used on the bottoms and sides to prevent erosion. Riprap or other acceptable erosion prevention methods would be used only as necessary in other sections of the diversion channel where high erosion potential occurs.

The West Unit channel would intercept runoff originating from a number of defined and undefined natural drainage courses draining 13.6 square miles of watershed upgradient of the West Unit impoundment area. This channel would reconnect to the natural Giroux Wash drainage course just below the embankment. It has been designed and would be constructed to convey the flows from a 24-hour, 100-year storm event, which is a maximum of 2,050 cubic feet per second in the downstream section. The channel is expected to be dry most of the year because all of the drainages intercepted are intermittent, flowing only in response to major precipitation events.

Environmental monitoring would include regular field inspection of pipelines, pumps, spigots, and secondary containment ditches and berms to ensure that these components are functioning properly. The seepage collection ponds and the tailings impoundment pool would be visually observed on a daily basis to ensure that pond and pool volumes are within normal operating ranges. The stormwater diversion channel above the West Unit tailings impoundment area would be inspected after major precipitation and runoff events, and cleaned out as needed to maintain sufficient capacity for the design storm event.

2.2.7 Copper Leaching and Solvent Extraction/Electrowinning

2.2.7.1 Copper Heap Leaching Activities

RMLP proposes to conduct heap leaching operations to recover copper from new ore in the open-pit mines and from waste material left on-site by Kennecott's activities. These leach operations would take place on both undisturbed and previously disturbed public and private land.

The Keystone waste rock dump was created by Kennecott during its mining activity in the Robinson District. This dump, containing approximately 85 million tons of mixed oxide and sulfide material, sits primarily on public land, on the north side of the project area and to the southeast of Ruth (see Map 1-3). Kennecott attempted to leach this dump with sulfuric acid to remove contained copper values, but abandoned the project due to operational problems. In addition, leachable ore has been identified within the areas of planned expansion of the existing open-pit mines. Current estimates, based on preliminary data, suggest a leachable reserve of approximately 11 million tons of oxide ore. Additionally, approximately 125 million tons of low-grade sulfide ore have been identified. RMLP would develop leaching techniques to recover copper values from at least a portion of this ore.

RMLP proposes to construct a heap leach facility for this material. A synthetic liner would be installed, newly mined ore and Keystone waste rock would be agglomerated to aid in infiltration of leach solution, and dilute sulfuric acid would be applied to liberate copper values. Solvent extraction and electrowinning technology would be used to recover copper from the pregnant leach solution (PLS). With the exception of the leaching agent, the design and operation of the leach pad and ponds would be similar to heap leaching operations for gold ores, as described in Section 2.2.8.

The proposed location for the leach facility is shown on Map 2-1. The leach pad must be close to the existing dump in order to minimize haul distance and make recovery of copper from the Keystone Dump economically feasible. The only available area with sufficient space for the leach pad is the Keystone Dump and the adjacent land to the east. The section of County Road 1146 that runs along the east side of the Keystone Dump would be closed, and traffic would use the existing road along the west side of the dump. This road passes through the east end of Ruth (see Map 2-1). County Road 1146, which connects with U.S. 6 south of the mine area, would remain open to traffic throughout the life of the mine. Pad construction would start on the area of undisturbed ground to the east of the Keystone Dump and expand to the west as the Keystone Dump is mined and ore transported to the leach pad. Mining and placement of Keystone material on the pad would occur simultaneously with mining and leaching of new ore. The exact sequence of these activities and the relative placement of the two ores would be determined by the mining rate of new leachable ore and the schedule to mine the Keystone Dump.

The pad would be built in three phases, with the eastern portion completed first and covering the currently undisturbed land to the east of the Keystone Dump. The eastern half of the Keystone Dump would have to be excavated and placed on Phase I of the pad to make room for construction of Phase II. The remaining western half of the dump would then have to be moved before construction of the Phase III pad. The northwestern corner of the Keystone Dump would be the last portion to be mined in order to limit noise impacts on Ruth from the construction and operation of the leach facility.

As currently planned, the first phase of the leach facility would utilize approximately 168 acres of land and include the solution ponds. The second phase would add approximately 95 acres to the pad, and the final phase would consist of approximately 104 acres of land. The exact configuration of each phase of the pad may be modified during development of the final design, which may change the acreages of each phase of construction. However, the total disturbance would remain approximately the same (367 acres).

Movement and leaching of the Keystone Dump would trigger both BLM and Nevada reclamation requirements. Upon cessation of leaching activities, the heap would be closed as required by NDEP regulations and reclaimed as required under the BLM and state reclamation programs as described in Section 2.2.15.

2.2.7.2 Design and Construction of Copper Heap Leach Facilities

The leach facility would be designed in a manner substantially identical to that normally used in precious metals heap leach facilities and would comply with the State of Nevada Regulations Governing Design, Construction, Operation and Closure of Mining Operations (NAC 445.242-445.24388, inclusive), the BLM Cyanide Management Policy (as applicable to acid leach facilities), as well as other applicable state and Federal regulatory requirements. The application for the state water quality permit (including the detailed engineering design plans), the quality control and quality assurance plans for facility construction and liner installation, and the operating and closure plans are on file at BLM's office in Ely.

The pad would be built in three phases, with each phase segmented into three cells. Each phase of the pad would be designed and constructed in the following manner. After the surface has been cleared of vegetation, approximately 1 foot of soil would be removed and stockpiled for use in future reclamation. As with other soil stripping activities, more soil would be recovered from areas with deeper soil to account for areas that cannot provide 1 foot of this material. The surface would then be graded to the north to a minimum 3 percent slope. A minimum 1-foot layer of soil liner would be placed on the surface in 6-inch lifts, with a permeability not to exceed 1×10^{-6} centimeters per second.

A leak detection and collection layer would then be installed over the soil liner, consisting of a minimum of 6 inches of granular material with a permeability of approximately 1×10^{-3} centimeters/second. Perforated pipes would be placed within this leak detection layer beneath all pregnant solution collection pipes and channels and on the upstream side of the cell separation berms. This system would be monitored weekly for evidence of leakage, as required in the NDEP water pollution control permit, and results of this monitoring would be furnished to the State and BLM.

An 80-mil very-low density polyethylene (VLDPE) synthetic liner would then be placed on top of the leak collection layer. Perforated plastic pipe would be placed on the synthetic liner on 15- to 25-foot centers to route PLS to external or internal collection channels. A drainage blanket overliner would then be placed over the synthetic liner and pipe network to protect the liner from punctures and to enhance drainage of PLS. This overliner would consist of a 2-foot-thick layer of minus 0.75-inch rock, with less than 10 percent minus 200 mesh. A second layer of 80-mil VLDPE would be installed in the external collection channels.

Ore would be stacked on the pad by conveyor, radial stacker, or truck haulage in lifts of approximately 20 to 30 feet in height. Run-of-mine ore excavated from the various open pits, as well as Keystone Dump material, would be placed to an ultimate height of approximately 300 feet. The conveying system would include a series of enclosed drop points where water, and possibly acid, would be added to agglomerate the ore to aid in the percolation of solution through the heap. This design also would minimize the emission of fugitive dust. The heap side slopes would be constructed with an overall slope of 2.5H:1V, with a series of horizontal benches and interbench slopes at angle of repose. This design provides for long-term mass stability and erosional stability and would facilitate final reclamation.

Surface runoff would be diverted to prevent run-on to the leach pad from the 24-hour, 100-year storm event. Drainage down Fisher Canyon would be rerouted to a storm water collection channel around the eastern side of the leach pad, ***which would result in disturbance of about 0.2 acre of waters of the United States.*** During construction and operation of Phase I of the pad, a diversion ditch would be built to carry runoff between the pad and the Keystone Dump. Construction of Phase II would fill in this diversion ditch and require a new, larger diversion channel to be built around the western edge of the ultimate pad.

In addition to the leak detection and collection systems built into the pad, groundwater monitoring wells would be installed upgradient and downgradient of the leach facility. Sampling and reporting requirements would be included in the State water pollution control permit. The quality control/quality assurance plan would be part of the construction program for the leach facility. RMLP would contract with a third party to ensure that the program would be strictly followed.

Because of the high acid-consuming nature of some of the leach ore, RMLP is considering a "layered" leaching option. When leaching has been completed on a lift, the surface may be compacted and a new series of perforated drain pipes installed prior to the placement of the next lift. The next lift of ore would then be leached and the PLS could be recovered with minimal contact with previously leached ore. The drain pipes would route PLS down the sides of the heap directly to the external solution collection channels and thereby limit the re-leaching of lower lifts. If this option is pursued, the leak detection system would still remain functional and be able to detect any solution percolating through the lower lifts and penetrating the synthetic liner.

RMLP would cover, net, or otherwise prevent wildlife access to leach solution in external solution ditches in a manner acceptable to the NDOW and the BLM. If ponding of solution on the heap occurs, appropriate measures would be taken subject to NDOW and BLM approval.

The pond system for the heap leach facility would employ three ponds; a PLS pond, a barren solution (raffinate) pond, and an intermediate pond. The designs of these ponds would be identical, with 80-mil HDPE primary synthetic liners, 60-mil HDPE secondary liners, and HDPE geonet or other permeable material between the liners for leak detection and collection. Each leak detection and collection system would be routed to a sump to allow for sampling and determination of the leakage rate. Solution in the sump would be returned to the leach circuit.

The raffinate pond would be designed to contain the total of twice the average daily operating volume of solution and 17 percent of the 48-hour draindown from the pad, while still retaining a minimum of 2 feet of freeboard. The PLS and intermediate ponds would each be sized to the same criteria, with each having an additional capacity for one-half of the 25-year, 24-hour storm event over the area draining to the pond. A dedicated emergency backup generator and pump system would be available to recirculate leach solution in the event of a prolonged power outage. The ponds would be connected by spillways to allow their combined capacity to be used for stormwater or emergency storage. All three ponds would be equipped with devices to allow measurement of available capacity.

RMLP would obtain an Artificial Pond Permit from NDOW for the solution ponds and would fence the ponds with an 8-foot-high wildlife-exclusion fence designed to preclude most terrestrial wildlife, including big game, from entering the facility. The lower 4 feet of the fence would be small mesh to block access by small mammals. Covers, bird-exclusionary netting, or other proven techniques would be used to prevent access to the surfaces of these ponds.

2.2.7.3 Operation of Copper Heap Leach Facility

Current plans call for the leach pad to be loaded at an average rate of approximately 850,000 tons per month of combined Keystone Dump material and new ore from the open pits. The ratio of Keystone material and new ore would vary throughout the life of the project to accommodate the expansion of the pad and the mining rate of new ore. The pad would be loaded and leached on a continuous, year-round basis.

The pad would be built with internal berms segmenting each phase into three cells so that the facility could be operated as a "double-pass" system. Each cell would be equipped with individual collection pipes that could route pregnant solution to either the intermediate pond or the PLS pond. One cell would be leached with fresh leach solution, which would be collected in the intermediate pond and cycled back to a second cell for additional copper recovery. After this second pass through the heap, the pregnant solution would be collected in the PLS pond and then sent to the SX/EW plant for extraction of the copper. Leaching with fresh solution and with intermediate PLS would occur simultaneously on different cells.

The average solution application rate would be approximately 0.005 gpm per square foot, and each cell would be approximately 1.5 to 2 million square feet. Total solution application rate, including both stages of leaching, would be between 15,000 and 20,000 gpm. After initial conditioning of the heap with strong sulfuric acid, the strength of the acid in the raffinate applied to the heap would be approximately 10 grams per liter of sulfuric acid. Once the heap has been saturated, makeup solution requirements for the leach operation are estimated to be approximately 400 gpm.

Due to the variability of the materials in the Keystone Dump, as well as the different mineralogies and acid-soluble copper contents of the different ore types found in the open pits, it is assumed that some leaching parameters, such as application rates, solution strengths, or total areas under leach, may change through the life of the facility. If any such changes adversely affect the overall solution balance such that pond capacities are inadequate to meet NDEP requirements, permit modifications and/or facility reconstruction would be necessary.

An Emergency Response Plan for the environmental aspects of the leach facility operation is contained in the POO. This plan identifies response actions for sloughage of ore from the heap, evidence of leaks in pad or pond liners, and other contingencies. The PLS, raffinate, and intermediate ponds would be operated to prevent any surface discharges and to limit the potential for subsurface discharges. The solution balance for the facility indicates a net makeup requirement in all months of the year. Ponds would be maintained with containment capacity for the 24-hour, 25-year storm event and an additional 2 feet of freeboard. The pond system also would have capacity for 51 percent of the total 48-hour pad draindown and two times the daily operating volumes in the event of a power outage. A dedicated emergency backup generator and pump would be available to recirculate the remaining draindown solution back through the pad. Procedures to address power outages and other emergency or upset conditions are discussed in the Emergency Response Plan.

2.2.7.4 Solvent Extraction and Electrowinning

SX/EW technology recovers copper as high-purity cathodes directly from PLS. The leaching/SX/EW system consists of three closed loops: leaching, solvent extraction, and electrowinning. A dilute sulfuric acid solution is applied to the leach pad to mobilize copper from the ore. The pregnant solution drains into a double-lined pond and is then pumped to "mixer/settler" chambers, where it is mixed with kerosene and a proprietary additive designed to aid in the collection of copper. This solution selectively extracts copper from the pregnant leach solution. After agitation to mix the leach solution and the kerosene, these two immiscible solutions are allowed to separate. The barren leach solution is sent to the raffinate pond and then returned to the pad for continued leaching. The loaded solvent is mixed with high-concentration sulfuric acid, which strips the copper from the collector solution. The collector solution is recycled back to extract copper from pregnant leach solution, while the strong acid containing the copper becomes the electrolyte for the electrowinning cells.

In the electrowinning process, lead anodes and stainless steel cathodes are placed in cells containing the copper-rich sulfuric acid electrolyte, and a current is applied. Copper plates directly from the solution onto the stainless steel blanks, forming a cathode of high-purity copper suitable for sale.

The mixer/settler tanks used to contact the PLS with the solvent and the solvent with the strong acid are covered, enclosed vessels that prevent leaks to the environment and limit the potential for airborne emissions of reagents. The area containing these vessels would be graded and bermed to contain any spills or ruptures. The electrowinning cells are contained within a building, and plastic beads are floated on top of the cells to limit the evolution of sulfuric acid mist.

SX/EW technology generates two waste materials, a solvent extraction sediment from cleansing the solvent and a sludge that is periodically removed from the electrowinning cells. The sediment is a colloidal bacterial growth that is typically centrifuged and filtered with the residue placed on the leach pad. The electrowinning sediment (sludge) is chiefly comprised of lead particles that settle to the bottom of the cells and are collected and returned to the foundry that fabricates the anodes. The rate at which these wastes are generated depends on the metallurgy and physical and chemical characteristics of the ore.

The SX/EW plant would be located on approximately 29 acres of private land at the north end of the copper leach facility (Map 2-1). Ancillary facilities that would also be located in this area include two or more sulfuric acid storage tanks with a total capacity of approximately 500,000 gallons, and a 20,000-gallon kerosene storage tank. These volumes are subject to revision during the final design phase of the project. A number of other smaller tanks of various reagents would also be located at the SX/EW facility. Design criteria for all tanks would include construction with materials resistant to the tanks' contents, the ability to detect leaks, and secondary containment capacity for 110 percent of the volume of the largest storage tank. A layout of the facility, including secondary containment for all chemical storage tanks, can be found in the POO. Except as required for safety and health considerations, buildings and tanks in the SX/EW area would be painted with colors that would limit strong contrasts with the surrounding environment.

2.2.8 Gold Leaching

Gold leaching for the proposed Robinson Project would take place both on existing leach pads that are currently in operation on private land, as well as on a pad planned for future leach activities.

2.2.8.1 Use of Existing Gold Leach Facilities

Waste rock and overburden from the Liberty Pit containing leachable grades of gold would be trucked to the existing Pad D north of the proposed concentrator complex. The existing pad location is shown in Map 1-3. The design, construction, operation, and closure of this facility has been permitted by the NDEP (Permit No. NEV90030). An application for a state reclamation permit for this facility was submitted to the NDEP in April of 1993. Approximately 9 million tons of gold ore are anticipated to be mined from operations at the Liberty Pit, depending on the final cutoff grade selected. Pad D has a permitted capacity for approximately 6 million tons of additional ore. RMLP plans to amend its state water quality permit to expand the pad from its currently permitted 34 acres to a total of approximately 92 acres to accommodate an additional 12 million tons of ore. Map 2-1 shows the layout of the expanded pad. The state permit would also be amended to modify and update the pad design.

To construct the pad, a minimum of 1 foot of compacted clay with a maximum permeability of $1x10^{-5}$ centimeter per second would be placed in 6-inch lifts and then covered with 80-mil HDPE. A solution collection system consisting of 6- to 18-inch HDPE pipes would be placed on the top of the synthetic liner to route solution into internal collection pipes and external collection channels. The 6-inch piping would be placed on the upstream side of berms to compartmentalize the flows from different sections of the pad. Leak detection channels consisting of geonet wrapped in geotextile would be placed beneath the 12- and 18-inch piping that collects solutions from the 6-inch feeder pipes. A 2-foot-thick rock overliner would cover the pad and piping to protect them from damage, and a more permeable rock cover would be placed around the collection pipes.

The solution recovery and leak detection systems would be tied into the existing systems, and the pad would utilize the existing solution ponds. This facility is permitted under the NDOW Artificial Impoundment Program for protection of wildlife. Fencing, nettings, and reporting requirements would apply to the proposed pad expansion. Surface water run-on from the 24-hour, 100-year storm event would be diverted around the pad and ponds.

2.2.8.2 Proposed Gold Leach Facilities

The existing and expanded capacity on Pad D is anticipated to be sufficient to accommodate the bulk of the gold ore from mining the Liberty Pit. As mining progresses to the Veteran-Tripp Pit, additional gold leach capacity would be required. Liberty Pit would generate more gold ore than can be placed on Pad D, and a new pad would be needed prior to Veteran-Tripp operations. RMLP proposes to construct a new gold leach pad (Pad E) in the location shown on Map 2-1. The design is anticipated to be similar to that of the proposed Pad D expansion. The solution ponds would be double-lined with synthetic materials as shown in the typical details of the proposed copper leach solution ponds. The facility would have a total area of approximately 202 acres and a capacity of approximately 25 million tons of ore. The facility design, construction, operation, and closure would meet all requirements of the NDEP, BLM, and NDOW. Existing water quality and reclamation permits issued to the RMLP would be amended to include this facility.

2.2.9 Work Force

Manpower requirements for the project can be separated into two categories: construction and operations. Each is discussed below.

2.2.9.1 Construction Phase

Construction of the proposed facilities is anticipated to take approximately 18.5 months. During this time, the construction work force would grow from 150, approximately 4 to 6 months after the start of construction, to a peak of 514 approximately 12 months into the construction schedule, then taper off to under 200 during the final 5 months. The construction season is dependent on weather constraints, which may cause fluctuations to the manpower requirements and time frames.

As part of its construction contract, RMLP would require that the prime contractor ensure adequate housing for its construction work force. These facilities may be in the form of a mobile home park with hookups for worker-owned mobile homes, which could be located in the Ely vicinity. The mobile home park could be built as a temporary facility or it may be designed as a permanent one suitable for use by the operational work force. Regardless, the facility would have capacity for approximately 330 construction workers, and its design, construction, and location would conform to local building and zoning requirements.

2.2.9.2 Operational Phase

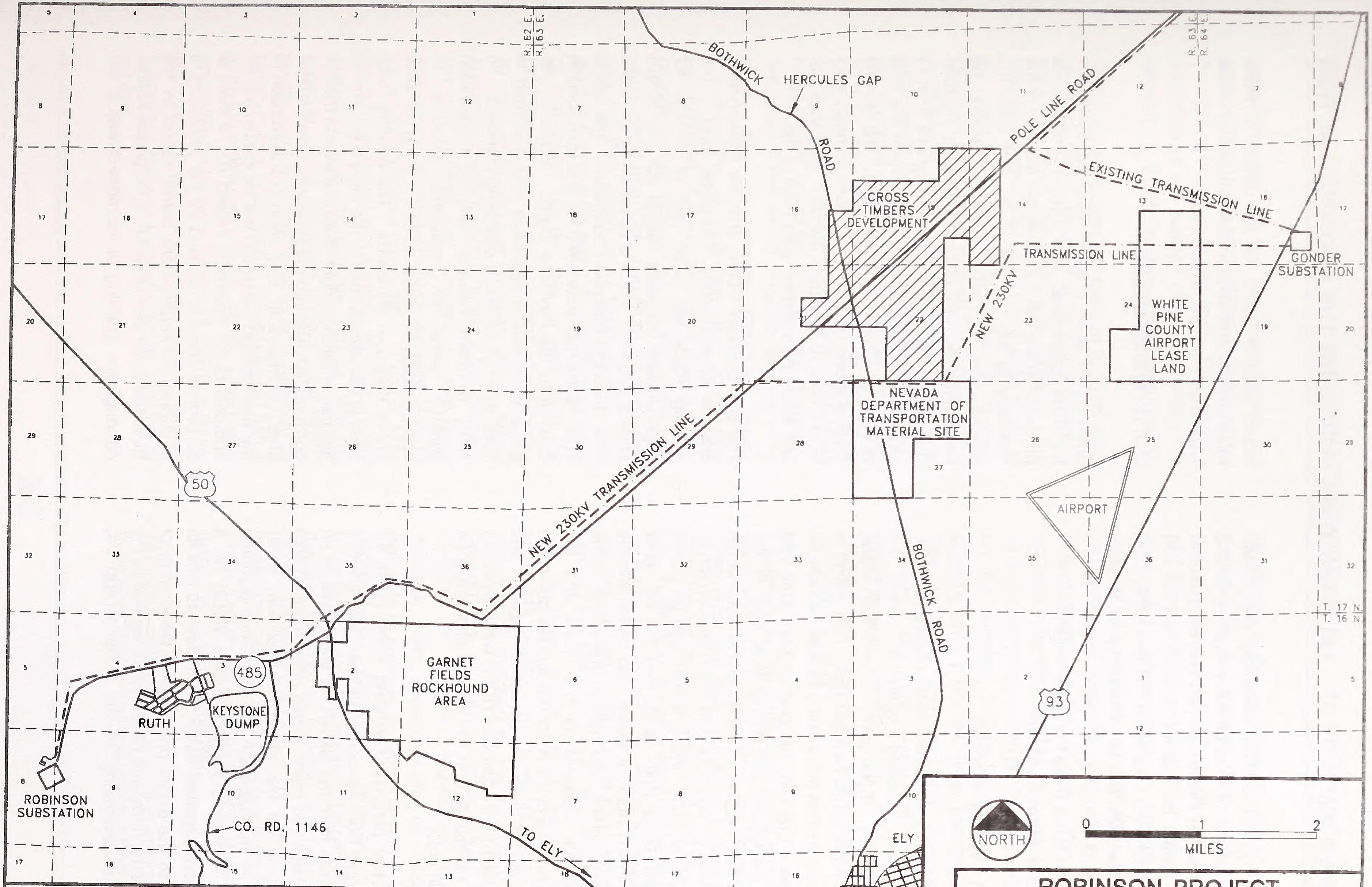
An initial work force of approximately 170 would be required for operation of the proposed facility. Once full production is reached approximately 2.5 years into the operation, a total work force of approximately 550 would be required. RMLP is an equal opportunity employer and anticipates hiring as much of the work force as possible from the local and surrounding communities.

If a permanent mobile home park were built, more than 100 units could be converted for use by the operational work force after the completion of construction activities. If a temporary mobile home park were provided, it would be removed once construction is complete.

The total new operational work force needed for the Robinson Project is projected to be a maximum of 522 plus the 28 employed at the gold operation in 1994 and having residences in the community. The number of new units required to house the new Robinson work force would initially be 357, which represents the hiring of 70 percent of the total new operational work force from outside the Ely area. This figure would be revised downward as hiring progresses, if and when more of the new personnel were hired from the local population.

2.2.10 Electrical Power

Operation of the proposed project would require construction of a 230-kV electric transmission line from the Gonder Substation south of McGill, Nevada, to the project site. RMLP would construct, operate, and maintain the new line. The proposed alignment of the transmission line is shown on Map 2-2. The route would be approximately 13.7 miles long and would follow an existing distribution line and/or road for about 8.2 miles. The design would use wood pole H-frame structures that would be dark brown in color. The structures would vary from 65 to 95 feet in height (average 80 feet) and would be placed 600 to 900 feet apart (average 700 feet). Where the transmission line crosses White Pine County Airport lease lands, the structure height would meet all Federal Aviation Administration regulations for clearance. Conductors would be 22 feet apart. An access trail would be constructed along the route where it does not parallel the existing Pole Line Road or Highway 485, a distance of about 5.5 miles. This trail would disturb an area 12 feet wide. Each structure would require an area approximately



ROBINSON PROJECT

MAP 2-2
LOCATION OF TRANSMISSION LINE

65 feet by 100 feet for assembly and setup. Where the line crosses pinyon-juniper woodland near the Garnet Fields Rockhound Area, trees and shrubs would be cleared to allow access and construction. An area up to 150 feet wide could be disturbed and has been assumed for acreage calculations in this area. Authorization for the transmission line route from BLM would be part of the overall project approval.

2.2.11 Water Supply

The maximum combined water requirements for milling and leaching operation would be approximately 7,500 gpm. Average water requirements would be 3,500 gpm. Test drilling to date predicts that this volume of water should be available on or near the project site. One well would be located on private land east of the copper leach facility. Two additional wells would be located on public land in Robinson Canyon to the north of Ruth. Water would also be drawn from the Deep Ruth Shaft, and the pit water stored in the Ruth Pit would also be beneficially used in leaching and milling operations. The approximate locations of the wells, and the probable route of the water line and the powerline to operate the wells, are shown on Maps 2-1 and 2-3. The 16-inch-diameter HDPE water pipelines would be installed on the surface and would be black in color.

RMLP has purchased existing water rights for 1,750 gpm from Kennecott and has been granted 10 permits from the NDWR for withdrawal of an additional 6,000 gpm. These water requirements are based on the projected maximum water usage for the Robinson Project. Since pumping water from wells for the project would be a significant expense, RMLP would seek to limit its usage to the extent practicable. Dewatering of the Liberty, Ruth, and Kimbley Pits, as well as the possible dewatering of the Veteran-Tripp Pit, would provide some of the project's water requirements and reduce the amount of water withdrawn from production wells.

2.2.12 Transportation

Sulfuric acid to be used for leaching, diesel fuel for mine operations, and copper concentrate produced in the mill constitute the majority of the materials to be transported to and from the project site. These materials would be transported by the Northern Nevada Railroad (NNRR), which plans to reinitiate service from its junction with the Southern Pacific main line east of Wells at Cobre to the Ruth area. The railroad route is shown on Map 2-4. Tracks currently exist from Cobre to Keystone Junction (see Map 2-3) and would be extended past Ruth to the mine.

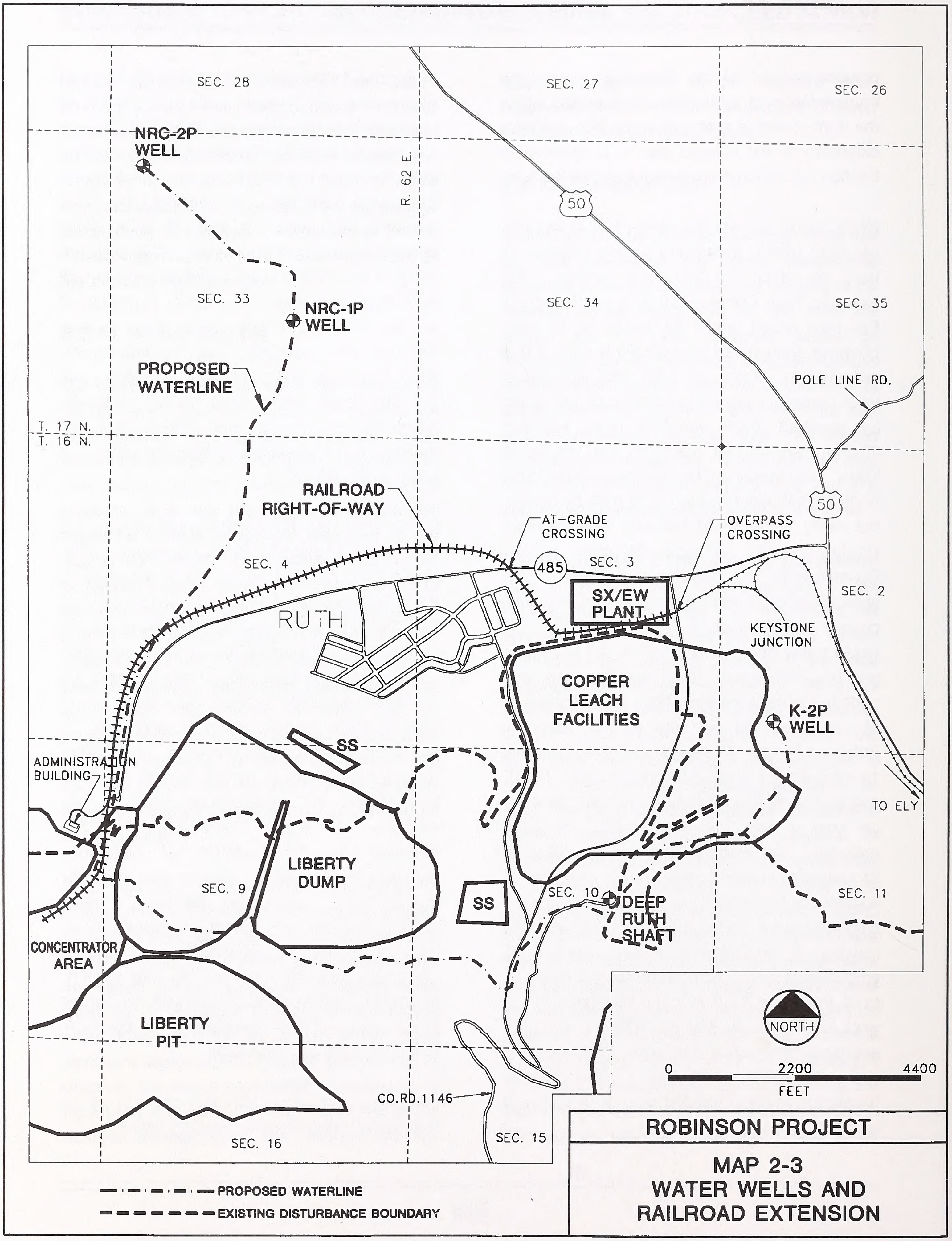
The line between Cobre and the concentrator area is approximately 150 miles long. The existing track has been out of service for approximately 10 years except for the "Ghost Train of Old Ely," which is operated by the White Pine Historical Railroad Foundation. The Ghost Train travels near downtown Ely and up Robinson Canyon to the Keystone Dump. However, the entire track was rehabilitated and upgraded in 1992 to meet minimum operating standards. In 1994, Northern Nevada Railroad Corporation (NNRC) plans an additional upgrade of approximately 62 miles of track to bring the track above minimum standards. The existing track ends at the access road to the mine area. NNRC has been granted a right-of-way to extend the line north of Ruth and into the proposed concentrator area (see Map 2-3). Even though construction of the new railroad extension will be contingent on approval of the Robinson Project (i.e., if there is no project, there is no need for the extension), it is subject to independent consideration by the BLM and is not part of RMLP's Proposed Action. Although the granting of the right-of-way is not considered part of the Proposed Action, the transportation of project-related materials within the right-of-way is analyzed in the EIS. NNRC's extension of the railroad also is considered in Section 4.6, which discusses cumulative impacts.

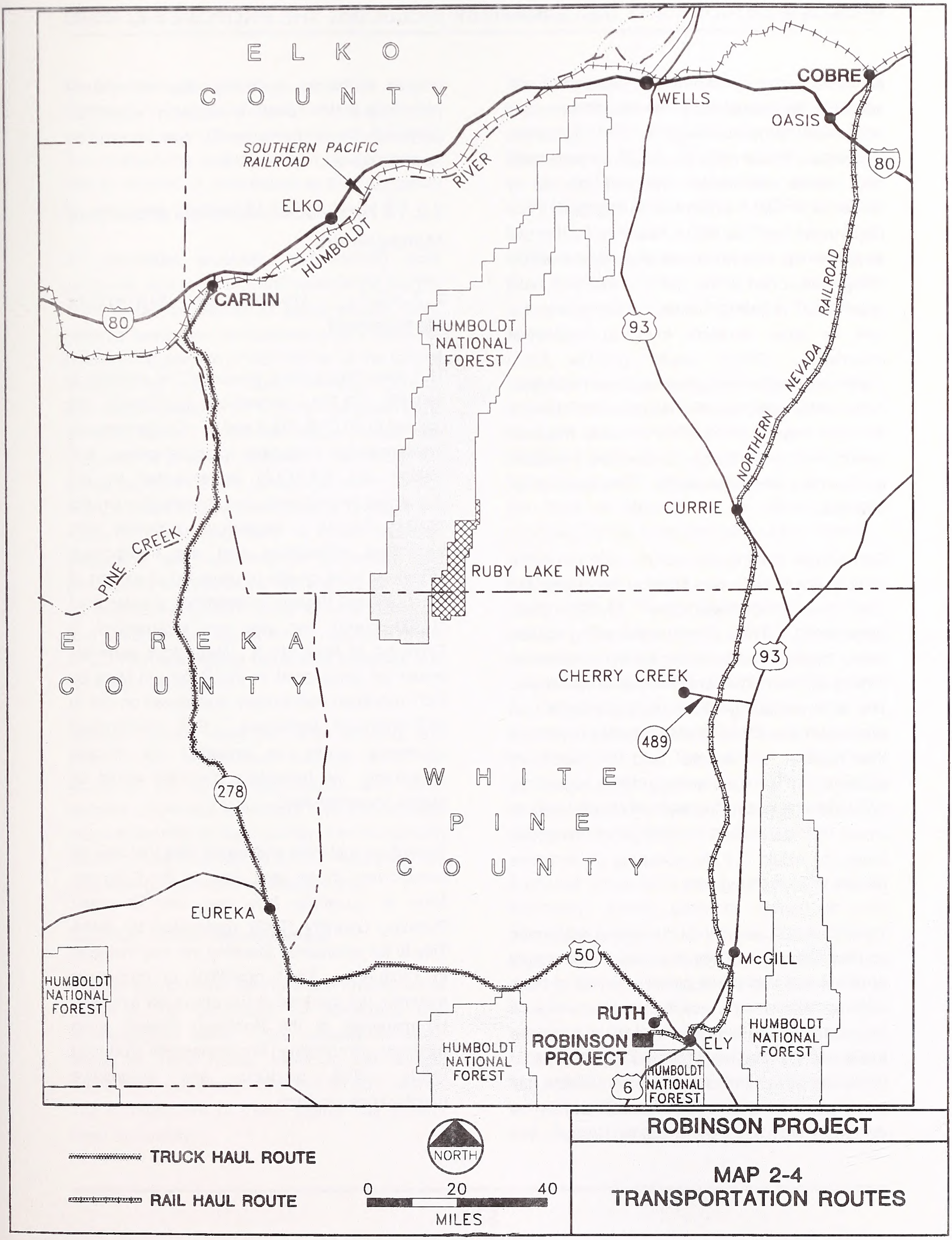
NNRC would operate the trains at 10 to 25 miles per hour (mph), depending on the segment of track on which the trains are running. For example, from Cobre south to a point north of Ely, train speed would be limited to 10 mph. However, train speed through Ely is now, and is expected to remain, 20 mph; this segment of track meets the standards for 25 mph but would be operated under yard-limit rules, requiring 20 mph, due to joint operation with the Ghost Train. Train speed on the new track construction north of Ruth would be up to 25 mph by design, but many trains would probably operate more slowly due to tonnage (Whipple 1994b). Consequently, a one-way trip would take approximately 15 hours and would require a crew change at the midpoint of the trip. One train would travel from Cobre south to the mine area and one train would travel from the mine area north to Cobre at the same time, or the equivalent of one round-trip per day to and from the Robinson Project. There are passing tracks every 10 miles along this route (Whipple 1994b). NNRC anticipates hauling approximately 7,320 carloads per year of acid, fuel, concentrate, and other materials. This amounts to an average of 20 to 25 carloads per train (one-way) or a total of 40 to 50 carloads (round-trip) per day. NNRC currently employs five full- and part-time workers. With the initiation of the Robinson Project, total NNRC employment would increase to approximately 20 to 29 workers in addition to the anticipated RMLP work force (Whipple 1994a). NNRC would have approved Emergency Response Plans in place, and all NNRC employees would receive hazardous material training prior to initiation of service.

In addition to the rail transport of acid, fuel, and concentrate, an average daily truck traffic of approximately 10 vehicles (or 20 one-way trips to and from the Robinson Project) is projected. This amounts to an average of one truck every 24 minutes entering or leaving the site, conservatively assuming that all such traffic occurs during an 8-hour shift. This estimate includes materials brought to the property as well as those shipped from the property, and is based on the following freight items: fuels (diesel, gasoline, and propane), tires, blasting agents, lime, kerosene and other mill reagents, mill grinding balls and other wear materials, miscellaneous mining and milling supplies, molybdenum concentrate, copper cathodes, and leach facility diluent.

It is assumed that truck traffic could come to the site from Salt Lake City, Reno, Las Vegas, or Ely. Traffic from the east and south is expected to enter the site on U. S. Routes 93 and 50 through Ely. Traffic from the west would arrive at the site via Route 50. The potential routes for truck traffic are rated to handle the number and weight of the vehicles that would be used. Truck transport on any of these routes would comply with all applicable safety, environmental, and other requirements imposed by the Nevada and U.S. Departments of Transportation (DOT). Title 49 Code of Federal Regulations (49 CFR) regulates the transportation of hazardous materials in commerce. Anyone who offers for transportation, transports, packages, loads, unloads, or in any way assumes responsibility for marking, labeling, or handling of any regulated hazardous materials must comply with 49 CFR. In addition, carriers must comply with the Federal Motor Carrier Safety Regulations of the DOT (parts 383, 390-397, and 399).

Hazardous materials required for operation of the Robinson Project include gasoline, diesel fuel,


SEC. 28
SEC. 27
SEC. 26
NRC-2P WELL
R. 62 E.
50
SEC. 33
NRC-1P WELL
SEC. 34
SEC. 35
PROPOSED WATERLINE
POLE LINE RD.
T. 17 N.
T. 16 N.
50
RAILROAD RIGHT-OF-WAY
AT-GRADE CROSSING
OVERPASS CROSSING
SEC. 4
485
SEC. 3
SX/EW PLANT
SEC. 2
RUTH
KEYSTONE JUNCTION
COPPER LEACH FACILITIES
K-2P WELL
SS
ADMINISTRATION BUILDING
TO ELY
LIBERTY DUMP
SEC. 9
SS
SEC. 10
DEEP RUTH SHAFT
SEC. 11
CONCENTRATOR AREA
LIBERTY PIT
NORTH
0
2200
4400
FEET
CO.RD.1146
SEC. 16
SEC. 15
ROBINSON PROJECT
MAP 2-3
WATER WELLS AND RAILROAD EXTENSION
PROPOSED WATERLINE
EXISTING DISTURBANCE BOUNDARY



ROBINSON PROJECT

MAP 2-4
TRANSPORTATION ROUTES

kerosene, propane and other petroleum products, solvents for degreasing of machinery and equipment, process reagents, and laboratory chemicals. These materials would be purchased from various vendors and brought to the site by rail or truck. RMLP would ensure that the Ely Fire Department and the White Pine Fire District are aware of the nature of the materials routinely being transported to the site, and that they have appropriate response training in the event of a spill or other accident involving hazardous materials. RMLP would provide these departments with emergency response training for sulfuric acid spills and the equipment necessary for such response. RMLP also would make its own trained on-site personnel available, if needed, to assist the fire departments in the event of an acid spill.

Concentrate loading and sulfuric acid unloading stations would be constructed on the project site near the concentrator and SX/EW plant, respectively. The concentrate loading station would be designed to minimize the emission of fugitive dust from concentrate transfer operations. The acid unloading station would include spill prevention and containment measures to prevent the release of sulfuric acid. Secondary containment for acid storage tanks would be provided, and routine inspections of tank integrity would be performed. Emergency response measures would include stockpiles of limestone for use in neutralizing acid.

The continued operation of the mining equipment and leach facility requires an uninterrupted supply of diesel fuel and the constant addition of fresh makeup acid. In the event that rail service is interrupted for more than several days, it may be necessary to bring diesel fuel and/or sulfuric acid to the site by truck. For analysis purposes, it has been assumed that these materials would be off-loaded from rail cars in Carlin, Nevada, and trucked to the site over Highways 278 and 50 (see Map 2-4). Such a situation would be temporary, and transport by rail would be resumed as soon as possible.

2.2.13 Hazardous Materials and Waste Management

2.2.13.1 Hazardous Materials Management

The term "hazardous materials" is defined in 49 CFR 172.101; hazardous substances are defined in 40 CFR 302.4 and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA) Title III. Hazardous materials and hazardous substances that are transported, stored, or used on-site or disposed of as part of the Robinson Project in quantities greater than 10,000 pounds per year are summarized in Table A-1 in Appendix A. Hazardous materials would be transported to the Robinson Mine by DOT-regulated transporters and stored on-site in DOT-approved containers. Spill containment structures would be provided for storage containers. All hazardous materials would be stored on private land.

Hazardous materials and substances that may be transported, stored, and used at the Robinson Mine in quantities less than the Threshold Planning Quantity (TPQ) designated by SARA Title III for emergency planning are also included in Table A-1. Small quantities of hazardous materials not included in the above list may also be managed at the Robinson Project; such materials are contained in commercially produced paints, office products, and automotive maintenance products.

Management of hazardous materials at the Robinson Project would comply with all applicable Federal, state, and local requirements, including the inventorying and reporting requirements of Title III of CERCLA, also known as the Emergency Planning and Community Right-to-Know Act.

All petroleum products and sulfuric acid, kerosene, and other reagents used in the SX/EW plant would be stored in above-ground tanks within a secondary containment area capable of holding 110 percent of the volume of the largest vessel in the area. A Spill Prevention, Control, and Countermeasure (SPCC) Plan addressing the general topics presented below would be prepared for all stored materials. The SPCC Plan would be reviewed and updated at a minimum of every 3 years and whenever major changes are made in the management of these materials. Inspection and maintenance schedules and procedures for the tanks, as well as all piping connecting the SX/EW facility with the leach pad and ponds, would be set forth in sections of the SPCC Plan addressing hazardous materials and petroleum products.

Sodium cyanide used for gold leaching and possibly for molybdenum flotation would be stored at the concentrator and/or gold leach facilities, physically separated from acid storage areas at the copper leach facility. Use of cleaning solvents would be limited to that necessary for degreasing machinery and equipment.

2.2.13.2 Waste Management

Copper operations at the Robinson Project would result in the generation of hazardous and nonhazardous waste. The majority of waste would be "mine waste," including mill tailings, waste rock, spent leach ore, and SX/EW wastes. The management of these wastes has already been discussed.

The Robinson Mine would operate as a large-quantity generator of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). A large-quantity generator is a facility that generates more than 1,000 kilograms per month of RCRA-regulated hazardous waste (40 CFR Part 262). RCRA-regulated hazardous waste generated at the Robinson Mine and in associated management practices is included in Table A-2 in Appendix A.

Nonhazardous wastes that would be generated include waste paper, wood, scrap metal, used tires, and other domestic trash. These materials would be disposed of in the existing on-site Class III sanitary landfill, which has been approved by the State of Nevada, or by other methods approved by the State and White Pine County.

A wastewater treatment plant would be constructed in the concentrator area to treat sewage. The plant would utilize a three-stage process consisting of aeration, digestion, and chlorine contact, and the effluent would be sent to the mill tailings disposal circuit. Construction and operation of the wastewater treatment plant would be authorized by the NDEP. Preliminary information on the wastewater treatment facility is on file at the BLM office in Ely, as part of RMLP's application for a state water quality permit.

Analytical procedures conducted in the on-site laboratory would generate hazardous and nonhazardous laboratory wastes. The laboratory drains would be connected to the mill tailings disposal circuit, allowing disposal of liquid residue from the various analyses. Nonhazardous solid wastes from the laboratory would be disposed of in the landfill. Other wastes from the laboratory that exhibit a hazardous waste characteristic, including off-specification commercial chemicals and assay wastes, would be managed as hazardous waste. A short-term hazardous waste storage facility would be constructed in the concentrator area for storage of these wastes for up to 90 days. Hazardous wastes would be transported to an approved facility for disposal.

Hazardous wastes other than those from the laboratory would also be managed in the short-term storage facility prior to their shipment to an off-site licensed disposal facility. These materials may include waste paints, thinners, and spill cleanup. Spent solvents and used oils would be returned to recycling facilities.

2.2.13.3 Emergency Response

RMLP has developed a general Emergency Response Plan as part of the POO. A detailed plan following the general outline presented on Table 2-4 would be prepared prior to the start of operations. This plan describes the reporting and response that will take place in the event of a spill, release, or other upset condition. A detailed SPCC Plan for the facility describing procedures for cleanup and disposal would also be developed prior to the start of operations (see Table 2-5). RMLP would be responsible for events at the mine site, while contract haulers (i.e., NNRC and trucking companies) would be responsible for accidents and spills along the transportation routes. The following overview has been extracted from the Emergency Response Plan.

2.2.13.4 Spill and Release Reporting

Reporting spills or releases of certain materials to the environment may be divided into four categories: 1) those requiring internal notification only; 2) those also requiring notification to the State of Nevada pursuant to NAC 445.240; 3) those also requiring notification to the National Response Center (NRC) and the local Emergency Planning Committee pursuant to CERCLA or Superfund; and 4) those subject to Clean Water Act requirements only. Although the definitions (e.g., release) used by RMLP in the reporting procedure described below are not identical to those used in CERCLA, the procedures comply with the requirements of CERCLA.

Determining which of the above categories is appropriate for any particular spill or release depends on the material spilled or released, the amount spilled or released, and the circumstances of the spill or release.

A. Definitions: For purposes of RMLP reporting policy, separate definitions are established for spills and releases.

1. "Spill" is defined as the universe of discharges of any material that is not expressly authorized by a permit. Spills may include discharge of materials to lined or otherwise contained surfaces. For example, the discharge of mill tailings to a permitted tailing impoundment is not a spill if it occurs through the normal operational procedures. However, if a reagent storage tank ruptures and the reagent is contained in a secondary containment system, it constitutes a spill even if the area is lined with concrete. Similarly, the intentional or accidental loss of any materials listed under Reportable Quantities and Materials to the concrete floor of a building also constitutes a spill.

2. "Release" is a subset of "spill." All releases are spills, but only uncontained spills that contact soil, surface water, or air are releases. For purposes of this reporting procedure, a release to air is subject to reporting only if the release is of a material in a gaseous state.

Table 2-4

Outline for Robinson Project Emergency Response Plan

I. Introduction

II. Emergency Coordinator Information; Emergency Phone Numbers (40 CFR Part 262.34 [d][5])

III. Preparedness, Prevention Contingency (PPC) Plan

- 1) PPC Plan (40 CFR 265, Subpart C and ARS 26-347)
  - A. Maintenance and Operation of Facility (40 CFR 265.31)
  - B. Required Equipment (40 CFR 265.32)
  - C. Testing and Maintenance of Equipment (40 CFR 265.33)
  - D. Access to Communications or Alarm Systems (40 CFR 265.34)
  - E. Required Aisle Span (40 CFR 265.35)
  - F. Arrangements with Local Authorities (40 CFR 265.37)
  - G. Transportation Routes (ARS 26-347 [D] [6])
- 2) Hazardous Waste Training for RMLP Employees
- 3) Emergency Plan for Hazardous Materials
- 4) Disaster Plan
- 5) Acid Handling Procedures
- 6) RMLP Emergency/Safety Equipment Lists & Locations; Evacuation Plan/Routes
- 7) Spill Prevention Control Countermeasure (SPCC) Plan
- 8) Maps, Illustrations

IV. Emergency Preparedness Regulations for a Small to Large Quantity Generator

Table 2-5

Spill Prevention, Control, and Counter Measure Plan Outline

Part I - General Information

1. Name of Facility
2. Type of Facility
3. Location of Facility
4. Name and Address of Owner or Operator
5. Designated Person Accountable for Oil Spill Prevention at Facility
6. Facility Experienced a Reportable Oil Spill Event During the Twelve Months Prior to January 10, 1971
7. Potential Spills - Prediction and Control
8. Containment or Diversionary Structures or Equipment to Prevent Oil from Reaching Navigable Waters are Practicable
9. Inspections and Records
10. Personnel Training and Spill Prevention Procedures

Part II - Design and Operating Information

A. Facility Drainage

B. Bulk Storage Tanks

C. Facility Transfer Operations, Pumping, and In-Plant Process

D. Facility Tank Car and Tank Truck Loading/Unloading Rack

E. Security

B. Reporting: Separate reporting requirements are established for spills and releases.

1. Reporting of Spills: All spills of materials listed under Reportable Quantities and Materials, regardless of the quantity, are to be reported through the normal chain of command as soon as any employee has knowledge of such spill. An employee would notify his or her immediate supervisor of the spill, and the area manager would then be notified. The Environmental Affairs Department would be contacted to determine the appropriate regulatory requirements for reporting and disposing of the spill. The BLM would also be notified of spills on public lands.

2. Reporting of Releases in Excess of Reportable Quantities (RQs):

   a) Releases within a 24-hour period equal to or in excess of Reportable Quantities established at 40 CFR 302.4 pursuant to CERCLA must be reported to the NRC by phone as soon as the owner/operator has knowledge of the release. In the event that such a release results in exposure to individuals outside the facility boundary, notice must also be given to the local Emergency Planning Committee (Ely Fire Department), pursuant to 40 CFR 355.40(a). The BLM would be notified of releases on public lands.

   b) Releases equal to or in excess of RQs must also be reported to the Nevada Division of Emergency Management (NDEM) and the NDEP. NDEM must be notified by phone as soon as the owner/operator has knowledge of the release. NDEP must be notified as soon as possible after the owner/operator has knowledge of the release but not later than the end of the first working day after the release occurs. These notifications are required by the NAC 445.240.1(a) and (b), respectively.

Reportable Quantities and Materials

RMLP would inventory all process chemicals and solutions on-site, including tailings, mill reagents, sulfuric acid, kerosene, and SX/EW reagents. (A list of potential mill reagents is presented on Table 2-3). This inventory, along with analytical data, would be used to determine the volumes that are equal to their Reportable Quantities, based on state and Federal regulations. The following lists the materials known to be at the Robinson Project that, when released within a 24-hour period in the quantities indicated, require notification pursuant to the section above.

Sulfuric Acid @ 100%
1,000 pounds

65.4 gallons
Solid Sodium Cyanide
10 pounds
Chlorine
10 pounds
Petroleum Products
25 gallons
Characteristic Hazardous Waste
100 pounds

2.2.13.5 Mine Facilities

The concentrator complex is designed so that spills or overflows of tailings from the thickeners or pump house, of concentrate from the mill building, or of reagents from the storage building would all report to the emergency containment pond. The pond would be emptied of process solutions as soon as practicable.

The SX/EW facility would be constructed so that if any spills, upsets, or failures occur, solutions would flow to the secondary containment area surrounding the acid and reagent storage tanks. Pipelines for Raffinate and PLS would be within secondary containment ditches and/or berms. Stockpiles of limestone would be maintained around the SX/EW facility for use in neutralizing concentrated sulfuric acid spills. Limestone would be applied to the spill area, including any ponded acid. Earth-moving equipment would then be used to excavate all affected soils. The degree of excavation would be determined by a visual evaluation of the site and the extent to which the soils are wetted. The excavated soil-limestone mixture would be placed on the heap leach pad to take advantage of any residual acid values. In the event that acid spills into areas that cannot be accessed by machinery, or if acid is released into the Gleason Creek drainage, milk of lime from the concentrator complex would be applied to the spill site. This liquid would be able to neutralize the acid in place, making excavation unnecessary.

2.2.14 Closure

If copper mining operations begin in 1995, and the current estimate of the life of the deposit is accurate, then closure of the site would be initiated some time in 2011. While mining and milling activities would cease when ore reserves have been exhausted, leach activities would continue as long as sufficient copper and/or gold values can still be recovered in the pregnant solutions. Therefore, closure of leach facilities could be deferred to some point in the future. Also, milling would continue for approximately 2 years after completion of mining to consume and process stockpiled ore.

The closure activities proposed in this section would be subject to change over time as environmental engineering techniques evolve and more definitive information is developed throughout the life of the project. The term "closure" is used to describe the chemical stabilization of the project area, while reclamation of the disturbed area is addressed in Section 2.2.15. A draft closure plan for the tailings disposal facility, copper leach operations, and other process components was submitted to the NDEP as part of the water quality permit application, and is on file at the Ely BLM office. Closure of the gold leach Pad D was addressed in the NDEP permit application. In accordance with NAC 445.24388.2, a final plan for permanent closure of these units would be submitted to NDEP at least 2 years prior to the anticipated cessation of operation. The plans would describe the measures to be taken to ensure that these portions of the facility would not cause degradation of surface and groundwater quality after closure. Once stabilized from a water quality perspective, these and other surface disturbances would be subject to reclamation under state and Federal requirements.

2.2.14.1 Tailings Disposal Facility Closure

In general, the closure process for each phase of the tailings impoundment would consist of the following activities:

- Managing final tailings deposition to aid recontouring;
- Establishing geochemical baseline for final closure design requirements;
- Disposing of process fluids; and
- Contouring and grading the tailings surface.

Samples of tailings for acid generation potential testing would be taken quarterly during the operation of the facility. These data would be provided to NDEP and BLM to indicate potential future impacts of the facility on surface and groundwater quality and to aid in design of the final closure plan and subsequent reclamation.

After tailings deposition ceases in the East Unit of the impoundment and the tailings surface has dried sufficiently, the area containing any ponded water would be backfilled to prevent future ponding of precipitation and snowmelt, and limit infiltration. Runoff from the small watershed remaining to the northeast, between the Veteran-Tripp waste rock dump and the upper reaches of the impoundment, would continue to flow to the East Unit of the impoundment. During reclamation, a channel would be cut to route run-on and direct precipitation to a drainage on the southeastern edge of the impoundment.

Closure and subsequent reclamation of the majority of the East Unit of the tailings surface would commence upon activation of the West Unit of the impoundment. Closure and reclamation of the East Unit, concurrent with the operation of the West Unit, would limit the period that the tailings would be exposed and could reduce the potential for fugitive emissions. However, it would take approximately 5 years for the tailings to dry sufficiently to allow closure and reclamation of this area.

Toward the end of the active life of the West Unit of the impoundment, tailings distribution practices would be modified to aid in establishing the final contour and surface drainage patterns. Tailings would be deposited to smooth the surface and fill the low area used for the reclaim of process water. The pool levels would be reduced to minimize the amount of reclaim water remaining at the end of operations. The final pool would be located on the western end of the impoundment. Tailings water remaining at closure would be reduced in volume by pumping to the leaching operation, spraying on the exposed beaches, or by natural evaporation from the pool.

Once each phase of the tailings disposal facility has been closed in compliance with its state water pollution control permit, reclamation would be initiated on those areas not already subject to concurrent reclamation during operations.

Ancillary facilities, such as pumps, the tailings pipeline, the water reclaim pipeline, and power poles, would be removed and/or disposed of in accordance with applicable local, state, and Federal requirements for solid waste management. The tailings water seepage reclaim ponds would be maintained until no flow emanates from the tailings and then filled in and regraded to prevent ponding.

2.2.14.2 Copper Leach Facility Closure

In general, the closure process for the copper heap leaching facility would consist of the following phases:

- Compacting and recontouring heaps to restrict infiltration and enhance runoff;
- Disposing of process fluids;
- Removing solids from ponds;
- Eliminating depressions that may collect water; and
- Removing ancillary facilities.

Active copper leach operations would continue after mining and milling cease as long as economically recoverable concentrations of copper were still contained in pregnant leach solution. Leach operations would be terminated and closure would begin once all active use of the leach facility ceased.

RMLP proposes to close the copper heap leach pads by a cover system, rather than rinsing. This would be accomplished by first gently sloping the top of the heaps to a 1 to 2 percent slope through contouring and grading. Subsequently, a layer of rinsed ore 1 to 3 feet thick would be compacted to effectively limit the infiltration of meteoric waters. Test work indicates that spent ore can be compacted to a permeability of between 1.4×10^{-7} centimeters per second and 2.8×10^{-8} centimeters per second (Winters/Welsh 1991). A layer of growth medium would then be placed on top of that compacted layer in sufficient quantities to achieve plant growth and retention of annual precipitation above the compacted layer. The combination of a compacted cover between the heap and growth medium and placement of a final cover of growth medium would achieve final stabilization and revegetation of the heap such that it does not degrade the waters of the state.

At least one of the three leach solution ponds would be maintained in operation for containment of seepage and/or runoff until the effectiveness of the heap compaction could be confirmed. The other ponds associated with leaching operations would also be closed in accordance with NDEP requirements. Liquids would be evaporated by spray irrigation over the leach heaps. Any solid material remaining in the ponds would be analyzed to determine its chemical composition and potential to degrade waters of the state. The results of this analysis would be used to determine whether on-site burial, off-site disposal, or possibly shipment to the San Manuel smelter or other such facility for metal recovery would be appropriate. Subject to approval by NDEP and BLM, liner materials would be folded over and buried. The ponds themselves would be backfilled to eliminate depressions that could fill with precipitation or snowmelt.

Reclamation of the leach facilities would begin once they were closed in accordance with state requirements for closure and stabilization of process components.

2.2.14.3 Gold Leach Facility Closure

In general, the closure process for gold heap leaching facilities, including the expanded Pad D and the new facility planned for Pad E, would consist of the following phases:

- Rinsing the spent ore with water and possibly a cyanicide;
- Reusing or evaporating rinse water;
- Regrading the heap;
- Removing solids from ponds;
- Backfilling or breaching ponds to eliminate depressions that may collect water; and
- Removing ancillary facilities.

When leaching ends, the spent ore would be rinsed with fresh water and, if necessary, a cyanicide to reduce residual cyanide concentrations. Rinsing would continue until the rinsate meets NDEP and BLM closure standards as specified in NAC 445.24354. After rinsing is complete, the rinse water would be used elsewhere at the Robinson Project or be evaporated. Any sludge remaining in the ponds would be sampled and, depending on its metal content, sent for on-site or off-site metal recovery, or be disposed of in accordance with Federal, state, and local waste management requirements. The primary pond liners would be ripped, folded over, and buried in place.

The heap would be regraded to cover the exposed pad liner and achieve a maximum slope of 2.5:1. Ancillary surface facilities, such as piping, would be removed. The site would then be reclaimed according to the requirements of the state reclamation permit and the BLM reclamation plan.

2.2.14.4 Waste Rock Disposal Area Closure

Closure of the waste rock disposal areas would proceed directly to reclamation activities following the end of operations at the area.

2.2.14.5 Closure of Open Pits

Nevada places several state requirements on the closure of open pits that fill with water. NAC 445.24352.2 requires that, to the extent practicable, such pits be free-draining or be left in a manner that minimizes the impoundment of surface drainage and the potential for transport of contaminants and degradation of waters of the state. NAC 445.24352.3 requires that bodies of water that are a result of mine pits penetrating the water table must not create an impoundment that either could degrade groundwaters of the state or could adversely affect human, terrestrial, or avian life. Closure of the Liberty, Veteran-Tripp, Ruth, and Kimbley Pits would comply with these requirements.

RMLP would close its open pits in a manner protective of public safety. Perimeter fencing and/or earthen berms would be constructed to prohibit access to the pits. A maintenance schedule would be established to ensure the effectiveness of the fencing and berms. Signs would be posted warning of the dangers associated with the pits, identifying the area as private property, and prohibiting trespassing. Where potential instability of pit walls would compromise the effectiveness of these measures, the walls would be brought to a stable configuration or the fences and berms would be located in a stable area removed from the edge of the pit. An area approximately 50 feet wide, extending back from the pit edge would be established as a safety buffer zone and, therefore, revegetation activities would be restricted.

Many underground workings are present at the project site. Based on correspondence between the Nevada Department of Minerals and Kennecott, it appears that all shafts, adits, or other underground mine openings have been secured to the satisfaction of the State. If additional, unsecured openings were found within the area to be disturbed, or if existing closure proved to be unsafe or unacceptable, RMLP would contact the BLM and the NDOW, prior to sealing the mine opening but would otherwise restrict public access by constructing fences or berms.

2.2.14.6 Closure of Other Process Components

Other portions of the facility considered to be "process components" requiring closure under NDEP regulations include the mill, the SX/EW plant, and ancillary tanks containing process fluids. Closure considerations for these facilities involve the removal and disposal of solid and liquid materials that present the potential to degrade waters of the state. When active operation of these facilities is terminated, current plans call for the evaporation of all remaining process solutions. Reagents and other materials that could degrade water quality would be removed from the site or otherwise managed to prevent future degradation of water quality. Materials and solutions with metal values may be transported to Magma Copper Company's San Manuel facility or to other metal recovery facilities. Waste materials would be disposed of in compliance with state, Federal, and local requirements in effect at that time.

2.2.15 Reclamation Plan

This section describes the measures that would be taken to reclaim the individual facilities associated with the Robinson Project. The Robinson Mining District includes extensive historic surface disturbances that would not be part of the proposed Robinson Project. All reclamation would be consistent with the requirements of Nevada Revised Statute (NRS) 519A, NAC 519A, and 43 CFR 3809. The proposed project would result in new disturbance of approximately 1,941 acres of public land and 1,356 acres of private land and in the reclamation of 917 acres of previously disturbed private land and 199 acres of previously disturbed public land. See Table 2-1 for a summary of disturbance by ownership and mine component. Table 2-6 provides a breakdown of the acres to be reclaimed as part of the Proposed Action.

The extensive pre-existing disturbances present a significant constraint on the practicability of some reclamation techniques. The historic dumps were built prior to reclamation requirements, and no material was stripped and stockpiled for subsequent use as a plant growth medium. Due to the steepness of the terrain and the shallowness of the soil, it would be difficult to strip sufficient growth medium from the Veteran-Tripp and Ruth Dump expansions to recover the entire dump. Reclamation of these disturbances would, therefore, entail direct revegetation of the waste rock itself on certain areas of the dumps. Expansion of the Liberty Dump and construction of the copper leach facility would allow pre-stripping of some soils, and reclamation of these units would likely be on a growth medium of soil over waste rock. Additionally, all the existing dumps were built at their angle of repose and would require extensive earth work to recontour to an overall 2.5:1 slope.

Reclamation of areas affected by past mining activities would provide additional environmental benefit beyond restoration of productive land uses. In several cases, the planned reuse and subsequent reclamation of existing waste rock dumps would result in a more environmentally protective closure of these units. For example, a number of the existing waste rock dumps were subjected to leaching for recovery of copper. These dumps were not formally "closed," and remaining cells on the tops of the dumps catch precipitation and encourage infiltration through the dumps. Where the reuse of these waste rock disposal areas involves deposition of new waste materials on the tops of the dumps, these cells would be eliminated.

RMLP has prepared an estimate of the cost to conduct all reclamation activities for the proposed project activities. These costs are itemized in detail in the reclamation plan and provide a basis for establishing reclamation performance bonding levels for respective mine components. Financial assurances in the form of surety bonds, cash bonds, financial guarantees, corporate guarantees, or a combination of the above would be established initially and adjusted periodically throughout the life of the project to cover planned reclamation activities.

The proposed reclamation plan consists of the following key measures:

- Top surfaces of the waste rock disposal areas and tailings storage facility would be constructed or graded to configurations that promote stability and prevent ponding of surface runoff to protect waters of the state.
- Waste rock and tailings disposal areas and leach facility side slopes would be constructed or modified during reclamation to slopes of 2.5:1, broken by horizontal

Table 2-6

Total Acres to be Reclaimed as Part of the Proposed Action

Disturbance Type	Total Disturbance	Public Land Reclaimed	Private Land Reclaimed	Total Reclaimed
Tailings Disposal Area	1,901	1,462	439	1,901
Tailings Disposal Area Soil Stockpiles	176	169	7	176
Seepage Collection Ponds	1.8	0.9	0.9	1.8
Tailings Disposal Area Access Road	29	18	11	29
Rerouted County Road[1]	32	--	--	--
Surface Drainage Diversion[2]	35	--	--	--
Concentrator Area[3]	167	--	--	--
Administration Building[3]	0.2	--	--	--
Leach Pad D	92	--	92	92
Leach Pad E	202	13.5	188.5	202
Leach Pad E Soil Stockpiles	9	--	9	9
Veteran-Tripp Pit[4]	377	--	--	--
Veteran-Tripp Dump	507	92	415	507
Liberty Pit[4]	279	--	--	--
Liberty Dump	359	42.5	316.5	359
Liberty Dump Soil Stockpiles	19	2	17	19
Ruth Pit[4]	254	--	--	--
Ruth Dump	327	34	293	327
Ruth Dump Soil Stockpile	11	--	11	11
Kimbley/Wedge Pit[4]	87	--	--	--
Copper Heap Leaching Facilities	367	168	199	367
SX/EW Facility[3]	29	--	--	--
Waterline	21	12	9	21
Transmission Line	74	63.5	10.5	74
Total Disturbance	5,356	2,077.4	2,018.4	4,096

[1]Rerouted county road would not be reclaimed. Original county road would be buried under tailings in Giroux Wash area.

[2]Drainage diversion would not be reclaimed since it would continue to be used to drain the Giroux Wash area following completion of the mine project.

[3]Area would not be reclaimed. Buildings in area would be maintained for post-mining industrial use.

[4]As discussed in Section 2.2.15.5, RMLP has applied for and been granted a waiver of reclamation for the pit area. Pit areas would not be reclaimed. No pit areas are located within public lands.

erosion control features every 100 feet. The slopes would be ripped along the contour and "moonscaped," if appropriate, for the specific location.

- Revegetation of tailings dam and impoundment surfaces would be accomplished on a growth medium of alluvial material stockpiled during construction of the tailings impoundment.

- Waste rock disposal areas would be revegetated primarily on a growth medium developed from the waste rock amended as necessary and directly vegetated. Where soil can be stripped prior to dump expansions, the soils would be used first in reclamation of the dump top and benches.

- The growth medium planned for revegetation of the copper heap leach facility would be stockpiled soil and waste rock, amended as necessary.

- Soil stripped prior to construction of the gold heap leach facility would be used for reclamation of this component.

- Erosion control measures other than vegetation would be implemented, where necessary, to prevent sedimentation of surface drainages.

- An extensive test plot program would be developed in conjunction with BLM and NDEP to evaluate techniques needed to achieve the standards for successful reclamation.

The field test plot program would be implemented on-site to determine the most appropriate reclamation techniques to revegetate the waste rock dumps and leach heaps, where the extent of new disturbance would not provide sufficient growth medium to cover the combined new and existing disturbed areas. Variables would include soil amendments, mulch and fertilizer, plant species, planting rates and techniques, use of initial irrigation, and the effects of slope and aspect. Decisions regarding the methods to be used during final reclamation would be based directly on the economic and technical feasibility of various reclamation practices evaluated during the test plot program and their ability to achieve the specified standards for success. Therefore, specific techniques discussed in this plan, such as seeding rates, species, and practices, are starting points for further evaluation through the test plot program.

Reclamation would be conducted concurrent with project operations to the extent practicable. The following areas would be stabilized or reclaimed during construction and operation of the mine:

- Pole locations and other areas disturbed during construction along the transmission line route from the Gonder Substation (excluding the access road) to the project area;

- Water supply line routes (excluding the service road) (North Robinson Canyon and Keystone well);

- East Unit of the tailings impoundment, once West Unit is operational;

- Soil stockpiles, diversion channels, and temporary access routes;

- Portions of the waste rock disposal facilities that are at final grade; and

- Construction-related disturbances that would not be redisturbed during operations, including those related to the concentrator complex, SX/EW facility, and water pipelines.

Areas reclaimed during construction and operation of the facility would be monitored in conjunction with the test plot program to determine the effectiveness of the reclamation techniques. Final reclamation efforts would be implemented within 2 years after permanent closure, with the exception of the pool area of the tailings impoundment, which is expected to require 5 years to dry out sufficiently to allow reclamation work.

Modifications to the reclamation plan would only be made after consultation with and approval by the BLM or the NDEP's Bureau of Mining Regulation and Reclamation, as appropriate.

2.2.15.1 General Reclamation and Test Plot Program

Reclamation of the Robinson Project would be planned and designed to return the area to a stable and productive condition that would be compatible and supportive of post-mining land uses. The following sections address the overall reclamation concepts and methodology applicable to all types of disturbances. The test plot program is being developed by RMLP in cooperation with the BLM to address these concerns. The test plot program would be implemented to evaluate and select successful, site-specific reclamation measures that would achieve the reclamation standards or to demonstrate the need to plant species mixes that would be adaptable to different geomorphic settings expected within the reclaimed project area. These settings would include different aspects and soil or growth medium types. Various surface preparation practices would also be evaluated for their success in promoting plant establishment and resistance to soil erosion, including growth medium amendments. The reclamation studies would be developed in cooperation with BLM and NDEP.

Growth Medium Management

Soil would be stripped from all lands designated for new disturbance, except where limited by excessively steep topography or rocky conditions. The uppermost layer of soil materials, approximately 12 inches, would be removed from these areas prior to disturbance.

RMLP would attempt to recover at each disturbance area the volume of growth medium needed to cover that disturbance. For example, if some areas in the tailings impoundment have less than 1 foot of growth medium, other areas within the impoundment would be stripped to a greater depth, if practicable, so that the total volume of stockpiled soil was equal to that required to cover the entire impoundment with approximately 1 foot of material. A 6-inch cover is planned for the waste dump expansions and the leach facility. In these areas, due to the extensive pre-existing disturbances, there is not enough growth medium available to cover the expanded disturbances with a foot of material.

All salvaged growth medium materials would be stored in clearly marked stockpiles, away from active project operations, but located as strategically close to the facilities as possible. Stockpiles would be designed to minimize wind and water erosion and, to the extent possible, would not be disturbed after stabilization. A catchment berm would be constructed around each stockpile to contain any growth medium that may be eroded, especially prior to the establishment of vegetation.

The stockpiles would be seeded with an interim seed mixture during the first appropriate season following construction. The stockpile surface would be loosened, if necessary, to provide a proper seedbed. The interim seed mixture would be drilled or broadcast-seeded onto the top and ramps of the stockpiles; side slopes would be broadcast-seeded or hydroseeded. Chemical binders and/or mulch may be applied to control erosion. Diversion channels would be constructed around the stockpiles to protect them from surface runoff, where needed. A program to monitor the success of erosion control on soil stockpiles and embankment areas, particularly following high precipitation events, would be implemented. Any evidence of inadequate erosion control would be remedied.

Post-Mining Surface Material Analysis

A post-mining surface material survey and analysis would be conducted for all surfaces to evaluate soil material suitability for supporting plant growth. Results of this survey, in conjunction with the field test plot program, would be used to determine the appropriate vegetation establishment and surface stabilization methods for the various anticipated conditions that would exist (i.e., soil, aspect, slope). The soil analyses would include mineralogy of the parent material, residual heavy metal concentrations, and other physical and chemical parameters.

Growth Medium Amendments

Amendments would be applied as demonstrated to be needed by the test plot program to establish vegetation on disturbed areas. Amendment materials would be placed on roughened surfaces to ensure good contact, with the amended surface lightly compacted to allow for water retention and to prevent erosion. During material distribution on steeper slopes, efforts would be made to create small trenches perpendicular to the slope (i.e., dozer tracking) to enhance seed catchment and reduce erosion. Amendment material would be applied just prior to seeding and in as few passes of equipment as possible to decrease compaction.

Fertilizers would be evenly distributed prior to seeding. Fertilization would be completed in the spring, and seeding would be completed between October 1 and March 15. On gentle slopes, the surface would then be disked and/or harrowed along the contour to break up large clods, prepare an appropriate seedbed amenable to drill seeding, and incorporate fertilizer into the soil. Fertilizer and mulch would be applied concurrently with seed on any steep slopes selected for hydroseeding.

Where the need for mulch has been determined through the test plot program, the mulch would be evenly spread over the seeded area at rates dependent on seeding method and slope. The mulch would be free of mold, fungus, noxious weed seed, or other competitive plant seed.

Seedbed Preparation

Seedbeds would be prepared immediately after grading. Soil amendments would be added only as required, based on soil analyses and test plot results. The area to be planted would be reasonably smooth and free of rills and gullies to provide the best possible soil conditions for seeding. Furrows and terraces may be created to aid in the collection and retention of rainwater. Seedbed preparation would generally include the following practices, as determined to be necessary during test plot work:

- Compacted surfaces would be loosened and left in a roughened condition through ripping, disking, or other mechanical means. Compacted areas, such as access and haul roads, would be ripped to a depth of 1 to

2 feet prior to soil amendment or further seedbed conditioning.

- Where practical, areas to be reclaimed would be scarified or tilled to a depth of several inches prior to seeding. Tillage operations on slopes would be conducted on the contour to minimize erosion.

- The addition of soil amendments, such as mulch or fertilizer, would be evaluated and applied based on an assessment of site characteristics and the test plot results.

- Loose, erodible surfaces may need to be "dozer-tracked," terraced, or deep-furrowed to prevent sloughing before amendments, seed, and mulch are applied.

Vegetation Establishment

Proposed interim and final seeding mixtures were developed for the Reclamation Plan based on known climatic and soil conditions, consultation with BLM and the NDOW, as well as anticipated post-mining land use requirements. Most of the areas to be disturbed currently support sagebrush shrub vegetation with little grass cover. Because natural invasion of shrubs would occur over time, the final seed mixture is comprised mostly of grasses.

The species selected for inclusion in the mix and their application rates are expected to vary depending on seed availability and site conditions, such as aspect, slope, and nutrient conditions, as determined by the test plot program. The rates presented in Tables 2-7 and 2-8 should be considered as starting points for the test plot work, which would be used to develop final seeding species, rates, and other parameters.

For linear features, such as access roads and pipelines, slight variations in the seed mixture may be required depending on the terrains that would be crossed. Seed mixtures and application rates would be refined for the various types of reclamation sites based on an evaluation of post-mining site characteristics (slope, soil type, aspect), seed availability, interim seeding success, and results from the test plot program.

As much as practical, an effort would be made to obtain seeds of native species from sources as close as possible to the project area. Potential plant material dealers located within the geographic region are identified in the complete Reclamation Plan in the POO.

Methods of seeding to be used include drill, broadcast, and hydroseeding. Drilling is preferred where topography and surface conditions permit operation of the equipment. Broadcast seeding would be done on rocky areas, on steep slopes, and on small disturbances. Hydroseeding would be considered for use on steep slopes.

Seed planted with a drill would be covered with soil to a depth of 0.25 to 0.5 inch. Small grass, forb, and legume seed would be seeded at a maximum depth of 1 inch, preferably about 0.5 inch for most species. Special species, such as Indian ricegrass, would be drilled 3 inches deep in sandy soils. Some areas may be reclaimed by "grouping" shrubs to increase habitat diversity. In these situations, shrub seeds or small, individual shrubs may be hand-planted.

Vegetation establishment activities would be timed to take advantage of optimal climatic conditions and would be coordinated with other reclamation activities to occur as soon as practical after seedbed preparation. RMLP would restrict the access of livestock and wild horses to areas that

Table 2-7

Interim Seed Mixture[1]

Species	PLS/lb	Seed Rate (lbs/acre)	Seeds (sq ft)
Grasses			
Thickspike wheatgrass - *Agropyron dasytachyum*	154,000	4	14
Great Basin wildrye - *Elymus cinerus*	95,000	4	8.7
Western wheatgrass - *Agropyron smithii*	110,000	4	10.1
Streambank wheatgrass - *Agropyron dasystachum riparium*	156,000	3	10.7
Forbs			
Sainfoil - *Onobrychis viciaefolia*	30,000	7.0	4.8
Ladak alfalfa - *Medicago sativa*	210,000	0.5	2.4
Yellow sweetclover - *Melilotus officinalis*	260,000	0.5	3.0
Total			53.7

[1]Seeds will be planted between October 1 and March 15.

Percentages:

Grass - 81%
Forbs - 19%

PLS = Pure live seed.

Table 2-8

Final Seed Mixture[1]

Species	PLS/lb	Seed Rate (lbs/acre)	Seeds (sq ft)
Grasses			
Thickspike wheatgrass - *Agropyron dasytachyum*	154,000	2.5	8.8
Indian ricegrass - *Oryzopsis hymenoides*	188,000	2.0	8.6
Great Basin wildrye - *Elymus cinerus*	95,000	4.0	8.7
Western wheatgrass - *Agropyron smithii*	110,000	3.5	8.8
Streambank wheatgrass - *Agropyron dasystachum riparium*	156,000	2.0	7.2
Forbs			
Small burnett - *Sanquisorba minor*	55,000	3.0	3.7
Blue flax - *Linum lewisii*	293,000	0.5	3.4
Scarlet globemallow - *Sphaeralcea coccinea*	500,000	0.5	5.7
Palmers penstemon - *Penstemon palmeri*	610,000	0.25	3.5
Yellow sweetclover - *Melilotus officinalis*	260,000	0.5	3.0
Shrubs			
Four wing saltbrush - *Atriplex canescens*	60,000	3.0	4.1
Prostrate kochia - *Kochia prostata*	500,000	0.5	5.7
Total			74.2

Percentages:

Grass - 57%
Forbs - 30%
Shrubs - 13%

Optional Grasses[1]

Species	PLS/lb	Seed Rate (lbs/acre)	Seeds (sq ft)
Bluebunch wheatgrass - *Agropyron spicatum*	117,000	3.0	8.0
Bottlebrush squirrel tail - *Sitanion hystrix*	192,000	2.0	8.8
Sandbergs bluegrass - *Poa sandbergii*	925,000	0.5	10.6

[1]Seeds will be planted between October 1 and March 15.

have been seeded to allow for the successful establishment of vegetation.

2.2.15.2 Schedules for Surface Disturbance and Reclamation Activities

Figure 2-1 shows a proposed schedule for initiation of surface disturbances. The concentrator, leach facilities, SX/EW plant, transmission line, and various administrative, support, and maintenance facilities would be constructed first, followed by the East Unit of the tailings dam and the gold leach facility. Final reclamation of facilities would be implemented as soon as practicable after permanent closure of mining operations in any discrete area (see Table 2-9). This would normally be within 2 years. One exception to this would be the tailings impoundment, which would need to dry sufficiently prior to its reclamation.

2.2.15.3 Post-Mining Topography

The topography of the reclaimed mine and process facility sites would be consistent with the anticipated post-mining land uses*, which would be rangeland, wildlife habitat, and dispersed recreation for public lands, and industrial uses for private lands. These land uses are in conformance with the Egan Resource Management Plan.* All project roads not required for long-term access and maintenance would be recontoured to the extent possible. Sites that may have buildings or other ancillary facilities removed would also be recontoured to blend with the existing topography to the extent practicable. All recontouring would be completed in a manner that would facilitate free drainage of the reclaimed sites.

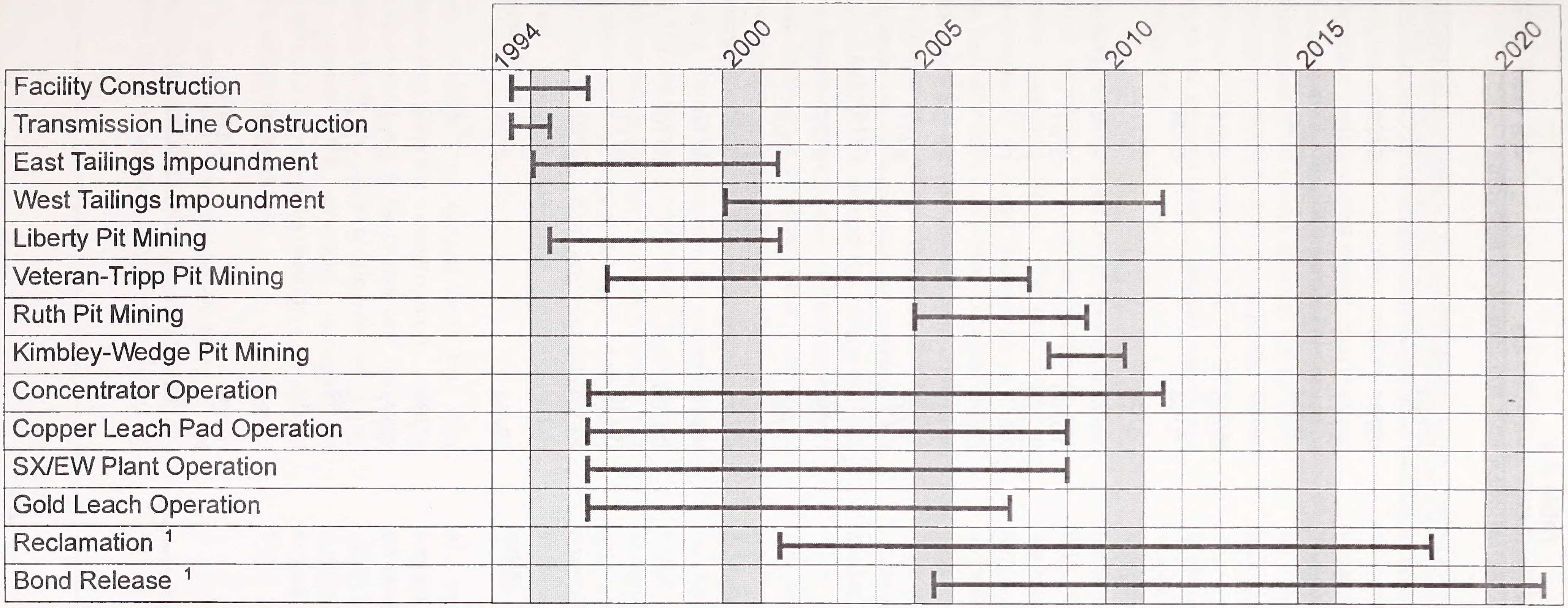
The tailings impoundment dam would remain in place at its designed configuration of 2.5:1. During operations, management of the tailings facility would shape the final impoundment surfaces to allow for drainage of precipitation runoff. The final grade of the East Unit and West Unit impoundment surfaces would be a 1-foot drop in elevation for every 1,000 feet of horizontal distance (0.1 percent slope).

During reclamation, the overall 2.5:1 slopes of the heap leach facilities would be maintained. Regrading would consist of rounding off the edges of the lifts to create a series of terraces in each heap face at a minimum of 1 terrace per 100 feet of slope.

Final waste dump elevations would be approximately 7,300 feet, which increase the heights of the existing dumps approximately 100 feet (Liberty and Veteran-Tripp) to 250 feet (Ruth). New dump faces would be constructed at an overall angle of 2.5:1. Erosion control features (benches or "moonscaping") would be constructed at maximum 100-foot intervals on the slopes.

2.2.15.4 Reclamation of the Tailings Impoundment

The phased construction of the tailings impoundment would allow reclamation of the East Unit impoundment concurrent with operation of the West Unit facility. Depositional practices would be modified during the end of the impoundment life to smooth the surface and fill in the low area used for the reclaim of process water. During operations, the final tailings deposition would be managed so the impoundment surface is contoured to promote runoff to the easternmost side of the impoundment. A post-operation drainage channel would be constructed on the capped impoundment to transport runoff from the East Unit portion of the facility to the adjacent drainage leading back into the Giroux Wash. The last



[1] Reclamation would begin on individual components as soon as design life has been completed. Bond release would also be contingent on successful completion of specified reclamation activities for individual components.

Note: See Table 2-9 for more precise dates.

Figure 2-1. Tentative Schedule for the Robinson Project

Table 2-9

Schedule for Surface Disturbance and Reclamation Activities

Activity	Start	End
Facility Construction	9/94	2/96
Facility Reclamation	6/17	6/18
Transmission Line Const.	9/94	5/95
Transmission Line Reclm.[1]	9/95	11/95
East Tailings Impound. Const.	3/95	2/01
East Tailings Impound. Reclm.	6/03	6/08
West Tailings Impound. Const.	3/00	2/11
West Tailings Impound. Reclm.	6/13	6/18
Liberty Pit Mining	10/95	3/01
Liberty Pit Closure	6/17	6/18
Liberty Dump Construction	9/95	3/01
Liberty Dump Reclamation	6/01	6/02
Veteran-Tripp Pit Mining	4/97	9/07
Veteran-Tripp Pit Closure	6/17	6/18
Veteran-Tripp Dump Construction	1/98	9/07
Veteran-Tripp Dump Reclamation	6/08	6/09
Ruth Pit Mining	4/05	6/09
Ruth Pit Closure	6/17	6/18
Ruth Pit Dump Construction	04/05	2/10
Ruth Pit Dump Reclamation	6/10	6/11
Kimbley-Wedge Mining	8/08	2/10
Kimbley-Wedge Closure	6/17	6/18
Concentrator Const. & Oper.	9/94	2/11
Concentrator Reclamation	--[2]	--[2]
Copper Leach Pad Const. & Oper.	7/96	11/08
Copper Leach Pad Reclamation	6/17	6/18
SX-EW Const. & Operation	7/96	11/08
SX-EW Reclamation	--[2]	--[2]
Gold Leach Operation	7/96	6/07
Gold Leach Reclamation	6/08	6/09
Bond Release	6/05	6/21

[1]Reclamation of pole locations only.

[2]Not reclaimed.

100 feet of the channel through its confluence with the natural drainage channel would be armored with riprap or other erosion control features to protect against erosion and/or failure. The downstream face of the main dam would be constructed at an overall slope of 2.5:1. Upon completion of the final lift, no regrading to final slopes would be necessary, and the dam face would be covered with stockpiled topsoil and revegetated.

Reclamation of the West Unit of the impoundment would be initiated as soon as practicable after milling operations cease. The dam would be constructed at an overall slope of 2.5 to 1, and the southerly dam face would be covered with stockpiled soil and revegetated after completion of the final lift. As with the East Unit, tailings depositional practices would be modified at the end of facility life to smooth the surface and fill in the depression at the back of the impoundment used for the pool of reclaim water. This tailings management would promote sheet flow of precipitation runoff to the westerly side of the facility. Riprap or other erosion control features on 100 feet of the channel through its confluence with the natural drainage would allow excess flow to enter into the diversion structure, which would be installed along the north and west sides of the West Unit impoundment during facility construction.

Soil materials from Giroux Wash that were stockpiled during construction of the impoundment would be placed over the entire tailings facility to a depth of approximately 1 foot. In general, the practices discussed in Section 2.2.15.4 would be used for reclamation of the tailings impoundment.

It is anticipated that the beach areas of the tailings impoundment would be sufficiently dry to allow heavy equipment and resoiling during the first 1 to 2 years following tailings deposition. However, a period of approximately 5 years may be needed before the pool areas on the tailings surfaces dry out sufficiently to allow reclamation. The diversion structure would remain in place and be subject to periodic inspection and maintenance.

Reclamation of the impoundment would also include removal of surface facilities and revegetation of ancillary disturbances. Tailings distribution lines, cycloning facilities, reclaim water lines, powerlines and electrical switchgear, and the reclaim booster pump stations would all be removed and sold or otherwise disposed of according to applicable state and local requirements. Surface disturbances created by these facilities, as well as by such other ancillaries as access roads, would be regraded, ripped, and seeded.

The tailings water seepage collection ponds would be maintained until no flow emanates from the tailings and would then be filled in, regraded to prevent ponding, covered with stockpiled alluvial materials stripped from the area during construction, and revegetated. Subject to the approval of the BLM, monitoring wells installed downgradient of the impoundment would be left in place to allow future sampling of groundwater quality.

All reclamation practices for the tailings impoundment and its related facilities would be consistent with the requirements of NAC 445.242-445.24388, inclusive, the State Water Pollution Control Permit issued to the Robinson Project, and the approved project Reclamation Plan.

2.2.15.5 Reclamation of Open-Pits

The feasibility of reclaiming open pits and rock faces can be determined by the technological and economical practicability considering the following: topography of the site, sequence of mining, time required to complete reclamation, consumption of resources required to complete reclamation, potential adverse environmental impacts to the quality of the air and water associated with the activities for reclamation, and future access to mineral resources.

The sequence of mining and the distance between pits would not allow for backfilling of the pits. Liberty Pit would be mined for 7 years (at current dollar prices of copper), and mining of the Veteran-Tripp Pit would start before mining in Liberty Pit was completed. By the time mining in Liberty Pit was completed, the quantity of waste rock from the Veteran-Tripp Pit would not completely fill Liberty Pit. Hauling waste rock from the Ruth Pit and Kimbley/Wedge Pits across the District to the Veteran-Tripp Pit would be economically infeasible.

All of the five pits at the project are subject to ongoing exploration, which has demonstrated mineral resources potential. In particular, most recent evaluations identify approximately 212 million tons of mineral resources in Liberty Pit that are not economically recoverable at this time and not included in the Proposed Action.

Based upon the current Proposed Action, mining would continue for about 15 years and remove approximately 487 million tons of waste rock and 292 million tons of ore from the pits. Backfilling would require an essentially equivalent amount of time and material and the resultant manpower, equipment and fuel. Approximately 77 million gallons of fuel would be required for mining and an equivalent amount of fuel consumption would be required to complete backfilling. Based on these criteria, RMLP has proposed not to reclaim the open pits. NDEP has approved not backfilling or reclaiming the pits under reclamation permit No. 0021.

2.2.15.6 Reclamation of Waste Rock Disposal Areas

Because all waste rock disposal is planned as extensions of existing dumps, it would not be feasible to construct them in benches. Therefore, new slopes of the waste rock disposal areas would be constructed at the angle of repose for the respective types of material. Regrading of these slopes to an overall 2.5:1 would be undertaken during final reclamation.

Loose faces of slopes would be "walked" with a dozer to partially compact the surfaces prior to placing soil amendments. Excessively compacted surfaces would be ripped or scarified where necessary. Water bars, terraces, contour furrows, or other erosion control features would be constructed into the slopes at no greater than 100-foot slope intervals to control erosion and sediment transport. During final regrading of the waste rock dumps, efforts would be made to add small hills, loose rock piles, depressions, and other irregular features ("moonscaping") up to the tops of the dumps to provide additional wildlife habitat and avoid an artificially smooth appearance.

Soil and growth medium stripped from the areas of dump expansion would be used first to cover the regraded slopes so that erosion can be minimized. Since existing conditions prevent the stockpiling of sufficient soil and growth medium to cover the entire dump surfaces, the results of the test plot work would be used to determine specific reclamation practices for direct revegetation of a growth medium created from the waste rock itself.

During previous operations in the Robinson District, attempts were made to leach copper from several waste dumps in addition to the Keystone Dump. Cells excavated on the tops of a number of dumps, including the Sunshine, Puritan, and Kimbley Dumps, were designed to promote the leaching of the waste rock. Where these dumps would be used for additional waste disposal, deposition of new waste rock would remove the cells and encourage runoff rather than infiltration of precipitation.

2.2.15.7 Reclamation of Copper Leach Facilities

Following the regrading of the lift crests, the heap would be compacted with a wheeled soil compactor. Since compaction could hamper revegetation efforts, it would be necessary to cover the compacted surface with growth medium to promote satisfactory revegetation of the heaps.

Since much of the surface area proposed for use in the leaching operations has already been disturbed, the amount of soil available for subsequent revegetation may be limited. To the extent practicable, efforts would be made to excavate sufficient soil to cover the entire heap. This would entail recovering more than the nominal 1 foot of soil where it is available in the area. If sufficient suitable soil cannot be stripped from each leach pad area, final reclamation of this disturbance would include spreading waste rock from the nearby Liberty Dump as a growth medium over the surfaces of the heap. Where waste rock only would be used for growth medium, it would be placed to a depth of 18 inches. Where stripped soil would be used for growth medium, a layer of waste rock would be placed between the compacted soil surface and the soil for a combined soil/waste rock depth of 18 inches.

Revegetation practices for these disturbances would be consistent with those discussed in Section 2.2.15.1. Subject to the approval of the BLM, monitoring wells installed downgradient of the copper leach pad would be left in place to allow future sampling of groundwater quality. All closure practices for the leach pad and its related facilities would be consistent with the requirements of NAC 445.242-445.24388, inclusive, and the NDEP Pollution Control Permit issued to the Robinson Project.

At least one of the three copper leach solution ponds would be maintained in operation until the effectiveness of the heap compaction in eliminating contaminated seepage or runoff could be confirmed. The timing and specific final reclamation measures for this portion of the leach facility would depend on the success of the environmental closure procedures proposed in the NDEP Pollution Control Permit application. This pond(s) may be retained for sediment and runoff control.

After evaporation or other disposal of leach solutions from the ponds that are not used for containment of seepage and/or runoff, solids remaining in the ponds would be analyzed and either processed on- or off-site for metals recovery or disposed of in accordance with applicable state and Federal requirements, as part of closure procedures under state water quality regulations. The synthetic liners would then be cut up, folded over, and buried as the ponds are filled in with waste rock, local borrow materials, or other fill material. Soil stockpiled during pond construction would be spread over the disturbed area and the site would then be revegetated.

The mill water holding pond, located on the southwestern edge of the Liberty waste rock dump, would be closed and reclaimed by evaporating or otherwise disposing of the water, puncturing the pond floor such that it would not retain water, and covering with waste rock from the adjacent portion of the Liberty Dump (or other waste rock or fill material). The area would then be revegetated in a manner similar to the rest of the Liberty Dump.

2.2.15.8 Reclamation of Gold Leach Facilities

Reclamation activities are required for the four gold heap leach pads identified as Pads A, B, C, and D, which are currently in operation at the site. These activities have been approved by BLM and NDEP. Map 1-3 shows the locations of the four pads. Gold leaching operations include approximately 150 acres of private and public land, all of which will be reclaimed following operation.

The heap leaches were constructed in successive lifts, approximately 20 feet in height, to a total maximum height of approximately 200 feet. Regrading would consist of rounding off the edges of the lifts to create a series of terraces in each heap face at a minimum of one terrace per 100 feet of slope. These terraces would act as moisture and sediment traps, which should enhance vegetation establishment. Heap leach side slopes would be modified during reclamation to overall slopes of 2.5:1 (horizontal:vertical) within the physical limits (if the case may be) of the steep side slopes of the copper waste rock dumps on which they are situated. Heap leach areas would be revegetated on a growth medium developed from the existing material, amended as necessary, and directly vegetated. Erosion control measures other than vegetation would be implemented, where necessary, to prevent sedimentation of surface drainages. Revegetation practices would be consistent with those discussed in Section 2.2.15.1.

Reclamation activities also would be required for the proposed expansion of Pad D and the additional gold heap leach Pad E. NDEP and BLM would be required to review and approve a reclamation plan for Pad E, which would include reclamation practices and standards similar to those presently required for Pads A, B, C, and D.

2.2.15.9 Reclamation of Roads (Including Transmission Line and Pipeline Corridors)

All roads within the project area would be reclaimed as soon as they are no longer needed for current or potential future operation of the Robinson Project. Culverts would be removed and the natural drainage re-established. Roads would be recontoured to the extent practicable by rounding off uphill cut and downhill fill slopes. Water bars or other erosion control features would be constructed as necessary to minimize sedimentation until the establishment of vegetation, and periodic inspections would be conducted to ensure the effectiveness of these structures. Recontouring would be accomplished by appropriate equipment, such as crawler-type bulldozers. All sidecast materials, cutslopes, berms, and drainage ditches constructed as part of the project would be reclaimed during the recontouring. Road surfaces would be ripped and revegetated in a manner consistent with that described in Section 2.2.15.1. Roadways that do not require recontouring would be ripped and the berms bladed out. Following all operations, any remaining roads would be reclaimed in a similar manner, except for those determined to be necessary for continued monitoring and maintenance of facilities, including those that are part of the required closure and/or reclamation of the site.

Disturbances resulting from construction of the transmission line from the Gonder Substation to the project site and installation of the water wells and pipelines would be subject to reclamation as soon as practicable after construction. Since there would be no loss of the existing soil, the disturbance would be ripped and directly revegetated. A dirt track would be left for maintenance of the transmission line and water lines. After mining ceases, the transmission line and water lines would be retained for post-reclamation industrial land uses.

2.2.15.10 Disposition of Buildings, Equipment, and Reagents

During final reclamation, all surface facilities and structures that would not be put to an industrial post-mining use would be removed. Facilities to be removed include the tailings distribution system, reclaim pipelines and pumps, electric distribution lines and poles, runoff and sediment control structures, leach facility piping, as well as all buildings that would no longer be used after operations cease. It is anticipated that the concentrator, SX/EW, and shop buildings on private land would be retained. Any facilities or corridors that could serve a beneficial future use on public lands (such as the transmission line from the Gonder Substation and the administration building access road) would remain in place following mining, upon approval by the appropriate regulatory agency.

Nonhazardous materials of no salvage value, such as concrete and asphalt, would be buried on-site or be covered in place, consistent with the requirements of NAC 519A.345.8B. Any waste classified as hazardous would be disposed of in accordance with applicable Federal and state laws and regulations.

2.2.15.11 Post-Reclamation Monitoring and Maintenance

Reclaimed areas would be examined by the BLM and state-authorized officers to determine reclamation success and release of financial assurance. Areas that do not meet the required standards after 3 to 5 years would be reseeded. At RMLP's option, reseeding may be conducted sooner than 3 years after initial seeding. Final design of the post-operational monitoring program would be completed prior to closure.

Vehicle traffic would be restricted within the reclaimed area. Livestock and wild horses would be excluded from the area until the soils are firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. This would probably take a minimum of 2 to 5 years after seeding.

Fencing and berms erected to prevent access to open pits and structures left in place would be inspected annually and repaired as needed. The inspections would also confirm that all warning signs are intact and legible. These signs would be replaced as needed. The diversion channel around the tailings impoundment would be inspected and cleaned out as necessary to allow passage of the design flow.

2.2.15.12 Standards for Successful Reclamation

The following standards would be applied to the Robinson Project to determine the success of reclamation efforts and final release of financial assurance:

- Establishment of vegetation with a 30 percent canopy coverage of the surface. No more than 5 percent of this cover may be undesirable weeds.

- Diversity of cover shall be as follows, based on total vegetation occurrence:

  - At least 33 percent must be perennial grasses;
  - At least 17 percent must be forbs (weeds are not counted in this percentage);
  - At least 7 percent must be shrubs, with no more than 50 percent rabbitbrush.

The above percentages include both planted and volunteer growth.

Conformance with these standards would be determined by either the Line Intersect Method or the Step Point Transect Method of cover monitoring (BLM 1985a).

These standards would be applied throughout the project site on all reclaimed surfaces. As discussed below, the Robinson Project would expand waste rock disposal areas that were created prior to any reclamation requirements. Due to the potential limitations inherent in reclamation in arid climates, especially in the direct revegetation of a growth medium created from waste rock, it is possible that meeting the success standards for cover or diversity may be infeasible. The following criteria would be used to determine if a lesser degree of cover and/or diversity would be judged by BLM as acceptable. The criteria are designed to assess whether RMLP has expended reasonable efforts to achieve the specified standards and are based on similar provisions in the State of Nevada Reclamation Regulations (NAC 445.519A.275).

1) RMLP must take adequate measures to fertilize the growth medium.

2) RMLP must take all reasonable surface and seedbed preparation measures necessary to create a viable growth medium.

3) RMLP must use an appropriate seed mixture for each stratigraphic feature, as approved by BLM.

Revegetation efforts would be determined to be complete and successful upon demonstrating that the standards for success described above, or alternative standards deemed appropriate by BLM based on the results of the test plot program, have been met.

In addition to the standards for successful revegetation, the following standards would also be applied to determine a successful reclamation program:

1) Water bars, terraces, contour furrows, or other erosion control features would be incorporated into the reclaimed slopes of the waste rock piles, leach pad, and tailings dam at a maximum spacing of 100 feet of slope length.

2) To the maximum extent practicable, all sediment from project-related disturbances resulting from up to and including the 100-year, 24-hour storm event would be contained within the project area.

3) Surface water diversion structures would be designed to prevent headcutting where the diversion re-enters the natural drainage.

4) After final reclamation earthwork, and until the completion of successful reclamation, rills or gullies would be limited to a size that can be traversed by the equipment necessary to perform revegetation work.

2.2.16 Summary of Environmental Protection Measures

The following list summarizes those measures incorporated into the Proposed Action that reduce the potential environmental impacts of the Robinson Project. The list also includes (under Social and Economic Values) commitments from the Mitigation Strategy Agreement signed in October 1992 by RMLP, the Magma Impact Committee, the White Pine County Board of County Commissioners, the City of Ely, and the White Pine County School District. This agreement identifies specific measures to mitigate social and economic impacts from the project.

The Mitigation Strategy Agreement identifies the short-term needs of the community and the costs of meeting those needs. The document commits RMLP to purchase bonds from the city, county, and school district in amounts sufficient to address those needs. RMLP's assurances for housing the new construction and operational work forces migrating to the area also are contained in the strategy, as are their commitments to donate hazardous materials spill response training and materials to the Ely Fire Department and to allow the county to purchase liner materials and equipment for the new landfill along with RMLP's purchases for the Robinson Project. A copy of the strategy is on file at the Ely BLM office.

Geology

- Design the tailings embankment to sustain a seismic event of 6.8 on the Richter scale.
- Monitor stability of the tailings dam, waste rock disposal areas, leach heaps, and pit walls.

Water Quantity and Quality

- If roads are to be utilized for more than 1 year, mulch and seed cut and fill slopes immediately after disturbance to control erosion and establish vegetative cover.
- Install synthetic lining and leak detection/collection system for copper leach pads.
- Install leak detection and/or secondary containment systems for SX/EW tanks and storage tanks.
- Install double lining and leak detection/collection system for leach solution ponds and solution ditches for copper and gold leach facilities.
- Routinely inspect tanks for integrity.
- Divert surface water around the West Unit of the tailings impoundment, leach facilities, open pits, and waste dumps.
- Build secondary containment berms and ditches for the acid unloading station and acid and reagent storage tanks, waste rock dumps, soil stockpiles, mixer/settler tanks, and the tailings pipeline from the mill to the impoundment.
- Line side slopes of retention ponds to prevent retention pond water from seeping through waste rock material.
- Recycling of water from pools in the tailings impoundment would provide a substantial volume of water for mineral processing; reduce the amount of water that would be obtained from other sources, primarily groundwater wells; reduce the size of the

pool, which in turn enhances the consolidation and structural strength of the tailings for final reclamation; reduce seepage into the embankment; and reduce infiltration into the soils beneath the impoundment.

- Install sensors on tailings pump motors to identify ruptures of the tailings pipeline.

- Seed soil stockpiles with interim seed mix to minimize erosion.

- Design and operate tailings impoundment and copper and gold heap leach pads and ponds to prevent discharge to surface water.

- Implement waste rock management procedures to prevent the generation of acid and acid drainage from waste rock dumps, including segregation, selective placement, mixing, covering of waste rock materials, and other preventive measures.

- There are existing conditions that currently allow a small, localized spot of acid mine seepage to occur in one location on the project area. These conditions would be avoided by RMLP during planning for placement and expansion of waste dumps so that acid mine seepage from dumps does not occur.

- Inspect the runoff containment system after major precipitation events.

- Construct an embankment seepage collection system, a solution recycling system, and monitoring wells in proximity to the Giroux Wash tailings impoundment.

- Riprap diversion channels to limit erosion and inspect and maintain, as necessary.

- Construct berms below the downstream face of the tailings embankment to fully contain all sediments within the berms.

- Place waste rock that has acid-generating potential in disposal areas in a manner that precludes infiltration by meteoric water and air.

- Implement groundwater monitoring program.

- Contain or control runoff from disturbed areas pursuant to surface water quality standards.

- During the life of the project revise and improve, as necessary, stormwater pollution prevention practices and procedures.

- Immediately prior to reclamation, limit slope lengths on waste rock, leach facility side slopes, and the tailings disposal area embankment face to 100 feet with construction of appropriate benches, berms, or trenches. Rip along the contour and "moonscape," if appropriate.

- Regularly inspect pipelines, pumps, spigots, secondary containment ditches, berms, seepage collection ponds, the tailings impoundment pool, and the stormwater diversion channel.

- Use covered, enclosed mixer/settler tanks to prevent leaks to the environment.

- Dewater the Liberty, Ruth, and Kimbley Pits, and possibly the Veteran-Tripp Pit, to provide some of the project's water requirements and reduce the amount of water withdrawn from production wells.

- Develop a general Emergency Response Plan.

- Take quarterly samples of tailings to test for acid-generating potential.

- Upgrade City of Ely water intake measuring system.

- Deepen wells in Gleason Creek, if impacted.

- The Murry Springs monitoring system has been upgraded by RMLP. If it is demonstrated that Murry Springs water is affected due to operation of the Robinson Project to the point that it no longer meets state standards for drinking water quality or is inadequate to meet the demands of the City; RMLP would take appropriate actions required by law, such as construction of a water treatment facility or development of a new source of water.

Soils

- If roads are to be utilized for more than 1 year, mulch and seed cut and fill slopes immediately after disturbance to control erosion and establish vegetative cover.

- Use water and possibly chemical additives to control fugitive dust from haul roads and construction areas.

- Stockpile up to 1 foot of available topsoil/growth medium from disturbed areas for use in reclamation.

- Build secondary containment berms and ditches for the tailings embankment, waste rock dumps, mixer/settler tanks, and soil stockpiles.

- Grade and seed soil stockpiles with an interim seed mix to minimize erosion.

- Use covered, enclosed mixer/settler tanks to prevent leaks to the environment.

- Prior to reclamation, limit slope lengths on the waste rock, leach facility side slopes, and the tailings disposal embankments face to 100 feet with construction of berms, benches, or trenches. Rip along the contour and "moonscape," if appropriate.

- Develop a general Emergency Response Plan.

- Develop test plot program to evaluate techniques needed to achieve successful reclamation.

- During construction and operations, stabilize or reclaim transmission line construction disturbance areas (excluding access roads), water supply line routes, the East Unit of the tailings impoundment (once the West Unit is operational), diversion channels, temporary access roads, soil stockpiles, portions of the waste rock facilities, and construction-related disturbances that would not be redisturbed during operations.

- Initiate a program to monitor the success of erosion control measures on soil stockpiles and embankment areas. Remedy any evidence of inadequate erosion control.

Vegetation

- Restrict livestock and wild horse access to areas that have been seeded to allow for successful vegetation.

- Install a four-strand barbed wire fence around the tailings impoundment.

- Reduce impacts on area vegetation by controlling noxious weed infestations in disturbed and revegetated areas through the use of Best Management Practices (BMP), such as proper reclamation, judicious use of herbicides, and monitoring to identify potential problems.

Wildlife and Fisheries Resources

- Fence and cover/net leach solution ponds and channels and the proposed gold leach pad expansion.

- Implement appropriate access control measures if ponding of solution on the heap occurs.

- *Place* a water tank on Rib Hill, a wildlife guzzler in the Egan Range, *and two water tanks near the tailings facility. The locations of these water sources would be determined in conjunction with the BLM and NDOW. Water sources would contain wildlife escape ramps.*

- *Incorporate raptor protective design as presented in Rural Electrification Administration guidelines for the entire length of distribution lines within the mine area.*

- Install an 8-foot mesh wire fence around the seepage collection ponds.

- *Monitor (observe and record) bird and other wildlife use of the pit and tailings impoundment waters during water sampling activities.*

- Receive permission from BLM and NDOW prior to sealing any mine openings (potential bat habitat) within the project area.

Air Quality

- If roads are to be utilized for more than 1 year, mulch and seed cut and fill slopes <u>immediately</u> after disturbance to control erosion and establish vegetative cover.

- Use water and possibly chemical additives to control dust from roads and construction areas.

- Collect and control particulate emissions from the crusher and the ore reclaim systems with dust control systems.

- Control dust emissions from the stacking conveyor system drop point with a pneumatic water spray dust suppression system.

- Use covered, enclosed mixer/settler tanks to limit the potential for airborne emission of reagents.

- Cover or stabilize concentrate during transport.

- Use mist suppression on electrowinning cells.

- Grade and seed soil stockpiles with an interim seed mixture to minimize wind erosion.

- Design the concentrate loading station to minimize fugitive dust emissions from concentrate transfer operations.

Noise

- Temporarily leave northwestern edge of the Keystone Dump in place as a sound barrier while mining the dump for the leach operation.

Social and Economic Values

- Require prime construction contractor to ensure adequate housing for the construction work force. RMLP and its contractor would bear the responsibility and cost for construction of these facilities.

- Cause to be built any additional housing units (including mobile home spaces) if, 2 months after the initiation of construction activities at the concentrator complex (trigger date), sufficient units either are not available or are not permitted for construction.

- Hire as much of the work force as possible from the local and surrounding communities.

- Continue to coordinate with community representatives during construction and operation of the Robinson Project to identify any new issues arising from the project and cooperatively develop appropriate responses.

- Purchase bonds totaling $931,000, if offered by the City of Ely, the White Pine County School District, and White Pine County, to finance the identified measures in the amounts for each governmental entity as follows:

<u>White Pine County</u>

$250,000 - Landfill siting study/
preliminary engineering;
$ 30,000 - Sheriff squad car;
$126,000 - 2 sheriff salaries for 2 years.

<u>City of Ely</u>

$100,000 - Water well construction;
$250,000 - Sewage sludge digester.

<u>White Pine County School District</u>

$175,000 - Shortfall funding for Ruth school operation.

The bonds would be purchased by RMLP, at the request of each governmental entity, no earlier than 2 months after construction activity begins at the project.

- Reasonably assist in development of a new water well for the City of Ely, in addition to providing the $100,000 described above.

- Provide the City of Ely Fire Department and White Pine Fire District with two spill kits (up to a total value or cost of $40,000) and appropriate emergency response training to allow them to respond to a spill or other accident involving hazardous materials. RMLP would also make its own trained on-site personnel reasonably available to assist the Ely Fire Department and White Pine County Fire District in such an event at the request of the Fire Department, provided that RMLP shall have no liability to the city or county for any such advice, training, or assistance rendered.

- Allow the county, to the extent reasonably possible, to purchase liners and other equipment required by the planned regional solid waste landfill in conjunction with similar liner and equipment purchases by RMLP to the extent such purchases are actually made.

- On December 31, 1992, the RMLP paid $13,836, in immediately available funds, to the White Pine County School District for marketing the 1992 School Construction Bond to the local electorate.

Transport of Process Materials, Products, and Hazardous Wastes

- Develop a general Emergency Response Plan.

- Specify to the trucking company that RMLP adheres to regulations recently adopted by the U.S. Department of Transportation (49 CFR 171-177; 57 FR 20944 May 15, 1992) designed to aid in reducing the potential for accidents and in mitigating releases that may occur during transport of hazardous materials. These rules require that the truck drivers bringing sulfuric acid and other hazardous materials to the Robinson Project site receive training in the following areas: methods and procedures for avoiding accidents; pre-trip safety inspections; use of vehicle, including dangers associated with weather or road conditions; and loading and unloading of materials. Additional specialized training is also required for drivers of tank trucks, such as those transporting acid, including training on vehicle handling characteristics, and retest and inspection requirements for cargo tanks. In addition to these Federal requirements, RMLP would also require that any trucking or rail companies transporting acid to the site have its own spill contingency plans and appropriate emergency response capabilities (see Section 2.2.13.3).

- Specify that all NNRC employees receive hazardous material training prior to initiation of rail service.

- Ensure that the Ely Fire Department and White Pine County Fire District are aware of the nature of materials being transported to the mine site, and that they have appropriate training in the event of a spill or other accident involving hazardous material.

- Provide the Ely Fire Department and the White Pine County Fire District with emergency response training for sulfuric acid spills and the equipment necessary for such a response, and make trained on-site mine personnel available to assist in the event of an acid spill, if necessary.

Access

- Construct a new road for public access around the Giroux Wash West Unit tailings impoundment.

- Install a four-strand barbed wire fence around the tailings impoundment.

Recreation

- Assist BLM with improvements to and/or maintenance of the Garnet Fields Rockhound Area.

Visual Resources

- Construct buildings with natural, low-contrast colors.
- During reclamation, fill slopes designed to be similar with the surrounding natural topography to the maximum extent practical in keeping with the Reclamation Plan.
- Minimize visual disturbances near the Garnet Fields Rockhound Area by using dark brown transmission line poles and by placing poles out of public view where possible.
- To the extent practicable, spread the soils or materials excavated during construction and not stockpiled for reclamation into the cleared area and grade them to conform with existing terrain.
- Reduce potential visual impacts by avoiding, to the extent possible, disturbances to foliage adjacent to the site, so that there would be maximum available screening of the site. Where possible, disturbances would be created with curvilinear boundaries instead of straight lines, and grading would be done in a manner that minimizes erosion and conforms to the natural topography.

Cultural Resources

- If previously undocumented archaeological sites or subsurface components of documented sites are discovered during construction, halt activities until the resources are examined by professional archaeologists in accordance with the procedures outlined in the 1992 Programmatic Agreement among the BLM, Nevada Division of Historic Preservation and Archaeology, the Advisory Council on Historic Preservation, and RMLP. If resources were eligible for the National Register of Historic Places (NRHP), impacts would be mitigated through an appropriate treatment plan as stipulated in the Programmatic Agreement.

Safety

- Station a fire truck on-site.
- Provide the Ely Fire Department and the White Pine County Fire District with emergency response training and equipment necessary for the potential spill of a project-related hazardous material.
- Install a four-strand barbed wire fence around the tailings impoundment.
- Place warning signs around the pits following reclamation.

Reclamation

- Stockpile topsoil/growth medium from disturbed areas for use in reclamation.
- In reclamation of tailings and waste rock dumps, include physical surface stabilization and revegetation procedures and financial assurance to ensure completion of successful reclamation.
- Develop a test plot program to evaluate techniques to achieve successful reclamation.
- Promptly revegetate areas where no further disturbance is anticipated.

- Grade in a manner that would minimize erosion and conform to the natural topography.
- Begin reclamation of the East Unit portion of the tailings disposal facility as soon as the West Unit portion is ready for use, subject to adequate drying of the tailings surface.

2.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, copper mining at the Robinson Mine would not occur and the proven ore reserves in the area would remain undeveloped. No construction of ore crushing facilities, copper concentrator, mill tailings disposal facility, heap leach pads and ponds, SX/EW plant, and other related facilities would occur. Recovery of gold from existing heap leach facilities would continue until gold values are exhausted, then all operations would cease. Gold facilities would be reclaimed under the existing permits for those activities. However, no reclamation activities would take place on approximately 2,932 acres of disturbed land in the Robinson Mining District.

2.4 DISPOSAL OF MILL TAILINGS OR WASTE ROCK IN LIBERTY PIT

Disposal of tailings or waste rock into Liberty Pit instead of depositing these materials in Giroux Wash or on the Veteran-Tripp Dump, as has been proposed by RMLP, was an alternative frequently mentioned during scoping. In order to evaluate which disposal possibilities might represent reasonable alternatives to the Proposed Action, a set of six scenarios was created to encompass the various scoping suggestions. Each scenario is outlined on Table 2-10. Map 2-5 illustrates the tailings impoundment configurations discussed under Scenarios 2 through 5. Each scenario was evaluated for its potential to reduce impacts, for its technical feasibility, and for its cost consequences. The results of this evaluation are presented on Table 2-11. Based on the evaluation, all but Scenario 1 have been deemed reasonable and will be subjected to detailed analysis in Chapter 4.0. ***Both waste rock and tailings could not be disposed of in Liberty Pit because there is not enough volume in the pit to hold the amounts of material that would be generated.***

The Liberty Pit disposal alternative would involve the use of Liberty Pit after mining in that location has been completed. Liberty Pit would be the first pit mined during the project life. Detailed exploration drilling has determined that the mine plan would leave approximately 212 million tons of mineral resources on the sides of Liberty Pit, which is not economically mineable at the current time. Upon completion of mining of currently identified economic reserves, tailings could be deposited directly into the pit from the concentrator (Scenarios 1 through 5). Since a suitable tailings disposal site is required during the mining of the Liberty Pit, this alternative includes the construction and operation of at least part of the Giroux Wash tailings disposal facility. Associated facilities, including the embankment, seepage collection pond, impoundment area, access road, electrical distribution line, and tailings pipeline, would still need to be constructed. Any alternative involving disposal of tailings or waste rock in Liberty Pit would be subject to review and permitting requirements of NDEP, as well as the future economic and operational feasibility of recovering mineral resources in the pit. If it becomes economically and operationally feasible to extend the life of Liberty Pit, deposition of tailings into the Giroux Wash tailings impoundment or placement of

Table 2-10

Liberty Pit Disposal Scenarios[1]

Proposed Action

- Construct and utilize the East and West Giroux Wash tailings disposal areas as proposed (280 million tons).

Scenario 1

- Construct and utilize the East Giroux Wash tailings disposal area (80 million tons).
- Place remainder of tailings (200 million tons) in Liberty Pit.
- Reclaim the Liberty Pit area (279 acres).

Scenario 2

- Construct and utilize the East Giroux Wash tailings disposal area (80 million tons).
- Construct and utilize a smaller (167 million tons) West Giroux Wash tailings disposal area.
- Place remainder of tailings (33 million tons) in Liberty Pit to just below final pit lake level (subaqueous disposal).

Scenario 3

- Construct and utilize a smaller (110 million tons) 7-year life West Giroux Wash tailings disposal area.
- Place remainder of tailings (170 million tons) in Liberty Pit.
- Reclaim the Liberty Pit area (279 acres).

Scenario 4

- Construct and utilize a straight across tailings embankment sized for 7 years (110 million tons).
- Place remainder of tailings (170 million tons) in Liberty Pit.
- Reclaim the Liberty Pit area (279 acres).

Scenario 5

- Construct and utilize a larger (247 million tons) straight across tailings embankment.
- Place remainder of tailings (33 million tons) in Liberty Pit to just below final pit lake level (subaqueous disposal).

Scenario 6

- Construct and utilize the Giroux Wash tailings disposal area (280 million tons).
- Place 80 million tons of waste rock from the Veteran-Tripp Pit in Liberty Pit.

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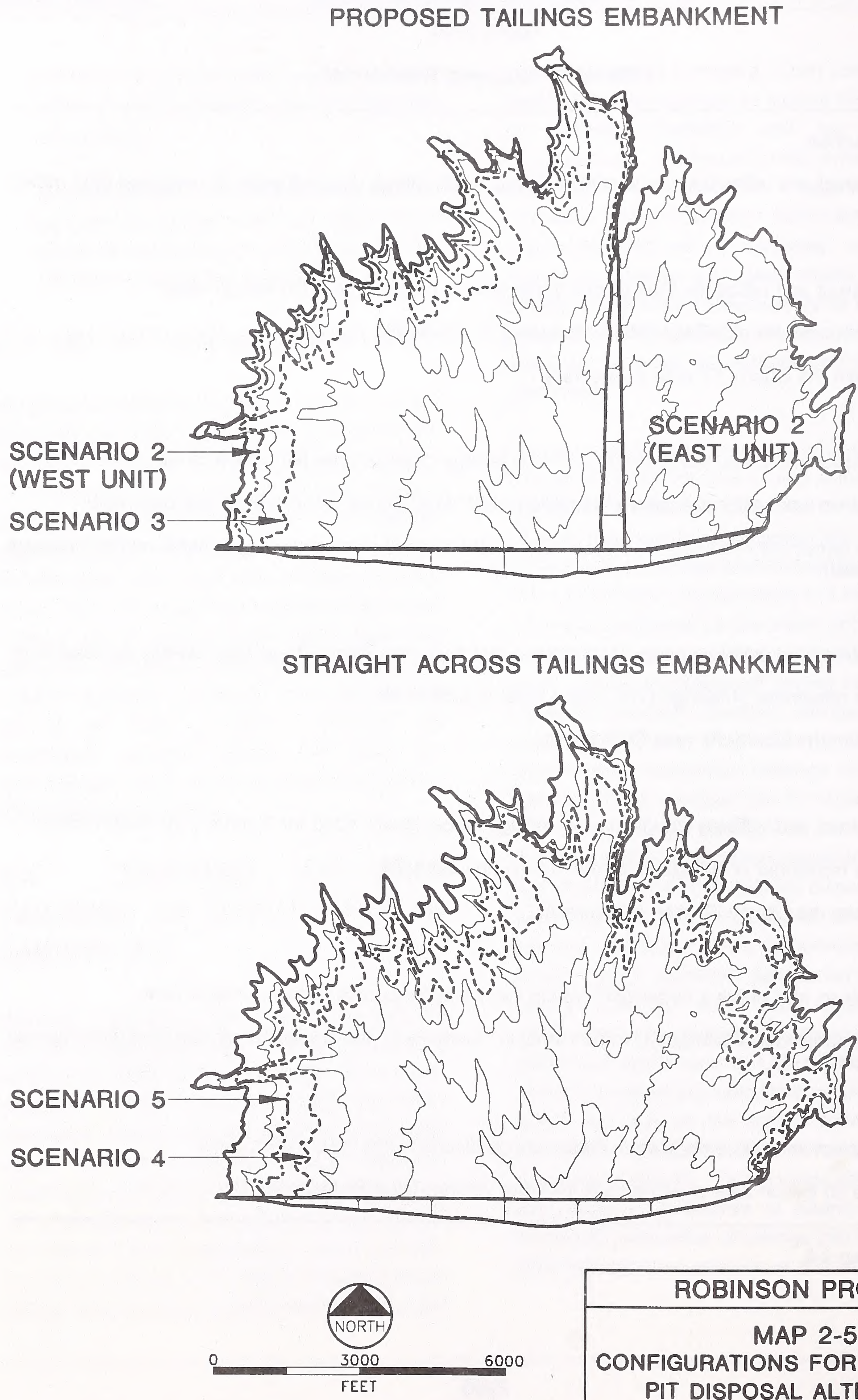
[1]Refer to Map 2-5.



ROBINSON PROJECT

MAP 2-5
CONFIGURATIONS FOR THE LIBERTY PIT DISPOSAL ALTERNATIVE

Table 2-11

Comparison of Liberty Pit Disposal Scenarios

	New Surface Disturbance (acres)		Mineral Resources in Liberty Pit (in million tons)			
	Giroux Wash	Veteran-Tripp Dump	Mined	Unrecoverable	Operational Feasibility	Capital Cost Implications[3]
No Action	0	0	0	All Recoverable	NA	No recovery of incurred costs
Proposed Action	2,174	340	88	Remaining Recoverable	Feasible	$12.3 million
Scenario 1 East Giroux Wash/ Total Backfill	752	340	88	212	Not Feasible[1]	NA
Scenario 2 East and West Giroux Wash/ Subaqueous Backfill	2,117	340	88	212	Feasible[2]	$12.3 million
Scenario 3 West Giroux Wash/ Total Backfill	1,330	340	88	212	Feasible	$15.9 million
Scenario 4 Straight Across Dam/ Total Backfill	1,518	340	88	212	Feasible[2]	$6.7 million
Scenario 5 Straight Across Dam/ Subaqueous Backfill	1,846	340	88	212	Feasible[2]	$6.7 million
Scenario 6 Waste Rock Backfill	2,174	240	88	Most of Remaining Recoverable	Feasible	$12.3 million

[1]East Giroux Wash would be full of tailings after 5 years versus 7 years to complete mining of Liberty Pit.

[2]Would potentially allow continued mining of Liberty Pit if the price of copper increases and continued deposition of tailings into the Giroux Wash impoundment up to 280 million tons.

[3]Net present value for the capital costs associated with each tailings embankment alternative.

NA = Not Applicable.

waste rock on the Veteran-Tripp Dump would continue as described in the Proposed Action.

Placement of waste rock in Liberty Pit (Scenario 6) would similarly occur after completion of mining. Mining of the Veteran-Tripp Pit would occur subsequent to the Liberty Pit, and therefore portions of waste rock from the Veteran-Tripp Pit could be placed into Liberty Pit. This would reduce the new surface disturbance of the Veteran-Tripp Dump by an estimated 100 acres. Disposal of waste rock in Liberty Pit would preclude tailings disposal in the pit; therefore, surface disturbance in Giroux Wash would be the same as the Proposed Action. Because of hauling distances and elevation differences, hauling of waste rock from the Ruth and Kimbley Pits would be unacceptably expensive.

The following criteria would be considered in determining how much waste rock could be removed from Veteran-Tripp Pit and placed in Liberty Pit:

- Mining economics dictate that the hauling and placement of waste rock be as close as possible to the pit being mined. These factors require that a waste rock dump in Liberty Pit be constructed by end dumping into the northwest quarter of the pit;

- Any waste rock placed in Liberty Pit must be non-acid-generating; and

- Placement of waste rock in Liberty Pit could not jeopardize the availability of suitable excess neutralizing capacity waste rock that must be preserved for management of acid-generating waste rock in the Veteran-Tripp Dump.

Subject to the above criteria, Liberty Pit could not be completely backfilled with waste rock, and disposal of waste rock into Liberty Pit would not eliminate the pit lake. It would result in a mine dump constructed in the northwest section of the pit extending into the pit lake. Approximately half of the available limestone waste rock from Veteran-Tripp Pit (80 million tons) could be placed into Liberty Pit.

2.5 RECLAMATION ALTERNATIVE

A number of commenters during scoping suggested reclamation procedures that could be implemented in place of those proposed by RMLP. These suggestions were grouped into seven reclamation options that could be analyzed and compared to the Proposed Action. These are presented on Table 2-12, with the change from the Proposed Action underlined. Except for these differences, the plans would be the same in all other aspects. All seven reclamation options are independent, that is, they could be implemented separately and are not linked to other options. The BLM Authorized Officer would have the flexibility to integrate reclamation options and select all, some, or none of the options as deemed appropriate. Both plans would be consistent with the requirements of NRS 519A, NAC, and 43 CFR 3809. Table 2-13 presents optional reclamation cover standards and Map 2-6 shows the alternative reclamation zones. Tables 2-14 and 2-15 present optional seed mixtures.

Table 2-12

Comparison of Proposed Action and Reclamation Options

Proposed Action	Reclamation Options
1. Waste rock and tailings disposal areas, and leach facility sideslopes would be constructed or modified during reclamation to slopes of 2.5:1 broken by horizontal erosion control devices every 100 feet.	1. Waste rock dumps and facility sideslopes would be constructed or modified during reclamation to unbenched slopes of 3:1.
2. All surface facilities and structures that would not be put to possible post-mining use would be removed. Some facilities may then remain on private land.	2. All surface facilities and structures would be removed and surface disturbance reclaimed.
3. Reclamation cover standards would be 30 percent cover for all project areas, except where test plots demonstrate that this is not feasible.	3. Reclamation cover standards would be based on Range/Woodland Site Descriptions. There would be five different vegetative areas with five different cover standards (see Table 2-13).
4. Seed mixtures would be composed of native and introduced species.	4. Seed mixtures would be composed of only native species (see Tables 2-14 and 2-15).
5. Weeds[1] could comprise up to 5 percent of the required cover. Beyond this, there would be no restrictions for weeds. No noxious weeds[2] would be allowed on reclaimed areas.	5. Weeds[1] could not comprise any percentage of the required cover. Beyond the required cover, there is no limit on weeds. No noxious weeds[2] would be allowed on any of the reclaimed areas.
6. There would be no limitations on seed source for seeding.	6. Seed sources would be from environments with similar elevation and climatic characteristics of the mine site.
7. There would be no diversity requirements beyond the listed composition percentages for grasses, forbs, and shrubs.	7. There would be specific diversity requirements to meet the vegetation composition standards for five different vegetative areas (see Table 2-13).

[1]The following species are considered undesirable weeds:

African rue	(*Peganum harmala*)	Loco weed	(*Astragalus*) spp.
Bindweed	(*Convolulus arvensis*)	Mustard	(*Brassica*) spp.
Buffalo-bur	(*Solanum rostratus*)	Poverty weed	(*Iva axillaris*)
Bull thistle	(*Cirisum vulgare*)	Quackgrass	(*Agropyron repens*)
Burdock	(*Arctium minus*)	Russian thistle	(*Salsola kali*)
Cheatgrass	(*Bromus tectorum*)	Saltcedar	(*Tamarix*) spp.
Coyote tobacco	(*Nicotiana attenuata*)	Sandbur	(*Cenchrus pauciflorus*)
Dodder	(*Cuscuta*) spp.	Spotted knapweed	(*Centaura malculosa*)
Dogbane	(*Apocynum cannabinum*)	Tansy ragwort	(*Senecio jacobaca*)
Goosefoot	(*Chenopodium*) spp.	Wild iris	(*Iris*) spp.
Halogeton	(*Halogeton glomeratus*)		

Table 2-12 (Continued)

Loco weed	(*Astragalus*) spp.
Mustard	(*Brassica*) spp.
Poverty weed	(*Iva axillaris*)
Quackgrass	(*Agropyron repens*)
Russian thistle	(*Salsola kali*)
Saltcedar	(*Tamarix*) spp.
Sandbur	(*Cenchrus pauciflorus*)
Spotted knapweed	(*Centaura malculosa*)
Tansy ragwort	(*Senecio jacobaca*)
Wild iris	(*Iris*) spp.

[2]Noxious weeds as identified by the Nevada State Department of Agriculture, approved revision dated September 29, 1989:

Austrian fieldcress	(*Rorippa austriaca*)
Austrian peaweed	(*Sphaerophysa salsula - Swainsona salsula*)
Camelthorn	(*Alhagi camelorum*)
Klamath weed	(*Hypericum perforatum*)
Hemlock	
Poison	(*Conium maculatum*)
Water	(*Cicuta douglasii*)
Horsenettle	
Carolina	(*Solanum carolinense*)
White	(*S. elaeagnifolium*)
Knapweed	
Diffuse	(*Centaurea diffusa*)
Russian	(*C. repens*)
Leafy spurge	(*Euphorbia esula*)
Licorice	(*Glycyrrhiza lepidota*)
Mediterranean sage	(*Salvia aethiopis*)
Medusahead	(*Elymus caput-medusae - Taeniatherum asperum*)
Puncturevine	(*Tribulus terrestris*)
Sorghum species, perennial, such as, but not limited to: Johnsongrass, Sorghum alsum, and perennial Sweet sudan.	
Thistle	
Canada	(*Cirsium arvense*)
Musk	(*Carduus nutans*)
Scotch	(*Onopordum acanthium*)
Sow	(*Sonchus arvensis*)
Iberian star	(*Centaurea iberica*)
Purple	(*C. calcitrapa*)
Yellow star	(*C. solstitialis*)
Dalmatian toadflax,	(*Linaria dalmatica*)
Whitetop/hoary cress	(*Cardaria draba, C. pubescens*)
Peppergrass	(*Lepidium latifolium, L. repens*)

Table 2-13

Reclamation Cover Standards

Reclamation Zone[1]	Range/Woodland Site Description	Project Disturbance
I	28B82, 28B45, and 28B60	East tailings disposal area.
II	28B82, 28B10, 28B06, and 28B60	West tailings disposal area.
III	28B60	Veteran-Tripp dump, Ruth dump, Gold Leach Pad E.
IV	28B88 and 28B90	Liberty dump, concentrator area, Gold Leach Pad D.
V	28B90	Copper leach and adjacent ancillary facilities.

	Reclamation Zone[1]	Reclamation Cover Standard	Vegetation Composition Standard			
			Grasses	Forbs	Shrubs	Trees
Site Description Cover and Composition	I	33%	50%	12%	38%	--
Cover and Composition Standard[2]		33%	50%	5%	20%	--
Diversity Standard[3]			3	2	2	--
Site Description Cover and Composition	II	25%	53%	9%	38%	--
Cover and Composition Standard[2]		25%	50%	5%	20%	--
Diversity standard[3]			3	2	2	--
Site Description Cover and Composition	III	25%	35%	15%	50%	
Cover and Composition Standard[2]		25%	35%	10%	35%	15/ac
Diversity standard[3]			2	2	3	2
Site Description Cover and Composition	IV	17%	37%	7%	56%	--
Cover and Composition Standard[2]		17%	40%	5%	40%	--
Diversity standard[3]			2	1	3	--
Site Description Cover and Composition	V	10%	30%	5%	65%	--
Cover and Composition Standard[2]		10%	30%	5%	50%	--
Cover and Composition Standard for Copper Leach Pads[4]		10%	70%	5%	0%	--
Diversity standard[3]			2	1	3	--

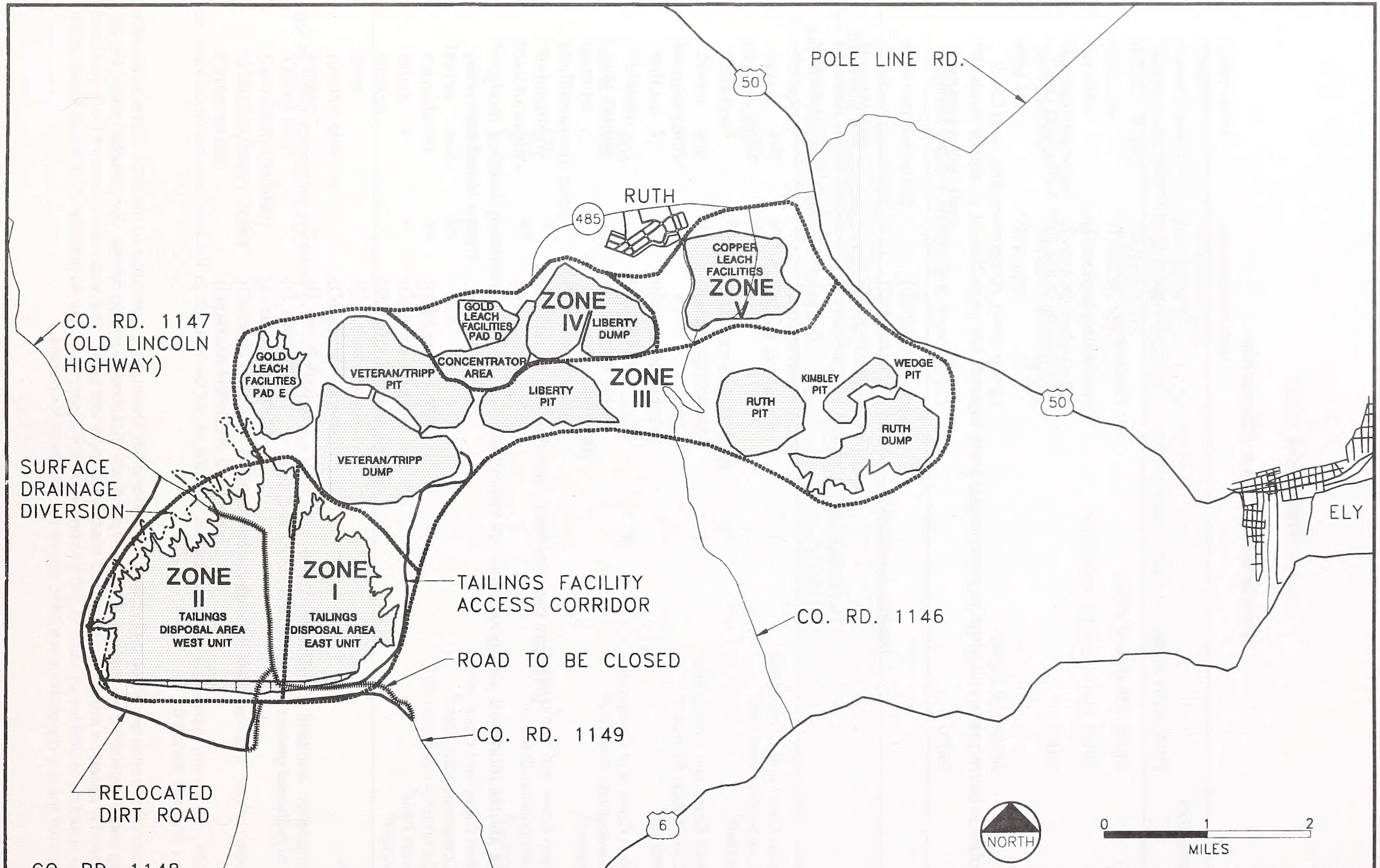
[1]See Map 2-6.

[2]Minimum composition standard; therefore, percentage total does not equal 100. The remaining percentage could be any combination of ***perennial*** grasses ***and*** forbs, ***and*** shrubs and trees.

[3]***Diversity equals*** number of species ***over the reclamation zone.***

[4]Remaining 25% can be any type of perennial vegetation. Shrubs would be included in the seed mix but would have no composition or diversity standard.

NOTE: The reclamation zones ***are based on*** the Range/Woodland Site Descriptions developed by the SCS. ***Some zones have existing native vegetation, while others have been previously disturbed by mining activity. For disturbed areas, the site description is based on adjacent, undisturbed areas with similar soil types.*** The reclamation standard for project bond release would be to achieve as close to 100 percent of the site description cover as possible. The actual figures taken directly from the site descriptions are listed above the standards for release.



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MAP 2-6
ALTERNATIVE RECLAMATION
ZONES

Table 2-14

Alternative Seed List *(Native Only)* for Areas I and II (Final Seed List to be Based on Test Plots)

	Seeds/Lb	Seed Rate[1] lbs/ac	Seeds/sq ft
Agropyron spicatum (Bluebunch wheatgrass)	140,000	2.0	6
Elymus cinerus (Great Basin wildrye)	130,000	2.0	6
Poa canbyi (Canby bluegrass)	926,000	0.3	6
Agropyron smithii (Western wheatgrass)	110,000	2.0	5
Sitanion hystrix (Squirrel tail)	192,000	1.0	4
Oryzopsis hymenoides (Indian ricegrass)	141,000	2.0	6
Sphaeralcea ambigua (Desert globemallow)	500,000	0.5	6
Penstemon palmeri (Palmer penstemon)	610,000	0.5	7
Balsamorhiza sagittata (Arrowleaf balsamroot)	55,000	3.0	4
Castilleja species (Paintbrush)	4,500,000	0.05	5
Purshia tridentata (Antelope bitterbrush)	15,000	5.0	2
Cowania mexicana (Cliffrose)	64,600	4.0	6
Grayia spinosa (Spiny hopsage)	166,800	1.0	4
Artemisia nova (Black sagebrush)	907,200	0.5	10
Total		23	77

[1]Seed rate - Adjust listed pounds/acre for pure live seed (PLS).

$$\text{Pounds PLS/acre} = \frac{\text{Seed rate (listed above lbs/acre)}}{\text{(\% germination) (\% purity)}}$$

Table 2-15

Alternative Seed List *(Native Only)* for Areas III, IV, and V
(Final Seed List to be Based on Test Plots)

	Seeds/Lb	Seed Rate[1] lbs/ac	Seeds/sq ft
Agropyron spicatum (Bluebunch wheatgrass)	140,000	2.0	6
Agropyron dasystachyum (Thickspike wheatgrass)	154,000	1.5	5
Sitanion hystrix (Squirrel tail)	192,000	1.0	4
Oryzopsis hymenoides (Indian ricegrass)	141,000	2.0	6
Stipa comata (Needle and thread grass)	115,000	2.0	5
Gilia species	400,000	0.5	5
Sphaeralcea ambigua (Desert globemallow)	500,000	0.5	6
Penstemon palmeri (Palmer penstemon)	610,000	0.5	7
Purshia tridentata (Antelope bitterbrush)	15,000	5.0	2
Atriplex confertifolia (Shadscale)	64,900	4.0	6
Atriplex canescens (Four wing saltbrush)	50,000	4.0	5
Cowania mexicana (Cliffrose)	65,000	4.0	6
Grayia spinosa (Spiny hopsage)	166,800	2.0	8
Artemisia nova (Black sagebrush)	907,200	0.5	10
Total		29	81

[1]Seed rate - Adjust listed pounds/acre for pure live seed (PLS).
Pounds PLS/acre - Seed rate (listed above lbs/acre) / (% germination) (% purity)

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED DISCUSSION

2.6.1 Alternative Locations for the East Unit Tailings Disposal Facility

During the early feasibility stages of the project in 1990, a number of locations for tailings disposal were examined. The primary criteria used in determining the functional suitability of a potential tailings disposal include the following:

1. Proximity to the concentrator to:
   - Minimize the distance to transport tailings;
   - Reduce pipeline construction; and
   - Reduce operating and maintenance costs, including electrical power consumption for pumps.

2. Geotechnical and Hydrological
   - Topography. Prefer a valley or natural basin landform to provide containment;
   - Seismic. Prefer that the facility not be located on an earthquake fault;
   - Embankment size. Prefer that site conditions reduce the size of the embankment and the amount of excavation and borrow to a minimum;
   - Embankment foundation. Prefer that the facility be located on structurally stable soils to eliminate or reduce engineering of foundation;
   - Groundwater. Prefer that groundwater be deep below the surface to reduce potential impacts and eliminate the need for a liner; and
   - Catchment (watershed) area. Prefer to reduce the size of the watershed that would flow into and/or require diversion around facility.

3. Operational
   - Cannot be located in defined or potential mineralized zones;
   - Cannot be located where other essential mine facilities are located, including haul roads, waste rock dumps, and leach facilities; and
   - Capacity to contain approximately 300 million tons of tailings.

4. Elevation. Prefer that the facility is at a lower elevation than the concentrator to maximize the use of gravity flow in pipelines.

The primary environmental criteria used in determining the suitability of a potential tailings disposal area include the following:

5. Land use. Prefer that the potential site would not displace current human occupation or interfere with land uses;

6. Safety. Prefer that the watershed downstream of the facility have little or no human habitation; and

7. Groundwater and surface water appropriated for beneficial use. Prefer that the facility not be near water users.

Based upon initial screening factors, large areas of the land within and adjacent to the Robinson Mining District were determined to be unsuitable for a tailings disposal facility. Much of the area south, northeast, and northwest of the project is mountainous and precludes potential tailings disposal. All areas in the Steptoe Valley nearest the project are extensively developed and inhabited, as are portions of the project vicinity in and around Ruth. All of Murry Canyon and Robinson Canyon, including Gleason Creek, have major highways, as well as surface and groundwater resources that could not be disturbed. Much of the project area itself is mineralized, occupied by historic waste rock dumps, or required for future mine facilities. Some areas west of the project and farther west of Giroux Wash have a combination of operational constraints, primarily distance, elevation, topography, and geotechnical factors, that rendered them unsuitable.

Most of the areas within the core project area were also determined unsuitable, primarily because the majority of the area is occupied by known mineral zones or other essential mine facilities, including the mill, waste rock dumps, haul roads, heap leach pads, and other ancillary facilities. Waste rock dumps are already present from past mining activities and new waste rock areas must be placed as close to the pits as possible to allow for the most cost-effective means of long-term disposal. Most of the proposed waste rock dumps are located on or are expansions of these existing dumps.

Of the five pit areas, only one, the Liberty Pit, would have been mined sufficiently to allow for tailings disposal. This alternative is discussed in Section 2.4. Therefore, the Kimbley, Wedge, Ruth, and Veteran-Tripp Pits were deemed unsuitable for tailings disposal due to the sequence of mining.

Of the total area examined for potential tailings deposition, three general areas remained for consideration after initial screening: Copper Flat; the Giroux Wash vicinity, containing four potential sites (A through D on Map 2-7); and the Liberty Pit.

After further consideration, Copper Flat was eliminated for the following reasons:

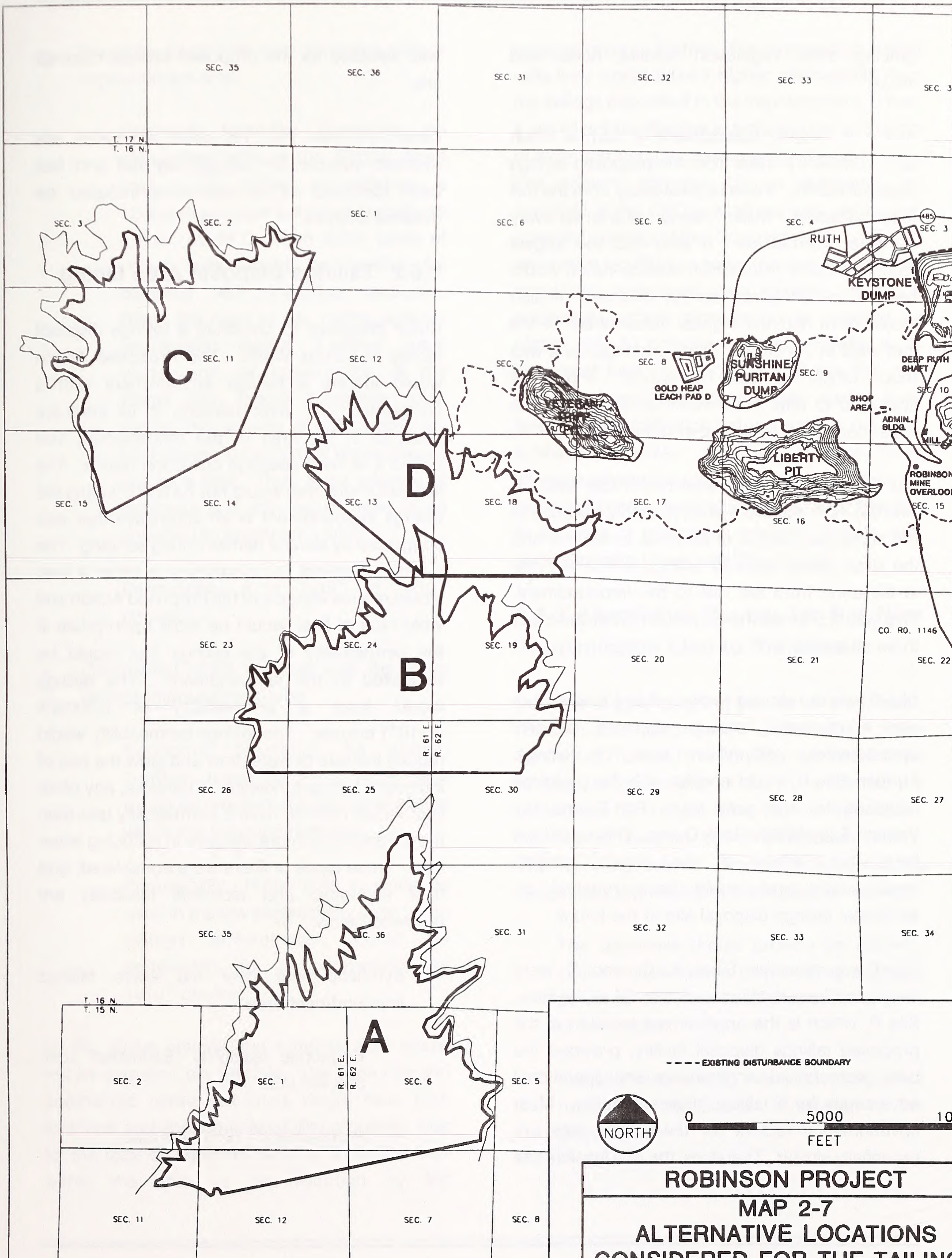
1. Land use. It has been the subject of extensive range improvements over the past several years. It is also nearer to residences and Highway 50 than either Giroux Wash or Liberty Pit.

2. Safety. It is directly upgradient of the City of Ely and occupied areas of Robinson Canyon and Steptoe Valley.

3. Surface and groundwater uses. There are several appropriated uses in this watershed, including seven appropriated domestic water wells (Winters/Welsh 1991). Comparatively, there are no domestic water wells in Giroux Wash or near Liberty Pit.

5. Geotechnical. The area is generally flat and would require a very extensive embankment to adequately contain 300 million tons of tailings.

6. Environmental. Initial screening did not indicate any other environmental advantages associated with Copper Flat; in fact, there appeared to be disadvantages with other specific resource elements, including



ROBINSON PROJECT

MAP 2-7
ALTERNATIVE LOCATIONS CONSIDERED FOR THE TAILINGS DISPOSAL FACILITY

grazing, soils, vegetation, wildlife, noise, and visual.

Site A is located downstream of Giroux Wash approximately 2 miles from the proposed tailings disposal facility. It was farthest away from the mill (approximately 7 miles), nearly twice as far away as other alternatives. It also had the largest catchment area from which surface runoff would need to be contained and/or diverted. It also would have had the highest visual effect of the four sites in the Giroux Wash drainage, as it was much closer to U.S. Highway 6. Finally, it appeared to offer no environmental advantages when compared to the other three sites.

Site C was the farthest west of the four sites. It was the third choice of sites, primarily because of the combined factors of distance to the mill and the static pump head for tailings, a 300-foot rise in elevation from the mill to the impoundment. This was 2.5 times the elevation rise of the other three alternatives.

Site D was the closest to the mill at 1.6 miles, but had a maximum storage capacity of only approximately 200 million tons of tailings. Further, Site D would conflict with the preferred locations for the gold leach Pad E and the Veteran-Tripp Waste Rock Dump. This would not have met several of the primary project requirements and would have required an additional tailings disposal site in the future.

For these reasons, Sites A, C, and D were eliminated from detailed analysis. Of all the sites, Site B, which is the approximate location of the proposed tailings disposal facility, provided the best geotechnical, engineering, and operational advantages for a tailings disposal facility. Most environmental factors for these four sites are essentially similar. Therefore, the one feasible site was selected as the proposed tailings disposal site.

Liberty Pit was the only other alternative site deemed suitable for tailings disposal and has been identified as an alternative included for detailed analysis.

2.6.2 Tailings Disposal Area Lining

RMLP proposes to construct a tailings disposal facility in Giroux Wash. The Proposed Action would involve a tailings embankment with a compacted soil layer beneath it to intercept seepage in the area of the embankment and collect it in lined seepage collection ponds. The impoundment area would not be lined. Lining the tailings impoundment is an alternative that was suggested by several parties during scoping. The criterion involved in determining whether a liner would reduce impacts of the Proposed Action and what type of liner would be most appropriate is the permeability of the tailings that would be deposited in the impoundment. The tailings would have a permeability of 0.000001 (1×10^{-6}) cm/sec. The tailings permeability would reduce the rate of water flow and slow the rate of infiltration into groundwater. Therefore, any other liner would need to have a permeability less than the tailings to be more effective in reducing water flow. Three types of liners were considered, and their economic and technical feasibility are reviewed below.

- Synthetic liner over the entire tailings impoundment area.
  - Economic feasibility - Estimated cost: $36,400,000.
  - Permeability - 1×10^{-9} cm/sec.

- Bentonite (clay) liner over the entire tailings impoundment area.
  - Economic feasibility - There are no native clay soils in the Giroux Wash area. In order to achieve a 12-inch-thick layer that would qualify as a liner, about 3 million cubic yards of native soils would be needed for blending with imported bentonite. Given the need to use native soils for reclamation (about 3 million cubic yards) and for construction of the starter dam (about 3.2 million cubic yards), this volume of soils would not be available in the Giroux Wash area for use as a liner. Thus, large volumes of bentonite and soils would need to be imported to construct a liner.
  - Permeability - from $1x10^{-5}$ to $1x10^{-6}$ cm/sec.

- Compacted native soil liner over the entire tailings impoundment area.
  - Economic feasibility - As above, 3 million cubic yards of native soil would be required and are not available within the impoundment area.
  - Permeability - Native soils, as would be used in the low permeability layer in the tailings embankment, could be compacted to a permeability of $1x10^{-5}$ cm/sec.

Of the above options, the synthetic liner would not be economically feasible. The bentonite and compacted native soil liners would have both technical and economic feasibility problems, due to the lack of sufficient soils to form the liner within the area to be disturbed by the impoundment. Further, the compacted native soils liner would have a higher permeability than the tailings deposited in the impoundment. Thus, it would not be effective in reducing the infiltration of water through the bottom of the impoundment. The primary objective for an alternative, as specified in the CEQ guidelines, is to reduce the potential impacts of the Proposed Action. A lining alternative would have economic and/or technical constraints and could even increase impacts if additional surface disturbance is required to obtain soils to construct a liner. Finally, as is discussed later in Chapter 4.0 of this EIS, the potential impact to groundwater quality from tailings water infiltration did not warrant pursuing a lining alternative. For these reasons, lining alternatives were considered, judged not to be technically or economically reasonable or effective in avoiding or minimizing adverse impacts, and were eliminated from detailed analysis.

2.6.3 Alternative Routes for the New Transmission Line to the Mine

During the early planning phases of the project, transmission alignment alternatives were examined. To meet the purpose and need of the project, the destination of the line would be the project site. The origin is the Gonder Substation, the nearest existing power distribution facility. The following criteria were used in identifying acceptable alignments of the transmission line:

- The alignment should provide an efficient, cost-effective means of providing electrical power to meet the basic purpose and need of the project;
- The alignment should follow the most direct route from the Gonder Substation to the project site;

- The route should avoid private property and have a minimum of interference with other land uses;
- The route should attempt to minimize visual effects;
- For airplane safety, the route should avoid certain areas near the Ely airport;
- The route should avoid NDOT and Federal Highway Administration right-of-ways;

Four different alignments were screened and evaluated applying these criteria. The current proposed alignment shown on Map 2-2 met the criteria best and avoided a number of potential conflicts. Therefore, the other three alternatives were eliminated from detailed analysis.

Subsequent to selection of the proposed alignment, one segment of the line between U.S. Highway 50 and Garnet Hill was modified. This segment moved the line to the northwest and farther down the hill so that it would not directly cross Garnet Hill and the Garnet Field Rockhound Area. This would reduce the level of visibility compared to the alignment that would pass directly over the hilltop.

2.6.4 Alternative Design Standards Above Those Required by Regulatory Agencies

During public review of the Robinson Project Environmental Assessment, commenters suggested that more stringent design standards be considered, particularly regarding the containment of runoff from storm events in ponds. Design standards used for the ponds (24-hour, 25-year storm event) and all other regulated mining facilities are those specified by the NDEP in its regulations for mining facilities (NAC 445.242 through 445.24388). BLM has accepted these standards pursuant to the Memorandum of Understanding with NDEP. The standards provided in the regulations have been used for design of all Robinson Project facilities. Under the regulatory rulemaking process, these standards have been subjected to extensive technical, as well as public, review. The standards incorporate widely accepted engineering design and environmental protection principles. In all cases, these standards far exceed minimum capacities for specified storm events and normal operating conditions, providing an added factor of safety. As such, they offer maximum, yet reasonable, levels of protection for the environment. Therefore, other, more stringent design standards for facilities have been eliminated from detailed analysis.

2.6.5 Methods for Closing Acidic Copper Leaching Heaps

RMLP proposed to reprocess material currently located in the Keystone waste dump to recover copper. Analysis and testing indicate that copper can be economically recovered from this dump material by heap leaching with acid. In addition, certain types of run-of-mine ore would be processed on the same copper heap. Heap leaching would be conducted on a synthetically lined pad. Subsequent to leaching, the heap would need to be closed and stabilized according to Nevada regulations (NAC 445.24388.2). RMLP proposes to close the copper heaps by a cover system to provide for long-term stabilization and closure.

Another common method of closure for heaps, primarily in gold heap leach operations, is rinsing. In gold heap leaching, rinsing is primarily used to reduce the levels of toxic cyanide. Additionally, cyanide heaps are operated at very high pHs (basic). Therefore, another objective of rinsing is to reduce the pH to oxidize cyanide to nontoxic compounds. No cyanide would be used in the copper leach facilities. However, copper leaching is operated at very low pHs (acidic); therefore, the heap must still be closed and stabilized in order to prevent degradation of surface and groundwater.

The criteria used to evaluate closure and stabilization alternatives for the copper heaps include design and operational feasibility and environmental suitability as follows:

- The heap must have adequately high permeability to maximize recovery of copper and maintain efficient leaching;
- The leach pad size must be optimized because the amount of area available is limited;
- The pad design must optimize the height of the heap to maximize the quantity of material to be leached per unit area of pad without compacting material as a result of static loading pressure;
- The leach pad must be stable over the long term to avoid potential degradation of waters of the state;
- The leach pad must meet state standards for closure of mining facilities.

Keystone dump material is very fine in texture, and permeability tends to be naturally very low. In addition, tests indicate that acid leaching breaks down the structure of materials placed on the leach pad, and over time, the permeability decreases. Permeability is also reduced as the height of the heap increases, since static loading pressures compact the material.

To compensate for these conditions, several methods would be used to maintain and increase permeability. Dump material would be mixed with run-of-mine ore to increase permeability. Waste dump ore and run-of-mine ore would be agglomerated prior to placement on the heap. However, both of these measures are only effective during initial stages of leaching, since permeability begins to decrease almost immediately as a result of structural breakdown from acid leaching and compaction. To compensate for the latter effect, material to be leached would be stacked and leached in lifts ranging from 20 to 50 feet high. As lifts are added, pipes and drain systems would be placed on top of the previous lift to intercept solution prior to their entering the lower lifts where permeabilities have been greatly reduced during leaching.

As a result of the design and operational criteria noted here, rinsing completed sections and lifts of the pad would not be feasible. Rinsing could not be accomplished prior to placement of the next lift since that would interrupt the continuous placement and sequential leaching on the pad. Similarly, the entire leach dump could not be feasibly rinsed due to the decreased permeabilities that would occur in the base and interior sections of the leach pile during operations.

Rinsing might be possible if the height of the heap were reduced. However, even then permeabilities would have been reduced by leaching operations. In addition, the size of the leach pad would need to be increased substantially, perhaps 3 to 5 times larger to both adequately enhance conditions for rinsing and still accommodate the quantity of ore to be processed. Even if sufficient, operationally suitable land were available, the environmental impacts to surface resources would increase substantially.

With respect to the environmental suitability, both closure alternatives, covering and rinsing, would be required to be stable over the long term to avoid potential degradation of waters of the state and meet state standards for closure of mining facilities. The environmental consequences of each alternative would be the same, in that no impacts to surface or groundwater would occur.

In light of these criteria, rinsing, as an alternative method of closure for the heap, has very low technical and economic feasibility and does not result in lessening of environmental impacts. Therefore, this alternative was not carried forward for detailed analysis.

2.6.6 Monitoring Systems, Wells, and Tailings Impoundments Seepage Collection

Present and proposed operations at the Robinson Project include a number of monitoring systems and wells. During the life of the project, the number and location of monitoring systems and wells can be increased or decreased at the discretion of the regulatory agencies, primarily the NDEP and BLM. The extent and frequency of monitoring would be based upon project circumstances, ongoing evaluation of the effectiveness of existing monitoring facilities at the time, and observed environmental effects of operations.

More extensive monitoring can be required at any time to evaluate the performance of mine facilities, and appropriate protection measures can be required if a problem is detected. Therefore, monitoring systems beyond those proposed by RMLP would not accurately be classified as an alternative to the Proposed Action and were not analyzed in detail.

A seepage collection system for the tailings embankment is already included in the Proposed Action. No seepage collection system is proposed for the impoundment area because water leaving the impoundment would not discharge to the surface. However, seepage or infiltration of water from the tailings impoundment area to groundwater was analyzed in detail.

2.7 SUMMARY COMPARISON OF IMPACTS AMONG THE PROPOSED ACTION AND ALTERNATIVES

Tables 2-16, 2-17, and 2-18 summarize and compare the environmental impacts between the Proposed Action and the No Action Alternative, Liberty Pit Disposal Alternative, and Reclamation Alternative, respectively. Tables 2-17 and 2-18 present comparisons for Liberty Pit Disposal Scenarios 2 through 6 and Reclamation Options 1 through 7. The quantitative information presented on these tables is the net difference (plus or minus) between the Proposed Action and Scenario or Option. Detailed descriptions of impacts are contained in Chapter 4.0. The summarized impacts include the implementation of the mitigation measures presented in Section 4.5. Resource topics that are not affected by the Scenarios or Options are not shown on the comparison tables.

2.8 AGENCY PREFERRED ALTERNATIVE

In accordance with NEPA, Federal agencies are required by the Council on Environmental Quality (40 CFR 1502.14) to identify their preferred alternative for a project in the Final EIS prepared for the project. The preferred alternative is not a final agency decision; it is rather an indication of the agency's preliminary preference. The alternative identified below is the BLM's preferred alternative at the Final EIS stage in the environmental review process. BLM's preference at this time considers all information that has been received and reviewed relevant to the proposed project. The agency preferred alternative is a combination of potential actions that have been analyzed. It consists of the Proposed Action with two major modifications: tailings disposal and reclamation options. The agency preferred alternative for tailings disposal is the Liberty Pit Alternative, Scenario 4 -- construction of a straight-across tailings dam in Giroux Wash and placement of tailings from Liberty Pit in this location while Liberty Pit is being mined, then placement of the remaining tailings into Liberty Pit after it has been economically mined (see description in Section 2.4). The rationale for selection of this alternative for tailings disposal is that it:

- Would not degrade the waters of the State of Nevada;

- Would disturb fewer acres of native vegetation on public land in Giroux Wash than the Proposed Action;

- Would leave open the option of mining additional copper ore from Liberty Pit if economics prove this feasible during the time that Liberty Pit is being mined;

- Would also leave open the option of placing all the tailings in Giroux Wash if RMLP cannot obtain a water pollution control permit for disposal of tailings into Liberty Pit; and

- Would cost less than the Proposed Action.

The agency preferred alternative for reclamation consists of the ***Proposed Action and the*** following ***options***: 3) vegetation cover standards based on Range/Woodland Site descriptions; 5) weeds could not comprise any percentage of the cover; and 7) specific vegetation diversity requirements (see Tables 2-12 and 2-13 in Section 2.5). The rationale for selecting these options is they would realize successful reclamation as similar as possible to pre-existing conditions to support post-mining land uses on public lands, in particular wildlife, and would reduce visual contrasts.

Table 2-16

Comparison of the Proposed Action and No Action Alternative

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
GEOLOGY AND MINERALS	292.4 million tons of mineral resource would be mined.	Following completion of current gold operations, no additional mineral resource would be mined.
WATER QUANTITY AND QUALITY	Withdrawal of water at 3,500 gpm for 15 years would reduce stream flow in the intermittent portion of Gleason Creek; lower the water table in Lane City, Ruth, and Keystone Junction areas, possibly causing domestic water supply interruptions; draw currently degraded groundwater from the area of the pits and shafts to the Ruth-Keystone Junction area; and rearrange groundwater flow paths during pumping until the water table rebounds.	No groundwater would be withdrawn, so water levels and water quality in Gleason Creek and at springs within the project area would remain the same.
	Pit expansion and deepening would improve pit water quality after mining ceases. Acidic seepage from the existing Veteran-Tripp and Sunshine/Puritan waste rock dumps would be eliminated, thus improving surface water quality.	Water quality in Ruth and Liberty Pits would continue to exceed state standards. Acidic effluent to surface waters from existing waste rock dumps would continue, and locally degraded groundwater in the area of past mining would remain.
	Groundwater quality in the Mining District would not change.	Groundwater quality in the Mining District would not change.
	Sulfate-laden effluent would flow to groundwater from the Giroux Wash tailings, but concentration levels would be within Nevada drinking water standards at Well WCC-G1.	There would be no impact to Giroux Wash or its groundwater.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
	3.5 acres in Giroux Wash ***and 0.2 acre in Fisher Canyon*** (designated as "waters of the United States") would be disturbed.	No disturbance to areas designated as "waters of the United States" would occur.
SOILS	Would disturb 2,218 acres of soil that were previously disturbed and 3,138 acres of undisturbed land; 4,096 acres would be reclaimed. Reclamation would stop further soil loss; less than 0.4 million cubic yards of growth medium would be permanently buried under tailings in Giroux Wash and would be unavailable for use.	3,138 acres of undisturbed land would not be impacted. 818 acres previously disturbed by Kennecott operations (that would be reclaimed under the Proposed Action) would not be reclaimed.
VEGETATION	Would disturb 3,345 acres of native vegetation. 4,096 acres would be reclaimed to BLM/NDEP standards.	3,345 acres of native vegetation would not be disturbed. 818 acres previously disturbed by Kennecott operations would not be reclaimed.
	A sulfuric acid or diesel fuel release along the transportation corridors (low probability) would affect vegetation contacted by the release.	No impacts to vegetation from hazardous releases along the transportation corridors would occur.
	Disturbance would result from a one-time loss of 4,502 cords of wood; annual loss of 150 cords of firewood and 4,502 Christmas trees; and 2,251 pounds of pinyon nuts every 5-year period.	No changes to current productivity of firewood, Christmas trees, or pinyon nuts would occur.
RIPARIAN AND WETLAND AREAS	4.1 acres of riparian vegetation would be disturbed. No wetland areas would be disturbed.	No impact to any riparian areas or wetlands would occur.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
WILDLIFE AND FISHERIES RESOURCES	2,198 acres of pinyon/juniper and 1,073 acres of northern desert shrub/sagebrush habitats would be lost from the mine area; 53 acres of pinyon/juniper and 21 acres of shrub/sagebrush habitats would be removed along the transmission line corridor. Habitat would be restored following reclamation of previously unreclaimed mining areas.	No undisturbed native habitat would be disturbed; 818 acres of previously unreclaimed land would not be restored from long-term reclamation activities.
	Disturbance of native habitats would result in increased mortalities, displacement, and habitat fragmentation; loss of breeding habitat, foraging areas, hunting territories, and cover; and effects to adjacent carrying capacities.	No impacts to area wildlife or their associated habitats would occur.
	Indirect impacts to wildlife populations would include increased vehicle-related mortalities, legal and illegal hunting and shooting, harassment, and noise.	The existing conditions would be maintained. No additional indirect impacts would occur.
	3,345 acres of marginal mule deer winter range would be lost. Minor impacts would occur to secondary migration corridors between seasonal ranges.	There would be no change to the amount of marginal deer winter range and seasonal migration corridors.
	Increased raptor predation to sage grouse may result along 5.5 miles of the transmission line.	There would be no change to the existing sage grouse use.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
	Permission would be obtained from BLM and NDOW prior to closing existing underground workings within the mine area, as presented in Section 2.2.16. This measure would prevent direct impacts to bat species occupying the mine area and identify the appropriate closure techniques to be implemented.	Existing underground openings could potentially be closed without determining the status of resident bat species. Colonies and roost sites could be lost as a result of these closures.
	The potential for cyanide poisoning of birds and mammals would remain approximately the same as the current gold pads (A through D) are closed and the new pads (D and E) are developed.	The potential for cyanide poisoning would continue until current gold operations are terminated.
	There would be a minor increase in the potential for avian collision with transmission line conductors or static wires along 5.5 miles of the transmission line.	There would be no increased potential for avian line strikes.
	Future pit water quality would improve and is not anticipated to adversely affect wildlife species that may periodically use these areas.	Future pit water quality would be poorer than under the Proposed Action but is not anticipated to adversely affect wildlife species that may periodically use these areas.
	A sulfuric acid or diesel fuel released into sensitive water resources along the transportation corridors (low probability) would result in direct mortalities, effects to annual nesting productivity, or prey availability, depending on size of the release, location, season, buffering capacity, and requirements of the SPCC.	Potential releases related to the Proposed Action and resultant impacts would not occur.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
THREATENED AND ENDANGERED SPECIES	The potential for cyanide poisoning of federal candidate raptor species (e.g., ferruginous hawk, northern goshawk) would remain approximately the same as the current gold pads (A through D) are closed and the new pads (D and E) are developed.	The potential for cyanide poisoning would continue until current gold operations are terminated.
	An accidental release of sulfuric acid or diesel fuel into the Steptoe Slough area located along the railroad corridor (low probability) would impact prey species and foraging area of wintering bald eagles.	There would be no change to bald eagle roosting and foraging habitat.
	Loggerhead shrike habitat would be lost within the open, pinyon/juniper and shrubby habitats appropriate for nesting birds.	No loggerhead shrike habitat would be lost.
	Pygmy rabbit habitat would be lost within the suitable stands of sagebrush and rabbitbrush.	No pygmy rabbit habitat would be lost.
	An accidental release of sulfuric acid or diesel fuel into the perennial water sources used by long-billed curlew, white-faced ibis, relict dace, Lahontan Creek tui chub, Steptoe Valley crescent spot butterfly, the intermediate populations of the White River wood nymph butterfly, and Nevada viceroy butterfly located along the railroad and highway corridors (low probability) would result in: 1) direct mortality of some adults from contact with hazardous materials 2) loss of some native habitat, and 3) potential loss of the production for that season.	There would be no impact to habitats for these species.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
	Permission of BLM and NDOW would be obtained prior to closing existing underground openings within the mine area, as presented in Section 2.2.16. This measure would prevent direct impacts to the Pacific western big-eared bat that may occupy the mine area and would identify the appropriate closure techniques.	Existing underground openings could potentially be closed without determining the status of resident bat species. Potential habitat and individuals of the Pacific western big-eared bat species may be lost as a result of these closures.
	There would be no impacts to any listed plant species.	There would be no impacts to any listed plant species.
WILD HORSES	No impacts to wild horses are anticipated.	No impacts to wild horses are anticipated.
AIR QUALITY	Air quality effects from construction may result in a temporary elevation of local total suspended particulate levels. Dust emissions would occur from the redisturbed and newly disturbed areas. Increased truck traffic would also generate dust but is not expected to affect air quality. Dust control measures would reduce the amount of dust generated from mine construction, operation activities, and traffic. The heavy milling machinery would be electrically powered and have dust control measures applied. Drop points would be controlled for dust emissions.	Dust emissions would continue from the unreclaimed past mining areas and current gold activities. Levels would generally decrease with time as gold production ceases and revegetation takes place on a volunteer basis on those areas previously disturbed by Kennecott.
	Emissions of vehicle exhaust would increase from the additional employees and truck traffic.	Vehicle emissions would continue from the current gold operations and from employees to and from the mine. Vehicle traffic and emissions in Ruth would continue.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
NOISE	Noise levels would temporarily increase with construction, which is anticipated to take 2 years. Additional vehicles would also increase the noise levels. Noise would be at acceptable levels in Ruth, Cross Timbers, and Ely. Proper operation and maintenance of manufacturer-installed noise abatement equipment would reduce noise impacts.	The existing noise conditions (truck traffic) would be maintained until cyanide leaching of present gold reserves are exhausted, all operations cease, and limited reclamation is completed.
SOCIAL AND ECONOMIC VALUES		
Housing	RMLP would cause additional housing units to be constructed by providing incentives for outside contractors, constructing houses itself, or assisting employees in building homes if insufficient housing is available for its employees.	No additional housing units would be required.
Water Supply	Additional stress on the existing water system would occur during peak periods in the summer months. RMLP would purchase a bond, if offered by the City of Ely, to fund or provide other assistance for installation of a new well to alleviate the summer shortfall.	No additional impacts on the potable water supply would occur. Current system is stressed in the summer months.
Wastewater	Current system can meet the needs of the community if a sludge digester is added to the system. RMLP would purchase a bond, if offered by the City of Ely, to enable the community to purchase the needed digester.	There would be no additional demands on the system.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
Solid Waste	Current system can handle the projected increase in population. A new landfill is required whether or not the Robinson Project occurs. To alleviate the financial burden to the community, RMLP would purchase bonds, if offered by the County, and provide other assistance to help the community site and design this new landfill.	No additional demands would be placed on the existing solid waste system under this scenario. Regulations require White Pine County to build a new landfill.
Economics	Increase in employment and growth would occur in the retail and mining service community. Total income would increase. The employment variable would be in response to the value of metals.	General downward trend in gold mining employment would continue. If the population of the area decreased, there could be under-used infrastructure (schools, housing, etc.) in the communities, resulting in an inefficient use of resources.
Schools	Current school system can meet the increased demand by using existing capacity at Ruth Elementary School. To alleviate the temporary financial burden to the community, RMLP provided marketing funds to help the school district pass a bond issue to construct new middle and high schools.	There would be no additional demands on the system.
TRANSPORT OF PROCESS MATERIALS, PRODUCTS, AND HAZARDOUS WASTES	There is the potential for a release of sulfuric acid or diesel fuel into a sensitive area, e.g., stream, wetland, developed area, as the result of a truck or rail accident. This potential is low, less than 0.33 releases predicted during the life of the project.	No increased potential for accidental releases would occur.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
ACCESS AND LAND USE	Portions of County Roads 1148 and 1149 through Giroux Wash would be severed. RMLP would construct a new dirt road on public lands around the west side of the tailings disposal area to re-establish access to the Old Lincoln Highway; 2,140 acres of public lands would be converted to mining activities and closed to the public. Approximately 2,251 acres of potential firewood, Christmas tree, and pinyon nut harvesting areas would be removed. Additionally, short-term and long-term land use changes would be caused by the project.	There would be no change to existing public access patterns and no change from current uses of livestock grazing, wildlife habitat, dispersed recreation, and some firewood, Christmas tree, and pinyon nut harvesting. Gold production would continue until present reserves are exhausted.
GRAZING MANAGEMENT	143 livestock grazing AUMs would be lost or displaced in the short term. No existing range improvements would be lost.	Existing conditions would be maintained.
RECREATION	2,140 acres of public land would be removed from dispersed recreational use; however, adjacent public lands could be utilized.	No additional public or private land would be dedicated for mining activities.
VISUAL RESOURCES	New project features, such as the tailings disposal area and transmission line, would increase the physical extent of visual effects from the existing disturbed areas. Similar modified forms, lines, textures, and colors that presently exist would be repeated. Visual contrasts would be reduced by minimizing disturbance and through reclamation and revegetation.	Visual effects from the existing disturbance would remain as is seen today. Visual contrasts of existing mined landscape are accepted historical features of the local topography. Some additional land form changes would occur as the current gold mining operations proceed.

Table 2-16 (Continued)

	Proposed Action (reinitiate mining)	No Action (mining not reinitiated)
CULTURAL RESOURCES	Impacts would be associated with ground-disturbing activities. The use of site-specific treatment plans, as stipulated in the Programmatic Agreement, would reduce impacts.	No impacts to cultural resources would occur on public lands surrounding the project.
PALEONTOLOGICAL RESOURCES	No impacts to known paleontological resources would occur. Impacts to fossils discovered during mining would be mitigated through consultation with BLM.	No impacts to paleontological resources would occur.

Table 2-17

Comparison of the Proposed Action and Liberty Pit Disposal Scenarios[1]

Resource/Issue	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Geology and Minerals					
• Loss of Access to Mineral Resources	(+)212 million tons unrecoverable	(+)212 million tons unrecoverable	(+)212 million tons unrecoverable	(+)212 million tons unrecoverable	Same as Proposed Action
Water Quantity and Quality					
• Flow at Murry Springs	Same as Proposed Action (no effect)	Same as Proposed Action (no effect)	Same as Proposed Action (no effect)	Same as Proposed Action (no effect)	Same as Proposed Action (no effect)
• Drawdown of Wells and Springs	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
• Liberty Pit Water Quality	Same as Proposed Action	NA[2]	NA[2]	Same as Proposed Action	Same as Proposed Action
• Giroux Wash - Maximum Sulfate at WCC-G1 (mg/l)[3]	Same as Proposed Action (230 mg/l)	90 mg/l versus 230 mg/l	180 mg/l versus 230 mg/l	380 mg/l versus 230 mg/l	Same as Proposed Action (230 mg/l)
• Waste Rock Dump Drainage	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Higher percent potential acid-generating waste rock in Veteran Dump
• Groundwater Quality in Mining District	Same as Proposed Action	Flow of tailings water with 1,000 mg/l sulfate directly into groundwater with 1,000 - 1,500 mg/l sulfate	Flow of tailings water with 1,000 mg/l sulfate directly into groundwater with 1,000 - 1,500 mg/l sulfate	Same as Proposed Action	Same as Proposed Action
Soils					
• Loss of Plant Growth Medium Under Giroux Wash (million cubic yards)	0.3	0	0.2 - 1.3	0.5 - 1.7	Same as Proposed Action (0.4)

Table 2-17 (Continued)

Resource/Issue	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Vegetation and Wildlife					
• Loss of Vegetation/Habitat for Migratory Birds	(-)57 acres disturbed	(-)844 acres disturbed	(-)656 acres disturbed	(-)328 acres disturbed	(-)100 acres disturbed
• Area of Liberty Pit Reclaimed	Same as Proposed Action (zero reclaimed)	(+)279 acres reclaimed	(+)279 acres reclaimed	Same as Proposed Action (zero reclaimed)	Same as Proposed Action (zero reclaimed)
• Exposure of Wildlife to Poor Quality Water	Same as Proposed Action (no impacts)	Same as Proposed Action (no impacts)	Same as Proposed Action (no impacts)	Same as Proposed Action (no impacts)	Same as Proposed Action (no impacts)
• Impacts to T&E Species	Same as Proposed Action (no impacts)	Same as Proposed Action (no impacts)	Same as Proposed Action (no impacts)	Same as Proposed Action (no impacts)	Same as Proposed Action (no impacts)
Access and Land Use	(-)57 acres disturbed	(-)844 acres disturbed	(-)656 acres disturbed	(-)328 acres disturbed	(-)100 acres disturbed
Grazing Management	(-)3 to 4 AUMs displaced	(-)42 to 56 AUMs displaced	(-)33 to 44 AUMs displaced	(-)16 to 22 AUMs displaced	(-)5 to 7 AUMs displaced
Visual Resources	Same as Proposed Action	Less disturbance visible than with Proposed Action	Slightly less disturbance visible than with Proposed Action	Same as Proposed Action	Same as Proposed Action
Cultural Resources	Same as Proposed Action (4 sites affected in Giroux Wash)	Same as Proposed Action (4 sites affected in Giroux Wash)	(-)1 site affected in Giroux Wash	(-)1 site affected in Giroux Wash	Same as Proposed Action (4 sites affected in Giroux Wash)

[1]Numbers represent the net difference between the Proposed Action and the Scenario. See Table 2-10 for descriptions of the scenarios.

[2]No pit lake would remain following deposition of tailings.

[3]Well WCC-G1 is the downgradient monitoring point established by NDEP, and is about 1,500 feet south of the proposed tailings embankment. The Nevada drinking water standard for sulfate is 500 mg/l.

NOTE: Impacts to riparian and wetland areas; wild horses; air quality; noise; social and economic values; transport of process materials, products, and hazardous wastes; recreation; and paleontological resources would be the same as those for the Proposed Action.

Table 2-18

Comparison of the Proposed Action and Reclamation Options[1]

	Reclamation Options						
Resource Areas	1 3:1 Slopes	2 Removal of All Surface Structures	3 Variable Cover Standards	4 Native Seed Mixes	5 No Weeds in Cover Standard	6 Similar Condition Seed Sources	7 Species Diversity Requirements
Soils	(+)175 previously undisturbed acres (Veteran and Liberty Dumps). Additional soil stockpiling may be required. Erosion levels reduced.	(+)196 acres reclaimed. Additional soil stockpiling may be required.	Variable potential erosion with variable cover standards.	May increase potential for erosion since a longer plant establishment period is required.	Same as Proposed Action.	Reduced erosion due to better vegetation establishment.	Reduced erosion due to improved reclamation success.
Vegetation	(+)175 previously undisturbed acres; better potential for reclamation.	(+)196 acres revegetated.	Cover standards easier to meet and equal to the existing vegetation. Greater potential for species diversity.	May take longer for plants to become established. Greater potential for species diversity, especially shrub.	Adjacent areas less likely to be invaded by weed species.	Overall reclamation success may be higher since seed is produced by plants adapted to site conditions.	Increased plant diversity. Greater potential for reclamation success.
Wildlife and Fisheries Resources	(+)110 acres of poor habitat and 65 acres of marginal wildlife habitat removed.	(+)196 acres revegetated that may be used by wildlife.	Value of reclaimed areas for wildlife habitat would be the same as existing conditions.	Increased value of reclaimed areas for wildlife habitat.	Increased value of reclaimed areas for wildlife habitat.	Increased value of reclaimed areas for wildlife habitat.	Increased value of reclaimed areas for wildlife habitat.
Air Quality	Same as Proposed Action.	Same as Proposed Action.	Variable dust levels with variable cover standards.	Same as Proposed Action.	Same as Proposed Action.	Slightly lower dust levels.	Slightly lower dust levels.

Table 2-18 (Continued)

Resource Areas	Reclamation Options						
	1 3:1 Slopes	2 Removal of All Surface Structures	3 Variable Cover Standards	4 Native Seed Mixes	5 No Weeds in Cover Standard	6 Similar Condition Seed Sources	7 Species Diversity Requirements
Social and Economic Values	Same as Proposed Action.	Decreased value of the property and decreased property tax revenues generated. Eliminates possibility of using structures for post-mining use.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.
Access and Land Use	Same as Proposed Action.	Eliminates possibility of using structures for post-mining land use.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.
Grazing Management	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Less suitable for livestock grazing forage.	Better forage production.	Better forage production.	Better forage production.
Visual Resources	Same as Proposed Action.	Reduced visual contrasts, particularly in those areas visible to the public, such as the Garnet Fields Rockhound Area (i.e., removal of transmission line).	Same as Proposed Action.	Better visual blend with existing vegetation.	Same as Proposed Action.	May reduce visual contrast between undisturbed reclaimed areas.	May reduce visual contrast between undisturbed reclaimed areas.

Table 2-18 (Continued)

	Reclamation Options						
Resource Areas	1 3:1 Slopes	2 Removal of All Surface Structures	3 Variable Cover Standards	4 Native Seed Mixes	5 No Weeds in Cover Standard	6 Similar Condition Seed Sources	7 Species Diversity Requirements
Cultural Resources	An approximate 100-acre area near Liberty Dump would need to be surveyed. Any sites located would be mitigated under the PA.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.

[1]Numbers represent the net difference between the Proposed Action and the Reclamation Option.

3.0 AFFECTED ENVIRONMENT

This chapter describes the environment that would be affected by development of the Robinson Project. The environmental baseline information summarized in this chapter was obtained from studies; published sources; unpublished materials; interviews with local, state, and Federal agencies; and from field and lab studies of the study area. The affected environment for various resources was based on where direct and indirect impacts would likely occur. For some resources, such as geology, vegetation, and soils, the affected area was determined to be the physical location and immediate vicinity of the areas to be disturbed by the Robinson Project (i.e., mine area, transmission line route, tailings disposal facility). For other resources, such as water quality, air quality, social and economic values, and the transport of hazardous materials, the affected environment was larger (e.g., White Pine County). For each resource, the affected environment described was determined by the extent of the environmental impacts of the Proposed Action.

3.1 GEOLOGY AND MINERALS

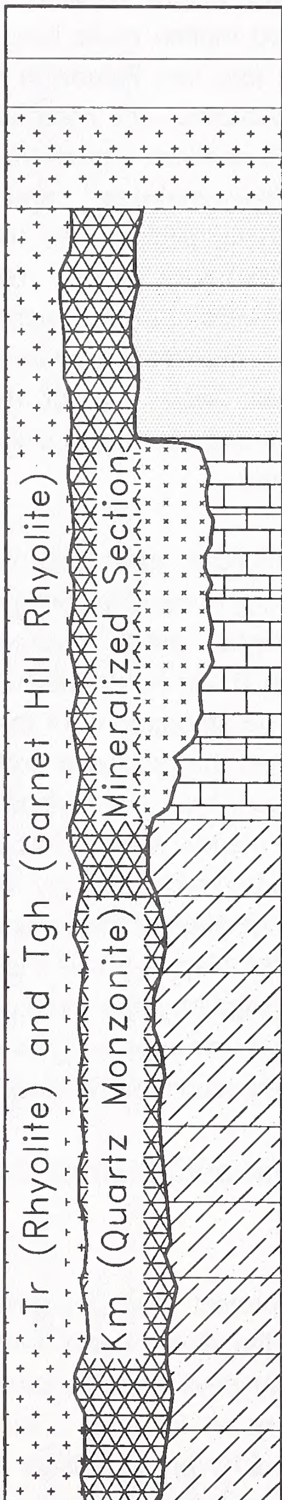
The RMLP's Robinson Mine is located in the Egan Range of east-central Nevada, immediately south of the town of Ruth and approximately 6 road miles west of Ely, Nevada, in White Pine County. The Robinson Mining District, also known as the Ely, Ruth, or Kimbley District in the past mining literature, is located in the northern half of T16N,R62-63E (Mt. Diablo meridian), and has been mined intermittently since 1868 (NBMG 1976; Tingley and Bentz 1983), resulting in five copper open pits (Veteran, Tripp, Liberty, Ruth, and Kimbley Pits, from west to east), several large mine waste dumps, and numerous underground workings developed for copper, zinc, gold, lead-silver, and manganese. Mineralization is confined to an east-west belt through the district where late Cretaceous (111 million years before present) plutons, or areas of solidified molten rocks lying below the surface, intrude into late Paleozoic limestones, sandstones, and shales. Ore consists of copper sulfides and their oxidized equivalents occurring as veins, disseminations, and massive replacements in the plutons and the adjacent mineralized sedimentary rocks. Groundwater percolating downward through the copper sulfide ores produced a blanket-like zone enriched in copper that has been one of the primary objectives of the copper mining since the early part of this century.

The following sections summarize the regional and district geology of the proposed project area. Additional geological details are contained in Technical Report B, on file at the BLM office in Ely, Nevada. The stratigraphy of the Robinson Mining District and the proposed project area is presented in Figure 3-1. The surface geology is shown in Map 3-1, and a schematic cross-section showing the subsurface geology is given in Figure 3-2. The geology of the Robinson District was simplified for Map 3-1 and Figure 3-2 by grouping the stratigraphy into three packages of sedimentary rocks and separating intrusive rocks into those of Cretaceous and Tertiary ages.

3.1.1 Regional and District Geological Setting

The proposed project area occupies a central location within the Great Basin section of the Basin and Range physiographic province. The Great Basin is noted for long, linear mountain ranges separated by broad valleys that usually exhibit interior drainage. The mountain ranges can be 5 to 20 miles in length. The valleys are often equal in length to the mountain ranges and are usually at least 10 to 30 miles across.

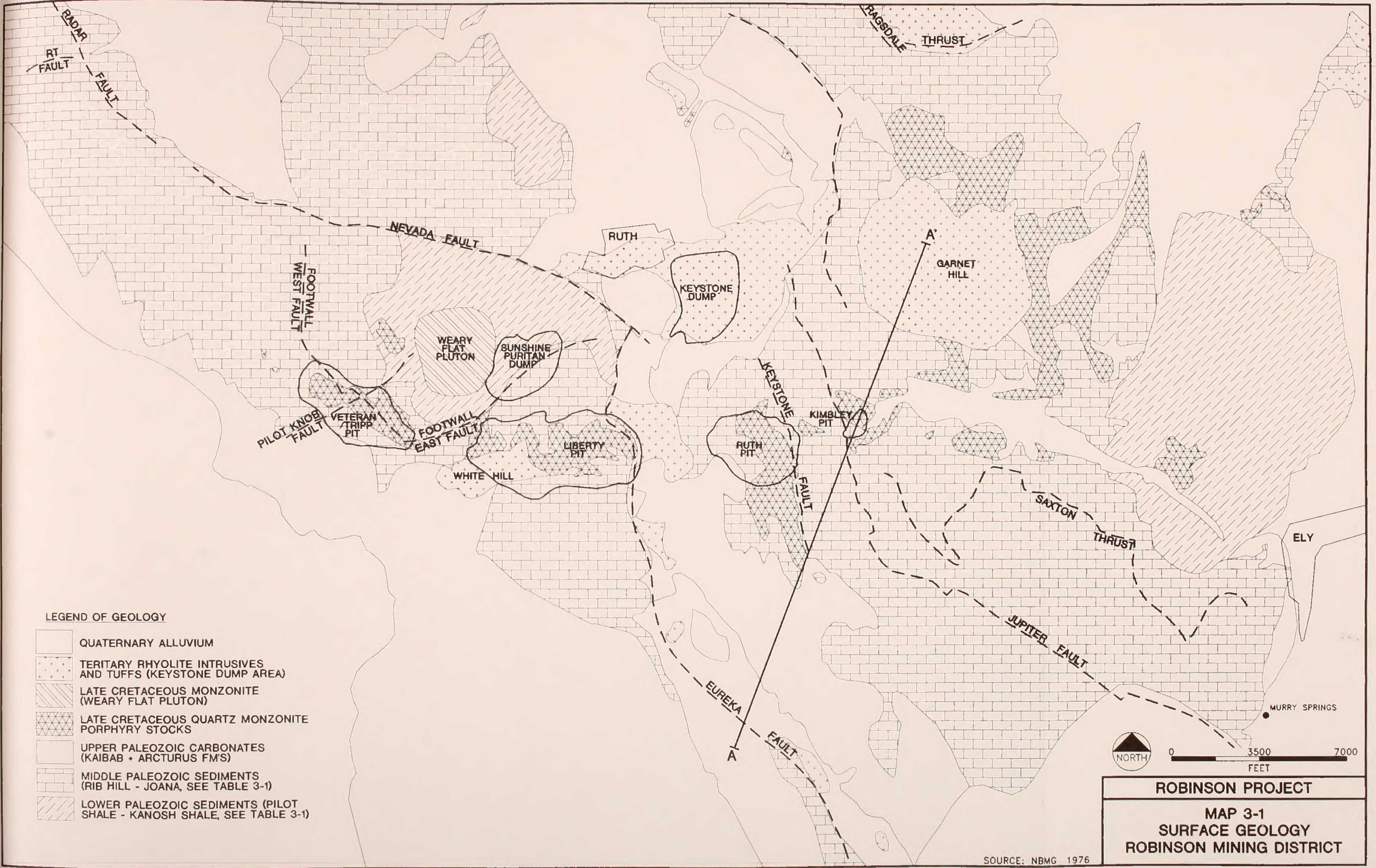
			THICKNESS
QUATERNARY	Qal & Qt	Terrace Gravels & Alluvium	
TERTIARY	Tt & Tsp	Ash-Flow and Ash-Fall Tuffs (Tt) & Sheep Pass Formation (Tsp)	1000'
PERMIAN	Pk	Kaibab Limestone	90–150'
	Pau	Upper Arcturus Fm	1280'
	Pal	Lower Arcturus Fm	1600'
	Prh	Rib Hill Sandstone	1100'
	Prs	Riepe Spring Limestone	250'
PENNSYLVANIAN	IPe	Ely Limestone	2300'
MISSISSIPPIAN	Mc	Chainman Shale	400–1500'
	Mj	Joana Limestone	400'
DEVONIAN	Dp	Pilot Shale	350'
	Dg	Guilmette Limestone	2500'
	Dsi	Simonson Dolomite	850–1200'
	Dse	Sevy Dolomite	450–650'
SILURIAN	Sl	Laketown Dolomite	1900'
ORDOVICIAN	Des	Ely Springs Dolomite	220'
	De	Eureka Quartzite	500'
	Ol	Lehman Formation	600'
	Ok	Kanosh Shale	300'
		Basement (Consolidated Sedimentary Rocks)	TOTAL THICKNESS 16000–18000'



SOURCE: NBMG 1976

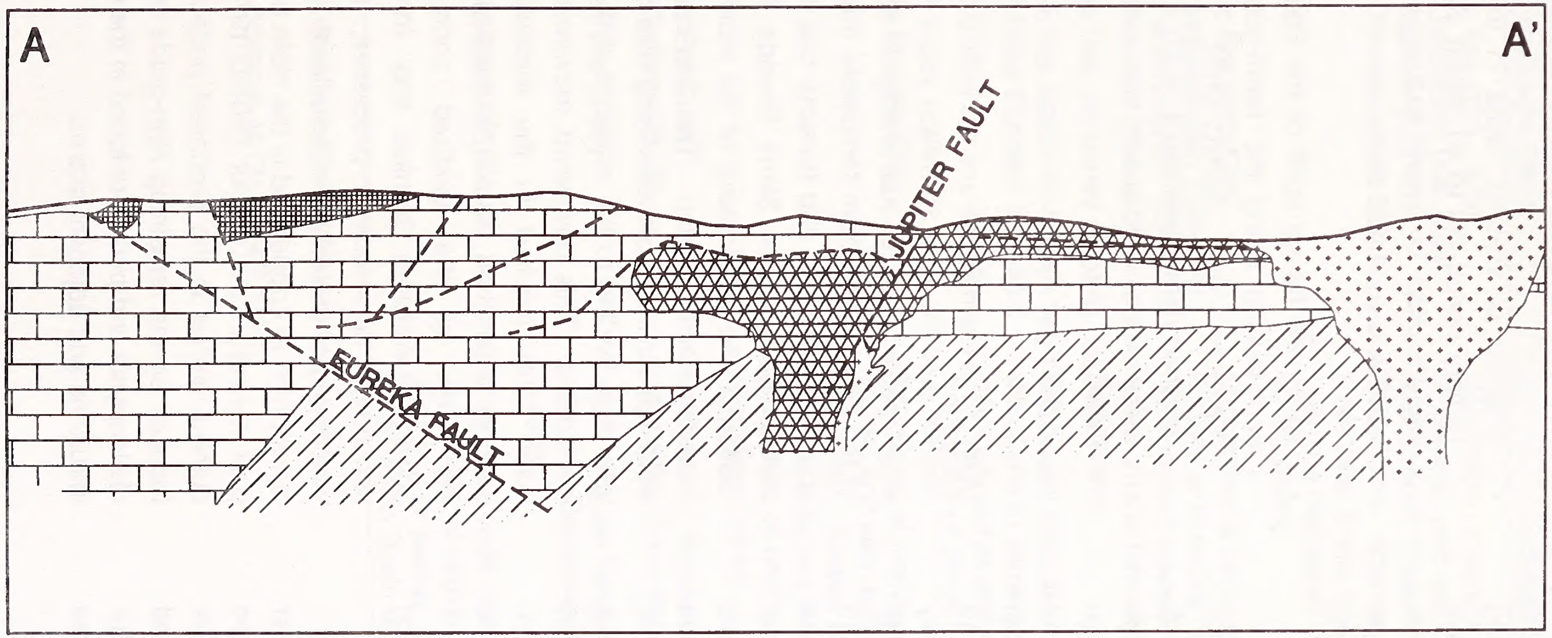
ROBINSON PROJECT

FIGURE 3-1
GENERALIZED STRATIGRAPHY
ROBINSON MINING DISTRICT

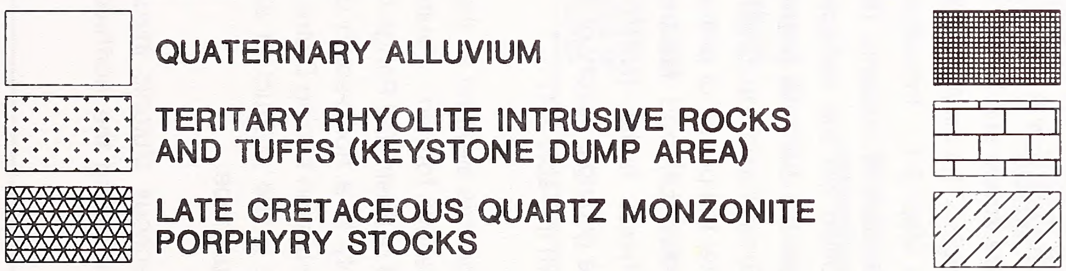


ROBINSON PROJECT

MAP 3-1
SURFACE GEOLOGY
ROBINSON MINING DISTRICT



LEGEND OF GEOLOGY



QUATERNARY ALLUVIUM

TERITARY RHYOLITE INTRUSIVE ROCKS AND TUFFS (KEYSTONE DUMP AREA)

LATE CRETACEOUS QUARTZ MONZONITE PORPHYRY STOCKS

UPPER PALEOZOIC CARBONATE ROCKS (KAIBAB + ARCTURUS FM'S)

MIDDLE PALEOZOIC SEDIMENTARY ROCKS (RIB HILL - JOANA, SEE TABLE 3.1)

LOWER PALEOZOIC SEDIMENTARY ROCKS (PILOT SHALE - KANOSH SHALE, SEE TABLE 3.1)

SOURCE: MAGMA GEOLOGIC MAPPING, NBMG 1976

ROBINSON PROJECT

FIGURE 3-2
CROSS SECTION A-A'
ROBINSON MINING DISTRICT

The Basin and Range Province is tectonically active with frequent earthquakes and well-developed recent fault scarps (steep rock faces formed by shearing of rock) common along the margins of the valleys. The valleys have formed by downward movement of large blocks of the earth's crust. Thus, the mountain ranges are elevated remnants between these large areas of down-dropped rock (NBMG 1976).

The Egan Range is one such elevated block between the Steptoe Valley graben, or fault block valley, on the east and the White River Valley and Butte River Valley grabens on the west. Within the Robinson Mining District, faulting (i.e., movement and breakage of rocks along a zone of weakness in the crust) aligned in a northwest to southeast direction may have served to not only localize the plutonic intrusions and their associated ore bodies rich in copper, but also to disrupt these ore zones and displace them from their point of origin. The main faults of the district are shown on Map 3-1. Intrusion of plutonic rocks and extrusion of volcanic rocks (molten rock that solidified on the surface) may have locally deformed the bedrock formations of the district. The Great Basin topography in the Ely area formed after the period of plutonic intrusion, folding, mineralization, and faulting along the northwest-southeast faults (NBMG 1976). A summary of the geologic history of the Robinson District is shown in Table 3-1.

The Egan Range was elevated as the White River and Steptoe Valleys formed. Faults associated with this period of Basin and Range formation are aligned primarily in a north-south direction and transect the Robinson Mining District. Thus, this Mining District is the product of at least three periods of disturbance:

- Late Cretaceous plutonic intrusion, folding and faulting along the northwest-southeast faults, and mineralization to form the copper ore bodies;

- Eruption of volcanic lavas in the middle Tertiary period (20 to 40 million years ago) accompanied by more faulting along the northwest-southeast faults; and

- Basin and Range uplift of the Egan Range and faulting along the north-south faults (Spencer 1917; NBMG 1976). Recent unconsolidated sediments, such as stream valley deposits and alluvial fans, locally cover the faults, plutonic intrusions, and ore bodies of the Egan Range.

Uplift of the Egan Range and the Robinson Mining District over the past 20 million years has been accompanied by a gradual change in the climate of the Great Basin from temperate (humid with abundant plants) to arid (desert), due mainly to the formation of the Sierra Nevada Range in California and its blocking of the moisture flow from the Pacific Ocean. This has caused the water table in the Robinson Mining District to drop with time, leading to the oxidation of the copper ore bodies. This downward movement of the water table resulted in the formation of a supergene-enriched blanket of copper beneath the base of the oxidized zone. The supergene-enriched blanket was formed by secondary near-surface processes, such as weathering or groundwater percolation. This ore is very high in copper and is the main reason for past mining in the district (NBMG 1976). The current interest in the proposed project area is focused on the remaining high-grade hypogene chalcopyrite and pyrite ore found in the porphyry intrusions and adjacent skarns.

Table 3-1

Geologic History of the Robinson Mining District

Geologic Time[1]	Geologic Settings	Mineralization
Paleozoic Era (225 - 570) Ordovician (430-500) Silurian (395-430) Devonian (345-395)	Deposition of carbonate bank shales, limestones and quartzites beginning with Kanosh Shale and ending with the Pilot Shale. Approx. 8,000 feet of limestone, shale, dolomite, and quartzite deposited in bank or platform environment.	Not mineralized.
Paleozoic Era (225-570) Mississippian (325-345) Pennsylvanian (280-310) Permian (280-250)	Deposition of approx. 5,000 feet of limestone in stable carbonate bank environment covered with shallow seas. Joana Limestone to Rib Hill Sandstone.	Mineralized with copper and iron sulfides adjacent to Laramide plutons.
Paleozoic Era (225-570) Upper Permian (230-250)	Continued deposition of 3,600 feet of limestone in same stable carbonate bank. Arcturus and Kaibab limestones. Formation of thrust faults.	Not mineralized.
Mesozoic Era (65-225)	Intrusions of monzonite plutons as stocks and sills during Laramide time (60 - 100). Source of mineralizing fluids in adjacent limestones. Formation of northwest-trending faults in mining district.	Mineralized with copper and iron sulfides.
Cenozoic Era (0-65) Tertiary (25-40)	Intrusion of rhyolite stocks and deposition flows and tuffs.	After main period of mineralization.
Cenozoic Era (0-65)	Uplift of Egan Range and beginning of erosion. Deposition of lake beds in valleys.	No mineralization.
Cenozoic Era (0-65)	Continued uplift of Egan Range and deposition of alluvial sediments in valleys and basins. Development of north-south Basin and Range faults.	No mineralization.

[1]Geologic time in millions of years before present.

Source: Spencer 1917; NBMG 1976.

3.1.1.1 Stratigraphy

The rocks found in the Robinson Mining District and the proposed project area consist of limestones, dolomites, shales, and sandstones of Paleozoic age (245 to 570 million years old). These sedimentary rocks formed in an ancient carbonate bank environment similar to the Florida Keys or the Bahamas of today. The total thickness of the consolidated sedimentary rocks is 16,000 to 18,000 feet (NBMG 1976). The stratigraphy of the district, with formational names and thicknesses, is shown in Figure 3-1.

The Paleozoic sedimentary rocks were intruded by plutonic rocks during the late Cretaceous (approximately 111 million years ago) and mineralized to form the copper sulfide deposits. Later, during middle Tertiary time (20 to 40 million years ago), the sedimentary rocks, along with the plutonic rocks and the copper sulfide ores, were intruded by rhyolitic volcanic rocks (light-colored, tuffaceous lavas). Basin and Range faulting and uplift of the Egan Range (including the proposed project area) accompanied and followed the Tertiary volcanism (NBMG 1976).

Erosion of the Egan Range during uplift from 20 million years ago to present produced the considerable amount of alluvium (sand and gravel) that now fills stream valleys and the alluvial fans shed into the Steptoe and White River Valleys. The alluvial sediments are mostly unconsolidated to poorly consolidated and serve as aquifers (water-bearing rocks) for domestic and farm wells in these valleys. Below the alluvial sediments are lake beds that formed during the early history of the valleys when the climate was still humid and ranges such as the Egan Range were only low hills. Minor amounts of basalt in the form of lava flows are interbedded with these lake beds and alluvial sediments. As the mountain ranges grew in size and the climate became arid, the lake beds were covered by the alluvial sands and gravels. Many of the lake beds contain thick zones of gravel that are good aquifers (NBMG 1976).

Sedimentary rocks exposed in the Robinson Mining District and the proposed project area are mainly limestones, shales, and sandstones of Paleozoic age, as well as the alluvial gravels of Giroux Wash. Important mineralized rocks include the plutonic intrusions, the Joana Limestone, Chainman Shale, Ely Limestone, Riepe Spring Limestone, and the Rib Hill Sandstone (see Table 3-1 and Map 3-1). These rocks would be affected by the proposed mining operations.

3.1.1.2 Structure

Regional Structure

White Pine County and much of northeastern Nevada have experienced four major tectonic events since the end of the Precambrian (570 million years ago). In the Robinson Mining District, some of the late Cretaceous plutonism and associated mineralization took the form of sills and followed old bedding-plane thrusts. Tertiary volcanism swept across northern Nevada from 40 to 25 million years ago and blanketed the land with ash-flow and air-fall tuffs. Large calderas (volcanic collapse structures) formed in the source regions of these huge ash flows. The Robinson Mining District experienced such volcanism and was covered by a thin mantle of volcanic ash flows and intruded by small stocks of rhyolitic magma (subcircular bodies of molten lava). During the waning stages of Tertiary volcanism, extensive lake beds filled with volcanic ash covered the valleys between the volcanic centers (NBMG 1976).

Basin and range faulting began around 20 million years ago and continues to the present. Large valleys (grabens) formed as major blocks of the earth's crust were down-dropped along north-south-trending faults. Vertical displacements of thousands of feet are common along these Basin and Range faults. Land between these grabens was elevated and today forms the long, linear mountain ranges that characterize Nevada. The Egan Range is one of these remnant-elevated blocks, or horsts, as they are commonly called. This period of extensive north-south faulting served to disrupt (offset by fault movement) mineralization in the Robinson Mining District and initiated a period of erosion in horst blocks like the Egan Range that continues to the present (NBMG 1976).

Local Structure

The local structure of the Robinson Mining District and the proposed project area is dominated by a northwest-southeast-trending graben (down-faulted block of sediments) that encompasses the eastern end of the belt of late Cretaceous plutons, mainly those near the Ruth and Kimbley Pits. The graben is bounded in part on the south by the Eureka-Nevada fault zone and on the north by the Jupiter fault (Figure 3-2). These two fault zones dip inward toward the center of the graben. The late Cretaceous plutons, called quartz monzonite porphyries in this area, preceded the formation of the graben. Thus, both the monzonite porphyries and their associated mineralization are offset by the graben faults.

Prior to late Cretaceous time, the Paleozoic sedimentary rocks of the Robinson Mining District were folded and thrust-faulted (one bed of rock shoved along the top of another) during the Sevier Orogeny. Thrust faults that trend northwest-southeast and verge (direction of movement) to the south are common in the Paleozoic sedimentary rocks of the Mining District. A large, overturned fold is present at the western end of the district in the limestones, and a south-dipping monocline (inclined warp) is found at the eastern end of the district with step faults dropping the beds to the south. The overall dip of Paleozoic sedimentary rocks in the Robinson Mining District, however, is to the west (NBMG 1976).

North-trending Basin and Range normal faults (vertical movement downward of one block against another) offset the faults that bound the main graben (Eureka and Jupiter), the porphyritic monzonite intrusives and their associated copper sulfide mineralization, and the thrust faults. Thus, the Robinson Mining District and the proposed project area have three types of faults that may direct groundwater flow:

- The bedding plane thrusts;
- The large graben faults, such as Eureka and Jupiter; and
- The north-trending Basin and Range normal faults (NBMG 1976).

3.1.2 Mineral Resources

The porphyry copper deposits of the Robinson Mining District are located between Ely and Ruth in the Egan Range and are centered on the late Cretaceous quartz monzonite intrusives that form an east-west trend across the Egan Range and the Mining District. To date, the Robinson Mining District is the largest base metal producer in Nevada. Between 1908 and 1963, Consolidated Coppermines Company and Kennecott Copper Corporation mined more than 255 million tons of ore averaging around 1 percent copper. This ore was mined underground initially using stoping and block caving of high-grade pods of ore and then later from the five open pits (NBMG 1976).

There are four principal types of ore deposits in the Robinson Mining District:

- Disseminated copper deposits within altered quartz monzonite porphyries;
- Replacement deposits in altered sedimentary rocks around the intrusives;
- Vein deposits within the monzonite intrusive and the sedimentary rocks; and
- Supergene copper deposits formed by groundwater percolating through the above three types of deposits.

The principal copper sulfide mineral is chalcopyrite (NBMG 1976). Lead, zinc, and silver sulfide deposits, along with gold, manganese, and iron deposits, are peripheral to the copper deposits and are crudely zoned outward from the mineralizing monzonite plutons. Sedimentary rocks adjacent to the plutons are often replaced by high-temperature silicates and sulfides to form mineralized skarns (altered limestone with silica and sulfides replacing the original rock).

3.1.2.1 Disseminated Copper Deposits

These deposits, the main ore bodies of the district, consist of disseminated chalcopyrite (copper-iron sulfide) in altered stocks and sills of the quartz monzonite porphyries. Six major and several minor deposits of this type occur in a 6-mile-long zone east-west across the Robinson Mining District that is up to 3,000 feet wide and has been mined to depths of 900 feet (NBMG 1976). The main ore bodies in order of tons mined are the Liberty (180 million tons), the Tripp (25 million tons), the Ruth (19 million tons), the Emma (17 million tons), the Veteran (7 million tons), and the Kimbley (5 million tons). The known dimensions of these ore bodies range from approximately 2,000 feet long by 1,000 feet wide by 1,500 feet deep at the Kimbley to approximately 5,000 feet long by 2,500 feet wide by 1,000 feet deep at the Liberty. The disseminated copper deposits are confined to altered quartz monzonite porphyry and silicated (altered to silica and pyrite) sedimentary rocks adjacent to the porphyritic intrusions. Principal ore minerals are chalcopyrite, chalcocite (high-grade copper sulfide), molybdenite, and copper oxides. Pyrite (iron sulfide) is an important alteration mineral. The average grade of these deposits is 0.8 percent copper (NBMG 1976). Other metals recovered are molybdenum, zinc, lead, gold, platinum, and silver.

Mineralization in the silicated sedimentary rocks adjacent to the mineralized monzonites is restricted to the Ely Limestone, the Chainman Shale, and the Rib Hill Sandstone. These deposits extend up to 500 feet away from the intrusion and have a mineral assemblage similar to that found in the mineralized monzonite, except that pyrite is more abundant (NBMG 1976).

3.1.2.2 Replacement Deposits

Replacement copper deposits are found erratically distributed in structural traps within the Ely and Joana Limestones around, above, and locally under the mineralized monzonites. They are zoned outward from the intrusions in an area about 8 miles long and 2 miles wide that has been mined to depths of 1,600 feet. The Alpha and Richard mines yielded a total 409,000 tons of oxidized (supergene) copper ore averaging 4 to 7 percent copper (NBMG 1976).

Replacement zinc deposits have been limited to the Riepe Spring Limestone along intersecting shear zones at the Willard and Monroe mines in the eastern area of the Mining District. Small bodies consisting of a few thousand tons of hemimorphite (hydrated zinc silicate) and smithsonite (zinc carbonate) have been mined averaging 16 percent zinc. Lead-silver deposits are also limited to the Riepe Spring Limestone and are usually found above the quartz monzonite porphyries. These are small (few thousand tons), high-grade pods of ore averaging 10 percent lead and one or more ounces of silver per ton (NBMG 1976).

Manganese deposits consisting of manganiferous carbonate-bedded replacements in the Joana and Ely Limestones were mined at the Keystone, Columbia, Cuba, and Issacs mines. These deposits, which were up to 12 feet thick, consisted of supergene blankets of manganese oxides formed by groundwater percolating through the manganese carbonate beds. Several thousand tons of pyrolusite and braunite (manganese oxides) were mined in 1917 to 1918 and again in 1952 to 1959 from ores containing more than 35 percent manganese. Low-grade manganese ores still remain in the district (NBMG 1976).

3.1.2.3 Vein Deposits

Vein deposits carrying gold or lead-silver are commonly localized along northeast-trending faults in the mineralized quartz monzonite porphyries and the surrounding Ely Limestone and the Chainman Shale. Replacement deposits in the limestones are often found adjacent to these veins. The veins can carry as much as 1 ounce of gold and 20 ounces of silver per ton, as in the Chainman gold mine (NBMG 1976).

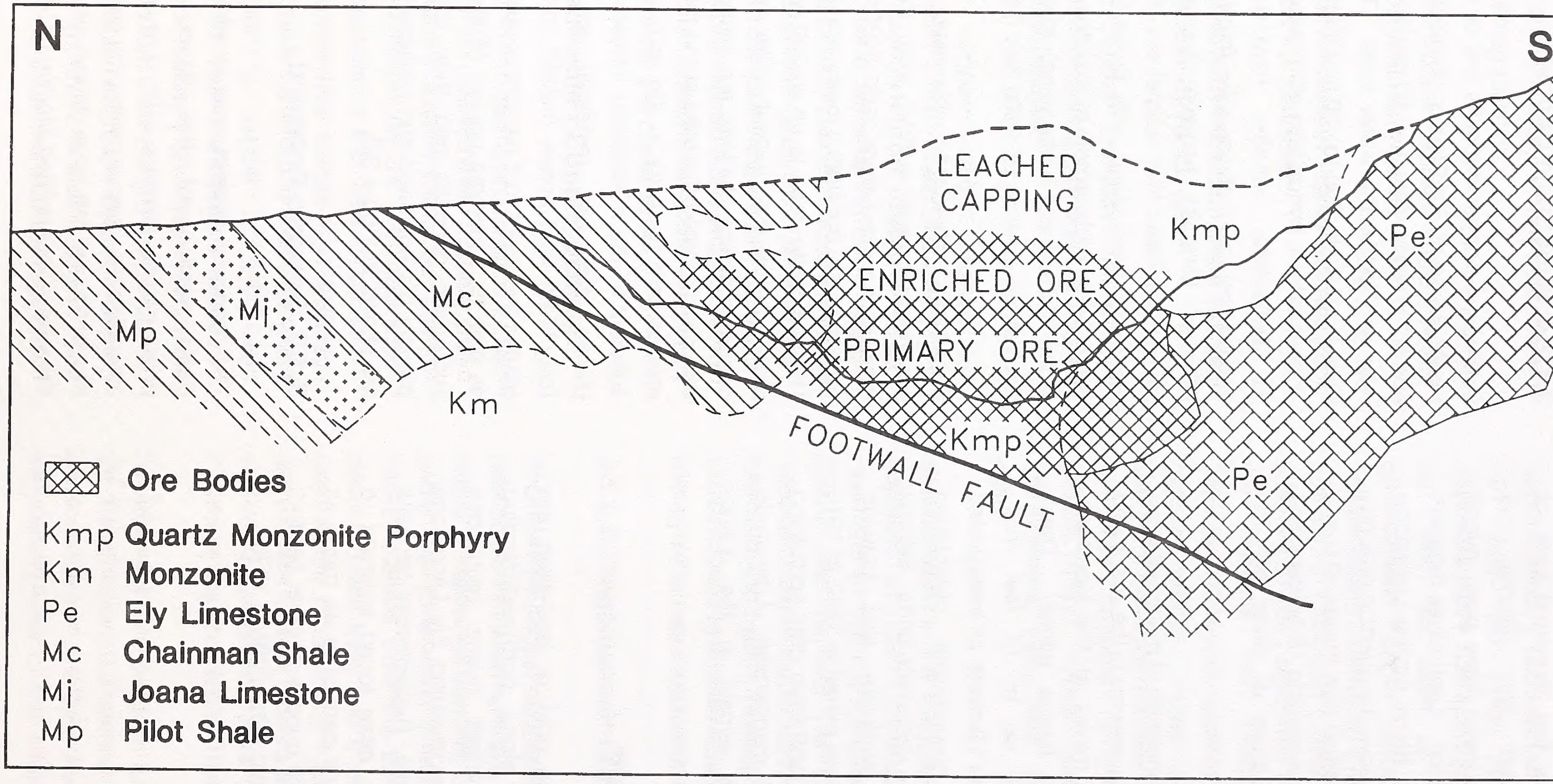
3.1.2.4 Supergene Deposits

Supergene copper deposits are of two types in the Robinson Mining District: (1) oxidized deposits above the water table, and (2) chalcocite blankets near and below the water table. The oxidized zone is generally 100 to 400 feet thick and carries copper oxides, hydroxides, and carbonates, such as malachite, azurite (hydrated copper carbonates), and chrysocolla (hydrated copper silicate). Limonite, hematite (iron oxides), and jarosite (hydrated iron sulfate) are often found in the oxide zone along with jasperoid (massive, vuggy silica) replacement of limestones. Oxidation at the Richard and Alpha mines (western part of the district) extends to 1,800 feet (NBMG 1976).

Supergene chalcocite blankets (high-grade secondary copper sulfide) were the source of most of the ore before 1950 (NBMG 1976) and were mined at the Ruth, Liberty, and Kimbley Pits. The chalcocite zone is up to 300 feet thick and mostly below the present water table. These copper-enriched blankets are found associated with disseminated deposits in the monzonite and replacement deposits in the sedimentary rocks adjacent to the mineralized intrusions. In many places they are restricted to gouge-filled (clay-filled) fault zones (NBMG 1976). Copper grades average 1 to 2 percent copper, but can be as high as 5 percent copper (Ruth Mine). The supergene deposits and their relation to the primary disseminated and replacement deposits are shown in Figure 3-3.

3.1.3 Seismic Potential

The proposed project area is within the Great Basin section of the Basin and Range physiographic province. This is an area of crustal extension (i.e., forces pulling the crust apart) that has produced the large valleys or grabens and the intervening uplifted blocks, or horsts, that



Liberty Pit
(looking East)

SOURCE: NBMG 1976

ROBINSON PROJECT

FIGURE 3-3
CROSS SECTION THROUGH
LIBERTY PIT

characterize Nevada. This movement of crustal blocks results in occasional earthquakes. A summary of major seismic events (earthquakes) in Nevada is presented in Table 3-2.

To identify historic earthquakes in the vicinity of the proposed project area, a radial search extending 100 miles from the site (Lat. 39-15.3N, Long. 114-58.5W) was conducted by the USGS National Earthquake Information Center in Golden, Colorado. A total of 284 historic earthquakes have been recorded from 1875 to 1990 within this 100-mile radius. The strongest earthquake recorded had a magnitude of 5.5 on the Richter scale and occurred in 1875 approximately 50 miles west-northwest of the proposed project site. In addition, at least five earthquakes, two with a magnitude of 3.0 or greater, have occurred within the proposed project area. The area encompassing the proposed project site is classified as a Zone II seismic risk area (NOAA 1973); this classification means that moderate damage is possible from the maximum credible earthquake. A list of all of the earthquakes within the 100-mile radius of the proposed project site is presented in Technical Report A, on file with the BLM in Ely, Nevada.

3.2 WATER QUANTITY AND QUALITY

The water resources section discusses surface and groundwater, current water consumption, and water quality and quantity in existing pits, waste rock disposal areas, and mine workings. The description of the affected environment for water resources was produced from: (1) a review of literature available on the proposed project area and vicinity, (2) technical data and maps provided by the staff of RMLP, (3) data contained within the Robinson Project Environmental Assessment (BLM 1992a), and (4) field data gathered for RMLP by PTI Environmental Services (PTI 1994).

3.2.1 Surface Water Resources

3.2.1.1 Surface Water Sources

The Robinson Mining District is located along a ridge crest in the Egan Range and between this ridge crest and Robinson Canyon (Map 3-2). This canyon is drained by Gleason Creek and trends northwest-southeast through the northern part of the Egan Range, starting approximately at the west edge of the city of Ely, Nevada. Gleason Creek (and its minor tributaries shown on Map 3-3) is an intermittent stream that flows generally in response to heavy snowmelt or high precipitation storm events. Water in the stream comes mainly from surface runoff, but also from baseflow when the water table is high in the late spring. Most of the year Gleason Creek is dry, and commonly it does not flow for months. The USGS gaging station along Gleason Creek just west of Ely, Nevada, was discontinued in 1982, due to a lack of flow in the stream. Prior to termination of mining in 1978, flow in Fisher Canyon and lower Gleason Creek was maintained by dewatering of the Deep Ruth Shaft.

Steptoe Valley Basin, which lies to the east of the Robinson Mining District, has a drainage area of approximately 1,975 square miles and extends roughly 110 miles northward from the southern end of White Pine County to the southern part of Elko County. Precipitation ranges from a low of 6 inches per year in the valley to more than 20 inches per year in the mountains that border the basin. Evaporation and transpiration by plants generally exceed precipitation, leading to a net loss of water from the basin. There is a net flow of water out of the valley as either surface flow or underflow to the north at Currie, Nevada (Eakin 1967). Flow into Steptoe Valley Basin comes from the adjacent mountain ranges both as surface and subsurface flow, primarily in the

Table 3-2

Major Seismic Events in Nevada

Date	Epicenter	Magnitude[1]	Area[2] (mi^2)
1845, possibly 1852	Stillwater area (?) possibly Pyramid Lake	Greater than 7	unknown
October 2, 1915	Pleasant Valley	Approximately 7.8	500,000
December 20, 1932	Cedar Mountains	7.3	500,000
December 16, 1954	Fairview Peak and Dixie Valley (2 events, 4 minutes apart). Fairview Peak approximately 34 miles south of Dixie	7.1; 6.8	200,000

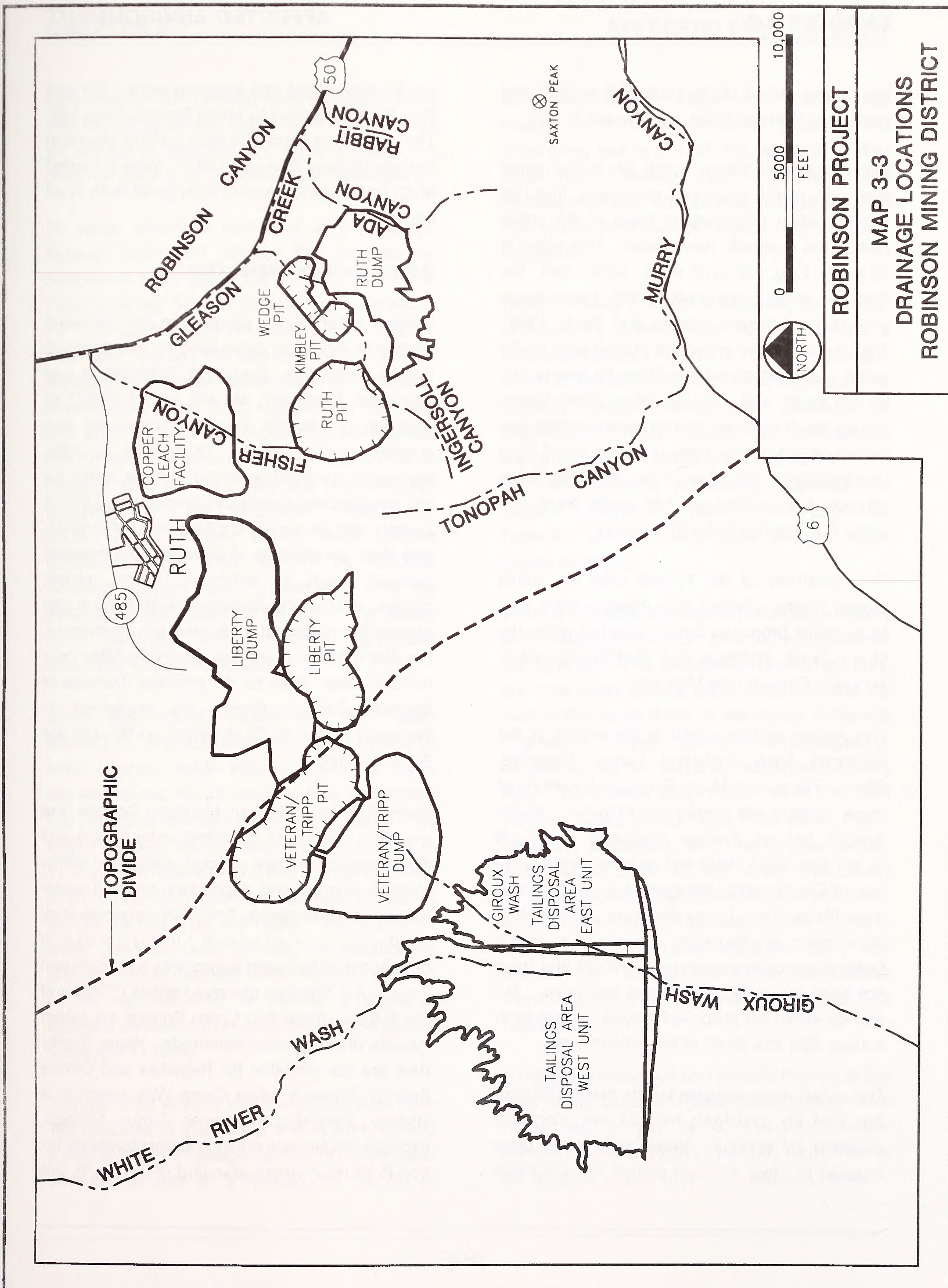
[1]Magnitude based on the Richter scale.

[2]Area represents the area over which the effects of the earthquake were felt.

Source: NOAA 1973.

ROBINSON PROJECT

MAP 3-2
REGIONAL SURFACE
HYDROLOGY FEATURES



ROBINSON PROJECT
MAP 3-3
DRAINAGE LOCATIONS
ROBINSON MINING DISTRICT

late spring. Most of the proposed project area drains into Steptoe Valley via Gleason Creek.

The White River Valley, which lies to the south and west of the proposed mine area, includes approximately 1,620 square miles of the upper part of the Colorado River Basin. This valley is 70 miles long, 20 to 30 miles wide, and like Steptoe Valley, evaporation and transpiration exceed precipitation (Maxey and Eakin 1949). That portion of the proposed project area to the south and west of Veteran-Tripp Pit drains into Giroux Wash and into the White River Valley. Giroux Wash contains an intermittent stream that flows primarily in response to storm runoff from precipitation. This flow sinks into the valley alluvium and seldom reaches Jakes Wash and rarely reaches the White River Valley.

The remainder of the project area lies within closed basins draining into existing mine pits. None of the proposed project area lies within the Murry Creek drainage and its tributary valley, Tonopah Canyon (see Map 3-3).

Five natural springs occur in the vicinity of the Robinson Mine, including Lyons, Ragsdale, Giroux, Riepe, and Murry Springs. Locations of these springs are shown on Map 3-2. Murry Springs has an average discharge of 7.5 cfs (3,300 gpm; Frick 1985) and provides water to the city of Ely, Nevada, because of its regular and dependable flow. Lyons Spring is currently dry. Flow rates at Ragsdale, Giroux, and Riepe Springs are quite low and intermittent and have not been measured in the past few years. No springs within the proposed project contribute to surface flow into or off of the project area.

The public water supplies for the communities of Ely, East Ely, and Ruth, Nevada, are principally provided by springs. Water wells have been installed in valley alluvium around Ely, but these are for agricultural and irrigation water. Ely and East Ely are supplied by Murry Springs (Map 3-2). The main water supply for Ruth is Ward Mountain Springs (Dames & Moore 1987). Water is carried north from Ward Mountain Springs to Ruth in an aqueduct.

3.2.1.2 Surface Water Quality

Surface water quality sampling in the proposed mine area has been conducted by two previous mining companies, Kennecott Corporation and Alta Gold Company, as well as by RMLP to establish a baseline value for dissolved and suspended constituents. From 1984 to 1989, Kennecott routinely analyzed surface water for pH, specific conductivity and temperature, USEPA primary and secondary drinking water standards, and other constituents of possible environmental concern, such as antimony, boron, nickel, cyanide, and nitrate. Because the streams in and around the proposed mine area are intermittent, the data are limited and not always available on a monthly basis. Data for the principal drainage of interest, Gleason Creek, are contained in Technical Report C (BLM 1992a) on file with the Ely BLM office.

Murry Springs and Ward Mountain Springs, the two main sources of municipal water for Ely and Ruth, respectively, are of good quality and within Nevada primary and secondary drinking water standards. Both springs flow from carbonate rock and are calcium/magnesium bicarbonate-dominated waters with a pH between 7.0 and 8.0, low total dissolved solids (TDS), and low sulfate. Riepe and Lyons Springs are within Nevada drinking water standards. Water quality data are not available for Ragsdale and Giroux Springs; however, West Camp Well, which is a shallow, hand-dug well near Giroux Springs, exceeds the Nevada drinking water standards for iron (5.29 mg/l versus standard of 0.6 mg/l), but otherwise is within drinking water standards, even with its high pH of 9.0. Locations of these springs are shown on Map 3-4, and water analyses are given on page B-13 of Table B-2 in Appendix B.

Pit water chemistry measured in the Liberty, Veteran, Ruth, and Kimbley Pits prior to the transfer of water from Liberty Pit to Ruth Pit in 1993 exceeded Nevada drinking water standards for TDS, sulfate, and pH (Liberty Pit). Liberty, Ruth, and Veteran Pits also exceed the Nevada standard for various metals, such as cadmium, chromium, copper, iron, manganese, mercury, and zinc. Table B-2 in Appendix B summarizes the pit water chemistry based on analyses in October 1993 by PTI (1994) and past analyses presented in the Robinson Project EA (BLM 1992a). These waters were calcium sulfate-dominated and formed by reaction between surface water, groundwater, and the mineralized wall rocks of the pits. The waters were generally within Nevada agricultural standards, except for fluoride.

Some pits, notably Liberty and Ruth, were affected by past acidification of waste dumps to leach copper. Acidic effluent flowed into these pits and caused the pit waters to have abnormally low pH values and elevated metal contents. The Ruth Pit waters had elevated cyanide levels (2 to 11 mg/l WAD cyanide) and had a pH range of 4.0 to 8.0 due to the addition of cyanide-rich tailings slurries starting in the late 1980s. The Kimbley Pit water has not been affected by acidification and/or cyanide leaching and is therefore believed to be representative of natural equilibration between surface and/or groundwater and pit wall sulfides (PTI 1994).

Transfer of pit water from Liberty Pit to Ruth Pit in 1993 resulted in dewatering of the Liberty Pit and a lowering of the cyanide content of the pit water at Ruth, as well as a lowering of the pH to near-neutral levels. Inflow water coming into Liberty Pit from the pit walls following the dewatering has a pH of 5.6, elevated sulfate (3,050 mg/l), elevated TDS (4,100 mg/l), and fluoride, cadmium, copper, iron, manganese, and zinc values in excess of Nevada drinking water standards.

Water currently in Ruth Pit, following the transfer of Liberty Pit water in 1993, has a pH of 4.5, a sulfate content of 2,780 mg/l, TDS of 4,120 mg/l, and WAD cyanide content of 0.492 mg/l, and also exceeds Nevada drinking water standards for cadmium, chromium, fluoride, iron, manganese, selenium, and zinc (page B-10 of Table B-2). The pit water exceeds agricultural standards for fluoride, selenium, copper, and cadmium. Table 3-3 presents applicable Nevada water quality standards.

Water is currently seeping from the base of some of the waste dumps, from pit walls, and from one old mine adit. This seepage is minor in quantity, but does affect surface water quality around the base of the waste dump or the mouth of the adit in question. Pit water quality does not appear to be affected by the seeps in Veteran and Liberty Pits. The Veteran seep has a pH of 4.68 and elevated sulfate (5,400 mg/l), TDS (9,360 mg/l), cadmium, chromium, iron, manganese, nickel, zinc, fluoride, aluminum, and cobalt. The Liberty Pit seeps show a similar chemistry with pH values from 2.25 to 5.54, and elevated sulfate (2,900 to 30,000 mg/l), TDS (4,500 to 46,000 mg/l), and metals, with concentrations elevated above Nevada drinking water standards (page B-7 of Table B-2).

A historic process solution pond is located at the base of the Sunshine-Puritan waste dump. This water has a pH of 2.7 to 2.8, sulfate concentrations of 13,000 to 14,500 mg/l, TDS in the range of 21,000 mg/l, and elevated metal

Table 3-3

Water Quality Criteria and Standards for Nevada[1]

Parameter	Drinking Water		Domestic Supply	Agriculture		Wildlife Propagation
	Primary	Secondary		Irrigation	Stock Water	
Arsenic	0.05		0.05	0.1	0.2	
Barium	1.0		1.0			
Beryllium			0.0	0.1		
Boron				0.75	5.0	
Cadmium	0.01		0.01	0.01	0.05	
Chromium	0.05		0.05	0.1	1.0	
Copper		1.0		0.2	0.5	
Iron		0.3(0.6)[2]		5.0		
Lead	0.05		0.05	5.0	0.1	
Manganese		0.05(0.1)[2]		0.2		
Mercury	0.002		0.002		0.01	
Nickel			0.0134	0.2		
Selenium	0.01		0.01	0.02	0.05	
Silver	0.05		0.05			
Thallium			0.013			
Zinc		5.0		2.0	25	
Cyanide (WAD)[4]			0.2			
Alkalinity				Less than 25% Change	(Same as propagation)	
Chloride		250 (500)	250 (400)			
Color (PCU)		15	75			

Table 3-3 (Continued)

Parameter	Drinking Water		Domestic Supply	Agriculture		Wildlife Propagation
	Primary	Secondary		Irrigation	Stock Water	
Dissolved Oxygen			Aerobic	5.0	5.0	
Fluoride	1.4 - 2.4					1.0
Nitrate as N	10			90 (w)	90 (w)	
pH (SU)		6.5 - 8.5	5.0 - 9.0	6.5 - 9.0	6.5 - 9.0	4.5 - 9.0
Sulfate		250 (500)	250 (500)			
Temp °C				site-specific determination		
TDS		500 (1,000)	500 (1,000)			
TSS				25 - 80	25 - 80	
Turbidity (NTU)				50(w);10(c)	50(w);10(c)	

[1]Units are mg/l unless otherwise stated; TDS = total dissolved solids; TSS = total suspended solids; SU = standard units; PCU = photoelectric color units; NTU = nephelometric turbidity units.

[2]( ) secondary standards for public water systems.

[3]WAD = weak acid dissociable

values for cadmium, chromium, copper, iron, manganese, nickel, fluoride, aluminum, cobalt, and zinc (page B-7 of Table B-2, Appendix B). This waste dump was acidified in the past for in-situ leaching of copper.

There is a small seep at the Veteran-Tripp waste dump, which has a pH of 2.67, sulfate value of 37,200 mg/l, a TDS of 47,400 mg/l, and elevated metal concentrations for cadmium, chromium, copper, iron, manganese, nickel, zinc, fluoride, aluminum, and cobalt. This waste dump was not acidified in the past. All waste dump seeps are currently controlled and under mitigation by RMLP.

One mine tunnel in Ada Canyon (R-13S; page B-12 of Table B-2, Appendix B) that is allowing discharge of water was sampled (BLM 1992a). This water is within Nevada drinking water standards for most constituents except iron. The water analysis is incomplete, but suggests water of reasonably good quality.

Waste rock was dumped into Liberty, Ruth, Kimbley, and Veteran-Tripp Pits in the past as a means of disposal. These waste rock piles have a pore water chemistry that is often different from that of the adjacent pit lakes (PTI 1994). For the Veteran Pit, the waste rock pile pore waters show a pH of 7.5, sulfate in the 2,000 mg/l range, a TDS in the 4,000 mg/l range, and elevated values of iron, cadmium, chromium, and fluoride. The Kimbley Pit waste rock pile pore waters have a similar chemistry. Ruth Pit pore waters have a pH in the 2.0 to 4.0 range with sulfate in the 3,000 to 11,000 mg/l range, TDS in the 5,000 to 20,000 mg/l range, and elevated metal values for cadmium, chromium, copper, iron, manganese, nickel, zinc, fluoride, and aluminum. The Liberty Pit pore waters have a pH of 6.0, sulfate values of 2,560 mg/l, TDS of 4,080 mg/l, and elevated metal values for chromium, iron, manganese, nickel, and zinc. Some of this waste rock may have been acidified to leach copper before being dumped into the pits, so the origin of the pore water chemistry is not certain. These analyses are presented on page B-13 of Table B-2 of Appendix B.

3.2.1.3 Surface Water Quantity

Flow measurements have been made on Steptoe Creek since 1966 at a USGS gaging station near its headwaters, about 9 miles southeast of Ely (Map 3-2). The data available indicate that, on average, nearly half of the annual stream flow occurs from April through July and is sourced from snowmelt in the adjacent highlands (Frick 1985). Table 3-4 summarizes the mean monthly flow at this gaging station from 1966 to 1990. The average monthly flow rate is 7.5 cubic feet per second (cfs) for this gaging period.

Gleason Creek is intermittent. The USGS gaging station was discontinued in 1982. Prior to that date, flows as high as 165 cfs in 1 day were recorded (March 1969), but in general, many months and occasionally an entire year would pass with no flow. Prior to termination of mining in 1978, flow in Fisher Canyon and lower Gleason Creek was maintained by dewatering of the Deep Ruth Shaft.

3.2.2 Groundwater Resources

3.2.2.1 Regional Groundwater System

The proposed mine area falls within the Carbonate-Rock Province of the Great Basin Aquifer System as defined by Burbey and Prudic (1991). Map 3-5 shows the extent of this hydrologic province within the Great Basin. Groundwater flow is controlled by two main hydrologic regimes: (1) thick alluvial sediments filling the basins or valleys between the high

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**MAP 3-4
EXISTING GROUNDWATER LEVELS**

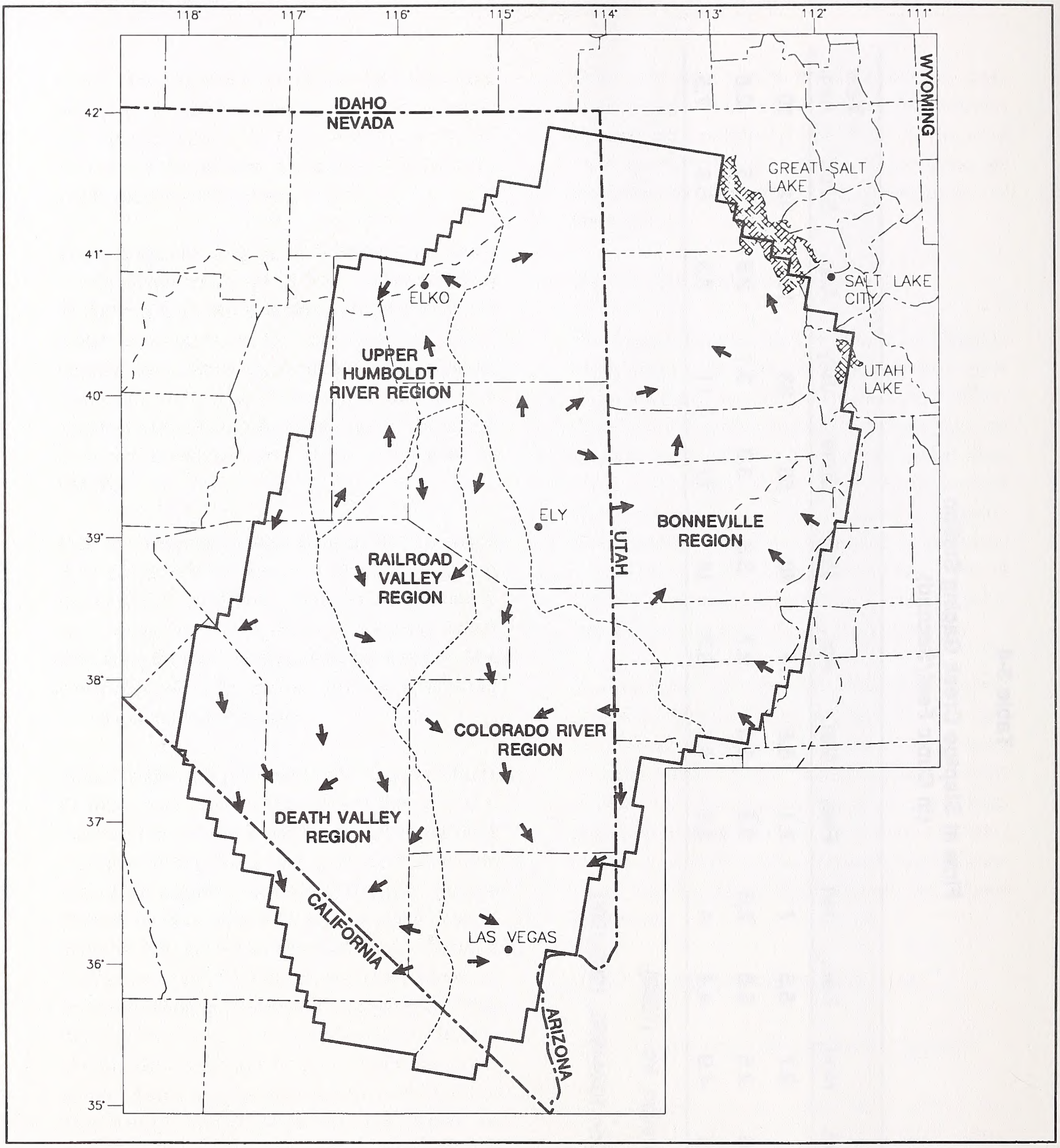
Table 3-4

Flow at Steptoe Creek Gaging Station (in Cubic Feet/Second)

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Year Avg.
Monthly Max.	11	9.7	8.5	7	7.1	8.8	14	40	59	33	18	12	19
Monthly Min.	2.6	2.5	2.5	2.3	2.3	2.3	2.7	3.3	3.9	3.1	2.8	2.5	2.8
Monthly Avg.	5.5	4.9	4.4	4	3.9	4.4	6.7	14	17	11	7.3	5.9	7.5

Source: Earth Information, Inc. (1993).

NOTE: Data for Station 10244950, 1966-1990.



LEGEND

BOUNDARY OF CARBONATE-ROCK REGIONAL AQUIFER

BOUNDARY OF DEEP-FLOW REGIONS

COUNTY LINES

DIRECTION OF DEEP GROUNDWATER FLOW

SOURCE: BURBEY AND PRUDIC 1991

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MAP 3-5
FLOW PATHS IN CARBONATE-ROCK REGIONAL AQUIFER SYSTEM

ranges, and (2) Paleozoic carbonate rocks (limestones) that are exposed within the mountain ranges and lie beneath the alluvial sediments of the basins. Recharge to these two main hydrologic regimes comes principally from precipitation in the mountain ranges. Snowmelt recharges the carbonate aquifers directly, and surface flow down mountain streams reaches the alluvial valleys and descends into the coarse alluvium along the mountain fronts to recharge the alluvial aquifers. Rainfall also contributes to recharge in both aquifer systems. The overall percent of precipitation that reaches groundwater can vary from a regional average of 5 percent for the Carbonate-Rock Province (Burbey and Prudic 1991) to local values as high as 25 percent for the mountainous areas of White Pine County (Maxey and Eakin 1949).

Water is lost from the mountain ranges by surface flow in streams, evaporation, plant transpiration, and especially by subsurface flow through the carbonate aquifers. Faults, karsts (open cavities and caves within the limestones), and solution cavities along bedding planes allow fluid flow. Water is lost from the basins by evaporation, plant transpiration, and flow downgradient through and eventually out of the basins. Water is also lost by deep subsurface flow in the carbonate rocks out of one region and into another. Although some basins are closed and thus do not allow flow out of the basin hydrologic system, many basins in eastern Nevada are at least partially open and participate in the general deep subsurface flow of water from north to south across southeastern Nevada. Flow in the Colorado River Region begins in White Pine County and includes the proposed mine area at its northern boundary (Map 3-5; Burbey and Prudic 1991).

3.2.2.2 Local Groundwater System

The local groundwater flow system in the Robinson Mining District and the proposed mine area is dominated by two main components: (1) a groundwater mound or high beneath Saxton Peak (Map 3-4), and (2) a shallow groundwater flow divide that follows the ridge crest south of Ruth that contains the Veteran and Tripp Pits. Shallow groundwater south of this divide, including the Giroux Wash area, will flow to the south. Shallow groundwater north of the divide will flow to Robinson Canyon. Similarly, shallow groundwater will flow from Saxton Peak toward the Kimbley and Wedge Pits and then toward the north and Robinson Canyon. The Jupiter fault acts as a barrier to flow and thus prohibits flow from Saxton Peak into Liberty and Ruth Pits. Groundwater also flows from Saxton Peak to Murry Springs.

Within the Robinson Mining District, groundwater can be found in the Paleozoic limestones (carbonate aquifer) and in the alluvium of Giroux Wash and Gleason Creek (alluvial aquifer). Groundwater in the alluvial aquifer is unconfined and flow is controlled by elevation of the water table above mean sea level (MSL) and permeability differences within the alluvial sediments. Groundwater in the carbonate aquifer can be confined (under pressure) or unconfined, and flow is controlled by permeability variations within the Paleozoic limestones, faults, mineralization and alteration, and intrusion of the late Cretaceous porphyries. The hydrostratigraphic units in the Robinson Mining District parallel lithology rather closely. Besides the alluvium, the main units controlling groundwater flow are limestones, shales, and sandstones along with the intrusive quartz monzonite stocks.

3.2.2.3 Hydraulic Properties

The hydraulic properties of the rocks in the proposed mining area and the properties of the alluvial sediments of Giroux Wash and Gleason Creek have been evaluated by aquifer tests conducted by previous investigators (Dames & Moore 1990; Hydro-Search 1990). The hydraulic properties in the Giroux Wash area are not well known due to the presence of only three wells and the lack of aquifer testing (Table B-3 in Appendix B).

Variations within the carbonates are due to alteration, mineralization, and faults. Limestones, such as the Ely and the Arcturus, have transmissivities of 100,000 to 150,000 gallons per day per foot (gpd/ft) in the Keystone area, which is to the north of the mineralized area. Hydraulic conductivities range from 18 to 25 feet/day. Altered and mineralized limestones have hydraulic conductivities as low as 0.1 to 0.3 feet/day (silicified Ely and Arcturus limestones).

The hydraulic conductivity of alluvium in Gleason Creek varies depending on lithology from 0.08 to 3.1 feet/day. The unfractured monzonite porphyry is very tight and impermeable, with a hydraulic conductivity of 0.05 feet/day. The alluvium of Giroux Wash has a hydraulic conductivity in the range of 0.02 to 3.7 feet/day (PTI 1994). Hydraulic conductivities of the alluvium in Steptoe Valley range from 400 feet/day in the coarser alluvium to as low as 0.1 foot/day near the edges of alluvial fans (Frick 1985).

Thus, the ability of rocks in the mine area to transmit water varies considerably and is dependent in part on fracturing and proximity to mineralization. The controlling factors for hydraulic conductivity are lithology, alteration/mineralization, and especially faults, fractures, and joints. Table B-3 in Appendix B summarizes the hydraulic properties of the hydrostratigraphic units in the proposed project area.

3.2.2.4 Occurrence of Groundwater in the Pit Areas

The geology of the open pit areas is complicated by many intersecting faults, and fluid flow in the subsurface is further complicated by an extensive network of interconnected underground workings totaling many miles (Kennecott mine records). For example, during construction of the Kellinske Shaft (located just south of the Ruth Pit) and the Deep Ruth Shaft, dewatering was required. The Kellinske Shaft was driven in unmineralized limestone and required pumping at 300 to 500 gallons per minute (gpm) to dewater the workings to 6,400 feet MSL. At this level, a fault was encountered that flooded the workings and required pumping at a rate of 1,200 to 1,400 gpm to finally dewater the mine workings to 5,927 feet MSL, which was 1,346 feet below ground level and approximately 700 feet below the local groundwater level of 6,650 feet.

Construction of the Deep Ruth Shaft, which was also collared in unmineralized rock and driven for the most part outside the zone of mineralization, required pumping at a rate of only 15 gpm to an elevation of 6,554 feet MSL. Pumping had to be increased to 1,400 gpm as the shaft was driven through fractured monzonite porphyry. At an elevation of 6,383 feet MSL, a fault was encountered that flooded the shaft at rates up to 10,000 gpm. In contrast, the Star Pointer Shaft (adjacent to the Ruth Pit) was completed in mineralized rock with only minor dewatering. When the shaft was closed in 1948, the workings were at a level of 6,350 feet MSL and flooded by rise of water to 6,700 feet MSL (rise of 350 feet).

Later opening of the shaft to drive it to 5,680 feet MSL required pumping at only 500 gpm.

Mine records indicate that the Deep Ruth and Kellinske shafts are connected beneath the Ruth Pit through the D-level at 6,105 feet MSL and that underground workings were encountered during mining of the Ruth Pit. These records indicate that water inflow to the Ruth Pit and the Liberty Pit during mining was minor. The low hydraulic conductivity of altered and mineralized rock (Table B-3 in Appendix B) suggests that much of the current hydraulic communication between the Ruth Pit and the surrounding aquifer is through old mine workings and faults. This may also be the case with the Liberty Pit. Flow through altered and mineralized pit wall rocks may be low in areas not in proximity to faults, fractures, and/or underground mine workings.

The Veteran and Tripp Pits are located west of the shallow groundwater divide along the crest of the Egan Range and exhibit a different groundwater regime from the Liberty and Ruth Pits (Map 3-4). The Veteran Pit, the deeper of the two pits, is currently excavated to an elevation of 6,660 feet MSL. Two bore wells in the vicinity of the pit, SKVE-5 and SKVE-7, were dry to depths of 6,289 feet and 6,337 feet MSL, respectively, 1 year after installation. The Alpha shaft, which is just south of these two pits, required dewatering at the 1,200-foot level (5,973 feet MSL) but not above that elevation (BLM 1992a).

Thus, groundwater in the Veteran-Tripp area is currently estimated to be about 300 feet below the deepest pit bottom. In the Liberty and Ruth Pit areas, the estimated water table elevation is currently around 6,620 to 6,630 feet MSL (Map 3-4), while pit water levels are 6,567 feet MSL for Liberty Pit and 6,678 feet MSL for Ruth Pit (PTI 1994). Kimbley Pit lake level is 6,721 feet MSL. Thus, the water table in this part of the proposed mine area is above the pit lake level for Liberty Pit, but just below the lake level for Ruth Pit. For Kimbley Pit, the water table is around 6,685 to 6,700 feet MSL, and thus just below the pit lake level. Water is currently flowing into Liberty Pit at a rate around 100 gpm. Water appears to be flowing out of the Ruth Pit, and the water level in Kimbley Pit is static.

3.2.2.5 Occurrence of Water at Murry Springs

A historical record of discharge at Murry Springs from 1970 to 1992, provided by the City of Ely, is shown in Figure 3-4. The discharge rates reported by Ely were based on meter readings taken at the water system inflow and overflow meters in the meter house at the springs. These meters did not measure total discharge from the springs because some of the overflow bypassed the meter house and was not recorded. Thus, the total discharge from Murry Springs reported by the City of Ely is lower than the actual flow at the springs.

Discharge rates reported between 1970 and 1986 ranged from a low of 2,000 gpm to a high of 5,000 gpm with a mean around 3,000 gpm. The period of low flow from 1978 to 1979 (2,000 gpm) occurred 4 years after the lowest precipitation year (1974) recorded at Ely. This suggests a correlation between precipitation and flow at Murry Springs with a 4-year lag between a precipitation event and a change in flow at Murry Springs (PTI 1994). The Deep Ruth Shaft was pumped through 1974 at a rate of 3,500 gpm. This pumping did not produce a noticeable decrease in flow at Murry Springs.

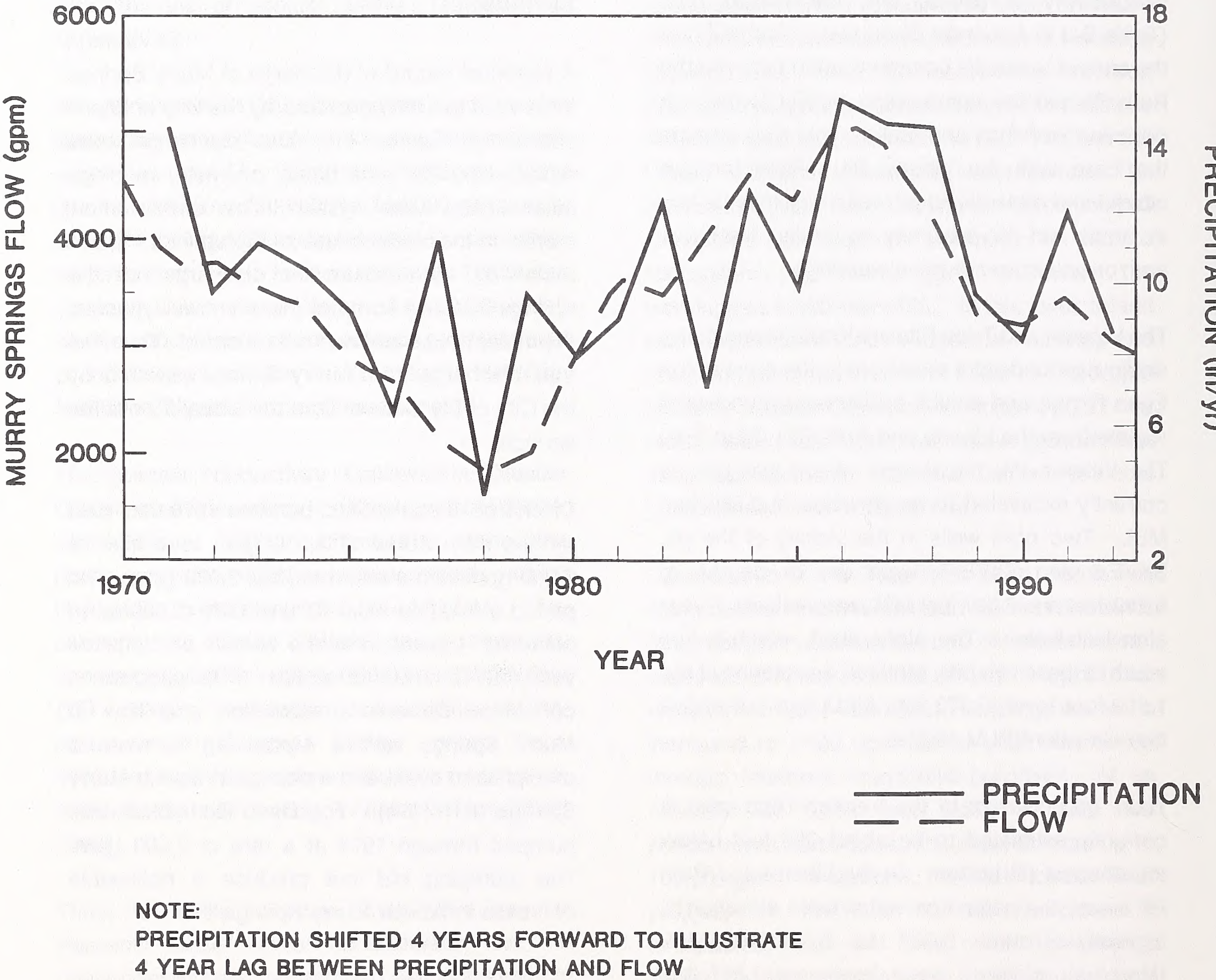

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FIGURE 3-4
DISCHARGE AT MURRY SPRINGS
AND PRECIPITATION AT ELY

3.2.2.6 Occurrence of Groundwater in the Giroux Wash Area

Giroux Wash is underlain by a thick wedge of alluvial gravels with interbedded, poorly consolidated lake beds. The gravel wedge is 50 to 60 feet thick at the north end of the valley and thickens to an unknown depth down valley to the south as the valley widens. The alluvial gravels are underlain by ash-flow and air-full tuffs, then the Sheep Pass Formation lake beds, and finally the limestones of the Arcturus Formation. The alluvial gravels and presumably the underlying rock units are faulted by normal faults trending both north-northwest and north-northeast. The offset on these faults is not known. Faulting is prevalent along the east side of Giroux Wash.

Stock wells drilled into the alluvial gravels are dry. Three wells drilled by Woodward-Clyde Consultants (BLM 1992a) to evaluate the water table in the proposed Giroux Wash tailings disposal area (Map 3-4) found water in the alluvium in the deeper central portion of the valley but not at the north end (head) of the valley or 1 mile to the east on the flank of the valley in a draw eroded into the ash-flow tuff. Well WCC-G2, drilled at the far north end of the valley, found no water in the alluvium but did encounter water in the limestone bedrock beneath the alluvium at an elevation of 6,623 feet MSL.

Water in the alluvium in well WCC-G1, drilled in the center of the valley below the proposed site of the tailings impoundment, was encountered at an elevation of 5,820 feet MSL (770 feet below ground surface). This well penetrated 1,040 feet of alluvium and did not hit bedrock. A third well, WCC-G3, drilled approximately 1 mile to the east of well WCC-G1 and up on the slope of the valley, encountered water in a fractured limestone with a potentiometric (pressure) head at an elevation of 6,424 feet MSL. The alluvium in well WCC-G3 is 375 feet thick, compared to 1,040 feet or greater in the center of the valley at WCC-G1 and only 50 to 60 feet at the head of the valley (WCC-G2).

Thus, groundwater in the alluvium is unconfined, while groundwater in the Arcturus Formation limestones is confined (under pressure) along the east slope of the valley but may be either unconfined or confined at the head of the valley. The well data currently available (BLM 1992a) are not definitive for well WCC-G2 at the head of Giroux Wash. These data suggest two separate aquifers, one in the alluvium and one in the Arcturus Formation limestone.

3.2.2.7 Groundwater Quality

Baseline groundwater quality in the proposed mine area is based on the results of water samples from 18 wells sampled between February 1984 and September 1989 (on a semiannual basis) at the locations shown on Map 3-4 (Dames & Moore 1990). The mine area was resampled again in August 1993 and October 1993 by PTI (1994). The results of these analyses are summarized in Table B-2 in Appendix B.

Saxton Peak, which is east-southeast of the proposed mine area and generally outside the area of past mining, contains groundwater in limestone. The water table elevation is above the main area of mining and is directly recharged by precipitation. Wells in this area (WCC-3M, WCC-1M, SKKR-12, SKKR-13M, and WCC-6M) show a pH range of 6.7 to 8.6, TDS from 169 mg/l to 872 mg/l, high suspended solids of 1,540 to 2,610 mg/l, and vary from calcium/magnesium bicarbonate-dominated to calcium sulfate-dominated. Metals are generally low except for iron, which can range up to 5.9 mg/l. These waters generally fall within Nevada primary and secondary drinking water standards, with only occasional exceptions for iron.

The locally high sulfate in wells SKKR-13M and WCC-6M correlates roughly with an increase in TDS and to some degree with an increase in total suspended solids (TSS), suggesting either local influence by old mines developed in the Saxton Peak area, or influence by pyrite in the Chainman Shale layer, which was intercepted by the wells. Thus, even the "baseline" groundwater in the proposed project area is subject to wide variations in quality due to mineralization on the fringe of the main Mining District, the influence of small adits and shafts driven in the past century, and the presence of pyrite in the Chainman Shale.

Groundwater in Tonopah Canyon (wells WCC-2M and WCC-4M), which is located south of the main area of past mining but north of the shallow groundwater flow divide running along the crest of the Egan Range, is calcium bicarbonate-dominated and low in TDS. The pH ranges from 8.0 to 8.6, sulfate is less than 30.0 mg/l, and metals, including iron, are low. Only the TSS are high (2,260 to 3,690 mg/l). These wells are screened in Arcturus Formation limestone. This groundwater is within Nevada drinking water standards.

Groundwater in Giroux Wash, an area south of the shallow groundwater divide that follows the ridge crest in the Egan Range and forces flow from all the pits except the Veteran and Tripp to flow north, is calcium bicarbonate-dominated in the alluvium with a pH of 7.9 and a TDS of 486 mg/l. Sulfate is low (less than 50 mg/l), but TSS are high (1,160 mg/l). Metals are low, but silica is high for shallow alluvial groundwater (52.3 mg/l). Groundwater in the carbonate bedrock is also calcium bicarbonate-dominated, but has a higher pH (8 to 10.5) and lower TDS (237 mg/l) and TSS (656 mg/l). Well WCC-G3 has anomalously high sodium and may have been contaminated during drilling or may be showing the influence of hydrocarbons in the limestone (PTI 1994).

Groundwater north of the main Mining District around Keystone and Ruth (wells R-23, AB-3, AB-4, and R-21; Map B-1) is highly variable in quality. In the Ruth area (well R-21), the water is calcium bicarbonate-dominated with low sulfate, low TDS (400 mg/l), and low TSS. The pH is 7.08 and the water is low in metals and meets Nevada drinking water standards. In the Keystone area (wells R-23, AB-3, AB-4), the groundwater is variable with the pH ranging from 6.7 to 8.0 and the waters being either calcium bicarbonate- or calcium sulfate-dominated. Sulfate ranges up to 1,480 mg/l and TDS up to 3,020 mg/l. These wells are screened in igneous rock and limestone. Metals are low except for iron and manganese. The calcium sulfate-dominated waters (well AB-4) also have the highest TDS and lowest pH and do not meet Nevada drinking water standards for sulfate and TDS.

Groundwater in the Lane City area (Map 3-4; wells R2-4, R8, R15-16, R22, RA, and RB on page B-9 Table B-2 in Appendix B) is of poor quality and does not generally meet Nevada drinking water standards. This water is invariably calcium sulfate-dominated with a pH range of 6.7 to 8.6, sulfate in the 400 to 1,780 mg/l range, TDS of 600 to 2,840 mg/l, and high iron content (8 to 17 mg/l with maximum of 127 mg/l). The TSS are usually low. This groundwater is not recommended for drinking or agricultural use (Table 3-4 and Table B-4).

Groundwater in rocks adjacent to the Liberty and Ruth Pits is of variable quality. Generally these waters are calcium sulfate-dominated waters with sulfate ranging from 319 to 1,940 mg/l and TDS ranging from 350 to 3,025 mg/l. Groundwater adjacent to the Ruth Pit in well R-11S has a pH of 7.5 and exceeds Nevada drinking water standards for copper and manganese. Well R-13S adjacent to the Liberty Pit has a pH of 3.19 and exceeds Nevada drinking water standards for cadmium, copper, chromium, iron, manganese, nickel, and zinc. However, well LDW-3A has relatively good water quality with a pH of 7.72, only exceeding Nevada drinking water quality standards for manganese. This variable groundwater quality is expected due to variations in lithology, mineralization within and adjacent to the pit walls, and the low hydraulic conductivities of the pit walls, resulting in minimal direct hydrologic communication between groundwaters and pit lake waters.

Groundwater quality in monitor wells installed in the area of past open pit mining (wells R-24, R-1, R-E, R-C, R-F, and R-H; Table B-2 and Map 3-4) is generally calcium sulfate-dominated with high TDS (800 to 2,920 mg/l) and sulfate in the range of 400 to 1,540 mg/l. Two wells, however, are calcium bicarbonate-dominated and within Nevada drinking water standards. These are the wells in the concentrator area (R-F) and south of the shallow groundwater divide south of Liberty Pit (well R-E). The pH in the high sulfate wells ranges from 6.5 to 7.5. Metals that exceed Nevada drinking water standards are iron, manganese, cadmium, and zinc.

Groundwaters in the proposed project area range from calcium sulfate to calcium bicarbonate waters, with TDS ranging from 350 to 3,000 mg/l. These trends are demonstrated by the Piper diagram (Figure B-1 in Appendix B), showing the grouping of pit waters, mined area waters, and Lane City waters. Wells in the Saxton Peak area, Giroux Wash, and in the area of past mining contain elevated sulfate levels in part due to the oxidation of pyrite by infiltrating water. In wells adjacent to the Keystone and Ruth Dumps and some wells in the vicinity of the Ruth and Liberty Pits, water quality has elevated levels of sulfate, TDS, and exceedences of Nevada water quality standards for iron and manganese, with some wells also exceeding drinking water standards for cadmium and zinc. Groundwater quality in the project area, particularly in the areas of past mining, is variable due to: (1) the role of faults, fractures, and old mine workings in controlling fluid flow, (2) past mining activities such as acidification of dumps to leach copper, (3) the low permeability of pit walls, and (4) the presence of pyrite and other sulfides and their oxidation products still remaining in the subsurface.

3.2.2.8 Summary

Surface water originates from precipitation runoff, snowmelt, and groundwater base flow to trunk streams, such as Gleason Creek. Most surface flow in streams is intermittent and dependent on spring snowmelt and spring/summer storms.

Groundwater in the Egan Range, the Robinson Mining District, and especially the proposed mine area occurs primarily in Paleozoic limestones and secondarily in the alluvial gravels of the stream valleys. Groundwater in the alluvial valleys, such as Robinson Canyon (Gleason Creek) and Giroux Wash, is unconfined and found at varying depths in the gravels depending on topography and the permeability of the gravels. Groundwater in the carbonates is both confined and unconfined.

Past mining activity, especially the historical acidification of dumps for copper leaching, in the Robinson District has degraded both surface waters and groundwaters with increased TDS, increased TSS, and a noticeable increase in sulfate and locally heavy metal content. Groundwater away from mined areas is calcium bicarbonate-dominated with low TDS, low TSS, and a pH in the 7.0 to 8.0 range. This water generally meets Nevada drinking water standards. Groundwater in the mined areas is often elevated in sulfate and TDS relative to Nevada drinking water standards and contains elevated concentrations of metals, mainly iron, manganese, cadmium, and zinc. Groundwater quality in the areas of past mining varies considerably over short distances due to the influence of faults, fractures, underground mine workings, past acidification of waste rock dumps for copper leaching, and sulfide ore remaining in the subsurface. Pit walls and mineralized/altered rock in the Mining District generally have low hydraulic permeabilities, while faults and underground mine workings can carry considerable quantities of water.

Wells in the Lane City area contain elevated levels of sulfate, TDS, and occasionally metals. The origin of this degraded water is not entirely certain, but is believed to be due to the past mining practice of flushing water pumped from the Deep Ruth Shaft down Fisher Canyon. This degraded water from the shaft would certainly account for the poor groundwater quality in the Lane City area.

Murry Springs flows at a relatively constant rate of 7.5 cfs (3,300 gpm) and thus provides water for the city of Ely, Nevada. Except for Ward Mountain Springs, which is considerably south of the proposed mine area, all other springs in the proposed project area are intermittent at best and flow in response to rainfall and/or snowmelt. These springs currently are not used for water supply or agricultural needs. Most are dry or only flow very slightly in the spring. They do not appear to derive any of their flow from groundwater, but rather are dependent on precipitation or possibly shallow, perched groundwater that has a very limited areal extent and is itself dependent on precipitation.

3.3 SOILS

Twenty-five soil associations, including rock outcrop and disturbed land, have been mapped and described for the proposed mine area and transmission line route. Descriptive and interpretive data on the general soil associations found in the proposed mine area and along the proposed transmission line were derived from an unpublished SCS survey report for Western White Pine County, Nevada (USDA-SCS 1991) and field reconnaissance conducted as part of the Robinson Mine EA. The data are summarized in Appendix D and include:

- The soil association name and corresponding map unit;
- The landscape position and parent material;
- The slope, soil depth, and texture;
- Dominant vegetation;
- Soil erodibility and erosion hazards;
- Percentage of organic matter; and
- Salinity, alkalinity, and soil reactivity.

Acreage totals for each soil association located in the proposed mine area are provided in Table 3-5. These totals were determined by measuring map units on a soils map of the area (Map 3-6) developed from SCS maps of the vicinity.

Soils vary in depth, quality, and quantity across the proposed mine area. Approximately 37 percent of the soils found in the proposed mine area have been previously disturbed as part of historic mining activities. Over 80 percent of the soils within the proposed mine area are extremely gravelly to cobbly or very gravelly,

Table 3-5

Soil Association Acreage Totals for the Proposed Mine Area[1]

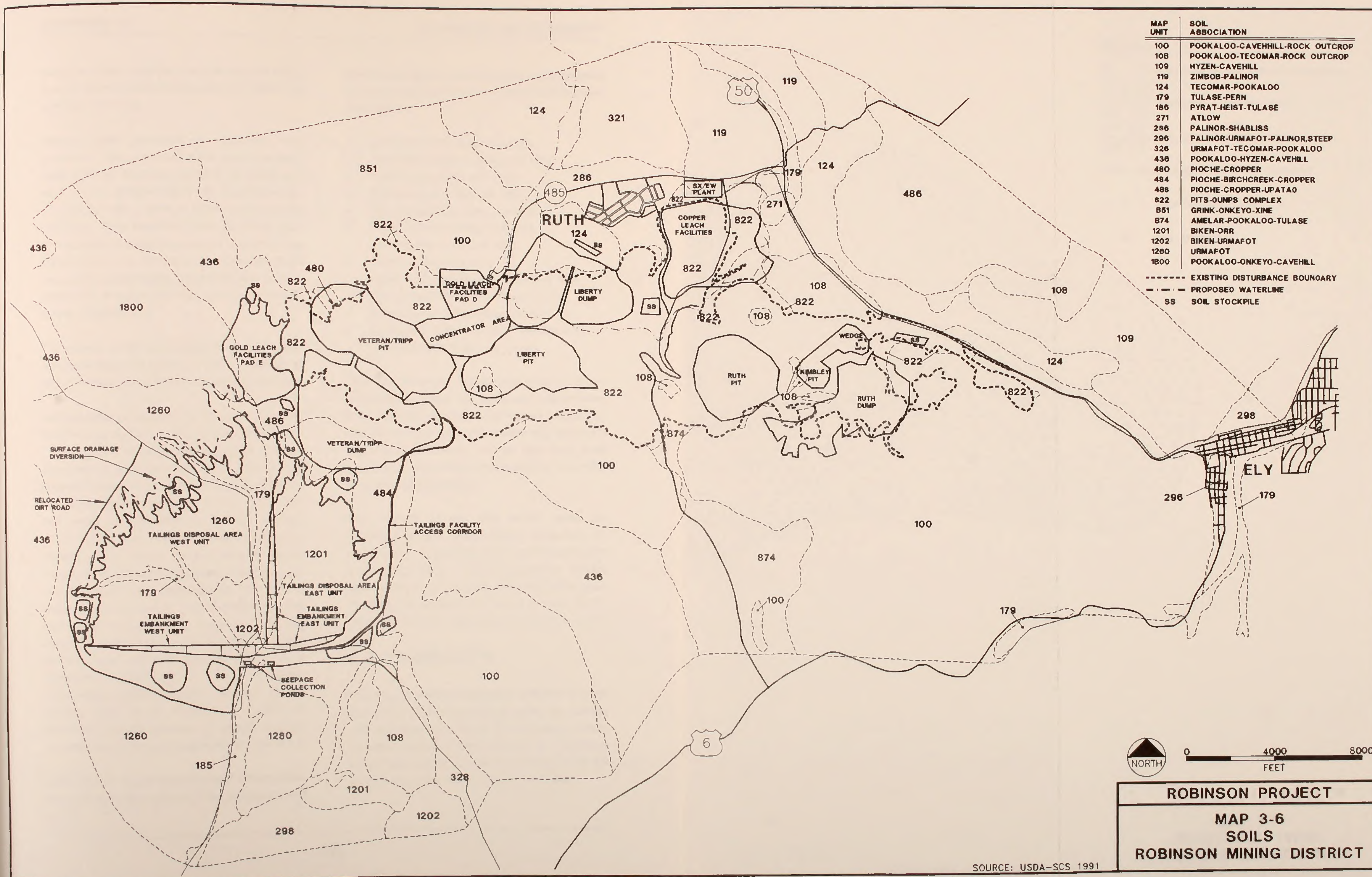
Unit	Total Acres	Associations																		
		822	100	108	119	124	179	185	286	296	321	436	480	484	486	851	1201	1202	1260	1800
1) Tailings Disposal Area	1901						220	15						35.4	0.8		608	103	919	
East Unit	642						25							35			582			
West Unit	1,259						195	15						0.4	0.8		26	103	919	
2) Tailings Disposal Area Soil Stockpiles	176		9									1		15.5	5		41.5		104	
East Unit	72		9									1		15.5	5		41.5			
West Unit	104																		104	
3) Seepage Ponds	1.8							0.9									0.9			
4) Tailings Disposal Area Access Road	29											7		8			14			
5) Rerouted Road	32			1.50					0.6								5.4		23.3	
East Unit	8.5			1.50				0.7	0.6								5.4		0.3	
West Unit	23																		23	
6) Surface Drainage Diversion	35						3												30	2
7) Concentrator Area	167	163														4				
8) Administration Building	0.2															0.2				
9) Leach Pad D	92	65	27																	
10) Leach Pad E	202						1					180								21
11) Leach Pad E soil stockpiles	9											9								
12) Veteran-Tripp Pit	377	346											14			17				
13) Veteran-Tripp Dump	507	171										178.5		149.5			8			
14) Liberty Pit	279	253.5	0	25.5																
15) Liberty Dump	359	275				64										20				
16) Liberty Dump Soil Stockpiles	19	13				6														
17) Ruth Pit	254	250	1	3																
18) Ruth Dump	327	216	110	1																
19) Ruth Dump Soil Stockpile	11.0	11.0																		

Table 3-5 (Continued)

Unit	Total Acres	Associations																		
		822	100	108	119	124	179	185	286	296	321	436	480	484	486	851	1201	1202	1260	1800
20) Kimbley/Wedge Pit	87	84		3																
21) Copper Heap Leaching Facilities	367	312		6		48.5														
22) SX/EW Facility	29	8			21															
23) Water Line	21	10		0.5		4			1		2.5					3				
Totals	5282	2177.5	147	40.5	21	122.5	227	16.6	1	0.6	2.5	375.5	14	208.8	5.8	44	677.8	103	1076	23

[1] Transmission line acreages are not included since it is anticipated that no stockpiling of soils would be necessary for reclamation. Small discrepancies in acreage totals are due to rounding.

Source: SMI, ENSR.



ROBINSON PROJECT

MAP 3-6
SOILS
ROBINSON MINING DISTRICT

stony, or cobbly. Approximately 26 percent of the soil associations have salvageable soil depths of less than 20 inches.

Although soils occurring on relatively level surfaces in the proposed mine area generally have slight to moderate hazards for water and wind erosion, approximately 244 acres have the potential for high erosion at slopes of 14 percent or greater. Soils located in drainage areas, fans, or piedmonts account for about 27 percent of the soils found in the mine area and generally have loamy textures to depths greater than 30 inches. These soils are generally found in the proposed tailings disposal area.

The majority of the soils found in the proposed mine area have low salinity, a low percentage of organic matter, and moderate to strong alkalinity.

Soil suitability evaluations for the proposed mine area are summarized in Table 3-6 and indicate the average depth of salvageable growth medium estimated for each soil association. Salvageable depths for reclamation purposes were determined from physical and chemical characteristics of soils that would be disturbed by mining activities. These depths were assumed to be restricted to material lying above duripan/caliche layers, material lying above decomposed bedrock layers, and material not characterized as having extremely gravelly, stony, or cobbly textures. Soil evaluations indicated that seven of the soil associations within the proposed mine area may contain areas with soils unsuitable for use in reclamation (Table 3-6). The remaining associations exhibit suitable salvage depths ranging from 8 to 70 inches. Additional information on the amounts of growth medium available for salvage is discussed in Section 4.1.3.

Soils crossed along the proposed transmission line route running northeast of the proposed mine area are generally similar to those encountered in the proposed mine area and include the following associations:

- Zimbob-Palinor (map unit 119)
- Tecomar-Pookaloo (map unit 124)
- Tulase-Pern (map unit 179)
- Pyrat-Linoyer (map unit 189)
- Palinor-Shabliss (map unit 286)
- Palinor-Urmafot (map unit 296)
- Heist-Tulase (map unit 351)
- Cassiro (map unit 411)
- Pioche-Cropper-Upatad (map unit 486)
- Pits-Dumps Complex (map unit 822)
- Grink-Onkeyo-Xine (map unit 851)
- Devilsgate-Duffer-Kunzler (map unit 911)
- Shabliss-Pyrat (map unit 1141)

Table 3-7 indicates the general location of the associations along the proposed transmission line, the miles each soil association crossed by the transmission line, and whether any significant hazards or limitations, such as high flash flood potential or high wind or water erosion potential, exist for that association.

The majority of the soils found along the transmission line have severe limitations on reclamation, excavation, and road construction (USDA-SCS 1991). These limitations include shallow depths to bedrock, extremely rocky soils, flooding, the potential for banks to cave, or the presence of cemented duripans or caliche layers.

3.4 VEGETATION

The area of affected vegetation consists of lands that would be disturbed or occupied by facilities and activities included in the Proposed Action, including related activities (Map 3-7). Additional areas, such as the region downstream from the proposed tailings disposal area, were also

Table 3-6

Summary of Soil Suitability Evaluations in the Proposed Mine Area

Map Unit Number	Soil Association Name	Average Soil Depth (inches)	Average Salvageable Growth Medium Depth[1] (inches)	Growth Medium Texture	Limiting Factors[2]
100	Pookaloo-Cavehill-Rock Outcrop	19-27	19-27	Very gravelly loam to very gravelly silt loam.	Moderate water erosion hazard; moderate alkalinity.
108	Pookaloo-Tecomar-Rock Outcrop	18-19	0-19	Very gravelly loam to very gravelly silt loam.	Extremely gravelly to cobbly loam in Tecomar soil; rock outcrop; moderate water erosion hazard; strong alkalinity in Tecomar soil.
119	Zimbob-Palinor	12-60	12-18	Very gravelly loam to extremely gravelly sandy loam.	Moderately to strongly alkaline; duripan below 18" in Palinor soils; extremely gravelly sandy loam in Palinor below 30"; moderate water erosion potential in Palinor soils.
124	Tecomar-Pookaloo	15-50	0-19	Very gravelly loam to very gravelly silt loam.	Extremely gravelly to cobbly loam in Tecomar soils; moderate water erosion; moderate alkalinity in Pookaloo soils; moderate to strong alkalinity in Tecomar soils.
179	Tulase-Pern	60	60	Silt loam.	Moderate alkalinity in Pern soils; moderate to strong alkalinity in Tulase soils. High erosion potential on slopes >14.5% in Tulase soils.
185	Pyrat-Heist-Tulase	60-70	39-70	Silt loam, gravelly sandy loam, very gravelly sandy loam, very gravelly loam , very gravelly sandy loam.	Strong alkalinity in Heist soils; extremely gravelly loamy sand below 39" in Pyrat soils. High erosion potential on slopes >14.5 % in Heist and Tulase soils.
286	Palinor-Shabliss	13-60	10-13	Gravelly loam to extremely gravelly, sandy loam.	Duripan below 13" in Shabliss, 18" in Palinor. Extremely gravelly sandy loam in Palinor soils. Moderately alkaline soils in Shabliss.
296	Palinor-Urmafot	60	10-14	Gravelly loam to very gravelly loam.	Extremely gravelly loam below 10" in Palinor; duripan below 14" in Urmafot.
321	Palinor	30-60	10	Gravelly loam to extremely gravelly loam.	Duripan below 18"; extremely gravelly loam between 10-18"; moderately alkaline soil.

Table 3-6 (Continued)

Map Unit Number	Soil Association Name	Average Soil Depth (inches)	Average Salvageable Growth Medium Depth[1] (inches)	Growth Medium Texture	Limiting Factors[2]
436	Pookaloo-Hyzen-Cavehill	12-27	0-27	Very gravelly loam to very gravelly silt loam.	Extremely stony loam in Hyzen soils; moderate water erosion hazard and alkalinity.
480	Pioche-Cropper	15-16	0-4	Very cobbly loam.	Extremely stony loam in Pioche; extremely gravelly sandy clay loam below 4" in Cropper soils; moderate water erosion potential in Cropper soils.
484	Pioche-Birchcreek-Cropper	15-28	0-28	Very cobbly loam to very cobbly clay loam.	Extremely stony loam in Pioche soils; extremely gravelly sandy clay loam below 4" in Cropper; moderate water erosion potential in Cropper.
486	Pioche-Cropper-Upatad	15-50	0-15	Very cobbly loam to very gravelly silt clay loam.	Extremely gravelly below 4" in Cropper; extremely stoney at 0-3" in Pioche.
822	Pits-Dumps Complex	0-60	--	Fragmental (waste rock)	No soils.
851	Grink-Onkeyo-Xine	15-35	15-35	Very gravelly loam, very cobbly loam, very stony loam, very gravelly silt loam, very cobbly silty clay loam.	Moderate alkalinity; moderate water erosion hazard for Grink soils.
1201	Biken-Orr	30-60	12-60	Gravelly sandy loam , gravelly sandy clay loam, very gravelly fine sandy loam.	Decomposed sandstone below 18" in Biken; strong alkalinity in Biken soils.
1202	Biken-Urmafot	30-60	12-18	Very gravelly fine sandy loam, very gravelly loam, gravelly loam.	Decomposed sandstone below 18" in Biken; strong alkalinity in Biken soils; moderate alkalinity in Urmafot soils; duripan below 8-9" in Urmafot soils.
1260	Urmafot	60	8-9	Gravelly loam to very gravelly loam.	Duripan below 8-9"; moderate alkalinity.
1800	Pookaloo-Onkeyo-Cavehill	15-27	15-27	Very gravelly loam, very gravelly silt loam, very cobbly silty clay loam.	Moderate alkalinity; moderate water erosion potential in Pookaloo and Cavehill soils.

[1]Growth medium to be salvaged for use in reclamation was assumed to be restricted to material lying above caliche/duripan layers, material lying above decomposed bedrock layers, and material that was not extremely gravelly, stony, or cobbly. Growth medium depth ranges correspond to each specific soil series within an association. Salvageable growth medium depths are average maximum obtainable depths based upon limiting factors in each soil unit.

[2] All soils, with the exception of Cavehill, have less than 5% organic material. Cavehill has 4-6%.

Source: USDA-SCS 1991.

Table 3-7

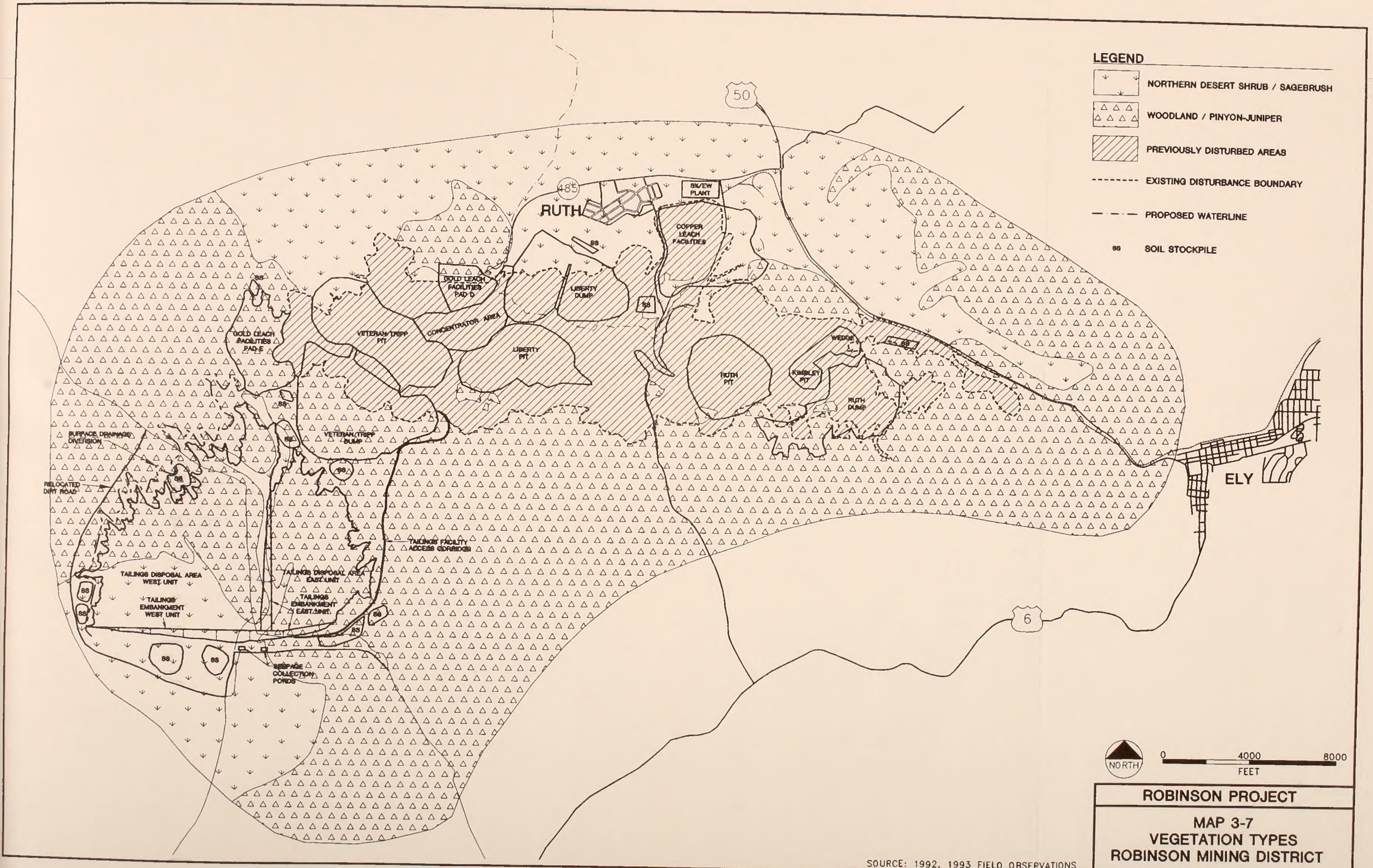
Transmission Line Soil Associations, Mileages, Acres Affected, Restrictions, and Locations[1]

Association	Miles Crossed	Restrictions[2]	Location Along Transmission Line
Zimbob-Palinor (119)	1.33	Cemented pan, cutbank caving, shallow depth to bedrock, steep slopes	East and west Highway 50 borders
Tecomar-Pookaloo (124)	0.41	Shallow depth to bedrock, steep slopes	East of Highway 50
Tulase-Pern (179)	0.08	Frost action, low strength	Highway 50
Pyrat-Linoyer (189)	0.66	Caving cutbanks, Frost action	East of Pole Line Road
Palinor-Shabliss (286)	1.33	Cemented pan, caving cutbanks	North of Ruth
Palinor-Urmafot (296)	0.89	Cemented pan, steep slopes, cutbank caving	Eastern Pinyon/Juniper (PJ) Boundary, Pole Line Road
Heist-Tulase (351)	0.41	None	East of Pole Line Road
Cassiro (411)	0.45	None	Robinson Substation
Pioche-Cropper-Upatad (486)	1.22	Shallow depth to bedrock, steep slopes	Eastern PJ area (Garnet Fields Rockhound Area)
Pits-Dumps Complex (822)	0.12	Large stones, steep slopes	Mine area
Grink-Onkeyo-Xine (851)	0.66	Shallow depth to bedrock, steep slopes	North of Robinson Substation
Devilsgate-Duffer-Kunzler (911)	4.07	Occasional flooding March through June, cutbank caving, shallow depth to watertable (5 to 6 feet)	Gonder Substation to about 1 mile east of intersection with Pole Line Road
Shabliss-Pyrat (1141)	2.04	Cemented pan, cutbank caving, frost action.	Pole Line Road intersection
Total	13.67		

[1]Disturbance acreages by soil type are not presented since no stockpiling of soils is anticipated.

[2]Severe restrictions on shallow excavations, construction, reclamation.

Source: USDA-SCS 1991.



ROBINSON PROJECT

MAP 3-7
VEGETATION TYPES
ROBINSON MINING DISTRICT

assessed if the potential for indirect or low-probability impacts on such areas existed.

Vegetation in the mine area is associated with the pinyon-juniper woodland and northern desert shrub/sagebrush vegetation types. Portions of the mine area also include areas that have been disturbed during previous mining activities.

Pinyon-juniper woodland is the predominant vegetation type in the mine area and primarily occurs on hillsides and mountaintops. This vegetation type is characterized by a dominant overstory consisting of single leaf pinyon pine and Utah juniper and a subdominant understory consisting of various shrub and herbaceous species. Shrub species associated with this vegetation type include curlleaf mountain mahogany, bitterbrush, snowberry, Mexican cliffrose, serviceberry, and rubber rabbitbrush. Within the pinyon-juniper type, big sagebrush is more abundant in the understory where soils are deeper, whereas black sage is more abundant in areas with shallower soils. Herbaceous understory species include Sandberg bluegrass, Idaho fescue, bluebunch wheatgrass, thickspike wheatgrass, Great Basin wildrye, needle-and-thread, Indian ricegrass, bottlebrush squirreltail, scarlet globemallow, penstemon, and Indian paintbrush.

The northern desert shrub/sagebrush type occurs in valley bottoms and alluvial fans adjacent to washes. Big sagebrush is dominant on deeper soils and may be accompanied by winterfat, four-wing saltbush, Mormon tea, spiny hopsage, and rubber rabbitbrush. Black sage is dominant on shallower soils and is associated with Mormon tea, winterfat, four-wing saltbush, and rabbitbrush. Additional understory species common to all soils are needle-and-thread, Great Basin wildrye, bottlebrush squirreltail, Sandberg bluegrass, Indian ricegrass, scarlet globemallow, and several penstemon species.

The area surrounding current mining operations is mostly pinyon-juniper woodland (Map 3-7). Juniper and single leaf pinyon pine are generally equally abundant. Curlleaf mountain mahogany is also abundant at the higher elevations surrounding the mine. Along the southern portion of the mine area, the overstory of pinyon pine and juniper limits the development of the understory vegetation. Sagebrush communities are more abundant at lower elevations in the northern and southwestern portions of the mine area.

The southern and central portion (approximately 40 percent) of the tailings disposal area is dominated by vegetation associated with the northern desert shrub/sagebrush type, and the northern portion (approximately 60 percent) of the area is dominated by vegetation associated with pinyon-juniper woodland. Utah juniper and single leaf pinyon pine are dense in most areas and the understory vegetation is very sparse. Plant communities dominated by sagebrush occur along Giroux Wash and extend south to the low hillsides located in the southwestern portion of the area.

Portions of the mine area have been previously disturbed by mining activities. The majority of these disturbed areas are relatively devoid of vegetative cover. However, some plant species have become established in the nutrient-deficient mine waste rock and heavily disturbed areas. Plant species that are established in these disturbed lands include rubber rabbitbrush, winterfat, antelope bitterbrush, big sagebrush, Russian thistle, halogeton, and Indian ricegrass. Vegetation along the proposed access roads and the soil stockpiles is associated with the pinyon-juniper woodland and northern desert shrub/sagebrush vegetation types. Plant species that occur along the access roads and at the soil stockpiles are similar to those plant species that occur throughout the remainder of the mine area.

The proposed transmission line route traverses three areas that support vegetation associated with the northern desert shrub/sagebrush type and two areas that support vegetation associated with the pinyon-juniper woodland type. The majority of the transmission line route traverses vegetation characteristic of the northern desert shrub/sagebrush type. Plant species associated with this vegetation type that occur along the transmission line route include big sagebrush, rubber rabbitbrush, winterfat, broom snakeweed, halogeton, and Indian ricegrass. Portions of the transmission line route that traverse pinyon-juniper woodland are located approximately 0.5 mile north of the Robinson substation and adjacent to the Garnet fields. Plant species that occur along these portions of the transmission line route include single leaf pinyon pine, Utah juniper, big sagebrush, rubber rabbitbrush, scarlet globemallow, penstemon species, Indian ricegrass, Sandberg bluegrass, and needle-and-thread.

Wood products generated from the pinyon-juniper vegetation type are discussed in Section 3.13.2.2.

3.5 RIPARIAN AND WETLAND AREAS

The mine area does not contain wetlands. However, small riparian areas occur within the mine area as depressional areas that periodically collect pond water during periods of heavy rainfall, snowmelt, or seepage from the waste rock disposal areas. These areas support a prevalence of hydrophytic species. However, the soils in these seasonal wet areas consist of waste rock, which lacks the characteristics indicative of hydric soils. These riparian areas are characterized by a low species diversity and a low to moderate functional value.

Two riparian areas (totaling 4.5 acres) occur within the mine area: one north of the Sunshine Dump and the other at Deep Ruth Shaft. The area at the Sunshine Dump is composed of a 0.2-acre parcel of isolated rush/sedge assemblage. This area supports a prevalence of hydrophytic vegetation and receives water seepage from an adjacent waste rock material area and during periods of heavy rainfall or snowmelt. The riparian area near the Deep Ruth Shaft covers approximately 4.3 acres; a small, dense 0.4-acre stand of sandbar willow is located adjacent to the mine shaft and a rush/sedge community of 3.9 acres extends approximately 3,600 feet and is approximately 70 feet wide. This community is also intersected by a narrow drainage channel. This channel historically received dewatering runoff from the Deep Ruth Shaft operations. ***Since the end of mining operations in the late 1970s, no water has been present except during heavy runoff, and the riparian vegetation is in the process of reverting to upland species.*** The riparian area adjacent to the Deep Ruth Shaft is also bounded by a railroad grade.

The source of water in these areas is surface runoff. Records for the Deep Ruth Shaft area indicate groundwater levels of 40 feet below the surface. Hydrologic characteristics at the Deep Ruth Shaft have been modified by mining activities (i.e., discharge of dewatering effluent from the shaft during active mining). Hydrophytic vegetation may have developed during mining operations when water was discharged from the mine into the channel. Mining records from the 1930s through the 1960s regarding dewatering of the Deep Ruth Shaft were reviewed and indicate that during construction, pumping rates from 15 gpm to 10,000 gpm were required to dewater the mine. The shaft was completed in 1954 and a pumping rate of 3,600 gpm was required for dewatering the mine workings.

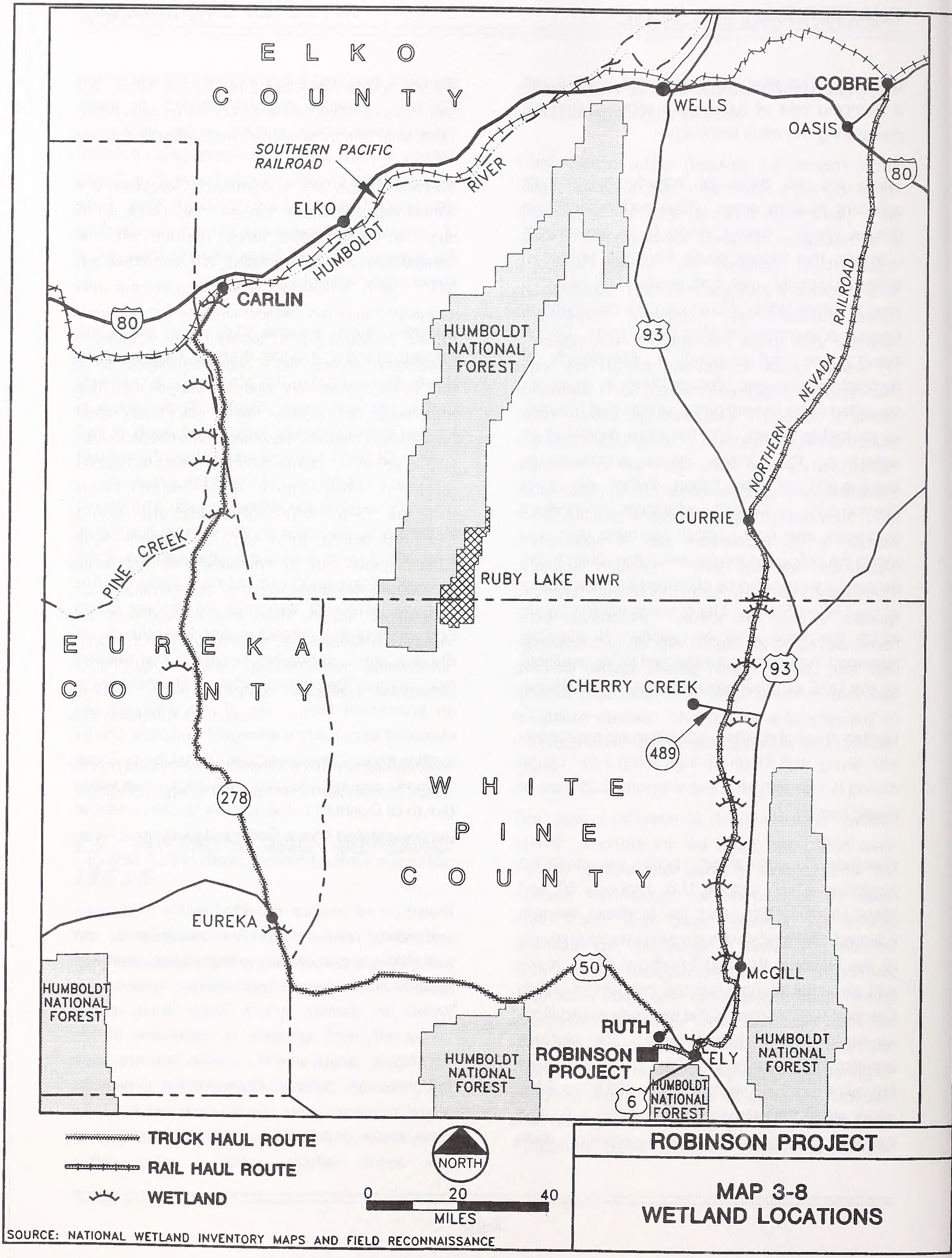
There are no perennial aquatic habitats or adjacent riparian areas within and adjacent to Giroux Wash. Giroux Wash is an intermittent drainage that drains south from the proposed tailings disposal area and waste rock disposal area to Jake's Wash. Flows typically occur during periods of snowmelt or after heavy rains. Giroux Wash does not support a prevalence of hydrophytic species. Giroux Wash is, however, classified as an intermittent drainage and tributary to navigable waters, and therefore regulated as waters of the United States according to Section 404 of the Clean Water Act (see Section 3.2). Several additional intermittent drainages also occur within the mine area and along the proposed transmission line route; these drainages would also be classified as other waters of the United States. The process mining ponds within the mine area are subject to eventual reclamation and are not expected to be regulated by the COE as other waters of the United States.

Limited areas of riparian vegetation are associated with Murry and Riepe Springs (Map 3-2). Lyons Spring is currently dry, but supports 0.25 acre of mesic habitat.

Wetlands occur along both transportation corridors, which include U.S. Highway 50 and State Highway 278, and the Northern Nevada Railroad. Wetlands were identified through review of the National Wetland Inventory (NWI) maps and an aerial reconnaissance conducted during October 1993. Some of the wetlands would likely be designated as jurisdictional. The highway corridor traverses or parallels 7 wetland areas (10 miles total); 10 wetland areas (19 miles total) occur along the railroad corridor (Map 3-8). The wetlands along the highway corridor were classified as palustrine emergent wetlands by the USFWS. Species typically present in these wetland areas include sedges, rushes, bulrushes, cattails, willows, dock, and several grass species. Wetland areas are concentrated along Pine Creek, Henderson Creek, and the Humboldt River. Four of the seven wetland areas are not traversed by the highway; however, these wetland areas occur immediately west of the highway.

Sensitive water sources that occur along the railroad corridor include Steptoe Slough, Duck Creek, Bassett Lake, the area north into Cherry Creek, Goshute Lake, Shafter Knoll, which is located within Goshute Valley, and north of Raif Siding. Of the 10 wetland areas along the railroad corridor, 6 are located along Duck Creek, which generally parallels the railroad grade. The largest wetland area traversed by the railroad corridor is west of the town of McGill at the interface of the historic tailings pond and railroad grade. At this location, extensive wetlands are present along both sides of the railroad grade. Near the city of Ely is a small, spring-fed wetland. The railroad also crosses the western edge of Goshute Lake, an ephemeral lake. Six of the wetlands are classified as palustrine emergent wetlands, one as riverine intermittent streambed (near Cherry Creek Station), one as palustrine emergent/open water (south of Goshute Lake), one as lacustrine littoral unconsolidated shore (Goshute Lake), and one as numerous wetland basins (north of Raif Siding).

Based on information provided by the NWI maps and aerial and ground reconnaissance, no wetlands are present along the transmission line route.



ROBINSON PROJECT

MAP 3-8
WETLAND LOCATIONS

3.6 WILDLIFE AND FISHERIES RESOURCES

As stated in the vegetation description, the habitat surrounding the existing mine is dominated by pinyon/juniper woodland with interspersed northern desert shrub/sagebrush. The transportation corridors and transmission line route also cross these vegetation types. Rocky outcrops are scattered throughout the area, and perennial and intermittent drainages with small, natural springs provide limited surface water in the region. Since available water is a limiting factor, riparian and wetland habitat supports a higher population diversity and density of wildlife species than any other habitat type occurring in the region.

Surface water resources within the immediate mine area are limited to the large mine pits and small, intermittent drainage areas. Other intermittent drainages and localized perennial springs occur in the region, as described in Section 3.2. ***The 4.5 acres of riparian vegetation located within the mine area sustain only limited wildlife use. The original riparian zones along Fisher Canyon were created by water pumping and discharge at Deep Ruth Shaft for previous mining operations (see Section 3.5).*** Although no perennial water source occurs in the immediate mine area, the pinyon/juniper habitat provides structural diversity for a number of wildlife species and typically supports a higher percentage of species than the surrounding shrub community. These coniferous stands may also provide important habitat for a number of bird species, particularly during the winter season, as both thermal cover and food sources (Sieg 1991). Terrestrial wildlife that inhabit the pinyon/juniper and shrub communities include a variety of big game, upland game, and nongame species.

Big game species common to the Ely, Elko, and Battle Mountain Districts include mule deer, pronghorn, and elk. Of these species, only mule deer consistently inhabit the mine area, although occasionally elk may be present (BLM 1987; Baughman 1993). These species use the mine area on a yearlong basis, depending on the availability of water in the summer and the snow conditions in the winter. Deer periodically use Veteran Pit as a water source. Although key mule deer winter ranges occur to the north and west of the mine area (BLM 1987), the pinyon/juniper habitat immediately surrounding the mine is only considered marginal winter range for deer. Secondary migration corridors between seasonal ranges also intersect this pinyon/juniper habitat (Baughman 1993).

The existing railroad corridor (see Map 2-3) intersects pronghorn yearlong range (BLM 1987), with pronghorn use being seasonally heavy in specific areas (NDOW 1993). Mule deer also occur along this corridor, particularly along the southern portion during the winter season and between the Schell Creek and Cherry Creek Ranges (see Maps 1-1 and 1-2) (NDOW 1993). Areas of deer summer, winter, and yearlong ranges are intersected by the existing highway corridor (BLM 1987). Mule deer have several migratory crossings along Highway 278 and U.S. 50. Additional movement of deer occurs along U.S. 50, particularly near Little Antelope Summit along the White Pine Range, where Nevada's largest deer herd, the Ruby Mountain Herd, typically winters (NDOW 1993). The proposed transmission line corridor (see Map 2-2) would cross portions of mule deer winter range (BLM 1987).

Pronghorn also occupy portions of Newark Valley along the eastern side of the Diamond Mountains, which are crossed by U.S. 50. Jakes Valley has been selected as a future reintroduction area for pronghorn, possibly in 1994 to 1995 (NDOW 1993).

Upland game species occurring near the mine include sage grouse, chukar, gray (Hungarian) partridge, and mourning dove (BLM 1987). Sage grouse are associated with sagebrush habitat; important habitat components for sage grouse include mesic and riparian zones and sagebrush ridges and benches. Chukar are associated with riparian zones, mesic areas, and rugged slopes or outcrops. Gray partridges are often found along riparian drainages and adjacent terraces. Important habitat features for mourning doves include riparian zones, particularly those areas containing trees or shrubs large enough for nesting.

The area immediately surrounding the mine is expected to support mourning dove, but the lack of water sources and the limited sagebrush habitat restrict occurrences of other upland game birds. All four species likely occur within the appropriate habitat types along the transportation corridors. Sage grouse leks or breeding grounds have been recorded in specific areas of the region (BLM 1987). One lek is located within 0.9 mile of the proposed transmission line corridor. Active leks also are located west of the railroad route near its junction with the main line at Cobre. A small sage grouse population is established on both sides of Highway 278 near Pine Fields, which is located approximately 5 miles north of Garden Pass along Henderson Creek and its tributaries. Grouse movement across the highway has been documented in this area and farther south near Garden Pass (NDOW 1993). Brooding gray partridges have been reported in Steptoe Valley south of Cherry Creek (BLM 1987).

Other game species inhabiting the project area include the bobcat, Nuttall's cottontail, and pygmy rabbit (BLM 1985b; BLM 1987). Although the pygmy rabbit is considered a game species in Nevada, it is also a Federal candidate species, Category 2 and is discussed further in Section 3.7. Aquatic furbearers, such as mink, river otter, beaver, and muskrat, are found on the major waterways in the region (e.g., Humboldt River) south of Carlin (BLM 1985b), but would not be expected at the mine site.

Waterfowl and shorebird use of the project region occurs on large bodies of water (e.g., Ruby Lake National Wildlife Refuge), as well as on small wetlands, area stock ponds, playa lakes, and natural springs. Depending on the season and the species, area water sources within Steptoe, Railroad, White River, Butte, Long, and Newark Valleys may provide important breeding, resting, and foraging habitat for both resident and migratory waterfowl within the Great Basin (BLM 1987). The existing pit lakes at the mine site sporadically attract common species of waterfowl, particularly during migration.

The railroad corridor crosses important nesting and foraging areas for both waterfowl and shorebird species along Steptoe Slough, Bassett Lake, and Duck Creek (see Map 1-2); north to Cherry Creek; and through areas of Steptoe and Goshute Valleys, depending on precipitation. The wetlands associated with Duck Creek can be substantial during periods of high precipitation (NDOW 1993). Along the highway corridor, Pine Valley supports wetlands near the confluence with the Humboldt River (NDOW 1993). Migratory use of these wetlands is extensive, including use by sandhill cranes. Pine Meadows also contains wetland areas, which are bisected by Highway 278 (NDOW 1993). No water sources are located along the proposed transmission line corridor.

The diverse habitats found in the valley systems, mountain ranges, and riparian drainages surrounding the mine and its associated corridors also support a variety of nongame species. A number of small mammals occupy the project region, including the Townsend's ground squirrel, least chipmunk, and Great Basin pocket mouse. Bat species utilize a variety of habitat types within the project area that are known to support bat hibernacula, nursery colonies, and bachelor roosts. Bats are known to occupy abandoned mine shafts, adits, and other underground openings in the region. Bat species that may occur in the region include the little brown bat, pallid bat, big brown bat, silver-haired bat, hoary bat, Townsend's big-eared bat, western pipistrelle, California myotis, long-eared myotis, and long-legged myotis (Bradley 1994). No bat concentrations have been documented within the mine ***property owned by RMLP or managed by BLM, although they do occur adjacent to the mine area.***

Nongame birds include such raptors as the red-tailed hawk, ferruginous hawk, prairie falcon, American kestrel, northern harrier, golden eagle, turkey vulture, great-horned owl, short-eared owl, and burrowing owl (NDOW 1993; BLM 1987). The rough-legged hawk occurs in the region during the winter season (NDOW 1993). Passerines or perching birds include the pinyon jay, raven, western meadowlark, northern flicker, mountain chickadee, dark-eyed junco, green-tailed towhee, Brewer's sparrow, and chipping sparrow (BLM 1987; Medin 1990).

Area reptiles and amphibians include the northern sagebrush lizard, collared lizard, Great Basin gopher snake, Great Basin rattlesnake, and Great Basin spadefoot (BLM 1987, 1992b). A number of these nongame species depend on the limited riparian habitat associated with area streams and springs, which is particularly important to certain species' existence.

To characterize the birds occurring within Giroux Wash south of the mine area, the BLM conducted bird surveys in April, May, June, and August of 1993. A number of passerines and raptors were recorded during these survey periods. Although many species were observed exhibiting breeding behavior (e.g., courtship flights, territorial defense), documented nesting was limited. It is assumed that many of the species recorded during these site visits breed in the area. A list of bird species observed during these surveys is presented in Table 3-8. This list, however, is representative of species that inhabit the Giroux Wash area and does not include all species likely to breed within the pinyon/juniper woodland and shrub/sagebrush communities.

Because of the lack of perennial water bodies, no fisheries occur on or adjacent to the mine site or along the proposed transmission line corridor. Fisheries do occur along the railroad route and highway corridor. Tailings Creek, which travels adjacent to the railroad grade west of McGill, supports game fish, including rainbow, brook, and tiger trout. Bassett Lake contains warm water fisheries with northern pike and largemouth bass. Northern pike also occur in Duck Creek near McGill (BLM 1987; NDOW 1993). Fisheries along the highway route include the Humboldt River and Pine Creek. Prominent largemouth bass and limited smallmouth bass fisheries are associated with the Humboldt River (Johnson 1993). Fisheries data for Pine Creek are limited; the most recent data are from 1954. At that time species of fish recorded included dace, shiners, suckers, and chubs. The Lahontan tui chub likely occurs in Pine Creek and is discussed further in Section 3.7 (NDOW 1993).

As noted in Section 3.2, five natural springs occur in the vicinity of the Robinson mine, including Lyons, Ragsdale, Giroux, Riepe, and Murry Springs. Lyons Spring supports approximately

Table 3-8

Bird Species Observed During Giroux Wash Surveys Conducted April-August 1993

Species Common Name	Species Common Name
American kestrel	Pinyon jay
Sharp-shinned hawk	Scrub jay
Cooper's hawk	Clark's nutcracker
Common raven	Black-billed magpie
Loggerhead shrike	Mountain chickadee
Mourning dove	Black-capped chickadee
Red-naped sapsucker	Plain titmouse
Northern flicker	Bushtit
Mountain bluebird	American robin
Chipping sparrow	Western wood pewee
Fox sparrow	Dusky flycatcher
Rufous-crowned sparrow	Dark-eyed junco
Grasshopper sparrow	Red crossbill
Brewer's sparrow	MacGillivray's warbler
Cassin's finch	Humingbird spp.

0.25 acre of mesic habitat, although this spring is currently dry. Ragsdale Spring is a seep that maintains a small mesic meadow, and mule deer are known to consistently use this area. No information is currently available for Giroux Springs. Riepe Spring is located on Forest Service land approximately 3 miles southeast of the mine. This spring is important for both mule deer and elk. Minimal riparian habitat is associated with this area (Swenson 1994). Murry Springs supports a riparian woodland corridor that is used by a variety of bird and mammal species. West Camp Spring is a limited well site and is not important for wildlife use.

3.7 THREATENED, ENDANGERED, AND OTHER SENSITIVE SPECIES

3.7.1 Wildlife

The project region contains a variety of habitat types that may be used by sensitive wildlife resources. However, relatively few sightings of Federally threatened or endangered, Federal candidate, or state sensitive species have been recorded near the mine site and its ancillary facilities. Table 3-9 lists the Federally listed and Federal candidate species that were considered for this project. The majority of these species were originally identified by the USFWS in its revised species list for the project, dated October 20, 1993 (File Number 1-5-93-SP-357). The White River wood nymph butterfly and Schell Creek mountainsnail, which were not included in this species list, were added to the analysis, based on Federal and state concerns.

The American peregrine falcon (*Falco peregrinus anatum*) is Federally endangered. Breeding peregrines may occur in the Ruby Mountains, where the NDOW has released 27 birds over a period of 7 years on the Ruby Lake National Wildlife Refuge in an effort to re-establish a breeding population. However, this species would primarily occur as a migrant in both district areas associated with the project. Peregrines have been recorded in southern Steptoe Valley and Duck Creek Basin located east of McGill (BLM 1987).

The bald eagle (*Haliaeetus leucocephalus*) is ***proposed to be downlisted to*** Federally ***threatened***. Successful bald eagle nesting in Nevada has not been recorded within the last century (USFWS 1993). Wintering eagles typically migrate into the ***Ely, Elko, and Battle Mountain D***istricts in November and December and depart as late as May (BLM 1987; USFWS 1993***; NDOW 1993***). Bald eagles are associated not only with open water areas for foraging, but are also tied closely to upland habitats that support large jackrabbit populations (USFWS 1993). Bald eagle use is limited on and near the mine area, but is considered moderate along specific areas of the transportation corridors. A winter concentration of eagles occurs in the Bassett Lake and Steptoe Slough area north to Cherry Creek. Five to six wintering eagles may annually occupy this area, depending on environmental conditions.

Two Federally listed fish species that may occur in the project area were identified by the USFWS as being highly sensitive. The White River spinedace (*Lepidomeda albivallis*) is Federally listed as endangered and is one of the four native fishes to have historically occupied the stream and spring habitats of northern White River Valley (USFWS 1992). Six of the seven historic populations of the White River spinedace have been destroyed, and the one remaining population has declined, due to habitat alteration and the introduction of non-native fish species (USFWS 1984, 1992, 1993). Designated critical

Table 3-9

Threatened, Endangered, and Candidate Wildlife Species

Common Name	Scientific Name	Federal Status[1]	Project Component[2]
BIRDS			
American peregrine falcon	*Falco peregrinus anatum*	E	A
Bald eagle	*Haliaeetus leucocephalus*	*E*[3]	RR, HW, TL
Northern goshawk	*Accipiter gentilis*	C2	A
Ferruginous hawk	*Buteo regalis*	C2	RR, HW, TL
Loggerhead shrike	*Lanius ludovicianus*	C2	A
Black tern	*Chlidonias niger*	C2	RR, HW
Long-billed curlew	*Numenius americanus*	*C3*	RR, HW
White-faced ibis	*Plegadis chihi*	C2	RR, HW
Western snowy plover	*Charadrius alexandrinus nivosus*	C2	RR, HW
Western least bittern	*Ixobrychus exilis hesperis*	C2	RR, HW
Mountain quail	*Oreortyx pictus*	C2	N
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	C2	N
MAMMALS			
Spotted bat	*Euderma maculatum*	C2	A
Pacific western big-eared bat	*Plecotus townsendii townsendii*	C2	A
Pygmy rabbit	*Sylvilagus idahoensis*	C2	A
Sierra Nevada red fox	*Vulpes vulpes necator*	C2	A
North American wolverine	*Gulo gulo luscus*	C2	N
FISH			
White River spinedace	*Lepidomeda albivallis*	E	M[4]
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	T	HW
White River desert sucker	*Catostomus clarki intermedius*	C2	M[4]
Meadow Valley Wash desert sucker	*C. c.* ssp.	C2	M[4]
Preston White River springfish	*Crenichthys baileyi albivallis*	C2	M[4]

Table 3-9 (Continued)

Common Name	Scientific Name	Federal Status[1]	Project Component[2]
Moorman White River springfish	*C. b. thermophilus*	C2	M[4]
White River speckled dace	*Rhinichthys osculus* ssp.	C2	M[4]
Meadow Valley Wash speckled dace	*R. o.* ssp.	C2	N
Relict dace	*Relictus solitarius*	C2	RR
Fish Creek Springs tui chub	*Gila bicolor euchila*	C2	HW
Lahontan Creek tui chub	*G. b. obesa*	C2	HW
INVERTEBRATES			
Baking Powder Flat blue butterfly	*Euphilotes battoides* ssp.	C2	N
Nevada viceroy	*Limenitus archippus lahontani*	C2	HW
Steptoe Valley crescentspot butterfly	*Phyciodes pascoensis*	C2	RR
White River wood nymph butterfly	*Cercyonsis pegala*	C2	M[4], RR
Schell Creek mountainsnail	*Orehelix nevadensis*	C2	RR

[1]E = Federally Endangered: species that are in danger of extinction throughout all or a significant portion of their ranges.
T = Federally Threatened: species that are likely to become endangered within the foreseeable future through all or a significant portion of their ranges.
C2 = Federal Candidate - Category 2: species that may be listed as federally threatened or endangered, but conclusive biological data to support these listings are not currently available.

[2]Project components the species may be associated with.
M = mine area
RR = railroad corridor
HW = highway route
TL = transmission line route
A = area-wide, or the potential to occur throughout the area within the appropriate habitat types
N = no project components are associated with this species

[3]*Proposed to be downlisted to federally threatened on July 12, 1994. Decision is pending.*

[4]Potential occurrence south of the mine area, particularly within the White River drainage.

habitat encompasses Preston Big Spring, Lund Spring, Flag Springs, and their associated outflows south of the mine near the towns of Preston and Lund. In addition to these critical habitat areas, essential habitat for the species was also designated and included perennial portions of the Upper White River and Ellison Creek, Cold Spring, Nicholas Spring, and Arnoldson Spring (USFWS 1992). Currently, the spinedace is limited only to the northern spring of the Flag Springs complex, which is located on Nevada's Wayne E. Kirch Wildlife Management Area in Nye County (USFWS 1992, 1993). The Flag Springs population is precariously low and was estimated to contain fewer than 50 individuals in 1991 (USFWS 1992). This population is located approximately 50 miles south of the proposed tailings disposal facility (USFWS 1984, 1992).

The Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) has been recognized for its large size since 1870 (Behnke 1979). The subspecies is Federally listed as threatened and currently inhabits approximately 12 percent of its probable historic range within the Humboldt River Basin. It occurs in less than 300 miles of the previous 1,000 miles of fishable streams located in the basin (NDOW 1982). The Lahontan cutthroat trout population nearest to any of the project components would possibly be in the upper reaches of Trout Creek, which originates in the Pinon Range, approximately 3 to 4 miles east and upgradient of Highway 278 directly south of Carlin. No Lahontan cutthroat trout are known to occur in Pine Creek or in the Humboldt River near the highway crossing.

A number of Federal candidate-Category 2 species also may occur in the region. Category 2 indicates that the species is a candidate for Federal listing as threatened or endangered, but conclusive biological evidence to support the listing is not currently available.

The Northern goshawk (*Accipiter gentilis*) is an area resident and may be observed in mountainous terrain near 9,000 feet during the warmer months and in the lower foothill and valley habitats during the winter. This species primarily nests within deciduous woodlands and would typically occur within pinyon/juniper habitat only during migration (Baughman 1993). Although goshawks are known to frequent the region, there are no known nesting sites on or adjacent to the mine area or along the transportation corridors or transmission line route. Therefore, goshawk use of these areas would likely be limited to occasional occurrences.

The ferruginous hawk (*Buteo regalis*) is a common breeder in the Ely and Elko Districts (USFWS 1984). The NDOW identified the Egan Resource Area as the most important resource area within the state for breeding ferruginous hawks. This species nests on trees, promontory points, cut banks, or on the ground; preferred breeding habitat is scattered juniper trees at the interface between pinyon/juniper and desert shrub communities that overlook broad valleys. Breeding ferruginous hawks are closely associated with the Townsend's ground squirrel, which is their primary prey species during the breeding season. Therefore, nestlings typically fledge by mid-July, as the ground squirrels enter aestivation, and breeding birds migrate from the Ely District by August 1. Although suitable habitat may occur in the mine area, no nesting activity has been reported near the mine (BLM 1993a). ***Based on BLM surveys conducted in the project area,*** one active and one inactive ferruginous hawk nest are located approximately 1 and 0.6 mile from the proposed transmission line corridor, respectively. No active nest sites are currently known to occur near the transportation corridors. The exact locations of the active and inactive nest sites will not be disclosed to ensure protection of the nests and their inhabitants.

The loggerhead shrike (*Lanius ludovicianus*) is common in the region. This species nests in desert shrublands and pinyon/juniper habitats and primarily forages in open grasslands and shrublands. This species is known to occur near the mine area and along the associated facilities.

Intermittent, as well as perennial, wetlands provide habitat for resident or migrant shorebirds. Potential nesting habitat fluctuates annually with available water (BLM 1987). Of the sensitive water birds listed by the USFWS, no water birds are known to nest in the mine area or along the transmission line route.

The black tern (*Chlidonias niger*), western snowy plover (*Charadrius alexandrinus nivosus*), and western least bittern (*Ixobrychus exilis hesperis*) are not known to nest along the transportation corridors, but may be present during migration. During periods of high precipitation, wetlands located along these routes, particularly along Duck Creek and Steptoe Slough, may be used extensively by these species for resting and feeding (NDOW 1993).

The long-billed curlew (*Numenius americanus*) and white-faced ibis (*Plegadis chihi*) are reported to nest in wetlands and low, marshy areas along the transportation corridors, such as Steptoe Slough, Duck Creek, Bassett Lake, Cherry Creek, and Pine Creek (NDOW 1993; USFWS 1984).

Gallinaceous species include the mountain quail (*Oreortyx pictus*) and Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*). These two species have not been reported in White Pine County (Baughman 1993), and no recent records exist for Elko County.

Five mammals that are Federal candidate-Category 2 were identified by the USFWS as potentially occurring near the Robinson project. The spotted bat (*Euderma maculatum*) is considered rare in Nevada and appears to be associated with steep topography and water sources. This species has been reported using pinyon/juniper woodlands adjacent to rock cliffs. However, available resource data are limited (USFWS 1984).

The Pacific western big-eared bat (*Plecotus townsendii townsendii*) is a subspecies closely related to the Townsend's big-eared bat (*Plecotus townsendii pallescens*), which is a year-round resident throughout Nevada and has been documented in Elko County. Although the most recent Federal candidate list (November 21, 1991) only shows *P. t. townsendii* occurring in California, Idaho, Oregon, and Washington, it also is known to occur in areas of Nevada (Barrett 1994). The project area is located on the border of the known range of this sensitive subspecies (Hamlin 1994). Because of its existing range and its close association with *P. t. pallescens*, it is possible that the Pacific western big-eared bat occurs in the mine area and along the project corridors.

The pygmy rabbit (*Sylvilagus idahoensis*) is typically found in big sagebrush plains and alluvial fans. The species has an irregular distribution, limited to suitable stands of sagebrush and rabbitbrush (Dobler and Dixon 1990). In Nevada, the pygmy rabbit is considered a game species. This species likely occurs near the mine site or along the associated project corridors within the appropriate habitat type.

It has been proposed that the red fox found in Ely and Elko Counties may be the subspecies *Vulpes vulpes necator*, the Sierra Nevada red fox. Incidental sightings have been reported; however, this species would not be considered widespread in the Ely area and along the transportation routes (Baughman 1993).

A nonfossilized skull of the North American wolverine (*Gulo gulo luscus*) was previously found near the Utah border in White Pine County. However, this species has not been reported for the mine area or its ancillary facilities.

A number of Federal candidate fish species were identified by the USFWS. The majority of these species are associated with springs along the White River drainage near the towns of Lund and Preston. The White River desert sucker (*Catostomus clarki intermedius*), Preston White River springfish (*Crenichthys baileyi albivallis*), and White River speckled dace (*Rhinichthys osculus* ssp.) historically occupied the same habitats as the White River spinedace within the northern White River Valley (USFWS 1992). These springs are located approximately 21 to 26 miles south of the proposed tailings facility (USFWS 1984, 1992).

The Meadow Valley Wash speckled dace (*R. o.* ssp.) occurs in Condor Canyon, approximately 100 miles south of Ely. The Meadow Valley Wash desert sucker (*C. c.* ssp.) is only found in the southern portion of the Ely District and into the Las Vegas District. The Moorman White River springfish (*C. b. thermophilus*) is also found only in the lower White River Valley, south of the mine area and south of Lund. Populations of these species have been reduced in the northern White Pine Valley due to habitat alteration and the introduction of exotic species (USFWS 1984).

The relict dace (*Relictus solitarius*) occurs in many of the springs and outflows into Duck Creek along the railroad corridor. These populations typically expand into the Duck Creek drainage during periods of high precipitation (NDOW 1993). This species also occurs in Duck Creek near Warm Springs and Monte Neva Hot Springs within Steptoe Valley (NNHP 1993). The Lahontan Creek tui chub (*Gila bicolor obesa*) likely occurs in Pine Creek along Highway 278. However, information from Pine Creek is dated from 1954, and more recent data on this species' occurrence are not available (NDOW 1993). The Fish Creek Springs tui chub (*G. b. obesa*) is found only in the western portion of the Ely District near Eureka County.

Five invertebrate species, including four butterflies and one snail, are Federal candidate-Category 2 species. The Steptoe Valley crescentspot butterfly (*Phyciodes pascoensis*) occurs in the moist flats immediately adjacent to Duck Creek along the railroad corridor from Bassett Lake and the Steptoe Slough north to Warm Springs. The known flight period is from early July through early August (Austin 1993). The Baking Powder Flat blue butterfly (*Euphilotes battoides* ssp.) was identified by the USFWS as potentially occurring near the mine or its associated facilities. However, this species appears to be limited to Spring Valley, over 30 miles southeast of the mine site (Austin 1993). The Nevada viceroy (*Limenitus archippus lahontani*) is found only in Elko County and may occur along Pine Creek and the Humboldt River. The larval stage of this species is associated with willow habitat, which is limited along the Highway 278 corridor. The White River wood nymph butterfly (*Cercyonsis pegala pluvialis*) occurs in marshy habitat located within the channel of the pluvial White River. Populations of *Cercyonis pegala* also occur in low-elevation marsh habitats within Steptoe Valley from Comins Lake to south of the Elko County Line. However, these populations appear intermediate between *C. p. pluvialis* and *C. p. paludum*, which occur farther to the north. The White River wood nymph butterfly has been recorded in flight from early July to late August (Austin 1993).

One candidate snail species identified by the USFWS, the Schell Creek mountainsnail (*Orehelix* *nevadensis*), occurs in Cleve, Goshute, and Indian Creeks west of Goshute Lake within the Ely District. This species occurs approximately 1.5 to 2 miles west and upgradient of the railroad corridor. In addition to this Federal candidate species, a number of endemic snail species occupy the natural springs and seeps located throughout the Ely and Elko Districts. However, many of these species have not been identified to date (Hershler 1993).

3.7.2 Plants

Information provided by the USFWS, NNHP, and BLM identified 11 special status species that occur or potentially occur within or adjacent to the mine area and other project component areas (USFWS 1993; NNHP 1993). Special status species that were listed included 1 Federal candidate-Category 1 species; 8 Federal candidate-Category 2 species; 1 Federal candidate-Category 3C species; and 1 species of interest. The list provided by the USFWS, NNHP, and BLM includes the following special status species:

- Monte Neva paintbrush (*Castilleja salsuginosa*), Federal candidate-Category 1;
- Holmgren's buckwheat (*Eriogonum holmgrenii*), Federal candidate-Category 2;
- Tunnel Springs beardtongue (*Penstemon concinnus*), Federal candidate-Category 2;
- Nevada primrose (*Primula nevadensis*), Federal candidate-Category 2;
- Jan's catchfly (*Silene nachlingerae*), Federal candidate-Category 2;
- Sunnyside green gentian (*Frasera gypsicola*), Federal candidate-Category 2;
- Peck Station milk-vetch (*Astragalus eurylobus*), Federal candidate-Category 2;
- Schleser's fishhook cactus (*Sclerocactus schleseri*), Federal candidate-Category 2;
- Welsh's cat-eye (*Cryptantha welshii*), Federal candidate-Category 2;
- Shockley's rock-cress (*Arabis shockleyi*), Federal candidate-Category 3C; and
- *Draba penelli*, species of interest in White Pine County.

The USFWS and NNHP identified the Monte Neva paintbrush as a species that potentially occurs within the mine area and along the transmission line route (USFWS 1993; NNHP 1993). Monte Neva paintbrush is known to be associated with ***Monte Neva Hot Springs located upgradient of the railroad corridor*** north of the mine area and is unlikely to occur within the mine area or along the transmission line route. Holmgren's buckwheat, Tunnel Springs beardtongue, and Nevada primrose are unlikely to occur in the mine area since preferred habitats for these species do not occur within the mine area or along the transmission line route. General habitat for Jan's catchfly may occur within the mine area (Mozingo and Williams 1980). The Sunnyside green gentian, Peck Station milk-vetch, and Schleser's fishhook cactus have been identified by the USFWS as potentially occurring near the mine area. However, BLM biologists have determined that the nearest documented population is a considerable distance south of the mine area and impacts to these species are not anticipated. Potential habitat for Welsh's cat-eye was determined to occur within the mine area. BLM biologists conducted ground surveys for Welsh's cat-eye within potential habitat areas. After completion of the survey, it was determined that Welsh's cat-eye did not occur within the mine area. The most recent occurrence record for Welsh's cat-eye indicates that a population occurs approximately 20 miles south of the mine area in the general vicinity of Lund, Nevada. Shockley's rock-cress was identified by the NNHP as a species that potentially occurs along the proposed transmission line route (NNHP 1993).

The most recent sighting of Shockley's rock-cress occurred in the general vicinity of Squaw Peak approximately 3 miles northeast of the mine area. *Draba penelli* is an endemic species of White Pine County, Nevada, and is listed by the NNHP as a species of interest. One population has been documented to occur in the general vicinity of Hercules Gap approximately 2.2 miles north of the transmission line route.

All of these special status species occur within the understory. The pinyon-juniper woodlands within the mine area and along the transmission line route are characterized by an overstory consisting of a dense pine and juniper canopy cover and a minor understory. *Since special status plant species that may occur within the project area would be found in the understory and the understory in the pinyon-juniper woodlands found within the project area is low in composition, special status plant species are not expected to occur within the mine area or along the transmission line route.*

After the evaluation of potential habitat areas and completion of ground surveys for special status species within the mine area and along the proposed transmission line route, it was determined that special status species do not occur within the mine area or along the proposed transmission line route.

On January 5, 1994, BLM formally notified USFWS of its conclusion that the four Federally listed threatened or endangered species included on the Revised Species List for the Robinson Mining Project would not be impacted by the project, and that a biological assessment is not necessary.

3.8 WILD HORSES

Wild horses, protected under the Wild and Free Roaming Horse and Burro Act, are found within specific herd management areas in both the Ely and Elko Districts. These locations often fluctuate, as bands move across use areas and district boundaries. The Jake's Wash Herd Management Area is a small herd of approximately 20 horses located to the west of the mine area (BLM 1987). The mine and Giroux Wash are located outside the designated herd area and would receive incidental use by horses. Wild horses would occasionally occur along the railroad corridor from herd management areas, such as the Cherry Creek, Antelope Valley, Spruce Pequop, and Goshute (BLM 1987). Wild horse use does not occur along the highway route within the Elko District; however, some use of this corridor from the Buck and Bald herd may occur within the Ely District (BLM 1987).

3.9 AIR QUALITY

3.9.1 Terrain, Climatology, and Meteorology

The proposed project area is located near the east-central portion of the Great Basin. The local surrounding terrain consists of alternating mountain ranges and sagebrush-covered valleys, with the mine site situated within the Egan Range on rolling terrain at elevations of 6,600 to 7,300 feet. The highest mountains in the Egan Range reach over 10,000 feet in elevation. The mountains rise to about 4,000 feet above the surrounding valley floors, which are generally near 6,000 feet above sea level.

The climate is semiarid, mid-latitude with the mountains and valleys influencing the regional climate. In the high elevation, summer nights may be pleasant, but the season that is free from freezing temperatures is short. In the absence of larger-scale storms, the wind patterns in the area are driven by temperature differences in the mountains and valleys. Air currents flow down the valleys during the morning hours. As the valley walls warm up during the day, the flow generally reverses and moves up the valleys during the afternoon. More rain and snow are observed in the mountain areas than in the center of the valleys.

The nearest weather monitoring station is in Ely, Nevada. The station is situated within the Steptoe Valley, which lies 2 miles east of the proposed mine area and at a much lower elevation. Average temperatures at the station range from the low 20s (degrees Fahrenheit) in January to the mid-60s in July. Temperatures are generally several degrees cooler at the proposed mine area because the area is at a higher elevation. Table 3-10 presents minimum, maximum, and average temperatures for the vicinity of the mine site. Precipitation amounts are generally consistent throughout the year with May being the wettest month and February the driest. The average annual precipitation is 9.27 inches. Precipitation totals by month are presented in Table 3-11. Average relative humidity ranges from a low of 17 percent in the summer during the day to a high of 77 percent in spring during the night (NOAA 1990).

3.9.2 Ambient Air Quality Data

The proposed mine area is located in the Nevada Intrastate Air Quality Control Region. However, for the purposes of statewide regulatory planning, the Nevada Bureau of Air Quality has designated Hydrographic Basin 179 (Steptoe Valley) as unclassifiable. Table 3-12 presents the Federal and State of Nevada ambient air quality standards. Previous monitoring data indicated that the Steptoe Valley exceeded the standard for sulfur dioxide (SO_2). The exceedences were attributed to a copper smelting operation at McGill, Nevada, which has since been closed. The current levels of criteria pollutants (nitrogen oxide [NO_x], ozone, SO_2, lead, carbon monoxide [CO], and PM-10) are not known in the Steptoe Valley due to a lack of monitoring data in the valley. The Nevada Bureau of Air Quality has designated this area non-attainment for SO_2.

3.9.3 Total Suspended Particulate Levels

The total suspended particulate (TSP) levels reported in Table 3-13 are 24-hour samples taken at the state air sampling station at McGill, Nevada. The sampling station is located approximately 22 miles northeast of the proposed mine area. TSP levels in the area of the sampling station appear to be dominated by fugitive dust emissions from the tailings disposal area of a former copper concentrating operation. Measured TSP levels at McGill are not expected to be representative of the proposed mine area.

3.10 NOISE

The nearest residents that might be impacted by noise-emitting operations within the mine area are located in the town of Ruth. Current noise levels in the vicinity of Ruth and downtown Ely are unknown; however, for the purposes of this discussion, noise levels have been estimated for typical cities the size of Ruth and Ely using published data.

The nearest receptors that may be impacted by project-related noise are the residents of the town of Ruth and along Aultman Street in downtown Ely. Monitoring data for these sites are not available. Estimated background noise levels for these sites are based on published information on

Table 3-10

Minimum, Maximum, and Average Temperatures (°F)
Ely, Nevada

Month	Minimum[1]	Maximum[1]	Average[1]
January	9.2	38.6	23.9
February	14.5	42.1	28.3
March	20.2	47.7	34.0
April	26.5	57.1	41.8
May	33.7	66.8	50.3
June	40.2	77.5	58.9
July	47.9	86.7	67.3
August	46.5	84.4	65.5
September	37.4	75.7	56.5
October	28.4	63.3	45.8
November	18.7	49.1	33.9
December	11.6	40.9	26.3
Annual	27.9	60.8	44.3

[1]Temperatures are averaged through 1990, beginning in 1939.

Table 3-11

Monthly Precipitation
Ely, Nevada

Month	Precipitation (inches)[1]
January	0.68
February	0.62
March	0.93
April	0.99
May	1.04
June	0.77
July	0.64
August	0.67
September	0.84
October	0.81
November	0.64
December	0.64
Annual Average	9.27

[1] Precipitation is averaged through 1990, beginning in 1939.

Source: NOAA 1990

Table 3-12

Ambient Air Quality Standards

Pollutant	Averaging Time	Nevada Standards[1] Concentration[3]	National Standards[2,3] Primary[4]	Secondary[5]
Sulfur Dioxide	Annual Arithmetic Mean	80 μg/m^3 (0.03 ppm)	80 μg/m^3 (0.03 ppm)	---
	24 hours	365 μg/m^3 (0.14 ppm)	365 μg/m^3 (0.14 ppm)	---
	3 hours	1,300 μg/m^3 (0.5 ppm)	---	1,300 μg/m^3 (0.5 ppm)
PM10[6]	Annual Arithmetic Mean	50 μg/m^3	50 μg/m^3	50 μg/m^3
	24 hour	150 μg/^{m}	150 μg/m^3	150 μg/m^3
Ozone[7]	1 hour	235 μg/m^3 (0.12 ppm)	235 μg/m^3 (0.12 ppm)	Same as Primary Standards
Carbon Monoxide (below 5000 feet MSL)	8 hours	10,000 μg/m^3 (9.0 ppm)	10,000 μg/m^3 (9 ppm)	Same as Primary Standards
Carbon Monoxide (at or above 5000 Feet MSL)	8 hours	6,670 μg/m^3 (6.0 ppm)	---	---
Carbon Monoxide (at any elevation)	1 hour	40,000 μg/m^3 (35 ppm)	40,000 μg/m^3 (35 ppm)	Same as Primary Standards
Nitrogen Dioxide	Annual Arithmetic Mean	100 μg/m^3 (0.05 ppm)	100 μg/m^3 (0.05 ppm)	Same as Primary Standards
Crystalline Silica	8 hours	2.38 μg/m^3	---	---

[1]Nevada standards are values that are not to be exceeded where the general public has access.

[2]National standards, other than those based on annual averages or annual geometric means, are not to be exceeded more than once per year.

[3]Concentration expressed first in units in which it was promulgated micrograms per cubic meter (μg/m^3), and are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of Hg (1,013.2 millibar); ppm in this table refers to parts per million (ppm) by volume, or micromoles of pollutant per mole of gas.

Table 3-12 (Continued)

[4]National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.

[5]National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after implementation plan is approved by the EPA.

[6]The Nevada State Implementation Plan adopted the Federal PM10 Standard as of December 1991.

[7]The state ozone standard for Hydrographic Basin 90 (Lake Tahoe) is 195 $\mu g/m^3$ (0.10 ppm).

Source: Nevada Bureau of Air Quality.

Table 3-13

Total Suspended Particulate Levels McGill, Nevada

Date	TSP Concentrations	Date	TSP Concentrations
1989 October 1	27	June 4	54
7	30	10	23
13	51	16	38
19	38	22	71
25	48	28	62
31	69		
November 6	45	July 4	50
12	47	10	51
18	40	16	31
24	49	22	51
30	49	28	58
December 6	24	August 3	47
11	52	9	69
18	58	15	38
24	50	21	31
30	63	27	59
		September 2	44
1990 January 5	69	8	21
11	70	14	129
17	27	20	40
23	44	26	31
29	43		
February 4	37	Number of Samples	60
10	27		
16	46		
22	46		
28	21		
March 6	48	Highest	177
12	35		
18	46		
24	54		
30	--		
April 5	51	Second Highest	129
11	54		
17	31		
23	16		
29	41		
May 5	51	Mean (Geometric)	47.03
11	45		
17	105		
23	177		
29	11		

[1]The Nevada Bureau of Air Quality 1989.

Source: Nevada Bureau of Air Quality 1989.

typical average day and night sound levels (L_{dn}) for various population densities (NAS 1977). These data, presented in Table 3-14, are for areas where there is no well-defined noise sources other than traffic. Sound levels are expressed in decibels, A-weighted (dBA). The A-weighting system simulates human hearing, which is more sensitive to high-frequency (high-pitch) sounds. The A-weighting system de-emphasizes lower frequency sounds to simulate the response of the human ear.

Background noise levels at both sites are expected to be dominated by transportation noise. The mine exists in a partially developed rural setting (40 dBA). The town of Ruth can be compared to a normal suburban setting. Receptors located between the mine and the center of Ruth are likely to experience a noise level in the range of 40 to 50 dBA. Ely can be compared to a normal suburban to urban setting. Receptors located along Aultman Street are likely to experience a noise level in the range of 50 to 55 dBA.

The nearest receptors that may be impacted by construction and operation of the transmission line are the residents of the Cross Timbers development and dispersed recreationists within the Garnet Fields Rockhound Area (see Map 2-2). Monitoring data for these areas are not available; however, these areas can be compared to an undeveloped rural and/or partially developed rural setting. Receptors located in these areas are likely to experience an existing noise level in the range of 35 to 40 dBA.

3.11 SOCIAL AND ECONOMIC VALUES

This section describes socioeconomic conditions in the study area. Categories discussed include population; economy and employment; housing; and community facilities and services, including water, wastewater treatment, solid waste disposal, schools, fire protection, law enforcement, health care, and social services. Also discussed are government and public finance, and transportation. This section also identifies existing deficiencies and planned improvements or expansions in community services that are not project-related. The study area for the socioeconomic analysis was based on the resident locations of existing mining employees. This affected area has been identified as White Pine County and the communities of Ely, Ruth, and McGill.

The following description of the affected environment for socioeconomics was developed through review of existing literature, including in-house data, file data, and published reports. Direct contacts were also made with city officials in Ely, county officials in White Pine County, and officials of various local, state, and Federal agencies.

3.11.1 Population and Demography

White Pine County's population trends have reflected the boom-bust cycle of the mining industry. Throughout the 19th Century, silver camps flourished and then became ghost towns overnight. From 1900 to 1910, the opening of the copper mines caused a 279 percent increase in the population. The county reached a peak of 12,377 in 1940. The population fell to 9,424 in the 1950s and began to slowly rise again. By 1970 it had reached 10,150.

With the closure of various Kennecott facilities beginning in 1978, White Pine County experienced a decrease in population. The shutdown at Kennecott in 1978 was responsible for a 21 percent decline by 1980, when the population dropped to 8,167 (as reported in the

Table 3-14

Typical Average Day-Night Sound Levels for Various Population Densities

Description	Population Density (people/sq. mi)	Noise Level L_{dn} - dBA
Rural (undeveloped)	20	35
Rural (partially developed)	60	40
Quiet Suburban	200	45
Normal Suburban	600	50
Urban	2,000	55
Noisy Urban	6,000	60
Very Noisy Urban	20,000	65

For areas where there are no well-defined noise sources other than transportation noise.

Source: National Academy of Sciences 1977.

1980 census). Table 3-15 shows the population trends for the study area. The White Pine County population also declined during the 1981-85 period, reflecting the general downturn in the national economy.

Economic diversification efforts, the opening of the new state prison, and renewed precious metal mining activities have resulted in population growth in White Pine County. In 1986 and 1987, the county's population increased to 7,800 and 7,950, respectively. A change in the methodology used to estimate the population and increases from mining and the prison project are responsible for an increase to 8,480 in 1988, 8,830 in 1989, and 9,410 for 1990 (White Pine County Economic Diversification Program [WPCEDP] 1991). The city of Ely's 1990 population was 5,300, which is just over 50 percent of the total county population. The 1990 population approached the early 1970s level. The 1993 population was estimated to be 9,640. The Nevada State Demographer's preliminary projections estimate that the county's population will be at 10,950 by 1997, almost a 14 percent increase over the 1993 estimate (WPCEDP 1993).

3.11.2 Economy and Employment

Historically, White Pine County's economy has been directly influenced by the economic health of the mining industry. Since its early years, the county's population and economy were subject to the "boom-bust" cycles that followed gold and silver strikes in the area. In the early 1900s, that pattern changed. Copper mining and smelting dominated the economic activity in the county. The large copper companies offered stable employment opportunities for the county's residents. The company towns of Ely, Ruth, and McGill managed more orderly growth and better services than most of the state's mining towns. By 1958, Kennecott had purchased all the major copper holdings in the county and was the primary employer. The company provided more than jobs. It operated as a self-contained industry by providing all phases of transportation, repair, maintenance, and training programs. Kennecott provided housing, operated a dairy, subsidized freight services, and provided workers with community organizations and services.

In 1978, falling copper prices, the competition from foreign copper producers, and increased smelting costs forced Kennecott to close the copper mine and reduction facilities, and cut its work force drastically. Over the next 4 years, Kennecott was forced to cut its work force until it had laid off 1,148 workers by the end of 1982. In 1983, an additional 302 jobs were lost when Kennecott closed the smelter and stopped freight service by the Nevada Northern Railway. In 1984, and early 1985, the company continued to cut its support services and security forces, laying off an additional 220 from the copper operations and 20 from the Nevada Northern Railway. The official total does not include salaried managerial staff who elected to take early retirement rather than be laid off or transferred from the area.

The loss of Kennecott as the major employer caused continually high unemployment rates (White Pine County has consistently had the highest unemployment rates in the state.). This resulted in decreasing population; decreased business activity; local business failures; and a loss of tax revenue. As population declined, retail sales dropped; housing construction declined; and sales, as well as property tax revenues, fell. County and city revenues dropped drastically. These losses were compounded by changes in the state law that limited further growth in revenues. The closure of Kennecott's mine meant the loss of the net proceeds of mines tax. While Kennecott had provided 20 percent of

Table 3-15

Study Area Population Characteristics

	1980	1990	1980-1990 Percent Change	1980-1990 Annual Average Change	1991[1]	1992[1]	1993[1]	1990-1993 Percent Change	1990-1993 Annual Average Change
White Pine County	8,167	9,410	+15.2	+1.6	9,630	9,760	9,640	+2.4	+1.0
Ely	4,882	5,300	+8.6	+1.0	NA	NA	NA	NA	NA
Ruth	456	391	-14.3	NA	NA	NA	NA	NA	NA
McGill	1,419	1,712	+20.6	NA	NA	NA	NA	NA	NA

[1]Based on estimates provided by the Nevada State Demographer.

NA = Not Available.

Sources: WPCEDP 1991, WPCEDP 1993.

the state's total net proceeds of mines tax, after 1978 proceeds fell to less than 0.2 percent.

The Kennecott mine closures, combined with the general economic recession between 1981 and 1984, resulted in 800 job losses in White Pine County. The county experienced another setback when the White Pine Power Project (originally scheduled for construction in 1984) was delayed because power demand did not reach forecasted levels. Former Kennecott employees who remained in the area waiting for jobs with the power project decided to move. Along with the loss of jobs, the overall labor force declined by 400 individuals.

In the late 1980s, White Pine County was emerging from a decade of economic decline following the mine and smelter closure. The county benefitted economically from renewed growth in the mining sector, the construction and operation of the maximum security prison, new industry, and increased tourism. This increased economic activity combined to produce increased population, decreased unemployment, and increased business activity. This transformation from economic decline to growth conditions, however, placed a strain on local services, both public and private. Tax revenues lagged behind the increased demand for services, and made it difficult to meet the needs of county residents while addressing the impacts of the mining industry and the prison.

The recent nationwide recession again had negative effects on the mining industry. Decreased demand for products from the mines has resulted in some down-scaling in the area, causing county unemployment rates to rise.

Table 3-16 shows employment by sector and the annual average unemployment rate in the county from 1985 through 1993. Unemployment rates averaged 13.4 percent in 1985 and workers in the county numbered 2,780. From 1985 to 1990 the economy improved; the mining sector became more active as evidenced by sector employment levels and unemployment rates. Unemployment rates dropped to a low of 5.4 percent in 1989. In 1985, oil exploration and drilling activity in northern Nye County benefitted White Pine County because Ely housed temporary crews and provided services to the oil companies. In early 1986, however, changes in the world oil prices eliminated the profit in domestic oil production, and the interest in eastern Nevada's oil ceased almost entirely.

The economic picture continued to improve in 1987. The state legislature sited its new maximum security prison in Ely. Safety Industries, which located in McGill in late 1986, went into operation in early 1987 with an annual payroll of $500,000. Congress announced the designation of the Great Basin National Park, and the City of Ely received the donation of the Northern Nevada Railway Yards and historic rolling stock, both of which gave White Pine County potential as a tourism destination. Gold mining activity began to increase steadily. In 1987 there were approximately 490 mine employees. That number rose to 982 workers by 1989 (NESD 1991).

Toward the end of the decade, falling metal prices again caused the closure of several mines. The total number of mining workers fell to 886 in 1990, 519 in 1991, 408 in 1992, and to a low of 320 in 1993 (NESD 1991, 1992, 1994). The decline in the mining industry had a significant effect on the unemployment rates. Unemployment rates rose from 6.2 percent in 1990 to 9.6 percent in 1992 (WPCEDP 1993; NESD 1994). The unemployment rate in White Pine County was 9.9 percent in September 1993, up from 9.5 percent in August 1993, but dropped to

Table 3-16

White Pine County Industrial Employment[1] by Sector 1984 - 1992

	1985	1986	1987	1988[1]	1989	1990	1991	1992	1993	Percent of 1993 Total
Mining	410	510	490	530	982	886	519	408	320	10
Construction	110	130	150	130	207	195	144	113	100	3
Manufacturing	40	40	80	80	39	32	29	27	30	1
T.C.P.U.[2]	190	210	200	180	118	129	108	99	110	3
Trade	750	750	760	770	865	910	874	786	790	24
F.I.R.E.[3]	70	70	70	80	84	79	89	76	90	3
Services	530	490	490	460	562	600	556	550	570	17
Government	680	680	710	710	861	1,088	1,199	1,219	1,330	39
Total Industries	2,780	2,880	2,950	2,940	3,718	3,919	3,517	3,277	3,340	100
Unemployment Rate	13.4%	8.2%	7.9%	6.3%	5.4%	6.2%	7.9%	9.6%	8.4%	---

[1]Annual average except first quarter 1988.

[2]Transportation, Communications, Public Utilities.

[3]Finance, Insurance, Real Estate.

Nevada Employment Security Department 1990-1994.

8.4 percent in December 1993 (NESD 1993, 1994).

In early 1990, Alta Gold closed some of its projects (i.e., Illipah, Easy Junior) and laid off all but 176 employees. In November 1991, Alta Gold announced the sale of the Robinson Project to RMLP. RMLP currently has 28 employees.

Mining is not the only industry contributing to the local economy. Due to the recession in mining, the government and tourism sectors of the economy have become increasingly important. Other large employment sectors include trade with 24 percent of the employment and services with 17 percent of the employment.

The government sector represented 39 percent of total employment in Ely in 1993. Most county and state government offices are located in Ely, which is the county seat and regional trade center for the area. Phase II of the prison went into operation in January 1991, bringing its total employment to 370.

Although agriculture is a small employer (approximately 130 persons according to NESD 1994), it does contribute to the county economy. County agriculture includes some crops but is predominantly devoted to livestock.

Tourism, which is represented in the retail trade and services sector of the economy, is becoming a major industry in White Pine County. Growth in this sector is approximated at 5 percent per year (as reflected by room tax receipts). Since the designation of the Great Basin National Park in 1987, visitors to the park increased until 1988. During 1989, visitorship at the park decreased, but ridership on the Northern Nevada Railroad and visitorship at Cave Lake State Park increased dramatically. White Pine County has numerous other tourist attractions and provides many outdoor recreational activities.

Cave Lake is a popular fishing and wildlife area. Comins Lake has supported a popular sport fishery when water levels are maintained in the lake. Hunting provides an economic benefit to the tourism trade in White Pine County. In 1986, it was estimated that deer hunting provided $1,245,000 and that trophy big game hunting provided $1,286,000 of income for White Pine County. These were the second highest estimated incomes per county for these activities in the state for 1986.

Per capita personal income in the county increased an average of 8.5 percent per year between 1986 and 1990. In 1986, per capita income was $12,958 compared to $16,335 estimated for 1990. These income estimates are lower than the statewide averages of $15,380 in 1986 and $17,525 in 1990 (WPCEDP 1993). The median state family income in 1990 was $36,905, while the median household earnings for White Pine County in 1990 were estimated at $31,000 (WPCEDP 1993). The Employment Security Department reports that the average yearly wage in White Pine County for the mining sector was $33,000 in 1989. Wage earnings for workers at the Robinson Project are anticipated to average between $30,000 and $40,000.

3.11.3 Housing

Recent mine closings and employee layoffs have decreased the demand for local housing and created vacancies in the rental market. Housing availability in White Pine County during periods of high employment is usually minimal. The following discussion includes information and conclusions from three surveys, as well as data gathered from previous documents, the 1990

Census, county assessor's office, the WPCEDP, and local realtors.

A local housing study was conducted in December of 1991 by Mr. George Swallow, a local realtor in Ely. The methods used to conduct this study were telephone canvassing, by using the phone numbers from the 1991-92 Great Basin Telephone Directory, and neighborhood canvassing of Ely, Ruth, and McGill to determine the number of homes and vacant lots with "For Sale" signs.

Housing surveys of White Pine County were also conducted by the University of Nevada, Reno, Bureau of Business and Economic Research, for the State Housing Division in 1989 and 1990. The mailout questionnaires used the Mt. Wheeler Power Company's mailing list and achieved a 55 percent response rate in 1989 and a 26.8 percent response rate in 1990. Housing data were also collected for a percent of the county for its 1990 Block Grant application. The objectives of these studies were to assess existing housing stock and how it met current intra-county demand and also the demand of those relocating to the county. Important data were the number and availability of existing housing units as well as their type, price, and condition.

A population impact assessment and housing strategy was conducted in 1982 for the proposed White Pine Power Project (White Pine Power Project 1982). The housing strategy was necessary as the projected level of nonlocal in-migrating construction workers was estimated at over 2,000 persons, and in-migrating operations workers at 530 persons.

According to the county assessor, as of March 1991, there were 3,959 housing units in the county. Of these, 2,968 were single-family dwellings, 745 were mobile homes, and 246 were multiple dwellings. The Ely area contained 2,455 units or 62 percent of the total housing units in 1990.

According to the Swallow study, as of December 1991, there were approximately 104 lots, 87 5-acre parcels, and 163 housing units (127 houses and 36 mobile homes) available for sale in the Ely area. Twenty rental units and 813 potential transient (175 recreational vehicles [RV] and 638 hotel/motel) housing accommodations were also reported to be available in the area.

Of the 163 housing units, approximately 25 percent (41) were empty and ready for immediate occupancy. The remaining 75 percent (122) of the units for sale are now occupied. Of those, it was projected that approximately 28 percent (34) of the sellers would relocate in the area and become part of the new housing demand group. This would eliminate those 34 homes from the available housing pool as these people become part of the housing demand group. It was projected that 42 percent (51) of the sellers would leave the area upon sale of the home. The remaining 30 percent (37) of the homes for sale are rented to individuals who would need to locate another rental unit in the area. This leaves a total of 129 actual units available for sale in the area.

The quality of a portion of the housing stock is questionable. The housing consists primarily of single-family detached houses, almost 70 percent of which were built before 1950. The 1980 Census indicated 28 percent of the housing units were uninhabitable, and subsequent studies suggest quality problems with over one-third of the housing stock (WPCEDP 1993). The habitability issue refers primarily to lack of adequate insulation and, to a lesser degree, to inadequate foundations. Housing rehabilitation and weatherization has been available for senior citizens through the Division of Aging and the FmHA Housing Preservation Program. In 1993, the City of Ely approved an application for Community Block Grant Housing Rehabilitation funding to extend assistance to low-income residents.

There are discrepancies among the studies conducted on housing stock quality. The Swallow study estimated that the uninhabitability of the local housing stock was as low as 8 percent, depending on assumptions made about occupants' tolerance of sub-standard quality. According to the 1994 Housing and Community Needs Statement, the more recent housing studies reported that 28 percent of the housing in the county was uninhabitable. The housing impact assessment conducted in 1982 for the White Pine Power Project concluded that 31 percent of the stock was uninhabitable. Assuming that 30 percent of housing stock is uninhabitable, approximately 89 units would be available for sale. The Regional Planning Commission reports that 15 new homes were constructed since 1991 (WPCEDP 1993).

The availability of mobile homes and pads in the Ely area has increased during the last several years. In 1991 there were 745 mobile homes compared to 412 in 1989. These include mobile homes that have been converted to real property. In 1993, there were 151 permitted mobile home pads in the Ely vicinity (Moorehead 1994). Cedar Park West is a 56-unit facility that as of January 1994 had more than half of its spaces available. Cedar Park East, an older park with 40 units, had 50 percent vacancies (Moorehead 1994). Valley View Mobile Home Park with 38 units also has several new vacancies (Rose 1994). The Regional Planning Commission reports that 62 permits have been issued since 1991 for mobile home installation.

The most significant difference between the 1990 and 1989 survey results, with respect to type of dwelling unit, is the percentage of survey respondents who live in mobile homes. In 1990, 15.7 percent of the respondents lived in mobile homes compared to 9.0 percent in 1989 and 9.5 percent in 1980. The findings would suggest that mobile homes, as a percentage of the total housing stock in White Pine County, have increased over the past 10 years (1990 Survey). The Bureau of Business and Economic Research reports that these findings verify an unpublished statistic stating that in rural counties in Nevada between 1980 and 1990, more than 80 percent of the new homes purchased were mobile homes.

Housing units purchased by survey respondents in 1989 and 1990 were generally affordable. For instance, 81.3 percent of the housing units purchased over those years were $70,000 or less. Approximately 58.7 percent of the households in White Pine County could afford a housing unit priced at $70,000 or less. This same group could afford 100 percent of the mobile homes purchased in the last 2 years. The median sales price of a mobile home purchased in the county in 1990 was $22,875. Mobile homes provide an affordable housing alternative in White Pine County (1990 Survey).

In 1990, the median sales price for a single-family detached home purchased by survey respondents over the previous 2 years was $45,315. Only 4.9 percent of homes purchased fell in the price range of $70,000 to $100,000. However, nearly 10 percent of housing units purchased by survey respondents in the last 2 years were priced over $100,000 (1990 Survey).

There are three FmHA public housing projects in Ely offering subsidized rental housing for the elderly, handicapped, and low-income families. The Bristlecone Apartments have 68 units, 24 set aside for the elderly. A one-bedroom apartment rents for $283 per month. A two-bedroom apartment rents for $358 per month. The facility is not full. Steptoe Terrace Apartments have 24 units available on rent subsidy, 16 one-bedroom apartments, and 8 two-bedroom units. A one-bedroom apartment rents for $580 per month while two-bedroom units rent for $639 per month. This facility is full (WPCEDP 1993).

The Highland Apartments have 36 units, 4 one-bedroom, 24 two-bedroom, and 8 three-bedroom. Market rate rents are $460 for a one-bedroom, $539 for a two-bedroom, and $600 for a three-bedroom unit. The Highland Apartments are full and have a waiting list (WPCEDP 1993).

The Silverridge complex has 57 units on rent subsidy. The studio apartments in the complex rent for $275 per month, $335 for one-bedroom apartments, and $265 for two-bedroom apartments. The facility is 80 percent full (WPCEDP 1993).

Short-term, transient housing in White Pine County consists of 640 motel rooms, about 607 of which are located in the Ely vicinity (White Pine County Fair and Recreation Board 1993). Several of the 21 motels and hotels in the Ely area will accommodate weekly or monthly rentals, but a majority of rooms are rented on a nightly basis. Occupancy rates are not available, but room tax receipts have risen consistently in recent years due largely to increasing tourism. Occupancy rates increase during peak tourist season, June through September.

There are several RV parks and campground facilities in the Ely area, the largest of which is a 100-space KOA franchise. There are more than 200 RV spaces in the Ely and Ruth vicinity (White Pine County Fair and Recreation Board 1993).

In summary, there is housing availability in both the sales and rental markets. Housing is affordable; however, the age and quality of the housing stock may be indicative of the relatively low housing prices.

Vacancies are also available in the rental markets. However, the 1990 Census reported that over 30 percent of White Pine County renters reported overcrowding. The community, through the Overall Economic Development Plan, has identified the need for larger rental units and single-family homes (WPCEDP 1993). The availability of mobile homes has increased and there are vacancies in many of the mobile home parks in the area. Short-term transient housing is available in the many motels and RV parks. New housing construction can be accommodated by current and planned infrastructure.

3.11.4 Community Facilities and Services Results

3.11.4.1 Water

Water is provided to the city of Ely and vicinity by the Ely Municipal Water and Sewer Department. The City has certified rights exceeding 20,000 acre-feet of water per year; unfortunately, much of this appropriation is not feasible to transport in the domestic water system. There are currently three domestic water sources that enter the system: Murry Springs, the North Street Well, and the Tenth and Avenue M (East Ely) Well. Current yield of the system is approximately 12,305 acre-feet per year. Due to line size restriction and gravity flow, only about 3,000 gpm out of Murry Springs enters into the water system. In the summer, when people water their lawns, the wells are run to service approximately 6,000 people. During these periods the system can be stressed. The City has certified water rights to all water from the three sources and is permitted to take up to 14,476 acre-feet a year or 11 million gallons per day (mgd). The City is in the process of planning for an additional water source to meet the increasing demand (Rajala 1994).

The Ely system has four storage tanks with a capacity of 6 million gallons of water when full. The 6-million gallon capacity is sufficient for 15,000 people based on Nevada's rural standard of 400 gallons of storage per capita. Storage and distribution systems are being improved to add a 1-million gallon tank, improve service to the eastern and southern portions of the city, and improve service by reducing dependence on a series of four booster stations. Ely water meets state standards for domestic use, requiring only chlorination at the Murry Springs Station (Rajala 1994).

Ruth and McGill receive water service from the McGill-Ruth Consolidated Water and Sewer General Improvement District (M-RCD), which was established in 1983 to take over water and sewer services when Kennecott shut down local operations. The physical systems inherited by M-RCD were antiquated and in need of substantial improvements. A new distribution system has since been installed.

McGill obtains water from Duck Creek with local wells for backup. Storage capacity in McGill is 1 million gallons in two 500,000-gallon tanks, sufficient for 2,500 people or more than double the current estimated service population of almost 1,000. McGill water receives both chlorination and filtration treatment; the system was new in 1986.

Water for Ruth is obtained via an aqueduct from Ward Mountain Springs, 18 miles from the town site. Flow rates of the springs range from 50 to 250 gpm. In dry years, when flows are minimal, Ruth obtains backup water of up to 150 gpm via a pipeline from Ely. Current use peaks at about 250 gpm in summer, but averages only about 80 gpm in winter. Ruth has storage for 500,000 gallons, which is nominally sufficient for 1,250 people. Current service population is estimated at 660 people in 235 households. The chlorination system for Ruth was installed in 1986. Areas in White Pine County outside these municipal service areas obtain water from private wells or springs.

3.11.4.2 Wastewater Treatment

The Ely Sanitation Department serves the city of Ely and adjacent areas. The existing plant was upgraded in 1987 and is currently being permitted to handle an average flow of 1.40 mgd. The plant currently accommodates an average wastewater flow of 1.1 mgd, which includes approximately 300,000 gpd of water infiltration into the system (Day 1994). The current plant will be able to deal with increased population if the city can manage to treat its sludge more efficiently. Currently, the existing sludge-drying beds do not dry the sludge fast enough to totally preclude odor. The sludge could be managed by adding a sludge digester onto the current wastewater treatment system at a cost of approximately $250,000 (Day 1994). If the flows reach 1.19 mgd, the City will be required to prepare an expansion plan and will be forced into a construction timetable to plan for the expansion of the plant. Effluent from the treatment plant currently meets the requirements of its State Discharge Permit (Day 1994).

The City is planning for wastewater plant expansion to accommodate future growth. One plan is to expand the plant in place, doubling its size to 2.7 mgd at a cost of $4.5 million. A more ambitious plan is to build a new plant of about 3 mgd 5.5 miles north of town, costing approximately $8 to 10 million. This plant could also serve Ruth and McGill along with all potential Ely growth by gravity alone. A final plan is the pond wastewater treatment method, which would involve the construction of new ponds in the area. This method requires very little mechanical equipment as the sludge would decompose in the ponds without odor as long as the top 3 feet of the pond is aerated. The largest cost of the new pond system is the earth movement work. Cost for this method is estimated at $2,000,000. Funds have not been found to finance the proposed wastewater plants (Day 1994).

The M-RCD was established to provide wastewater treatment as well as water for Ruth and McGill. The McGill system consists of two lined aerated ponds with five aerator motors. System capacity is estimated to be able to accommodate 1,900 people (Forman 1994), or approximately 500 more than is currently being served. The McGill collection system was recently reconstructed and has been operating since the fall of 1992.

The Ruth wastewater treatment system is a "zero discharge" multiple-pond percolation-evaporation system. It has an approved operating permit from NDEP (Forman 1994). System service capacity is estimated at about 650 to 750 people, or 250 households (Forman 1994). The system currently serves approximately 500 people, or 195 households. The collection system, installed in the early 1950s, is in fair to good condition, and a new flow monitoring system is the only modification planned. Wastewater treatment outside the public system service areas is handled via private septic systems.

3.11.4.3 Solid Waste Disposal

The City of Ely operates the principal sanitary landfill for Ely, Ruth, and McGill. It is currently operating a 120-acre site with fill and cover methods and will reach capacity in a couple of years. White Pine County has submitted a patent application to the BLM for 480 acres of public land to construct the new White Pine County Nonhazardous Solid Waste Disposal Facility. The new landfill will be located approximately 10 miles northeast of Ely. The facility will be able to accept up to 20 tons per day (Winters/Welsh 1991).

3.11.4.4 Schools

The White Pine County School District total enrollment for 1993-94 is 1,683 students, a decline of 2 percent over 1992-93 enrollment. Table 3-17 breaks that population down by school and indicates each school's capacity and the percentage of capacity currently allocated. The 1993-94 enrollment is well below the peak enrollment of 2,300 in the 1970s. The District has a high school, middle school, elementary school, and primary school in Ely; an elementary school in McGill; an elementary school and high school in Lund; and the Baker school operates under a cooperative agreement with Garrison, Utah, which serves grades one through eight. There is one private elementary school for grades one through five sponsored by the Sacred Heart Catholic Church in Ely. The District also owns the building that once housed the Ruth Elementary School. The school was closed due to low enrollment, but the district will maintain ownership and the option to reopen the school in the future (Goff 1994). Table 3-17 indicates that the two elementary schools (Mountain View and Baker) and the White Pine Middle and High Schools are within 30 percent of school capacity.

Table 3-17

White Pine School District Enrollment
1992/1993 and 1993/1994

	Capacity	Number of Students (1992-1993)	Number of Students (1993-1994)	% Change (1992/1993-1993/1994)	% Capacity (1993-1994)
Elementary					
McGill	500	120	115	(4)	23
Mountain View	700	546	582	7	83
Lund	125	68	64	(6)	51
Baker	40	24	28	17	70
Junior High					
White Pine Middle School	500	384	379	(3)	76
Lund Jr/Sr High	100	61	65	7	65
Senior High					
White Pine High School	600	474	450	(5)	75
Total	2,565	1,716	1,683	(2)	66

Source: Rajala 1994; Goff 1994.

The District employs 97.5 full- and part-time certified personnel and 6 administrators. The average class size at the White Pine High School is 19, and in the elementary schools and the middle school, it is 15. The district's 92 percent graduation rate is the highest in the state. Total expenditures for the District for 1992-93 were $8,580,291, or $4,201.45 per student. White Pine County ranks 12th out of the 17 counties in the state in expenditures per student and 11th in total expenditures (WPCEDP 1993).

Most of the District's facilities have been in use a minimum of 50 years. The high school and middle school have been in use over 75 years. Both buildings are badly in need of repair and are not conducive to providing quality programs for the county's youth. The middle school has been declared unsafe by a structural engineer's report. Remodeling expenses would be in excess of $1,000,000 to meet Americans with Disabilities Act requirements at both the high and middle schools.

Current projects, however, should alleviate unsafe conditions in Ely. In November 1992, the county's voters passed a bond issue for $13.8 million to construct a new middle school and a new high school. Construction on the new high school began in the fall of 1993. Other projects include completion of a multipurpose building/lunchroom for the elementary building in Ely and replacement of the elementary school in Baker. The District will address additional needs in the next few years, including renovations to the Mountain View Elementary School in Ely and possibly reopening the Ruth school should enrollment warrant such action (WPCEDP 1993).

Three adult education programs are offered through the White Pine County School District. An adult education class is offered during the day as well as in the evening to assist area adults in earning a high school diploma or finishing their general equivalency diploma (GED) programs.

The Northern Nevada Community College (NNCC) in Ely is the fastest growing satellite center in the NNCC system. Started in the early 1970s, NNCC Ely now educates an average of 400 to 500 students each fall and spring semester. The NNCC will begin construction of a 16,000-square-foot building in spring 1994. The building will be open for classes in the fall of 1995. The new location will allow for expansion as the school grows (Sanford 1994).

3.11.4.5 Fire Protection

Fire protection is provided in White Pine County by local, state, and Federal agencies, with extensive coordination from a county fire protection officer. There are local volunteer fire departments at Baker, Cold Creek, Lund, McGill, Ruth, and the Cross Timbers Subdivision, 5 miles north of Ely. The types, numbers, and quality of fire fighting equipment vary for each location as does the level of training of the volunteers. Only Ely has full-time, paid staff with a chief and five firemen. Ely supplements this small core group with 40 volunteers (WPCEDP 1993). The Ely Fire Department personnel have received training in handling hazardous materials. The City has several fire fighting vehicles, including a rescue truck, a ladder/pumper unit, and three pumpers, the most recent purchased in 1986. Based on the existing personnel training level, the existing equipment and water system, Ely has been assigned an Insurance Services Organization rating of 5, and the Industrial Park has a class 6 rating on a scale of 10. Although mid-scale, this rating is quite good for a small city with a mostly volunteer staff.

There is a county-funded fire protection officer, supervised by the local Nevada Division of

Forestry (NDF) supervisor, to provide coordination, advice, and training assistance. Also, the local agencies are now eligible for state fire fund reimbursement for providing cross-jurisdictional assistance, and they are all linked via NDF's county-wide radio network.

The NDF is self-equipped to fight both structure and wildland fires. It is directly responsible for fighting fires on state lands and assists local and Federal agencies under mutual assistance agreements. Both the Forest Service and BLM provide fire fighting capabilities on Federal lands in White Pine County. In 1992, the BLM Ely District fought 179 fires (a total of 455 acres burned).

Hazardous Material (HazMat) responses are currently handled by the Ely City Fire Department. The department is equipped with level C protective gear and self-contained breathing apparatus. HazMat training sophistication is low, and the department is prepared for only containment and evacuation duties as well as small spill cleanups, depending on the nature of the spill.

3.11.4.6 Law Enforcement

The White Pine County Sheriff provides police protection throughout the county, including the city of Ely. As of December 1993, the sheriff's staff is served by 13 patrol officers. The patrol force is supported with 5 dispatchers, 4 part-time reserves, and part-time deputies in Baker and Lund. The county's law enforcement officers are supplemented by Nevada Department of Investigations officers.

The current ratio of sheriff's patrol officers to population is approximately 1.35 to 1,000. By comparison, the ratio was approximately 2.5 to 1,000 in 1981 after the sheriff took over patrol duty in Ely. The highway patrol has recently received authorization to hire one additional trooper, and the sheriff has requested authorization for two to three additional officers.

The sheriff's office received 5,737 complaints of a criminal nature in 1993, or an average of 110 per week. The county jail currently has capacity for 32 men and 8 women in a double bunking arrangement. The average daily inmate population in 1993 was 14.4 (Francone 1994).

In addition to law enforcement, the sheriff's department is assigned responsibility for White Pine County's jail, civil process, county-wide emergency communications, and shares the ambulance service with the Emergency Management Service office. The local court system includes one district judge for a three-county district, one justice of the peace in Ely, one Ely municipal court judge, and two county justices of the peace based in Baker and Lund (WPCEDP 1993). A second district court was established in 1993 to cover the additional burden of the cases from the Ely State Prison.

3.11.4.7 Health Care

Health care facilities in White Pine County include the William Bee Ririe Hospital with 43 beds; the William Bee Ririe Clinic; the Eastern Nevada Medical Group Clinic; and the White Pine Care Center, a 98-bed skilled nursing facility. The Ririe Hospital provides an emergency room, two operating rooms, three intensive care beds, two psychiatric care beds, seven obstetrical care beds, and surgical beds for a total of 43 beds. The hospital's utilization or occupancy rate was about 13.1 percent for the 1992-1993 fiscal year (Lyon 1994).

White Pine County has five resident physicians: a surgeon, a pediatrician, and three general practitioners. There are also two dentists and two optometrists in the county. Specialists visit the county regularly to provide additional services as needed. Emergency services are provided by a county-wide ambulance service staffed by volunteer Emergency Medical Technicians under the jurisdiction of the sheriff (WPCEDP 1993).

3.11.4.8 Social Services

Emergency financial assistance is available to White Pine County residents through the County Welfare Department and Salvation Army. Counseling, psychiatric evaluation, and substance abuse treatment are provided by the Bristlecone Counseling Service and the Ely Community Counseling Center, a service of the Nevada Rural Clinics Program. The Nevada Bureau of Vocational Rehabilitation provides counseling, evaluations, and placement for both training and employment for handicapped adults. Day care, Headstart, and cooperative preschool programs are available in Ely (WPCEDP 1993).

3.11.5 Government and Public Finance

The primary governing bodies in White Pine County include the County Commissioners and Planning Commission, the school district, and the City of Ely. The County Commissioners oversee county operations, which include roads, sheriff's office, judicial offices, assessor, clerk, and recorder. The County also administers the budgets of Ruth, McGill, Baker, and Lund townships, and contributes to the regional planning commission, Ely Fire Department, and the cemetery. The City of Ely is administered by a mayor and council. The City provides services and facilities, such as streets and roads, sanitation, water, fire protection, a cemetery, and parks and recreation. The school district is governed by an elected board, which administers schools and support services for the County.

A large percentage of the State of Nevada's revenues is derived from the collection on gaming winnings. Nongaming tax revenues consist of sales tax, the statewide gas tax, cigarette and liquor tax, the drug manufacturer's tax, the estate and lodging tax, and the net-proceeds-from-mines tax. The sales and use tax rate in White Pine County for all transactions is 6.75 percent, broken down as follows:

Local School Support Tax	2.25 percent
Basic City-County Relief Tax	.50 percent
Supplemental City-County Relief Tax (SCCRT)	1.75 percent
State of Nevada Sales/Use Tax	2.00 percent
Optional Transportation Tax	.25 percent
Total Tax Rate	6.75 percent

The SCCRT was enacted as a property tax relief measure and is distributed as a means to compensate for lost property tax revenues. Consequently, most of these revenues go to Clark (Las Vegas) and Washoe (Reno) Counties.

The complex formula for distribution of the SCCRT was amended by recent legislation. Essentially, all SCCRT revenues go into a statewide pool. Ninety-seven percent of the pool goes to the seven "performing" counties (the transaction and population centers), and the remaining 3 percent of the pool goes to the "guarantee" counties. White Pine is a guarantee county, which means it receives a fixed monthly amount established by law and which all governmental entities in the county must share. This amount is currently $165,613 per month, and it will not change without legislative amendment. For example, the December 1991 SCCRT distribution to White Pine was shared as follows:

White Pine County	$111,735.68
Ely	48,878.77
Lund Township	901.88
McGill Township	3,200.13
Ruth Township	896.54
	$165,613.00

There is a provision in the new law that, if SCCRT collections in a guarantee county increase by 10 percent over the annual amount distributed to the county ($1,987,356 annually for White Pine), then the county ceases to have a guaranteed distribution and joins the counties in the 97 percent pool. If those collections drop in subsequent years, the county does not go back to guarantee status.

Local school support tax revenues are collected by the state and redistributed to school districts based on enrollment and the per student cost of education.

The assessed valuation of properties in White Pine County has decreased less than 1 percent from 1992 to 1993. In 1991-1992 assessed valuation was approximately $120 million. In 1992-1993 it decreased to $119.9 million (Gransbery 1994). This decrease is minimal and likely reflects a decrease in mining activity. County revenues are negatively affected by decreases in the county-assessed valuation, although the 1 percent decrease would only minimally affect county tax revenue.

The ad valorem or property tax rate for White Pine County was $3.4234 for 1992-93 per $100 of assessed valuation (Bishop 1994). In addition, the existing RMLP gold mining operations generate a net-proceeds-from-mines tax. This tax, currently $5 per $100 (if net is over $4 million), is assessed on net proceeds or net profit. The County receives revenues equal to its ad valorem rate applied to the net proceeds, and the State of Nevada receives the balance of the generated revenues. For example, White Pine County will receive $3.4234 for every $100 of net mining proceeds. The State of Nevada will receive $1.5766 for every $100 of net mining proceeds generated in White Pine County. The net proceeds from mines in White Pine County have gone from $4.9 million in 1984 to a recent high of $30.3 million in 1988. In 1989 the total fell to $14.8 million and was estimated at $14.8 million for 1990. In 1991 net proceeds in White Pine County dropped to $11.8 million and increased in 1992 by 37 percent for a total of $16.2 percent (Gransbery 1994). The White Pine County portion of this tax is distributed in the same manner as the ad valorem tax revenues.

3.11.6 Transportation

The city of Ely is situated at a major highway junction in eastern Nevada where Highways 6, 50, and 93 intersect. Highway 6 connects Ely with Tonopah; Bishop, California; and the Los Angeles area via U.S. 395. To the east, Highway 6, in combination with Highway 50, provides access to Provo and Salt Lake City, Utah. Highway 50, going west through Eureka and Austin, connects Ely with Reno; Sacramento, California; and the San Francisco Bay area. Highway 50 also connects with State Route 278, which connects with Carlin and Elko. Highway 93 north connects directly with Twin Falls, Idaho, and Missoula, Montana. To the south, U.S. 93 was formerly the major artery to Las Vegas and to Phoenix, Arizona, but recent paving and widening of State Route 318 made this the preferred route, reducing travel time from Ely to Las Vegas by 1 hour.

Access to the proposed project area is via Highway 50 and Old State Route 44 to the north and from unimproved County Road 1146 to the south, which intersects with Highway 6.

Capacities of the major highways in the Ely vicinity are typically estimated at 13,000 vehicles per day (WPCEDP 1993). Current traffic volumes on major arteries in Ely are well below capacity of 20,000 vehicles per day. Traffic congestion can occasionally occur at the 90-degree junction of Highways 93 and 50 in Ely. Tractor-trailer rigs experience some difficulty in negotiating the turn, and general traffic can be temporarily slowed (Mouritsen 1994). In rural areas north of McGill, west of Ruth and south of Ely, current traffic volumes on major highways average fewer than 1,000 vehicles per day, which is less than 8 percent of capacity (WPCEDP 1993). Levels of service are easily in the A category for these rural highway segments (Transportation Research Board 1985). Level of service A represents free-flowing traffic. Individual users are unaffected by the presence of others in the traffic stream and the ability to select desired speeds and to maneuver within the traffic is extremely high (Transportation Research Board 1985).

The Northern Nevada Railroad (NNRR) plans to reinitiate service from its junction with the Southern Pacific main line east of Wells at Cobre to the Ruth area. The railroad route is shown on Map 2-4. Tracks currently exist from Cobre to Keystone Junction (see Map 2-3) and would be extended past Ruth to the mine. The existing rail line between Cobre and the concentrator area is approximately 150 miles long. The existing track has been out of service for approximately 10 years except for the "Ghost Train of Old Ely," which is operated by the White Pine Historical Railroad Foundation. The Ghost Train travels near downtown Ely and up Robinson Canyon to the Keystone Dump. However, the entire track was rehabilitated and upgraded in 1992 to meet minimum operating standards. In 1994, Northern Nevada Railroad Corporation (NNRC) plans an additional upgrade of approximately 62 miles of track to bring the track above minimum standards. The existing track ends at the access road to the mine area. NNRC has been granted a right-of-way to extend the line north of Ruth and into the proposed concentrator area (see Map 2-3).

Yelland Field is the local airport and is currently underused. The airport supports one fixed-base operator with fixed-wing aircraft and helicopter chartering capabilities. Of 45 airplane tie-down spaces, an average of 5 are used at any one time. Space is available for potential expansion should it be needed (Brown 1994). The airport is also served commercially by Skywest Airlines. Currently, there are two incoming and two outgoing flights per day (Rogers 1994).

3.12 TRANSPORT OF PROCESS MATERIALS, PRODUCTS, AND HAZARDOUS WASTES

RMLP proposes to transport process materials to the mine site via rail and truck and copper concentrate from the mine site via rail, as described in Section 2.2.12. Transportation would be along the routes shown on Map 2-3. The possibility of a rail or truck accident and a release of hazardous or nonhazardous material does exist and is discussed in Section 4.1.12. Sensitive areas along the transportation routes were identified and are presented in this section.

Wetlands are the most extensive sensitive resource along the transportation routes, and the general location of wetland areas is shown on Map 3-8. A total of 19 miles of wetland would be crossed or adjacent to the rail route, and 10 miles would be crossed or adjacent to the truck route.

Four communities (Ely, Ruth, Eureka, and Carlin) would be crossed by either the rail or highway route. Scattered rural residences also occur along the routes, with approximately 12 along the railroad, 12 along Highway 278, and 2 along Highway 50. There are 10 at-grade crossings of paved roads or streets along the rail route. These include Highway 485 east of Ruth (a component of the proposed railroad extension by Northern Nevada Railroad); 4 within the city of Ely; 2 crossings of Highway 93 (the north side of East Ely and south of McGill); Highway 489 east of Cherry Creek; Highway 93 at Currie; and Highway 233 south of Cobre.

Agricultural areas are found along Highway 278 and the Humboldt River south of Carlin; along Pine Creek and Highway 278 through Pine Valley; along Highway 278 north of Eureka; and along portions of Highway 50 between Eureka and Ely. There also are scattered parcels of hay production along the rail route.

Sensitive plant and animal species occur along both the rail route and the truck route. These species are described in more detail in Sections 3.4, 3.5, 3.6, and 3.7.

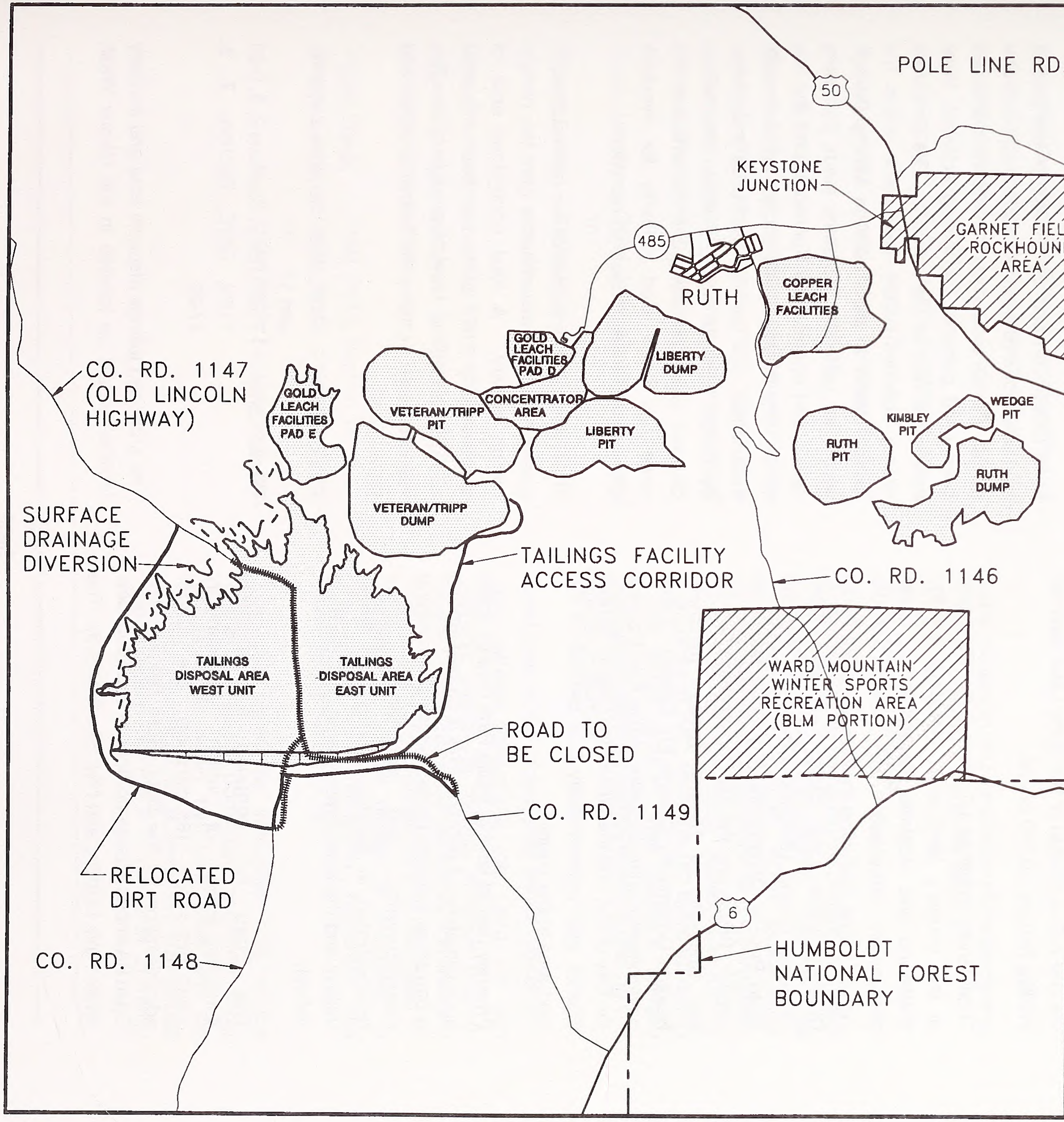
3.13 ACCESS AND LAND USE

The purpose of the access and land use investigation was to identify and describe current public access and all major land uses that may be affected by the Proposed Action. Maps were prepared illustrating public access and land jurisdiction. Access and land use information was compiled from maps and existing literature from public and private agencies. Data sources for the baseline inventory included interpretations from U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle sheets, BLM surface management quadrangle maps, BLM Master Title Plats, White Pine County road map, White Pine County Master Plan of Land Use, White Pine County zoning map and zoning ordinances, aerial photographs, and review of the BLM RMP. The baseline data were supplemented by contacts with the BLM and White Pine County. The data were verified by ground reconnaissance during the fall of 1993.

3.13.1 Access

Primary access within the Egan RA is furnished by interstate highways, state highways, county roads, and public access roads. The majority of the public lands are accessible to the general public via one of these roads. Some areas do have large amounts of BLM-managed land that are not accessible due to steep terrain and lack of maintained roads. Legal access across private lands is generally not a problem because most private land in the area is accessible only by crossing BLM-administered lands on BLM or county roads.

Access routes for the proposed project would use existing roads (see Map 3-9). Regional access routes include U.S. Route 50, which is located north of the mine area and runs into the Ely corporate limits. U.S. Route 6 extends southwest of the mine and tailings disposal areas. U.S. Route 93 extends north of Ely. The main access to the mine area is via County Road 1146. County Road 1146 traverses the mine area in a north-south direction between Highway 485 (the highway to Ruth) and U.S. Route 6. The proposed tailings disposal area is accessible from U.S. Route 6 via County Roads 1147, 1148, and 1149 (see Map 3-9). The transmission line route parallels Power Line Road for approximately 4.5 miles and Highway 485 for approximately 2.5 miles (see Map 2-2).



ROBINSON PROJECT

MAP 3-9
ROAD ACCESS
ROBINSON MINING DISTRICT

3.13.2 Land Use

3.13.2.1 Land Jurisdiction/Ownership

Ninety-three percent of the land in White Pine County is publicly owned. Almost 92 percent is administered by four Federal agencies: BLM (4,302,537 acres), National Park Service (Great Basin National Park, 77,640 acres), Forest Service (Humboldt National Forest, 840,214 acres), and the USFWS (a portion of the Ruby Lake National Wildlife Refuge, 10,760 acres).

Tribal lands constitute 1.2 percent (70,699 acres) of the county's land area, including the Ely Shoshone and Goshute Reservations. State government administers 0.05 percent of the county's land, including the Nevada State Parks Division (Cave Lake State Park and Ward Charcoal Ovens Historical Sites), the Nevada State Prisons Department (Ely State Maximum Security Prison and the Ely Conservation Camp), and University of Nevada System (Northern Nevada Community College Ely Center). Local governmental units, including White Pine County, the City of Ely, and the White Pine County School District, own approximately 0.03 percent of the land area in the county.

Privately owned land in White Pine County totals approximately 3.4 percent. This is divided among urban areas, privately owned industrial and mining developments, and agricultural lands (concentrated in Steptoe, Spring, and Snake Valleys and the Lund-Preston area of White River Valley).

The Egan RA contains approximately 4,488,665 acres, of which approximately 3,842,143 acres (85 percent) are under administration by the BLM (BLM 1993a). The Egan RA encompasses portions of three counties: White Pine, Lincoln, and Nye (see Map 4-3). The remaining breakdown of the land status by entity within the Egan RA includes: lands administered by other Federal agencies (460,107 acres, 10 percent); private lands (181,135 acres, 4 percent); and state, county, or city-administered lands (5,280 acres, less than 1 percent) (BLM 1993a). The land ownership pattern of the Egan RA is characterized by large tracts of public land with small parcels of private and non-Federal land dispersed throughout the RA.

Land jurisdiction and ownership for the project area was broken down into two types, private and public. Private property within the mine area has been used primarily for mining activities since before the turn of the century. The proposed mining activities would take place within the mining claims in the Robinson Mining District, which are generally the same lands that were owned and operated by Kennecott until the late 1970s. The mining claims occupy approximately 4,800 acres, and are now controlled and owned by RMLP. Private property within the tailings disposal area and along the transmission line route has been used primarily for livestock grazing and limited dispersed recreation.

The Robinson Mining District has been subject to extensive surface disturbances from the historic mining activity. A total contiguous area of approximately 3,370 acres has been impacted and left with little or no natural vegetation. This impacted area includes the following public and private land:

Public Lands	T16N, R62E, Sections 2-4, 9-15, and 17
Private Lands	T16N, R62E, Sections 2, 5, 6-24 T16N, R63E, Sections 7, 8, 17-20

The proposed tailings disposal area and ancillary facilities would be located in the Giroux Wash area, to the immediate southwest of the mine area. This facility would include portions of the following sections:

Public Lands	T16N, R61E, Sections 13 and 23-26
	T16N, R62E, Sections 18-20, 29, and 30
Private Lands	T16N, R61E, Section 25
	T16N, R61E, Sections 19 and 30

New disturbances resulting from expansion of existing waste rock dumps would occur in the following sections:

Public Lands	T16N, R62E, Sections 4, 9, 13, 14, 17, and 18
Private Lands	T16N, R62E, Sections 7, 9, 10, 12-14, 17, and 18

New disturbances resulting from relocation of the existing Keystone waste rock dump and subsequent copper leaching activities would occur in the following sections:

Public Lands	T16N, R62E, Sections 2, 3, and 10
Private Lands	T16N, R62E, Sections 2, 3, 10, and 11

New disturbances resulting from construction and expansion of the gold leach facilities would occur in the following sections:

Public Lands	T16N, R61E, Section 12
Private Lands	T16N, R61E, Sections 12 and 13
	T16N, R62E, Sections 7, 8, and 18

The proposed transmission line route from south of McGill to the mine area would cross the following sections:

Public Lands	T16N, R62E, Sections 2, 4, and 9
	T17N, R62E, Sections 35 and 36
	T17N, R63E, Sections 13, 14, 22, 23, 27-31
	T17N, R64E, Section 18
Private Lands	T16N, R62E, Sections 3, 8, and 9

Land ownership and jurisdiction of the study area is shown on Map 2-1 and on Table 2-1.

3.13.2.2 Land Uses

Agricultural lands comprise the majority of private land use in White Pine County. Total farmland comprises 216,636 acres. About 32,500 acres (20 percent) of the agricultural land are irrigated. According to the most recent Census of Agriculture in 1987, there are 127 farms averaging 1,706 acres each. The county's primary agricultural activities include livestock grazing and alfalfa production.

Land uses in the project area reflect typical land use patterns throughout the Egan RA and primarily consist of mining, livestock grazing, wildlife habitat, dispersed recreation, and firewood cutting. Grazing management is discussed in Section 3.14; wildlife habitat is discussed in Section 3.6; and recreation resources are discussed in Section 3.15.

Land use within the immediate area of the proposed project is dominated by mining. Most private lands within the mine area are the historical Kennecott lands, which are now owned and operated by RMLP. The area currently contains the waste rock dumps, leach piles, open pits, roads, and buildings typical of a conventional truck and shovel open-pit mining operation. RMLP has acquired title to the private property in Riepetown, which has been identified as the only open, stable, and level ground available for its concentrator within economic haulage distance of its mining operation. The lots were previously severed surface interests, and RMLP owned the mineral rights. These lots are currently vacant, undeveloped, and void of electrical, water, or sewer services.

The timber in the Ely area is mostly second growth, having been harvested for firewood and mining uses prior to the 1950s. This resource is currently used for Christmas tree and firewood cutting. The BLM estimates that approximately 2,000 cords of wood are harvested annually from BLM Ely District-managed lands. At present, an estimated 7,000 cords of firewood are available in the areas to be disturbed by the Proposed Action. This assumes an average harvest rate of 2 cords per acre of vegetation impacted (excludes previously disturbed areas).

3.13.2.3 Land Use Plans

Public lands under BLM jurisdiction are under multiple-use management for range, hunting, forestry, watershed, mineral extraction, recreation, and wildlife habitat. The following is a summary of the planning issues and management decisions contained in the Egan RMP ROD as they relate to the project area.

Management Zones. The project area is located within Management Zones 3 (Steptoe/Horse & Cattle Camp) and 4 (Jake's Valley). In Zone 3, the high incidence of private land surrounding the communities of Ely and McGill has resulted in public pressures for public land disposal to satisfy various individual, and local and state government demands. The management of the intermingled public lands in this urbanized part of the zone is influenced by adjacent private land uses. In turn, the development of the private land adjacent to public land affects public land resource values. State and local governments have requested public land disposals to promote community growth and economic activity.

A major transmission line, a railroad, several smaller electric transmission and distribution lines, and major highways crisscross this zone. The effect of these linear utility lines is to create an east-west and a north-south right-of-way corridor through the zone.

Zone 4 is a relatively small management zone and contains approximately 102,000 acres of public land. The approximately 9,000 acres of private land in this zone are almost entirely concentrated in the vicinity of Ruth where open-pit mining has occurred. Past land disposals here have been primarily for mineral extraction under the mining laws. Mining claims and other intermingled private and public lands create some land management problems in this zone.

Mineral Resources Management. The BLM's mineral resources policy provides that the public lands will remain open and available for mineral exploration and development unless withdrawal or other administrative action is clearly justified in the national interest.

Rangeland Management. A discussion of grazing management is presented in Section 3.14.

Wild Horses. The project area is not located within a designated wild horse herd area. A discussion of wild horses is presented in Section 3.8.

Wildlife. Portions of the project area are located within designated deer winter range. A discussion of wildlife resources is presented in Section 3.6.

Realty Management. Portions of the transmission line route traverse designated land transfer areas within Management Zone 3. These general areas have been identified as suitable for disposal by the BLM.

Utility Corridors. The proposed transmission line route and water pipeline routes are located within designated and planning utility corridors. A designated corridor is a preferred location for expansion that has an existing transmission or transportation facility and room for expansion. A planning corridor is a utility corridor that has no existing transmission or transportation facilities and is a preferred location for future facilities.

Riparian Areas. A discussion of riparian areas is presented in Section 3.5.

Off-Road Vehicle Management. The public lands within the project area designated as "open" to off-highway (OHV) use. A discussion of recreation resources is presented in Section 3.15.

Special Management Areas. The Garnet Fields Rockhound Area is located 1 mile northeast of the mine area. The proposed transmission line route avoids crossing the Garnet Fields Rockhound Area (see Map 2-2).

According to the current White Pine County Master Plan of Land Use (1970), the mine area is designated a "mining reserve" area. This designation recognizes the value of this historic mining area to the county. The tailings disposal area is located partially within the mining reserve area and partially within an area designated as "high mountain land." Mineral extraction industries are an accepted use within the high mountain land classification. The transmission line route traverses agricultural and rural estate land (i.e., 5-acre ranchettes); open rangeland; high mountain land; and heavy industrial land in the vicinity of the mining area.

The county's zoning ordinance was updated in 1987. The ordinance limits light and heavy manufacturing primarily to the county's industrial park, the Kennecott smelter site in McGill, and areas that were part of the Nevada Northern Rail yards in the East Ely Area. Residential and commercial zones are concentrated in the communities of Ely, Ruth, McGill, Baker, Lund, and Preston; the land along Highway 93 between Ely and McGill, and a residential area known as Cross Timbers northwest of Ely. Since the zoning ordinance was completed, the area south of Ely, along Highway 50, has been the site of residential and commercial growth, resulting in zone changes. The remainder of the county is zoned for agricultural land, open space, and 5-acre residential parcels.

According to the White Pine County zoning map for the Ely, McGill, and Ruth urban region, the mine area is zoned for heavy manufacturing (zone M-2). The tailings disposal area is zoned partially for heavy manufacturing (M-2) and partially as open range (O-5). The transmission line route traverses lands zoned for ranch/agricultural (R-A-5), open range (O-5), and heavy manufacturing (M-2). Mining activities and utility corridors are identified as special uses within these zones and would require a conditional use permit from the county.

3.14 GRAZING MANAGEMENT

The mine area is not open to livestock grazing. With the exception of the transmission line route and the tailings disposal area, all other new disturbance would involve minimal public land currently used for livestock grazing. The proposed tailings disposal area is located within the Copper Flat and Giroux Wash livestock grazing allotments. One-third of the tailings facility lies in the Copper Flat allotment and the remaining two-thirds are in the Giroux Wash allotment. The RMP classifies the Copper Flat allotment as an "M" category allotment or maintain, and the Giroux Wash allotment as an "I" category allotment or improved. An "I" classification indicates the allotment has a high potential to increase forage production, current forage production is below maximum, current forage value is fair to poor, and the allotment has moderate to extreme resource conflicts.

These allotments are evaluated periodically to ensure that the management objectives are being reached and that range improvements are done on those allotments with the greatest potential for improvement in resource conditions and return on investment. Both allotments carry approximately 1 animal unit month (AUM) per 15 to 20 acres. The Copper Flat allotment has approximately 1,769 active preference AUMs with an additional 1,716 Temporary Non-Renewable (TNR) AUMs. The Giroux Wash allotment has 2,219 AUMs of cattle preference or 3,107 AUMs of sheep preference. There are two water sources in the Copper Flat allotment and one water source in the Giroux Wash allotment. None of these water sources are located in the proposed tailings disposal area.

The proposed transmission line route crosses portions of the Heusser Mountain, West Schell Bench, Georgetown Ranch, and Copper Flat livestock grazing allotments. The Copper Flat allotment was discussed above. The RMP classifies the Heusser Mountain and West Schell Bench allotments as "M" category allotments or maintain, and the Georgetown Ranch allotment as a "C" category allotment for custodial management. A "C" classification indicates the potential to increase forage production is low, the current forage production is near maximum, current forage value is fair to poor, and little or no resource conflicts exist.

According to the *Egan Resource Area Rangeland Program Summary* (BLM 1988), the Heusser Mountain allotment will be managed to provide forage for up to 1,416 AUMs of livestock use, and the Georgetown Ranch allotment has a preference of 1,675 AUMs. According to a final multiple use decision issued by the BLM in 1990, the West Schell Bench allotment will be managed to provide forage for up to 1,389 AUMs of livestock use.

3.15 RECREATION

Dispersed backcountry recreation is the predominant type of outdoor recreation in the Egan RA. Primitive backcountry opportunities are abundant, especially in the mountainous areas. Important areas or sites on public lands managed for recreation in the project area include the Garnet Fields Rockhound Area northwest of Ely (managed by the BLM) and the Ward Mountain Winter Sports Recreation Area southwest of Ely (managed by the Forest Service and BLM) (see Map 3-9). The Nevada Statewide Comprehensive Outdoor Recreation Plan reports that increasing numbers of Clark County residents are coming in the summer to White Pine, Lincoln, and Eureka Counties to enjoy uncrowded conditions and cool climates for their outdoor recreation activities.

The Egan RA provides quality hunting for a variety of game animals. These include mule deer, elk, antelope, sage grouse, blue grouse, cottontail rabbit, mourning dove, and mountain lion. Hunting for big game is regulated through a quota system established by the NDOW. The quota system is oversubscribed each year for deer, elk, and antelope tags because demand far exceeds the supply (BLM 1993a).

Most of the Resource Area, including the project area, is designated as open to use by ORVs and OHVs, except for portions of Riordan's Well Wilderness Study Area (WSA) and the South Egan Range WSA. Vehicle use within WSAs is restricted to established routes by BLM's Interim Management Policy to protect these areas until Congress makes Wilderness designation decisions. This policy does not constitute a long-term OHV designation.

3.16 VISUAL RESOURCES

The objectives of the visual resources investigation were to identify and describe important visual resources that could be affected by the construction and operation of the Proposed Action and related facilities. Important visual resources are defined for this study as visually sensitive use areas where the maintenance of the surrounding visual environment is important to people's enjoyment of using an area, and unique or unusual landscapes having natural scenic value. The study area is defined to include landscapes in which viewers may travel, recreate, or reside where existing views may potentially be affected by the Proposed Action or ancillary facilities.

The BLM initiated visual resource management (VRM) to manage the quality of the landscape by minimizing impacts to visual resources resulting from development activities, while maintaining the effectiveness of all BLM resource programs. In determining VRM class designations, the inventory process considers the scenic value of the landscape, viewer sensitivity to the scenery, and the distance of viewer to subject landscape. These management classes identify various permissible levels of landscape alteration, while protecting the overall visual quality of the region. Management classes are broken down into four levels (Classes I to IV), with Class I designated the most protective of the visual resources. The objectives of these classes vary from very limited management activity to activity that requires major landscape modifications.

3.16.1 Landscape Characteristics

Landscape character type is a unit of physiographic area having common characteristics of land forms, rock formations, water forms, and vegetation patterns. The study area is located in the east-central portion of the Great Basin section of the Basin and Range Physiographic Province. The Great Basin is characterized by a rhythmic pattern of mountain ranges and basins. Isolated, irregularly shaped, block-faulted mountain ranges average 50 to 75 miles in length and are separated by desert plains and broad basins. The proposed project area is located within the Egan Range near the city of Ely. Elevation at the project site ranges from approximately 6,600 feet to 7,300 feet MSL, and the surrounding mountain ranges have peaks up to 8,083 feet MSL (Rib Hill).

The province as a whole is one of the driest in the United States, with its maximum precipitation coming in the winter months. The valley basins contain vast areas of sagebrush and scattered grasses. Infrequent linear patterns of riparian vegetation of willows and cottonwoods outline the larger drainages. At higher elevations, the mountains contain a cover of mixed shrubs and pinyon-juniper forest. Bristlecone pines and alpine fields can be found at elevations from 10,000 to 12,000 feet.

The study area is characteristic of the higher elevations of the province. Generally set within the rolling hills and broad valleys of the Egan Range, the vegetation has a contrasting pattern of pinyon-juniper forests intermixed with sagebrush and grasses. The project site varies from a predominantly undisturbed natural setting with occasional dirt roads in the proposed tailings disposal area to the visually dominant, culturally modified, disturbed area of the existing Robinson Mine.

Clear skies with broad, open landscapes characterize the regional landscape setting of northeast Nevada, including the project area. This type of landscape allows for long viewing distances. Consequently, maintenance of visual resources is a concern from nearby and distant viewing locations, including views from Federal lands with high visual resource values, Federally designated wilderness areas, recreation areas, major transportation routes, and population centers.

3.16.2 Existing Visual Impacts

No formal visual resource classification has been prepared by the BLM for the Egan Resource Area; however, the general mine area and the transmission line route, as it crosses through the Steptoe Valley and over Highway 93 north of Ely (Map 2-2), have generally been managed as potential VRM Class IV lands. Under this tentative classification, any changes to the characteristic landscape can be high and activities may dominate the view and be the major focus of viewer attention. Visual impact of these activities can be lessened through careful location, minimal disturbance, and repeating the basic elements of the landscape.

The study area is located within an extensively disturbed area resulting from long-term, historical mining activities. Existing visual contrasts generated by the open pits, waste dumps, leach piles, and facilities from the Robinson Mine are historical features of the local topography and can be observed from many viewpoints in the Ely vicinity. These areas are primarily along Highway 50, Highway 485, Bothwick Road, Highway 93, and Highway 6. Typical noticeable features of the mining operation from these viewpoints are similar to the Keystone and Juniper Dumps viewed from Ruth: high pyramidal waste rock dumps and occasional buildings and equipment. The soils range from yellowish to a chalky, off-white color, which, when exposed, contrast highly with the surrounding vegetation. Rock colors vary from light to dark brown and burnt orange.

The undisturbed region surrounding the mine area, including the tailings disposal facility in Giroux Wash and the transmission line route around the Garnet Fields Rockhound Area, has the potential to be managed as VRM Class III lands. Under this tentative classification, any changes in the basic elements (form, line, color, and texture) caused by a management activity should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The landscapes crossed by the transmission line route are the Steptoe Valley north of Ely and Pole Line Road, and the inactive Kennecott right-of-way, which extends around the Garnet Fields Rockhound Area. These areas are either in a relatively natural condition, such as the stretch by the Garnet Hill area, or moderately developed, such as the segment through the Steptoe Valley and the Pole Line Road.

3.17 CULTURAL RESOURCES

Cultural resources consist of prehistoric and historic archaeological deposits; structures of historic or architectural importance; and Native American traditional ceremonial, ethnographic, and burial sites. Analysis of cultural resources can provide valuable information on the cultural heritage of local citizens and regional populations. Cultural resources are nonrenewable resources, which are afforded protection by Federal, state, and local laws, ordinances, and guidelines. The Antiquities Act of 1906 and the following Federal legislation, policies, regulations, and guidelines have been enacted to protect cultural resources and have been considered during review of the proposed project:

- National Historic Preservation Act of 1966 (NHPA); Section 106 Compliance; 16 United States Code 470 et seq., and implementing regulations 36 CFR 800;

- American Indian Religious Freedom Act of 1978 (AIRFA); requires Federal agencies to evaluate their policies and procedures with the objective of protecting the religious freedoms of Native Americans; and

- Native American Grave Protection and Repatriation Act of 1990 (NAGPRA); although specific actions are required in this Act, to date, no implementing regulation has been promulgated.

3.17.1 Cultural Setting

The proposed mine area is located in the east-central portion of the Great Basin, an area that has evidenced a long history of human occupation. The earliest commonly accepted date for man's presence in the region is approximately 15,000 years before present (B.P.) (James and Zeir 1982).

The oldest archaeological site recorded to date in eastern Nevada is Smith Creek Cave, located approximately 40 miles east of the proposed mine area, which yielded carbon-14 dates ranging from 11,680 B.P. to 9,940 B.P. (Pre-Archaic period) in the lowest occupation level (Bryan 1979). Archaeological evidence suggests use of the area by a hunting and gathering culture (or cultures) whose mobile lifeway of extensive foraging and seasonal migration remained essentially unchanged for thousands of years.

At the time of Anglo entry into the proposed mine area, the region was occupied by Numic-speaking Western Shoshone. Based on archaeological, ethnographic, and linguistic information, the ancestors of the Shoshone are thought to have entered the area about 1,100 Anno-Domini (AD) (Aikens and Witherspoon 1986). A hunting and gathering culture, the local Shoshone foraged in a biologically diverse area that included Steptoe Valley and portions of the Egan and Schell Creek ranges (Steward 1938). Diagnostic artifactual remains of the Shoshonean culture include wickiups, brownware ceramics, distinctive projectile points, and basketry.

The incursion of European and American explorers into the area is documented as early as 1827 when Jedediah Smith passed south of the project area on his return from California (Brooks 1977). Other early explorers and pioneers in the region include John C. Fremont, who traveled through the area in 1845; Howard Egan, who in 1855 pioneered a mail service in the region; and Captain James H. Simpson, who led a military exploration expedition through this area in 1859.

The proposed mine area is located within the boundaries of the Robinson Mining District, which was established in 1868. A rich silver deposit was discovered in the district the following year, resulting in rapid local settlement of what was to become White Pine County. Copper, considered strictly a surface phenomenon, was discovered in the Robinson Mining District in 1872. The city of Ely was established 6 years later, becoming the county seat in 1887. The discovery of extensive subsurface copper deposits near Ely in 1900, in conjunction with the completion of the Northern Nevada Railroad into the area in 1906, marked the beginning of massive exploitation of local mineral resources that continues today. Riepetown, a community established within the Mining District in 1907, was the only noncompany town in the area and quickly acquired a reputation for being the "wettest town in the country and one of the state's toughest communities" (Paher 1970). Forced to disincorporate by an act of the state legislature in 1919, Riepetown's remaining saloons were eliminated by the 18th Amendment, but the wide-open marketing of illicit alcohol maintained the town's reputation during Prohibition (Hardesty et al. 1992). The economic depression of the 1930s hastened the decline of several Ely-area mining towns, including Riepetown (Hardesty et al. 1992). Response to an increased demand for copper during World War II resulted in a brief economic recovery in Riepetown, but a steady decline in population followed, with the last remaining residents vacating the town in the 1970s (Hardesty et al. 1992).

The Lincoln Highway, which borders the proposed mine area on the west near White River Wash, was the United States' first transcontinental motor route (New York City to San Francisco). The Lincoln Highway was designated in 1913, with sections of the highway alignment in Nevada following the mail route established by Howard Egan in 1855 (Egan 1917). Portions of the Old Lincoln Highway in other areas have been found eligible for inclusion in the NRHP (Mehls 1994).

3.17.2 Cultural Resources Identified in the Project Area

In 1992, the Advisory Council on Historic Preservation (ACHP), the BLM, the Nevada Division of Historic Preservation and Archeology (NDHPA), and the RMLP entered into a Programmatic Agreement (PA) for the treatment of cultural resources during mineral development associated with the Robinson Mine. A copy of the PA is on file in the BLM's Ely, Nevada office.

The PA was developed to establish how the consultation process under Section 106 of the NHPA would be implemented with regard to further development in the Robinson Mine area. Prior cultural inventories had identified historic properties in the proposed mine area, including Riepetown, that were eligible for the NRHP (Mehls et al. 1992). Other historic properties have been identified in the area that may be determined to be eligible after further evaluation (Young 1992). The PA defines the mine property boundaries and stipulates guidelines for identification and treatment of historic properties in the mine area to mitigate or avoid effects to the properties to the extent practicable, regardless of surface ownership. The stipulations include requirements for surveys, subsurface testing, documentation of inventory and evaluation results, evaluation methods, mediation, mitigation, curation, discovery situations, surety bonds, and surveyor qualifications. The PA allows for expedition of Notices to Proceed with mine development, provided all historic property evaluation and approval requirements have been met.

Between 1991 and 1993, 11 cultural resource inventories and two data recoveries were conducted by D.L. Zerga and Associates, Archeological Research Services, Inc. (ARS), and Western Cultural Resource Management (WCRM), for Magma Copper Company, as part of the proposed mine area and transmission line development action (Kolvet 1993a,b; Mehls et al. 1992; Stoner et al. 1993; Peterson 1993a,b; Young 1992; Zerga 1991a,b,c). The inventories included surface evaluations of the areas, archival records review, and literature searches. The initial on-site inventories were nonintrusive, and no attempt was made to remove visual obstructions, such as vegetation or other materials. During subsequent inventories, as warranted, selected sites were probed to determine the nature of deposits, depth, and presence or absence of cultural materials. Table 3-18 lists the inventories and findings, including site numbers, descriptions, project associations, eligibility, and potential mitigation, where appropriate.

Zerga and Associates conducted three Class III cultural resources inventories of approximately 17.2 acres in the Giroux Wash area for proposed drill locations and 86.7 acres in the Steptoe Valley area as part of the transmission line right-of-way in spring and fall 1991, respectively. No eligible sites were identified during these surveys (Zerga 1991a,b,c).

A Class III archaeological inventory of nine parcels, an access road, and the originally proposed powerline right-of-way totaling 4,418.8 acres of public land and 563.2 acres of fee land, were initiated by ARS in May 1991. The subsequent 3 months of inventory and subsurface probing resulted in the recording of 315 archaeological sites (including sites attributed to prehistoric, proto-historic, and historic occupations) and 84 isolated finds (Young 1992). Archaeological remains included remnants of prehistoric and proto-historic temporary habitation sites, lithic quarries, and temporary use (food processing) areas as well as artifacts associated with historic settlement and mining activities by ARS (Young 1992). A total of 34 of the 315 archaeological sites recorded by ARS were recommended as eligible for nomination to the NRHP pending further evaluation. Of the 34 sites recommended by ARS for further testing, review by the BLM determined that only 25 of the sites required further evaluation (Demuth 1994).

Under guidelines established by the PA, seven Class III archaeological surveys of public and private land parcels in the proposed mine area and transmission line right-of-way and one data recovery were completed by WCRM in 1992 and 1993. The first survey by WCRM, performed between May 4 and June 25, 1992, involved inventory of the historic town site of Riepetown, located approximately 4 miles west of Ely. The Class III inventory recommended that the study area be considered as the Riepetown Historic District (NRHP). Based upon the inventory, the town site contained 486 features representing 46 feature types, which were evaluated for subsurface deposits using probes, excavation units, and backhoe trenches (Mehls et al. 1992). Based upon either surface or subsurface characteristics or both, 391 of the features were recommended as contributing elements to the proposed district (Mehls et al. 1992).

As required in the PA, cultural resources that are identified within the proposed mine area as exhibiting a potential for significance will receive further evaluation. Since the Riepetown town site was scheduled for direct impact by future activities related to construction in the concentrator area and had been determined by

Table 3-18

Summary of Noneligible, Potentially Eligible, or Eligible Cultural Sites Located, Relocated, or Evaluated for the Robinson Project

Agency Site No. or Smithsonian No.	Brief Site Description	Project Association	NRHP Potential	Project Disturbance	Mitigation
Transmission Line Survey (Zerga 1991a)					
46-6999	Trash Dump	Transmission Line - East Portion	NEL	Yes	NA
Condemnation Drill Locations Survey (Zerga 1991b)					
	No eligible sites		NEL	---	---
Proposed Access Road and Drill Site Relocations (Zerga 1991c)					
46-6553		Tailings Disposal Facility	NEL	Yes	NA
46-6554		Tailings Disposal Facility	NEL	Yes	NA
ARS Survey (Young 1992) (ARS)					
227 Sites 84 Isolates	Lithic Scatters; Trash Scatters; Historic Habitation Sites; Prospecting Areas; Historic Wood Cutting Sites; Mines; Historic Bridge; Wickiup	Tailings Disposal Facility; Copper Heap Leach Facility; Concentrator Area; Altman Dump; Transmission Line	NEL	Yes	NA
46-6840[1]*	Mine		NEV	No	AV
46-6877[2]*	Trash Scatter with Prehistoric Component	Tailings Disposal Area	NEV	Yes	ME
46-6691[3]*	Lithic Scatter	Tailings Disposal Area	NEV	No	AV
Townsite of Riepetown (Mehls et al. 1992) (Hardesty et al. 1992 [WCRM])					
26WP2868	Historic Townsite (486 features)	Concentrator Area	E	Yes	ME (completed)
PM_{10} Air Monitoring Site Survey (Peterson 1993a) (WCRM)					
7 sites	Historic Building Sites, Lithic Scatter, Prospects, Trash Scatter		NEL	No	NA

Table 3-18 (Continued)

Agency Site No. or Smithsonian No.	Brief Site Description	Project Association	NRHP Potential	Project Disturbance	Mitigation
Administration Building Site Survey (Peterson 1993b) (WCRM)					
7 Sites	Lithic Scatters, Trash Scatters	Administration Area	NEL	No	NA
1 Site	Historic Feature Complex		JI	-- (location information pending publication of amended report)	
4.2 Miles of Transmission Line Survey (Kolvet 1993a,b)					
2 Sites	Lithic Scatters	Transmission Lines	JI	Yes	NA
Magma Parcel Survey (Stoner et al. 1993) (WCRM)					
68 Sites	Lithic Scatters, Prospecting Areas, Mines and Mine Scatters, Historic Habitat Sites, Domestic Trash Scatter, Trash Dumps, Prospecting Camps, Mining Machinery	Tripp/Veteran Dump, Tripp/Veteran Pit, Tailings Disposal Facility, Administration Area, Sunshine/Puritan Dump, Copper Heap Leach Facilities, Ruth Dump, Altman Dump	JI	Yes	NA
46-7318	Lithic Scatter		E	Yes	ME (completed)
CRNV 04-546	Northern Nevada Railroad		JI		
46-7361	Prospecting Camp and Lithic Scatter	Tripp-Veteran Pit	JE	Yes	ME
46-7396	Mine	Tripp-Veteran Pit	JE	Yes	ME
46-7404	Mine with Prehistoric Isolate	Access Corridor	JE	Yes	ME
Waterline Survey (Stoner et al. 1993) WCRM					
13 Sites	Lithic Scatters, Prospecting Areas, Trash Scatter, Mine		JI	Yes	NA
	Old Lincoln Highway		JI	Yes	NA

Table 3-18 (Continued)

Agency Site No. or Smithsonian No.	Brief Site Description	Project Association	NRHP Potential	Project Disturbance	Mitigation
ARS Sites Re-evaluated (Stoner et al. 1993) WCRM					
23 Sites[4]	Lithic Scatters, Historic Wood Cutting Area, Quarry, Historic Habitat Site, Historic Tent Flat, Trash Scatter		JI	Yes	NA
46-6712	Lithic Scatter with Historic Component	Tailings Disposal Area	JE	Yes	ME
46-6771	Lithic Scatter	Tailings Disposal Area	E	Yes	ME (completed)

[1]Site 46-6840 is located outside the area of impact for RMLP's current project.

[2]Site 46-6877 was not relocated by WCRM (Stoner et al. 1993) due to lack of data.

[3]Site 46-6691 is located on the boundary of the Robinson Mine proposed project.

[4]This total includes 3 sites (46-6842, 46-6849, and 46-6856) that Magma requested WCRM to re-evaluated.

*Although recommended by the SHPO for reevaluation in WCRM's "ARS Sites Re-evaluated" program (Stoner et al. 1993), this site was not re-evaluated by WCRM either because WCRM was unable to relocate the site or because the site was avoided by the Proposed Action.

E = eligible (SHPO concurrence)
JE = Judged eligible
JI = Judged ineligible (pending SHPO concurrence)
NEL = Not eligible (SHPO concurrence)
NEV = eligible pending further evaluation (SHPO concurrence)

AV = Avoid
ME = Mitigative Excavations
NA = No Action

the SHPO as eligible for inclusion in the NRHP as a district under 36 CFR 60.4 criteria a. and d. in 1992, a data recovery plan was proposed in the summer of 1992 to mitigate potential adverse effects to the district (Hardesty et al. 1992). Data recovery from the Riepetown town site commenced in September 1992 and ended in January 1993. Published results from the data recovery program are pending (Stoner 1993).

Six additional Class III cultural resource inventories were conducted by WCRM in the proposed mining area and transmission line right-of-way in 1993. In April 1993, approximately 16.5 acres of the proposed administration building location area were inventoried. The inventory located eight sites, including four primarily historic and four primarily prehistoric sites and two isolated prehistoric artifacts. Two of the sites were evaluated for significance. None of the sites was recommended as eligible for the NRHP, and no further archaeological work was recommended (Peterson 1993b). Additional evaluation of another property within the administration area was completed in fall 1993. Published results from this survey are pending (Stoner et al. 1993).

In April, May, and June 1993, WCRM conducted a Class III inventory of approximately 4.2 miles along the eastern portion of the proposed transmission line. The inventory recorded and evaluated previously recorded site 26-Wp-693 (46-888P) and recorded five isolates. WCRM reinventoried the previously recorded site and conducted limited subsurface probing. Neither the site or the five isolates were determined eligible for the NRHP. No additional work was recommended as a result of this survey (Kolvet 1993a).

WCRM inventoried 0.97 miles of proposed road and powerline alignment within a 100-foot-right-of-way for the mine area's PM-10 air monitoring station in June and July 1993. Seven archaeological sites were located during the inventory; two sites were primarily historic, four were primarily prehistoric, and one site had both prehistoric and historic components. None of the sites were considered eligible for the NRHP, and no additional archaeological work was recommended (Peterson 1993a).

During the 1992 and 1993 field seasons, WCRM performed Class III cultural resources inventories on 18 block parcels, a pipeline and access road corridor, and a waterline right-of-way. The parcel survey, which also included investigations of the pipeline/access road areas and the extant roadbed of the old Nevada Northern Railroad, resulted in the identification of 72 new archaeological sites. The sites included lithic scatters, trash dumps and scatters, prospecting areas and mines, and historic habitation sites (Demuth 1993a). Four of the newly recorded sites, including prehistoric site CrNV-46-7318, multicomponent sites 46-7361 and 46-7404, and historic site 46-7396 have been recommended as eligible for the NRHP. The old Nevada Northern Railroad between mileposts 128 (near McGill) and 148 (near Ruth) has been determined eligible for the NRHP based upon a December 1, 1987, Memorandum of Agreement between NDHPA, the Nevada Northern Railway Company, the Interstate Commerce Commission, the White Pine Historical Foundation, and the City of Ely. Portions of the railway outside these mileposts have been judged ineligible pending concurrence with the BLM and SHPO (Stoner et al. 1993).

The waterline inventory, which also included investigation and evaluation of the previously identified route of the Old Lincoln Highway, located 13 sites. These sites, which included lithic scatters, prospecting areas, trash scatters, and mines, were judged ineligible pending SHPO concurrence (Demuth 1993a). WCRM also recommended that the Old Lincoln Highway was not eligible for the NRHP pending concurrence from the BLM and SHPO due to roadbed and marker sign degradation (Demuth 1994).

WCRM also re-evaluated for NRHP eligibility 25 sites previously recorded by ARS in the Giroux and White River Wash areas. The investigation included study of surface material, limited subsurface probing, and re-recording of sites as needed. The SHPO had originally recommended 25 ARS sites for re-evaluation. WCRM re-evaluated only 22 of these original 25 sites. Three of the 25 sites, a lithic scatter (46-6691), a mine (46-6840), and a trash scatter with a prehistoric component (46-6877), had been deemed eligible, in accordance with 36 CFR 60.4 criteria, for nomination to the NRHP, pending further evaluation and concurrence by the SHPO (Demuth 1993a). These sites, however, were not re-evaluated by WCRM either because the sites could not be relocated or would not be disturbed by the Proposed Action. Three additional sites previously located by ARS were recommended by Magma for re-evaluation. These sites (46-6842, 46-6849, and 46-6856) were investigated by WCRM as part of the "ARS Sites Re-evaluated" project.

Two of the previously recorded 25 sites are eligible for the NRHP (prehistoric sites CrNV-46-6771 and 46-6712). A data recovery plan was developed, submitted, and accepted by the BLM, the Nevada SHPO, and the President's ACHP for the site, CrNV-46-6771, and an associated site, 46-7318 (Stoner et al. 1993). Data recovery on the two sites was completed in November 1993 and publication of the results is pending.

An inventory of reroutes in the proposed transmission line corridor was conducted by WCRM in November 1993. One site, a lithic scatter (46-7465), was located and judged ineligible pending concurrence from the SHPO. Published results from this survey are pending (Demuth 1993b).

Of the 336 sites identified in the mine area by the end of 1993, 3 have been judged eligible for the NRHP; 4 have been judged eligible pending SHPO concurrence; 3 have been judged eligible pending further evaluation; 104 are judged ineligible pending SHPO concurrence; and 222 have been found not eligible for the NRHP.

3.17.3 Ethnography

The proposed project area was traditionally occupied by the Western Shoshone, including the Goshute. Their territory extended from southeastern California, near Death Valley through central and northeastern Nevada into northwestern Utah. The northern boundary generally corresponds to the Idaho state line; the western boundary was roughly the Humboldt River drainage. With the exception of the Goshute, the eastern boundary of the Western Shoshone territory was the Utah-Nevada state line (Dames & Moore 1992).

Goshute territory extended into Utah to the Wasatch Mountains and was bounded on the north by the Great Salt Lake and the south by the northern edge of Sevier Lake. The Goshute population was concentrated around the southern portion of the Great Salt Lake Desert in the Deep Creek Range area on the Nevada-Utah border and the area south of the Great Salt Lake in Tooele and Skull Valleys (Dames & Moore 1992). The Western Shoshone population was generally centered in broad valleys located between north-south trending mountain ranges (Steward 1938). The harsh environment and lack of water and resources kept group sizes small.

The Shoshone followed a systematic, seasonal foraging round. Small, relatively isolated groups foraged in the spring, summer, and fall, collecting edible greens in the lowlands in the spring; seeds, berries and roots from the foothills and valleys in the summer; and piñon nuts in the foothills between 5,000 and 8,000 feet in the fall. In winter, larger and more stable villages were formed; these winter camps were generally located in the low foothills near seed and nut caches (Dames & Moore 1992; Steward 1938).

Plant resources, particularly pine nuts, were staples of the Western Shoshone diet. Seeds and berries were gathered in moister areas, usually mountains, marshes, and stream borders. Meat from deer, bighorn sheep, and antelope supplemented the diet of the Western Shoshone (Dames & Moore 1992). In Goshute territory, smaller game, such as rabbits, lizards, snakes, fish, birds, and insects, played a larger role in subsistence practices (Steward 1938).

Corrals, snares, traps, nests, skewers, and deadfalls were used for hunting. Baskets were used for collecting plant material, carrying water, and preparing food. Manos and metates were used for grinding. Stone tools were made from obsidian, flint, and other metamorphic and igneous rocks. Pottery was made in the pre-contact period, but production appears to have been discontinued following contact (Dames & Moore 1992).

Shelters were simple and included caves and rockshelters or conical brush shelters made of juniper poles thatched with bark and branches; in summer semicircular structures made of sagebrush acted as windbreaks and sunshades (Dames & Moore 1992).

Western Shoshone religious activities were generally centered around the cure and prevention of illness and the hunting of large game, particularly antelope. Curative powers were limited to shamans. Shamans also used their powers to charm the souls of antelope and ensure the success of the hunt. The Round Dance was the primary group ceremonial activity. The Goshute held their Round Dance during the spring in conjunction with the antelope drive. The Shoshone of eastern Nevada performed the Round Dance generally during the fall at the time of the piñon harvest (Steward 1938; Dames & Moore 1992). The Western Shoshone cremated their dead, burned the bodies in the structure where the person died, or buried the body in caves, rock slides, or talus slopes (Dames & Moore 1992).

Notification and requests for comment (scoping) letters were sent to the Tribal Chairs of the Ely Colony, the Goshute Reservation, and the Duckwater Reservation in February 1992 and again in January 1994. The letter notified the respective Native American groups of the proposed project and potential impacts to proto-historic cultural resources, and provided the Native American groups with an opportunity to express their comments or concerns regarding the Proposed Action. No response to the letters had been received as of this printing (April 1994).

3.18 PALEONTOLOGICAL RESOURCES

Paleontological resources in the proposed mine and transmission line area consist of invertebrate and paleobotanical fossils, including corals, algaes, mollusks, bryozoans, sponges, and crinoids, which occur in Mississippi, Pennsylvanian, Permian, and Tertiary-age formations (NBMG 1976; Spencer 1917).

No paleontological resources of critical scientific or educational value are known to occur within the proposed mine area (Repenning 1993; Henry 1993; Silverling 1993). The nearest significant vertebrate fossil assemblages known to occur in the vicinity of the Proposed Action are located in the Schell Valley east of Ely, in the Schell Creek Range approximately 15 miles southwest of the proposed mine area, 20 miles west of the proposed mine area in the White Pine Range, and 20 miles northwest of the Proposed Action in the Butte Mountains (Repenning 1993; NBMG 1976). No vertebrate fossil localities are known to occur within the proposed project area (Repenning 1993).

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter discusses anticipated direct and indirect impacts of the Proposed Action (Section 4.1), the No Action Alternative (Section 4.2), and three component alternatives for the Robinson Project. The alternative of Disposal of Waste Rock in Liberty Pit is discussed in Section 4.3, and the Reclamation Alternative is in Section 4.4.

Potential mitigation and monitoring measures developed in response to anticipated impacts are discussed in Section 4.5. All actions listed as mitigation measures have been developed by BLM and are not part of RMLP's Proposed Action. These measures could be required by BLM or other regulatory agencies as a condition or stipulation of approval and authorization of the Plan of Operations.

Cumulative impacts are discussed in Section 4.6. Unavoidable adverse impacts are described in Section 4.7; short-term uses compared to long-term productivity are discussed in Section 4.8; irreversible or irretrievable commitments of resources are presented in Section 4.9; and energy consumption for the Robinson Project is summarized in Section 4.10.

Changes to the sequence of mining as presented in Chapter 2.0 (other than mining Liberty Pit first) would not change the results of the impact analyses.

4.1 PROPOSED ACTION

4.1.1 Geology and Minerals

4.1.1.1 Mine Development/Operation

Direct impacts from the Proposed Action would include: 1) the widening and deepening of the Liberty, Veteran-Tripp, Ruth, Kimbley, and Wedge pits; 2) the generation of 1,193 acres of waste rock to be left on site in reclaimed waste rock disposal areas on or near existing waste rock piles; and 3) the generation and disposal of 280 million tons (2,174 acres) of new tailings in Giroux Wash. Additional potential impacts from the Proposed Action due to the exposure of sulfide-bearing rock to oxidation in waste dumps and pit walls are discussed in Section 4.1.2.

Approximately 292.4 million tons of mill and leach ore would be extracted from the Robinson Mining District and processed to yield 1.4 million tons of copper and 2.86 million ounces of gold. Mining would proceed 24 hours per day, 365 days a year at an average rate of 35,000 to 45,000 tons of ore and 75,000 to 180,000 tons of waste generated per day. Table 4-1 summarizes the planned production of ore and waste from the Robinson District as presented in Chapter 2.0. These resource estimates and planned production rates are subject to change by RMLP.

Construction of the Giroux Wash tailings disposal facility would require the installation of an earthfill embankment, construction of fluid collection systems, the tailings delivery system, and associated access and haul roads as discussed in Chapter 2.0. This would alter the local ground surface and the upper reaches of Giroux Wash would permanently contain the tailings. No cuts into existing hills are proposed, so there would be no anticipated impact on slope stability. The geologic materials underlying the proposed tailings facility should not be prone to subsidence under the anticipated load of either the East Unit

Table 4-1

Projected Mineable Ore, Low-Grade Stockpile, and Waste Robinson Project

	Mill Feed			Gold Leach			Oxide Copper Leach			Low-Grade Copper Stockpile			Waste	Total	Strip
	Tons (000)	% Cu	OPT Au	Tons (000)	% Cu	OPT Au	Tons (000)	% Cu	OPT Au	Tons (000)	% Cu	OPT Au	Tons (000)	Tons (000)	Ratio (W/O)
Liberty	60,153	0.548	0.0093	9,210	0.036	0.0086	4,148	0.431	0.0099	14,672	0.276	0.0063	108,482	196,665	2.27
Veteran-Tripp	102,274	0.601	0.0124	34,688	0.046	0.0092	13,723	0.487	0.0092	14,189	0.278	0.0086	279,826	445,151	3.33
Ruth	33,123	0.663	0.0078	0	0.000	0.0000	0	0.000	0.0000	0	0.000	0.0000	81,203	114,326	2.45
Kimbley	2,144	0.694	0.0079	0	0.000	0.0000	0	0.000	0.0000	0	0.000	0.0000	9,517	11,661	4.44
Wedge	3,675	0.844	0.0050	0	0.000	0.0000	0	0.000	0.0000	0	0.000	0.0000	8,245	11,920	2.24
Total	201,819	0.601	0.0105	43,899	0.044	0.0090	17,871	0.474	0.0094	28,861	0.277	0.0074	487,273	779,722	2.86

OPT = ounces per ton.

W/O = waste/ore.

Cu = copper.

Au = gold.

or the West Unit of the Giroux Wash tailings disposal area (Welsh Engineering 1990).

Activities associated with the gold and copper leaching operations would entail construction of heap leach pads and ponds and eventual transfer of the Keystone Dump to a new heap leach pad. This construction would require excavation, modification, and/or covering of existing in-place geologic materials. No identified resources would be impacted by surface activities related to gold and copper leaching.

Although a major earthquake (magnitude 3.0 or greater on the Richter Scale) is possible within the project area, such an earthquake is not anticipated due to the limited number of earthquakes that have occurred in the area.

4.1.1.2 Mine Closure and Reclamation

Potential slope failure in the Liberty Pit is a moderate hazard, but conservative design (Chapter 2.0) would alleviate this hazard.

4.1.2 Water Quantity and Quality

Construction and operation of the Proposed Action would result in the disturbance of 2,058 acres of previously disturbed lands and 3,297 acres of newly disturbed lands. Presently existing pit lakes would be enlarged, and an impoundment would be constructed in Giroux Wash that would receive tailings slurry liquids and solids.

The Proposed Action would also involve the removal of groundwater from the North Robinson Canyon and Keystone areas, from the Deep Ruth Shaft, and from the mined pits (pit dewatering) at an average rate of 3,500 gpm for the 15-year life of the proposed mining operation. This water would be reused in the milling and leaching operations. No water would be discharged into existing streams. Surface water runoff during and after mining operations would be controlled and diverted to existing surface drainages.

The Robinson Mining District has experienced over 100 years of mining activity beginning in the 1860s. EIS scoping comments identified a number of specific issues relating to surface water and groundwater quantity and quality. Field data collected in 1993 and 1994 have provided substantial information relevant to assessment of these issues. In addition, a number of laboratory experiments and modeling studies have been conducted to generate additional data on these issues. The data generated, technical analyses, and conclusions reached are set out in a separate technical report prepared by PTI Environmental Services, Inc. (PTI). This report is on file at BLM's office in Ely and should be consulted for detailed information on the assessment of water quality and water quantity issues raised.

4.1.2.1 Mine Development/Operation

Surface Water

Three major surface drainage basins occur in the vicinity of the project: Gleason Creek, Giroux Wash (White River Drainage), and Murry Creek Canyon. The majority of existing surface disturbance is located within the Gleason Creek drainage. However, large portions of the area currently drain into the Liberty, Ruth, Kimbley, and Veteran-Tripp Pits. The Proposed Action would increase the total surface area draining into these pits. There are currently a number of unvegetated mine dumps with no sediment control features within the Gleason Creek drainage; additional dumps would be created by the Proposed Action. During operations, much of the disturbed area would be bare rock or soil. Surface drainage would be subject to stormwater control practices, including ditching, contour plowing, temporary water bars, seeding of disturbed areas, and sediment traps (straw bales, silt fences, riprap and sediment basins) to prevent sediment-laden runoff. Fisher Canyon (a tributary to Gleason Creek) would be relocated around the Copper Leach Facility ***(which would disturb about 0.2 acre of intermittent drainage)*** and would be protected from impacts by the stormwater control practices. Even with various sediment controls, there would be a short-term increase in sediment-laden runoff into the Gleason Creek drainage.

In the Giroux Wash area, three principal mine components would affect surface drainage patterns: the tailings impoundment and associated facilities (roads, soil stockpiles, the diversion ditch, and seepage ponds), gold leach Pad E, and the expansion of the Veteran-Tripp Dump. The tailings impoundment area and gold leach pad are designed for no discharge to surface drainages. All surface drainage directly within their respective footprints would be fully contained and surrounding surface drainage would be diverted around them. There would be a small decrease in natural sediment flow from these areas during intense storm events, when natural sediment flows otherwise would be expected to be high. Expansion of the Veteran-Tripp Pit would increase the surface area drainage into the pit by approximately 46 acres, from 331 to 377 acres. This surface area would be permanently removed from the Giroux Wash surface drainage watershed. The expansion of the Veteran-Tripp Dump would add 340 acres of new disturbance to the watershed. However, during operations, all of the runoff from this component would be directed into the tailings impoundment, so that no potential for increasing sediment loads to Giroux Wash would occur.

None of the proposed project activities are located within the Murry Creek Canyon drainage, and therefore there would be no effect on surface water flows in that drainage. Surface disturbances would not directly impact any springs in the area, as none of the springs are located where project activities occur. Potential indirect effects to spring flows from project groundwater pumping and withdrawals are discussed later in this section.

The mine facilities, including the concentrator, gold and copper leach operations, and SX/EW plant, would be designed to fully contain all process solutions with no discharge to surface waters, as outlined in Chapter 2.0. Stormwater runoff would be diverted to collection and detention structures designed to hold runoff from the 24-hour, 100-year storm event. Installation of these systems would eliminate the potential for excess sediment transport from both mined and disturbed areas to Gleason Creek or Giroux Wash and the White River drainage. Any discharge that may reach existing streams would be in compliance with RMLP's National Pollutant Discharge Elimination System stormwater discharge permit and state of Nevada regulations. Thus, increased soil erosion is expected from the Proposed Action, but it would be contained by planned diversion and detention structures.

The stormwater pollution prevention plan outlined in Chapter 2.0 would contain any surface effluent from waste rock dumps, leach pads, or the tailings impoundment. Since the leach pads would be constructed on an impermeable liner, the only potential threat to stream water quality is from subsurface flow of effluent from the waste rock dumps and the tailings impoundment. Subsurface effluent flow from the tailings impoundment will be discussed later. The design of the waste rock dumps as described in Chapter 2.0 and the storm water management plan would limit the infiltration of water into the waste rock dumps. Currently, many of the waste rock dumps have surface depressions that collect rain water and snowmelt. These waters can react with the sulfides in the waste rock dumps and become acidic. These depressions would be covered and the waste rock dumps recontoured to prevent surface water accumulation. Also, existing acidic seeps from the Veteran-Tripp and Sunshine-Puritan waste rock dumps would be eliminated. The Veteran-Tripp waste rock dump would be expanded with new waste rock as part of the Proposed Action after the acidic seep is eliminated. Based on field measurements of existing conditions, laboratory testing, and computer modeling, the potential effluent from the new waste rock dumps is expected to contain sulfate and total dissolved solids (TDS) within Nevada secondary drinking water standards, to have a near-neutral pH, and to contain heavy metals concentrations below the Nevada water standards (PTI 1994). Thus, degradation of surface water in streams by effluent from waste rock dumps is not expected.

All petroleum products would be stored above-ground in tanks surrounded by a secondary containment area that can hold 110 percent of the volume of the largest tank enclosed. An SPCC Plan would be prepared and implemented pursuant to the requirements of the Federal Water Pollution Control Act, as amended. This act specifies the types of storage vessels to be used for each petroleum product, quantities to be stored, containment requirements, rates of flow and potential flow paths in the event of a spill or leak, and both cleanup and inspection requirements. Therefore, the potential for petroleum product degradation of nearby streams would be minimal.

Removal of groundwater from the North Robinson Canyon and Keystone areas through pumping would lower the shallow groundwater table in the Gleason Creek area of Robinson Canyon. Results of groundwater flow and drawdown modeling (PTI 1994) indicate that the water table would drop up to 100 feet in the Gleason Creek area by the end of mining (after 15 years). Potential drawdown and impacts on the water table are discussed in Section 4.1.2.2. Flow in Gleason Creek comes from precipitation, storm runoff, and base flow from the shallow, tributary groundwater. Lowering of the water table in the vicinity of Gleason Creek, coupled with decreased storm runoff due to diversions in and around the mined area, would reduce surface flow in Gleason Creek. However, this stream is intermittent and often does not flow during any given year (Section 3.2). Stormwater runoff from the north side of Gleason Creek would continue without interruption.

Surface water in Tonopah Canyon, the White River Valley, and the Steptoe Valley Basin would not be affected by the Proposed Action. Tonopah Canyon lies outside the area of proposed mining, while White River Valley and Steptoe Valley are too far removed (10 miles or more) from the Mining District to be impacted by changes in surface water flow or surface water quality.

No impact from the Proposed Action is expected on the Colorado River Basin. The only flow in the project area that could potentially reach the Colorado River Basin is down Giroux Wash. This wash has an intermittent stream that is usually dry. Thus, no impact on the salinity of the Colorado River Basin due to surface water flow or diversions from and near the Proposed Action is expected. Approximately 3.5 acres of intermittent stream channel within the area of the tailings disposal facility, which are subject to regulation by the COE pursuant to Section 404 of the Clean Water Act (CWA), would be disturbed permanently by the proposed impoundment.

There are two possible scenarios for a breaching of the Giroux Wash tailings embankment: 1) earthquake-induced tailings flow, and 2) breaching due to the 24-hour, 100-year flood. Woodward-Clyde Consultants (BLM 1993b; BLM 1992a) evaluated the impact of earthquake-induced tailings dam failure using the National Weather Service's Dambreak Model (BOSS Version 2.0). Assuming a breaching of the dam by an earthquake at full height (200 feet) near the end of mining, the maximum inundation downstream for tailings flow would be 2.2 miles if the entire volume of tailings flowed. If only 24 percent of the tailings flowed, the inundation distance would be less than 1 mile. Details of this modeling, including a diagram of the impact area of tailings flow on Giroux Wash, are on file with the Ely BLM (Technical Report B: BLM 1992a). Seismic potential is discussed in Section 4.1. The maximum distance of material flow down the Giroux Wash drainage from breaching of the dam by the 100-year flood would be 15 miles, where Jakes Wash enters Preston Reservoir. Any residual tailings that are transported this far would settle out in the Reservoir and not be transported farther downstream. This would not impact current or planned domestic or agricultural use of the valley, and the flow of tailings material would have minimal, if any, impact on the salinity of the Colorado River Basin in Nevada. The tailings material would remain in the valley after a breach of the tailings dam. Rainwater would leach sulfate out of the tailings and carry it through the alluvium to groundwater. However, the concentration of sulfate at the water table would be far less than that modeled for the tailings impoundment as discussed later. Thus, the tailings in the valley after a potential breach of the dam would not pose a threat to groundwater.

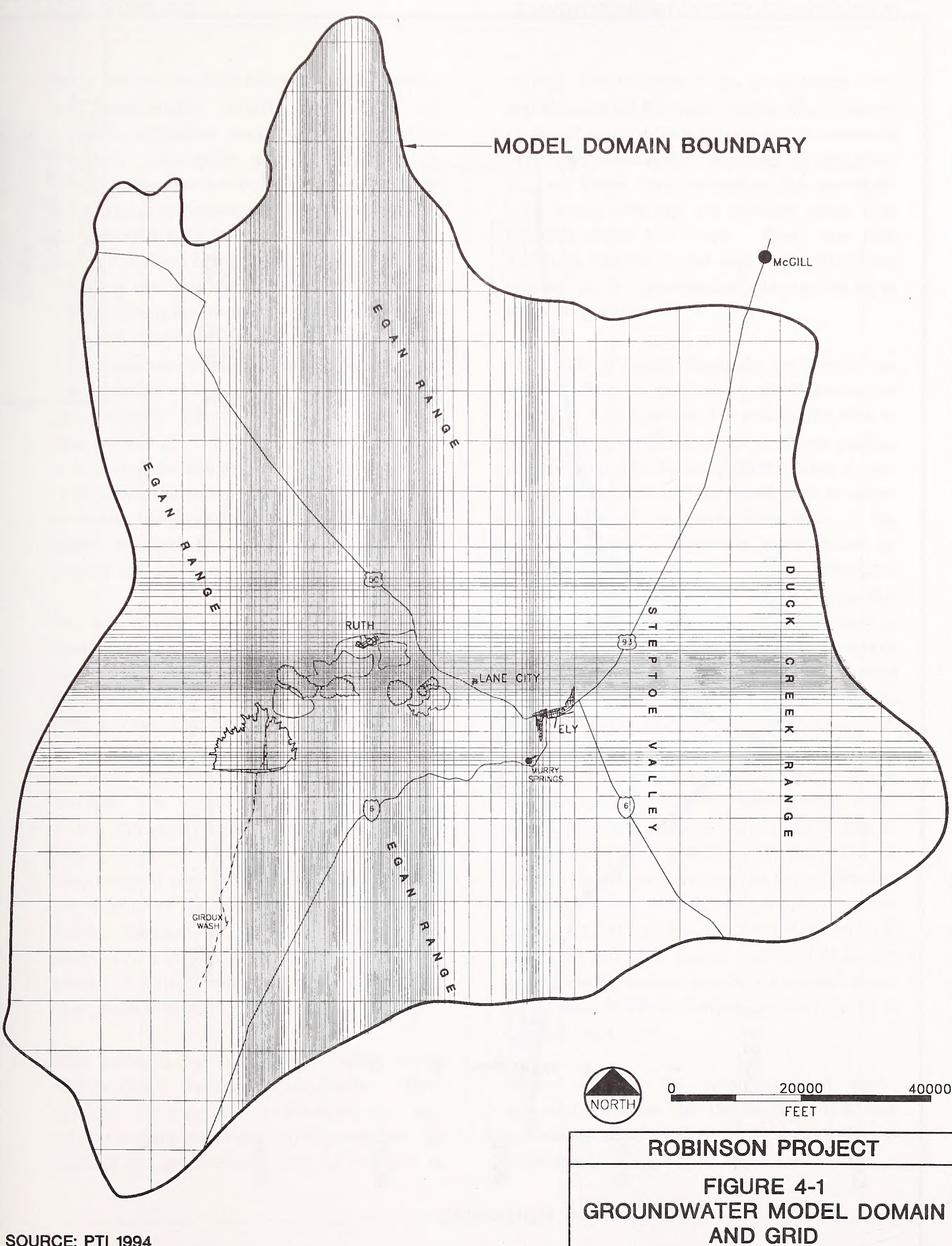
Groundwater

Groundwater in and around the proposed mining area would be impacted by drawdown caused by pumping of an average of 3,500 gpm for the 15-year life of the mining operation. The effects of pumping were analyzed using the most recent version (August 1993) of the USGS groundwater modeling program MODFLOW (McDonald and Harbaugh 1984). This analysis was conducted by PTI and the detailed approach and results are presented in the water technical report (PTI 1994). The modeled domain, model grid, and model layers used are shown in Figures 4-1 and 4-2.

The modeled area extends approximately 30 miles in the north-south direction and 25 miles east to west, with the Robinson District located in the approximate center of the model. The model was developed to include the entire area of concern for pumping, as well as to provide high resolution, both laterally and vertically, in the areas of the pits, pumping wells, and Murry Springs. The model consists of nine vertical layers, extending from Ward Mountain at 10,800 feet to a depth of 3,000 feet above mean sea level. The model contains approximately 65,000 active cells.

Local geology in the pit area was determined from the geologic models developed by Magma Copper Company using extensive borehole data, and regional geology was determined from available geologic maps. The regional geology was incorporated into the model using available USGS geologic quadrangles and cross-sections, as well as the Robinson District map prepared by Kennecott (1991). Thirty-one major faults were identified and incorporated into the groundwater model.

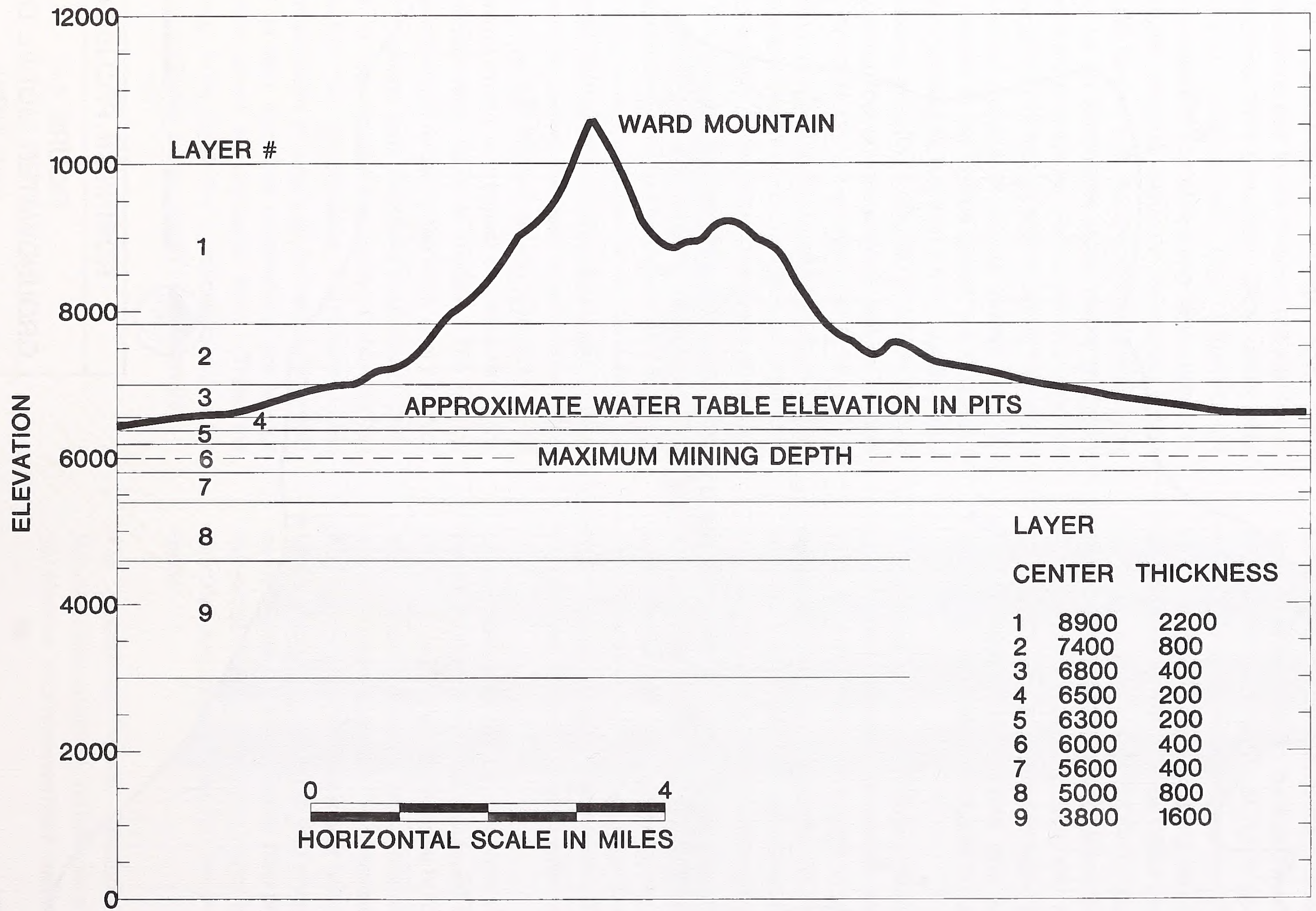
The groundwater model developed for the Robinson Mining District and the area surrounding Ely, Nevada, encompasses highly varied geology,



ROBINSON PROJECT

FIGURE 4-1
GROUNDWATER MODEL DOMAIN AND GRID

SOURCE: PTI 1994



SOURCE: PTI 1994

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FIGURE 4-2
GROUNDWATER
MODEL LAYERS

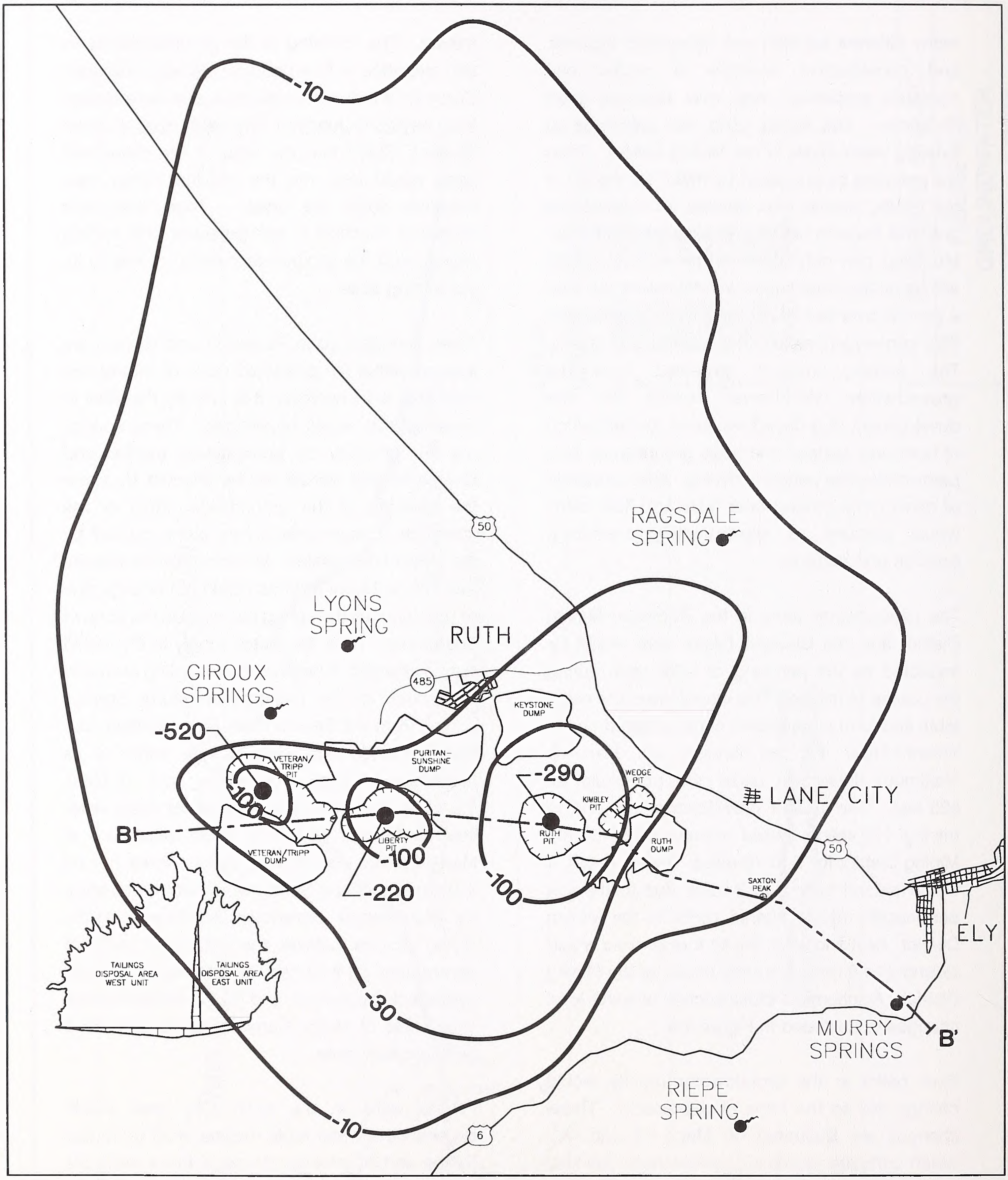
many different aquifers and hydrologic regimes, and considerable variation in aquifer and hydraulic properties, even over relatively short distances. The model used was calibrated to existing water levels in the Mining District. Then the pumping as proposed by RMLP for the life of the mining activity was applied to estimate the potential impacts of this groundwater withdrawal. Modeling can only estimate the most probable effects of the groundwater withdrawal and provide a general overview of the most likely impacts and their consequences to water quantity and quality. The primary impacts expected from the groundwater withdrawal would be the development of a drawdown cone and alteration of both near surface and deep groundwater flow paths during the period of mining. After cessation of mining, the groundwater table and flow paths would rebound to approximately pre-mining position and patterns.

The groundwater table in the Robinson Mining District and the Gleason Creek area would be impacted by the pumping of 3,500 gpm during the course of mining. This would lower the water table and form a drawdown cone centered on the Veteran-Tripp Pit, as shown on Map 4-1. Maximum drawdown under the pit would be 520 feet. The 10-foot drawdown at the end of mining (15 years) would extend north of the Mining District for 8 to 10 miles. To the south, it would extend only 2 to 3 miles due to the low permeability of the altered rocks in the Mining District. East and west, the 10-foot contour would extend 2 to 3 miles from the center of the Mining District. A schematic cross-section of water level changes is illustrated in Figure 4-3.

Flow paths in the groundwater regime would change due to the cone of depression. These changes are illustrated on Maps 4-2 and 4-3, which compare premining conditions to the final state of the groundwater table at the end of mining. The lowering of the groundwater table and alteration of flow paths would affect Gleason Creek for 3 to 5 miles upstream and downstream from Keystone Junction; any water coming down Gleason Creek into the area of the drawdown cone would sink into the alluvium rather than continue down the creek. Thus, flow past Keystone Junction is not expected until mining ceases and the groundwater table returns to its pre-mining state.

Three springs (Lyons, Ragsdale, and Giroux) are located within the projected cone of depression (see Map 4-1); however, it is unlikely that flow to these springs would be affected. These springs are fed primarily by precipitation (rainfall and snowmelt) and should not be affected by either the lowering of the groundwater table or the alteration of near-surface flow paths caused by the cone of depression. Modeling results indicate that flow at Murry Springs would not change due to pumping, as the spring lies outside the cone of depression. Thus, the water supply to Ely would not be affected. However, the modeling assumed that much of the recharge to Murry Springs comes from the Saxton Peak area (Section 3.2). Murry Springs may also receive some of its recharge from deep groundwater flow. If this is the case, alteration of flow paths for deep water flow at the end of mining could affect flow at Murry Springs, but this reduction would not be substantial. Riepe Spring would not be affected by groundwater drawdown because: (1) the spring occurs outside the estimated cone of depression; (2) it is part of the Ward Mountain hydrogeologic system, and (3) it is located on the south side of Murry Canyon, which may be a geologic fault zone.

Private wells in the Lane City area would experience a water table decline of 30 to 50 feet by the end of mining. Some of these wells are shallow and may go dry until the water table



NOTE: MAXIMUM DRAWDOWN IS 520 FEET.
CONTOURS IN FEET.

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MAP 4-1
PROJECTED CONTOURS OF WATER TABLE CHANGE AT THE END OF MINING

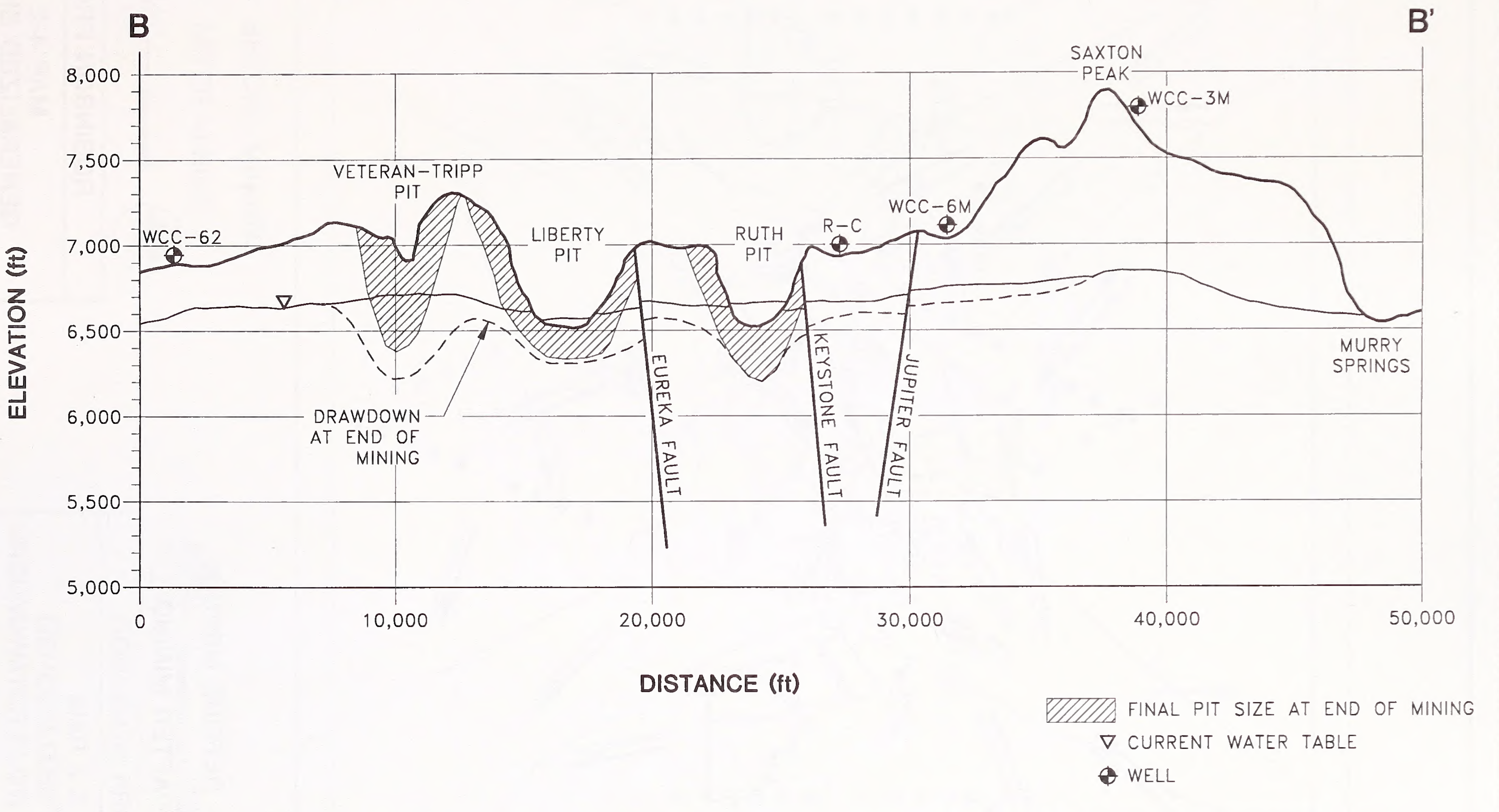

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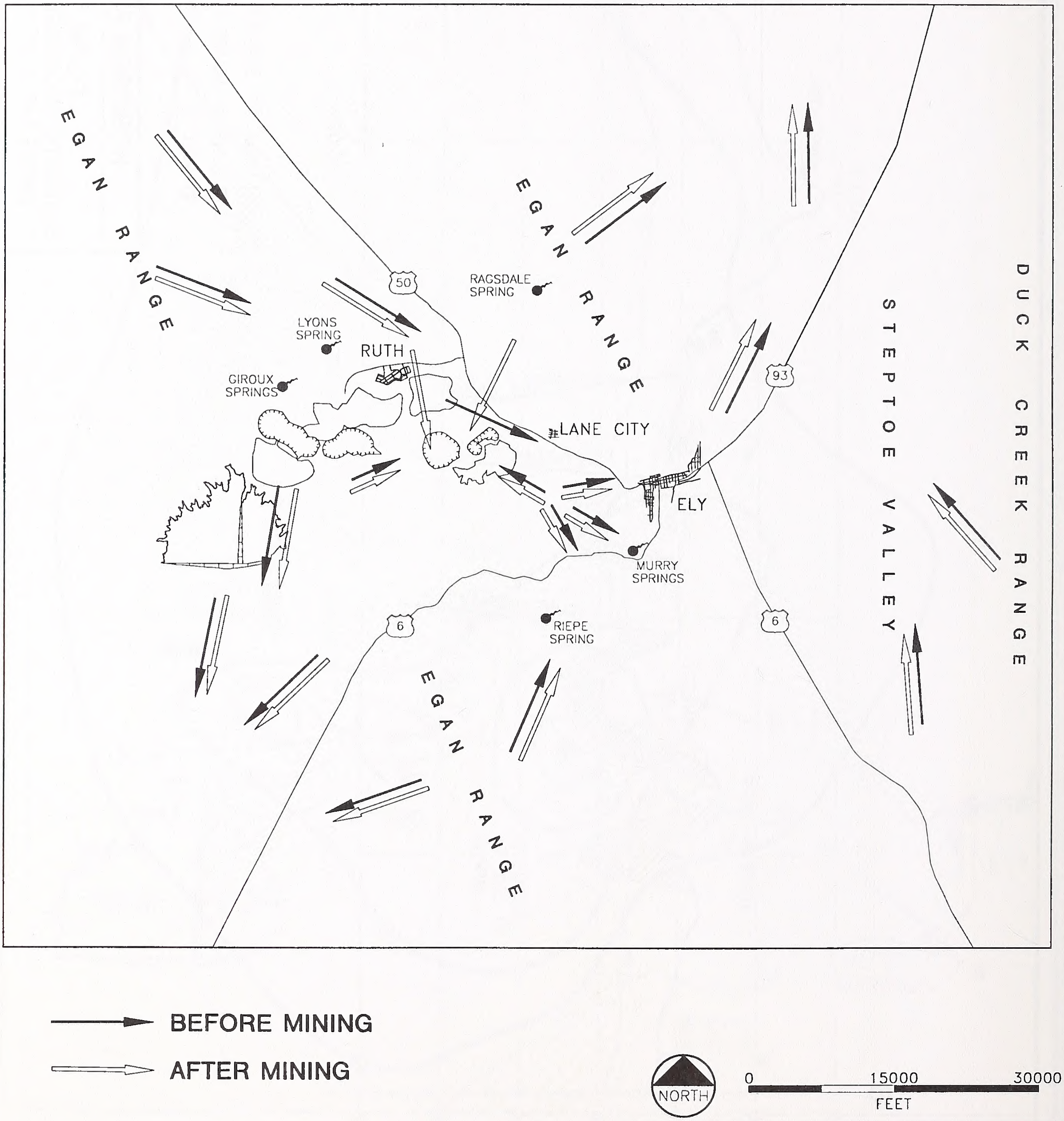
FIGURE 4-3
SCHEMATIC CROSS-SECTIONAL VIEW OF WATER TABLE AT END OF MINING



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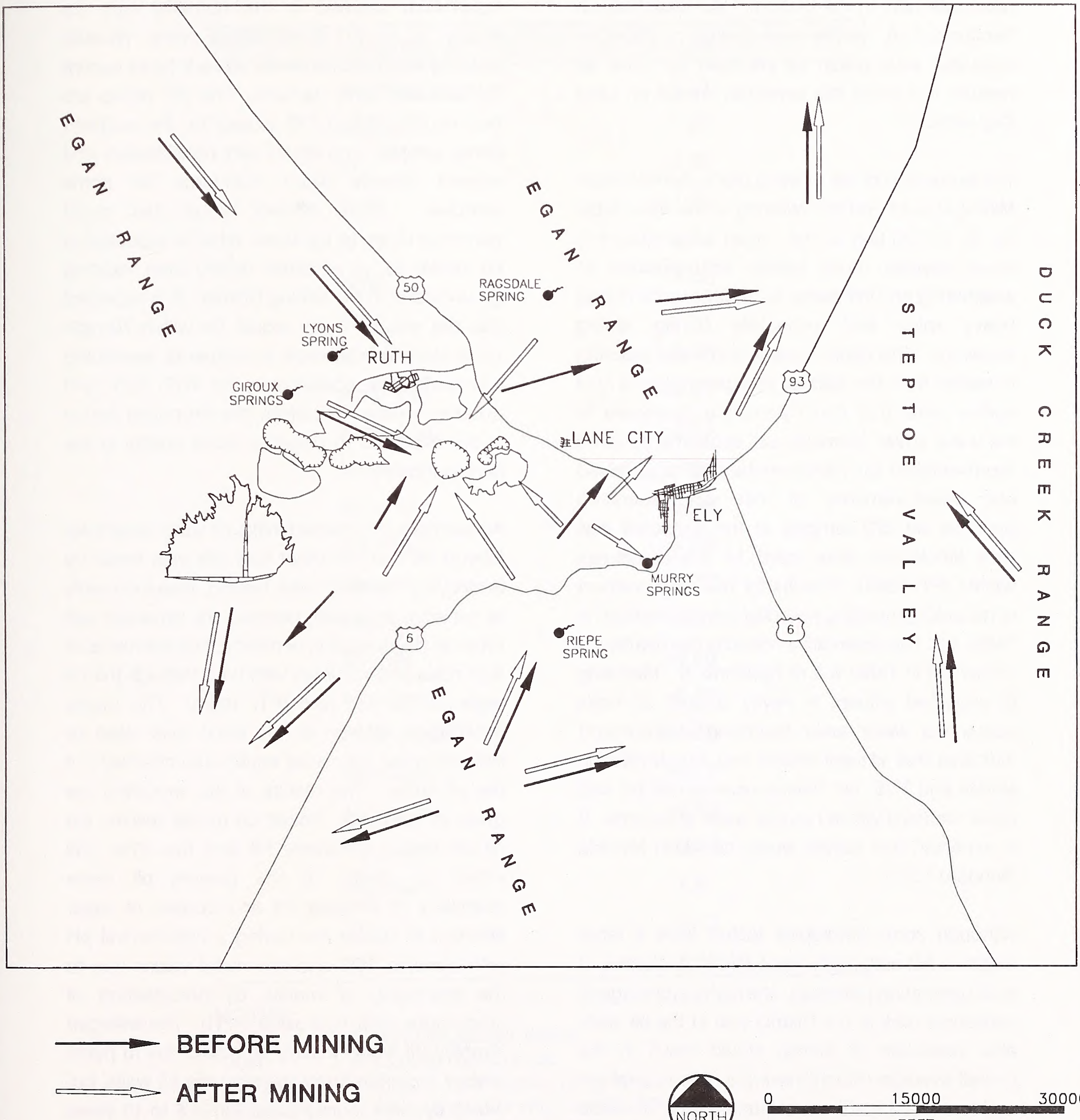
MAP 4-2
GENERALIZED SHALLOW
GROUNDWATER FLOW DIRECTIONS



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MAP 4-3
GENERALIZED DEEP
GROUNDWATER FLOW DIRECTIONS

rebounds after mine closure. As described in Section 2.2.16, an alternate source of water for impacted wells would be provided by RMLP as needed to correct this expected impact on Lane City wells.

The expansion of the existing pits in the Robinson Mining District and the lowering of the water table by 30 to 520 feet in the mined area (Map 4-1) could expose more sulfide mineralization to weathering and infiltration by surface water during heavy rains and especially during spring snowmelt. This could result in additional leaching of metals from the sulfides and generation of acid sulfate water that could percolate downward to the water table. Humidity cell experiments on 40 representative samples from the area to be mined and measurements of net acid-generating potential on 279 samples of the expected wall rock lithologies were used to model effluent waters (PTI 1994). Results for the measurement of net acid-generating potential are summarized in Table 4-2. Representative humidity cell results are presented in Table B-5 of Appendix B. Modeling of expected effluent in newly created pit walls above the water table (oxidizing environment) indicates that effluent waters may be elevated in sulfate and TDS, but have a near-neutral pH and metal loadings within Nevada water standards. It is expected that sulfate would be within Nevada standards also.

Although some lithologies tested have a large negative net carbonate value (NCV) (indicative of acid-generating potential), the high percentage of carbonate rock in the District and in the pit walls after cessation of mining would result in the overall average effluent having a near-neutral pH and low metal loadings. Neutralization of acidic waters generated by the overwhelming presence of carbonate would leave only sulfate and elevated TDS in the effluent waters. Humidity cell results support the NCV measurements. Equilibrium attained in the humidity cells by weeks 20 to 21 show sulfate within Nevada drinking water standards for all rock types except the acidified dump sample. The pH values are near-neutral (6.0 to 7.0) except for the acidified dump sample. Iron values vary considerably and exceed Nevada water standards for some samples. Thus, effluent water that could percolate down to the water table is expected to be similar to, or of better quality than, existing groundwater in the Mining District. It is expected that the effluent water would be within Nevada water standards for most constituents, exceeding standards only occasionally for TDS, iron, and possibly sulfate. Therefore, the Proposed Action is not expected to degrade water quality in the Mining District.

An estimate of expected initial pit water quality for Liberty Pit and the other four pits was made by employing humidity cells testing, measurements of net acid-generating potential for expected wall rocks at the cessation of mining, and estimates of flow rates and volumes with time through the pit walls as the pits refill (PTI 1994). The model MINTEQA2 (Allison et al. 1991) was used to determine the estimated equilibrium chemistry of the pit lakes. The results of this modeling are given in Table 4-3. Based on model results, the pit chemistry of Liberty Pit and the other pits would be similar to the present pit water chemistry of Kimbley Pit and consist of water elevated in sulfate but having a near-neutral pH with elevated TDS and low metal values due to the scavaging of metals by precipitation of amorphous ferric hydroxide (AFH). The enlarged Kimbley Pit would initially be acidic due to pyrite in the Chainman Shale found in the pit walls, but would become more neutral within 5 to 10 years as groundwater replaces acidic effluent generated in the pit walls.

Table 4-2

Net Acid Generating Potential

Rock Type	NCV
Acidified dump	-2.17
tailings	-1.67
Km	1.56
Kmp	-1.86
Kmp	-0.34
Kmp	-1.32
Kmp	-0.67
Kmp	0.57
Kmp qsp	-10.51
Kmp qsp	-2.15
Kmp qsp	-1.96
Kmp qsp	1.98
Mc hfls	1.28
Mc hfls	-20.72
Mc hfls	-4.31
Mc hfls	-0.45
Mc skarn	-4.71
Pe marble	34.39
Pe skarn	-8.17
Pe skarn	-4.26
Pe skarn	-0.94
Pe skarn	7.5
Tr	0.12
Tr	1.65

NOTES:
NCV = Net carbonate value.
Km = Quartz monzonite.
Kmp = Quartz monzonite porphyry.
Kmp qsp = Altered quartz monzonite porphyry.
Mc hfls = Metamorphosed Chainman shale.
Mc skarn = Metamorphosed limestone (Chainman).
Pe marble = Ely marble.
Pe skarn = Ely limestone skarn.
Tr = Rhyolite.

Table 4-3

Predicted Chemical Composition of Pit Lakes[1]
(mg/l)

	Tripp/Veteran	Liberty	Ruth	Kimbley	Wedge
Al	0.014	0.014	0.016	0.009	0.019
As	<0.001	<0.001	<0.001	<0.001	<0.001
Cd	<0.001	<0.001	<0.001	0.003	<0.001
Cu	<0.001	<0.001	<0.001	0.025	<0.001
Mn	33	32	27	33	1.3
Ni	<0.001	<0.001	<0.001	0.026	<0.001
Pb	<0.001	<0.001	<0.001	<0.001	<0.001
Se	0.084	0.052	0.047	0.082	0.038
Tl	0.082	0.049	0.060	0.083	0.072
Zn	<0.001	<0.001	<0.001	0.073	<0.001
Mg	66	47	32	74	38
SO_4	1400	1200	840	1,900	460
Ca	460	410	280	620	140
Fe	<0.001	<0.001	<0.001	0.025	<0.001
CO_3	24	24	27	0.79	33
pH	7.8	7.8	7.9	5.7	7.9

[1]At equilibrium with precipitated amorphous ferric hydroxide.

Water entering the dewatered Liberty Pit in February 1994 was sampled and had a pH of 5.6 with elevated sulfate, TDS, iron, manganese, copper, cadmium, and zinc (Table B-2). The Proposed Action is expected to improve the water quality in the pits by removing the presently acidic waters and allowing the pits to refill with waters that would be less acidic (near neutral pH), but still elevated above Nevada drinking water standards for sulfate, TDS, selenium, manganese, and thallium (Table 4-3). Selenium may exceed agricultural water standards, but the pit waters are not expected to be acidic, based on the modeling by PTI (1994).

The waste rock disposal dumps would contain pyrite. Oxidation and leaching of pyrite by infiltrated air and surface water could result in acidic effluent water that is laden with heavy metals. The chemistry of the effluent waters was estimated using computer modeling (PTI 1994). Effluent waters from waste rock dumps are expected to have a near-neutral pH and be within Nevada water standards for metals and sulfate. Total dissolved solids (TDS) may be elevated above drinking water standards. The resultant water chemistry is due to: 1) the low permeability of the waste dumps to oxygen and water, 2) the neutralization of acidic water generated by the abundant limestone found in the waste rock dumps, and 3) the precipitation of metal sulfates, carbonates, and hydroxides within the waste rock dumps due to reaction with contained carbonate. Humidity cell experiments (Table B-5) support the computer modeling and indicate that generation of acidic effluent is not likely. RMLP proposes to selectively mix carbonate rock with waste rock that may have an acid-generating potential to ensure that any effluent waters would not be acidic (see Section 2.2.16). Waste rock dumps currently producing acidic effluent, the Veteran-Tripp and Sunshine-Puritan Dumps, would be modified to eliminate the present acidic drainage, and drainage through future waste rock deposits would be controlled by contouring the dumps to minimize infiltration. Thus, waste rock dumps to be generated by the Proposed Action would not be expected to produce acidic effluent. The stormwater management plan described in Chapter 2.0 would direct run-on or contain any effluent that may leak from the waste rock dumps due to heavy precipitation or snowmelt.

Groundwater quality in the Mining District would not change under the Proposed Action. Humidity cell experiments (PTI 1994) show that both the expected pit lithology and the proposed waste rock piles would not be acid-generating. Furthermore, the high carbonate content of rocks that would remain in the District after mining would act to limit acid generation by infiltration waters. Current sulfate values in the Mining District are the result of equilibration over time between sulfide minerals in the altered and mineralized bedrock and groundwater. The proposed mining of copper and gold would remove some of the existing sulfides from the bedrock as the pits are widened and deepened; however, the overall groundwater quality in the Mining District, which has been affected by over 100 years of past mining activities, would remain as described in Section 3.2.2.7, elevated in sulfate (300 to 3,000 mg/l) and TDS (350 to 3,000 mg/l) with pH ranges from 6.5 to 8.6.

Approximately 280 million tons of tailings would be disposed of in the proposed Giroux Wash tailings facility. Tailings would be delivered and disposed of in two separate phases, as outlined in Chapter 2.0. The East Unit of Giroux Wash would be filled first to act as a barrier and holding facility for stormwater runoff from the east side of the valley. Then the larger West Unit of Giroux Wash would be filled with tailings as the mining progresses. Giroux Wash is an alluvial valley that has been relatively unaffected by past mining in the Robinson District. The tailings impoundment would be unlined, but the tailings fines (slimes) would have an estimated hydraulic conductivity of 1.0×10^{-6} cm/sec. Tailings water and rainfall would seep through the bottom of the impoundment into the underlying alluvial sediments. This seepage effluent would eventually reach the groundwater table in Giroux Wash. Seepage of tailings water through the impoundment dam would be collected in lined ponds and returned to the tailings impoundment pool.

Fluid flow modeling utilizing the USGS two-dimensional flow model VS2D/VS2DT (Lappala et al. 1987; Healy 1990) was used to estimate the potential flow of tailings effluent to groundwater (PTI 1994). This model is designed for unsaturated flow in alluvial sediments with multiple layers (variably saturated porous media flow). The model was run in a one-dimensional mode to simulate maximum flow to groundwater. The results indicate that the flow to the water table beneath the East Unit of Giroux Wash would have a maximum flow of 380 gpm to groundwater at year 5 after filling of the impoundment and would decrease thereafter to steady flow of around 20 gpm starting about year 50. For the West Unit of Giroux Wash, effluent flow would peak at 570 gpm at year 40 and decrease thereafter to a steady value around 30 gpm starting about year 200. The sum total of both units would have a peak flow of 380 gpm at year 5, then a decrease in flow followed by a rapid buildup starting around year 25 and continuing to a peak value of 570 to 600 gpm at year 40. The flow would steadily decrease to an average flow around 100 gpm by year 100 and slowly decrease with time to a steady flow rate of 30 to 50 gpm by year 200.

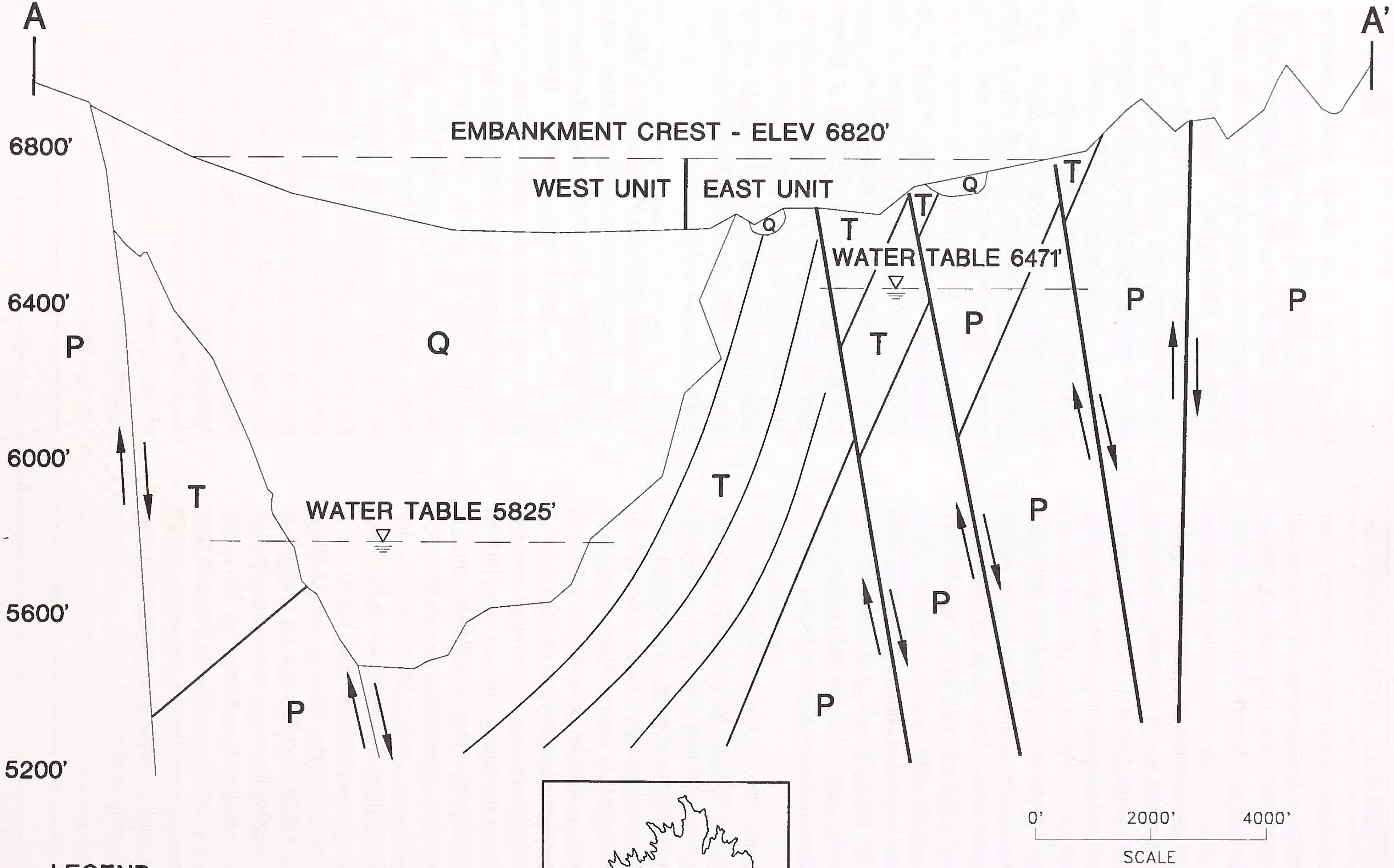
The tailings planned for disposal in Giroux Wash were subjected to a locked-cycle leach test that simulated the actual operations presented in the Proposed Action. The results of the locked-cycle test indicate that effluent waters would be elevated in sulfate (approximately 1,000 mg/l), but would have a near-neutral pH and be low in metals. Table B-4 in Appendix B provides more complete results of the locked-cycle test. In addition, tailings water was applied to undisturbed soil columns collected from the area of Giroux Wash that would be under the impoundment. Results of these experiments indicate that the concentrations of all chemicals in the tailings water except sulfate and TDS would be reduced as the chemicals move through the alluvium and bedrock beneath the impoundment. Thus, the Giroux Wash tailings are expected to produce effluent water with elevated sulfate and TDS, but otherwise the water would be within Nevada water quality standards.

Transport modeling of effluent water passing through the Giroux Wash alluvium using the USGS modeling code VS2D/VS2DT showed that by the time the effluent water reaches the groundwater table in the East Unit of Giroux Wash, the sulfate in the effluent water would be reduced from 1,000 mg/l (locked-cycle test) to a maximum value of 980 mg/l (PTI 1994). Similarly, for the West Unit of Giroux Wash, the sulfate would be reduced further to 700 mg/l because of the 770 feet of alluvium separating the base of the tailings impoundment from the groundwater table. Only 350 feet of alluvium are present beneath the East Unit of Giroux Wash. These peak sulfate values would occur after 223 years (year 223) for the East Unit of Giroux Wash and after 1,870 years for the West Unit of Giroux Wash. Sulfate flux to groundwater beneath the Giroux Wash tailings impoundment would lag considerable behind the water flux. The lag for the East Unit is 218 years, while the lag for the West Unit is 1,830 years. This lag in maximum sulfate concentration to groundwater would result from sulfate being diluted by and retained within the pore waters of the unsaturated alluvium as the flux of water from the impoundment initially passes through the alluvium (PTI 1994). As the alluvium approached saturation due to the passage of water from the impoundment, the retention of sulfate would decrease. Continued flux of water would then flush the sulfate out of the alluvium and carry it to the water table. Thus, the maximum movement of sulfate to groundwater would occur during lower water flux rates, causing the high value of the sulfate concentration peak. The sulfate concentrations for both units of the Giroux Wash impoundment decrease steadily after reaching their respective peak values. Starting around year 3000 after filling of the impoundment, it is estimated that both water flux and sulfate flux to the water table beneath the impoundment would be minimal.

To estimate the sulfate concentration in groundwater 1,500 feet downgradient from the tailings impoundment at well WCC-G1 (NDEP-designated point of compliance), an analytical model (Galya 1987) was used to estimate the effect of mixing effluent waters and groundwater. Results showed an estimated maximum sulfate concentration of 230 mg/l (PTI 1994). This peak value would occur at year 800 and decrease thereafter. The Nevada drinking water standard for sulfate is 500 mg/l, so it is anticipated that groundwater would be within Nevada drinking water standards at the downgradient point of compliance for the life of the Giroux Wash tailings impoundment. As a requirement of its Water Pollution Control Permit issued by NDEP, RMLP would be required to prepare and implement a monitoring plan for groundwater in the Giroux Wash area. The permit requires "a system for monitoring the most likely flow pathways in the unsaturated zone". NDEP and BLM would review and approve this plan prior to deposition of tailings.

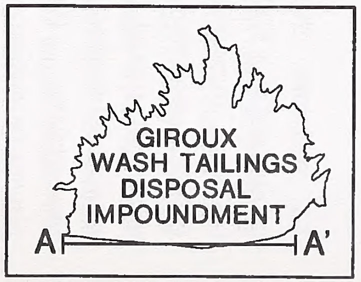
Giroux Wash is an alluvial valley containing low-permeability clay layers that formed as lake beds, overbank deposits during floods, and as fine-grained clay and silt zones in the alluvial depositional environment. The concern was identified that one or more shallow, low-permeability clay layers could intercept effluent water from the tailings impoundment and create a perched water table, resulting in mounding of effluent water beneath the impoundment. If the mounding occurred at a shallow depth, flow of effluent waters from beneath the tailings impoundment out to the surface would be possible. The results of soil borings and permeability tests performed by WESTEC (1994) concluded that clay layers in the alluvium are discontinuous and should not cause mounding. Thus, surface discharge of effluent waters from beneath the impoundment due to mounding should not occur. Monitoring for surface seepage would be part of the overall monitoring plan for the Giroux Wash tailings facility.

The east side of Giroux Wash contains inferred northwest-trending basin margin faults that bound the alluvial valley and separate the alluvial basin from the ridge-forming Arcturus Formation limestone (Figure 4-4). Some of these inferred faults may pass under the area of the proposed East Unit of Giroux Wash. Alluvium and clastic volcanic rocks directly underlie the area, and should prohibit fluid flow into the faults. No springs are currently known to occur from the inferred faults, and thus it is not expected that tailings effluent would surface. The inferred faults are not expected to be a water quality concern. No sensitive receptors or uses are found in the area up to 15 miles downstream from the impoundment. The monitoring plan for the Giroux Wash tailings facility would include field checking of the inferred faults for possible seepage of tailings effluent.



LEGEND:
T = TERTIARY VOLCANICS
P = ARCTURUS LIMESTONE
Q = QUATERNARY ALLUVIUM

SOURCE: PTI 1994



CROSS SECTION LOCATION

ROBINSON PROJECT

FIGURE 4-4
SCHEMATIC GEOLOGIC CROSS SECTION OF GIROUX WASH

4.1.2.2 Mine Closure and Reclamation

Surface Water

Subsequent to mining, the tailings impoundment, leach pads, and waste dumps would be contoured and reclaimed. Reclamation would include contour furrowing, berming, and revegetation to reduce rapid surface runoff and promote infiltration of precipitation. Free drainage would be restored to those facilities. Drainage diversions installed during project construction would be left in place to prevent run-on of surface flows from adjacent lands to reclaimed areas. The diversion structures would also limit runoff of precipitation from reclaimed areas. Monitoring and closure of the Giroux Wash tailings facility would be in accordance with the NDEP Water Pollution Control Permit issued to RMLP and NAC 445.24388.2.

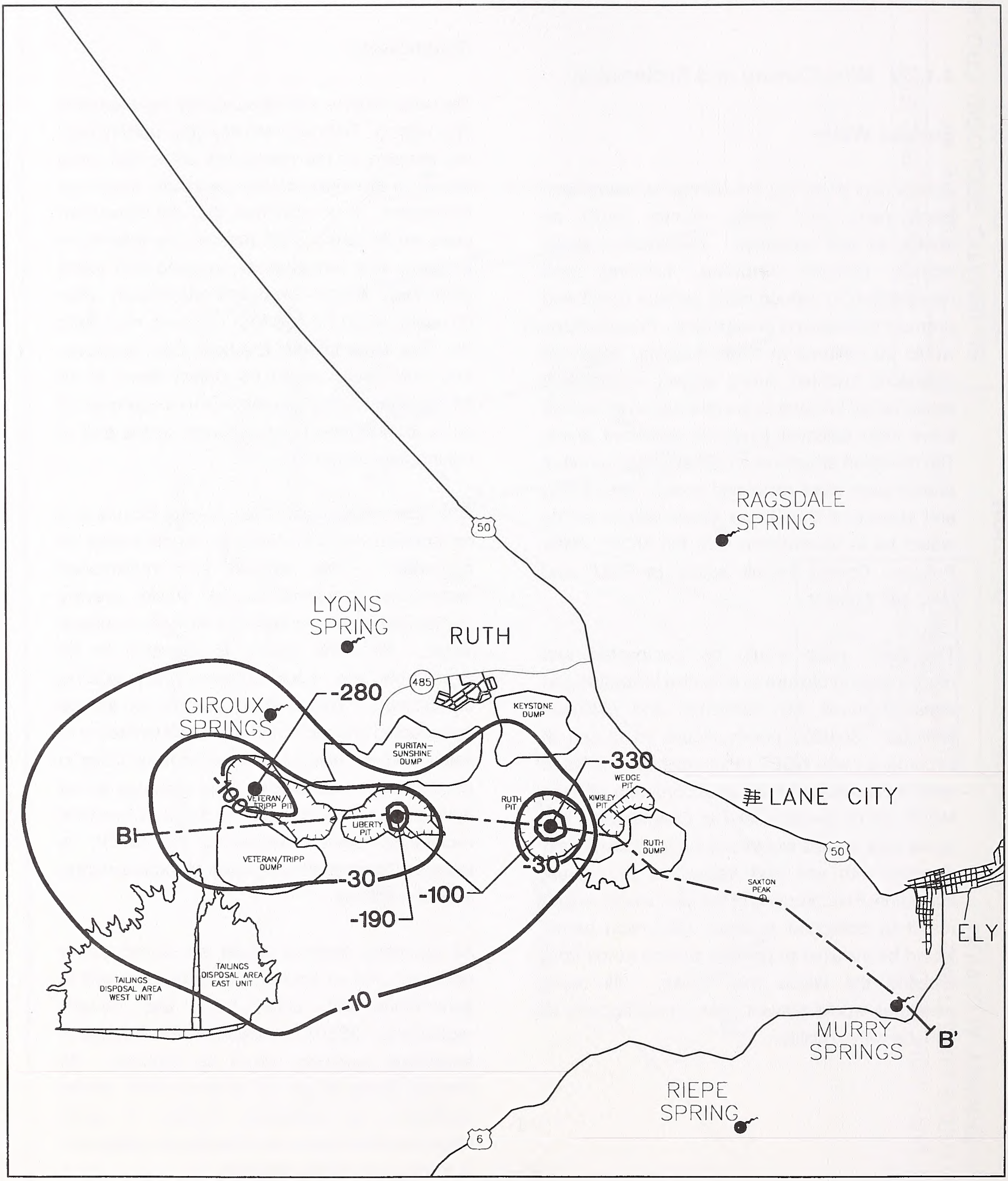
The leach pads would be compacted and recontoured at closure to minimize infiltration and enhance runoff into collection and diversion facilities. Solution ponds would be closed in accordance with NDEP requirements. The leach pads would be reclaimed in accordance with the NDEP permit as discussed in Chapter 2.0. The waste rock dumps would also be compacted and covered with soil and vegetation to prevent infiltration. Recontouring of the piles would ensure runoff to collection facilities. Diversion berms would be installed to prevent surface runoff from entering the waste rock areas. All these measures would prevent post-mining impacts to surface water quality.

Groundwater

The water table would rebound after the cessation of pumping. Rebound would occur quickly near the margins of the drawdown cone, but more slowly in the area of pumping and maximum drawdown. It is estimated that the drawdown cone would rebound 87 percent (by volume) in 50 years after cessation of pumping (PTI 1994) (see Map 4-4). Maximum drawdown after 50 years would be 330 feet centered near Ruth Pit. The water table in the Lane City, Keystone, and Ruth areas would be drawn down 10 to 30 feet after 50 years, compared to a maximum of 30 to 50 feet near Gleason Creek at the end of mining (see Map 4-1).

Groundwater quality during and after closure and reclamation would be the same as discussed for operation. The closure and reclamation techniques described above would prevent contamination of groundwater as well as surface water. Pit water quality is expected to be acceptable and would improve over existing conditions. Waste rock dumps would be constructed and reclaimed to prevent infiltration of water, and any effluent is expected to be close to drinking water standards. Acid drainage is not anticipated. Groundwater at the downgradient monitoring point, established by NDEP, is expected to meet drinking water standards during and after mining.

All operating facilities would be closed, tanks removed, and all liquids and solids removed in accordance with state, local, and Federal regulations. USEPA requirements for disposal of hazardous materials would be followed. All process fluids would be removed from closed facilities. No additional impacts to water resources from these components are anticipated at the end of mining activities.



NOTE: MAXIMUM DRAWDOWN IS 330 FEET.
CONTOURS IN FEET.

NORTH

0 8000 16000
FEET

ROBINSON PROJECT

MAP 4-4
PROJECTED CONTOURS OF WATER TABLE CHANGE 50 YEARS AFTER MINING

4.1.3 Soils

4.1.3.1 Mine Development/Operation

The soils analyses for the Proposed Action were based upon operation descriptions outlined in Chapter 2.0 and the following information:

- Soil yardage calculations in this section were derived using information provided in the general Soil Conservation Service (SCS) soil survey information for White Pine County. Soil depths and types may vary within the mine area.

- Waste rock and surface soil medium would not be mixed; where surface soil amounts would not be available in amounts necessary to meet reclamation seedbed depth standards, salvaged soil would be layered on top of waste rock.

- Test plots to evaluate the properties of amended soils and/or waste rock as plant growth medium would be established for the mine area. Test plots would be used to identify the waste rock types that could be used successfully as a plant growth medium.

- Growth medium from one part of the project area would not be salvaged for use in other parts of the project area that may not have sufficient amounts of growth material for reclamation; soils available in each area would be used in a prioritized manner in that area.

Assumptions concerning soils are included in text where appropriate.

Implementation of the Proposed Action would result in the disturbance and alteration of in-place, native soils from vegetation clearing; construction activities; excavating, salvaging, and storing growth medium (including topsoil and suitable subsoil); cut and fill/grading lands preceding construction of temporary access roads, development of storage areas, and minor ancillary facilities, such as monitoring wells; and recontouring slopes.

Approximately 3,138 acres of previously undisturbed native soils would be disturbed in the proposed mine area and along the transmission line. This total consists of 2,175 acres that would be disturbed during construction of the proposed tailings disposal facility; 890 acres that would be disturbed by construction and mining operations in the leaching, waste rock, and mine areas; and approximately 74 acres that would be disturbed during construction of the transmission line (Tables 2-1, 3-3, 4-4).

Approximately 5.2 to 6.7 million cubic yards of growth medium from the tailings disposal facility area and 0.4 to 3.2 million cubic yards of growth medium from other areas would be available for salvage before construction of the tailings disposal facility and mine-related operations, respectively (Table 4-4). In some areas, the volume of salvageable growth medium could be limited due to the shallow depth of the soil or limiting physical properties, and consequently not provide 6 to 12 inches of growth medium for revegetation as specified in the Reclamation Plan. These areas may include the gold heap leach Pad E, Veteran-Tripp Dump, Liberty Dump, Ruth Dump, copper heap leaching facility, the access road, the tailings soil stockpile areas, and the water line. In such cases, salvaged growth medium would be layered above waste rock to achieve 6 or 12 inches depth of reclamation material; 18 inches of material would be placed on the copper heap leach pads. Results from test plots would provide input on reclamation success and practices that would be employed during reclamation, including amendments that could be

Table 4-4

Estimated Acres of Disturbance and Growth Medium Volumes for the Proposed Mine Area[1]

Mine Component	Newly[2] Disturbed Soils (Acres)	Previously[3] Disturbed Soils (Acres)	Total Acres to be Reclaimed	Reclamation[4] Growth Medium Material Needed (million cubic yards)	Growth[5] Medium Available (million cubic yards)
Tailings Disposal Facility	1,901	--	1,901	3.0	5.2 - 6.7
Tailings Area Soil Stockpiles	176	--	176	0.3	0.2 - 0.6
Access Road	29	--	29	0.05	0.03 - 0.17
Seepage Collection Ponds	1.8	--	1.8	0.003	0.007 - 0.015
Surface Drainage Diversion	35	--	--	--	--
Rerouted County Road	30.5	1.5	--	--	--
Concentrator Area	4	163	--	--	--
Administration Building	0.2	--	--	--	--
Gold Heap Leach Pad D	27	65	92	0.07	0.7-0.1
Gold Heap Leach Pad E[6]	211	--	211	0.20	0.008-0.7
Veteran/Tripp Pit	31	346	--	--	--
Veteran/Tripp Dump	336	171	507	0.41	0.02-1.3
Liberty Pit	--	279	--	--	--
Liberty Dump[6]	90	288	378	0.3	0.04-0.1
Ruth Pit	1	253	--	--	--
Ruth Dump[6]	110	228	338	0.27	0.04-0.1
Kimbley/Wedge Pit	--	87	--	--	--
Copper Heap Leaching Facility	49	318	367	0.59	0-0.14
SX/EW Facility	21	8	--	--	--
Waterline	10.5	10.5	21	0.02	0.01-0.03
Total	3,064	2,218	4,022	5.3	5.6 - 9.9

[1]Acreages for the transmission line (74 acres) are not included since soil salvage is not anticipated as part of construction activities along the transmission line. Reclamation acreage totals do not include pit, surface drainage diversion, and the rerouted county road acreages since these would not be reclaimed.

[2]Soil available for salvage.

Table 4-4 (Continued)

[3]No soil available for salvage.

[4]Figures derived using the following equation:

Total acres to be reclaimed x 43,560 sq ft/acre x 12 in (amount to be salvaged in tailings disposal area and copper heap leaching facility) or 6 in (amount to be salvaged in waste dump, and gold heap leach areas) ÷ 27 cubic ft/cubic yd

[5]Figures derived by multiplying the acreage of each soil association found in a mine component area (Table 3-5), by the percentage of each soil type in the association by square feet in an acre (43,560 sq ft) by depth of soil growth medium available for that association (Table 3-6). This amount was then divided by the number of cubic feet in a cubic yard (27).

[6]Includes soil stockpiles

Note: Data derived using information in USDA-SCS 1991 and from general BLM pedon descriptions for White Pine County.

Newly disturbed soils acreages and previously disturbed acreages may vary by component from those indicated in Table 2-1, although the total acreage remains the same. SCS soils maps used to determine soil boundaries and disturbance areas varied slightly from maps used to identify disturbed areas for public and private lands in Table 2-1.

added to growth medium to improve reclamation success on waste rock areas.

Construction and mining activities, particularly in the gold leach facilities Pad E, the Giroux Wash areas, and in soil stockpiles, would temporarily impede soil development, including soil structure and horizonation (profile) development. Alteration of biological and nutrient conditions would occur in soil stockpiled for extended periods. Soil biological activity (especially with the mycorrhizae-root association) would be substantially reduced or eliminated during stockpiling as a result of anaerobic conditions created in deeper portions of the stockpiles. After soil redistribution, biological activity would slowly increase and eventually reach pre-salvage levels. The duration of these temporary effects would depend on the duration of the construction activities and the ability to apply reclamation measures during or immediately after the completion of construction activities.

Construction and operation activities would also permanently alter soil profiles and development in the mine area, particularly in the tailings disposal area. Placement of soils over waste rock or tailings would change the character and texture of the original soil profiles. New soil profiles would develop over time for the area, however, the original character of the native soil would be permanently changed.

Compaction of soil materials would occur during construction and/or mining activities, especially along access roads and in the heap areas. Ripping or otherwise loosening compacted surfaces prior to placement of growth medium and reclamation seeding, as discussed in Section 2.2.15, would aid in reclamation. Ripping would not occur on the copper heaps (to avoid infiltration of the heap), and 18 inches of growth medium would be placed directly over compacted areas. Reclamation vegetation root depths would be limited in the heap areas due to the compacted layer and success of some plant species, such as shrubs, with greater root depth needs would be limited. There is potentially not enough available water holding capacity in 18 inches of growth medium to support the proposed reclamation vegetation.

Exposure and disturbance of soils could increase the potential for accelerated soil erosion from sites affected by construction, particularly on slopes greater than 14 percent in the tailings disposal area and gold heap leach facility Pad E. Excavation, transportation, and placement of growth medium could also promote the breakdown of soil aggregates into loose soil particles and increase the potential for wind and water erosion on the stockpiles. Blading and/or excavation of remaining subsoil materials to achieve desired grades and soil conditions for the facilities could result in steeper slopes on exposed soils, mixing of soil materials, and the additional breakdown of subsoil aggregates. Measures to stabilize and protect growth medium stockpiles and embankments, as described in Section 2.2.15 and the Reclamation Plan (on file with BLM in Ely and NDEP in Carson City), would be implemented to minimize soil loss and additional disturbance to soils on-site.

Potential indirect effects of soil destabilization and erosion would be dust generation and off-site deposition. Off-site stream sedimentation should be eliminated by using the erosion control practices described in Section 2.2.16 and the Reclamation Plan. Increased sediment loads and deposition in streams below the areas of disturbance are not anticipated, as there are no perennial streams in the vicinity of the new disturbance and sediment catchment berms would be placed at the base of the downstream side of the tailings embankment, around the soil stockpiles, and at the base of dump slopes. Dust generated by vehicular traffic would be reduced by using dust abatement techniques, such as wetting and binding agents, on the haul roads. Movement of exposed soil particles from stockpiles and disturbed areas by surface winds could reduce air quality and/or result in the deposition of soil particles on surfaces off-site. Wind erosion abatement measures, as discussed in Section 2.2.16 and the Reclamation Plan, would help to reduce soil losses.

Direct effects to soils from operation of the constructed facilities could result from releases of sulfuric acid, leach solutions, mill and SX/EW reagents, concentrate, and tailings, and from windblown tailings and concentrate. Spill prevention and dust control measures, which would be implemented at the mine, are discussed in Sections 2.2.13 and 2.2.16.

Approximately 1,901 acres of soils with salvage depths between 0 and 70 inches are located in the tailings disposal area, which equates to an estimated 5.2 to 6.7 million cubic yards of potential growth medium available in the tailings disposal area (see Table 4-4). As part of topsoil salvage operations, approximately 12 inches or 3.0 million cubic yards of this growth medium would be removed from the tailings disposal area in Giroux Wash prior to construction and stockpiled. An additional 3.3 million cubic yards of soils at depths below 6 to 12 inches would be removed subsequent to salvage of growth medium material and used in construction of the tailings disposal area starter dams. This subsoil material is generally located in the alluvial deposits and would otherwise be suitable for growth medium if it was not required for embankment construction. Following the salvage and construction operations, at most 0.4 million cubic yards of growth medium would remain under the tailings disposal area.

4.1.3.2 Mine Closure/Reclamation

Salvaged soil would be utilized as the primary plant growth medium on reclaimed areas. Soil would be redistributed to depths of 12 inches on all graded areas within the tailings disposal facility, soil and/or waste rock to 18 inches on the copper heap leaching facility, and 6 inches on all other mine areas, as available. Since many of the soil associations in the area are shallow and may not provide the full depth of growth material, salvaged soil may be amended with waste rock. The suitability of waste rock as a growth material would be assessed in test plots that would be constructed once mine activities have commenced. Information on the physical and chemical properties of waste rock from the mine area is limited, although waste rock from previous mining activities in the area has naturally revegetated in some cases.

Waste rock generally contains few fines, is low in nutrients, and contains little organic matter and biological organisms. Test plots would be used to evaluate amendments to improve properties of waste rock as a component of the plant growth medium. Since test plots have not been completed, potential impacts from use of waste rock as a plant growth medium are unknown. If undesirable waste rock were present in soil, revegetation could succeed initially but fail later as plant roots reach unsuitable growth materials. If mine waste rock has high coarse-fragment content or other undesirable characteristics (high alkalinity, high trace element concentrations), revegetation success could be limited.

No soil salvage is scheduled along the transmission line since soil is not anticipated to be removed or buried as a result of transmission line construction. Areas disturbed during construction around poles and at route staging areas would be disked and reseeded. The line would be maintained following mine closure.

Although stripping, stockpiling, and redistribution adversely affect soil characteristics, including alteration of soil profiles and soil structure, the benefits of using soil for revegetation outweigh the adverse effects of soil handling. Interim and final reclamation/revegetation efforts would return some areas of soil disturbance not involved with operations to productivity following construction, thereby reducing the duration and magnitude of impact. Loss of soil or discontinuation of natural soil development, decreases in infiltration and percolation rates, decreases in available water-holding capacities, breakdown of soil structures, and loss of organic material occurring as a result of mine operation activities would be reversed by natural soil development over an unknown amount of time following reclamation. Loss of soil fertility and soil microorganisms, and loss of vegetative productivity could be reversed after successful reclamation.

Depending upon actual amounts of salvageable soil available in the tailings disposal area, at most 0.4 million cubic yards of potential growth medium could be permanently buried by tailings disposal operations following salvage and would be permanently removed from use. This would result in a reduction in potential soil productivity for the mine area.

To determine the potential for erosional losses from the tailings disposal area following reclamation, the plan for the final configuration of the tailings impoundment was evaluated for potential long-term erosional losses using the SCS Revised Soil Loss Equation (RUSLE) computer program (USDA and Agricultural Research Service 1991). See Appendix D for assumptions used in the RUSLE calculations.

The resultant average annual soil loss for a 100-foot segment of the embankment, using the parameters presented above, is 1.0 ton/acre/year. The maximum tolerable soil loss limit for reclaimed surfaces is 1.0 ton/acre/year as defined by the USDA-SCS (1983). With the implementation of slope breaks every 100 feet on the tailings embankment, the average annual soil loss calculations indicate that soil loss in the reclaimed tailings disposal embankment area is equal to the accepted levels.

Revegetation and recontouring of the tailings disposal area using methods presented in the Reclamation Plan would assist in minimizing soil loss due to erosion. Soil losses in reclaimed areas outside the tailings disposal area cannot be calculated because of the incorporation of waste rock into the growth medium. Soil losses due to erosion would be evaluated following the test plot studies, and erosion control measures would be implemented accordingly.

4.1.4 Vegetation

Direct impacts to vegetation would result from the disturbance or removal of vegetation during mine development and construction of the proposed transmission line. Direct impacts include the loss of vegetation, vegetative productivity, forage for livestock and wildlife use, fuelwood, pinyon nut production, and Christmas trees. The impacts to vegetation indirectly affect other resources, such as soil, water, wildlife, and watershed.

4.1.4.1 Mine Development/Operation

The major effect of mine development would be direct removal or disturbance of vegetation within the mine area and along the proposed transmission line route. Project components that would impact vegetation include the tailings disposal area, concentrator area, soil stockpiles, transmission line route, access roads, leach pad and heap leaching facilities, and waste rock disposal and pit expansion areas. Removal and disturbance of vegetation may also occur in additional areas as a result of clearing and grading of temporary access roads or storage areas, and construction of minor ancillary facilities, such as monitoring wells. Construction effects would occur over a period of years, as the facilities are sequentially constructed. Most of the proposed disturbance area would be occupied by project facilities during the life of the project.

Development of the mine area would remove or disturb vegetation on approximately 3,345 previously undisturbed acres. About 2,011 acres of previously disturbed lands would be redisturbed during development of the mine area (Table 4-5). Approximately 2,251 acres of pinyon-juniper woodland and 1,094 acres of northern desert shrub/sagebrush vegetation would be removed or disturbed during mine development. Any vegetation present in the remainder of the mine area (2,011 acres of disturbed land) would also be removed or disturbed; however, the disturbed lands currently support little or no vegetation. Construction of the transmission line would remove or disturb approximately 53 and 21 acres of pinyon-juniper woodland and desert shrub/sagebrush vegetation, respectively, which were included in the acres presented above. This loss of vegetation is considered minimal since these vegetation types are widely distributed throughout the region.

Construction of the Proposed Action would result in the loss of available wood products from the removal of 2,251 acres of pinyon-juniper woodland. This loss represents less than 1 percent of the pinyon-juniper woodland in the Egan Resource Area. These impacts are further discussed in Section 4.1.13.

Vegetation established on previously undisturbed land would be impacted by the development of each project component. However, project components within the mine area that would be developed solely on previously undisturbed land include the tailings disposal area, leach Pad E, soil stockpiles, and access roads. The removal or disturbance of 1,901 acres of vegetation (1,290 acres of pinyon-juniper woodland and 611 acres of desert shrub/sagebrush vegetation) would result from the development of the tailings disposal area. Other project components that would remove or disturb vegetation on previously undisturbed lands include the Veteran-Tripp Dump (340 acres), leach Pad E expansion area (202 acres), copper heap leaching facilities (142 acres), Liberty Dump (104 acres), and Ruth Dump expansion area (143 acres). Construction of the transmission line would also occur on previously undisturbed land and would remove or disturb approximately 74 acres of vegetation.

Project components that would be developed predominantly on previously disturbed land include the expansion of pit and dump areas and the development of leach Pad D, heap leaching facilities, and concentrator area. The expansion area for the Veteran-Tripp Pit is the largest area (377 acres) that would remove or disturb vegetation on previously disturbed land.

Normal operation of the facilities is not expected to have any additional direct impacts to vegetation; impacts would occur in the unlikely event of a tailings dam failure. Failure is highly unlikely because of the design of the facility, including maintenance of the seepage collection ponds, monitoring of the facility during operation, and other features. If the tailings dam failed, dam material, tailings, and tailings solution would be deposited downstream in and near drainage channels and floodplains. Some vegetation would be affected and sedimentation would result

Table 4-5

Acres of Vegetation That Would be Removed or Disturbed During Mine Construction and Operation[1]

Project Component	Component Size (ac)	Previously Disturbed Land	Acres of Vegetation: Pinyon/Juniper Woodland	Acres of Vegetation: Northern Desert Sagebrush/ Shrub
Tailings Disposal Area				
East Unit	642	--	586	56
West Unit	1,259	--	704	555
Subtotal	1,901	--	1,290	611
Soil Stockpiles				
East Unit	72	--	64	8
West Unit	104	--	18	86
Subtotal	176	--	82	94
Seepage Collection Ponds	1.8	--	0.2	1.6
Access Road	29	--	29	--
Rerouted Road				
East Unit	9	--	7	2
West Unit	23	--	9	14
Subtotal	32	--	16	16
Surface Drainage Diversion	35	--	31	4
Concentrator Area	167	162.5	--	4.5
Administration Building	0.2	--	--	0.2
Leach Pad D	92	55	22	15
Leach Pad E	202	--	202	--
Leach Pad E Soil Stockpiles	9	--	9	--
Veteran-Tripp Pit	377	331.5	--	5.5
Veteran-Tripp Dump	507	167.5	339.5	--
Liberty Pit	279	277	2	--

Table 4-5 (Continued)

Project Component	Component Size (ac)	Previously Disturbed Land	Acres of Vegetation	
			Pinyon/Juniper Woodland	Northern Desert Sagebrush/ Shrub
Liberty Dump	359	255	--	104
Liberty Dump Soil Stockpiles	19	7	--	12
Ruth Pit	254	246	8	--
Ruth Dump	327	184	143	--
Ruth Dump Soil Stockpile	11	9.5	1.5	--
Kimbley/Wedge Pit	87	82	5	--
Copper Heap Leaching Facilities	367	225	15.5	126.5
SX/EW Facility	29	--	--	29
Water Line	21	9	2	10
Transmission Line Route	74	--	53	21
Grand Total[1]	5,356	2,011	2,251	1,094

[1]Small discrepancies in acreage totals are due to rounding.

down-drainage from the site. Impacts to vegetation would occur under either of these scenarios.

Impacts to vegetation may also occur if an accidental release (low probability) of sulfuric acid or diesel fuel occurred along the highway or railroad corridors. Vegetation within the spill area would be lost for several years following the spill until the toxicity of the pollutants has been reduced to tolerable levels. These pollutants would also affect the physiological condition of the affected vegetation for several years.

Construction within the mine area would result in the loss of approximately 4.1 acres of riparian vegetation (see Section 4.1.5). The proposed tailings impoundment would result in the temporary loss of vegetation in portions of Giroux Wash. The project design includes numerous features to reduce erosion-related impacts to vegetation and control erosion and sedimentation in all drainages, including locating facilities away from perennial streams and shallow groundwater, building diversion structures to route surface drainage around the facility (e.g., the tailings disposal area), operating the leaching facilities as a zero-discharge facility, using structures, and implementing interim and final reclamation measures (Reclamation Plan, on file in the NDEP's office in Carson City and the BLM's office in Ely).

Indirect impacts resulting from construction include an increase in weed species invasion in disturbed areas. Since the existing mine area currently supports populations of weed species, additional weed invasions that may result from proposed mining activities would not substantially increase weed infestations within the mine area.

Vegetation disturbance would result in the loss of approximately 4,502 cords of wood (estimating 2 cords/acre of pinyon-juniper woodland impacted) and an annual growth loss of 150 cords/year (based on 1 cord/15 acres of pinyon-juniper woodland per year), 4,502 Christmas trees (estimating 2 trees/acre in pinyon-juniper woodland), and 2,251 acres of pinyon-juniper woodland that produce approximately 1 pound of pinyon nuts/acre every 5 years (i.e., 2,251 pounds of pinyon nuts every 5-year period).

4.1.4.2 Mine Closure/Reclamation

Following closure and reclamation of the mine site, vegetative communities in the Giroux Wash area would be dominated by herbaceous species (grasses and forbs) for the first 5 to 10 years. Depending upon climatic conditions and land use following reclamation, mature shrubs would become more dominant in 10 to 15 years, and mature pinyon in 50 to 100 years. Big sagebrush, singleleaf pinyon, and Utah juniper currently are the dominant species present in the area.

The re-establishment of vegetation on currently unreclaimed areas would increase the total amount of vegetation over the entire site following reclamation. Vegetative productivity within the copper heap leach area would be lower relative to current productivity. With reduced amounts of topsoil available as growth medium following regrading activities, plant growth would be limited to those species requiring soil depths equal to or less than that available.

On the copper heap leach pads, 18 inches of combined soil/waste rock would be placed over the compacted heap. The heaps would be compacted to prevent infiltration of water. Vegetation root depths would be restricted by the compacted layer, and success of some plant species, such as shrubs, with greater rooting depths would be limited. The potential water holding capacity within the 18 inches of growth medium may not reach levels needed to support the proposed revegetation species. If volunteer shrubs with aggressive rooting systems should become established on the copper heap leach area, there is a potential for the compacted layer in the heap to be breached, thus opening a conduit for water into the heap. The contact of plant root systems with the heap materials could result in plant mortality, an increase in surface erosion potential, and the potential for non-point source pollution from the heaps.

Construction and salvage operations would permanently alter the existing soil profiles in the mine area, particularly in the tailings disposal area and heap leach Pad E. This alteration would also change the floristic composition of existing plant communities. Most native vegetation is adapted to particular soil types in this area, and any alteration of the soil character would affect the type of vegetation that would re-establish on the disturbed soil. Existing plant communities would be replaced by other plant communities following reclamation.

In portions of the mine area, particularly the waste rock dumps, the volume of available growth medium would be insufficient to meet the desired depth of 12 inches of growth medium for reclamation. In these instances, available growth medium would be layered over waste rock. Test plots would assess the suitability of waste rock as a growth medium and would provide information on amendments that could be used to reduce potentially adverse waste rock properties on revegetation success.

4.1.5 Riparian and Wetland Areas

4.1.5.1 Mine Development/Operation

Direct impacts would result in the loss of 4.1 acres of riparian vegetation during mine development and operations. This includes 3.9 acres of rush/sedge community near Deep Ruth Shaft and a 0.2-acre parcel near the Sunshine Dump as described in Section 3.5. Impacts may occur to wetlands adjacent to the railroad and highway routes in the event of a probability spill during the transportation of sulfuric acid and diesel used in mine processing activities. The extent of the impacts to wetland vegetation would depend on the type and amount of chemical spilled and the proximity of the spill relative to the location of flowing water and wetlands (see Section 4.1.12 for additional discussions of transport of process materials, products, and hazardous wastes).

4.1.5.2 Mine Closure/Reclamation

Impacts to riparian and wetland areas are not anticipated during the closure and reclamation of the mine area.

4.1.6 Wildlife and Fisheries Resources

4.1.6.1 Mine Development/Operation

General Impacts

Development of the Robinson Project mine area would result in the loss of 2,198 acres of pinyon/juniper and 1,073 acres of northern desert shrub/sagebrush habitat. Construction of the proposed transmission line would remove 53 acres of pinyon/juniper and 21 acres of shrub/sagebrush. No additional disturbance to native vegetation would result from operation of the transmission line or the transportation routes.

Based on these estimates of vegetation removal, the total loss of pinyon/juniper and northern desert shrub/sagebrush habitat types for development of the proposed project would be 2,251 and 1,094 acres, respectively. The total amount of pinyon/juniper habitat recorded within White Pine County in 1992 was 1,939,073 acres, with 1,343,537 acres of that occurring on BLM-administered land (Born et al. 1992). Therefore, the development of the Robinson Project would result in less than a 1 percent loss of pinyon/juniper habitat in the Egan Resource Area.

Disturbance of these native habitats would result in the direct loss of less mobile species (e.g., small mammals, bird nestlings, reptiles) and the displacement of more mobile species (e.g., medium-sized mammals, adult birds, and big game animals). The greatest direct impact of habitat removal and disturbance to area wildlife species near the mine area would be the loss of nesting or breeding habitat, foraging areas, and cover, with an associated reduction in carrying capacity. Loss of habitat and effects to carrying capacity would occur *for the life of the project and* until reclamation is achieved. Displaced individuals may or may not be able to establish territories in adjacent habitats, depending on variables *such* as the species' behavior, density, and individual habitat requirements. *Based on the environmental protection measure in Section 2.2.16, the placement of water sources outside of the mine area would enhance the adjacent habitats for wildlife use, since water availability is a major limiting factor in the project area. The additional water sources may allow animals to more easily disperse from the project area during the incremental development of the mine.*

Transmission line construction would primarily affect smaller, less mobile wildlife species within the disturbance area. Small mammals and reptiles would be more susceptible to construction-related mortality than other animal groups. Some species of ground-nesting birds would not nest within the area of disturbance during construction but would return to nesting habitats located along the route following project reclamation.

Disturbance of the Giroux Wash area would result in the direct loss of bird nesting habitat. Since vegetation could be removed during the breeding season, eggs and nestlings would be lost, adversely affecting the annual productivity. No known raptor nests would be directly disturbed by mine development or transmission line construction. The locations of ferruginous hawk nests relative to the transmission line route are discussed in Section 4.1.7.

The hunting territories of raptors and mammalian predators would be reduced by the amount of disturbance of native habitats associated with the mine area expansion, likely affecting small numbers of local predators (e.g., coyote, badger, red-tailed hawk, great-horned owl). Because most predators are wide-ranging, it is not likely that the loss of hunting range and associated prey base of this magnitude would result in long-term effects.

Mine development would affect approximately 3,345 acres of marginal mule deer winter range. Development of the tailings disposal facility, Pad E, and the Veteran-Tripp Dump would affect secondary migration corridors between seasonal deer ranges; however, the impacts to deer movement would be expected to be minor and would not affect survival rates during these periods. It is not anticipated that mule deer displacement would cause an exceedence of carrying capacity in adjacent habitats. The tailings disposal facility in Giroux Wash would be developed incrementally, facilitating deer dispersal. An estimated 200 acres per year would be cleared. Elk are only occasionally present and are not likely to be affected by the proposed mine development.

The proposed transmission line would cross approximately 5 miles of marginal mule deer winter range. If construction activities occurred during the winter season, the disturbance would initially force mule deer to avoid the construction areas. The deer would likely become accustomed to activity levels and re-establish themselves in the surrounding habitat. However, the level of disturbance to wintering animals would depend on the environmental conditions and the condition of the herd. Based on the location along the transmission line route and the amount of available winter range in adjacent habitat, the effects to deer are expected to be low. In addition, construction would not likely occur during severe winter weather.

Operations along the two transportation routes would not affect mule deer or pronghorn populations. As discussed in Section 4.1.12, the estimated daily train traffic is 2 trains traveling approximately 10 miles per hour (mph). At this speed, no increased mortalities to big game would be expected, and the likelihood of a hazardous material release into a water source located along the route also would be small. The potential for an accidental release of sulfuric acid or fuel is discussed below for specific wetland areas and in Section 4.1.12.

Project-related truck use of Highways 278 and 50 is estimated to be approximately 10 trucks per day along the highway route. Based on the existing traffic levels along these corridors (see Section 4.1.12), an additional 10 trucks per day would not substantially increase wildlife mortalities along the highways. The potential for vehicle-related mortalities from increased traffic in the immediate mine area during operation is discussed below.

Effects from mine development to upland game birds are expected to be low. The lack of water sources and riparian habitat at the mine area limits use by sage grouse, chukar, gray (Hungarian) partridge, and mourning dove. Impacts to upland game birds from operation along the transportation corridors would be limited to potential releases of hazardous materials into wetland or riparian areas, as discussed below. Construction of the proposed transmission line may only affect sage grouse, depending on lek activity, winter concentrations, and construction timing. As discussed in Section 3.6, an active lek is located within 0.9 mile of the transmission line; additional leks could occur in the sagebrush habitat along the proposed route. Disturbance from construction activities on or within 0.5 mile of established and viable leks from March 1 to May 15 (2 hours before dawn until 10 a.m.) may impact sage grouse productivity.

Indirect impacts to active sage grouse leks may result from predation by raptors using transmission line structures as perch sites. Leks that are located near powerlines often exhibit lek fragmentation and lower reproductive success rates, due to increased predation. However, the proposed transmission line would follow an existing distribution line for 8.2 miles of the 13.7-mile transmission line route, thereby increasing the potential for predation along 5.5 miles of the route within the appropriate sagebrush habitat where active leks may occur.

Indirect impacts to area wildlife during project development and operation would result from increased human presence and activities in the overall project region. Additional road construction, employee commuting, mine development, and transmission line construction would generate increased traffic and noise, potentially resulting in increased vehicle-related mortalities, legal and illegal hunting and shooting, and wildlife harassment. The peak work force is estimated to be 550 employees during mine operation (see Section 4.1.11). Increased hunting (both legal and illegal), due to the increased number of mine employees and their families, would result in increased law enforcement needs and responsibilities for the NDOW (see Section 4.1.11.4). The most visible wildlife species would be the most prone to these types of impacts.

Noise generated during project development and operation (see Section 4.1.10) would result in minor impacts to area wildlife. Common responses of animals to noise disturbances are either avoidance or accommodation. Except at extreme levels, the more secretive and smaller animals would coexist with the noise sources. Other animals, particularly those that rely most on vocal and auditory cues for communication and orientation, would avoid the vicinity of a noise source, moving out of the area until the source dropped to an acceptable background level for that species. After initial avoidance of human activity and noise-producing areas, some wildlife species may acclimate and begin to reinhabit adjacent areas formerly vacated. Abrupt and intermittent noises (e.g., blasting) are less likely to be accommodated than are the more steady, continuous noises (e.g., truck traffic).

Shafts, adits, or other underground workings that are associated with past mining activities may support bats, in addition to other nongame species, such as passerine birds, amphibians, and reptiles. Based on the protection measure presented in Section 2.2.16, no impacts to resident bat species or other animals are anticipated from the closure of any underground mine openings during mine development and operation. Obtaining permission from the BLM and NDOW prior to tunnel closure would ensure the use of the appropriate closure procedures (e.g., tunnel gates), and prevent bat colony loss.

No impacts to raptor species would result from construction of the 13.8-kV distribution line located within the mine area. As presented in Section 2.2.16, the structures would incorporate standard raptor-proof designs to prevent electrocution of birds attempting to perch on the line.

Through data compiled on wildlife mortalities at mining operations, the NDOW found that 92 percent of these mortalities were attributed to cyanide poisonings (NDOW 1991). Between February 1991 and January 1992 (under RMLP's ownership), a total of 28 wildlife mortalities were recorded by RMLP at the existing mine facility. These mortalities were primarily caused by cyanide ingestion, due to the incomplete fencing and aerial netting over the cyanide solution ponds. Wildlife affected included 1 mule deer, 9 waterfowl, 2 shorebirds, 8 raptors, and 8 other bird species. These recorded mortalities were predominantly associated with the B and C heap leach facilities, with two occurrences reported for the A heap leach.

Facility fencing and netting around the cyanide solution ponds were subsequently finished on January 21, 1992. Since these barriers were installed, 12 wildlife mortalities have been reported (through January 1994) from either cyanide poisoning or entanglement in the aerial netting. Table 4-6 lists the wildlife mortalities recorded since the final erection of the fence and netting in January 1992. The netting is subject to damage

Table 4-6

Wildlife Mortalities Recorded at the Robinson Mine Since January 1992[1]

Species	Location	Date
Red-tailed hawk	B Heap Leach	April 5, 1992
Northern goshawk	C Heap Leach	April 20, 1992
American kestrel	B Heap Leach	September 29, 1992
Finch species (5 individuals)	B Heap Leach	September 29, 1992
Mule deer	B Heap Leach	March 10, 1993
Red-tailed hawk	A Heap Leach	August 2, 1993
Red-tailed hawk	C Heap Leach[2]	October 6, 1993
Golden eagle	D Heap Leach	October 8, 1993

[1]Facility fencing and netting around the cyanide solution ponds were completed on January 21, 1992.

[2]Became tangled in netting; not attributed to cyanide poisoning.

from wind and weather, which occasionally results in breaches of the barriers and allows animals access to the cyanide solution. Maintenance for these barriers is ongoing at the mine. Solution ponds associated with existing Pads A through D and new Pad E would pose a hazard to bird and bat species that may drink from these ponds.

Water Quality Impacts

Impacts to area wildlife species related to water quality issues associated with the Robinson Project are based on the analysis presented in Section 4.1.2. Water birds have been reported to use existing pit water bodies, and deer periodically use the Veteran Pit as a water source. Because of the steep, unvegetated sidewalls around the pit lakes and the water depth, bird use is typically limited to occasional resting or loafing by waterfowl species, particularly during migratory periods.

Future water quality, specifically metals concentrations, was modeled for four existing pits: Veteran-Tripp, Liberty, Ruth, and Kimbley. For those parameters that were not modeled, existing Kimbley Pit water quality was used, as it is considered to be the most representative of final pit water quality (see Table B-4, Appendix B). The estimated concentrations of the specific metals were compared to various criteria and standards (or effects levels) to determine if there might be potential toxicological risk to wildlife from ingestion of pit water. The numerical criteria that were examined included the USEPA Maximum Contaminant Levels (MCLs) for drinking water (USEPA 1986), the National Research Council (NRC) Maximum Tolerable Levels (MTLs) for domestic animals (NRC 1980), and the State of Nevada standards for livestock water. Currently, no national criteria are directly applicable to consumption of water by terrestrial wildlife, although that issue has been raised by USEPA (USEPA 1989). Estimated concentrations of dissolved metals and the various standards are presented in detail in Table B-4 in Appendix B.

The USEPA drinking water MCLs are designed to protect human health. Although humans would not be drinking the water in the pits or tailings pool, these standards were included in the comparison because: 1) other organisms (e.g., birds, bats) would ingest water from these sources, and 2) no criteria currently exist that apply to consumption by terrestrial wildlife (i.e., organisms that do not live within the aquatic system). The criteria and standards presented are meant to provide a relative comparison of materials potentially present within the pit water and tailings pool, based on the available data and study results. Many of these materials show a wide range of species' tolerance. Of the elements examined and compared to the USEPA MCLs, selenium concentrations were projected to be greater than the MCLs in the Veteran-Tripp, Liberty, and Kimbley Pits.

Of the eight metals for which Nevada livestock water standards exist, selenium concentrations also were projected to exceed the stock standards for the Veteran-Tripp, Liberty, and Kimbley Pits (see Table B-4 in Appendix B). Of the metals for which NRC MTLs have been established, none was projected to be present at concentrations exceeding the MTLs. The MTLs should be considered levels that, when consumed for a limited period, will not impair animal function (NRC 1980). However, long-term consumption is not specifically addressed, and, therefore, the MTLs should not be considered as strict guidance for determining the risk from intake of the pit waters.

No aquatic life (with the possible exception of microorganisms) would be immediately present in the pit water, although with frequent waterfowl visits, some aquatic plants and animals may become established in the pits. However, plant and animal populations within future pit lakes should be limited, due to the depth of the pit water (greater than 50 feet) and the low nutrient concentrations. Although future aquatic life in the pit lakes is anticipated to be limited, the estimated pit water concentrations of metals were compared with USEPA acute and chronic criteria for aquatic life (USEPA 1986) to ascertain the potential for bioaccumulation in terrestrial animals using the pits (e.g., waterfowl). Of the elements examined, several metals were measured at concentrations greater than, or equal to, the USEPA acute or chronic criteria, including antimony, cadmium, chromium, copper, selenium, and thallium. Of these metals, selenium (acute criterion = 20 μg/l; chronic criterion = 5 μg/l) has been found to bioaccumulate in organisms and is therefore of potential concern.

Selenium has been found to cause physiological abnormalities in avian offspring (Ohlendorf et al. 1986). In addition to external abnormalities, acute internal effects also have been recorded (Ohlendorf et al. 1988). However, in cases where elevated selenium concentrations have resulted in abnormalities, avian species were exposed continuously prior to nesting, generally occupying adjacent habitats during the nesting season, and feeding on contaminated plants and invertebrates. Both fish and invertebrates have been found to bioaccumulate selenium to various degrees (Lemly 1985).

The depth of the pit lakes would prevent the rooting of aquatic plants and limit the development of benthic organisms. These factors, along with the lack of terrestrial vegetation on the surrounding sidewalls, should limit use by wildlife. Therefore, the future pit lakes would not constitute major nesting or foraging areas for waterfowl or encourage extensive use by mammals. In summary, it is unlikely that wildlife use of the pit lakes would have adverse results, since wildlife would not ingest water with a frequency sufficient to cause significant bioaccumulation of selenium or any other metal.

Water would pool at various locations in the tailings disposal impoundment, which would attract wildlife species, including birds, bats, and other mammals (e.g., mule deer). *To assess the potential adverse effects of reagents used in the mill process and discharged into the tailings impoundment (Table 2-3), a review was conducted of available toxicity data. As stated in Table 2-3, the estimated concentrations of mill reagents that might be found in the tailings are maximum concentrations, based on conservative estimates of factors (e.g., oxidation, chemical and biological degradation, and retention on solids) that would result in concentration reduction. Therefore, the actual concentrations of reagents found in tailings would likely be substantially lower than the levels listed in Table 2-3. The majority of toxicity data obtained for this review came from the Material Safety Data Sheets (MSDS) supplied by the manufacturers of individual compounds. These data were judged to be the best estimate of toxicity since they reflect toxicity of the actual compounds to be used rather than the generic formulation. When toxicity data were not available from MSDS, data were obtained from Verschueren (1983). For some compounds data are not available; however, estimates of effects can be inferred from the other reagents used. Although it is unlikely that substantial populations of aquatic organisms would develop in the tailings pools, the effects on aquatic life as well as ingestion by terrestrial vertebrates was investigated. Since Federal criteria or state standards do not exist for any of the reagents, the acute endpoint ($LC_{\underline{50}}$ or $LD_{\underline{50}}$) was used as an estimate of effect. The $LC_{\underline{50}}$ and $LD_{\underline{50}}$ represent the concentration or* *dose that causes 50 percent mortality in the test population during the given test period. For most reagents, aquatic life data existed for the rainbow trout (Oncorhynchus mykiss), although data for other species existed for some reagents. Rat oral ingestion data were used to estimate the effects that consuming the tailings water would have on wildlife.*

The Maximum Tailings Concentration to Effects Concentration Ratios (CER) were calculated for both aquatic life and vertebrate ingestion. The CER was calculated by dividing the maximum theoretical tailings concentration by the lowest effects concentration that could be found in the literature. A CER ≥1.0 would indicate a potential risk to either aquatic life or wildlife. For two materials, MINEREC 1331 and CO 125, no toxicity data were available from either the MSDS or Verschueren (1983). No aquatic life toxicity data were available for DP-6 and AEROFROTH 65. For those compounds for which aquatic life toxicity data were available, the CER did not exceed 0.23; for those compounds for which ingestion toxicity data were available, the CER did not exceed 0.0068. Therefore, direct toxicity from mill reagents should not be a concern for any wildlife that happen to drink from the tailings pools. Table B-6 in Appendix B summarizes the CERs for the reagents used in the mill process. None of the reagents are classified by EPA as carcinogenic or priority pollutants. Data on the mutagenic or teratogenic properties of the reagents were found for only two of the materials: AERO 5500 and CO 125. In both cases no evidence of mutagenicity was found. Because the ingestion CER for all compounds is very low, it is unlikely that any of the materials would pose a significant acute or chronic effect, including mutagenicity or teratogenicity.

The Locked-Cycle Test results (recirculated tailings water) provide the best representation of future tailings pool water quality (as discussed in Section 4.1.2). The concentrations of dissolved metals from this test were compared to existing standards and are presented in detail in Table B-4 in Appendix B. Of the metals measured, none exceeded either the NRC MTLs or the State of Nevada stockwater standards. In comparison with the USEPA MCLs, cadmium concentrations were estimated at 5 µg/l, which equals the MCL level. Lead concentrations also exceeded the MCLs, as shown in Table B-4 in Appendix B. As discussed for future pit water quality, the tailings impoundment would not provide prominent nesting or foraging areas for wildlife species. Use of the tailings water would be limited. Based on the existing water standards, anticipated frequency of use, and the projected levels of dissolved metals, the future tailings water should be of little risk to wildlife species that may ingest the water during operations. Big game species, such as deer and elk, may use the tailings impoundment as an occasional source of drinking water. There is a *low* potential for animals to become mired in the tailings, which could result in individual mortalities. However, occurrences would be unusual and rare. The tailings pool would cease to exist once the deposition of tailings ended, the pool level pumped down, and the pool evaporated in preparation for reclamation activities.

The seepage collection ponds below the tailings embankment would be enclosed with a game fence and mesh wire to prevent mammals from entering and possibly drowning in the collection ponds. No impacts to bird or bat species that may use the seepage collection ponds are anticipated, based on the projected water quality.

Water Quantity Impacts

The potential for drawdown of natural springs from mine operation is discussed in Section 4.1.2. As presented in Section 3.6, springs, seeps, and the associated riparian habitat support a higher diversity and density of wildlife species than any other habitat type occurring in the project region. As discussed in the Section 4.1.2 analysis, no effects to spring flows are anticipated from pumping activities. Therefore, no impacts would occur to Lyons, Ragsdale, Giroux, Riepe, and Murry Springs or to the riparian or mesic vegetation associated with these seeps and springs. Commensurate with this conclusion, no effects to the wildlife species that may use these areas would result.

No impacts to the perennial flow section of Gleason Creek, located approximately 7 miles north of the mine area, are expected (see Section 4.1.2). Because of the distance to the perennial section of the creek, impacts to wildlife species dependent on this section of Gleason Creek would not occur. In addition, no effects to natural springs along the White River drainage are expected from groundwater drawdown, due to the distance (i.e., 21 and 26 miles) from the mine area.

Hazardous Materials Spill Impacts

The probability of a release of hazardous materials into sensitive resources during the transport of sulfuric acid and diesel fuel along the two transportation routes is discussed in Section 4.1.12. Due to associated water resources, the sensitive wildlife areas that occur adjacent to the railroad corridor include Steptoe Slough, Duck Creek, Bassett Lake, the area north into Cherry Creek, Goshute Lake, Shafter Knoll, which is located within Goshute Valley, and north of Raif Siding. Approximately 19 miles of wetland habitat or playa lakes are crossed by the railroad. The presence and amount of water in these areas typically depend on seasonal precipitation and groundwater recharge. The flatter playas are often dry during much of the year.

As discussed in Section 4.1.12, the probability of a large sulfuric acid or diesel fuel release is low. It is not likely that wildlife species would be impacted, based on the low speed of the train, the construction of the tank cars, and the requirement for an SPCC Plan. However, in order to analyze the highest level of impact if a release occurred, a scenario was developed and examined for release of sulfuric acid or diesel fuel into Steptoe Slough and Duck Creek.

If a train derailed at this location and a large amount of sulfuric acid or diesel fuel were released into the wetland and Duck Creek drainage, habitat would be lost and mortalities would occur to both aquatic and terrestrial organisms that came into contact with the release. During the spring and early summer, nesting shorebirds and waterfowl would be directly affected, reducing the annual nesting productivity for that year, and a number of other wildlife species that rely upon the riparian habitat for feeding and cover would be indirectly affected. During the winter season, mortalities would be limited to aquatic organisms and some terrestrial species, such as waterfowl.

A diesel release would result in a greater level of impact than that anticipated for an acid release. Both aquatic and terrestrial organisms would be affected by hydrocarbon contamination, which would also require a higher level of remediation.

The extent of the impacts to this riparian system from a hazardous release is unknown; the long-term effects to the riparian system would depend on the amount of material spilled, the buffering capacity of the water, and the recharge or dilution of the system. Effects from a spill of sulfuric acid or diesel fuel could range from temporary loss of vegetation to the widespread loss of riparian habitat and the organisms that are associated with it. Site remediation would be critical in keeping adverse impacts short-term and re-establishing the riparian system.

The potential effects from a release of sulfuric acid or diesel fuel in other water resources along the railroad corridor would be less than those discussed for Steptoe Slough and Duck Creek. Ephemeral drainages would not be as sensitive to a release, and the water level in playa lakes would determine the level of effect. Large expanses of water would essentially dilute an acid release and primarily affect vegetation. A diesel release into a playa may affect wildlife species, in addition to vegetation. Low water levels over playa areas would aid in minimizing the extent of a diesel release. Effects to shorebirds, big game, wild horses, and other wildlife species that may use these areas would likely be short-term in the event of an sulfuric acid release. Diesel contamination within a playa, however, would require a higher level of soil and water remediation.

An accidental release of sulfuric acid or diesel fuel could also occur along the highway route, as presented in Section 4.1.12. Sensitive water resources for this project component include the Humboldt River, Pine Creek, and Pine Valley. Approximately 10 miles of wetland areas are crossed by the highway corridor. An acid spill into the Humboldt River would quickly dissipate, due to the river current. No long-term effects to wildlife resources associated with a potential spill into the Humboldt River would be anticipated from an acid spill. A release into Pine Creek or in the wetlands located along Pine Valley would parallel that discussed for the Steptoe Slough.

As discussed for the railroad right-of-way, the effects of a diesel spill on a water resource located along the highway route would result in a greater impact than for sulfuric acid. Diesel contamination would directly affect aquatic and terrestrial organisms that came in contact with it, likely resulting in loss of vegetation and wildlife, requiring a higher level of remediation. The level of impact to resources in terms of duration and length of stream reach affected would depend upon the size of the spill, time of year, physical characteristics of the water source, cleanup and control techniques, and susceptibility of the dominant or important organisms.

4.1.6.2 Mine Closure/Reclamation

No additional effects to wildlife are likely to occur from mine closure and reclamation. One of the specific goals of revegetation is re-establishment of wildlife habitat by using the appropriate native species. In the long term, there would be a beneficial impact through the net increase in wildlife habitat from reclamation, which would include approximately 818 acres of previously unreclaimed mining areas. Restoration of wildlife habitat would be enhanced through use of native species, development of shrub cover, and creation of habitat diversity, as discussed in Section 4.1.4. As human activity in the area decreased and revegetation occurred, wildlife use of the area would likely increase.

4.1.7 Threatened, Endangered, and Other Sensitive Species

4.1.7.1 Mine Development/Operation

On January 5, 1994, the BLM formally notified the USFWS of its conclusion that the four Federally listed threatened or endangered species included on the Revised Species List for the Robinson Mining Project would not be significantly impacted by the project. Therefore, a Biological Assessment under Section 7 of the Endangered Species Act is not necessary.

The impact assessment for sensitive wildlife species focuses on the potential effects to the species identified in Section 3.7; therefore, only the applicable project components are discussed for each species examined. The impact analysis associated with water quality effects is tiered from the analysis presented for general wildlife species in Section 4.1.6.

No impacts to the American peregrine falcon are anticipated, since no active peregrine eyries are known to occur in the area. Any migrants would likely avoid the expansion areas during project development, and no riparian areas have been identified that support falcon prey species.

No direct or indirect impacts to wintering bald eagles would result from mine development or transmission line construction, since wintering eagles do not typically use these habitats. The probability of a large sulfuric acid release along the railroad corridor directly into Steptoe Slough, Duck Creek, and Bassett Lake is discussed in detail in Section 4.1.6. Although this probability is very low, a large sulfuric acid release into these water resources could affect prey items for wintering bald eagles and would prevent foraging birds from using the area until cleanup had been completed. A substantial release during the winter could result in mortalities to prey species commonly used by the bald eagle. However, no impacts to wintering bald eagles are anticipated, since contaminated animals (e.g., waterfowl) would be removed from the area by the spill response team, and the presence of the emergency personnel would prevent wintering bald eagles from using the area for foraging until the area had been remediated. Disturbance to eagle foraging, therefore, would depend on the amount of the release, the buffering capacity of the water, the recharge of the system from groundwater and surface water resources, the time required to adequately remediate the area, and the effects to water resources and vegetation that support the eagles' prey base. Impacts to wintering bald eagles from an acid spill could range from temporary disturbance of the eagles' foraging activities to loss of the foraging area until remediation was completed, which could require the remainder of the winter season.

A diesel release along the railroad corridor into Steptoe Slough, Duck Creek, or Bassett Lake during the winter period could affect the wintering bald eagles' prey base for a longer period than that projected for a sulfuric acid spill. Remediation of the area would require a greater amount of time, possibly forcing the wintering birds to other foraging and roosting areas.

The impact analysis for the Federally endangered White River spinedace examined the potential effects to the natural springs located 21 to 26 miles south of the mine area along the White River drainage, either by dam failure or a 100-year flood event. The analysis examined the potential for tailings flow into the White River drainage, causing increased sedimentation in the springs and decreasing habitat quality. It is estimated that flow from a dam failure would reach about 2.2 miles down Giroux Wash from the mine area (see Section 4.1.2). Flooding from a 100-year storm event would not so much affect the springs from tailings deposition as it would from the amount of precipitation associated with an event of this magnitude. In addition, many of these springs occur upgradient of the confluence of the Giroux Wash drainage with the White River. Based on these factors and the distance of these springs from the mine area, no impacts to this sensitive fish species would occur.

No impacts to the Federally threatened Lahontan cutthroat trout would result from the proposed project. This species does not occur within any water sources potentially affected by the proposed project.

Cyanide-related wildlife mortalities are discussed in Section 4.1.6.1. Recorded mortalities include sensitive species, such as the ferruginous hawk and northern goshawk. As previously stated, the majority of these mortalities occurred prior to the completion of fencing and aerial netting; the mine currently maintains fencing and netting over the solution ponds and heap leach pads to prevent ingestion of cyanide solution by area wildlife species.

No nesting areas for the northern goshawk occur near the project components, and the limited use of pinyon/juniper woodland during migration would not warrant concern.

No impacts to nesting ferruginous hawks would result from mine expansion or the use of the transportation routes. However, ferruginous hawk nests are located at 0.6 and 1 mile from the proposed transmission line route. If construction activities were to occur near an active ferruginous hawk nest during the sensitive courtship and incubation periods, construction would adversely affect breeding birds. Impacts to the nesting pair would depend on nest location relative to the construction activities, the phase of the breeding period, and the duration of the disturbance. Nest abandonment or loss of productivity for that breeding season caused by line construction would be considered a significant impact to this species.

Operation of the 230-kV transmission line would increase the potential for avian collision to a small degree. However, the open, flat topography and the placement of 8.2 miles along the existing distribution line increase the visibility of the conductors and static wires, and decrease the chance of impacts. In addition, no resources occur along the route to concentrate raptor use (e.g., wetlands), thereby minimizing strike hazards. Electrocution of raptors is not considered a problem with transmission lines of this size. The physical dimensions and configuration of the structures and conductors would meet or exceed design requirements for raptor protection (Olendorff et al. 1981) and would not introduce an electrocution hazard.

Although the loggerhead shrike typically prefers more open country with thickets and hedges, this species is known to nest within open pinyon/juniper habitat. Mine development within pinyon/juniper woodland would result in a minor reduction of the amount of nesting habitat available for the loggerhead shrike. If vegetation were removed during the breeding season, eggs or nestlings may be lost. Loss of any nests during the breeding season would significantly affect breeding shrikes within the disturbance area.

No impacts to the black tern, western snowy plover, or western least bittern are anticipated from the proposed project. The sporadic nature of these species' occurrences along the transportation routes would reduce the probability of any effects.

The long-billed curlew and white-faced ibis may be affected by a sulfuric acid or diesel fuel release into water resources that are inhabited by nesting birds, as discussed for shorebirds and waterfowl species in Section 4.1.6. Although the annual productivity of the adult birds would be lost in the event of a large release, the probability of a release occurring is low.

No impacts would occur to the mountain quail, Columbian sharp-tailed grouse, or North American wolverine, since these species are not known to presently occur in the Ely, Elko, or Battle Mountain Districts. Impacts to the spotted bat or Sierra Nevada red fox are not likely, since both species are rare in the region, although data are lacking for both.

Based on the protection measure presented in Section 2.2.16, no adverse impacts to the Pacific western big-eared bat are anticipated from closure of mine openings. NDOW would ensure the identification of any *Plecotus townsendii townsendii* occupying the areas. These areas could then be retained through appropriate closure methods (e.g., tunnel gates).

Habitat for the pygmy rabbit would be affected by the proposed project. However, effects would be minor, since available habitat is widespread in the region, and this species is considered a game species within the state of Nevada.

Impact analysis for the Federal candidates White River desert sucker, Preston White River springfish, and White River speckled dace is the same as that discussed for the endangered White River Spinedace. Based on this analysis, no impacts to these sensitive fish species would occur.

The effects from a sulfuric acid or diesel fuel release on the relict dace, Lahontan Creek tui chub, the two known populations of the Steptoe Valley crescentspot butterfly, the intermediate populations of the White River wood nymph butterfly, and Nevada viceroy butterfly would parallel those discussed for general wildlife associated with the Duck Creek and the Steptoe Slough areas, since these species are associated with wetlands located along the transportation routes. As noted in Section 4.1.6, however, the probability of a release occurring is low.

No impacts from the proposed Robinson Project would affect the White River population of the White River wood nymph butterfly, Meadow Valley Wash speckled dace, Meadow Valley Wash desert sucker, Moorman White River springfish, Fish Creek Springs tui chub, Baking Powder Flat blue butterfly, or Schell Creek mountainsnail. All of these species occur outside of, or upgradient from, the areas affected by the mine and its ancillary facilities.

Eleven special status plant species were identified by the USFWS, NNHP, and BLM as potentially occurring within the mine area and along the transportation routes. Potential habitat for several species was identified within the mine area; however, those species are not present within the mine area based on ground surveys, database review, and discussions with agency specialists.

No documented populations of special status plant species are known to occur adjacent to either of the transportation corridors. Potential habitat may occur along these corridors; however, impacts to these areas would be limited to accidental releases of hazardous materials, as discussed in Section 4.1.12. Because of the low probability of a release, no direct or indirect impacts to special status plant species are anticipated.

4.1.7.2 Mine Closure/Reclamation

Impacts to special status plant and animal species are not anticipated during mine closure and reclamation activities.

4.1.8 Wild Horses

No impacts to wild horses occurring in the Ely and Elko Districts are anticipated. Neither mine development nor transmission line construction would affect herd management areas. ***No impacts to water sources used by wild horses are anticipated from mine operation, as discussed in Sections 4.1.2 and 4.1.6.1 (Water Quality Impacts).*** The tailings disposal facility would be enclosed with a four-strand, barbed-wire fence, approved by the BLM. ***This security fence, which would surround the entire project area, would help*** prevent wild horses from gaining access into the tailings impoundment. Although wild horses often move into playa areas during periods of high water, the potential for a hazardous material spill along the railroad into these areas is the same as that discussed for other sensitive species and for general wildlife in Section 4.1.6.

4.1.9 Air Quality

Air quality in the study area would be affected by both construction and operation of the facility. Air emission sources include construction activities, mining and milling activities, and vehicle operation. Air quality effects from construction may result in a temporary elevation of local TSP levels. Emissions from the facility are predicted to be below the 250 tons per year threshold requiring a PSD permit.

4.1.9.1 Mine Development/Operation

Construction activities that may affect air quality include soil stripping and construction of the heap leach pads, tailings disposal facility embankment, concentrator, and other facilities. During construction, vehicle exhaust emissions would be generated but would not affect regional air quality. TSP levels from construction activities would vary, and impacts would depend on the construction location and the daily wind and weather. While environmental protection measures, such as watering, would reduce the amount of emissions from construction activities, some level of fugitive dust emissions would be unavoidable due to the nature of this activity. Construction of the Robinson Project facilities can be expected to cause locally elevated levels of TSP and PM-10, particularly during the ground clearing and earthwork phases. These activities would require a surface disturbance permit from NDEP, which would require that watering or other measures be taken to limit fugitive dust emissions. Although some impacts on air quality would inevitably occur, they would be transitory and temporary, limited in duration, and controlled through Best Management Practices required by NDEP.

During the operational phase of the project, the emission sources would be the mill operations (crushing, conveying) and the leach pad operations. The tailings disposal facility would be kept moist during mining operations, or other measures would be taken to control dust so that it would not be a large source of emissions. Particulate and vehicle exhaust emissions would result from mining activities (blasting and hauling) and processing activities (crushing, screening, stockpiling, and pad loading). Dust generation from new soil stockpiles would be controlled by vegetating the piles and would not be expected to impact air quality.

Air Quality Modeling

The major particulate-emitting processes associated with the Robinson Project include ore crushing (mill) operations and leach pad stacking operations. The primary crusher and the ore reclaim system would be equipped with baghouses. In addition, two conveyor transfer points would be enclosed and/or equipped with dust suppression systems. The maximum process rate was assumed to be 3,500 dry short tons per hour (dstph) for the primary crusher and conveyor transfer points, and 2,710 dstph for the reclaim system, all operating 24 hours/day, 365 days/year, with an annual cap of 23,772,000 tons. Emissions from leach pad operations arise from material transfer. The tailings impoundment would be moist to wet during operation, which would reduce the possibility of tailings fines from becoming particulate emissions.

The COMPLEX1 model was run for emissions from the mill to estimate the maximum 24-hour and annual average concentration of particulates of less than 10 microns in size (PM-10). COMPLEX1 is a screening model that predicts the maximum possible impact at receptors located on a user-specified grid. Therefore, actual impacts are expected to be somewhat less than the model predictions. The model was run using 5 consecutive years of preprocessed meteorological data (1986 to 1990) from the Ely, Nevada, meteorological station. Impacts were predicted for a polar grid of receptors located every 10 degrees and 1 kilometer from the source out to 10 kilometers from the source. Maximum 24-hour impacts due to mill operations were predicted for 5 full years of meteorological data (BLM 1993b).

Detailed design information for the leach pad emission points has not yet been developed, and this source has not been included in the final modeling submitted to NDEP for permitting. However, preliminary modeling of PM-10 concentrations at the receptors due to the leach pad operation were predicted to be zero using 1986 meteorological data.

Results of the air quality modeling projected that concentrations of PM-10 at the receptors due to emissions from the Robinson Project milling operations would be well below established standards (BLM 1993b). Highest impacts on land beyond the facility boundary were predicted for the receptors northwest of the mill operations, with a maximum 24-hour concentration for the 5-year period of 85.25 micrograms per cubic meter ($\mu g/m^3$) of PM-10 at the 2-kilometer grid. The modeling demonstrated compliance with air quality standards at this boundary, with a maximum 24-hour value of 17.37 $\mu g/m^3$ expected for the town of Ruth and 0.33 $\mu g/m^3$ predicted for Ely. The maximum annual PM-10 concentrations predicted from the mill operations were 7.97 $\mu g/m^3$ north of the mill and 0.63 $\mu g/m^3$ in Ruth. The annual average PM-10 concentration in Ely would be unaffected by the mill sources. With a 24-hour and annual Federal air quality standard for PM-10 of 150 and 50 $\mu g/m^3$, respectively, the Robinson Project operations would not cause or contribute to a violation of the standard.

Construction and Operation Impacts of Other Emissions

In the copper leaching process, a dilute solution (10 grams per liter) of sulfuric acid is applied to an area of the leach pad to dissolve and recover the copper. The sulfuric acid can be applied either using a wobbler-type sprinkler that operates much like a lawn sprinkler or using an emitter, which utilizes a drip system to apply the acid solution. To assess the potential for nuisance from airborne emissions of acid to people in the town of Ruth, screening calculations that assumed worst-case meteorology were performed. Assumptions included the following:

- The wobbler is used to apply sulfuric acid;
- The average droplet size emitted from the wobbler can be approximated by assuming that it forms a spray with droplets of

1,000 microns in diameter (Perry and Chilton 1973);

- The wind is always blowing toward Ruth;
- The wobbler emits spray at a rate of 7.49 gpm (information from manufacturer); and
- Five sprinklers, spaced 40 feet apart, were considered in a configuration to line up with the wind direction at the leach pad point closest to Ruth (1,200 meters away).

The highest concentration predicted by the model was a deposition of 0.00299 $\mu g/m^3$ of a 10 grams-per-liter solution of sulfuric acid. This compares with health hazard data that have been developed by the Occupational Safety and Health Administration (OSHA) and the American Council of Governmental Industrial Hygienists (ACGIH) of 1,000 $\mu g/m^3$ for concentrated (100 percent) sulfuric acid. Due to the low concentration and the dilute solution of the acid being used, adverse health effects and/or nuisances at Ruth would not occur. In the event that emitters are used instead of wobblers, the potential for acid mist affecting people in Ruth is far lower, as emitters operate on a drip system rather than a spray system.

Emissions of NO_x, CO, and hydrocarbons are expected from operating trucks and other vehicles at the site. Emissions and impacts would be minimal from these sources.

Approximately 1,000 tons of 98 percent by weight sulfuric acid would be transloaded (rail car to storage tank) each day during the active mining life of this project. Due in part to the extremely low partial pressure of sulfuric acid (0.00007 millimeters Hg @ 20° Celsius), very low acid emissions are expected during transloading. Since sulfuric acid would not emit SO_2 unless heated to 340° Celsius and acid would be handled at ambient temperatures, no SO_2 emissions are expected to occur from the transloading of acid.

In the electrowinning process, copper is first leached from the ore with dilute sulfuric acid mixture and carried through subsequent extractions and electrowinning in aqueous solution. Electrowinning temperatures do not approach the decomposition temperature of 340° Celsius at which SO_2 could be formed. Therefore, no SO_2 emissions are expected to occur from the electrowinning process.

The gold leaching process would use sodium cyanide in solution at the heap leach pads. Lime and caustic are used to maintain the cyanide at a high pH in solution and to minimize the formation of hydrogen cyanide (HCN). With the continued pH control of the process solutions, HCN formation and the off-gas of HCN would be negligible; consequently, ambient HCN concentrations would be minimal.

Certain project facilities would produce odors that are characteristic of the reagents that are being used. The concentrator, SX/EW, and copper leach facilities would be expected to produce odors; however, the reagents associated with the concentrator and SX/EW facilities would be stored in closed tanks and used within closed buildings. Odors are not expected outside these buildings. The copper leach facility would place diluted sulfuric acid onto the heaps. In this outdoor setting, it is expected that an odor may be detected within 100 feet of the heap, depending on temperature, humidity, and wind conditions. The closest odor receptors would be residents in Ruth and passengers on the Ghost Train. Most receptors would be more than 500 feet from the outer edge of the copper heaps.

4.1.9.2 Mine Closure/Reclamation

Reclamation and revegetation would stabilize exposed soil and control fugitive dust emissions. As vegetation becomes established, TSP levels should return to what is typical for a dry, desert environment.

4.1.10 Noise

The potential for noise from mining operations within the mine area was evaluated based on the number and nature of noise-emitting operations, the noise levels commonly associated with those operations, the proximity of sensitive receptors, and the anticipated noise reduction over distance. Total noise levels off-site were estimated by using the noise levels from individual operations or equipment. The influence of land features on noise levels off-site was considered. Because measured noise data expected to result from the Proposed Action do not exist, the noise levels and impacts were estimated based on a review of existing literature and of existing noise analyses for similar projects.

4.1.10.1 Mine Development/Operation

Noise levels are expressed as dBA. The A-weighting system was designed to simulate human hearing, which is more sensitive to high-frequency (high-pitched) sounds. The A-weighting system de-emphasizes lower-frequency sounds to simulate the response of the human ear. A-weighting also expresses noise levels on a consistent scale for assessing cumulative levels. See Table 4-7 for the noise levels associated with familiar objects and activities. Contribution to hearing impairment begins at 70 dBA, a noise level that is equivalent to freeway traffic at 50 feet, while sustained noise levels of 90 dBA can cause hearing damage (BLM 1983).

Noise levels associated with construction would be temporary and would vary widely during the day. Activities that may generate noise include construction of the concentrator, the operation of heavy mobile equipment, and the movement of traffic to and from the project site. Noise levels associated with concentrator construction and the operation of heavy equipment are expected to be less than the noise levels during active mining operations and should not present an impact to the town of Ruth.

Vehicular traffic is expected to dominate construction-related noise levels during peak construction. Vehicular traffic would include commuting to and from the site. An average construction work force of 261 workers would be at the site for about 18 months. During this period, the traffic noise impact on Ruth and downtown Ely is expected to be about 65 dBA. The impact is expected to occur primarily during daytime commuting hours as opposed to the nighttime shift changes anticipated during active mining operations.

The potential for noise impacts from operating the mine is based on the number and type of noise-emitting operations and their associated noise levels. Operational information provided by RMLP identified four primary noise-emitting operations: the ore concentrator area, the copper heap leach facility, the mining pits, and vehicular traffic along Highway 485 and through downtown Ely on Aultman Street. In addition, potential effects of noise from the transmission line to the Cross Timbers residential development and the Garnet Fields Rockhound Area were examined. Comparison of the anticipated Proposed Action noise levels to Table 4-7 indicates that noise levels from the Proposed Action would not have adverse impact on the public in Ruth and Ely.

Table 4-7

Relative Scale of Various Noise Sources and Effect on People

Public Reaction		Noise Level (dBA)	Common Indoor Noise Levels	Common Outdoor Noise Levels
		110	Rock Band	Jet Flyover at 1,000 ft.
Local Committee Activity with Influential or Legal Action		100	Inside Subway Train (New York)	Gas Lawn Mower at 3 ft.
Letters of Protest	4 times as loud	90	Food Blender at 3 ft.	Diesel Truck at 50 ft.
Complaints Likely	Twice as loud	80	Garbage Disposal at 3 ft. Shouting at 3 ft.	Noisy Urban Daytime
Complaints Possible	Reference	70	Vacuum Cleaner at 10 ft.	Gas Lawn Mower at 100 ft.
			Normal Speech at 3 ft.	Commercial Area Heavy Traffic at 300 ft.
Complaints Rare	½ as loud	60	Large Business Office	
		50	Dishwasher Next Room	Quiet Urban Daytime
		40	Small Theater, Large Conference Room (Background)	Quiet Urban Nighttime
			Library	Quiet Suburban Nighttime
		30	Bedroom at Night Concert Hall (Background)	Quiet Rural Nighttime
		20	Broadcast and Recording Studio	
		10	Threshold of Hearing	
		0		

Source: Hatano 1980.

Mining Equipment

Noise levels were assigned to mining equipment items and operations based on vendor-furnished noise data or on published noise levels for the same or similar equipment. The noise-emitting operations under consideration for this project are described in Table 4-8.

The attenuation of sound is the decrease in sound level with increasing distance from the source. Sound attenuation is typically a 6-dBA reduction in sound level with each doubling of distance from the source. Although the frequency of the noise and the type of the source affect attenuation, this assumption represents an average attenuation rate.

Since mining would be from subgrade (below surface level) pits, the noise impact is not expected to be high. The two or three tracked dozers and several haul trucks associated with the mining operations would work at the Liberty Dump south of Ruth (during the initial years of operation). Therefore, these equipment items have been combined with other equipment at the copper leach facility. The copper heap leach facility would be located immediately southeast of the town of Ruth, in the proximity of the existing Keystone Dump. Operations at the leach facility are expected to include the movement of heavy equipment between the Keystone Dump and the new leach pad. Mobile equipment is anticipated to include two 85-ton haul trucks (Caterpillar 777B), a front end loader (Caterpillar 992C), and a water truck (Caterpillar 773B). Stationary equipment includes a metal bar screen, commonly referred to as a "grizzly."

Although the bar screen is expected to have the highest individual noise level, it would be located more than 3,000 feet to the southeast of the northwestern edge of Keystone Dump. At this distance, its contribution to the mobile equipment noise would be negligible. For a conservative estimate, the mobile equipment was assumed to operate at the northwestern edge of Keystone Dump, within 1,000 feet of Ruth. Operation this close to Ruth would occur only during excavation of this portion of the existing Keystone Dump and during construction of this portion of the copper leach facility. Similar equipment activity on the Liberty Dump is not expected to impact Ruth due to the greater separation between the dump and Ruth.

Leach facility activities would be a 24-hour operation. During the first 10 years of operation, the town of Ruth would be shielded from noise levels at the leach facility by Keystone Dump, which would serve as a 200-foot vertical barrier between Ruth and the leach facility. However, as the material from the Keystone Dump is relocated, the barrier would be eliminated. Relocation of the Keystone Dump is expected to occur sometime after the 10th year of mining activity. The perimeter of the copper heap leach facility would then come to within 1,000 feet of Ruth, without the benefit of a noise-reducing barrier, resulting in an increase in noise levels at Ruth. The noise level experienced in Ruth is expected to be 50 dBA if the northwestern edge of the dump were left intact as a sound barrier, and 70 dBA if the dump were completely removed.

The combined noise level from all of the above mining operations should not exceed 70 dBA at any receptor within the town of Ruth and would be expected to be less than 70 dBA. The noise impacts were estimated assuming that the noise sources were always operating at the nearest point to Ruth. In reality, the mobile sources, such as the bulldozers, haul trucks, and loaders, would be operated at various distances from Ruth. Therefore, their overall noise impact should be less than 70 dBA. The 70 dBA presents the

Table 4-8

Noise Levels Associated with Equipment

Operator Description	Number	Noise Level (dBA)
Concentrator area:		
Building:		
Semi-autogenous mill w/two 5,000-hp motors	1	96
Ball mill w/ 7,500-hp motor	2	—
Regrind Ball mill w/ 1,250-hp motor	2	—
Not expected to exceed 96 dBA inside building		
Gyratory crusher (outside building)	1	< 85
Leach Facility:		
Caterpillar 777B haul truck	2	86 at 15 meters
Caterpillar 992C loader	1	86 at 15 meters
Caterpillar 773B water truck	1	87 at 15 meters
Metal bar screen	1	96
(assumed to be similar to the semi-autogenous mill)		
Mining:		
Caterpillar D9N dozer	3	86 at 15 meters
Haul trucks	2	86 at 15 meters
Vehicular Traffic through Ruth:		
Private cars	325-350/shift change (35 mph)	55-60 at 300 feet
Trucks	10/day (25 mph)	60 at 300 feet

maximum potential noise impact at any receptor within the town of Ruth.

Blasting would occur below ground level and noise from blasting activities would be attenuated by the surrounding terrain. However, noise from blasting would be detected by residents of Ruth as well as Ely and Cross Timbers, located 5 to 7 miles distant. Generally, noise levels below 70 dBA are considered protective of human health and welfare. However, noise levels in excess of 55 dBA could cause annoyance and result in complaints, depending on the sensitivity of the exposed population. Published information suggests that at 60 dBA, noise complaints are rare, but at 70 dBA, noise complaints are possible (Table 4-7). It is anticipated that the population in Ruth would be more tolerant of noise levels in the range of 60 to 70 dBA, given the population's awareness of, previous exposure to, and association with local mining operations.

Concentrator Area

The concentrator area would be located about 1.3 miles southwest of Ruth and includes the ore crushing, milling, and concentrating operations. Ore would initially be crushed outside in a gyratory crusher prior to milling inside the concentrator building. Milling would be a 24-hour operation. The building, probably of sheet metal construction, is expected to house a semi-autogenous mill powered by two 5,000-horsepower (hp) electric motors, two ball mills powered by 7,500-hp electric motors, two additional regrind ball mills powered by 1,250-hp electric motors, and a compressor room.

The noise level at the concentrator area would be dominated by the semi-autogenous mill. The noise level within the building is not expected to exceed 96 dBA. Conservatively assuming the 96-dBA level at a distance of 50 feet from the concentrator building, the estimated noise level experienced at Ruth due to the concentrator would be 53 dBA. This noise level does not consider the fact that nearby buildings and hills between the concentrator area and Ruth would tend to reduce the noise level.

Vehicles

Additional vehicular traffic along Highway 485 is expected to result from the estimated 550 employees who commute to the site over three 8-hour shifts. Assuming that workers do not share rides, this translates into 325 to 350 private vehicles using Highway 485 during shift changes. Most workers are expected to travel to the mine via Highway 50. Additional truck traffic is expected to add to the traffic level at a rate of about 10 trucks per day. Each truck is expected to make a single round-trip each day. The traffic level during shift changes would be considered as heavy traffic.

Estimated noise levels (based on commonly reported literature values) for heavy freeway traffic at 60 mph, measured at a distance of 300 feet, are between 60 and 65 dBA. Noise levels tend to decrease as average speeds decrease. Speed limits along the portion of Highway 485 that skirts the town of Ruth are likely to be posted at 45 mph. A noise level adjustment of 5 dBA is appropriate and results in an estimated maximum level of 60 dBA at 300 feet from the roadway.

Additional vehicular traffic along Highway 50 through downtown Ely is expected to include private vehicular traffic comparable to that traveling through Ruth during shift changes and an estimated 1 percent increase in truck traffic (22 one-way truck trips per day) if trucks are routed through Ely. Project-related traffic would add to the normal background traffic level in Ely

(300 to 400 trucks currently travel through Ely each day) to result in a heavier traffic pattern.

Estimated noise levels at 300 feet from heavy traffic in commercial areas approach 70 dBA. Because posted speed limits along this section of the highway are 25 mph, noise levels between 60 to 65 dBA are more likely. As background traffic diminishes after peak daytime activity, evening and nighttime noise levels below 60 dBA are expected.

Railroad

Railroad operations would be conducted in compliance with the noise emission regulations of the Federal Railroad Administration (49 CFR 210). Intermittent train noise above 85 dBA can be expected on an infrequent basis in the vicinity of the tracks, particularly as the trains pass through Ely and north of Ruth. Noise levels inside residences near the tracks would be lower, as outside walls of houses would typically reduce noise levels. Overall, railroad noise would be temporary and of short duration, while the two trains servicing the mine passed through the area each day.

Transmission Line Route

The operation of construction equipment along the proposed transmission line route would cause localized, temporary noise levels that could be annoying to individuals, depending upon distance, weather, topography, individual sensitivities, and other factors. Noise levels at a distance of 50 feet would range from 70 to 90 dBA for various types of internal combustion-powered equipment, and up to 106 dBA for impact tools and equipment (BLM 1983). Impact equipment is typically used infrequently and for short periods of time during construction, primarily in the establishment of tower foundations.

Intermittent construction noise above 90 dBA (equivalent to the noise of a heavy truck 50 feet away) can be expected on an infrequent basis near the Cross Timbers residential development and the Garnet Fields Rockhound Area. Noise levels inside residences near the construction area would be much lower, as outside walls of houses would typically reduce high-frequency noise levels by 20 to 25 dBA (BLM 1983). Overall, construction noise would be intermittent and of short duration on a daily basis, while construction equipment would probably remain in a given location for only a short time. Noise from construction activities may also be audible as background noise at distances of 1 mile or more from the route.

Transmission lines may create some long-term noise effects through operation and maintenance. Audible noise from a 230-kV transmission line generally has two components: a hum at a frequency of 120 cycles per second (120 Hz) and a random crackling or hissing sound. The sound level near the transmission line depends on the electric field strength at the conductor surface, the size and number of conductors, and the weather. The magnitude of transmission line audible noise is closely associated with weather conditions. During fair weather, audible noise levels are normally very low and are rarely of concern. Audible noise increases during and after rain, due to water droplets on the conductors. During the rain, much of the transmission line audible noise is masked by the rain storm itself. Noise levels on most 230-kV lines have not been a problem, and audible noise is almost never reported for lines of this voltage.

4.1.10.2 Mine Closure/Reclamation

Noise levels from closure activities would be short-term in nature and have little effect on the residents of Ruth. Upon completion of closure activities, noise impacts at Ruth would be greatly reduced as site activities and the related traffic diminish.

4.1.11 Social and Economic Values

This section describes potential impacts to population; economy and employment; housing; and community facilities and services, which include water supply, wastewater treatment, solid waste disposal, schools, fire protection, law enforcement, wildlife law enforcement, health care, and social services. Also discussed are government, public finance, and transportation.

Because of the uncertainties associated with the current level of economic and employment activity in the Ely area, high- and low-impact scenarios for the assessment were created. These scenarios are based on two different assumptions of the local supply of skilled mining labor as described below. The outcomes of various assumptions under alternative scenarios for the construction and operation phases of the proposed project have been conceptually depicted as illustrated on Figures C-1 through C-9 located in Appendix C.

The following assumptions were used to conduct the impact assessment.

- The construction work force is assumed to be 20 percent local for the high-impact estimate and 35 percent local for the low-impact estimate; the remaining 80 and 65 percent, respectively, would be in-migrants.

- Local workers would commute daily from their place of residence to work.

- It is assumed that 70 percent of the indirect labor force would be second persons in a direct labor household or current residents of the Ely area.

- The indirect construction employment is calculated using a construction employment multiplier of 1.2 based on the publication, *The Economic Impacts of Nevada's Mineral Industry*, by University of Nevada Economist John Dobra (1988).

- The construction work force composition is estimated at 80 percent single (including married without family present) and 20 percent married with families. The population estimates are based on 1 person per single household and 3.5 persons per married household.

- Construction and startup operations activities are expected to occur concurrently during the transition period.

- The new operations work force is assumed to be 30 percent local for the high-impact estimate and 50 percent local for the low-impact estimate. The remaining 70 percent and 50 percent, respectively, would be in-migrants.

- It is assumed that 70 percent of the indirect labor force would be second persons in a direct labor household or current residents of the Ely area. The indirect operation employment is calculated using an operations employment multiplier of 1.74 (Dobra 1988).

- The operations work force is assumed to be composed of 25 percent single workers and 75 percent married workers with families. The population estimates are again based on

1 person per single household and 3.5 persons per married household.

These assumptions and the impact scenarios provide a range of effects that are expected to occur in the Ely area. These projections are based on the best information available as of November 1993 and from other assumptions noted in the analysis. Future employment and phasing of other projects in the county may result in changes to the impacts presented.

Construction of the proposed facilities is anticipated to take approximately 18 months. During that time, the construction work force would grow to a peak of 514 workers, approximately 12 months into the construction schedule, then taper off to approximately 100 or less during the final 5 months. As of December 31, 1993, 28 workers were employed in the present RMLP gold operation. Current employees are expected to continue working through the construction startup phase, and transition into copper-oriented activities midway through construction when copper production is scheduled to begin. Additional operations employees (approximately 522 workers) would be phased in over the next several years, bringing the total mining work force to approximately 540 employees.

During the transition period, there would be a brief time (approximately 1 month) when the total construction and operations workers would reach a peak of approximately 820 workers on-site (current employees and new operations and construction workers). Because 28 of these workers are currently employed, there would be a total of 792 new workers (high estimate).

4.1.11.1 Population and Demography Impacts

Anticipated population increases resulting from development of the Proposed Action for several impact scenarios are presented in Figures C-1 through C-9 located in Appendix C. These figures present impacts related to peak construction employment (514), average construction employment (261), peak transition period for construction and new operations workers (792), and peak operations employment (522 new workers brings the operational total to 550 workers), including direct and indirect employment-related effects for both the high and low estimates.

Construction Period

Construction of the Proposed Action is scheduled to begin in 1994 and would require 18 months, with peak employment occurring approximately 12 months into the construction schedule. The effect of the Proposed Action on area population depends largely on the number of in-migrating workers and the characteristics of their families. RMLP predicts the peak number of construction workers to be approximately 514, with between 334 and 411 of those coming from outside the local area. The resultant peak direct and indirect nonlocal population is estimated at a maximum of 662 people for the high estimate (Figure C-1) and 548 people for the low estimate (Figure C-2) during the construction phase.

The construction work force would average 261 workers over the 18-month period. As illustrated in Figures C-3 and C-4, the average increase in population in the area from the Proposed Action is projected to be between 338 new people (high estimate) and 279 new people (low estimate). The high estimate represents a 3.5-percent increase in the county's

1993 population. This is typically considered an average annual growth rate; however, this would be a temporary increase in population.

Transition Period

Operational activities are scheduled to begin during the construction period. The gradual addition of operations-related people would cause the population to peak for a short period around the 16th month from the start of the Proposed Action. High estimates of construction workers during this peak would be approximately 469 workers, 375 of which would come from outside the area (Figure C-5). High estimates of operations workers would add an additional 323 workers to existing operations (Figure C-6). Of these, 226 persons would come from outside the area. Peak direct nonlocal employment for construction and new nonlocal operations-related jobs during this same time frame could reach 701 workers. The resultant short-term peak total new population (direct and indirect employment and families) increase in the county would be 1,463 people. This peak would endure for approximately 1 month, then decline, as construction is completed. Transition-period new population would temporarily increase county population by 15 percent.

Operations Period

Peak employment during operation of the Proposed Action would be 550 workers. From the first quarter of 1995 through 2012 or beyond, the total additional population of White Pine County is projected at 1,383 for the high estimate, a 14 percent increase over 1993 population levels (Figure C-7), and 1,305 for the low estimate, a 13 percent increase in county population (Figure C-8). The resultant population would represent only a 9 or 8 percent (high and low estimates) increase over the 1970 population of White Pine County. The new residents are expected to locate primarily in or near Ely, which would represent a 26 or 25 percent (high and low estimates) increase in the 1990 population of Ely.

Project mining operations are currently estimated to last approximately 15 years. Assuming the mine life is not extended, operations personnel would gradually be released from their employment duties. At that time, if no additional economic activity is occurring in mining or related fields in White Pine County, people directly or indirectly employed by the Proposed Action could be expected to leave the area. However, phasing the closure period of the mine over several years would minimize sudden significant changes in population.

4.1.11.2 Economy and Employment

The principal economic effect of the Proposed Action would be an increase in mining employment in White Pine County and some growth in the retail and services industries. Most of the economic impact would occur in Ely with the influx of new population and new employment stimulating the local economy. A few new businesses and services would likely start in Ely to provide services not currently available. Other businesses would likely expand their operations to meet the additional demand for goods and services by the new population.

RMLP is an equal opportunity employer with women and minority workers employed at other projects. It is unlikely that the Proposed Action would affect minority or female employment in the county other than increasing employment opportunities for these groups.

Unemployment in White Pine County was 8.4 percent in December 1993, representing approximately 400 unemployed workers.

Employment impacts of the Proposed Action are summarized in Figures C-1 through C-9 for the various employment scenarios (see Appendix C).

Construction Period

Based on an understanding of past employment experiences with the mines, the prison, and the characteristics of the existing state labor force and unemployment figures for White Pine County, it is estimated that between 20 percent (103 employees) and 35 percent (180 employees) of the peak level of 514 construction workers would come from the local area. As indicated by the December 1993 unemployment rate and due to the closures of several mines, a substantial number of trained local Nevada miners is anticipated to be available for employment. RMLP's assumption, however, is that a relatively large number of construction workers would come from outside the Ely area. These construction workers would likely migrate to Nevada from states throughout the West.

As stated in the assumptions, the indirect employment generated in the service sector during the construction period was estimated using an employment multiplier of 1.2 (Dobra 1988). Approximately 103 indirect jobs would be created during the construction period, of which 72 are projected to be filled by local area residents. The total employment generated during the construction phase is estimated at 617 (Figures C-1 and C-2). Included in the indirect labor force figures are 20 to 50 construction workers needed to construct the Northern Nevada Railroad extension north of Ruth and to upgrade sections of railroad track between Ely and Cobre.

Transition Period

As stated previously, leaching and preproduction mining operations activities are scheduled to begin during the construction period. The gradual addition of operations employees would cause mine employment to peak at 820 workers for a short period during the 16th month of construction. The high estimate of construction workers during this peak would be approximately 469 workers (Figure C-5). The high estimate of transition period operations workers would add an additional 323 workers, 226 of which would come from outside the area (Figure C-6). Peak numbers of new construction-related population in this period could range up to 606, then decline rapidly as construction workers are laid off. The peak transition period is expected to last approximately 1 month. Due to the temporary nature of this peak employment period, impacts would consist of a temporary, but positive, increase in economic activity.

Operations Period

Employment Effects. The permanent operations work force would be built up incrementally and is expected to total approximately 550 workers within 18 months from the start of operations. Of the 550 workers, 28 are already employed in RMLP's gold extraction operations, leaving a total of 522 new workers needed to fill RMLP's complete employment projections. Estimates of the total employment during the operations period indicate 522 new direct jobs and 386 new indirect jobs, including approximately 5 to 10 positions with the Northern Nevada Railroad. Direct and indirect new jobs would total 908. The indirect jobs represent up to a 28 percent increase in the 1993 services and trade sector in the county. Indirect employment related to the operations of the mine complex was estimated using a multiplier of 1.74 (Dobra 1988).

The Dobra study suggests rural areas experience an increase of 0.74 workers for each new mine worker. The model represents an aggregation of rural counties in Nevada.

It is anticipated that a large number of local skilled workers are currently available for employment. The increases in their numbers are mainly associated with downsizing of mining operations, the high local unemployment rates, and the recent mining industry layoffs in surrounding counties. Though this EIS projected that 30 to 50 percent of the workers would come from the local area, it is possible that as many as 70 percent of the operations workers could come from the local labor pool, which includes many of these laid-off workers (a potential of 574 who may still be in the area). This would fill RMLP's projected employment requirements and limit the number of nonlocal employees needed to in-migrate into the area. It is also anticipated that more employees in the mining industry would become available, as other mines reach the end of their productive lives and lay off workers. A percentage of these laid-off mine workers could potentially find jobs with RMLP or with other mines. It is difficult to determine the total number of these laid-off workers who are either still living in White Pine County waiting for mining work, or are working elsewhere but are eager to return for work in the Ely area. Returning former residents would be able to readily integrate into the local community.

The primary employment impact resulting from the Proposed Action would be to increase the number of jobs in the mining and related sectors. This would provide increased opportunity and should result in a decreased unemployment rate, assuming other economic conditions do not change significantly.

Income Effects. Operation of the Proposed Action could benefit the economies of White Pine County and the state of Nevada in various ways, including: the purchase of goods and services; investment in further explorations by the company; and hiring of employees for construction, as well as operation and maintenance phases of the project. As these expenditures are re-spent throughout Nevada's economy, additional secondary and positive impacts would be added to the initial impacts, implying that the total economic impact of the proposed facility would be greater than the initial expenditure.

The segment of the proposed expenditures that is the main focus of this section of the economic impact analysis is the payroll impact. It is estimated that payrolls generated by the proposed operation would be about $18,700,000 per year (28 existing and 522 new employees). Applying an income multiplier of 2.57 (Dobra 1988), the total income effect of the $17,748,000 in payroll (522 new mine workers, at an average annual salary of $34,000 [NESD 1992]) would be increased to a total of $45,612,360. Of this total, the $17,748,000 shows the direct impacts and the remaining $27,864,360, the indirect impacts of the spending associated with the initial payroll.

The allocation of total income effects into White Pine County and the remainder of Nevada's economy is dependent on spending and saving behavior of mine workers and their families. It is not possible to precisely quantify the local impact of increased payroll expenditures, except to say that local purchases would increase. If it is assumed that disposable income amounts to 70 percent of gross income (30 percent income tax rate), 522 mine workers would have $12,423,600 to spend on housing, food, clothing, entertainment, other miscellaneous items, and savings. Approximately 70 percent, or $8,696,520 of this amount, would be captured by local businesses (Dobra 1988).

4.1.11.3 Housing

Construction Period

The construction population projections for the Proposed Action, over the 18-month construction period, could create an average demand for between 186 and 225 housing units, depending on the number of available local workers to fill these construction jobs. During the peak construction period, the demand could grow to between 365 and 442 housing units (Table 4-9), assuming a one-worker-to-one-housing-unit relationship. However, time spent on the job site by individual construction workers would range from a few weeks to the full 2-year period. Consequently, it is estimated that approximately 80 percent of the need during peak construction (292 to 354 units) would be for rentals and transient-type housing, such as RV spaces, motel rooms, or perhaps mobile home spaces or mobile home rentals. Currently, there are sufficient transient-type housing units available to satisfy such a demand. This scenario, however, does place pressure on the local hotel/motel industry to handle much of the transient housing. Construction during summer months may displace tourists from hotel/motel units; however, continual occupancy would increase hotel/motel revenues.

To reduce pressure on the local housing resources, RMLP would require, as part of its construction contract, that its prime contractor ensure adequate housing for the construction work force. These facilities likely may be a 100-unit mobile home park with hookups for worker-owned mobile homes. This would supply sufficient living space for the anticipated 267 to 329 single construction workers (Table 4-9). Projecting that 80 percent (214 to 263) of the single workers would utilize the mancamp means only 53 to 66 short-term housing units would be demanded from the community housing stock. This demand would be halved if single workers were to double up. Given this housing measure, existing housing units would satisfy the demand of the construction workers.

The remaining 20 percent demand would be for permanent-type, single-family homes or mobile homes (73 to 88 units). Currently, there are sufficient units for sale to accommodate this projected demand, factoring in the low 8 percent uninhabitability rate (118 units). If the high uninhabitability rate of 30 percent is factored in (89 units), there may be a shortage of housing units, depending on current vacancy rates. There are, however, sufficient RV spaces and motel accommodations to sustain workers and their families. Available housing stock could be depleted assuming no new units are constructed. Such demand may cause new construction of rental and sales units. New construction would ease the constraints in the housing market.

Housing costs should not be a problem. Construction worker wages in Nevada average about $29,000 per year or slightly over $2,400 per month (NESD 1990). Assuming that 25 percent of a worker's wages would be spent for housing, the average worker could afford a gross housing cost of $600 per month. This would be a reasonably competitive amount in the rental housing market.

Transition Period

As stated previously, concurrent construction and operations activities would occur during the construction phase. During this peak period, construction worker numbers would begin to decline and demand for housing would have

Table 4-9

Housing Demand from In-Migrant Households - Construction Period

Household Type	Low Estimate			High Estimate		
	Direct Labor-Related Households	Indirect Labor-Related Households	Total Households	Direct Labor-Related Households	Indirect Labor-Related Households	Total Households
Construction Period Average						
Single-Status Workers	136	13	149	167	13	180
Married-Status Workers	34	3	37	42	3	45
Total	170	16	186	209	16	225
Peak Construction Period						
Single-Status Workers	267	25	292	329	25	354
Married-Status Workers	67	6	73	82	6	88
Total	334	31	365	411	31	442

decreased somewhat (300 single workers and 75 married workers - high estimate, Table 4-10). Eighty percent (240) of the single work force is expected to use the contractor mobile home park. Of the remaining 60 single workers, 80 percent (48) are expected to prefer transient housing and 20 percent (12) are expected to prefer permanent units. Of the 75 married workers, 80 percent (60) are expected to prefer permanent units and 20 percent (15) are expected to prefer transient housing. Transition period housing demand for the construction workers would be approximately 63 transient units and 72 permanent units. The operations worker housing requirements would add an additional 181 units to the permanent housing demand (total - 253 units), and an additional 34 units to the rental and transient housing demand (total - 97 units) of the construction workers for this period. The demand for permanent housing, however, would create a potential shortage of approximately 164 homes, assuming 89 homes are available for sale.

Available housing in the area may not be sufficient to avert a temporary housing shortage if no other homes are built or come on the market. Therefore, RMLP would cause additional units to be built (including mobile home spaces) by providing incentives to outside contractors, constructing houses itself, assisting employees in building homes, or otherwise causing these units to be built. Implementation of these efforts would reduce housing impacts to negligible levels.

There are sufficient RV spaces and motel accommodations to handle the transient demand. Minor conflicts may arise from workers making long-term use of motel rooms during the peak summer tourist season. Such use could displace tourists.

Operations Period

Of the projected 550 total, 28 operations personnel are already employed and housed, and thus would generate no additional impact on the local housing supply. The Proposed Action could, however, generate demand for an estimated 261 to 365 direct labor housing units during its 15-year active mining life (Table 4-11). Similar to the construction period, the actual demand would depend on how many workers are available locally, and how many would move into the area for work.

After the first 1.5 years of construction, some construction workers would begin to leave. As mine operations personnel are hired, there would be a transference of housing. The approximately 89 permanent housing units, purchased or rented by construction personnel during the construction phase, would either again become available as construction personnel leave the area and sell their homes, or the units would become part of the operations phase housing inventory, if the construction worker made the transition to the operations work force.

Unlike construction workers, most mine and plant operators are expected to prefer permanent housing over transient housing. Over 80 percent of the direct labor (209 to 292) would be expected to prefer single-family homes, multi-family dwellings, or mobile homes with permanent connections. Most of the remainder would seek available rentals, which are currently few. Few, if any, are expected to opt for RV or motel-type accommodations except, perhaps, on a temporary basis.

If the available housing supply is utilized (approximately 89 units [see Section 3.11.3]) and the planned new housing units are developed (100-unit mobile home park), the number of

Table 4-10

Housing Demand from In-Migrant Households - Transition Period

	CONSTRUCTION			OPERATION		
	High Estimate			**High Estimate**		
Household Type	**Direct Labor-Related Households**	**Indirect Labor-Related Households**	**Total Households**	**Direct Labor-Related Households**	**Indirect Labor-Related Households**	**Total Households**
Transition Period Peak						
Single-Status Workers	300	22	322	57	18	75
Married-Status Workers	75	6	81	169	54	223
Total	375	28	403	226	72	298

Table 4-11

Housing Demand from In-Migrant Households - Operations Period

Household Type	Low Estimate			High Estimate		
	Direct Labor-Related Households	Indirect Labor-Related Households	Total Households	Direct Labor-Related Households	Indirect Labor-Related Households	Total Households
Operations Period Peak						
Single Workers	65	48	113	91	29	120
Married Workers	196	145	341	274	87	361
Total	261	193	454	365	116	481

homes available would total approximately 189 units, resulting in a shortage of between 20 and 103 units, assuming single operators do not double up. If the construction work force units are not available, the maximum total excess demand for permanent housing would be for approximately 203 units. As mentioned above, to eliminate the housing shortage for its workers, RMLP would cause additional units to be built by providing incentives for outside contractors, constructing houses itself, assisting employees in building homes, or otherwise causing these units to be built. Due to the long life span of the mining operations, it is anticipated, however, that a large percentage of the deficit in homes would be alleviated by future development from entrepreneurs, assuming financing is available. Total demand for both direct and indirect labor households could be from 454 to 481 units. Over 80 percent (354 to 376) would be expected to prefer permanent housing.

Housing costs for operations workers would not cause a problem given current housing costs. Average mine worker wages in Nevada are approximately $34,000 per year (NESD 1992). Assuming 25 percent would be devoted to housing, the average worker could afford $700 per month in gross housing costs. This would be competitive in the White Pine County housing market. However, given the possibility of excess demand for housing, prior to increases in the available housing stock, it would be likely that housing and rental prices would increase to capture higher profit potential. Such an increase may not be a detriment to the mine workers (where wages are above average), but may adversely affect persons in other employment sectors or those not in the labor force (e.g., retired persons).

4.1.11.4 Community Facilities and Services

Water Supply

Water production, storage, and treatment capacities in the municipal water service areas of White Pine County are in excess of current demand plus projected new demand generated by the Proposed Action's personnel and families. Only Ruth, with existing production shortages in dry years, would face any difficulty at all, and Ruth has ample backup from Ely. The Ely distribution system is occasionally stressed during certain peak periods during the summer when people water their lawns. To alleviate this stress, the City Engineer has developed an effective program of watering lawns every other day. The City of Ely has proposed a solution to this seasonal delivery problem through the construction of a new well, which would augment the existing system (Carnes 1994). The cost of locating and constructing a new well would be financed by RMLP through bond purchases, if this alternative is selected by the City. The estimated cost is approximately $100,000.

Wastewater Treatment

Current municipal wastewater treatment systems in Ely, McGill, and Ruth have sufficient capacities to accommodate project-related population increases. Ruth, the smallest of the three, has a limited wastewater treatment growth potential with an approximate capacity for an additional 50 to 100 homes. There are plans to construct an additional evaporation pond when growth warrants such expansion (Forman 1994). The bulk of population growth is expected to be in the county and in the Ely area. The potential exists for future development to push the Ely wastewater system to within 85 percent of system capacity, which would require that the City of Ely submit an expansion plan to the NDEP.

The Ely wastewater treatment plant can handle the projected population increase if the City can properly manage its sludge. The current sludge drying beds do not dry the sludge fast enough to prevent odor. A sludge digester to manage the sludge could be added onto the existing plant at an estimated cost of $250,000. RMLP would finance a new sludge digester through the bond program, if the alternative is selected by the City.

Solid Waste Disposal

RMLP is currently planning to handle the mine-generated solid waste stream in a state-approved, on-site solid waste landfill for the life of the mine. Wastes generated by the work force living in town would be directed toward the City-operated landfill. The present Ely sanitary landfill has the capacity to accommodate anticipated project-related growth for the next 5 years (Day 1994). Plans are underway to move the landfill operation to a new regional landfill location by October 1995. The move would allow switching to trench-and-compaction methods of operation and is being initiated in anticipation of stricter environmental regulations. A closure plan and new site plan must be submitted and approved by the NDEP. This process is costly and efforts are under way to find adequate funding (Day 1994).

Plans to relocate the landfill will proceed with or without the start of the Proposed Action. RMLP, however, would be willing to provide the County with financing to assist in the implementation of this community project. As part of the bond program, if the action is selected by the County, RMLP would provide a sum of $250,000 to fund a siting study and preliminary engineering design. RMLP would also allow the County to purchase its landfill liners and earthmoving and other equipment as part of RMLP's purchase package, which should reduce the County's cost.

Schools

Estimated student enrollment generated upon implementation of the Proposed Action was calculated using 3.5 persons per married household (2 adults and 1.5 children).

A high estimate of 132 construction worker children and 541 operations worker children may be in the community during the life of the project (Figure C-9). Of these, 30 percent are not expected to be of school age. Of the remaining 70 percent (92) construction worker children, it is expected that 55 percent (73) would be of elementary school age and 15 percent (20) of high school age. Of the remaining 70 percent (378) operation worker children, 30 percent (162) would be expected to be of elementary school age and 40 percent (216) would be of high school age.

The maximum project-related effect on school enrollment in White Pine County would occur during operations, when up to 378 additional students could be expected. This would increase the 1994-1995 enrollment by 22 percent over the current 1993-1994 enrollment of 1,683 students to approximately 2,061 students, which is still substantially below the early 1970s peak of 2,600 students and below the current estimated overall capacity of 2,565 students (WPCEDP 1993).

Once the new middle and high schools are completed, capacity of the district will decrease to 2,485 students. Though the overall school system capacity could handle the student projections, capacities at certain schools are approaching their limit. To ease potential sudden overcrowding problems at the new middle and high schools, it may be necessary to implement double shifts or year-round schooling, utilize the existing capacity at the Ruth Elementary School, or construct new facilities. The obvious best solution to any impact on the school district would be the construction of new school facilities. However, until funding can be generated from an increased tax base to finance the new construction, utilizing the Ruth School appears to be the best of the alternatives for handling students on a short-term basis. This alternative is the most economical and the least disruptive for the school system. Under this scenario, students would be bused to Ruth to take advantage of the now-closed school facilities. Re-establishing a busing program, which had been in place as recently as the 1990-1991 school year, would enable the district to redistribute students and ease overcrowding.

In light of the findings of the structural stability review for the middle school, the urgency for the construction of a new school is apparent. The passage of the 1992 school bond funding will allow the district to complete the new high school and construct a new middle school in Ely. Additional funding mechanisms that currently exist for new construction include the Nevada State Equalization Plan, which allots each county a per-student expenditure figure based on a formula incorporating certain specific criteria. Although local funds may not be available to handle a sudden increase in student population due to added tax revenue, state funds would be available. In addition, White Pine County passed a pay-as-you-go proposal that would add an additional $0.50 per $100 assessed valuation to the school district for capital improvements funding. These monies are used to make large-scale capital improvements or additions to other existing schools as student enrollment increases.

Other revenues accruing to the school district from property taxes paid by the mine during operations would be funneled to the State School Distributive Fund. These revenues would eventually go back to the school district as part of the student allotment or in the form of an additional $0.25 per $100 taxable value. The net effect of these tax revenues would be positive.

Implementation of a short-term plan to ease potential overcrowding would require additional financing. Using RMLP's bond program to pay for the first year would help the school district meet the immediate needs of new students until the tax revenues were sufficient to support the plan.

Overall, short-term, moderate impacts to the school district would be anticipated as new students arrive and potentially fill classrooms in the middle and high schools. Long-term positive impacts would occur to the school district as tax dollars are generated from the mining operations. The stronger tax base, due to a long-term mining project, would also make it easier to pass bonds for future school improvements.

Fire Protection

The Proposed Action would generate only minor increases in the need for fire protection services in developed areas of White Pine County. Fire danger would increase somewhat in the vicinity of the proposed project area because of increased activity; however, the manpower, equipment, and water source on-site would notably increase the opportunity to suppress wildland fires in the area before they became large and difficult to control. Thus, the increased risk would be offset. RMLP would prepare a Fire Suppression Plan to supplement the Plan of Operations. A fire truck would be located at the site for use in fighting fires on the property. RMLP would train an in-house fire brigade in the proper use of this equipment. In addition, the County Fire Protection Officer is expected to provide advice on how to maximize the benefit and also provide training assistance in fire fighting for the project personnel.

Potentially hazardous materials, such as sulfuric acid; gasoline, kerosene, and other petroleum products; solvents for degreasing machinery and equipment; process reagents; and laboratory chemicals, would pass through the area. RMLP would ensure that the Ely Fire Department and the White Pine Fire District are aware of the nature of the materials transported through town on a routine basis. RMLP would provide the Ely Fire Department and the White Pine Fire District with equipment and appropriate emergency response training in the event of a spill or other accident involving hazardous materials. Training for local volunteer fire fighters serving the area would be included with the training. RMLP would also make its own trained on-site personnel available, if needed, to assist the Ely Fire Department or the White Pine Fire District in such an event.

The Proposed Action would have no adverse impact on spill response capabilities in White Pine County. RMLP would specify that its trucking contractor adhere to the U.S. Department of Transportation's current regulations, which are designed to aid in reducing the potential for accidents and in mitigating releases that may occur during transport of hazardous materials. These rules require that the truck drivers bringing sulfuric acid and other hazardous materials to the study area receive training in the following areas: methods and procedures for avoiding accidents; pre-trip safety inspections; use of vehicle, including dangers associated with weather or road conditions; and loading and unloading of materials. Additional specialized training is also required for drivers of tank trucks, such as those transporting acid, including training on vehicle handling characteristics, and retest and inspection requirements for cargo tanks. In addition to these Federal requirements, RMLP would also require that any trucking or rail companies transporting acid to the site have their own spill contingency plans and appropriate emergency response capabilities.

Law Enforcement

The Proposed Action would slightly increase law enforcement needs in White Pine County. Of greater concern may be the transient nature of construction workers and their potential for disproportionate effects on law enforcement work loads. There are no precise means of predicting this effect; however, the net effect should be an increase in law enforcement work loads compared with current levels. On a population basis, the existing ratio of 1.35 patrol officers per 1,000 population would be reduced to 1.18 per 1,000, assuming the high estimate of 1,383 new residents. If the Sheriff's request for two additional patrol officers is approved, however, the ratio would be 1.36 officers per 1,000 population, which would be on a par with current staffing (Romero 1994).

The estimated cost of equipping two officers would amount to a one-time cost of approximately $30,000 for equipment and squad car and $67,000 a year for salaries (Romero 1994). RMLP would finance the equipment and salaries of the additional officers for the first 2 years by the bond program, if requested by the County. After the first 2 years, taxes would be sufficient to cover the need.

The local judicial system is also anticipated to be impacted to a minor degree. The projected rise in population would increase work loads from current levels; however, this increase would not interfere with the efficiency of the courts' operations.

Wildlife Law Enforcement

The Proposed Action would slightly increase wildlife law enforcement needs and responsibilities for the NDOW. With a population increase of 1,383 new people, greater impact to wildlife resources is expected to occur. The potential exists for increased poaching, due to the influx of transient construction workers, limited personnel to enforce wildlife laws, and the generally easy access to big game populations (see Wildlife and Fisheries Resources, Section 4.1.6.1). Although construction and operation workers are not necessarily predisposed to poaching, poaching may increase over present levels because: 1) construction transient workers may have little attachment or concern for the resources in the County; 2) there is only one wildlife law enforcement agent stationed in the County; and 3) there is generally easy access throughout the year to relatively large populations of big game. Although anticipated impacts from poaching cannot be quantified, the current problem is expected to be compounded. A greater interest in consumptive and non-consumptive use of wildlife and fisheries resources would be expected in the Ely area. This would lead to greater responsibilities for game, nongame, and fisheries law enforcement programs.

Health Care

Project-related population increases would increase demands on the White Pine County health care system to a small degree. The capacity of the system is sufficient to handle the increase. In the case of the William Bee Ririe Hospital, the increased use, though small, would be advantageous because of existing financial stress caused by low utilization rates in recent years. A higher usage rate would also help provide incentive for doctors to stay in the area for longer periods.

Social Services

The Proposed Action would have small and offsetting effects on the local social services system. Increased population would increase demand slightly for such services as counseling and day care. However, new jobs created by the Proposed Action would reduce unemployment and increase financial opportunity, which could reduce the need for public welfare assistance.

Construction workers are expected to be mostly nonlocal workers brought in by RMLP's contractor. They are expected to leave the area as their work is finished. This should prevent any impact from construction operations on local social services. Some of the construction workers who are hired locally may get permanent employment in the operation of the mine.

4.1.11.5 Government and Public Finance

The Proposed Action would contribute a net revenue increase to White Pine County throughout its projected 15-year life span. Revenue increases would result primarily from greater property tax, net-proceeds-from-mines tax, and sales tax revenues.

The net-proceeds-from-mines tax, which is collected in lieu of property tax on the ore body, is collected annually on the estimated net revenues from mineral extraction. The balance of the improvements to the mine property would generate property tax. The mine would also generate sales and use tax revenue to the state and local governments.

During the first few years of operation, the principal revenue change for White Pine County would result from an increase in sales and use tax revenues. In determining how much sales and use tax revenue would be distributed from the Proposed Action to Ely, White Pine County, and the school district, the base tax rate to be used is only 3 percent, comprised of the local school support tax (LSST), the basic city-county relief tax, and the optional transportation tax. The 2 percent State of Nevada sales and use tax goes to the State, and the distribution of the supplemental city-county relief tax (SCCRT) to White Pine County would not be impacted by the Proposed Action. Sales tax revenues would lag approximately 45 to 75 days behind the actual purchase dates.

The primary long-term revenue change would come from the net-proceeds-from-mines tax and the property tax generated by increased assessed valuation attributable to the mine improvements, processing facilities, and other support facilities. Receipt of the property tax would lag 1 year behind installation of improvements because of conventional assessment and collection practices. Based on projections made by RMLP when certain purchases would start and when employees would begin to arrive in the area, tax revenues to the community were projected by the accounting firm of Arthur Andersen. These tax revenues were projected for 24 months from the start of construction. The cost of addressing the community needs is shown on Table 4-12.

In addition to project construction activities, other commercial and residential activity would be occurring in Ely and surrounding areas. These developments would contribute to the tax base and add property tax and sales tax revenues to the City of Ely's and White Pine County's treasuries.

The Proposed Action would generate an approximate annual payroll of $18,700,000 during the operational period of the mine (550 total workers times an average annual salary of $34,000 [NESD 1992]). As stated previously, a total of $8,696,520 in new annual local spending for goods and services would occur from the project payroll. Applying an income multiplier of 2.57 (Dobra 1988), the total income impact of $8,696,520 in new local spending per year would increase to $22,350,056 per year. Sales and use tax for the County would be approximately $670,502.

As shown in Table 4-12, the Proposed Action would create public revenue surpluses for the White Pine County School District 9 months into the construction program, and surpluses for the City and County 22 and 17 months, respectively, after the start of construction.

In summary, and as shown in Table 4-12, the project would create public revenue surpluses in White Pine County after the first 2 years of construction activities. The effects are expected to continue during the operations phase. Upon project closure, White Pine County would experience reductions in ad valorem and net proceeds tax revenues similar to the increases experienced at the outset of the project.

4.1.11.6 Transportation

The potential impacts from the Proposed Action on area transportation systems would be primarily from additional employee vehicular traffic generated through downtown Ely. Traffic generation from the Proposed Action would have a short-term increase during the 18-month period of construction employment when up to 461 construction workers and 369 operations workers may be on-site.

Table 4-12

Tax Revenues versus Financial Needs

	MONTHS FROM START OF CONSTRUCTION											
Sales/Use Tax	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
County	0	0	2,234	2,234	2,234	2,234	2,234	2,234	30,198	30,198	30,198	51,241
Cumulative Total	0	0	0	4,468	6,702	8,936	11,170	13,404	43,602	73,800	103,998	155,239
City	0	0	1,213	1,213	1,213	1,213	1,213	1,213	16,399	16,399	16,399	27,826
Cumulative Total	0	0	0	2,426	3,639	4,852	6,065	7,278	23,677	40,076	56,475	84,301
Schools	0	0	10,342	10,342	10,342	10,342	10,342	10,342	139,792	139,792	139,792	237,202
Cumulative Total	0	0	0	20,684	31,026	41,368	51,710	62,052	**201,844**	341,636	481,428	718,630

	13	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
County	51,241	51,241	51,241	51,241	51,241	30,198	30,198	30,198	85,644	85,644	85,644	85,644
Cumulative Total	206,480	257,721	308,962	360,203	**411,444**	441,642	471,840	502,038	587,682	673,326	758,970	844,614
City	27,826	27,826	27,826	27,826	27,826	16,399	16,399	16,399	46,508	46,508	46,508	46,508
Cumulative Total	112,127	139,953	167,779	195,605	223,431	239,830	256,229	272,628	319,136	**365,644**	412,152	458,660
Schools	237,202	237,202	237,202	237,202	237,202	139,792	139,792	139,792	396,454	396,454	396,454	396,454
Cumulative Total	955,832	1,193,034	1,430,236	1,667,438	1,904,640	2,044,432	2,184,224	2,324,016	2,720,470	3,116,924	3,513,378	3,909,832

COMMUNITY NEEDS							
CITY		COUNTY		SCHOOLS			
Water	100,000	Landfill	250,000	Annual	175,000		
Wastewater	250,000	Law	156,000				
TOTAL	**350,000**	**TOTAL**	**406,000**	**TOTAL**	**175,000**	**TOTAL COMMUNITY NEED**	**931,000**

Tax Sources: Local School Support Tax (LSST)
Basic City-County Relief Tax (BCCRT)
Optional Transportation Tax (OTT)

BOLD: Numbers above are the breakeven points (where taxes exceed need)

Assuming 50 percent of the 830 workers (high impact during the transition period) exit the site in individual vehicles during a single hour, Highway 50 would potentially carry 415 additional vehicles in a 1-hour period. According to the NDOT, neither the general traffic flow on Highway 50 from the mine into and out of Ely, nor the Highway 93/Highway 50 intersection in Ely, would be affected, although the relative increase over existing traffic would be notable. Existing traffic levels on Highway 50 are low enough that entering traffic would be essentially unrestricted and levels of service should not be affected.

Truck Traffic

Currently, between 300 and 400 trucks travel through Ely each day. Over the life of the Proposed Action, RMLP projects the average daily truck traffic at a total of approximately 10 vehicles, or 20 one-way trips to and from the mine, for an average of one truck every 72 minutes entering or leaving the proposed project area. This estimate constitutes a 4 percent increase in truck traffic and is considered minimal. It is not expected that current levels of service on any routes through the area would be adversely impacted (Mouritsen 1994).

The estimated 10 trucks or 20 one-way trips would be for materials brought to the property as well as those shipped from the property. These freight items include fuels (diesel, gasoline, and propane), tires, blasting agents, lime and other mill reagents, mill grinding balls and other wear materials, miscellaneous mining and milling supplies, and copper cathodes. The transport of copper concentrate from the mine area and sulfuric acid to the mine area is discussed in Section 4.1.12.

Northern Nevada Railroad

Employment by the railroad is estimated to be between 20 (minimum) and 29 (maximum) equivalent full-time employees after shipments begin under the Proposed Action. The range of estimates is due to some uncertainty about the level of other business (non-RMLP business), rail market share of RMLP business, and evolving operational technology (Whipple 1994a).

Assuming an average of 24 employees, the on-duty locations would be approximately as follows:

Ely/East Ely/Ruth areas = 18 employees
Currie area = 2 employees
Shafter/Cobre areas = 4 employees

Ely/East Ely/Ruth area employees would live in those places, in McGill, or in adjacent rural areas. The Currie area employees would probably live in Currie, likely in company-provided living quarters (Whipple 1994a). The Shafter/Cobre area employees might live in the now unpopulated former towns of Shafter or Cobre, but more likely would live in Oasis, Wendover, or Wells.

Because of the limited number of workers that would be associated with the railroad, the impacts of resumed railroad operations on Cobre, Currie, Shafter, and other outlying stations with little or no population would be minimal and not adverse. However, the stationing of two to four employees and the passage of one or two trains per day, along with some brief switching activity, would at least be noticeable in those places due to their relative or complete lack of present activity. The impact on population, housing, and public facilities and services in Ely, East Ely, Ruth, or McGill also would be minimal and not expected to be adverse.

Potential traffic delays caused by the railroad operations at road intersections are expected to be of short duration. The median train length would be about 700 feet. Trains would be limited to 20 miles per hour through Ely, which is approximately 1,760 feet per minute. Therefore, a 700-foot train would require approximately 0.4 minute (about 24 seconds) to pass a given point. Allowing for advance warning of just over 0.5 minute (30 seconds), the maximum vehicle delay would be just about 1 minute (54 seconds) (Whipple 1994a). Although trains would occasionally be longer than 700 feet, or move at less than 20 miles per hour and thus block crossings for longer times, switching would normally be conducted at places where crossings would not be blocked (Whipple 1994a).

Crew assignments and schedules are still under review and the operating plan is not final. However, a likely scenario for crew assignments and dispatch under the Proposed Action is as follows:

Job #1: Riepetown Local

Operates East Ely to Riepetown and Riepetown to East Ely.
Crew on-duty East Ely 7 days per week at 5 p.m.
Ties up at East Ely around 3 a.m.

Job #2: South End Train

Operates East Ely to Currie and Currie to East Ely.
(One crew travels north on odd-numbered days, and south on even-numbered days.)
(Second crew travels north on even-numbered days, and south on odd-numbered days.)
Layover at Currie (or return to East Ely via crew shuttle).
On duty at East Ely around 5 a.m. (alternate days, each crew).
Arrival and tie-up at Currie around 1 p.m. (alternate days).
On duty at Currie around 12 noon (alternate days).
Arrival at East Ely around 8 p.m.

Job #3: North End Train

Similar to Job #2, except operates Cobre to Currie and Currie to Cobre.
Scheduled to arrive at Currie the same time as Job #2.
Cobre departs around 6 a.m.
Cobre arrives around 9 p.m.

Air Services

Implementation of the Proposed Action is anticipated to increase the use of services provided by Yelland Airfield. The field is currently underutilized and there is ample room for expansion (Brown 1994). Increased use of services provided by Skywest Airlines is expected. Skywest representatives have reported that an increase in the number of flights could be provided if there is proven increased demand for service (Rogers 1994). The continuation of commercial air service also depends on the status of the Federal Essential Air Service Subsidy. If Ely should lose commercial air service through the loss of the essential air service subsidy, the residents of White Pine County would be 180 miles from the nearest airport with commercial service and 250 miles from the closest hub airport (WPCEDP 1993).

4.1.11.7 Mine Closure/Reclamation

The socioeconomic impacts from closure, reclamation, and abandonment of the Proposed Action would be the loss of the approximately 550 jobs associated with the mine operation. If RMLP were not expanding operations into another nearby area at the time of closure, the jobs could be permanently lost.

When mine operations cease, tax revenues would no longer be accrued from this mine, including net-proceeds-from-mines revenues, property tax revenues for White Pine County, and the sales and use tax revenues related to the operation of the mine. The salaries from these jobs, and their multiplier effect in the local communities, would also be lost. The workers would likely attempt to acquire work at other mines in the Ely area, depending on the available jobs at that time. If jobs were unavailable, the unemployed workers would either remain in the area, continuing their demands on community services, or would relocate to another area for employment. If workers left the area at a time when there was a net loss in population in the communities, there could be underutilized infrastructure (schools, housing, etc.) in the communities, resulting in an inefficient use of resources.

The White Pine County economy has experienced periods of economic hardship in the past. Efforts taken by RMLP to phase out operations over several years would minimize impacts by allowing the affected population to adequately adjust and plan for their future.

In summary, socioeconomic effects would be minimized by RMLP's actions to provide solutions for socioeconomic effects, i.e., the bond program, assuring adequate housing units for workers, assistance in school bond promotion, and allowing landfill equipment and supplies to be purchased with RMLP purchases.

4.1.12 Transport of Process Materials, Products, and Hazardous Wastes

4.1.12.1 Probability of a Release

The possibility of an accident resulting in the release of a process material, product, or hazardous waste exists for both the railroad between Ruth and Cobre and the trucks traveling between Ruth and Carlin. The probability of such an event was investigated using existing accident data and the transportation parameters for the Proposed Action. Accidents resulting in the release of a hazardous material would be of greatest concern, and the analysis focuses on these "incidents".

Sulfuric acid, diesel fuel, copper concentrate, and other freight would be transported on the Northern Nevada Railroad between Cobre and Ruth. Two trains per day (one inbound and one outbound) would make the 150-mile trip and would operate at a maximum speed of 10 mph over much of the route. Using national railroad spill statistics to quantify the probability of a release is not representative of the Robinson Project since the project has very different operating conditions along the Northern Nevada Railroad (i.e., lower operating speeds). However, the probability of a release can be bounded using historic accident data. The probability was calculated using a national spill statistic that has been developed for the rail transportation of petroleum (Walter et al. 1985). This spill frequency (7.8 spills per billion ton-miles) relates the amount of material transported to the distance traveled. For the life of the Robinson Project, the number of rail releases for diesel fuel and sulfuric acid can be calculated as follows:

Diesel Fuel: 0.273 million tons shipped x 150-mile haul distance x 0.0078 releases per million ton-miles = 0.32 releases

Sulfuric Acid: 2.260 million tons shipped x 150-mile haul distance x 0.0078 releases per million ton-miles = 2.6 releases

However, due to the different operating condition, the Robinson Project would be expected to have fewer (but not quantifiable) releases than are calculated from a national average. A release into a wetland would be even less likely as only 19 miles of the 150-mile route cross wetlands. The upper bounds for releases of diesel fuel and sulfuric acid into a wetland are 0.04 and 0.33, respectively. The upper bound for a release in Ely is 0.06 as only 3 miles of the route pass adjacent to the populated area.

Due to the low operating speed, it is highly unlikely that a car or train would derail, and it is more unlikely that a car would turn over or be damaged and spill its contents. Further, the tankcar proposed to be used for the project is specifically designed to transport liquid hazardous materials, such as sulfuric acid. This specification of tankcar is a rail industry standard and has been in operation for approximately 30 years. The tankcar is designed and constructed with no bottom or side outlets, thus eliminating the possibility that a valve could be sheared off during a derailment and cause a release. In addition, the tankcar must be pressurized before it can be unloaded, thereby minimizing the probability that the contents would spill if a car turned over. For these reasons, it is believed that a release during the life of the project would be highly unlikely.

Trucks would be used to transport a variety of nonhazardous materials as well as hazardous materials and wastes. The majority of the project-related truck traffic is assumed to be on Highway 50 and 278 between Ruth and Carlin, a distance of approximately 165 miles. Ten trucks per day would supply the mine with fuel and other materials and supplies. If railroad service were interrupted, sulfuric acid and diesel fuel would be shipped to the mine by truck. For this analysis, it has been assumed that acid would be shipped by truck 30 days per year and that 28 loads per day would be required. For analysis purposes, it has also been assumed that RMLP would ship its entire diesel fuel supply by truck. This would require approximately 9,000 loads between 1995 and 2010, ranging from about 2 loads per week to 2 loads per day. Gasoline and propane would be obtained from a local supplier in Ely, resulting in a much smaller indirect increase in truck traffic hauling these fuels. The mine is expected to generate only small quantities of hazardous wastes. These would be stored on-site until a sufficient quantity has been accumulated to warrant pickup by a licensed hauler. It is assumed that one pickup per month would be required.

The probability of a truck accident resulting in the release of hazardous material (such as diesel fuel) has been calculated from a national statistic that shows a rate for such events of 0.28 releases per million vehicle miles traveled (Abkowitz et al. 1984). The releases for diesel fuel and sulfuric acid over the life of the project are calculated in the following:

Diesel Fuel: 9,000 truck deliveries x 165-mile haul distance x 0.00000028 accidents per mile = 0.42 releases

Sulfuric Acid: 28 truck deliveries per day x
30 days per year x
18 years x
165-mile haul distance x
0.00000028 accidents per mile =
0.70 releases

Assuming pickup of hazardous waste once per month ***and a haul distance of 175 miles to the USPCI facility west of Salt Lake City, 0.01*** accidents resulting in a release ***would be*** anticipated during the life of the project.

The above analysis indicates that about one truck accident resulting in the release of a hazardous material would be expected during the life of the project. Table 4-13 presents recent release statistics for trucks operating in the United States and Nevada. A release into a wetland would be even less likely as only 10 miles of the 165-mile route would cross wetlands. The combined number of releases into a wetland is estimated at 0.07. The probability of a spill in a populated area (Carlin or Eureka) is very low at 0.01 as only 2 miles would be crossed.

Assuming an 18-year period of truck hauling, an increase in the number of highway incidents in Nevada of 0.06/year as a result of the Proposed Action would not represent a substantial increase over the average number of 22.6/year for the past 10 years.

4.1.12.2 Effects of a Release

The environmental effects of a release would depend on what is released, how much is released, and where it is released. The releases calculated above assume a hazardous material but do not address volume or location. The event could involve a small amount of diesel fuel spilled onto open rangeland or a large amount of sulfuric acid spilled into a stream. In general, the materials of greatest concern would be liquid fuels (gasoline and diesel fuel) and sulfuric acid. An accident involving a propane tanker could cause an explosion and create a fire hazard, but the material would vaporize and should not affect water or surface resources (e.g., cropland and wildlife). Copper concentrate, which would be transported on the railroad, is an inert material that is not readily soluble in water. It is not classified as a hazardous waste under Resource Conservation and Recovery Act (RCRA) regulations {261.4(b)(7)} and would not pose an immediate environmental hazard. Sensitive resources along the transportation routes are described in Section 3.12, and impacts to terrestrial and aquatic life are discussed in Sections 4.1.4, 4.1.5, 4.1.6, and 4.1.7. The following paragraphs discuss the general effects of a fuel or acid release on terrestrial and aquatic resources.

Sulfuric acid spilled onto the ground or into a water body has the potential to severely damage localized terrestrial or aquatic habitats and contaminate soils. It is a very powerful acidic oxidizer that can react, sometimes violently, with a variety of materials, including water. Sulfuric acid spilled onto vegetation leaf surfaces or reaching plant roots through the soil would kill the plant. Thus, a spill onto rangeland or hay meadows would typically result in the chemical "burning" of the affected area, which would be expected to be quite limited in size. A spill into a stream or other water body has the potential for migrating much farther from the spill site, lowering the pH of the water and likely reducing populations of aquatic invertebrates, amphibians, and fish.

Diesel fuel is a petroleum distillate composed chiefly of unbranched paraffins. A spill of diesel fuel would also "burn" vegetation in high concentrations. Such a spill could also ignite

Table 4-13

Reported Highway Incidents[1] Involving Hazardous Materials in the United States and Nevada 1983 - 1992

	United States Highway	State of Nevada Highway
1992	7,771	26
1991	7,629	27
1990	7,274	31
1989	6,037	46
1988	4,906	35
1987	4,953	23
1986	4,616	11
1985	4,752	13
1984	4,507	8
1983	4,869	6
Total	57,314	226
Average	5,731.4/yr	22.6/yr

[1]Incident = Unintentional release of material during transportation.

Source: U.S. Department of Transportation (USDOT), Information Assistance Office, Washington, D.C. 1993.

from the accident and cause a range fire. Of course, a controlled fire can also reduce the amount of material penetrating into the soil and thus reduce long-term contamination. A spill into a water body would contaminate the water and sediment, possibly impacting local aquatic populations. Without cleanup, diesel contamination can result in higher levels of various hydrocarbons in soils, surface water, and possibly groundwater.

A release of fuel or acid could also have implications for public health and safety. The location of the release would again be the primary factor in determining its importance. The rail route is, for the most part, removed from human populations; however, it does pass around the north and west side of Ely and the north side of Ruth, where it is in proximity to residences. The truck route passes through Carlin and Eureka, and just north of Ruth. A release in one of these populated areas could have effects ranging from simple inconvenience during cleanup to potential loss of life if an explosion and fire were involved. The probability of a release anywhere along a transportation route is very small; the probability of a release within a populated area is smaller; and the probability of a release involving an injury or fatality is smaller still. USDOT statistics show that for the state of Nevada between 1983 and 1992, an average of 0.03 injuries or deaths occurred for each hazardous materials highway incident (USDOT 1993). It is not anticipated that a release involving severe effects to human health or safety would occur during the life of the project.

While the release of a hazardous material or waste into a sensitive area (such as stream, wetland, or populated area) is judged to be very unlikely, the probability is not zero. Again, depending on the material released, the amount released, and the location of the release, an accident resulting in a release could cause significant impacts to soil, water, biological, and human resources.

4.1.12.3 Response to a Release

Process materials, products, and hazardous wastes would be transported by independent companies contracted by RMLP. All hazardous materials would be transported in compliance with 49 CFR and U.S. Department of Transportation Federal Motor Carrier Safety Regulations. In the event of a release, the transportation company would be responsible for response and cleanup. Local and regional law enforcement and fire protection agencies may also be involved to initially secure the site and protect public safety. As discussed in Section 2.2.16, RMLP would specify that the contract haulers maintain certain safety standards and would also assist the City of Ely and White Pine County in upgrading their emergency response training and equipment.

Each company would develop a Spill Prevention, Control, and Countermeasures (SPCC) Plan to address the materials they would be transporting. The general content of an SPCC Plan is presented on Table 2-5. These plans detail the appropriate response, treatment, and cleanup for a material spilled onto land or into water. For example, a release of sulfuric acid could require neutralizing the spill with lime, flushing the area with water, or removing contaminated soil. Specific procedures would be developed for fuels, acid, and other hazardous materials. Copper concentrate has a high economic value, so any release would be picked up with appropriate equipment, reloaded onto rail cars, and shipped to the smelter. Any cleanup would be followed by appropriate restoration, which could include replacing removed soil, regrading the disturbed area, and seeding the area to prevent erosion and to return the land to its previous land use.

4.1.13 Access and Land Use

The Proposed Action could affect public access and land use resources both directly and indirectly by exerting a physical and/or visual influence. Direct effects may result in the termination or modification of the existing land uses in the study area. Indirect impacts may result in altered land use patterns or access to use areas adjacent to or within view of the Proposed Action. Indirect effects would also result if the Proposed Action stimulated or encouraged the development of land uses not presently anticipated.

The following criteria were integrated to determine impacts to public access and land uses: 1) termination or modification of existing public access opportunities; 2) potential conflicts with existing land use plans (e.g., BLM RMP, White Pine County land use plan and zoning ordinances); 3) proximity to "sensitive" areas (such as Ely or Ruth); 4) termination of an existing land use or a land use incompatibility; and 5) a general characterization of impact type (including duration, quantity, and quality of the impact). Direct impacts would affect primarily public access patterns, grazing allotments, wildlife habitat, recreational opportunities, land ownership, and timber harvesting. Impacts to grazing management are discussed in Section 4.1.14; wildlife habitat in Section 4.1.6; and recreation resources in Section 4.1.15.

4.1.13.1 Mine Development/Operation

Access

County Road 1146, which extends through the mine area, would remain open to the public (see Map 3-9). Segments of the historic Lincoln Highway are located in the proposed mine and tailings disposal areas. In addition, portions of County Roads 1148 and 1149 extend through the proposed location of the tailings disposal facility in Giroux Wash. These roads are used intermittently as access routes to public lands to the west. Construction of the tailings disposal facility would sever these particular routes; however, other, less direct roads are available to provide access to those public lands. Construction of the tailings disposal facility would sever east-west access on these roads. The remaining sections of the Lincoln Highway would remain available for round-trip access to the public lands west of the tailings disposal facility; however, this type of access would increase travel distances. RMLP would construct a new dirt road on public lands around the west side of the impoundment to re-establish access to the Old Lincoln Highway (see Map 3-7). Construction of the transmission line would have no impact on existing public access.

Land Use

As currently planned, the total disturbance to lands from the Proposed Action would be 2,140 acres on public land and 3,216 acres on private land (see Table 2-1). All mining of new ore would be conducted on private property and would entail expansions of the existing Veteran-Tripp, Liberty, Ruth, Kimbley, and Wedge open pits, formerly mined by Kennecott. The Proposed Action would result in the expansion of areas already affected by previous mining activities. The expansion of existing waste rock disposal areas and leach pads, and the construction of the new tailings disposal facility, would require use of public lands administered by the BLM and private lands owned by RMLP. Mining activities on the private lands would require a conditional use permit from White Pine County. The proposed development generally would preclude any public use of the affected lands for the life of the mine. For both safety and security reasons, public access to the active mining and processing areas would be precluded to the maximum extent permitted by law during the life of the Proposed Action.

A portion of the transmission line route would coincide with an existing but unused corridor formerly used by Kennecott. Authorization for the powerline from BLM would be part of the overall Proposed Action approval rather than as a separate right-of-way. The portion of the transmission line route that traverses private land (north of Ruth) would require a conditional use permit from White Pine County.

Land ownership in the Riepetown area has changed. RMLP purchased these townsite lots from private owners. The lots previously had severed surface interests, and RMLP had owned the mineral rights underlying them. The lots are vacant, undeveloped, and void of electrical, water, or sewer services.

The Proposed Action would remove approximately 2,251 acres of existing pinyon/juniper trees, which are currently used by the public for BLM-permitted harvesting of firewood, Christmas trees, and pinyon nuts. Construction of the proposed project would remove approximately 4,502 cords of wood, 4,502 Christmas trees, and 2,251 acres of pinyon pine habitat that produces about 1 pound of pinyon nuts every 5-year period.

Prior to the start of tailings disposal facility construction, the general public could harvest woodland products in the areas to be disturbed. BLM would designate the area for woodcutting and issue permits for harvest of woodland products. At present, approximately 2,000 cords of wood are harvested annually under BLM permits in the Ely District. If this amount is harvested prior to construction, there would be a large surplus of trees remaining after harvesting. Loss of these woodland resources is considered to be consistent with BLM's mandate under multiple-use management.

Approximately 1,713 acres of public rangeland administered by BLM would be changed to mining or fenced off from the remainder of the allotments. Use of portions of this area by wildlife may be restricted. The leach ponds would be permitted under the NDOW's Industrial Ponds permitting system, which would require fencing, monitoring, and reporting of all wildlife mortalities. The ponds would also be covered, netted, or equipped with other proven methods approved by NDOW and the BLM to limit or prevent access to the ponds.

Land uses in Ely and Ruth would not likely change or be affected during the life of this project. The Proposed Action would contribute to the demand for additional urban development in the Ely vicinity. However, a substantial amount of undeveloped land zoned for development is available in the area. Indirect impacts to residents located in Ruth would be incremental.

4.1.13.2 Mine Closure/Reclamation

The closure, abandonment, and reclamation of the Proposed Action would return public lands to their premining land use as rangeland, wildlife habitat, and dispersed recreation. Some private lands would remain available for industrial use. Except for the mine pits, SX/EW facility, concentrator complex, and miscellaneous buildings, all other areas would be revegetated. Public access would be maintained through the area.

4.1.14 Grazing Management

4.1.14.1 Mine Development/Operation

With the exception of the transmission line route and the tailings disposal area, all other new disturbances would involve minimal public rangeland currently used for livestock grazing. Livestock grazing would be excluded from the tailings disposal area during the life-of-the-project and at least until vegetation has been established on reclaimed areas. This would temporarily eliminate about 2,176 acres (463 of these acres are private) of rangeland, including a total of approximately 103 to 138 AUMs from the BLM Giroux Wash allotment and the Copper Flat allotment. The Proposed Action would, therefore, result in the short-term loss of less than 4 percent of the Giroux Wash and the Copper Flats allotments' active livestock grazing preference; however, this is not expected to cause degradation of the vegetation resource. The reduced number of AUMs would be considered during the formal allotment evaluation process. Removal of land from the grazing allotment could direct the remaining livestock use into smaller portions of the allotments. There are no existing range improvements to be lost. The three springs within the drawdown cone would not experience reduced water flows.

The disturbance associated with the proposed transmission line route would eliminate approximately 74 acres of land from portions of four livestock grazing allotments. This would result in the loss of approximately 3 to 5 AUMs (total).

4.1.14.2 Mine Closure/Reclamation

The required reclamation of the proposed project area would include the reseeding of all newly disturbed acreage except for the pits. Reseeding would increase vegetative cover and make the area suitable for livestock grazing. Livestock grazing may be resumed after re-established vegetation is capable of supporting grazing, i.e., two to five growing seasons after final seeding.

4.1.15 Recreation

4.1.15.1 Mine Development/Operation

No parks, concentrated recreational use areas, BLM Wilderness Study Areas (WSAs), designated wilderness areas, or protected natural areas would be directly impacted by the proposed project. The development of the proposed project would reduce opportunities for dispersed recreationists, primarily hunters and off-road vehicles users, during the operation and reclamation activities. Overall, the displacement of dispersed recreationists would be a minimal adverse impact because existing recreational use in the project area is relatively light, and the Egan Resource Area has abundant acreage of public, open-space lands available for dispersed recreational opportunities. Public access would be maintained through and around the project area. Although no specific recreational use data for public lands directly affected by the proposed project are available, the number of dispersed recreationists affected is expected to be minimal, and their displacement would not create overuse of other areas or degradation of the resource.

The Garnet Fields Rockhound Area is approximately 1 mile to the northeast of the mine area and immediately adjacent to a segment of the transmission line route. This 1,280-acre area is managed for recreational rockhounding, and the Egan RMP calls for BLM to restrict competitive or conflicting resource activities. The Proposed Action would have only minor indirect impacts on this area due to increased usage from new populations. The proposed transmission line would be installed to the north of the Garnet Fields area. However, it would be within an existing corridor and would not impact rockhounding activities because garnets do not occur at this location (see Visual Resources, Section 4.1.16).

The Ward Mountain Winter Sports Recreation Area is managed as a joint BLM/Forest Service area. The north boundary of Ward Mountain Winter Sports Recreation Area (BLM portion) is about 0.5 mile south of the Ruth Dump and the west boundary is approximately 2.3 miles east of the tailings disposal areas (see Map 3-9). Increased usage is expected from the Proposed Action; however, BLM/Forest Service personnel are anticipating the increase and do not foresee any problems.

Resumed railroad operations would have no impact on the "Ghost Train" operations. Northern Nevada Railroad's right to use tracks owned by the Ghost Train's operators, Ely's White Pine Historical Railroad Foundation (HRRF), was created under, and is subject to, a definitive contract negotiated between and executed by Northern Nevada Railroad and HRRF in 1993. This agreement provides:

- White Pine HRRF trains would have priority over Northern Nevada Railroad trains at all times;
- Northern Nevada Railroad would staff the dispatcher positions;
- Northern Nevada Railroad would pay money damages to HRRF if their trains were delayed by Northern Nevada Railroad actions or omissions; and
- Northern Nevada Railroad would also allow HRRF to extend its tourist operations, on an occasional basis, to points beyond HRRF-owned tracks (Whipple 1994).

4.1.15.2 Mine Closure/Reclamation

The closure, abandonment, and reclamation of the Proposed Action, including the waste rock disposal areas, tailings disposal facility, and ancillary facilities, would return public lands to their premining land use as rangeland, wildlife habitat, and dispersed recreation. Except for the mine pits, SX/EW, concentrator complex, and miscellaneous buildings, all other facilities would be revegetated. Public access would be retained through the area.

4.1.16 Visual Resources

Two issues were addressed in determining visual impacts: 1) the type and extent of actual physical contrast resulting from the Proposed Action and related activities to existing conditions; and 2) the level of visibility of a facility, activity, or structure. Impacts would be considered high if visual contrasts are identified for landscape modifications affecting the following: the quality of any scenic resources; scenic resources having rare or unique value; views from, or the visual setting of, designated or planned parks, wilderness, natural areas, or other visually sensitive land use; views from, or the visual setting of, travel routes; and views from, or the visual setting of, established, designated, or planned recreational, educational, preservational, or scientific facility, use area, activity, viewpoint, or vista.

The extent to which the Proposed Action would affect the visual quality depends upon the amount of visual contrast created between the proposed facilities and the existing landscape elements (form, line, color, and texture) and features (land and water surface, vegetation, and structures). The magnitude of change relates to the contrast between each of the basic landscape elements and each of the features. Assessing the Proposed Action's contrast in this manner indicates the severity of potential impacts and guides the development of mitigation measures so the VRM objectives would be met.

Visual contrasts generated by the existing open pits, dumps, leach piles, and facilities from the Robinson Mine can be observed from several viewpoints in the Ely vicinity. These landscape modifications are historical features of the local topography. The Robinson Mine, Ruth area, and the northern portion of the transmission line route through the Steptoe Valley and across Highway 93 have generally been managed by the BLM as potential VRM Class IV lands, where changes to the characteristic landscape can be high. The proposed tailings disposal facility and transmission line route around the Garnet Hill area are located on potential VRM Class III lands, where activities and facilities should remain subordinate to the existing character of the landscape.

4.1.16.1 Mine Development/Operation

The Proposed Action components would be located on the edge of an extensively disturbed area (see Figure 1-1). The Proposed Action would increase the physical extent of visual effects; however, it would not introduce new types of landforms, lines, colors, or textures.

The anticipated visual impacts from the proposed mining activities would be the creation of a horizontal line from the construction of the tailings disposal facility, an increase in the size of the existing dumps, an increase in line and color contrasts to the surrounding landscapes from the tailings disposal facility, dumps and leach piles, and the re-exposure of the public to the horizontal line from the re-establishment of the transmission line. There should be only a limited amount of dust generated from the tailings facility due to planned dust abatement measures.

Views along Highway 50 are representative of the views seen traveling through the study area. Views are from foreground through background distance zones. Views of the existing waste dumps, leach pads, and mine buildings and equipment can be seen along this corridor traveling both into and out of the Ely area. Color, form, and line contrasts are evident. Occasionally, views are blocked by intervening topography. Views of the proposed transmission line route would also be evident as it crosses Highway 50 and extends northeast around Garnet Hill and west along Highway 485. Intermittent middle ground views of the proposed water pipelines may also be noticeable along this route as the pipeline traverses the base of the hills. The incremental change to the existing landscape modifications during construction of the Proposed Action would not draw a large amount of increased visual attention along Highway 50. The study area as viewed along Highway 50 would be consistent with the objectives for VRM Class IV areas, which permit visual modifications to dominate the view.

Along Highway 485 and the town of Ruth, foreground views of the mine site are common to viewers who commute to work or reside near the project area. The proximity of the Keystone Dump provides strong conical forms, curving lines, and the yellowish hues typical of these landforms. There are currently only small amounts of nonlocal traffic along this route. The proposed mill facility would be constructed at the end of Highway 485 at the former Riepetown location. Intervening topography would block most of the visual impact from Ruth and Highway 50. The Keystone Dump behind Ruth is scheduled to be moved to the east to be releached. Visual changes to the dump would be noticeable from Ruth, but over time the visual impact should be minor as new material is redeposited on the proposed leach pad location. Foreground views of the proposed water pipelines and transmission line would be noticeable because both parallel Highway 485. Middle ground views of the pipeline extension to the north of Ruth would be seen for a short duration while traveling along the road. The low profile of the pipeline, other numerous linear features in the area, such as dirt roads, and use of a neutral, noncontrasting-color paint covering would tend to limit its overall visual presence. The project area, as viewed from Highway 485 and the town of Ruth, would be consistent with the objectives for VRM Class IV areas, which permit visual modifications to dominate the view.

From the Garnet Fields Rockhound Area, views to the south include the highly colored dumps of the majority of the Robinson Mine area, and views to the north and west include the transmission line route. The Robinson Mine viewshed is already highly modified by the existing mining operation and, even though manmade, the dumps are considered historical features of the local topography. Incremental changes to the form and line would occur over the life of the mine but would have little impact on the existing color and texture as seen from this location.

Foreground views of the horizontal transmission line element would be noticeable from the Garnet Hill area as the transmission line parallels Pole Line Road, which serves as the primary access route to the rockhounding area from Highway 50. This portion of public land is potentially VRM Class III land. Visual disturbances would be minimized by using dark brown poles and by placing the poles out of public view where possible. Middle ground and background views of the transmission line route would be seen as the line extends to the north into the Steptoe Valley, still paralleling Pole Line Road. This portion of the powerline passes through potential VRM Class IV lands, which allow visual modifications to dominate the view, but impacts could be mitigated by using noncontrasting colored poles. Middle ground views of the proposed water pipelines may also be visible from the Garnet Fields Rockhound Area. The pipelines would be approximately 2.5 miles from the Garnet Hill area and views may be limited due to intervening trees. The pipelines' overall visual presence would be minimized by its neutral, noncontrasting color. The water pipelines would be consistent with the VRM Class IV management objectives.

Views from Bothwick Road would be of the transmission line as it passes over Bothwick Road and south of the Cross Timbers community. The proposed transmission line would be a visual addition to nearby existing power and utility lines servicing the area. The installation phase of the Proposed Action would cause temporary visual impacts as crews and equipment move through the area. This area has already been modified by general residential development and is potential VRM Class IV land. The Proposed Action would be consistent with VRM Class IV management objectives.

Views along Highway 93 north of Ely would be background views of the transmission line as it extends from the Garnet Hill area, across Steptoe Valley to a point north of the Cross Timbers residential development. The horizontal line created by the transmission line would be below the horizon and barely discernible from this distance. The proposed transmission line route would then follow an existing transmission line route west to the Gonder Substation. Views on Highway 93 would become middle ground and foreground views as the road approaches, then passes, below the line. This portion of the line also passes through potential VRM Class IV lands. The Proposed Action would be consistent with Class IV management objectives.

Views of the project site from northbound Highway 6 extend from approximately 23 miles to 7 miles south of Ely. This view is approximately 17 minutes in duration from a vehicle moving along this route at 55 mph. Middle ground views of the predominately undisturbed Giroux Wash and background views of the existing mine dumps and leach pads occur intermittently through pinyon and juniper trees. New elements added by the Proposed Action to this viewshed would be the higher waste dumps in the background, and middle ground views of the 190-foot-high dam/tailings disposal facility. The increased height of the dumps and the size and scale of the dam/tailings disposal facility would remain below the level of the distant horizon. These new features would alter the existing visual resources of Giroux Wash and draw additional visual attention; however, they would be an extension of the existing waste dumps that are already a visible disturbance in the viewshed. With proposed reclamation techniques, the project features would be acceptable under Class III objectives.

Overall, the Proposed Action would repeat the similar modified forms, lines, textures, and colors that presently exist at the Robinson Mine. The proposed tailings dam would introduce a new landform with strong lines and contrasting colors. The scale of existing landform modification would increase incrementally with larger waste dumps and the gradual completion of the tailings facility. The leach pads and waste dumps would be located adjacent to existing disturbances and would draw minimal additional visual attention. The tailings disposal facility would attract attention, but it is also an extension of an already disturbed viewshed. Impacts would be partially mitigated as reclamation and revegetation progress during and after the period of active mining.

4.1.16.2 Mine Closure/Reclamation

After successful reclamation, the visual contrast of the Proposed Action would be reduced. Color and texture would blend more with the natural landscape. Revegetation of the faces of waste dumps and the tailings dam would reduce visual contrasts with surrounding vegetation. Revegetation would reduce the impact of these structures, and natural vegetation over the long term would begin to blend with the color and texture of the existing natural landscape. The grasses, shrubs, and recontouring of the tailings and waste rock facilities would create less visual contrast in the landscape. The scale of visual disturbance of existing modified pyramidal landforms contrasted with rounded natural landforms, however, would remain dominant.

4.1.17 Cultural Resources

Direct physical impacts to cultural resources could occur during ground-disturbing activities associated with construction of the open pits, mine waste dumps, leach pads, SX/EW facilities, concentrator complex, powerlines, water pipelines, access roads, and tailings areas, as well as reclamation activities around existing mine waste dumps. Indirect impacts could result from increased erosion or improved access, which makes sites more vulnerable to accidental or deliberate disturbance and illegal collecting.

Physical alteration of a standing historical structure diminishes the historical integrity of the resource with respect to its cultural setting. Any adverse impact to a cultural resource that is eligible for inclusion in the NRHP is considered a significant impact. The significance of a cultural resource is an assessment of the importance of a cultural resource to the citizens of the United States and indicates that a site has attributes that qualify it for inclusion on the NRHP.

An undertaking is regarded as having an effect on a cultural property if it alters any of the characteristics that may qualify the property for inclusion in the NRHP. An adverse effect is one that diminishes the integrity of any of these characteristics. Adverse effects can only be incurred by sites that have been identified as significant cultural resources eligible for inclusion on the NRHP. An undertaking is always considered to have no adverse effect or no effect if all sites in the area have been shown to be not significant or the impacts to the qualities that make the sites significant are mitigated as defined in 36 CFR 800.9(c)1. Therefore, discussions of project impacts are limited to sites within the proposed mine area and along the transmission line route deemed to be significant or eligible for inclusion on the NRHP. It is assumed that potential impacts will be mitigated using guidelines presented in the Programmatic Agreement (PA).

4.1.17.1 Mine Development/Operation

Ground-disturbing activities could result in direct impacts to prehistoric, proto-historic, and historic cultural resources in the form of vertical and horizontal displacement of soils containing cultural materials and in the loss of integrity of the cultural deposits, loss of information, and alteration of site setting. Additionally, construction of the tailings impoundment could result in direct impacts to proto-historic and historic resources, such as the Old Lincoln Highway, known to exist within the proposed project area by altering the site setting and isolating the resource from access and further study.

Construction of access roads could also result in indirect impacts by making cultural sites more vulnerable to vandalism and casual collecting. Subtle changes in topography due to mine road construction could result in indirect impacts to cultural resources due to alteration of the amount or patterns of erosion.

Avoidance of impacts is the primary mitigation for cultural resources. When disturbance of NRHP-eligible sites is unavoidable, impacts will be mitigated according to a site-specific treatment plan that will be formulated in consultation among RMLP, the BLM, State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation (ACHP), following procedures stipulated in the PA. These plans could include avoidance/protection, recording/documentation, collection, partial or complete excavation, and treatment or maintenance.

If previously undocumented sites, or subsurface components of documented sites, are discovered during construction, activities would be halted until the resources are examined by professional archaeologists. If the resources are determined to be eligible for the NRHP, pursuant to the PA, impacts would be mitigated through the appropriate data recovery program.

Reports detailing the results of the intensive archaeological evaluations conducted as part of this project are on file at the BLM's office in Ely, Nevada (Kolvet 1993a,b; Mehls et al. 1992; Stoner et al. 1993; Peterson 1993 a,b; Young 1992; Zerga 1991a,b,c). Only brief summaries and general location descriptions are provided in the EIS to protect the confidentiality of the sites.

Ten known sites eligible for the NRHP have been identified within the mine area; three sites, two lithic scatters and the historic Riepetown town site, are eligible for the NRHP, and seven sites have NRHP potential (Table 3-18). Of the 10 cultural sites, 5 sites would be directly impacted by the Proposed Action, 2 sites (46-6840 and 46-6691) would be avoided, and 3 sites (Riepetown [26WP2868], 46-6771, 46-7318) have been previously mitigated under guidelines designated in the PA. The 5 sites (46-7361, 46-7396, 46-7404, 46-6712, 46-6877) that would be directly affected by proposed mine construction and operation would be mitigated under conditions specified under the PA prior to implementation of the Proposed Action.

Reports and maps of cultural resource surveys conducted in the proposed mine and transmission line areas (Zerga 1991a,b,c; Kolvet 1993a,b; Mehls et al. 1992; Stoner et al. 1993; Peterson 1993a,b; Young 1992) indicate that portions of the Proposed Action area remain to be surveyed. These areas include portions of the gold leach facilities Pad E, gold leach facilities Pad D, and the proposed waterline. It is not known how many cultural resources exist in areas of the Proposed Action where there have not been Class III cultural resource inventories. Under PA guidelines, these areas will be assessed and mitigated as necessary.

4.1.17.2 Mine Closure/Reclamation

Previously identified cultural sites would be mitigated under conditions specified under the PA prior to commencement of mine closure and reclamation. Ground-disturbing activities associated with mine waste dump reclamation could result in direct impacts to previously unidentified prehistoric, proto-historic, and historic cultural resources in the form of vertical and horizontal displacement of soils containing cultural materials and in the loss of integrity of the cultural deposits, loss of information, and alteration of site setting.

Subtle changes in topography due to mine waste dump reclamation could result in indirect impacts to cultural resources due to alteration of the amount or patterns of erosion. Under guidelines established in the PA, these potential impacts would be assessed and mitigated as necessary.

4.1.17.3 Ethnography

Renotification letters requesting comments on the Proposed Action were sent to the Tribal Chairs of the Ely Colony, the Goshute Reservation, and the Duckwater Reservation in January 1994. As of the printing of this document (April 1994), no comments had been received concerning this second project notification letter.

4.1.18 Paleontology

Invertebrate and paleobotanical fossils occur in formations that are found in the proposed mine and transmission line areas (NBMG 1976). None of these fossils, however, appear to be unique or site-specific to the area, and no impacts to significant or critical fossil resources requiring protection are anticipated (NBMG 1976; Henry 1993; Silverling 1993). Because fossils are usually buried, their locations cannot be confirmed until excavation occurs. If significant fossiliferous deposits, specifically Tertiary vertebrate fossil deposits, are located during construction, operation, or reclamation, measures would need to be taken to identify and preserve the fossils. Potential direct impacts to paleontological resources from the Proposed Action would be limited to areas of disturbance;

potential indirect impacts could result from increased accessibility to fossil beds from improved transportation routes. Waste rock dump areas would not destroy any known fossil beds but would potentially restrict access and limit future study.

4.2 No Action Alternative

Under the No Action Alternative, impacts from the Proposed Action to the following resources, as described in the previous section, would not occur:

- Geology and Minerals;
- Riparian and Wetland Areas;
- Wild Horses;
- Transport of Process Materials, Products, and Hazardous Wastes;
- Access and Land Use;
- Grazing Management;
- Recreation;
- Visual Resources;
- Cultural Resources; and
- Paleontological Resources

Impacts to other resources within the Robinson Mining District that are associated with current gold operations would continue, and potential improvements to environmental conditions associated with the Proposed Action would not occur. These issues are discussed below.

A comparison of the No Action Alternative to the Proposed Action is found in Section 2.7.

4.2.1 Water Quantity and Quality

Liberty Pit has been dewatered and is currently refilling with water that has a near-neutral pH, but elevated sulfate, TDS, and heavy metal concentrations (see Section 3.2). Ruth Pit, which received the water pumped from Liberty Pit, currently has a pH around 4.0 to 5.0 with elevated sulfate, TDS, and heavy metal levels. Kimbley Pit water has a near-neutral pH, but elevated sulfate and TDS. The Veteran-Tripp Pit contains a small pit lake with neutral pH (7.0 to 8.0) but elevated sulfate and TDS. Pit lake chemistry is expected to stabilize and be similar to that described in Section 3.2. Under the No Action Alternative, pit waters with elevated sulfate and TDS levels, and in some pits, heavy metals in excess of Nevada water standards, would remain at the site. Historic acidified leach material would remain in Liberty Pit. Therefore, water quality in the pit would be of similar quality as in the past, or perhaps slightly better as a result of dilution, because of the continuing influence of this dump material on inflowing groundwater. Since the other pits are currently at steady-state levels, the chemical composition of these pit lakes would be expected to remain similar to existing conditions.

Acidic effluent currently seeping from the Veteran-Tripp and the Sunshine-Puritan waste rock dumps would continue indefinitely. These two acidic waste rock seeps are currently controlled to prevent contamination of surface or groundwaters. This would also continue under the No Action Alternative.

Groundwater quantity and quality in the Mining District would not change from present conditions. No pumping and resultant drawdown would occur. The current variable groundwater chemistry with local areas of elevated sulfate and TDS would continue indefinitely. The groundwater quality would not degrade with time under the No Action Alternative. Wells in Lane City would continue to show elevated sulfate and TDS and wells and springs that currently exhibit good water quality should continue to be sources of good water. Murry Springs would not be affected in quantity of flow or water quality under the No Action Alternative.

None of the stormwater and surface water diversion and detention facilities associated with the Proposed Action would be constructed under the No Action Alternative. Heavy precipitation runoff would continue to carry waste rock, soil, and water affected by oxidizing sulfides to Gleason Creek. Thus, the current potential movement of surface water with elevated sulfate and TDS to this stream would continue. The waste rock dumps with surface depressions that currently collect rainwater would continue to be a potential sources of acidic surface water with elevated sulfate and TDS.

No mining facilities would be constructed; no tailings impoundment in Giroux Wash would be built; no waste rock would be generated; and no roads, powerlines, or other mining related surface disturbances would be generated. Therefore, the potential impact of these planned mining and construction-related activities on surface and/or groundwater would not occur under the No Action Alternative.

4.2.2 Soils

Under the No Action Alternative, RMLP would continue with soil mitigation and reclamation measures currently required by existing permits. However, no soils disturbed by previous activities and not associated with current activities would be reclaimed. Approximately 818 acres of soil previously disturbed by Kennecott operations, which would be reclaimed under the Proposed Action, would not be reclaimed under the No Action Alternative. Since no erosion protection structures would be built on a portion of the currently disturbed acres, erosion would continue to be a problem. Approximately 3,138 acres of previously undisturbed native soils (3,064 acres associated with the mine area and 74 acres associated with the transmission line route) would not be impacted as would occur under the Proposed Action. Alteration of soil chemical and physical properties associated with the proposed mine activities would not occur.

4.2.3 Vegetation

Additional impacts to vegetation would not occur. Approximately 3,345 acres of native vegetation in the mine area and along the transmission line route would not be impacted, as would occur under the Proposed Action. Approximately 818 acres of land previously disturbed by Kennecott operations would not be reclaimed with the implementation of the No Action Alternative.

4.2.4 Wildlife and Fisheries Resources

Approximately 3,345 acres of native wildlife habitat would not be affected, as for the Proposed Action. Approximately 818 acres of land previously disturbed would not be reclaimed with implementation of the No Action Alternative. Under the No Action Alternative, no effects to birds using existing pit lakes are anticipated. Existing underground shafts, adits, and other openings could potentially be closed without determining the status of resident bat species. Bat colonies and roost sites could be lost as a result of closures.

4.2.5 Threatened, Endangered, and Other Sensitive Species

The Pacific western big-eared bat could be affected by the direct loss of individuals and the indirect loss of habitat, if existing underground openings are closed without determining the status of resident bat species.

4.2.6 Air Quality

Under the No Action Alternative, dust emissions would continue from the unreclaimed areas that were previously mined and from the current gold activities. Emission levels would generally decrease with time, as the gold production ceases and volunteer revegetation begins to occur on those areas previously disturbed by past mining activities. Vehicle emissions from the current gold operations and from employees traveling to and from the mine also would continue, in addition to the vehicle traffic and emissions that occur in the town of Ruth.

4.2.7 Noise

Under the No Action Alternative, the existing noise conditions (e.g., truck traffic) would be maintained until present gold reserves are exhausted, all gold operations cease, and the limited mine reclamation is completed. No additional noise sources would occur under this alternative.

4.2.8 Social and Economic Values

The local economy would not benefit from the addition of 522 potential new jobs, and 28 current jobs would be lost when gold production ceases. At that time, tax revenues would decrease or no longer be accrued from the mine, including net-proceeds-from-mines revenues for White Pine County and the State of Nevada, property tax revenues for White Pine County, and sales and use tax revenues related to the operation of the mine. The salaries from these jobs, and their multiplier effect in the local communities, would also be lost. The workers would likely attempt to acquire work at other mines in the area, depending on the available jobs at that time. If jobs were unavailable, the unemployed workers would either remain in the area, continuing their demands on community services, or would relocate to another area for employment. If workers left at a time when there was a net loss in population in the communities, there could be under-used infrastructure (schools, housing, etc.) in the communities, resulting in an inefficient use of resources.

Conversely, the No Action Alternative would not increase existing pressure on the local infrastructure. The water supply system, which is already stressed in the summer, and the local wastewater treatment systems would not be subject to increased demand from the projected increased housing supply associated with the project. There also would probably not be an increased need for more local housing or additional law enforcement officers.

4.3 DISPOSAL OF MILL TAILINGS OR WASTE ROCK IN LIBERTY PIT

Five disposal scenarios (2 through 6), as described in Section 2.4, have been carried forward for detailed analysis. These five scenarios are recapped below:

Scenario 2 - East and West Giroux Wash tailings disposal; subaqueous disposal in Liberty Pit.

Scenario 3 - West Giroux Wash tailings disposal; fill Liberty Pit with tailings.

Scenario 4 - Straight across tailings embankment in Giroux Wash; fill Liberty Pit with tailings.

Scenario 5 - Straight across tailings embankment in Giroux Wash; subaqueous disposal in Liberty Pit.

Scenario 6 - East and West Giroux Wash tailings disposal; place waste rock in Liberty Pit.

Impacts to the following resources from Liberty Pit disposal would be the same for all scenarios as those described under the Proposed Action:

- Riparian and Wetland Areas;
- Wild Horses;
- Air Quality;
- Noise;
- Social and Economic Values;
- Recreation;
- Transport of Process Materials, Products, and Hazardous Wastes; and
- Paleontology.

Impacts to other resources have been assessed and quantified where possible, and the results are presented in the following sections and on Table 4-14. Except for specific topics discussed below, impacts for the five scenarios would be the same as the Proposed Action. Impacts would generally be confined to Giroux Wash and the south side of the Veteran-Tripp Dump.

4.3.1 Geology and Minerals

Approximately 212 million tons of mineral resources would remain in Liberty Pit after completion of mining as currently planned in the Proposed Action. This geologic resource breaks down as follows:

- 60 million tons - 0.54 percent copper;
- 71 million tons - 0.009 *ounces* gold *per ton;*
- 21 million tons - 0.28 percent copper oxide; and
- 60 million tons - 0.30 percent copper.

Placing tailings in Liberty Pit (Scenarios 2 through 5) would render these mineral reserves uneconomic to recover in the future. Because the market for copper is highly volatile and dependent on politics in developing countries, the possibility of this remaining mineralization becoming economic in the future is good. Thus, placing tailings in Liberty Pit would entail the loss of the potentially economic resource for RMLP. Placing waste rock in Liberty Pit (Scenario 6) would allow limited flexibility as to where the waste rock would be placed in the pit, thus preserving access to unmined mineralized areas (see Table 4-14).

4.3.2 Water Quantity and Quality

Disposal of up to 200 million tons of tailings in Liberty Pit would affect groundwater around Liberty Pit and correspondingly reduce the impact to groundwater beneath the Giroux Wash tailings impoundment. Flow at Murry Springs would not be affected under any of the scenarios for Liberty Pit disposal of tailings or waste rock. The proposed groundwater withdrawal of 3,500 gpm for 15 years would be the same under each scenario as for the Proposed Action. The drawdown of wells and springs in the project area (including Giroux, Lyons, and Ragsdale) would not vary from that predicted for the Proposed Action under any of the Liberty Pit disposal scenarios, since the withdrawal of groundwater would remain the same in each scenario as for the Proposed Action.

Liberty Pit water quality would change under Scenarios 2 and 5 (subaqueous disposal of 33 million tons of tailings in the pit) and would be controlled by equilibrium with tailings. This would result in a pH around 7.0 to 8.0 and sulfate in the 1,000 to 1,200 mg/l range. TDS would be elevated but metals should be within Nevada water standards. Waste rock disposal in Liberty Pit would not change the pit water chemistry because the waste rock selected for disposal would not be acid generating (Scenario 6). Scenarios 3 and 4 would not result in a pit lake.

Deposition of tailings into Liberty Pit would affect the predicted flux of sulfate to groundwater in

Table 4-14

Comparison of Liberty Pit Disposal Scenarios

Resource	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
<u>Geology and Minerals</u>					
• Future availability of unmined mineral resources within Liberty Pit	No	No	No	No	Yes
<u>Water Quantity and Quality</u>					
• Flow at Murry Springs	No effect	No effect	No effect	No effect	No effect
• Drawdown of wells and springs	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
• Liberty Pit water quality	Same as Proposed Action	NA[1]	NA[1]	Same as Proposed Action	Same as Proposed Action
• Giroux Wash - Maximum flow to groundwater (gpm)	440	240	215	660	570
• Giroux Wash - Time for maximum flow to groundwater (years)	41	45	7	39	40
• Giroux Wash - Maximum sulfate to groundwater (mg/l)	980	590	980	980	980
• Giroux Wash - Time for maximum sulfate to groundwater (years)	223	1,930	111	80	223
• Giroux Wash - Maximum sulfate at WCC-G1 (mg/l)[2]	230	90	180	380	230
• Giroux Wash - Time for maximum sulfate at WCC-G1 (years)[2]	800	2,000	700	700	800
• Waste rock dump drainage	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Higher percent acid-generating waste rock in Veteran Dump

Table 4-14 (Continued)

Resource	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
• Groundwater quality in Mining District	Same as Proposed Action	Flow of tailings water with 1,000 mg/l sulfate to groundwater around Liberty Pit with 1,000 to 1,500 mg/l sulfate	Flow of tailings water with 1,000 mg/l sulfate to groundwater around Liberty Pit with 1,000 to 1,500 mg/l sulfate	Same as Proposed Action	Same as Proposed Action
Soils					
• Area disturbed (tailings disposal area only) (acres)	1,843	1,056	1,244	1,572	1,901
• Volume available for salvage (MCY)	5.1 - 6.6	2.8 - 3.0	3.7 - 4.8	4.5 - 5.7	5.2 - 6.7
• Volume salvaged for reclamation (MCY)	3.0	1.7	2.0	2.5	3.0
• Volume required for construction of starter dams (MCY)	3.3	2.4 (1.1 - 1.3 available)	1.5	1.5	3.3
• Volume buried by tailings (MCY)	0.3	0	0.2 - 1.3	0.5 - 1.7	0.4
Vegetation					
• Area disturbed and not reclaimed (acres)	67	67	67	67	67
• Area of Liberty Pit reclaimed (acres)	0	279	279	0	0
• Loss of pinyon/juniper woodland (acres)	1,750	993	1,231	1,519	1,787
• Loss of northern desert shrub/sagebrush (acres)	707	677	627	667	727
• One-time loss of firewood (cords)	3,500	1,986	2,462	3,038	3,374
• Annual loss of firewood (cords)	117	66	82	101	112
• Loss of Christmas trees (number)	3,500	1,986	2,462	3,038	3,374

Table 4-14 (Continued)

Resource	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
• Loss of pinyon nut production (pounds/5 years)	1,750	993	1,231	1,519	1,787
Wildlife and Fisheries Resources					
• Loss of pinyon/juniper habitat (acres)	1,750	993	1,231	1,519	1,787
• Loss of northern desert shrub/sagebrush habitat (acres)	707	677	627	667	727
Threatened or Endangered Species					
• Loss of pinyon/juniper habitat (acres)	1,750	993	1,231	1,519	1,787
• Loss of northern desert shrub/sagebrush habitat (acres)	707	677	627	667	727
Grazing Management					
• Animal Unit Months (AUMs) displaced (number)	139	87	99	121	136
Cultural Resources					
• Number of sites impacted	4	4	3	3	4

[1]No pit lake would remain following deposition of tailings.

[2]Well WCC-G1 is the downgradient monitoring point established by NDEP, and is about 1,500 feet south of the proposed tailings embankment. The Nevada drinking water standard for sulfate is 500 mg/l.

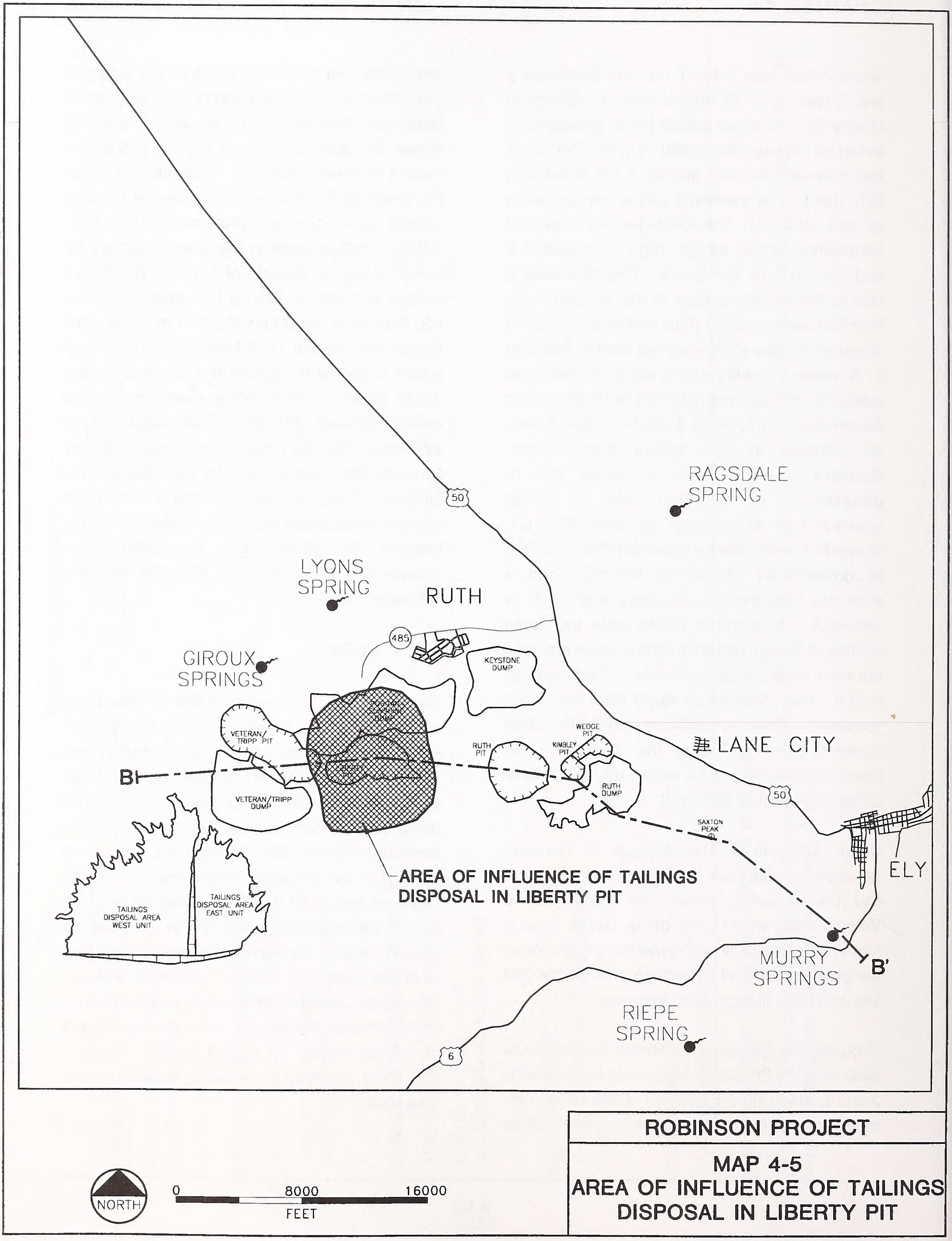
Giroux Wash (see Table 4-14). For Scenarios 2 and 5 (with only 33 millions tons of tailings in Liberty Pit), maximum sulfate flux to groundwater would be between 660 to 980 mg/l for Scenario 2 and between 760 and 980 mg/l for Scenario 5 (PTI 1994). The maximum sulfate concentration at well WCC-G1, the downgradient point of compliance, would be 230 mg/l for Scenario 2 and 380 mg/l for Scenario 5. This difference is due to the design change in the impoundment from two separate units (East and West Giroux) in Scenario 2 to the straight across dam in Scenario 5. Scenario 2 would result in the same maximum sulfate concentration at WCC-G1 as the Proposed Action (230 mg/l), while Scenario 5 would have an increase in this sulfate concentration. Scenario 3 would have a sulfate flux to groundwater of 590 mg/l and a sulfate concentration of 90 mg/l at well WCC-G1. Scenario 4 would have a maximum flux of sulfate to groundwater of 580 to 980 mg/l and a maximum concentration of sulfate at WCC-G1 of 180 mg/l. Scenario 6 would have the same volume of tailings placed in Giroux Wash and thus the same impact to groundwater as the Proposed Action. Thus, Scenario 3 would have the lowest maximum sulfate concentration at WCC-G1, while Scenario 5 would have the highest. All concentrations would be within the state water quality standard of 500 mg/l.

Under Scenario 6, the disposal of non-acid generating waste rock in Liberty Pit would mean that the remaining waste rock placed in the Veteran-Tripp waste rock dump would have a higher percentage of acid-generating rock. Thus, the potential for acid generation in the expanded Veteran-Tripp Dump would increase.

Groundwater quality in the Mining District would differ from the Proposed Action only for Scenarios 3 and 4, which involve disposal of 200 million tons of tailings in Liberty Pit. Water in these tailings would flow out of the pit and into the adjacent groundwater, forming a mound that would initially build with time and then decrease. Map 4-5 shows the projected extent of this anticipated mound beneath Liberty Pit. Groundwater within the range of this mound would receive influx of tailings water carrying approximately 1,000 mg/l sulfate. Groundwater in the area of Liberty Pit currently has an average of 1,000 to 1,500 mg/l sulfate, and ranges from a low value of 300 to 500 mg/l to a maximum of 2,500 to 3,000 mg/l (pages B-8, 10, and 11 of Table B-2). The flow of sulfate would be temporary and the groundwater would return to its previous chemistry as the mound diffuses into the water table. It is estimated that this would occur approximately 35 years after tailings disposal into Liberty Pit is initiated. Thus, Scenarios 3 and 4 would not change groundwater quality in the Mining District. Impacts to groundwater chemistry under Scenarios 2, 5, and 6 would not differ from the Proposed Action.

4.3.3 Soils

The differences in amounts of soil disturbed and cubic yards of soil buried in Giroux Wash under the five Liberty Pit scenarios being evaluated (see Table 4-14) are due to differences in tailings inundation boundaries and the types of starter dams used under each scenario. For example, Scenario 4 would disturb the least amount of acreage (1,244 acres) of the five scenarios being analyzed, yet would result in the loss of use of 0.2 to 1.3 million cubic yards (mcy) of potential growth medium, the second highest potential loss of all five scenarios. Under Scenario 4, a single, straight-across starter dam would require 1.5 mcy of soil material to construct, and a smaller amount of tailings would be placed behind the dam (110 tons), resulting in a smaller inundation area (see Map 2-5).



ROBINSON PROJECT

MAP 4-5
AREA OF INFLUENCE OF TAILINGS DISPOSAL IN LIBERTY PIT

Using SCS unpublished survey reports for White Pine County and BLM pedon descriptions for soils in the area, a depth and percentage of soils that would be inundated by Scenario 4 was determined. This amount was multiplied by the acres of soil to be inundated to determine the total amount of growth medium located in the tailings disposal area under Scenario 4 (3.7 to 4.8 mcy). The amount required for reclamation (2.0 mcy) and the amount required to construct a starter dam (1.5 mcy) was subtracted from that total. The remainder (0.2 to 1.3 mcy) was the amount remaining in the tailings disposal area that would be buried and lost to future use under Scenario 4. Soil disturbance calculations for each scenario were performed in the manner described above.

Scenario 2 used a "T"-shaped starter dam that would require 3.3 mcy of material to construct; the inundation area would be only slightly smaller than the Proposed Action. Scenario 3 would use an "L"-shaped starter dam that would require 2.4 mcy of soil material to construct. Because only 2.8 to 3.0 mcy of growth medium material would be available for salvage and 1.7 mcy would be required for reclamation, only 1.1 to 1.3 mcy would remain for use in the starter dam. An additional 1.1 to 1.3 mcy of non-growth medium material underlying the soil suitable for reclamation would have to be obtained for use in constructing the dam.

Scenario 5 would use a straight-across starter dam and would inundate an area slightly smaller than the Proposed Action, but larger than Scenario 4. The tailings disposal area under Scenario 6 would be constructed identically to that proposed under the Proposed Action with a "T"-shaped dam. The total amount of growth medium material lost to future use (0.4 mcy) would also be identical to the Proposed Action. Under Scenario 6, however, waste rock would be disposed of in the Liberty Pit; this would result in 100 fewer acres of the Veteran-Tripp Dump area being buried under waste rock from the Veteran-Tripp Pit.

4.3.4 Vegetation

Impacts to vegetation under this alternative would differ in the number of acres affected by the scenarios. Table 4-14 lists the vegetation types that would be lost under each scenario, in addition to effects to firewood availability, Christmas tree harvest, and pinyon nut production. Of the five scenarios evaluated, Scenario 2 would result in the greatest loss of pinyon/juniper woodland, Christmas trees, and firewood. Reduction in clearing would be limited to a narrow band of vegetation around the perimeter of the tailings disposal area. Scenarios 3 and 4, the scenarios with the least effect on pinyon/juniper woodland, firewood, and Christmas trees, would only use the west half of the tailings disposal area or a smaller overall area with a straight-across starter dam, respectively. Scenario 3 would require an earthen causeway to support the tailings pipeline across Giroux Wash to provide a route for the tailings pipeline and to avoid a "valley" in the pipeline. Although there would be less disturbance under this scenario since the tailings embankment and impoundment for the East Unit would not be constructed, this pipeline structure would result in 96 acres of additional surface disturbance and attendant loss of vegetation. Both scenarios would fill Liberty Pit with tailings and allow the pit to be reclaimed. Scenario 6, which would have the same footprint in Giroux Wash as the Proposed Action, would use Liberty Pit to dispose of waste rock, and reduce the Veteran-Tripp Dump area by 100 acres.

4.3.5 Wildlife and Fisheries Resources

Overall impacts to wildlife and fisheries resources would be essentially the same as those listed for the Proposed Action. Table 4-14 presents the amount of native habitat lost under this alternative for each scenario. The amount of native habitat lost would directly affect nesting habitat for birds, hunting territories for area predators, and marginal mule deer winter range surrounding the mine area. The differences in impacts from native habitat loss among the Liberty Pit scenarios would be minimal for area wildlife species that may occupy these pinyon/juniper and northern desert shrub/sagebrush habitats. Since the reduction in clearing among scenarios would be located along the margin of the tailings impoundment or Veteran-Tripp Dump (see Map 2-5), wildlife using these areas would still be exposed to the increased activity from impoundment or dump construction. However, minimization of vegetation clearing by implementing any of these scenarios would directly benefit the terrestrial wildlife species dependent on these areas.

4.3.6 Threatened or Endangered Species

No impacts to Federally threatened or endangered species would result from the implementation of the Liberty Pit scenarios, as would be the case for the Proposed Action. Impacts to Federal candidate species that may occur in the vicinity of the mine parallel those discussed for the Proposed Action. The Liberty Pit Alternative would differ in the amount of native pinyon/juniper and northern desert shrub/sagebrush habitats lost under each scenario (see Table 4-14). The loggerhead shrike and pygmy rabbit may be affected by the projected habitat loss, although these species are not common in the areas of Giroux Wash and the Veteran-Tripp Dump. For the Federal candidate species that may occupy the native pinyon/juniper and northern desert shrub/sagebrush habitats, nominal differences exist between the Liberty Pit scenarios and the amount of habitat lost, as discussed for general wildlife resources.

4.3.7 Access and Land Use

The existing county road through Giroux Wash (County Road 1147) would require relocation around the south end of the tailings disposal area for all five scenarios. Current land uses, such as livestock grazing, wildlife habitat, dispersed recreation, and some firewood and Christmas tree harvesting, would be displaced from the areas utilized for the tailings impoundment and Veteran-Tripp Dump. Impacts to land uses under this alternative would differ in the number of acres affected by the alternative scenarios. The acreage disturbed for each scenario is shown on Table 4-14 and discussed for Vegetation in Section 4.3.4. Scenario 3 would affect the fewest acres; Scenario 2 would affect the most. The differences between scenarios in the number of acres disturbed would be of little consequence to the overall impacts to current land uses.

4.3.8 Grazing Management

Based on the anticipated vegetation loss under this alternative, livestock grazing AUMs would be displaced, depending on which scenario was implemented (see Table 4-14). Scenario 3 would affect the least number of AUMs (87); Scenario 2 would affect the greatest number (139 AUMs). Each scenario would result in the short-term loss of less than 4 percent of the affected allotments' active livestock grazing preference; therefore, there would be little difference in impacts among scenarios. The reduced number of AUMs would be considered during the formal allotment evaluation process.

4.3.9 Visual Resources

Impacts to visual resources would remain essentially the same as those resulting from the Proposed Action. Scenario 3 would develop only the West Unit of the tailings disposal area but would still alter the existing visual resources of Giroux Wash and draw visual attention, particularly to northbound travelers on Highway 6 south of Ely. There would essentially be no difference in impacts among scenarios.

4.3.10 Cultural Resources

Under the Liberty Pit disposal alternatives, impacts to cultural resources for Scenarios 2, 3, and 6 would be identical to those of the Proposed Action. Sites 46-6877, 46-6771, 46-7318, and 46-6712 located in Giroux Wash would be directly affected by Scenarios 2, 3, and 6. Under Scenarios 4 and 5, three of the four cultural resource sites (46-6877, 46-6771, and 46-7318) would be impacted in the Giroux Wash area. Site 46-6712 would not be impacted by Scenarios 4 and 5 since the outer boundary of the tailings disposal inundation area where Site 46-6712 is located would be reduced under Scenarios 4 and 5.

4.4 Reclamation Alternative

This alternative identifies seven reclamation options that could be applied to the Robinson Project. Each of these options is evaluated below on a stand-alone basis. Any option or combination of options could be implemented.

Impacts to the following resources would be the same as those described under the Proposed Action:

- Geology and Minerals;
- Water Quantity and Quality;
- Riparian and Wetland Areas;
- Threatened or Endangered Species;
- Wild Horses;
- Noise;
- Transport of Process Materials, Products, and Hazardous Wastes;
- Recreation; and
- Paleontology.

4.4.1 3:1 Slopes

Under this option, side slopes on reclaimed areas would be 3:1 as opposed to 2.5:1 under the Proposed Action. In general, flatter slopes have less erosion and soil movement downslope, generally revegetate more successfully, and allow for greater variety in the type of equipment used in reclamation. However, flatter reclaimed slopes disturb more land and are more costly to build due to the greater height of the dump and the additional volume of material to be graded. RMLP has investigated areas where 3:1 slopes might be used. Opportunities are limited due to the interference of the larger dump footprints with other facilities (such as the Veteran-Tripp Dump with the tailings impoundment), expansion into rugged topography (such as south of Ruth Dump), and limited potential to increase dump height (such as Ruth Dump). Opportunities would exist on the northeast and northwest corners of Liberty Dump and on the south-central side of Veteran-Tripp Dump. The increased dump footprints in these areas would disturb 250 acres of additional land, including 175 acres of previously undisturbed land, as shown on Table 4-15.

Approximately 5,606 total acres of soil and vegetation would be disturbed under this alternative. The probability of achieving revegetation success on coarse-textured waste

Table 4-15

Surface Disturbance for the 3:1 Slopes Reclamation Option

Disturbance Type	Public Lands	Private Lands	Total
Liberty Dump			
Redisturbed Land	0	0	0
New Disturbance	85	25	110
Veteran/Tripp Dump			
Redisturbed Land	0	75	75
New Disturbance	44	21	65
Subtotal	44	96	140
Total Disturbance	129	121	250

rock and heap leach material would be higher on a shallower slope. With the proper revegetation technology, however, 2.5H:1V slopes can also be successfully reclaimed. The implementation of this option would remove an additional 110 acres of poor wildlife habitat associated with Liberty Dump and 65 acres of marginal wildlife habitat along the south-central side of Veteran-Tripp Dump.

The 3:1 slope expansion area in the vicinity of the Liberty Dump has not been surveyed for cultural resources. An approximately 100-acre area would need to be surveyed for cultural resources if this option were implemented. Any impacts to cultural resources identified during this survey would be mitigated using guidelines established under the PA.

4.4.2 Removal of All Surface Structures

The proposed Reclamation Plan specifies the removal of all surface facilities and structures that would not be involved in a post-mining land use. This option specifies that all mining-related structures and facilities would be removed. The preservation of facilities and structures that could be used for possible future industrial activities would make such activities more economically feasible, in addition to reducing the expenses associated with demolition and disposal. Start-up costs for construction of new facilities could be a major factor in determining if a new project were economically viable. Preservation of the buildings and facilities would enhance the economic value of the Robinson Mining District. The buildings would be kept on the White Pine County tax role as improved properties; however, the structures would have to be maintained by RMLP. Thus, removing all surface facilities would have economic impacts for both RMLP and White Pine County, and would eliminate the possibility of using the structures for post-mining land use (e.g., industrial activities).

Removal of all buildings in the concentrator area, administration area, and SX/EW area would require that an additional 196 acres be reclaimed and that available growth medium in these areas be salvaged and stockpiled for reclamation use. Since these areas are fairly level, revegetation would be expected to be successful. However, the post-mining land use would still be for industrial purposes. Removing all surface structures followed by revegetation of the private land would attract some wildlife use after final reclamation. Removing the facilities would have no effect on grazing management since forage production and livestock grazing is not proposed as a post-mining land use for these areas. The structures and facilities would contrast visually with the surrounding landscape; however, all facilities, with the exception of the transmission line, would be located on private land. Removing facilities would eliminate this contrast, particularly the transmission line near the Garnet Fields Rockhound Area.

4.4.3 Cover Standards

RMLP's current Reclamation Plan proposes that the reclamation standard for all reclaimed surfaces be 30 percent canopy cover. This option proposes that the cover standard be based on range/woodland site descriptions for five different reclamation zones (see Map 2-6). Under this option, the standard would be based on the amount of vegetation cover and composition that currently occurs *or did occur* in the mine area under existing climatic, *soil,* and land use conditions (see Table 2-13). For example, vegetation Zone *III* (*much of the mine area*) currently has *or historically had* a cover value of *25* percent. Therefore, *this* area would have to meet a *25* percent cover standard for reclamation.

Of the *25* percent reclamation cover in Zone ***III***, *35* percent would consist of grasses, *10* percent of forbs, and *35* percent of shrubs. ***Precipitation and soil conditions*** known to have supported ***certain plant*** species in each reclamation zone would be ***expected*** to support these species in the long term. Variable cover standards for different locations may make it easier for reclamation standards to be met, since plant cover is tailored to specific plant zones. This option also would offer greater plant diversity in reclamation mixes. Reclamation zones with higher cover standards (greater than the 30 percent proposed by RMLP) would be expected to have somewhat lower water and wind erosion rates and less dust generation. Lower standard areas would have greater erosion and dust generation. The value of reclaimed wildlife habitat and livestock grazing areas would be the same as existing conditions.

4.4.4 Native Species

The proposed Reclamation Plan incorporates both native and introduced plant species. This option would use only native species. A seed mixture composed of all native species was developed for initial evaluation in the test plot program (see Tables 2-14 and 2-15). Such a mixture should be just as successful in the long term as a mixture of native and exotic species. Although the native seed mix proposed for this option would potentially allow for greater species diversity, native plants generally take longer to become established than introduced species. This lag may increase the period that disturbed land is susceptible to erosion. This would be confirmed under the test plot program. Native species used in reclamation would enhance the value of wildlife habitat and the visual aesthetics of the area. A mixture of native and introduced species may produce better forage for livestock grazing but, in turn, may potentially decrease the value of wildlife habitat and reduce the aesthetics of the reclaimed area. Native species, such as squirrel tail and needle and thread grass, are less palatable to livestock as the growing season progresses, due largely to plant structures (e.g., awns, sharp-pointed seeds) associated with these species that are injurious to livestock. Native species may not be appropriate for reclaiming previously disturbed areas that would be used for other industrial purposes following mining. The test plot program would determine the effectiveness of native seed mixes for these industrial areas.

4.4.5 Undesirable Weeds

This option would require that no undesirable weeds be allowed to comprise any percentage of the required canopy cover. However, undesirable weeds may contribute to canopy cover in excess of the required canopy cover. For example, an area may have a canopy cover of 40 percent following reclamation; under this option, 30 percent of this cover could not contain weeds, and the remaining 10 percent could. By limiting the percentage of weeds, areas adjacent to reclaimed areas would be less likely to be invaded by weedy species, and the need for weed control would be reduced. Because overall cover standards would remain the same as those under the Proposed Action, soil erosion and dust generation are expected to be the same under this option as under the Proposed Action. The lower percentage of weedy species would result in increased value for wildlife habitat and better production for livestock grazing.

4.4.6 Similar Climatic Condition Seed Sources

Under this reclamation option, all seeds would originate from plants grown at an elevation and under climatic conditions similar to those of the

Robinson District. Seeds collected from environmental conditions similar to the mine site may improve the viability of the plants selected for reclamation and improve overall reclamation success. However, if the source of plant materials is limited, there is the possibility that seed would not be available for all the species described for reclamation because of the high level of variability in seed production. This could limit the species utilized, raise the cost of seed, and change the final composition of grasses, forbs, and shrubs. However, the use of seed produced from plant species adapted to similar environmental conditions would increase the amount of forage available for wildlife and livestock grazing, since these species have adapted to the regional climatic conditions and are more likely to become established in reclaimed areas. Improved reclamation success would lower soil erosion and dust generation and reduce visual contrast with undisturbed areas.

4.4.7 Species Diversity Requirement

Under this option, each area to be disturbed and reclaimed would be compared to a specific vegetation diversity standard (see Table 2-13). A specific number of grass, forb, and shrub species would be required to be established in each reclamation zone. The five zones outlined on Map 2-6 would serve as the basis for determining reclamation success for the Robinson Project. Reclaimed areas that meet or exceed these standards would result in a more diverse vegetation assemblage with distinct shrub and herbaceous layers. This stratification would be expected to reduce both water and wind erosion, and thus wind-blown dust. Increased plant species diversity would increase overall reclamation success, increase the value of reclaimed areas for wildlife habitat and livestock grazing, reduce contrast between undisturbed and reclaimed areas, and thus reduce aesthetic impacts in the area.

4.5 POTENTIAL MITIGATION AND MONITORING

The following proposed mitigation and monitoring measures have been developed to reduce potentially adverse impacts. These are in addition to the environmental protection procedures outlined in Section 2.2.16.

Vegetation

<u>Measure V-1</u>: A total of 24 inches of uncompacted material would be placed on the copper heap leach pad during reclamation.

<u>Effectiveness</u>: Increased depth of uncompacted material on the copper heap leach pad would improve shrub establishment on the heap by increasing available rooting depth, would reduce the potential for penetration of the heap by aggressive shrub species, and would reduce the potential for non-point source pollution from penetrated heaps.

<u>Application</u>: This measure would be applied to the Proposed Action and all alternatives, except the No Action Alternative.

Wildlife Resources

<u>Measure W-1</u>: Removal of native vegetation ***on previously undisturbed lands*** in the ***project*** area would be prohibited between May 1 and July 31 to protect nesting migratory birds, such as the loggerhead shrike.

<u>Effectiveness</u>: Constraint periods for native vegetation removal would ***minimize*** loss of migratory birds and other protected bird species.

Application: This measure would apply to the Proposed Action and all alternatives, except the No Action Alternative.

Measure W-2: An employee awareness program for wildlife resource protection and applicable laws would be developed. This program information would be distributed to all new employees.

Effectiveness: This measure would reduce the potential for increased harassment and increased illegal shooting of wildlife species, particularly of high-profile species (e.g., mule deer, golden eagle).

Application: This measure would apply to the Proposed Action and all alternatives, except the No Action Alternative.

Measure W-3: BLM would conduct nest surveys for ferruginous hawks along the transmission line route. ***If an occupied nest is located, restrictions would be applied to all*** disturbance activities during the breeding season (March 1 through June 30). Applicable protection procedures would be identified by the BLM biologist to protect these breeding birds. ***Depending on nest location to the transmission line route,*** procedures may include construction constraints within 0.5 mile of the nest during the highly sensitive early periods of the breeding season (e.g., courtship and incubation).

Effectiveness: Surveys would determine the potential for impacting breeding ferruginous hawks during nesting, and construction restrictions would prevent disturbances of breeding birds.

Application: This measure would apply to the Proposed Action and all alternatives, except the No Action Alternative.

Measure W-4: ***BLM would conduct a sage grouse lek survey in the spring of 1995.*** Anti-perching devices, approved by the BLM, would be installed on transmission line structures within 0.5 mile any active lek sites.

Effectiveness: Anti-perching devices would prevent raptors from using the transmission line structures as perch sites within 0.5 mile of a lek, reducing the potential for grouse predation during their breeding activities.

Application: This measure would apply to the Proposed Action and all alternatives, except the No Action Alternative.

Measure W-5: ***No construction activities would be allowed from 2 hours before dawn to 10:00 a.m. within 0.5 mile of active sagegrouse leks along the transmission line route between March 1 and May 15.***

Effectiveness: Construction restrictions would prevent disturbance of breeding ***sage grouse***.

Application: This measure would apply to the Proposed Action and all alternatives, except the No Action Alternative.

Measure W-6: Right-of-way clearing for transmission line construction within the pinyon/juniper habitat would use selective cutting to remove only the vegetation necessary for access, construction, and line reliability.

Effectiveness: Selective cutting would minimize the amount of pinyon/juniper habitat lost.

Application: This measure would apply to the Proposed Action and all alternatives, except the No Action Alternative.

Measure W-7: The existing monitoring program for the cyanide solution ponds and heap leach facilities would be expanded to determine the full extent of bird and mammal mortalities or injuries. The cyanide solution ponds and heap leach pads would be surveyed daily for wildlife species. The tailings facility also would be examined daily to record any wildlife mortalities and injuries that might be caused by animals becoming mired in the tailings. All recorded data would be reported to the BLM and NDOW. If the solution ponds, heap leach pads, or tailings facility cause wildlife mortalities, both the BLM and NDOW would be consulted, and the appropriate mitigation measures (e.g., netting, supplemental fencing) would be developed to reduce or eliminate the problem.

Effectiveness: Daily monitoring of the cyanide solution ponds, heap leach pads, and tailings facility would identify areas lethal or dangerous to wildlife. Consultation with the BLM and NDOW would facilitate the development of appropriate supplemental mitigation.

Application: This measure would apply to the Proposed Action and all alternatives, except the No Action Alternative.

Cultural Resources

The procedures for evaluation and mitigation of impacts to cultural resources documented in the proposed project area have been determined in consultation among the BLM, the RMLP, the SHPO, and the ACHP and are outlined in the Programmatic Agreement, which is on file at the Ely District office of the BLM. The Programmatic Agreement allows the BLM to determine effect based upon the mutually agreed upon guarantee of identification, evaluation, and mitigation of cultural resources in the proposed project area pursuant to Section 106 of the National Historic Preservation Act and implementing regulations (36 CFR 800).

Measure C-1: Mitigation of indirect impacts could be accomplished by limiting access to archaeological sites on private land, education of RMLP employees as to the fragile nature of cultural resources, and an RMLP strict management policy regarding casual collecting of artifacts from project lands.

Effectiveness: This measure would reduce but not eliminate indirect impacts to cultural resources on both public and private land.

Application: This measure would be applied to the Proposed Action and all alternatives, except the No Action Alternative.

Paleontology

Measure P-1: If potentially significant fossils, such as vertebrate fossils, are discovered during mine development, operations, or reclamation, steps would be taken to identify and preserve them. RMLP would contact the BLM paleontologist in the Ely District Office to determine steps necessary for dealing with the fossils.

Effectiveness: This measure would allow for the evaluation of the importance of any vertebrate fossils that may be discovered and provide adequate time for their preservation or data recovery.

Application: This measure would be applied to the Proposed Action and all alternatives, except the No Action Alternative.

4.6 CUMULATIVE IMPACTS

Cumulative impacts are defined as the impacts that result from the incremental effect of an action, decision, or project when analyzed with respect to other past, present, and reasonably foreseeable actions (RFAs). For this analysis, actions or projects that have environmental impacts on the same resources and in the same geographic area as those impacted by this Proposed Action or alternatives have been examined. These projects consist of other mining operations and other potential large-scale employers in the Ely vicinity. Overall, most cumulative impacts affect socioeconomic resources. There would be no differences in the results of the cumulative impact analyses for the Proposed Action or any of the alternatives except for the No Action Alternative, which would reduce cumulative impacts.

Much of the discussion in this section is based on data developed by the BLM for its cumulative impact section in the *BLM Egan Resource Management Plan, Proposed Oil and Gas Leasing Amendment and Final Supplemental Environmental Impact Statement* (BLM 1993a). The time frame for its cumulative impact analysis encompassed the remainder of the Egan Resource Management Plan (RMP) land use planning period or to the year 2007. The area of analysis encompassed the Egan Resource Area (RA) and public lands of the Humboldt National Forest contained within the resource area. RFAs in this analysis include area mining activities, the White Pine Power Project (WPPP), oil and gas projects, the Southwest Intertie Project (SWIP) and associated Utah-Nevada Transmission Project, and miscellaneous actions.

4.6.1 Area of Impact

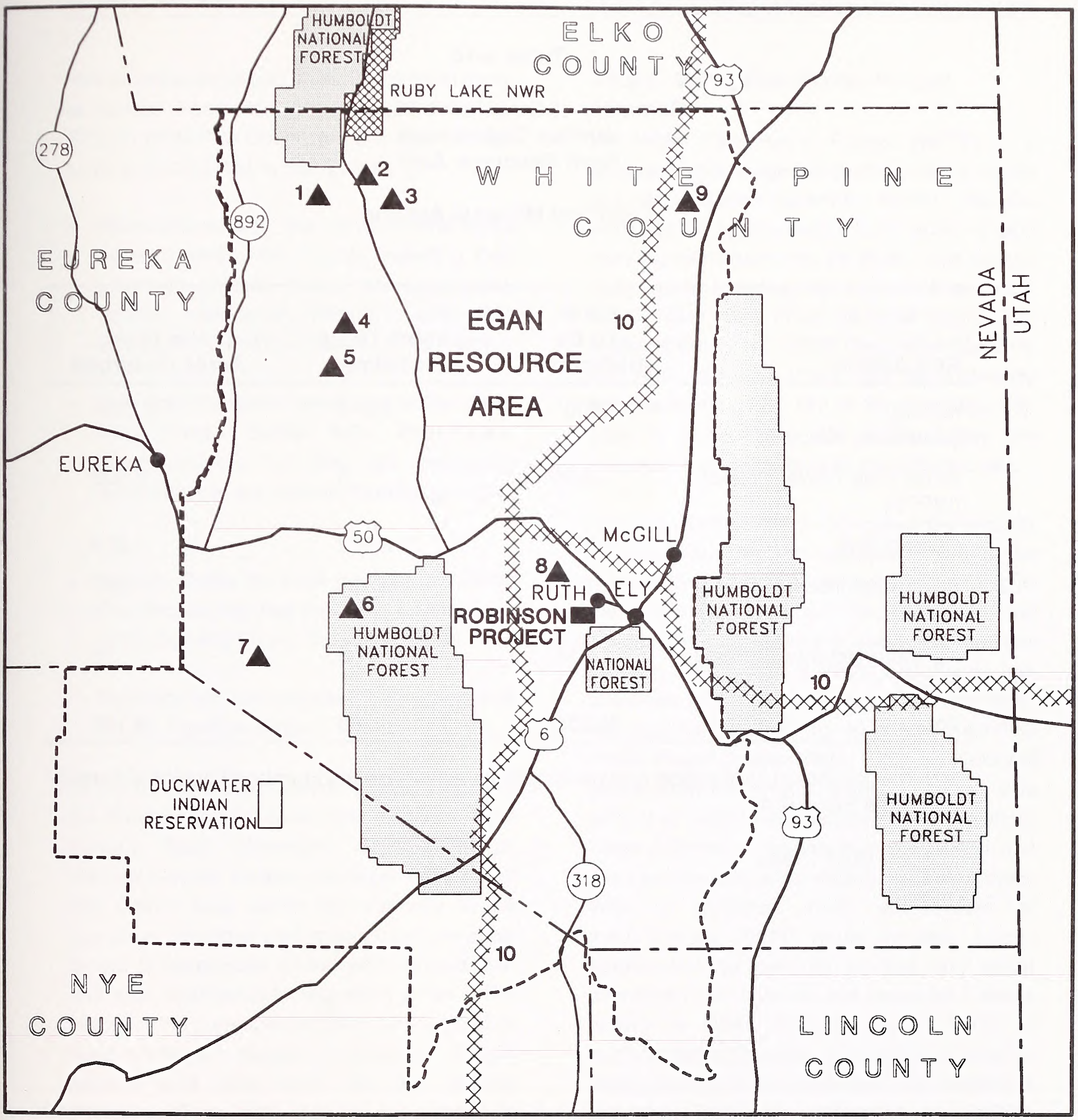
The specific area of environmental impacts may be different for each resource. As shown on Map 4-6, the Proposed Action is relatively distant from other mining operations or large-scale projects. This distance tends to limit potential cumulative impacts. All of the projects and resource disciplines examined occur in White Pine County. Because county-wide cumulative disturbance data are unavailable, cumulative acreage comparisons represented are from the BLM Egan RA, which represents a smaller geographic area and is therefore more conservative. Acreage of surface disturbance from the Oil and Gas Environmental Impact Statement (EIS) is presented on Table 4-16.

RMLP has projected that the Proposed Action would continue operating through the year 2011. The analysis period extends for the life of the mine, including development, operation, closure, and reclamation. Minimal data are available on past actions because they were never extensively analyzed. Many of the impacts have been addressed in other documents, including the RMP for the Egan RA and the EIS for Oil and Gas explorations in the county, which studied impacts to the year 2007.

4.6.2 Past, Present, and Reasonably Foreseeable Actions Included in Analysis

4.6.2.1 Mining Projects

As previously mentioned, the Robinson Project is relatively distant from other mining operations or large-scale projects, and that distance tends to



------- EGAN RESOURCE AREA BOUNDARY

▲ REASONABLY FORESEEABLE ACTIONS

1 - BALD MOUNTAIN MINE
2 - WHITE PINE MINE
3 - WINROCK/CASINO MINE
4 - ALLIGATOR RIDGE MINE
5 - YANKEE MINE
6 - MT. HAMILTON MINE
7 - EASY JUNIOR MINE
8 - WHITE PINE COUNTY LANDFILL
9 - WHITE PINE POWER PLANT
10 - SOUTHWEST INTERTIE PROJECT

ROBINSON PROJECT

MAP 4-6
EGAN RESOURCE AREA AND REASONABLY FORESEEABLE ACTIONS

Table 4-16

Summary of Cumulative Impacts
Surface Disturbance
Egan Resource Area

Land and Minerals Actions

RFA Activity	Acres To Be Disturbed	Acres To Be Reclaimed	Net Total Acres Disturbed
Mining (Locatable Minerals)	17,230[1]	8,245	8,985
White Pine Power Project (WPPP)	3,595	0	3,595
Oil and Gas	3,486[1]	2,212	1,274
Southwest Intertie Project (SWIP)	613	326	287
Northern Nevada Railroad Spur	14	0	14
Total	24,938	10,783	14,155

[1]Includes projected exploration and development activity on the Humboldt National Forest within the Egan R.A.

Source: BLM 1993a.

limit potential cumulative impacts that could occur to various resources. However, the following RFAs in White Pine County are of a large enough scale to be included in this analysis:

- Placer Dome, U.S., Inc. owns several active mines in White Pine County, including Bald Mountain, Alligator Ridge, Winrock/Casino, Yankee, and South Casino. Little Bald Mountain is currently inactive (Bailey 1993).
- Alta Gold Company owns one active mine, Easy Junior. Golden Butte, Ward/Taylor, Illipah, and the Pan Mine are undergoing reclamation or are inactive (Cummings 1993).
- Western States Minerals operates the White Pine Project and has proposed development of the Bellview Project (Hohbach 1993).
- ReaGold, Inc. has proposed development of the Mt. Hamilton Project.

Of the mining projects listed in Table 4-17, only the Western States' White Pine Project; Placer Dome's Bald Mountain, Alligator Ridge, Winrock/Casino, Yankee, and South Casino; and Alta Gold's Easy Junior are currently in full operation. The other mining operations are either closed or temporarily closed with reduced staff and with undetermined reopening dates. The effects of the currently operating mining projects listed above are already incorporated at their existing work force levels into the "existing environment" as their impacts are already in place. Little Bald Mountain and Bellview mining projects are in the initial permitting stage with undetermined starting dates. Environmental assessments have been written for all approved projects. Other potential mining developments in the area are considered speculative at this time.

4.6.2.2 White Pine Power Project

The White Pine Power Project (WPPP) is a proposed 1,500-megawatt gasified coal or natural gas, steam-electric generating facility. The site would be on approximately 2,250 acres of land currently administered by the BLM. Total surface disturbance, including transmission line, roads, railroad spur, etc., would be 3,595 acres. The preferred site for the WPPP Generation Station is the North Steptoe Valley site approximately 48 miles north of the city of Ely (see Map 4-3). Sites in Butte Valley and Spring Valley are designated as alternatives to the preferred site.

Inclusion of the WPPP in this cumulative analysis is problematic for two reasons. First is the uncertainty of the project schedule; according to the supervisor of load forecasting in the conservation and planning division of the Los Angeles Department of Water and Power, the slowdown in growth of electricity sales may delay the need for the WPPP for 10 years (White Pine Power Project Update 1993). Given the history of delays from the original project schedule, it is difficult to analyze the impacts of WPPP without better definition of the time frames. Second, and more problematic, is the magnitude of the project. With a projected peak employment of 2,610 workers, WPPP would increase county employment by over 80 percent and would overwhelm all current and expected mining activity in White Pine County in terms of socioeconomic impacts. Regardless of whether mining activity continues to grow and despite the mitigation measures proposed by WPPP, construction of the power plant would, in many respects, introduce boom town conditions to Ely and White Pine County and cause environmental impacts on almost all resources.

Table 4-17

Interrelated Mining Operations in White Pine County

Operator	Mine	No. of Workers Fall 1993	No. of Workers at Full Capacity	Difference	Projected Mine Life (years)	Current Status
Placer Dome, U.S., Inc.	Bald Mountain	150	150	0	8	Active
	Alligator Ridge	50	50	0	1.5	Active
	Winrock/Casino	50[1]	50[1]	0	1.5	Active
	Yankee	[1]	[1]		8	Active
	South Casino	[1]	[1]		6	Active
	Little Bald Mountain	0	0	0		Inactive
Alta Gold Co.	Easy Junior	65	65	0	1	Active
	Golden Butte	UN	UN		UN	Reclamation
	Ward/Taylor	UN	UN		UN	Inactive
Western States Minerals	White Pine Project	35	35	0	2	Active
	Bellview Project	0	UN	UN	UN	Exploration
ReaGold, Inc.	Mt. Hamilton Project	0	162	162	8	Unopened approved
TOTAL		350	512	162		

[1]50 employees total at Winrock/Casino, Yankee, and South Casino.

Sources: Personal communications: Hohbach 1993, Bailey 1993, Cummings 1993, Dennis 1993

UN - Unknown

4.6.2.3 Southwest Intertie Project

The Southwest Intertie Project (SWIP) would involve construction of over 500 miles of single-circuit 500-kV transmission line between the Midpoint Substation near Shoshone, Idaho, and a proposed substation in Dry Lake Valley northeast of Las Vegas, Nevada. Approximately 163 miles of transmission lines would be within the Egan RA. A new substation would be built near Ely, Nevada, and new transmission line would connect the substation near Ely with a new substation near Delta, Utah.

The impact from the project would mainly be during the construction phase, estimated as occurring in 1995. The total work force required to complete the phases of construction would be 100 to 150 people. Some labor might be hired locally. Nonlocal workers would probably utilize temporary housing in the Ely area and commute to and from the job site on a daily basis. Many may have their own motor homes or trailers and park them where connection facilities are available, while others may occupy rental houses and apartments. There would be an increased need for some community services. This construction time frame would begin at the approximate time that the Proposed Action construction phase would end. The potential would exist for those workers to transfer over to the SWIP. The project may be built in phases or sections if the market or financial conditions warrant. The project is scheduled to begin commercial operation by late 1997.

4.6.2.4 Oil and Gas Seismic Exploration

Numerous mining and oil and gas exploration ventures occur periodically in the area. These activities have intermittently benefitted White Pine County because Ely has housed crews and provided services to the oil companies. These explorations, however, are based on world oil prices, which, if low enough, can eliminate the profit in domestic oil production. When this occurs, the interest in eastern Nevada's oil ceases almost entirely. Services rendered in the Ely area are primarily in the hotel/motel industry and dining establishments. These impacts have traditionally been temporary and minor. Should exploration activities occur in the same time frame as the Proposed Action, there would be available hotel and motel space in the Ely area, even during the construction phase. No anticipated cumulative impacts are associated with this activity and with the development of the Proposed Action.

4.6.2.5 White Pine County Landfill

White Pine County has received a Recreation and Public Purpose Lease from the BLM for 480 acres of public land to construct the White Pine County Nonhazardous Solid Waste Disposal Facility. The facility would be located approximately 4 miles northwest of the mine area and approximately 10 miles northwest of Ely. The facility would be classified as a small, arid landfill and would be able to accept no more than 20 tons per day. A recycling facility could also be constructed on-site.

Plans are underway to move the existing Ely landfill operation to the new regional landfill location by October 1995. The move would allow switching to trench-and-compaction methods of operation and is being initiated in anticipation of stricter environmental regulations. A closure plan and new site plan must be submitted and approved by the NDEP. This process is costly and efforts are underway to find adequate funding (Day 1994).

Plans to relocate the landfill will proceed with or without the start of the Proposed Action. RMLP, however, would be willing to provide the County with financing to assist in the implementation of this community project. As part of the bond program, if the action is selected by the County, RMLP would provide $250,000 to fund a siting study and preliminary engineering design. RMLP would also allow the County to purchase its landfill liners and earthmoving and other equipment as part of RMLP's purchases, which should reduce the County's cost.

4.6.2.6 Northern Nevada Railroad Corporation (NNRC) Railroad Extension

As discussed in Section 2.2.12, NNRC intends to construct an extension of the existing railroad line from the end of the line near Highway 50 to the concentrator area (see Map 2-3). This activity is being granted separately to NNRC under a right-of-way action by BLM. Impacts associated with this action are discussed in the Robinson Project EIS in relevant resource sections. The actual land affected by the extension would result from approximately 15,000 feet of additional railroad line directly adjacent to the project. Of this, 4,300 feet would be on existing railroad grade or within currently disturbed project areas. Approximately 3,000 feet of new disturbance would occur on private RMLP land. Approximately 8,100 feet would be located on public land administered by the BLM. Incremental additional surface disturbance would be approximately 3.5 acres of RMLP land and 10 acres of public land, and associated vegetation removal and soil disturbance. This would add a total of 13.5 acres to the 3,298 acres of new surface disturbance directly associated with the Robinson Project. The incremental cumulative impact of the NNRC's railroad extension, therefore, represents 0.4 percent of new disturbance directly associated with Robinson Project activities.

4.6.3 Past, Present, and Reasonably Foreseeable Impacts

4.6.3.1 Geology

Mining and other large-scale operations occur throughout White Pine County. Additional mining operations by RMLP or other entities may be developed over time as economic ore deposits are discovered. Currently, uneconomic mineral deposits may be mined in the future or remain as mineral resources. Surface mining methods impact the geology from excavating, modifying, or covering geologic materials. No other impacts to the geology have resulted from the operation of surface mines.

4.6.3.2 Water Resources

Cumulative effects may occur in the area surrounding the Proposed Action if other projects that impact surface or groundwaters are located within or near the drainage basins impacted by the Proposed Action or its alternatives. For surface water resources, the Proposed Action and its alternatives drain either northward into Robinson Canyon and Gleason Creek and then into Steptoe Valley, or to the southwest into Giroux Wash and finally into the White River Valley, which is part of the upper Colorado River Basin in Nevada. Other existing or planned projects for these drainage basins are the Easy Junior and Mt. Hamilton mines, and WPPP.

The WPPP would require the withdrawal of approximately 25,000 acre-feet of water per year from the northern Steptoe Valley hydrographic area, primarily for cooling requirements. This water has been secured through groundwater appropriation. There is a potential for cumulative groundwater impacts in Steptoe Valley due to this project and the Proposed Action. However, it is considered unlikely that the Proposed Action would impact either the surface water flow or groundwater quantity and quality in Steptoe Valley. Furthermore, permits issued by the state engineer would limit the amount of groundwater to be withdrawn from any particular aquifer. This should limit any potential cumulative impacts due to the WPPP.

Mining projects other than the Proposed Action that are planned for the cumulative impact area include the Easy Junior Mine (Cherry Creek Range) and reopening of the Mt. Hamilton Mine. These are small gold mining projects that would have minimal impact on water resources in the upper (northern) part of Steptoe Valley.

Finally, concerns have been raised that past dewatering activities by Kennecott may have impacted springs downstream near Lund. The Lund Irrigation and Water Company and the Lund Township Advisory Board have indicated that flows at Lund Springs have varied from approximately 6 to 9 cfs, but that flows did not change in response to past groundwater withdrawal by Kennecott. Observations of landowners at Preston Springs indicate no substantial changes in flow during the past 50 years.

The cumulative effects to groundwater quality or quantity for surrounding landowners in or near Ely would be no greater than the effects of the Proposed Action.

4.6.3.3 Soils and Vegetation

The Proposed Action would contribute incrementally to the disturbance of soils in the proposed project area. To date, approximately 3,370 acres have been disturbed by previous mining activities. The Proposed Action would result in approximately 3,300 acres of new disturbance, which represents approximately 49 percent of the total disturbance area following the Proposed Action development. Of the total disturbed acres, approximately 4,096 acres would be subject to reclamation procedures. After reclamation of the proposed project area, approximately 2,260 acres would be left unreclaimed in the mine district, representing 34 percent of the total disturbed acres in the district.

It is expected that soils on 14,141 acres would be disturbed in the Egan Resource Area by the end of the current BLM land use planning period from combined RFAs analyzed in the BLM Proposed Oil and Gas Leasing Amendment (see Table 4-16). Mine areas within the RA left unreclaimed would include open pits and waste dumps. Though increased soil erosion would occur in most of the examined projects, the cumulative impact would be limited due to the dispersed geographical locations of the projects and reclamation of project areas.

Reclamation of areas disturbed by current mining and processing is required by current laws and regulations for the majority of all lands, both private and public. Areas disturbed by these operations must be reclaimed and revegetated in accordance with individual reclamation plans directed by the NDEP and the BLM. Historically, many mining operations have not had topsoil stripped and stockpiled prior to disturbance. Therefore, reclamation of many disturbed areas, especially those on private land, would have to be accomplished in the absence of an adequate soil cap. These conditions would limit the productivity, density, and diversity of revegetation. In addition, the plant species and densities that could be established on these reclaimed surfaces may be different than the species that presently grow or could grow in the area. In those cases where the soil has been stripped and stockpiled to be used to resurface and reclaim mining disturbances, soil loss from erosion can be expected; however, long-term impacts on soils would be less and the productivity of these reclaimed sites would be fair to good.

The RFAs that may affect soils include future potential mineral exploration and additional mining activities within the Robinson Mining District; ReaGold, Alta Gold, Western States Minerals, and Placer Dome potential mining activities; construction of the White Pine Power Project and Southwest Intertie Project; and continuing oil and gas exploration ventures. Chief impacts from oil and gas exploration would generally be those attributable to road and drill pad construction, such as surface disturbances and sedimentation on relatively small acres of native soils and vegetation. Additional mining would result in increased surface disturbances for tailings and waste rock disposal, and other mining-related facilities, and areas of native soil may be affected in ways similar to those described in Section 4.1.3, Soils, and 4.1.4, Vegetation. Potential impacts to soils and vegetation should be controlled through compliance with state and Federal environmental requirements.

With the closure of the facilities and the abandonment of the proposed project area as a mine-related operation, some facilities would be removed and reclamation measures would be implemented for all associated areas of disturbance. Reclamation would have no additional direct impact to areas previously undisturbed by construction or operations. Some areas previously addressed by interim reclamation measures would be redisturbed to facilitate final proposed project area reclamation. Dust and sedimentation could have temporary indirect effects until final reclamation measures are instituted.

4.6.3.4 Wildlife

Estimated habitat disturbances from the cumulative effects of mining development, transmission line construction, and operation of the transportation corridors were analyzed for the project region and the applicable RFAs, focusing on the issues and species discussed in Sections 4.1.6 and 4.1.7. Assessing cumulative impacts quantitatively for wildlife resources is difficult and contains inherent biases. Therefore, this analysis was based on overall qualitative values that are apparent within the Resource Area.

No identified RFAs occur in the immediate vicinity of the mine. The location of the proposed Robinson Project restricts additional habitat loss and fragmentation to an area already disturbed heavily by past mining activities and does not affect critical riparian habitat. Reclamation of previously disturbed areas under the proposed Robinson Mine Project would eventually increase the available wildlife habitat currently existing near the mine area.

The primary impacts to wildlife resources from regional development of RFAs would be the incremental habitat loss and fragmentation, displacement, impacts to associated carrying capacities of native habitats, increased harassment, and adverse effects to riparian areas. Wildlife species that would likely be most affected by cumulative development within the region would include mule deer; sage grouse; raptors, such as the ferruginous hawk and golden eagle; breeding water birds, such as the white-faced ibis and long-billed curlew; the loggerhead shrike; Townsend's big-eared bat; sensitive fish species, such as the Lahontan cutthroat trout and relict dace; and a number of invertebrate species, including resident butterflies and endemic snails.

Regional development has affected mule deer use of seasonal ranges and migration routes. Habitat fragmentation and increased disturbance to resident herds have resulted in loss of winter range, increased pressures on carrying capacities associated with other wintering areas, and the rerouting of traditional migration routes and corridors between the seasonal ranges. The cumulative development of the RFAs would additionally stress migrating deer by restricting seasonal movement, limiting transitional habitat, reducing key or crucial habitat, or increasing the potential for direct impacts, such as vehicle collisions, poaching, and harassment.

Loss of natural springs or associated riparian habitat has historically been associated with mining activities, overall development, and grazing within the project region. Riparian loss is a critical issue throughout Nevada. Potential cumulative loss is not quantifiable for any RFAs, and effects would be relative to the levels of water reduction and vegetation removal. Wildlife components that would be predominantly affected include breeding, foraging, and cover habitat; available drinking water; and loss of both vertebrate and invertebrate species dependent on free water and the associated riparian zones.

Increased development of regional RFAs would result in continued habitat fragmentation and animal displacement into adjacent habitats, which may not be able to support additional use by displaced animals. Direct loss of native habitat (e.g., pinyon/juniper, riparian) would further limit viable habitat for area wildlife populations, which would result in decreased breeding, foraging, and cover potential. Indirect cumulative effects would encompass expanded human use by both residents and nonresidents within the region, resulting in increased harassment of wildlife species, vehicle mortalities, and both legal and illegal hunting of animals.

The implementation of the No Action Alternative would result in an overall lower amount of cumulative habitat loss and fragmentation, human disturbance, displacement, and potential effects to natural springs within the study area. However, the long-term reclamation of previously disturbed mine lands would also be lower under this alternative. The anticipated cumulative impacts to wildlife resources under the other project alternatives would be the same as those described for the Proposed Action.

4.6.3.5 Air Quality and Noise

The planned dust abatement and emission reduction procedures at the proposed project area would minimize impacts generated from the project. This would negate cumulative impacts with other operations in the project vicinity, including the current dust problems generated from the tailings near McGill. Impacts to the air from mining operations, including fugitive dust from ground-level sources and particulates from point sources, would both be controlled to levels below state and Federal ambient air standards. Since the fugitive emissions are local to each mining operation and there are no other mining facilities in proximity to Ely, monitored TSP concentrations at the proposed project area would likely represent the highest concentrations that may occur in the area. RMLP facilities would comply with New Source Performance Standards for dust emissions as required by the Clean Air Act. Dust abatement procedures for the life of the proposed project have been incorporated into the Plan of Operations (POO). However, even though emission levels are anticipated to be far below maximum allowable levels, on certain days and under certain meteorological conditions, people may notice increased levels of emissions in the area. Such potential effects could take the form of increased haze, or localized dust plumes, which would be temporary in nature and limited to the immediate project vicinity.

4.6.3.6 Land Use

Consistent with the Egan RA RMP, mining, rangeland, wildlife habitat, and recreation are the predominant land uses of the proposed project area. No current or planned projects within the proposed project area would cause cumulative land use impacts with these singular land use issues.

The proposed project lies in the Copper Flat and Giroux Wash grazing allotments as discussed in Section 3.14 and Section 4.1.14. The construction and operation of the Proposed Action would remove approximately 143 AUMs from the disturbed area in the short term. Of the 206,744 AUMs in current grazing allocations within the Resource Area, the 143 AUMs affected constitute less than 0.1 percent. Any adjustment of AUMs would have to be accomplished through a formal grazing decision by the BLM. It is assumed that the reclaimed acres would produce close to predisturbance amounts of forage, thus minimizing this loss in the long term. Wildlife and livestock would be displaced to the surrounding public lands. Adequate forage resources for these displaced animals are available on the surrounding lands. Direct loss of livestock from collisions due to increased vehicle activity is expected to be negligible.

According to BLM projections, total surface disturbance from active mining currently on public lands in the Egan RA is estimated to be approximately 9,000 acres. A total of 17,247 acres of surface disturbance would result from existing and projected mining and other RFAs within the resource area and adjacent Forest Service lands by the end of the land use planning period. There are no anticipated land use cumulative impacts from the implementation of the Proposed Action with other projects.

4.6.3.7 Socioeconomics

Socioeconomic impacts resulting from RFAs would depend on the size and scope of the potential new mining activities. Exploration activities do not require large numbers of workers, whereas continued mining operations may extend the types of impacts similar to those discussed for the Proposed Action.

Several socioeconomic resources identified in this EIS are near their current capacities and may be affected by increases in the local population. Specifically, (1) a housing shortage is projected; (2) the water delivery system from Murry Springs is near capacity during the summer months; (3) the potential exists for wastewater volumes in Ely to reach 85 percent of capacity, requiring the submittal of plans for upgrading current wastewater treatment facilities; (4) overcrowding is possible at the new middle and high schools; and (5) there may be a shortage of law enforcement officers for the sheriff's department. As stated in the POO, and in this document, RMLP would alleviate some of these impacts through a purchase of special obligation bonds, if offered by the affected entities, through their provision of marketing funds used in the successful November 1992 school bond issue, and facilitating both the County's purchase of solid waste facility materials and equipment and the City's efforts in well construction.

Socioeconomic impacts in an area depend on the relationship between the amount and timing of the service demand and the amount and timing of the tax revenues that could fund the needed services. RFAs would produce public revenue surpluses, but there would be an initial lag of 1 to 2 years when public tax revenues (tax base) might experience deficits. All tax revenues would be generated indirectly through increased economic activity, jobs, and payrolls. Actual start dates for most of the gold operations would depend on favorable conditions in the gold market and are therefore very difficult to predict with any certainty.

Peak direct employment would occur when the Proposed Action, the Mt. Hamilton Project, and the majority of the other mining operations are projected to be in full production. The Proposed Action accounts for a little less than half of the combined direct employment. It is important to note that the overall peak direct employment level, when combined with the existing mining force employed, does not reach the recent historic high of 1,106 mine workers in 1989. The new population generated by all projects would increase the county population by approximately 25 percent.

Cumulative housing effects would vary according to when mining projects actually begin operations. With RMLP's single work force utilizing the possible 100-unit mobile home park, there would be ample short-term housing units available. The relatively small number of construction workers projected for the future would be accommodated fairly readily by the existing transient housing supply.

Permanent housing for operations workers would be more problematic. The total new household demand would be greater than the currently available supply. As stated in the Proposed Action and in the POO, the availability of housing for the construction and operational work force is one area of community concern that RMLP would take specific measures to address.

School enrollment would remain below the school district's historic high of 2,600 students if all projects proceed as projected. Nevertheless, increases in school-aged children could overload the school district's current capacities and create an overcrowding problem. Other available buildings in the community may have to be utilized or the school district may have to adopt a year-round school, a split-shift policy, or one or more grades could be transferred to the now closed Ruth School. These actions may have to take place whether or not the Proposed Action or the other RFAs' planned growth occurs. The recent bond passage will provide the funding for middle and high school construction activities.

Transportation effects would also be minor and, with geographically dispersed projects, they would tend to be site-specific. There would be no interactive cumulative effects except in the Ely area where some additional urban-type traffic control may be needed to safely accommodate the growth, and where maintenance requirements may increase slightly. All area thoroughfares currently have traffic levels below their Level of Service classifications.

In the future, long-term economic gain would continue from the collective activities within White Pine County. Property tax revenues for the county would increase. The communities of Ely, Ruth, and McGill would continue to receive tax revenues from workers and mining companies residing there. The indirect economic effects of increased numbers of, and expansion of, existing commercial establishments would continue. The demand for increased local infrastructure and services from these communities and counties would continue to rise as the population of this region continues to grow. A rise in population would benefit the hospital and local health care and social services through increased utilization.

4.6.3.8 Visual Resources

Continued activities on public land in the Robinson Mining District would extend the period in which the quality of visual resources for these public lands would be affected. Incremental changes to the topography would occur for the duration of the mine activities. Reclamation procedures at the end of the project life span would reduce visual contrasts.

Visual disturbances brought about by the projected RFAs in the county would be additive. There would be short-term cumulative impacts to visual resources during the construction and operation phases of the various projects on approximately 17,247 acres. The Proposed Action would account for 2,140 acres of public land disturbance, or approximately 12 percent.

It is expected that part of the short-term impacts would be minimized through proper design and location. Some operations are less visible although other facilities dominate views. Attention to visual change would depend on the inherent physical landscape feature's ability (e.g., slope, soil color, contrast, diversity) to absorb visual change relative to the locations of residents, travelers, and recreationists in the region. However, the number of viewers and their view orientation (e.g., viewer position, duration, view distance, viewer expectation, number of times seen, focal point sensitivity, slope and aspect relative to observer, light conditions, atmospheric conditions, season of the year) would determine the impact of the visual changes to the landscape of White Pine County.

Reclamation would reduce the magnitude of long-term visual impacts on approximately 11,570 future disturbed acres. According to the BLM Proposed Oil and Gas Leasing Amendment and Final Supplemental EIS, long-term impacts would remain at 17,247 acres in the Egan RA from mining activity, haul road construction, construction of the White Pine Power Plant, and installation of 500-kV electric transmission lines. This disturbed acreage projection includes the Robinson Project. Overall, no cumulative visual impacts are anticipated to result from the expansion and operation of the Proposed Action with any other current or proposed projects. No other visually impacting projects are within the local geographic area, but the proposed SWIP would add new transmission lines.

4.6.3.9 Cultural Resources

Any mining and other ground-disturbing activities could impact prehistoric and historic NRHP-eligible sites within the proposed project area. Cultural resource inventories would be conducted for any projects involving public lands, and impacts would be avoided or mitigated.

The proposed project area is located in a biotic zone referred to as pinyon-juniper woodland. The Egan RA contains approximately 409,600 acres of "manageable," or accessible, undisturbed pinyon-juniper. The ratio of NRHP-eligible sites recorded during archaeological surveys in pinyon-juniper is approximately 1 Historic Property per 75 acres surveyed (BLM 1992a). Assuming that the ratio would remain constant, the estimated number of NRHP-eligible sites in manageable, undisturbed pinyon-juniper could be 5,461 (409,600/75). The 10 potentially eligible or eligible Historic Properties described in Section 3.17, Cultural Resources, that could receive direct or indirect impacts by the Proposed Action would represent less than 1 percent of the remaining cultural resources in the pinyon-juniper woodland of the Egan RA.

The BLM has estimated that approximately 17,230 acres of pinyon-juniper may be disturbed through the year 2007 in the cumulative effects area (including the Robinson Project). This equates to possible mitigation of impact for an estimated 230 potential Historic Properties; of these, the 10 sites designated as potentially significant in the proposed project area represent 4 percent. The cumulative effect of this mitigation would be to increase the information base for cultural resources within the Egan RA.

4.6.3.10 Paleontology

The cumulative effects area for paleontological resources includes disturbance areas associated with existing and potential mining activities in the Egan Resource area. Vertebrate and invertebrate fossils in the Egan Resource Area occur primarily in Tertiary, Mississippi, Devonian, and Pennsylvanian-age deposits (NBMG 1976). Open-pit mining that intercepts and disturbs these deposits would have the greatest potential impact on paleontological resources.

4.7 UNAVOIDABLE ADVERSE IMPACTS

Implementation of the environmental protection measures (see Section 2.2.16) and the mitigation measures identified in Section 4.5 would eliminate most adverse impacts that would result from the Proposed Action. Those unavoidable adverse impacts that would remain are summarized below by resource area. The Liberty Pit Disposal Alternative would have reduced impacts to soils, vegetation, and wildlife habitat, with the amount depending on the scenario selected. Unavoidable adverse impacts for the Reclamation Alternative would be the same as those of the Proposed Action.

Water Quantity and Quality

- Possibility of a spill of sulfuric acid or diesel fuel into a sensitive area. Potential significant impact.

- Loss of *3.7* acres of "waters of the United States."

Soils

- Burial of less than 0.4 million cubic yards of soils under the Giroux Wash tailings impoundment and loss for potential future reclamation.

- Reduced soil productivity in the Giroux Wash tailings impoundment and copper leach pad areas.

Vegetation

- Clearing of 3,345 acres of native vegetation.

- Reduced vegetation productivity in the Giroux Wash tailings impoundment and copper leach pad areas.

- Loss of 4,502 cords of wood, 4,502 Christmas trees, an annual growth loss of 150 cords/year, and 2,251 acres of pinyon-juniper woodland that produces approximately 1 pound of pinyon nuts/acre every 5 years.

- Possibility of a spill of sulfuric acid or diesel fuel.

Riparian and Wetland Areas

- Loss of 4.1 acres of riparian vegetation.

- Possibility of a spill of sulfuric acid or diesel fuel into a sensitive area. Potential significant impact.

Wildlife and Fisheries Resources

- Clearing of 3,345 acres of native wildlife habitat.

- Possibility of cyanide ingestion from access to leach ponds when barriers become damaged.

- Possibility of a spill of sulfuric acid or diesel fuel into a sensitive area. Potential significant impact.

- Potential increases in vehicle-related wildlife mortalities and poaching.

Threatened and Endangered Species

- Possibility of a spill of sulfuric acid or diesel fuel into a sensitive area.

Transportation of Process Materials, Products, and Hazardous Wastes

- Possibility of a spill of sulfuric acid or diesel fuel into a populated area (Carlin, Eureka, and Ely). Potential significant impact.

Grazing Management

- Temporary loss of livestock forage productivity on the disturbed areas and a short-term reduction of approximately 106 to 143 livestock grazing AUMs.

Visual Resources

- Alteration of the existing visual resources in Giroux Wash.

Cultural Resources/Paleontology

- Direct and indirect impacts to cultural and paleontological resources.

4.8 RELATIONSHIP BETWEEN THE LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term is defined as the life of the Robinson Project through closure and reclamation. Long-term is defined as the future beyond reclamation. Many of the impacts associated with the Robinson Project would be short-term and would cease to be adverse impacts following reclamation. However, decreases in the long-term soil and vegetation productivity in the Giroux Wash tailings impoundment and copper leach pad areas are expected. This would be offset by increases in productivity where previously disturbed areas are reclaimed. A tabulation of changes in long-term productivity is presented in Table 4-18.

The Liberty Pit Disposal Alternative (Scenarios 2 through 6) would reduce the number of acres subject to permanent soil loss (burial) in the Giroux Wash area and would reduce the number of acres subject to reduction in long-term vegetative productivity. However, this alternative would preclude future mining of the mineralized zone in the event the price of copper increases.

Table 4-18

Irreversible, Irretrievable, Short-Term, Long-Term Commitment of Resources - Proposed Action

Resource Area	Irreversible Impacts	Irretrievable Impacts	Relationship of Short-Term Use of the Environment and Long-Term Productivity
Geology and Minerals	Yes	Yes	Once mineral reserves are mined, they would no longer be available for future, long-term production.
Water Quantity and Quality	No	No	Once the drawdown cone in the Robinson area has rebounded, the groundwater aquifer would be available for other consumptive uses. Effluent flow from the Giroux Wash tailings impoundment would decrease with time following closure.
Soils	Yes	Yes	Soil erosion is expected to be short-term due to implementation of reclamation measures. Some long-term reduction in soil productivity is anticipated in the Giroux Wash and Keystone areas.
Vegetation	Yes	Yes	There would be long-term reductions in available wood products and vegetation productivity following reclamation, but long-term increase on previously disturbed lands that would be reclaimed.
Riparian and Wetland Areas	Yes	Yes	No long-term changes in riparian productivity are anticipated.
Wildlife and Fisheries Resources	No	Yes	Removal of habitat would be a temporary impact during the life of the mine. Long-term losses in wildlife productivity following reclamation are not expected.
Wild Horses	No	No	Neither short-term nor long-term impacts to wild horses are anticipated.
Threatened or Endangered Species	No	Yes	Removal of habitat would be a temporary impact during the life of the mine. Long-term losses in wildlife productivity following reclamation are not expected.
Air Quality	No	No	Emissions from the Robinson Project would not deteriorate the existing air quality in the study area.
Noise	No	No	Short-term noise impacts during construction and from mining operations would not adversely impact sensitive receptors.

Table 4-18 (Continued)

Resource Area	Irreversible Impacts	Irretrievable Impacts	Relationship of Short-Term Use of the Environment and Long-Term Productivity
Social and Economic Values	No	Yes	There would be additional productivity from the site for the life of the project. Included in the new productivity would be the production of gold and copper reserves, the creation of 514 construction jobs and 550 operations jobs with an annual payroll of $17 million, and additional revenue support for White Pine County and the State of Nevada.
Transport of Process Materials, Products, and Hazardous Wastes	No	No	A spill of hazardous materials into a sensitive resource, such as a stream or wetland, is not expected during the life of the project. However, if one did occur, impacts could last for several months. Decreases in long-term productivity are not anticipated.
Access and Land Use	No	Yes	There would be no short-term or long-term impacts to access; public access patterns would be maintained. There would be a short-term loss of public land available for livestock grazing, wildlife habitat, dispersed recreational opportunities, and firewood and Christmas tree harvesting until reclamation is sufficient to restore productivity and allow these activities to resume.
Grazing Management	No	Yes	There would be a short-term loss of livestock forage productivity on the disturbed areas until reclamation is sufficient to allow grazing to resume.
Recreation	No	Yes	There would be a short-term loss of public land available for dispersed recreational opportunities until reclamation is sufficient to allow dispersed recreational activities to resume.
Visual Resources	No	Yes	A short-term commitment of visual resources would occur during the active mining period (approximately 15 years). Impacts to visual resources would be reduced through successful reclamation procedures and implementation of the environmental protection measures.
Cultural Resources	Yes	Yes	Disturbance of cultural sites would result in the permanent loss of site context.
Paleontological Resources	Yes	Yes	Disturbance to paleontological resources would result in the permanent loss of data.

Thus, it would not maintain or enhance the long-term recovery of mineral resources.

Long-term soil and vegetation productivity under the Reclamation Options is expected to be generally the same as under the Proposed Action. Removal of all surface structures (Option 2) would preclude the possibility of using the area for other industrial purposes once mining activities have been completed.

4.9 IRREVERSIBLE/ IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction and operation of the Robinson Project could result in either the irreversible or irretrievable commitment of certain resources. Irreversible is a term that describes the loss of future options. It applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over very long periods of time. Irretrievable is a term that applies to the loss of production, harvest, or use of natural resources. For example, livestock forage production from an area is lost irretrievably while an area is serving as a tailings disposal area. The production lost is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume forage production. Irreversible and irretrievable impacts of the Proposed Action are summarized in Table 4-18.

As a result of the Proposed Action, less than 0.4 million cubic yards of growth medium would be permanently buried under tailings in the Giroux Wash area. This represents an irretrievable commitment of resources. Approximately 4,502 cords of wood would be lost during clearing, and annual production of 150 cords/year, 4,502 Christmas trees/year, and 2,251 acres of pinyon/juniper woodland that produces 1 pound of pinyon nuts/acre every 5 years would be lost in the Giroux Wash area, also an irretrievable commitment of resources.

Scenarios 2 through 6 of the Liberty Pit Disposal Alternative would reduce the irreversible and irretrievable commitment of soil and vegetation resources under the Giroux Wash tailings impoundment, but it would result in the irreversible commitment of mineral resources that could not be mined from Liberty Pit at a later date. Thus, this alternative would not conserve depletable copper and gold resources. Reclamation Option 2 (removal of all surface structures) would result in the irretrievable loss of the construction materials used to build the administration building, concentrator complex, SX/EW plant, and transmission line. This option would preclude the reuse or conservation of the developed infrastructure for other industrial purposes.

Paleontological and cultural resources represent a finite resource that cannot be replaced. Any disturbance that results in their destruction would constitute an irreversible and irretrievable commitment of resources.

4.10 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Since the alternatives to the Proposed Action differ primarily in the detailed design of the tailings disposal facility and Reclamation Plan, there would be very little difference in the energy requirements of the three action alternatives and only limited conservation potential. The Liberty Pit Disposal Alternative would require slightly less energy for construction than the other two alternatives because the West Unit of the tailings disposal facility would be reduced in size. The following operational information for the Proposed Action would also apply to the two alternatives. It should be noted that this information represents initial estimates of annual energy consumption for mine operations. All action alternatives would have the same energy consumption for transportation.

- Electricity (primarily for shovels, mill, concentrator, and SX/EW facility)
  Annual use - 350 million kWHr
  Life-of-project (17 years) - 5.95 billion kWHr

- Diesel fuel (primarily for haul trucks)
  Annual use - ranges from 1.1 to 5.9 million gallons
  Life-of-project (15 years) - 73 million gallons

- Propane (for heating all mine buildings)
  Annual use - 1.9 million gallons
  Life-of-project (17 years) - 32.3 million gallons

5.0 CONSULTATION AND COORDINATION

5.1 DRAFT EIS PREPARATION

In preparing the EIS, the BLM communicated with and received input from many Federal, state, and local agencies as well as other organizations and individuals. The following is a list of those who provided input:

Federal Government Agencies

Department of Agriculture
- Forest Service - Humboldt National Forest (Elko, Ely)
- National Museum of Natural History, Smithsonian (Washington, D.C.)
- Soil Conservation Service (Ely, Reno)

Department of the Interior
- Bureau of Mines (Reno)
- Fish and Wildlife Service (Reno)
- Geological Survey (Denver)

Department of Transportation

Environmental Protection Agency (San Francisco)

State Government Agencies/Universities

Nevada Department of Taxation
Nevada Department of Transportation
Nevada Division of Wildlife (Elko, Ely)
Nevada Employment Security Department
Nevada Natural Heritage Program (Carson City)
Nevada State Demographer
Nevada State Museum and Historical Society (Las Vegas)
Northern Nevada Community College
University of Nevada (Reno) - Mackay School of Mines

Local Governments

Ely City Engineer
Ruth/McGill City Engineer
White Pine County Assessor
White Pine County Building and Safety Department
White Pine County Economic Diversification Program
White Pine County Nuclear Waste Program

Local Governments (Continued)

White Pine County Regional Planning Commission
White Pine County School District
White Pine County Sheriffs Department

Private

Association of American Railroads
Boundy & Forman, Inc.
Dr. Robert Hershler - Smithsonian
Northern Nevada Railroad Corporation
Skywest Airlines
Valley View Mobile Home Park
Western Cultural Resource Management, Inc.
William Bee Ririe Hospital
Yelland Airfield

5.2 DRAFT EIS REVIEW

In the course of preparation of the Draft and Final EISs for the Robinson Project, the BLM has communicated with and received input from many federal, state, and local agencies; elected representatives; environmental and citizens groups; industries; and individuals. Approximately 350 copies of the Draft EIS were distributed by mail to various individuals, organizations, and government agencies. During the 45-day public comment period, many of those who received copies of the Draft EIS have submitted written comments and/or presented verbal comments at the public meetings held in Ely and Reno, Nevada on May 24 and 25, 1994, respectively. Those comments are presented and responded to in the following sections.

A listing of the agencies, organizations, and individuals who received copies of the Draft EIS in April 1994 is presented below.

Agencies, Organizations, and Individuals Who Received Copies of the Draft EIS

<u>Federal Agencies</u>

Department of Agriculture
Farmer's Home Administration - East Ely, Nevada - Terry Brown
USFS, Humboldt National Forest - Elko, Nevada - Forest Planner, Mary Beth Marks
USFS, Humboldt National Forest - Ely, Nevada - Loretta Cartner, Jerry Green

Federal Agencies (Continued)

Department of Defense
- Army Corps of Engineers - San Francisco, California
- Bolling AFB - Washington, D.C.
- U.S. Air Force - Washington, D.C.

Department of the Interior
- Bureau of Mines - Spokane, Washington - Tim Spear
- Bureau of Mines - Washington, D.C.
- Bureau of Reclamation - Denver, Colorado
- Fish and Wildlife Service - Reno, Nevada
- Fish and Wildlife Service - Washington, D.C.
- Great Basin National Park - Baker, Nevada - Al Hendricks
- National Park Service - Washington, D.C.
- Minerals Management Service - Washington, D.C.
- Office of Environmental Policy and Compliance - Washington, D.C.
- Ruby Lake National Wildlife Refuge - Ruby Valley, Nevada - Dan Pennington
- U.S. Geological Survey - Reston, Virginia

Department of Transportation
- Office of Transportation and Regulatory Affaris - Washington, D.C.

Environmental Protection Agency
- EPA Region 9 - San Francisco, California - Jeanne Geselbracht

Interstate Commerce Commission - Washington, D.C. - Harold McNulty

State Agencies

Nevada Bureau of Mines & Geology - Reno, Nevada - Dr. Jonathan G. Price, Ron Hess, Joseph V. Tingley
Nevada Department of Conservation & Natural Resources - Carson City, Nevada
Nevada Department of Transportation - East Ely, Nevada - Glen Mouritsen
Nevada Division of Forestry - Carson City, Nevada - Lowell V. Smith
Nevada Division of Forestry - Elko, Nevada - Mike Jordon
Nevada Division of Forestry - Ely, Nevada - Jim Luce
Nevada Division of Historic Preservation & Archaeology - Carson City, Nevada - Ron James
Nevada Division of Minerals - Carson City, Nevada - Russell A. Fields
Nevada Division of Minerals - Las Vegas, Nevada - Walter Lombardo
Nevada Division of State Lands - Carson City, Nevada - Pamela B. Wilcox
Nevada Division of Wildlife - Elko, Nevada - Larry Barngrover, Rory Lamp
Nevada Division of Wildlife - Ely, Nevada
Nevada Division of Wildlife - Eureka, Nevada - Dale Elliott
Nevada Division of Wildlife - Hiko, Nevada - Bert Tanner
Nevada Division of Wildlife - Las Vegas, Nevada - Cornelio Padilla

State Agencies (Continued)

Nevada Division of Wildlife - Panaca, Nevada - Kraig Beckstrand
Nevada State Clearing House Coordinator - Carson City, Nevada - Ron Sparks
Nevada State Historical Society - Reno, Nevada - John Townley
Nevada State Museum - Carson City, Nevada - Donald Tuohy
Nevada State Park System - Carson City, Nevada - John Richardson
University of Nevada Las Vegas - Las Vegas, Nevada - James R. Dickinson Library
University of Nevada Reno - Reno, Nevada - Getchell Library
Colorado State University - Fort Collins, Colorado - Robert Behnke

County Agencies

Elko County Library - Elko, Nevada
Eureka County Commissioners - Eureka, Nevada
Lincoln County Commissioners - Pioche, Nevada - Keith Whipple
Nye County Commissioners - Tonopah, Nevada
White Pine County Commissioners - Ely, Nevada - John Chachas
White Pine County Sheriff's Department - Ely, Nevada - Bernie Romero
White Pine County Schools - East Ely, Nevada - Jan Cahill
White Pine County Library - Ely, Nevada - Lori Williams

Local Agencies

City of Ely - Ely, Nevada - Mayor Joanne Malone, Dean Day
Ely City Manager - Ely, Nevada
Eureka Branch Library - Eureka, Nevada
Los Angeles Department of Water & Power - Las Vegas, Nevada - Lance Lee
Los Angeles Department of Water & Power - Los Angeles, California - William W. Glauz
McGill Town Council - McGill, Nevada - Dick Bynum
Preston/Lund Town Council - Lund, Nevada - Ronald Ivans

Regional Agencies

Economic Diversification Council - Ely, Nevada - Barlow White
Nevada Coop Extension - Ely, Nevada - Gary Veserat
White Pine Conservation District - East Ely, Nevada - Marvin Jessen
White Pine Regional Planning Commission - Ely, Nevada

Elected Officials

Governor Bob Miller - Carson City, Nevada
Senator Richard Bryan - Washington, D.C.; Las Vegas, Reno, Carson City, Nevada
Senator Harry M. Reid - Washington, D.C.; Las Vegas, Reno, Carson City, Nevada
Representative Barbara Vucanovich - Washington, D.C.; Elko, Nevada; Reno, Nevada
Representative James H. Bilbray - Washington, D.C.; Las Vegas, Nevada
State Senator Mike McGinnis - Fallon, Nevada
Assemblywoman Marcia DeBragia - Fallon, Nevada

Tribal Councils

Tribal Chair, Duckwater Shoshone Tribe - Duckwater, Nevada - Boyd M. Graham
Tribal Chair, Duckwater Reservation - Duckwater, Nevada - Jerry Millet
Tribal Chair, Ely Colony - Ely, Nevada - Jerry Charles
Tribal Chair, Goshute Reservation - Ibapah, Utah - Harlan Pete
Tribes of Western Shoshone of Nevada - Elko, Nevada - David Platerio
Western Shoshone National Council - Reno, Nevada - Jack Orr

Organizations

Bristlecone Bowmen - McGill, Nevada - Dana Johnson
Eastern Nevada Miner's and Prospector's Association - Ely, Nevada
EIP Association - Sacramento, California - Roy Leidy
Forest Institute - Carson City, Nevada - Kathleen Garr
I.B.E.W. Local 401 - Reno, Nevada - Frank Grunstead
Int. Society for the Protection of Mustang & Burros - Scottsdale, Arizona - Karen A. Sussman
LASER Committee - Portland, Oregon - John Williams
Mineral Policy Center - Washington, D.C. - Philip M. Hocker
Motorcycle Racing Association of Nevada - Las Vegas, Nevada - Casey Folkes
National Audubon Society - Washington, D.C. - Brock Evans
Natural Resources Defense Council - San Francisco, California - Johanna H. Wald
Nevada Cattlemen's Association - Elko, Nevada - Vickie Turner
Nevada Mining Association - Reno, Nevada
Nevada Outdoor Recreation Association - Carson City, Nevada - Charles S. Watson
Nevada Wildlife Federation - Las Vegas, Nevada - Dr. John Leitch
New White Pine Sportman's Club - Ely, Nevada - Robert Marcum
Plumbers and Pipefitters - Sparks, Nevada - Jack Chesney
Sierra Club, Southern Nevada Group - Las Vegas, Nevada
Sierra Club, Toiyabe Chapter - Reno, Nevada - Chairman, Glen Miller, Lois Snedden, Steve Wathen
The Nature Conservancy - Reno, Nevada - Jan Nachlinger
The Nature Conservancy - San Francisco, California
The Wilderness Society - Elko, Nevada - Kent McAdoo

Organizations (Continued)

The Wilderness Society - San Francisco, California - Barbara Spolter
The Wilderness Society - Washington, D.C.
White Pine Chamber of Commerce - Ely, Nevada - Ferrel Hansen

Industries/Businesses

Alta Gold Co. - Ely, Nevada - Gary W. Cummings
Amuda Mineral Corp. - Denver, Colorado - Raymundo Chico
Barrick Goldstrike Mine Inc. - Elko, Nevada - Bob Ingersoll
Basin Research Associates - San Leandro, California - Colin I. Busby
Bath Lumber Co. - Ely, Nevada - Tom Bath
Battle Mountain Gold - Oroville, Washington - Jeb White
BHP Minerals International - Salt Lake City, Utah - John E. Zimmerman
Blue Sky Mining Claim - Reno, Nevada - Electra Larsen
Boundy and Foreman, Inc. - Ely, Nevada
Buckhorn Springs Ranch - Henderson, Nevada - Stanley Jones
Carter Cattle Company - Lund, Nevada - Steve Carter
Clark Mining - Dillon, Montana - Rodney D. Clark
Coeur Explorations, Inc. - Sparks, Nevada - Robley E. Berry
Conoco, Inc. - Casper, Wyoming - P. J. Turner
Cooper & Sons, Inc. - Ely, Nevada
Cyprus Amax - Englewood, Colorado
Cyprus Miami - Claypool, Arizona - Jay Spehar
Cyprus Mining - Tuscon, Arizona - Kathy Whitman
D. L. Zerga Associates - Crystal Bay, Nevada
Dames and Moore - Reno, Nevada - Phil Davis
Desert Mountain Realty - East Ely, Nevada - Dave Tilford
Elko Daily Free Press - Elko, Nevada
Elko Independent - Elko, Nevada
Ely Daily Times - Ely, Nevada
FWJ Archaeological Consultant - Crystal Bay, Nevada - Frank Johnson
Givens & Huntley - Boise, Idaho - Joe Baird
Greystone - Englewood, Colorado - Jerry Koblitz, Charlene Lopez
Hecker Mining Co. - Lovelock, Nevada - Eric Jones
Homestake Mining Company - Reno, Nevada - Alan Cox
Independence Mining Co., Inc. - Elko, Nevada - Julia Bosma-Douglas, Dallas B. Pulley
Independence Mining Co., Inc. - Reno, Nevada - Russell W. Allen
Infotech Research, Inc. - Fresno, California - Barry A. Price

Industries/Businesses (Continued)

JBR Consultants - Sandy, Utah - Brian Buck
KDSS 92.7 FM Radio - Ely, Nevada
KELY Radio - Ely, Nevada - Bart Reed
Kennecott - Bingham Canyon, Utah - W. Orchow
Kennecott - Salt Lake City, Utah - Cindy Emmons
Mt. Wheeler Power, Inc. - Ely, Nevada - Monica Symp
Noranda Exploration - Reno, Nevada - Melody Hefner
Northern Nevada Railroad Corp. - East Ely, Nevada - Bryan R. R. Whipple, Evva Schaefer
Northern Nevada Railroad Corp. - Riverside, California - Tom Stoery
Parsons, Behle & Latimer - Salt Lake City, Utah - Dave Deisley
Placer Dome U.S., Inc. - Elko, Nevada - Eric Klepfer, Bill Upton
R. K. Vierra Associates - Reno, Nevada - Robert K. Vierra
REDEV, Inc. - 29 Palms, California - Mear Lloyd
Riverside Technologies - Fort Collins, Colorado - Valerie Randall
Schafer and Associates - Bozeman, Montana
Sierra Pacific Power Company - Reno, Nevada - Carl E. Barnett
Simon Hydro Search - Reno, Nevada - Lori Frisch
Sitex Environmental - Salt Lake City, Utah - Terry Crawford
Taylor Construction & Mining - East Ely, Nevada - Glenn Taylor
Terra Matrix - Steamboat Springs, Colorado - Mike Neumann
The Eureka Sentinel - Tonopah, Nevada
The Lincoln County Record - Caliente, Nevada - Connie Simpkins
Uhalde Lease - Reno, Nevada - John H. Uhalde
Union Pacific Railroad - Omaha, Nebraska - Tom Guerney
WesTec - Elko, Nevada - Val Sawyer
WesTec - Reno, Nevada - Bill Reich
Western Cultural Resource Management - Boulder, Colorado - Thomas J. Lennon
Western Mining Corp. USA - Reno, Nevada - Mary Jane Smith
Western States Minerals - East Ely, Nevada - Gaylen Cropper

Individuals

Steve Aaker - Reno, Nevada
Deborah Allard - Brunswick, Maine
Joneille Anderson - Hastings, Michigan
Harlan Arnold - East Ely, Nevada
Jim Assuras - McGill, Nevada
Rev. John Babb - Ely, Nevada
Shawna Baker - Ely, Nevada
Sam Bida - Ely, Nevada
Douglas Braid - Ely, Nevada

Individuals (Continued)

John Breitrick - Ely, Nevada
Dee Burgess - Beryl, Utah
John Carpenter - Elko, Nevada
Mr. Clayton - East Ely, Nevada
Gerald Davidson - Buhl, Idaho
Richard Delong - Houston, Texas
Brent Eldridge - Ely, Nevada
Wes Farnsworth - Winnemucca, Nevada
Walt Ford - Ontario, Oregon
Rob Gelskey - Ely, Nevada
Norman L. Goeringer - Ely, Nevada
Lee Griswold - Elko, Nevada
Dan Halstead - Ely, Nevada
Richard Hasler - Ruth, Nevada
Craig Hause - Reno, Nevada
Caroline Hilton - Ely, NV
Sue Holloway - East Ely, Nevada
C. Wayne Howle - Reno, Nevada
John Huth - Ely, Nevada
Walter B. Johnson - Ely, Nevada; Tallahassee, Florida
Ann Kerston - Sparks, Nevada
T. J. Lani - Ely, Nevada
Alvin McLane - Reno, Nevada
Clifton Mee - Eureka, Nevada
Donald Molde - Reno, Nevada
Russell Moore - Fort Collins, Colorado
Dave Naslund - Edgewater, Colorado
E. B. Robinson, Jr. - Marlboro, Massachusettes
Charles D. Snow - Reno, Nevada
Gary Sprouse - Neola, Utah
Carl Stanek - Ely, Nevada
Gordon L. Steele - Sparks, Nevada
Roger Steininger - Reno, Nevada
Roy G. Stott - Negaunee, Michigan
Steve Sutherland - Reno, Nevada
George Swallow - Ely, Nevada
Jim Taylor - Baker, Nevada
Lee Tilman - Boulder City, Nevada
C. Neil Upchurch - Reno, Nevada
Lars Wakeman - Elko, Nevada

Individuals (Continued)

Bill Wilson - East Ely, Nevada
Cy Wilsey - Sparks, Nevada

5.3 PUBLIC MEETING COMMENTS AND RESPONSES

5.3.1 Ely, Nevada - May 24, 1994

This public meeting, held in the Bristlecone Convention Center, had 85 attendees. Twelve people presented statements. All spoke in support of the Robinson Project, and no deficiencies in the Draft EIS were mentioned. The key points from each statement are presented below. No responses are necessary for any of these statements.

Jim Lewis - representing Mt. Wheeler Power

- The Cooperative wants to provide least cost electricity to Magma to stimulate economic development.

- Environmental concerns are needed but an economic base is needed more.

- The project will have a positive impact on White Pine County.

- The EA was adequate; preparation of the EIS was probably unnecessary.

Nancy Swallow - Ely resident

- People are the endangered species in White Pine County.

- Many social problems have resulted from the lack of jobs.

- The project will provide jobs for local people.

George Swallow - Ely resident

- The project will create new wealth in White Pine County.

June Polsgrove - Ruth resident

- Air quality and drinking water quality are good at Ruth.

- Water quality issues at Ruth have been adequately addressed in the Draft EIS.

Kevin Kirkeby - representing People for the West

- The Draft EIS is adequate in all areas, including soils, reclamation, wildlife, and socioeconomics.

Bob Miller - Ely resident

- Vegetation productivity in Giroux Wash will be improved following reclamation, resulting in increased wildlife and livestock use.

- Socioeconomic issues are adequately addressed in the Draft EIS.

- Magma will assist the county in being prepared for hazardous materials spills.

- Taxes from the project will greatly benefit all jurisdictions. This must not be under emphasized.

- Effects on the economy will be nationwide.

- The socioeconomic impacts mitigation committee will continue to meet with Magma after the project goes into operation.

Caroline Hilton - Ely resident

- Compliments to the local and State BLM offices for their accessibility and cooperation with the public seeking additional information.
- Likes the analysis of local impacts contained in the Draft EIS.

Richard Fonger - Ely resident and fourth generation miner

- Make a decision on the project based on scientific facts and not innuendos and lies.

Tom Stoery - representing Northern Nevada Railroad

- The transportation analysis contained in the Draft EIS is complete.

Dave Olsen - representing the City of Ely

- The City is satisfied with the extent and depth of the Draft EIS.
- The City welcomes the project.
- The City does not anticipate submitting additional written comments.

Dave Tilford - representing White Pine Chamber of Commerce, and Economic Diversification Council

- The Draft EIS has been well done.

Jim Alworth - Ely resident

- Has observed ducks and geese on Liberty and Ruth Pits and deer around the edge of the mined area.
- Reclamation of previously mined areas will improve the habitat for deer.

5.3.2 Reno, Nevada - May 25, 1994

This public meeting at the Peppermill Hotel had 48 attendees. Three people presented statements. Two spoke generally in support of the Robinson Project and one requested clarification of BLM's preferred alternative in the Draft EIS versus the earlier EA. No deficiencies in the Draft EIS were mentioned. The key points from each statement are presented below. No responses are necessary for any of these statements.

Paul Scheidig - representing the Nevada Mining Association

- The Draft EIS does a good job of reviewing the alternatives.
- Placing tailings in Liberty Pit would result in the loss of mineral resources and should be avoided.
- The Draft EIS presents a complete and thorough review of all resources.
- The groundwater technical study is very complete in presenting existing conditions and expected conditions following mining.
- The Association would like a rational and reasonable decision based on the facts.

Ed Jucevic - resident of Sparks

- Concerned with the loss of mineral resources from placing tailings in Liberty Pit.

- Does not want to have the country go overseas to obtain needed minerals.

Rick Lassen - representing the Nevada Public Lands Alliance

- Has had difficulty obtaining a copy of the Draft EIS to review. [A copy was provided following the meeting.]

- Requested clarification of the BLM's preferred alternative in the Draft EIS versus the action proposed in the EA. [Gene Drais of BLM explained that the current agency-preferred alternative outlined in the Draft EIS was to place some of the tailings in Liberty Pit, while the EA action was to place all tailings in Giroux Wash.]

5.4 WRITTEN COMMENTS AND RESPONSES

The BLM received 34 letters addressing the Draft EIS during the 45-day public comment period. One letter from the U.S. Fish and Wildlife Service was received following the close of the formal comment period. However, this letter (No. 35) has been included in the Final EIS, and responses have been prepared where necessary. All letters were reviewed and comments needing a response were identified. Responses were provided to clarify the contents of the Draft EIS, modify or correct the Draft EIS, or provide additional information in the Final EIS. Comments that did not require one of these responses but may be relevant to BLM's ultimate decision regarding the Robinson Project were given the response "Comment noted". Where changes (modification, correction, or addition) have been made to the text contained in the Draft EIS, these changes have been presented in the Final EIS in ***bold-italic type***.

Table 5-1 lists each of the comment letters by author and reference number assigned to the letter. All letters have been reproduced in their entirety, and all material submitted has been reviewed and considered. Responses have been prepared for the comments identified and are presented in this section. All letters have been reviewed and considered by the BLM in determining the agency preferred alternative for the proposed project.

Following Table 5-1, the comment letters and responses are presented. Each comment is identified by a bracket and reference number keyed to the letter reference number. Thus, Comment 4-3 refers to the third comment in Letter 4. The response to each comment accompanies the letter and is identified by the reference number of the respective comment (e.g., Response to Comment 4-3). All acronyms and abbreviations used in the responses to comments can be found in the Acronyms and Abbreviations section immediately following Chapter 7.0, References.

Table 5-1

Comment Letters
(in order of receipt by BLM)

Letter No.	
1	Walt Johnson
2	Earlene Bergwall
3	Ruby Lake National Wildlife Refuge, Deborah Poelker
4	George Giannopulos
5	Komatsu Dresser Company, Joseph W. Fischer
6	Pioneer Equipment, Ronald Gash
7	Sierra Club, Glenn C. Miller
8	Edward P. Jucevic, P.E.
9	White Pine County Board of Commissioners, Julio Costello
10	Richard Ott
11	Mount Wheeler Power, Inc., Jodi McKenny
12	Jesse R. Murdock
13	Evelene Twitchell
14	George J. Allen
15	Randy Ewell
16	Jerry R. Martin
17	U.S. Environmental Protection Agency, David J. Farrel
18	USDI, Bureau of Mines, John Norberg
19	Nevada Department of Business and Industry, Division of Minerals, Walt Lombardo
20	Nevada Department of Conservation and Natural Resources, Advisory Board of Natural Resources, Barbara Curti
21	Mineral Policy Center, Philip M. Hocker
22	Interstate Commerce Commission, Elaine K. Kaiser
23	Nevada Department of Conservation and Natural Resources, Division of Water Resources, Thomas K. Gallagher
24	People for the West, Richard Hasler
25	Fish and Wildlife Service, Nevada Ecological Services State Office, David L. Harlow
26	Nevada Department of Conservation and Natural Resources, Division of Wildlife, Larry Barngrover
27	Jim J. Lewis
28	Mount Wheeler Power, Inc., Jim J. Lewis
29	New White Pine Sportsman's Club, Robert N. Marcum
30	Jackie Urbans
31	Eastern Nevada Realty, George N. Swallow
32	Nevada State Clearinghouse (Nevada Wild Horse Commission, Nevada Bureau of Mines and Geology)
33	Nevada State Clearinghouse (Nevada Natural Heritage Program)
34	Nevada State Clearinghouse (Nevada Department of Transportation and Nevada Division of Minerals)
35	Fish and Wildlife Services, Nevada Ecological Services State Office, David L. Harlow

Letter 1

Bureau of Land Management
Ely District
Dan Netcher, EIS Team Leader
HC 33 Box 33500
Ely, Nevada 89301

April 25, 1994

Dear Dan,

Thanks for allowing me to comment on your Draft Report "Environmental Impact Statement **Robinson Project**" dated April 1994.

I have studied your report for the past two days and have reached a few conclusions and comments which I am afraid will not be much help to you. These are:

1-1 (1) In your Summary on page i you indicate that Alta Gold Company remains to be a responsible party along with Magma Copper Company for the Robinson Project. You may want to check this out because Alta sold out entirely all of their Robinson interest to Magma in the fall of 1991. I believe it is important to identify exactly who the responsible parties are especially when it comes time for final reclamation.

1-2 (2) The Robinson Project should be permitted and allowed to proceed as soon as is practical but at the same time I am torn between the destruction of the flora and fauna in the Giroux and White River Washes and their upper reaches and the covering up with tailings of the valuable remaining copper resources of the Liberty Pit which can be utilized by future generations. If it were to be put up to a vote I just could not make a decision between the two. My only hope is that the BLM and Magma will come up with some other satisfactory alternate. We ought to do all we can to protect the habitat of all those wild animals including the porcupine. By the way I could not find him mentioned in your report.

1-3 (3) One thing that does bother me is why has the BLM granted Magma more than 4000 acres of mill site and mining claims for the purpose of the Giroux Wash Impoundment areas? Your report indicates that only 1712 acres of public land will be required. The 4000 acres comes from Magma's filings in the White Pine County Recorders Office.

I hope all is going well with you and my other friends at the Ely BLM office and I hope to see "Yall" sometime in early June.

Sincerely

Walt Johnson

Walt Johnson
4798 Highgrove Road
Tallahassee, Florida 32308

Response to Letter 1

1-1 Based on your comment, the text in the Summary of this Final EIS has been revised. In 1991, the Robinson Mining Limited Partnership was formed from the Alta-Magma joint venture, and subsequently, in November 1991, Alta's interests in the Partnership were redeemed and returned. The Partnership is now comprised of the Magma Nevada Mining Company, a wholly-owned Magma Copper Company subsidiary, and is operated by Magma Nevada Mining Company.

1-2 Comment noted. The Affected Environment for wildlife resources (Section 3.6) was developed to provide an overall description of the wildlife species that occur in and around the project area. Representative species were chosen that best characterize the habitats associated with the project components. The porcupine is known to occur in the project area, but is not common.

1-3 BLM has not and does not intend to grant patents on 4,000+ acres. The 1,712-acre area is the disturbed area that would result from the Giroux Wash impoundment. The patent application (N-54965), which includes the proposed Giroux Wash impoundment site, is for 2,054 acres.

Letter 2

PO Box 473
Ruth, Nevada
89319-0473
May 15, 1994

DAN NETCHER
EIS Team Leader
BLM
HC 33
Box 33500
Ely, Nevada
89301

Dear Mr Netcher:

I wanted to write in Favor of Magma to start up as I have a special interest in this.

2-1 My home is the most South west home in Ruth. I am the closest home to the leach ponds and I understand the water up here in Ruth is full of arsnic and my water in my home couldn't be more clean and non contaminated. I had it tested my drinking water is so good tasting. Also if our ground water is contaminated how come there is no dead deer or other animals around the under ground spring not far from my home? It is closer to the leach ponds than my house is!

I see no other reason that Magma shouldn't open up and start up operations.

Sincerely,

Mrs F. W. Burgwall

Response to Letter 2

2-1 Comment noted. As stated on page 3-16 of the Final EIS, the water supply for Ruth is Ward Mountain Springs; water is carried to Ruth through an aqueduct. There are no springs located in southwest Ruth near a leach pond (see Map B-1 in Appendix B of the Final EIS).

Letter 3

5 May 94

Dan Netcher,

Attached is the latest list I've seen of Candidate Species of Nevada.

3-1 On Table 3-9, page 3-49 of your Draft EIS for the Robinson Project, the Long-billed Curlew is listed as a C2 species. My understanding is that it was downlisted to a 3C. Please provide this info to your area biologist.

Sincerely,
Deborah Poelker
Refuge Operations Specialist
Ruby Lake NWR

Response to Letter 3

3-1 Based on your comment, Table 3-9 has been corrected in this Final EIS.

U. S. FISH AND WILDLIFE SERVICE
RENO FIELD STATION

CANDIDATE SPECIES OF NEVADA

Species with historic ranges identified in Nevada in the November 21, 1991 Animal Notice of Review, Endangered and Threatened Wildlife and Plants (50 CFR Part 17).

(Updated February 4, 1992)

	Common Name	Scientific Name	Category
MAMMALS			
1	Pygmy rabbit	Brachylagus idahoensis	2
2	Spotted bat	Euderma maculatum	2
3	Palmer's chipmunk	Eutamias palmeri	2
4	Hidden Forest Uinta chipmunk	Eutamias umbrinus nevadensis	2
5	North American lynx	Felis lynx canadensis	2
6	North American wolverine	Gulo gulo luscus	2
7	Sierra Nevada snowshoe hare	Lepus americanus tahoensis	2
8	Desert Valley kangaroo mouse	Microdipodops megacephalus albiventer	2
9	Fletcher dark kangaroo mouse	Microdipodops megacephalus nasutus	2
10	Pahranagat Valley montane vole	Microtus montanus fucosus	2
11	Ash Meadows montane vole	Microtus montanus nevadensis	2
12	Preble's shrew	Sorex preblei	2
13	Fish Spring pocket gopher	Thomomys umbrinus abstrusus	2
14	San Antonio pocket gopher	Thomomys umbrinus curtatus	2
15	Sierra Nevada red fox	Vulpes vulpes necator	2
BIRDS			
1	Northern goshawk	Accipiter gentilis	2
2	Ferruginous hawk	Buteo regalis	2
3	Western snowy plover	Charadrias alexandrinus nivosus	2
4	Mountain plover	Charadrius montanus	2
5	Black tern	Chlidonias niger	2
6	Harlequin duck	Histrionicus histionicus	2
7	Western least bittern	Ixobrychus exilis hesperis	2
8	Loggerhead shrike	Lanius ludovicianus	2
9	Long-billed curlew	Numenius americanus	3C
10	Mountain quail	Oreortyx pictus	2
11	White-faced ibis	Plegadis chihi	2
12	Columbian sharptailed grouse	Tympanuchus phasianellus columbianus	2
REPTILES			
1	Northwestern pond turtle	Clemmys marmorata marmorata	2
2	Chuckwalla	Sauromalus obesus	2
AMPHIBIANS			
1	Arizona southwestern toad	Bufo microscaphus microscaphus	2
2	Amargosa toad	Bufo nelsoni	2
3	Mountain yellow-legged frog	Rana muscosa	2
4	Relict (and Vegas Valley) leopard frog	Rana onca (including R. fisheri)	3A
5	Spotted frog	Rana pretiosa	2
FISHES			
1	Wall Canyon sucker	Catostomus sp.	2
2	Meadow Valley Wash desert sucker	Catostomus clarki ssp.	2
3	White River desert sucker	Catostomus clarki intermedius	2
4	Flannelmouth sucker	Catostomus latipinnis	2
5	Preston White River springfish	Crenichthys baileyi albivallis	2
6	Moapa White River springfish	Crenichthys baileyi moapae	2
7	Moorman White River springfish	Crenichthys baileyi thermophilus	2

8	Alvord chub	Gila alvordensis	3A
9	Big Smoky Valley tui chub	Gila bicolor ssp.	2
10	Dixie Valley tui chub	Gila bicolor ssp.	2
11	Fish Lake Valley tui chub	Gila bicolor ssp.	2
12	Hot Creek Valley tui chub	Gila bicolor ssp.	2
13	Pleasant Valley tui chub	Gila bicolor ssp.	2
14	Railroad Valley tui chub	Gila bicolor ssp.	2
15	Fish Creek Spring tui chub	Gila bicolor euchila	2
16	Sheldon tui chub	Gila bicolor eurysoma	2
17	Newark Valley tui chub	Gila bicolor newarkensis	2
18	Lahonton Creek tui chub	Gila bicolor obesa	2
19	Roundtail chub	Gila robusta	2
20	Virgin spinedace	Lepidomeda mollispinis mollispinis	2
21	Alvord cutthroat trout	Oncorhynchus clarki ssp.	3A
22	Bonneville cutthroat trout	Oncorhynchus clarki utah	2
23	Warner Valley redband trout	Oncorhynchus mykiss ssp.	2
24	Interior redband trout	Oncorhynchus mykiss gibbsi	2
25	Relict dace	Relictus solitarius	2
26	Diamond Valley speckled dace	Rhinichthys osculus ssp.	2
27	Meadow Valley Wash speckled dace	Rhinichthys osculus ssp.	2
28	Monitor Valley speckled dace	Rhinichthys osculus ssp.	2
29	Oasis Valley speckled dace	Rhinichthys osculus ssp.	2
30	White River speckled dace	Rhinichthys osculus ssp.	2
31	Moapa speckled dace	Rhinichthys osculus moapae	2
32	Pahranagat speckled dace	Rhinichthys osculus velifer	2
33	Bull trout	Salvelinus confluentus	2
INVERTEBRATES			
Clams & Mussels			
1	California floater (mussel)	Anodonta californiensis	2
Snails			
1	Moapa pebblesnail	Fluminicola avernalis	2
2	Pahranagat pebblesnail	Fluminicola merriami	2
3	Schell Creek mountainsnail	Oreohelix nevadensis	2
4	Crystal Spring springsnail	Pyrgulopsis crystalis	2
5	Ash Meadows pebblesnail	Pyrgulopsis erythropoma	2
6	Fairbanks springsnail	Pyrgulopsis fairbanksensis	2
7	Elongate-gland springsnail	Pyrgulopsis isolatus	2
8	Oasis Valley springsnail	Pyrgulopsis micrococcus	2
9	Distal-gland springsnail	Pyrgulopsis nanus	2
10	Median-gland Nevada springsnail	Pyrgulopsis pisteri	2
11	Sportinggoods tryonia	Tryonia angulata	2
12	Grated tryonia	Tryonia clathrata	2
13	Point of Rocks tryonia	Tryonia elata	2
14	Minute tryonia	Tryonia ericae	2
15	Amargosa tryonia	Tryonia variegata	2
Stoneflies			
1	Lake Tahoe benthic stonefly	Capnia lacustra	2
Grasshoppers and Allies			
1	Desert monkey grasshopper	Psychomastix deserticola	2
True Bugs			
1	Amargosa naucorid	Pelocoris shoshone	2
Beetles			
1	Crescent Dune aegialian scarab beetle	Aegialia crescenta	2
2	Hardy's aegialian scarab beetle	Aegialia hardyi	2
3	Large aegialian scarab beetle	Aegialia magnifica	2
4	Death Valley agabus diving beetle	Agabus rumppi	2

5	Crescent Dune aphodius scarab beetle	Aphodius sp.	2
6	Big Dune aphodius scarab beetle	Aphodius sp.	2
7	Sand Mountain aphodius scarab beetle	Aphodius sp.	2
8	Rulien's miloderes weevil	Miloderes rulieni	2
9	Guiliani's dune scarab beetle	Pseudocotalpa guilianii	2
10	Sand Mountain serican scarab beetle	Serica sp.	2
11	Crescent Dune serican scarab beetle	Serica sp.	2
13	Devil's Hole warm spring riffle beetle	Stenelmis calida calida	2
14	Moapa warm spring riffle beetle	Stenelmis calida moapa	2

Butterflies & Moths

1	Carson Valley wood nymph butterfly	Cercyonsis pegala ssp.	2
2	White River wood nymph butterfly	Cercyonsis pegala ssp.	2
3	Spring Mountains acessstus checkerspot	Chlosyne acastus	2
4	Baking Powder Flat blue butterfly	Euphilotes battoides ssp.	2
5	Dark blue butterfly	Euphilotes enoptes ssp.	2
6	Sand Moutain blue butterfly	Euphilotes rita ssp.	2
7	Mattoni's blue butterfly	Euphilotes rita mattoni	2
8	Morand's checkerspot butterfly	Euphydryas anicia morandi	2
9	Mono checkerspot butterfly	Euphydryas editha monoensis	2
10	Spring Mountain comma skipper	Hesperia comma ssp.	2
11	White Mountains skipper	Hesperia miriamae	2
12	Railroad Valley skipper	Hesperia uncas ssp.	2
13	MacNeill sooty wing skipper	Hesperopsis gracielae	2
14	Nevada viceroy	Limenitus archippus lahontani	2
15	Nevada admiral	Limenitus weidemeyerii nevadae	2
16	White Mountains copper butterfly	Lycaena rubicus ssp.	2
17	Steptoe Valley crescentspot butterfly	Phyciodes pascoensis	2
18	White Mountains icarioides blue butterfly	Plejebus icarioides ssp.	2
19	Spring Mountains icarioides blue butterfly	Plejebus icarioides ssp.	2
20	White Mountains saepiolus blue butterfly	Plejebus saepiolus ssp.	2
21	Spring Mountains blue butterfly	Plejebus shasta charlestonensis	2
22	White Mountains sandhill skipper	Polites sabuleti albomontana	2
23	Denio sandhill skipper	Polites sabuleti sinemaculata	2
24	Wandering skipper	Pseudocopaeodes eunus eunus	2
25	Grey's silverspot butterfly	Speyeria atlantis greyi	2
26	Carson Valley silverspot butterfly	Speyeria nokomis ssp.	2
27	Carole's silverspot butterfly	Speyeria zerene carolae	2

Ants, Bees, & Wasps

1	Redheaded sphecid wasp	Eucerceris ruficeps	2

PLANTS *

1		Angelica scabrida	2
2	Meadow pussytoes	Antennaria arcuata	2
3		Antennaria soliceps	2
4	Bodie Hills rock-cress	Arabis bodiensis	2
5		Arabis falcatoria	2
6		Arabis falcifructa	2
7		Arabis ophira	2
8	Boundary Peak rock-cress	Arabis pinzlae	2
9	Carson Range rock-cress	Arabis rigidissima demota	2
10	Tiehm's rock-cress	Arabis tiehmii	2
11	Desert poppy	Arctomecon californica	2
12	White bear desert poppy	Arctomecon merriamii	2
13		Arenaria kingii rosea	2
14	Eastwood's milkweed	Asclepias eastwoodiana	2
15		Astragalus aequalis	2
16		Astragalus anserinus	2
17	Beatley milk-vetch	Astragalus beatleyae	1
18		Astragalus eurylobus	2
19	Black wooly-pod	Astragalus funereus	2

20	Sodaville milk-vetch	Astragalus lentiginosus sesquemetralis	1
21	Curve-podded mojave milkvetch	Astragalus mohavensis hemigyrus	2
22		Astragalus musimonum	2
23		Astragalus oophorus clokeyanus	1
24	Lavin's milk-vetch	Astragalus oophorus lavinii	2
25		Astragalus oophorus lonchocalyx	2
26	Spring Mountain milk-vetch	Astragalus remotus	2
27	Robbins milk-vetch	Astragalus robbinsii occidentalis	2
28		Astragalus solitarius	2
29	Tiehm's milk-vetch	Astragalus tiehmii	2
30		Astragalus triquetrus	2
31		Astragalus uncialis	2
32	Osgood Mountain milk-vetch	Astragalus yoder-williamsii	2
33	Knapp's brickelia	Brickellia knappiana	3B
34	Alkali mariposa	Calochortus striatus	2
35		Camissonia megalantha	2
36	Monte Neva paintbrush	Castilleja salsuginosa	1
37		Chrysothamnus eremobius	2
38		Collomia renacta	2
39	Tecopa bird's beak	Cordylanthus tecopensis	2
40	Hoffmann's cryptantha	Cryptantha hoffmannii	3C
41	Catseye	Cryptantha insolita	2
42	Schoolcraft's cryptantha	Cryptantha schoolcraftii	2
43	Welsh's cryptantha	Cryptantha welshii	2
44	Bodie Hills draba	Cusickiella quadricostata (=Draba q.)	2
45		Cymopterus goodrichii	2
46		Cymopterus nivalis	3C
47		Cympoterus ripleyi saniculoides	2
48		Draba arida	2
49		Draba jaegeri	2
50		Draba paucifructa	2
51	Nevada waterweed	Elodea nevadensis	3B
52	Nevada willowherb	Epilobium nevadense	2
53	Fleabane	Erigeron latus	2
54		Erigeron ovinus	2
55	Mono buckwheat	Eriogonum ampullaceum	2
56		Eriogonum anemophilum	2
57		Eriogonum argophyllum	1
58	Forked buckwheat	Eriogonum bifurcatum	2
59	Crosby's buckwheat	Eriogonum crosbyae	2
60	Holmgren's buckwheat	Eriogonum holmgrenii	2
61		Eriogonum lewisii	2
62		Eriogonum lobbii robustum	2
63	Prostrate buckwheat	Eriogonum prociduum	3C
64	Tiehm's buckwheat	Eriogonum tiehmii	2
65		Eriogonum viscidulum	2
66	Hot Springs fimbristylis	Fimbristylis spadicea	3B
67	Clokey's forsellesia	Forsellesia clokeyi	2
68	Smooth pungent forsellesia	Forsellesia pungens glabra	2
69		Frasera gypsicola	2
70		Frasera pahutensis	2
71	Large-petaled ash	Fraxinus cuspidata macropetala	3B
72	Kingston bedstraw	Galium hilendiae kingstonense	2
73		Haplopappus alpinus	2
74		Haplopappus graniticus	2
75		Helianthus deserticola	3B
76		Ivesia cryptocaulis	2
77		Ivesia jaegeri	2
78	Pine Nut Mountains ivesia	Ivesia pityocharis	2
79	Grimy ivesia	Ivesia rhypara rhypara	2
80	Webber's ivesia	Ivesia webberi	2
81		Jamesia tetrapetala	2

82		Leptodactylon glabrum	2
83		Lewisia maguirei	2
84	Holmgren's lupine	Lupinus holmgrenanus	3B
85		Machaeranthera laetevirens	2
86	Smooth stickleaf	Mentzelia mollis	2
87	Packard's stickleaf	Mentzelia packardiae	2
88		Opuntia whipplei multigeniculata	1
89	Nevada oryctes	Oryctes nevadensis	2
90	White margined penstemon	Penstemon albomarginatus	2
91		Penstemon arenarius	2
92		Penstemon bicolor bicolor	2
93		Penstemon bicolor roseus	2
94	Tunnel Spring beardtongue	Penstemon concinnus	2
95		Penstemon floribundus	2
96	Amargosa penstemon	Penstemon fruticiformis amargosae	2
97		Penstemon pahutensis	2
98		Penstemon pudicus	2
99	Beatley phacelia	Phacelia beatleyae	2
100		Phacelia inconspicua	2
101	Mono phacelia	Phacelia monoensis	2
102		Phacelia nevadensis	3B
103	Combleaf	Polyctenium williamsiae	1
104	Soldier Meadows cinquefoil	Potentilla basaltica	1
105		Potentilla cottamii	2
106		Primula capillaris	2
107		Primula nevadensis	2
108	Tahoe yellow-cress	Rorippa subumbellata	1
109		Salvia dorrii blainei	2
110	Blaine's fishhook cactus	Sclerocactus blainei	2
111	Schlesser's fishhook cactus	Sclerocactus schlesseri	2
112		Selaginella utahensis	2
113		Silene clokeyi	2
114	Jan's catchfly	Silene nachlingerae	2
115	Jone's globemallow	Sphaeralcea caespitosa	2
116		Sphaeromeria compacta	1
117	Ash Meadows lady's tresses	Spiranthes infernalis	2
118	Masonic Mountain jewelflower	Streptanthus oliganthus	2
119	Tiehm's stroganowia	Stroganowia tiehmii	2
120	Kittentails	Synthyris ranunculina	1
121		Townsendia jonesii tumulosa	2
122		Townsendia sp.	3B

* Includes 1990 revision to category 3B and 3C for those taxa listed as category 2 in the 1985 Plant Notice of review which were changed in the 1990 Plant Notice of Review.

Category 1: Taxa for which the Service currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened species.

Category 2: Taxa for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

Category 3A: Taxa for which the Service has persuasive evidence of extinction. If rediscovered, however, such taxa might warrant high priority for addition to the List of Endangered and Threatened Wildlife.

Category 3B: Names that, on the basis of current taxonomic understanding (usually as represented in published revisions and monographs), do not represent distinct

taxa meeting the Endangered Species Act's definition of "species." Such supposed taxa could be reevaluated in the future on the basis of new information.

Category 3C: Taxa that are no longer being considered for listing as threatened or endangered species. Includes taxa that have been proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat(s).

Letter 4

June 4, 1994
P.O. Box 1332
McGill, Nv. 89318

Dan Netcher, EIS Team Leader
Bureau of Land Management
Ely District
HC 33 Box 33500
Ely, Nevada 89301

Dear Mr. Netcher,

I have just completed reading the EIS Draft of the Robinson Project and discussed it with my co-owners. Our family and business partners are the owners of Stillwater #1 (patented mining claim) and the Blue Sky mining claim (unpatented) which are to the east of the Liberty Pit and the immediate south border of the Star Pointer Pit. 4-1 The Star Pointer Pit is a major excavation located between the Liberty Pit and the Ruth Pit in section 15. For some reason this pit has been omitted from the photograph and all maps in the EIS Draft. Was there a reason for this omission?

4-2 The proposals to place the tailings within the Liberty Pit will have a negative impact on the quality of the water table beneath our property. Since Stillwater #1 borders the Liberty Pit it may be the first to be affected by the contamination. Since this property is patented we own the mineral and riparian rights beneath its surface. We believe that placing tailings within the Liberty Pit or the Star Pointer Pit should that become another option would be detrimental to us.

4-3 The EIS Draft indicates that the proposal to place the tailings in the Giroux Wash would be less likely to contaminate the underground water table. This option would not harm us and would also leave the Liberty Pit open to future mining which would enhance the county's economy beyond the estimated 15 years.

4-4 Another matter of concern to us is the closure of County Road 1146 that runs along the east side of the Keystone Dump requiring that traffic use the existing road along the west side of the dump. The east route is in much better condition than the west route. The west route has numerous pot holes as the result of approximately 30 years of neglect. Our family and partners have owned property and businesses in both Old Ruth and Riepetown. Our use of County Road 1146 goes back to 1906. We realize the closure of County Road 1146 is necessary for safety reasons but we believe the west road through New Ruth should be considerably improved and maintained properly in the future. Perhaps the west side route can be resurfaced before the east portion is closed.

Sincerely,

George Giannopulos

x.c. White Pine County Commission
Daniel J. Turk (Magma operations manager)

Response to Letter 4

4-1 There are a large number of named features (pits and dumps) within the Robinson Mining District. For sake of clarity, not all features were labeled on the figures and maps presented in the Final EIS. Figure 1-1 shows the extent of existing disturbance within the District, while Map 1-3 shows the major features that are mentioned in the Final EIS or may be familiar to people who have visited the area. As you indicate, the Star Pointer Pit and Dumps are located southwest of Ruth Pit within the area of the existing disturbance.

4-2 Please refer to Map 4-5 for the area of influence of tailings disposal in Liberty Pit. From your description of the location of the Stillwater #1 and Blue Sky mining claims (southwest of Ruth Pit), the groundwater mound (i.e., area of influence) would not reach these claims.

4-3 Comment noted.

4-4 Please refer to Section 2.2.7.1 on page 2-19 and Section 4.1.13.1 on page 4-79 in the Final EIS for a discussion of County Road 1146. The existing section of County Road 1146 that runs along the west side of the Keystone Dump and passes through the east end of Ruth, would be upgraded and maintained to White Pine County road standards and would remain open to traffic throughout the life of the mine. The necessary reconditioning and upgrading of the west side route would be completed prior to the east side closure.

Letter 5

Komatsu Dresser Company

May 31, 1994

Mr. Dan Netcher, EIS Team Leader
Bureau of Land Management
Ely District
HC 33, Box 33500
Ely, NV 89301

Dear Mr. Netcher:

We recommend the approval of the Robinson Mining project, Ely, Nevada, because 908 direct and indirect employees will have employment. Further, the employees will pay local and federal taxes on their incomes from the Robinson project.

Also, I am impressed that the tailings would involve use of the Liberty Pit after mining in the pit is completed in approximately seven years.

Robinson Mine will use large haulage trucks (240-ton capacity) that have environmentally friendly diesel engines equipped with the latest controls.

In summary, we recommend the approval of the Robinson Mining project because Magna Nevada Mining Company is a serious and environmentally correct company.

Sincerely,

Joseph W. Fischer

Joseph W. Fischer
Account Manager
Western Division Sales

JWF:am

Komatsu Dresser Company Haulpak Division P.O. Box 240, Peoria, IL 61650-0240 USA (309)672-7000 Telex 275084 FAX 309-672-7271

Response to Letter 5

Thank you for your letter. No response necessary.

Letter 6

Pioneer Equipment
SERVING MINING & CONSTRUCTION — RENO · ELY

RENO
P.O. BOX 11737
RENO, NEVADA 89510
900 MARIETTA WAY
SPARKS, NEVADA 89431
TELEPHONE (702) 356-1334
FAX: (702) 356-2117

ELKO
P.O. BOX 5130
ELKO, NEVADA 89802
4460 PIONEER WAY
ELKO, NEVADA 89802
TELEPHONE (702) 753-7557
FAX: (702) 753-7561

May 31, 1994

Bureau of Land Management
Ely District
HC 33 Box 33500
Ely, NV 89801

Attention: Dan Netcher - EIS Team Leader

Dear Sir,

I would like to submit for the record the following statement in regards to the DEIS - Robinson Mining Project.

We have a business that sells and services mining equipment. We operated our business in Ely, Nevada from 1962 to 1977. We had to close when the Kennecott operation shutdown.

Our company has a shop/parts building in Ely, Nevada. It is presently not being used by us due to the lack of surface mining operations to support the economics of such.

If the Magma Nevada Mining Company starts mining operations in the Robinson District, it is our intention to reactivate our business in the Ely area.

Yours truly,

Ronald Gash
President

RG:cja

Response to Letter 6

Thank you for your letter. No response necessary.

Letter 7

SIERRA CLUB

Toiyabe Chapter — Nevada and Eastern California
P.O. Box 8096, Reno, Nevada 89507

June 7, 1994

Bureau of Land Management
Ely District
Dan Netcher, EIS Team Leader
HC 33 Box 33500
Ely, NV 89301

Dear Mr. Netcher:

These comments are in regard to the Draft Environmental Impact Statement (DEIS) on the Robinson Mining District. Additional comments from Sierra Club may be submitted prior to the end of the comment period.

In general, the DEIS is a substantially more complete analysis than what was presented in the EA. I appreciate the level of commitment from the BLM on completion of the DEIS, and also the discussions with Tim Dyher of Magma and Andy Davis of PTI.

7-1 1. **Reclamation:** The discussion on reclamation provides a reasonable approach to reclamation. It is entirely unclear as to how the BLM will enforce these standards. As written, the standards are very weak and effectively unenforceable. Some areas will be revegetated, but where it is difficult, all the company is required to do is to do a minimal amount of preparation of the "growth medium" (which has no soil standards), fertilize and plant some seeds. If the efforts fail, the BLM will be compelled to accept the failure. Because the mine is likely to last for 15 years or more, few if any of the BLM staff presently in Ely are likely to be at the District when reclamation is occurring. You perhaps should read the reclamation plan as a person who was not part of the permitting discussions, and then ask yourself the simple questions of what standards are enforceable with all of the wiggle language present. Clear and enforceable standards do not exist. The BLM can expect only the good intentions that may exist with Magma when the mine is closing down and no longer
7-1 cont'd producing a profit for the company. Why not simply state that if Magma cannot meet the standard for revegetation, the bond will be forfeited for that portion of the mined site? That cost is a small percentage of the overall production of the mine, but the BLM will be in a much stronger position for discussions when future regulators are assessing the success of reclamation. Otherwise, the basically sound reclamation

Response to Letter 7

7-1 BLM disagrees with the comment that reclamation standards are very weak and effectively unenforceable. The standards are consistent with BLM and State of Nevada standards. The final reclamation plan has been reviewed and would be approved by the BLM and the Nevada Division of Environmental Protection (NDEP), Bureau of Mining Regulation and Reclamation. The comment is correct that if RMLP did not meet the standards for revegetation, its reclamation bond would be forfeited for that portion of the mined site and used to perform needed reclamation.

Letter 7 Continued

plan can be effectively ignored.

One of the mitigations mentioned is to develop test plot programs to evaluate reclamation techniques. This is a good idea, but as discussed above, is meaningless unless there is a plan for implementation. The BLM has a history of mentioning plot plans in environmental documents that have not been carried out, or have been conducted in a manner that does not provide useful information. Again, good intentions and promises do not, by themselves, constitute mitigation. The decision should set clear timelines and requirements for test plot work. Lack of progress in this area on public lands should constitute a violation and be subject to revocation of the bond so that the BLM can contract out those plot studies. 7-2

7-3 2. **Water Quality:** The water seeping into the subsurface system under the Giroux Wash is predicted to be elevated for sulfate and TDS. Based on my reading of the water quality regulations of the State of Nevada, this level of contamination is not acceptable. The regulations do not distinguish between primary and secondary standards, and simply require that discharges to groundwater must meet all state and federal water quality standards.

The term "point of compliance" is not described in the regulations and, perhaps, only a term which allows the unlined impoundment to be placed. Basically, the unlined tailings impoundment is a source of water contamination, and should be regulated at the discharge point, which is the tailings fluids themselves, or the fluids which occur at the bottom of the impoundment, immediately prior to entering the subsurface soils or geologic material.

With all due respect to the State of Nevada, it appears that the regulations are being ignored, and the regulators are not following the law. The BLM has the co-responsibility to follow both federal and state regulations. Even if the State of Nevada misinterprets the regulations, the BLM should protect those public resources. The BLM should consult with the Interior Solicitor and the United States Environmental Protection Agency as to the correct interpretation of the regulations and the water chemistry of the site.

The "what if" questions should also be answered. Assuming that the modelling effort of PTI is correct, the water quality in the pits, and the drainage from the waste rock dumps should not be a problem. The study is a very thorough analysis, and the following comments are not meant in any way of negative criticism of this excellent study. However, modelling pit water quality is an inexact science and some of the

7-4 waste rock and at least two of the pits had water quality which was poor. If the modelling efforts turn out to be incorrect, what will the BLM do if the pit water turns poor, or if the Giroux Wash impoundment contains materials which violate <u>primary</u> water quality standards, or if acid drainage occurs? It is not sufficient to state that the problem will be mitigated, since that term is not defined. When a water quality problem arises, the BLM should get an agreement from Magma that the problem will

Response to Letter 7

7-2 Within the Egan Resource Area, there are currently two established test plot programs for mining reclamation; however, data from the test plots are not yet available. A draft of RMLP's Reclamation Plan is currently being reviewed. The final Reclamation Plan will be appended to the Plan of Operations (POO). The Robinson Project POO (BLM N46-92-004P) and Nevada State Reclamation Permit (No. 0021) both provide that during mine operations, a reclamation test plot program would be developed within 12 months of project approval to determine successful reclamation methods and procedures to be implemented for ultimate reclamation of the project. RMLP's *Reclamation Test Plot Program* is intended to provide, initially, specific plans for such a program (see Section 2.2.15.1). The program would be evaluated continuously during its implementation and modified to reflect the results of previous test plots and changing conditions at the project. Following project approval from the BLM, RMLP proposes to form an advisory team to develop additional detail for the test plot program and to provide technical expertise to meet various land use objectives. An initial meeting would be held in the last quarter of 1994, and an additional meeting in June 1995, subsequent to completion of field inventories of historic disturbances and preliminary reclamation test plot site selection. Subsequent meetings would be held as warranted. The proposed Project Advisory Team would include representatives from the BLM, Ely District Office; NDEP, Bureau of Mining Regulation and Reclamation; and Nevada Division of Wildlife (NDOW), in addition to representatives from RMLP. A field inventory of historically disturbed sites would be performed between August and November 1994 and a report and maps prepared by March 1, 1995. Subsequent to the initial meeting of the Project Advisory Team and completion of the field inventory, sites would be identified for incorporation into the test plot program. Preliminary site selection should be made by April 1995, and field confirmation of sites conducted in June 1995. Initial test plots need to be confirmed by July 1995.

7-3 The commenter states that the "level of contamination from water seeping into the subsurface system under Giroux Wash is not acceptable" based upon "state and federal water quality standards;" however, the State of Nevada has made a determination to issue a water pollution control permit for the Robinson Project. That permit was subject to public review and was available for appeal to the State Environmental Commission, as provided for under the statutory authority of the State to regulate groundwater. A copy of the permit is included as Appendix B of the Robinson Project POO.

The regulation of groundwater resources should be, and was, applied on a site-specific basis, considering existing groundwater resources and quality, depth to groundwater, geologic conditions and surrounding uses. Based on those factors, on July 15, 1993, NDEP issued Water Pollution Control Permit Number NEV92105 to RMLP. Pursuant to the terms of that permit, tailings solution samples may not exceed during any three consecutive months primary and secondary drinking water standards at the outfall(s) into the tailings impoundment, except that the limitations are modified for total dissolved solids (2,000 mg/l), sulfate (1,500 mg/l), and pH (6 S.U.). The permit further requires compliance with primary and secondary drinking water standards at monitoring well WCC-G1 (the downstream point of compliance), as assessed through quarterly sampling at that monitoring well.

Letter 7 Continued

7-4 be stopped within a reasonable period (90 days) or that the bond for reclamation will be revoked to allow the BLM to begin remediation. Without such ability, the BLM will simply issue notices of violation and the problem is likely to last for a very long time. The record of the State in enforcement of water quality regulations is also weak, particularly in regard to groundwater contamination. The BLM needs to establish clear operating procedures for enforcement when those violations occur.

3. **Heap Decommissioning** Based on a reading of the DEIS, the copper heaps will not be neutralized, and will present a long-term reservoir for potential contamination.

7-5 Although problems may not occur in the near future, the BLM and the State of Nevada should ponder questions of long term liability, management and public safety regarding these heaps. The State effectively has no standards for heap decommissioning, and the BLM is deferring to the state those questions. Whether these heaps are on public or private lands makes little difference. For the time period these heaps will exist, all land should be considered public land.

Thanks for the opportunity to comment on this DEIS. I wish to commend the BLM, the consultants and Magma for this study. The above comments remain substantial concerns, particularly regarding the ability of the BLM to enforce the regulations; however, the product produced from your efforts has substantially increased the understanding of the site and is a significant contribution towards improving the BLM's analysis of large mines.

Sincerely,

Glenn C. Miller

Response to Letter 7

7-4 The models used to conduct the analysis at Robinson were the most appropriate available. The analysis performed was based upon substantial site-specific data collected during preparation of the EIS. Modeling was performed in consultation with technical experts from the BLM and NDEP. Though the model can predict the future quality of water in the pits only within the limits of accuracy, there is a preponderance of evidence that the water quality in the pits would improve substantially. Field studies indicate that the existing poor water quality in pits is the result of historic process leaching in the pits and the contact of process leached materials and residual solutions in the pits with pit water, rather than exposure of native geologic materials generating acid through natural biological and geochemical oxidation. Such activities are not proposed for future operations. There is no evidence, either from field investigations, numerous laboratory tests, or modeling analyses that were performed, that suggest the pit water quality would "turn poor." Furthermore, a rigorous sensitivity analysis was conducted on the pit water quality model. Such an analysis varies the parameters used in the model, in particular the nature of the rock that would influence acid generation. The sensitivity analysis further supports the evidence that acid formation is not likely to occur in the post-mining pit lakes.

With regard to Giroux Wash, field investigations, laboratory tests, and modeling were performed to analyze the potential for such problems to develop, none of which indicated that any *primary drinking* water quality standards would be exceeded or that acid would form. Laboratory column tests were performed using actual tailings generated from metallurgical bench tests and actual soil materials collected in the Giroux Wash area. These laboratory tests showed no evidence that the elements included under primary drinking water standards would migrate out of the tailings and affect groundwater. The geochemical analysis, which applied widely accepted scientific evidence on the geochemistry and mobility of these constituents, also showed that they would not be mobile and affect groundwater resources.

With regard to acid drainage in the tailings impoundment, kinetic laboratory tests of actual tailings showed no evidence of acid formation in the tailings, much less acid drainage. The commenter is referred to specific sections on pit water quality and Giroux Wash in the detailed technical report, *The Hydrogeochemistry of the Robinson Project, White Pine County, Nevada*, which provides substantial detail on the studies performed.

With regard to mitigation of potential problems, RMLP is required by the State of Nevada to comply with the terms of its water pollution control permit, which requires monitoring, and to notify NDEP and BLM if it is out of compliance. The State has the authority, which it has exercised in the past, to require corrective actions. Clear operating procedures for enforcement are well established by state regulation, including the State's authority to issue a cease and desist order, and penalties. See also Response to Comment 35-7.

7-5 The BLM and the State of Nevada are concerned about the long-term liability, management, and public safety of the heaps as well as all other components of the project. As the commenter noted, closure requirements would be the same "whether the heaps are on private or public lands". The NDEP, as the agency with primary jurisdiction of construction, operation, and closure of mineral processing components, requires the same detailed plan for closure of such facilities and applies the same standard. State regulations are set up such that a plan for permanent closure must be developed based upon actual, site-specific conditions, including the nature of the facility and the environmental conditions at the site (including climate, topography, geology, surface and groundwater resources). The regulations recognize the need to characterize the actual conditions of a heap, as a process component, in the context of the above factors, prior to closure.

Letter 8

EDWARD P. JUCEVIC, P.E.
Mining and Metallurgical Engineer
P.O. BOX 21097, RENO, NV 89515
(702) 355-7022

7 June 1994

Bureau of Land Management
Ely District
Dan Netcher, EIS Team Leader
HC 33 Box 33500
Ely, NV 89301

May concern:

Re: Robinson Mining District Draft Environmental Impact Statement

The following comments transmit in writing my oral remarks made at the May 25 public meeting at the Peppermill Hotel in Reno. Overall I found the quality and thoroughness of the DEIS to be excellent. The benefits of this project for Ely, White Pine County, the State of Nevada and the United States will be large. However, I believe that mandating the disposal of tailings in the Liberty pit and the consequent loss of about one billion pounds of recoverable copper and an estimated almost 400 thousand ounces of gold to be against the best interests of the people of the Country.

I base my conclusions on over 35 years of involvement in the international mining industry as well as my being a supporter of the Nature Conservancy and a member of the Sierra Club. I have taught resource technology for ten years in two major Western universities and have been an instructor in various BLM and USFS resource related courses. I have also lived and worked in Ely and White Pine County although I have never worked in the Robinson Mining District nor have I ever worked for Magma.

To reach these conclusions I spent two afternoons in the BLM Nevada State office reviewing the Robinson Project - Draft EIS, the Robinson Mining Limited Partners Plan of Operations, and the Hydrochemistry of Robinson Project Report.

8-1 Based on my reviews and experience I find the reports well done and comprehensive and that they thoroughly address the pertinent environmental questions. I would recommend that the DEIS be accepted for the final EIS with the following exception: It would be a mistake to mandate the agency preferred alternative for tailings disposal, the Liberty Pit Alternative, Scenario 4 (or any of the other Liberty Pit disposal scenarios, 1 thru 6). The agency preferred alternatives for reclamation (nos. 3, 5, and 7) are good and should remain.

Response to Letter 8

8-1 Comment noted.

8-1

The reasons for opposition to mandating the Liberty Pit Alternatives are as follows (also see attached calculations):

- The Liberty Pit Alternative if mandated would most likely bury forever about one billion pounds of recoverable copper and about four hundred thousand ounces of recoverable gold. At current prices ($1.05/ lb Cu & $385/ oz Au) this amounts to about $1.2 billion.

- The value of the land left undisturbed by mandating the Liberty Pit Alternative is estimated to be about $33,000.

- Although the gross value of the potential resource being lost should not be directly compared to the value of the land being used, the fact that the ratio is 37,000 to 1 strongly suggests that the copper and gold resource will be more valuable to the people of the United States.

- Within the State of Nevada there is an enormous additional resource of land similar to that which would be used; however, the occurrence of a similar copper & gold deposit is an extreme rarity.

It could be debated that the copper and gold bearing material is currently considered sub-ore (it is not considered economic to mine under current conditions) and therefore worthless but this argument is unsound. Most of the 6.5 billion pounds of copper mined between 1908 and 1978 was sub-ore with the technology of the 1800's. The 292 million tons of ore that will be mined by the Robinson Project was sub-ore when the mine closed in 1978. What is sub-ore today will likely be economic ore some time in the future.

8-1 cont'd

Consequently, I must conclude that approving the majority of the DEIS for use in the final EIS would be a wise decision. However, mandating any of the Liberty Pit Tailings Disposal Alternatives would not be in the best interests of the citizens of this Country.

Yours truly,

Edward P. Jucevic, P.E.

encl:

**ROBINSON PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT
LIBERTY PIT TAILINGS DISPOSAL ALTERNATIVE
ANALYSIS**

EP Jucevic, May 1994

Basis: (DEIS p 4-90) sub-ore to be left in the Liberty pit:

60 mil. ton sulfide at 0.54% Cu
60 mil. ton sulfide at 0.30% Cu
21 mil. ton oxide at 0.28% Cu
71 mil. ton at 0.009 oz Au/ton

Assumptions:

Metallurgical recovery expected for above materials:
(based on EPJ experience)

Higher grade sulfide (0.54% Cu)	=	93 %
Lower grade sulfide (0.30% Cu)	=	90 %
Oxide copper material (0.28% Cu)	=	80 %
Oxide gold material (0.009 oz Au/t)	=	60 %

Land saved from disturbance by mandating Liberty Pit tailings disposal:

Area: About 656 acre (from Table 2-11, p 2-68: 2,174 ac - 1,518 ac = 656 ac).

Value: about $50.00 per acre (based on EPJ experience).

Calculations:

Recoverable copper:

60 mil. ton x 0.54% x 20 lb/% x 0.93	=	603 mil. lb Cu
60 mil. ton x 0.30% x 20 lb/% x 0.90	=	324 mil. lb Cu
21 mil. ton x 0.28% x 20 lb/% x 0.80	=	94 mil. lb Cu
		1,021 mil. lb Cu

Recoverable gold:
71 mil. ton x 0.009 oz Au/ton x 0.60 = 383,000 oz Au

Approximate current value:

1,021 mil. lb Cu x $1.05/lb Cu	=	$1,072,000,000
383 K oz Au x $385/oz Au	=	147,000,000
		$1,219,000,000

Value of land not used by employing Liberty Pit for tailings disposal:
656 acre x $50 per acre = $33,000

Letter 9

Wayne Cameron
John A.Chachas
Julio C.Costello
Brent Eldridge
Claude Rose

White Pine County
Board of County Commissioners

Courthouse Annex
953 Campton St.
Ely, Nevada 89301
(702) 289-8841
Fax. (702) 289-8842

June 9, 1994

Bureau of Land Management
Ely District
Dan Netcher, EIS Team Leader
HC 33, Box 33500
Ely, Nevada 89301

RE: N46-92-004P 3809
(NV-040) (NV-930.1)

Dear Mr. Netcher,

The White Pine County Board of County Commissioners is pleased to support the Draft Environmental Impact Statement on the Robinson Project. The members of the County Commission have reviewed the Draft EIS, and during our meeting held June 8, 1994, we voted unanimously to submit comments noting that the document adequately addresses the potential impacts of the proposed action.

Based on our review, the Commission agrees that Chapter 3, the Affected Environment, provides an accurate description of White Pine County's current economy, work force, revenues available to local government, infra-structure, community facilities, and public services.

The analysis of Environmental Consequences offers a comprehensive view of the potential impacts the proposed action may have. The review of potential impacts on the ground water and surface water in the area is extensive, and the Commission agrees with the conclusion that the proposed action will not have a significant impact on the quality and quantity of water available in the communities of Ruth and Ely.

Response to Letter 9

Thank you for your letter. No response necessary.

Letter 9 Continued

Response to Letter 9

Bureau of Land Management
Ely District
Dan Netcher, EIS Team Leader
June 9, 1994
Page 2 of 2

The document details the cumulative impact of the Robinson Project in conjunction with other anticipated mining projects in the area and is in agreement with the County's assessment of its ability to meet the needs for housing and increased public services. The Commission feels that the Draft EIS adequately identifies the potential impacts to services funded through the County including road maintenance, law enforcement, judicial services, and solid waste management.

In conclusion, the Board of County Commissioners of White Pine wholeheartedly endorses the Draft Environmental Impact Statement on the Robinson Project. We would like to thank the Bureau of Land Management for the opportunity to participate in environmental review process as a cooperating entity. And, we urge the Bureau of Land Management to approve the Draft EIS and issue a decision allowing the Robinson Project to proceed.

Respectfully,

BOARD OF COUNTY COMMISSIONERS
COUNTY OF WHITE PINE

Julio Costello

Julio Costello,
Chairman

JC/dm

Letter 10

Bureau of Land Management
Ely District
Dan Netcher, EIS Team Leader
HC 33 Box 33500
Ely, NV 89301

Dear Sir:

CONGRESSIONAL DECLARATION OF NATIONAL ENVIRONMENTAL POLICY

"Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances, and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the federal government, in cooperation with state and local governments and other concerned public and private organizations, to use all practical means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." 42 U.S.C. 4331.

Having read the *Draft Environmental Impact Statement Robinson Project*, produced by the BLM, and the technical supporting document, *The Hydrogeochemistry of the Robinson Project, White Pine County, Nevada*, produced by PTI Environmental Services, I am taking this opportunity to comment on the adequacy of the aforementioned documents as they relate to the Congressional Declaration previously cited.

It is important to note how the decision affects a commentor. In their Appeal and Statement of Reasons of the decision to approve the Robinson Project Plan of Operations, May 29,1993, the Sierra Club and Mineral Policy Center stated that they have members who do or may use and enjoy public lands and water which will be affected by the decision. I agree, to such an extent, with the adequacy of their statement to establish their credentials to comment that I would like to make a similar declaration.

I and my family, unequivocally, state that we use public lands and water which will be affected by this decision. I am an employee of Magma whose livelihood and well being is dependent on your decision.

Having been to the site and reviewed the DEIS and technical support documents, it is apparent that the studies indicate that there will be a net environmental and economic improvement in the area if mining is allowed to proceed in this historic district. Specifically, I note the following:

1. Modelling results indicate that the ultimate water quality in all the pit lakes will be benign consisting of pH neutral $CaSO_4$-type waters. This is a significant improvement to the conditions that would continue to exist without project approval.

Response to Letter 10

Thank you for your letter. No response necessary.

Letter 10 Continued

2. Reclamation activities will be undertaken in the district if mining proceeds which would not be required if project approval is not forthcoming.

3. There is no adverse impact to the ground water in Giroux Wash. Sulfate levels in the monitoring well will always remain below the MCL's for drinking water and take hundreds of years to peak.

4. There is a lack of hydrologic communication between the Robinson District and Murry Springs, the city of Ely water supply.

5. Effluent waters from waste rock dumps are predicted to have a near neutral pH, and low metals and sulfate concentrations. Humidity cell experiments verified that generation of acidic effluent is unlikely.

6. 514 direct jobs will be required at the peak of the construction schedule.

7. 550 direct jobs will be required at full operation production of the plant generating an annual payroll of $18,700,000.

8. Including multipliers, local spending would increase by $22,350,056 per year.

9. Sales and use tax for the White Pine County would be approximately $670,502 per year. The mine would also generate sales and use tax revenue to the state and local government. Obviously, the federal government will realize increased tax collection on corporate and individual incomes. Other commercial and residential activity would occur as a result of this project which would contribute to the tax base.

10. Socioeconomic effects would be minimized by RMLP's actions to provide solutions for socioeconomic effects, i.e., the bond program, assuring adequate housing units for workers, assistance in school bond promotion, and allowing landfill equipment and supplies to be purchased with RMLP purchases. In dollar terms, RMLP will provide at least $931,000 in community needs.

If this project is deemed to do other than ..."to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans", then the fulfillment of the congressional intent in creating a National Environmental Policy will not be served.

Sincerely yours,

Richard E. Ott

Response to Letter 10

Letter 11

MT. WHEELER POWER, INC.

1600 SEVENTH STREET EAST • ELY, NEVADA

POST OFFICE BOX 1110
ELY, NEVADA 89301-1110

TELEPHONE (702) 289-8981
TELEFAX (702) 289-8987

June 9, 1994

Bureau of Land Management
Ely District Office
Mr. Dan Netcher, Team Leader
HC 33 Box 33500
Ely, NV 89301

Dear Mr. Netcher:

**RE: DRAFT
ENVIRONMENTAL IMPACT STATEMENT
ROBISON PROJECT**

I would like to commend you and your staff on the detailed amount of work that has been put into this study. I found the statement to be very thorough.

My main comments surface from what this project will improve.

The mining area has been mined for nearly 100 years. I see only improvement occurring from future mining. I am confident that Magma will improve the economy in White Pine County. Magma will bring back the pride this town has in the mining industry. Magma will have an impact on us, the people of White Pine County.

If the statement is lacking in any area, it is the message "White Pine County needs Magma". Please consider that all areas will provide the base for all environmental aspects.

Please also keep in mind the impact Magma will have on the area. Magma provides many the opportunity to remain in this area.

Remember, no one cares as much about White Pine County as the people who live in White Pine County.

Regards,

Jodi McKemy

Jodi McKemy
Member Services Coordinator

ms

"Your Rural Electric Cooperative"

Response to Letter 11

Thank you for your letter. No response necessary.

Letter 12

Jesse R. Murdock
207 East Grant Avenue
Ely, NV 89301

June 15, 1994

Bureau of Land Management Office
Mr. Dan Netcher, Team Leader
HC 33 Box 33500
Ely, NV 89301

Dear Mr. Netcher:

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT ROBISON PROJECT

I am writing in to comment on the Environmental Impact Statement concerning the new Magma-Robison Project.

I believe there has been a thorough investigation into all significant aspects and impacts affecting the area in question. I believe with all the previous mining impact in the area that a new mining operation with current laws could only improve the existing site.

I believe that the community presently is hurting economically and the Robison Project will once again bring back the pride and hope of the local residents.

My wife, three children and I moved to Ely 4 years ago from Montana and we have seen the economic hardship in the immediate area and believe that by allowing Magma to come in for the Robison Project that the community could once again get back on its feet. I have seen this in the local area as Project Engineer at Mt. Wheeler Power, Inc. and my wife has seen the impact to the White Pine School District as she is a school teacher in Ely.

Please consider the overall beneficial impact that Magma would bring to White Pine County and all of its residents.

Sincerely,

Jesse R. Murdock

Response to Letter 12

Thank you for your letter. No response necessary.

Letter 13

June 15, 1994

Bureau of Land Management Office
Mr. Dan Netcher, Team Leader
HC 33 Box 33500
Ely, NV 89301

Dear Mr. Netcher,

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT ROBISON PROJECT

Now that the EIS is complete and there are acceptable alternatives available for all of the environmental concerns. I would like to comment on the effect of this project to our community. Magma would add a much needed boost to the White Pine County economy. The job opportunities that this project would make available are very important to many families in White Pine County.

Please remember how important this project is to the people of White Pine County.

Sincerely,

Evelene Twitchell

Evelene Twitchell

Response to Letter 13

Thank you for your letter. No response necessary.

Letter 14

JUNE 14, 1994

MR. DAN NETCHER, BLM
HC 33 BOX 33500
ELY, NV 89301

DEAR MR NETCHER:

RE DRAFT EIS, ROBISON PROJECT:

MAGMA COPPER COMPANY MINING IN THE ROBISON MINING DIST WILL PROVIDE ADDITIONAL JOBS, PRODUCE COPPER METAL FOR THE NATION, IMPROVE GROSS NATIONAL PRODUCT, IMPROVE TAX BASE FOR WHITE PINE COUNTY, AND IN THE END IMPROVE THE ENVIROMENT. WHITE PINE COUNTY NEEDS MAGMA. THE BOTTOM LINE IS THAT EVERYONE GAINS INCLUDING THE ENVIORMENTALISTS, AND THEY DONT EVEN LIVE HERE. AS A RETIRED GENERAL MANAGER FOR KENNECOTT NEVADA MINES DIV, I CAN SEE NOTHING BUT GOOD COMING FROM MAGMA MINING IN WHITE PINE COUNTY.

SINCERELY,

GEORGE J. ALLEN

MCGILL, NV

Response to Letter 14

Thank you for your letter. No response necessary.

Letter 15

Bureau of Land Management Office
Mr. Dan Netcher, Team Leader
HC 33 Box 33500
Ely, Nv 89301

June 15, 1994

Dear Mr. Netcher:

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT ROBISON PROJECT

I would like of compliment you and your staff on the study that was prepared on behalf of the people of White Pine County. I feel the Environmental study address all the concerns that would effect me and my family.

I have lived here 13 years and have grown to love and appreciate the life style and the historic value of this county. Mining has a rich heritage with many peoples livelihood depending on this industry. I have yet to hear anyone complain about having a job in mining or the effect of mining on the environment. I suppose if they didn't like where they worked or lived they'd go somewhere else or pick another profession. If the environmentalist had there way we would not be allowed to disturb any soil. I'm surprise when God created this earth he placed the minerals in the ground why didn't he just make it flow in the streams or fall from the sky?

I have a hard time seeing the Bureau of Land Management denying a project that will come in and leave the county better than when they found it.

Please consider, Magma's importance to White Pine County, the jobs and opportunities for the people.

Sincerely,

Randy Ewell

Randy Ewell
Box 150583
East Ely, Nv. 89315
(702) 289-8572

Response to Letter 15

Thank you for your letter. No response necessary.

Letter 16

Bureau of Land Management Office
Mr. Dan Netcher, Team Leader
HC 33 Box 33500
Ely, NV 89301

Dear Mr. Netcher:

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT ROBISON PROJECT

I would like to commend you and your staff on the detailed amount of work that has been put into this study. I found the statement to be very thorough.

My main comments surface from what this project will improve. The mining area has been mined for nearly 100 years. The impact to the environment had occurred during those early mining years. I can see only improvement occurring from future mining. Mines are so regulated now that all environmental aspects are considered. The EIS has also weighed all those situations and offers acceptable alternatives.

I am confident that Magma will improve the economy in White Pine County. Magma will bring back the pride this town has in the mining industry. Magma will have an impact on us, the people of White Pine County.

If the statement is lacking in any area, it is the message "White Pine County needs Magma".

Please consider, Magma is important to regaining the stability White Pine once had. Magma will provide opportunities this area has not had for a long time.

Remember, no one cares as much about White Pine County as the people who live in White Pine County.

Regards,

Jerry R. Martin

Jerry R. Martin

Response to Letter 16

Thank you for your letter. No response necessary.

Letter 17

Response to Letter 17

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

June 15, 1994

Kenneth G. Walker
Bureau of Land Management
HC 33 Box 33500
Ely, NV 89301

Dear Mr. Walker:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the **Robinson Mine Project, White Pine County, Nevada.** Our comments are provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementation Regulations, and §309 of the Clean Air Act.

The DEIS evaluates a proposal by the Robinson Limited Mining Partnership (RMLP) to reinitiate copper mining activities at the project site. The project would involve construction and operation of new ore crushing facilities, copper and molybdenum concentrator, mill tailings disposal facility, heap leach pads and ponds, solvent extraction/electrowining plant, an electric transmission line, and a tailings slurry pipeline. The project would also include expansion of several pits and waste rock dumps and ancillary facilities.

We have rated this DEIS as EC-2 -- Environmental Concerns-Insufficient Information (see enclosed "Summary of Rating Definitions and Follow-Up Actions"). Our rating reflects our concerns regarding potential impacts to water quality and wildlife, and BLM's preferred reclamation measures, as well as the need for additional information in the Final Environmental Impact Statement (FEIS) regarding mitigation, monitoring, and emergency response planning. We have commented on previous iterations of this document several times during its development. Although the DEIS addresses many of our previous comments, several of our comments have not been addressed. Our specific comments are enclosed.

We appreciate the opportunity to have participated in this EIS as a cooperating Agency and look forward to working with your

Letter 17 Continued

agency on the FEIS. If you have any questions, please contact me at (415) 744-1574, or have your staff contact Jeanne Geselbracht at (415) 744-1576.

Sincerely,

David J. Farrel, Chief
Environmental Review Section
Office of Federal Activities

Enclosures

cc: Dick Reavis, NDEP
Doug Zimmerman, NDEP
Glen Mouritsen, Nevada Dept. of Transportation
City of Ely
County of White Pine

Response to Letter 17

Letter 17 Continued

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommend for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

Response to Letter 17

Letter 17 Continued

Water Quality

17-1 According to the DEIS (p. 4-39), metals concentrations in tailings pools and pit waters would exceed EPA acute or chronic water quality criteria guidance for protection of aquatic life as well as livestock. Aquatic life standards are set based on protection of a diverse range of aquatic life and wildlife. Acute standards are for a one-hour exposure, and chronic standards are for a 96-hour exposure. Based on Nevada's aquatic life standards and stock water standards, it appears that the metals concentrations expected in pits and tailings pools could cause a potential threat to wildlife, including birds. We recommend that the Plan of Operation require measures to reduce the exposure and/or toxicity to wildlife from these waters. The Plan of Operation should require RMLP to monitor these water bodies for adverse effects to wildlife and demonstrate that measures taken adequately protect wildlife. The FEIS should describe and discuss these measures.

17-2 It is unclear from the DEIS (p. 2-82) what monitoring systems have been proposed for all site facilities by RMLP or will be required by NDEP and BLM. For example, Figure 4-4 and other information in the DEIS indicate a somewhat complex geology underlying the tailings dam, including a difference in water table elevation of 650 feet from one side of a fault to the other. In light of this information, and as we have stated in previous correspondence, only one monitoring well 1500 feet downgradient from the impoundment would constitute an inadequate tailings facility monitoring system. However, the DEIS does not describe how the tailings impoundment would be monitored. Pursuant to 40 CFR 1505.2(c), the Record of Decision (ROD) shall include a summary of the monitoring and enforcement program. We recommend that this information also be provided in the FEIS in some detail.

17-3 PTI's Hydrogeochemistry Report indicates that, based on existing waste rock dumps, impermeable "hardpan" layers would be expected to form close to the surface of the expanded dumps. The FEIS should discuss whether sufficient differences in geochemistry, particle size, or other factors would be expected for the expanded waste rock dumps to produce different conditions (e.g., more permeable dump areas) than existing dumps.

17-4 The DEIS does not address how permanent disturbance of 3.5 acres of waters of the U.S. would be mitigated. As we have stated in previous correspondence, the EIS should include the mitigation plan which describes: (a) acreage and habitat type of waters of the U.S. that would be created or restored, (b) water sources to

Response to Letter 17

17-1 BLM disagrees that water in pit lakes and tailing pools would pose a threat to wildlife. Please refer to Section 4.1.6.1 for a discussion of potential bioaccumulation effects to wildlife species from anticipated water quality. The USEPA acute and chronic criteria are based on, and established for, protection of aquatic life, rather than terrestrial wildlife and livestock. The USEPA criteria for aquatic life were used as a relative and conservative comparison for the terrestrial wildlife species that may use the pit lakes, since no national criteria currently exist that are directly applicable to consumption of water by terrestrial species. It is for this reason that the EIS also included Nevada stock water standards, the National Research Council Maximum Tolerable Levels (NRC MTLs), and the USEPA Maximum Contaminant Levels (MCLs) for comparison. Nevada aquatic life standards are identical to the USEPA criteria for cadmium, chromium, copper, and selenium. There are no Nevada aquatic life standards for antimony and thallium.

Of these six metals, which are identified on page 4-39 to exceed the USEPA aquatic life criteria, only selenium was recognized as a concern to wildlife (especially birds) because of the potential for bioaccumulation in organisms. Selenium in the pit lakes was also acknowledged (page 4-38) as having a potential to exceed Nevada stock water standards. However, due to the lack of forage items and nesting habitat (i.e., cover), the pit lakes do not, and would not, provide necessary habitat features that would encourage continuous bird use. The incidence of future bird occurrences on the pit lakes is anticipated to be sporadic, paralleling present use patterns, due to the pit configuration, lack of habitat, low food availability, and water depth. No animals have been identified that would be exposed to the pit waters on a continual basis, particularly during the breeding period. Therefore, the EIS analysis did not identify a threat to short-term wildlife (i.e., bird) survival and long-term reproductive viability, based on these factors. Finally, the EIS analysis of this complex issue, based on the projected water chemistry and limited wildlife use, did not indicate the need for the development of potential mitigation measures. Please note in Section 2.2.16 that as an added environmental protection measure, RMLP would monitor (observe) bird and other wildlife use of the waterbodies during water sampling activities.

Regarding the comment that project tailings water would exceed Nevada's livestock criteria, the statement presented on page 4-39 (referencing Table B-4 in Appendix B) indicates that, "Of the metals measured [of representative future tailings water], none exceeded either the NRC MTLs or the State of Nevada's stockwater standards." Also, the tailings impoundment would not provide adequate nesting or foraging habitat for wildlife, as discussed on page 4-39.

17-2 There are currently two monitoring wells downgradient of the proposed impoundment, WCC-G1 and WCC-G3 (see Map 3-4). As required by the Nevada Water Pollution Control Permit 92105, which was issued for the project (including the tailings disposal facility), an additional system for monitoring the unsaturated zone is required and must be submitted to NDEP. These plans will be submitted to both NDEP and BLM for review and approval. This detailed monitoring plan will be included in the POO, and amended and revised to reflect all conditions of approval in the Record of Decision. At the present time RMLP has developed a draft monitoring plan based upon the technical information and modeling recently completed on the tailings impoundment area. This information was necessary to identify locations, depths, and screening intervals for additional monitoring wells. The draft plan includes six new monitoring locations -- three new monitoring wells and three piezometers to monitor water levels. RMLP presently proposes to conduct an evaluation

Letter 17 Continued

17-4 maintain the mitigation area, (c) the revegetation plans including the numbers and age of each species to be planted, (d) maintenance and monitoring plans, including performance standards to determine mitigation success, (e) the size and location of mitigation zones, (f) the parties that would be ultimately responsible for the plan's success, and (g) contingency plans that would be enacted if the original plan fails. Mitigation should be implemented in advance of the impacts, to avoid habitat losses due to the "down time" experienced until an area successfully revegetates.

Reclamation

17-5 As stated in previous correspondence, we recommend that revegetation be accomplished with native species indigenous to the area in order to restore habitat to as natural conditions as possible.

17-6 The BLM preferred alternative includes revegetation cover standards based on Range/Woodland Site descriptions. However, the DEIS indicates that the vegetation zone categories are based on current vegetation cover, rather than original, pre-mining cover. "For example, Zone IV (Liberty Dump area) currently has a cover value of 17 percent. Therefore, the Liberty Dump area would have to meet a 17 percent cover standard for reclamation" (p. 4-100). As we have previously stated, we urge BLM to require revegetation standards based on **original** pre-disturbance conditions, rather than on their current post-disturbance conditions, in order to return the area to as natural conditions as possible. Some of the Vegetation Zones in Table 2-13 and Map 2-6 should be redesignated to be consistent with predisturbance conditions.

Emergency Response

17-7 As we have stated in previous correspondence, the FEIS should indicate who would be responsible for reviewing and approving the Spill Prevention, Control and Countermeasures Plans in order to ensure that each company meets all health and safety standards and practices.

Response to Letter 17

of several devices that could be used to monitor the unsaturated zone, including field evaluations during 1994.

CEQ Guidelines (40 CFR 1505.2(c)) refer to monitoring for compliance with various conditions of approval of the POO. Monitoring for compliance is provided for in the Memorandum of Understanding between BLM and NDEP, whereby both agencies cooperate in reviewing compliance with all approvals, including state and Federal approvals. This includes requirements for RMLP to collect actual site monitoring data for groundwater, surface water, surface resources and reclamation, and state permit stipulations. These are well defined for groundwater resources in Water Pollution Control Permit 92105, which requires RMLP to collect data, weekly, monthly, or quarterly, depending upon the project component and/or monitoring element. The permit requires this data to be submitted quarterly to NDEP and an annual report of operations be prepared annually for submission to NDEP. That permit is included as Appendix B in the POO submitted to the BLM.

Both agencies plan to conduct regular inspections, the frequency of which would be based upon the compliance item or monitoring element. Water pollution control permit compliance inspections are generally conducted quarterly by NDEP, and twice monthly compliance inspections during construction and quarterly during operation are planned by BLM. Other inspections are provided for under other state permits. NDOW conducts regularly scheduled inspections under its Artificial Pond Permit program. NDEP conducts inspections at their discretion under the general stormwater permit and the required Stormwater Pollution Prevention Plan prepared for the project.

17-3 None of the proposed activities involving the waste dumps would result in substantially different permeabilities of the expanded waste dumps in comparison to the historic dumps. Two processes are responsible for the formation of less permeable layers at the surface of the current waste dumps: geochemical mechanisms such as precipitation of secondary gypsum and amorphous ferric hydroxide, and physical compaction due to trucks driving over the dumps.

The actions that would form the expanded waste dumps are the same as formed the current dumps: drilling, blasting, transportation to the dump site, and dumping. The material in the dumps is not processed or crushed, and thus, the physical characteristics of the dump (e.g., particle size) would not differ substantially from the historic material. Geochemically, the expanded waste dump materials would be similar to the current dumps. One exception is that the expanded dumps may contain slightly less sulfitic minerals because the current copper cut-off grades are lower than in the past (i.e., historically, higher grade ore was mined, which contained more sulfide). If less sulfate is generated, less gypsum may form in the top layer, which may reduce the thickness of the hardpan. However, the decreased sulfide content of the dumps would offset this effect by reducing the potential generation of acidic water that could affect groundwater. Thus, the conclusions reached in the Hydrogeochemistry Technical Report relating to sulfate migration, acidic water, and metals through the waste dumps are appropriate even though lower sulfide concentrations would occur in the expanded waste dumps.

In addition, the permeability of the top layer of the expanded dumps are expected to actually decrease because 240-ton trucks would be used rather than the smaller trucks (35 to 50 tons) used historically. Heavier trucks would result in additional compaction of

Response to Letter 17

the top layer, and lower permeability. Thus, the estimates in the Hydrogeochemistry Report overestimate the infiltration that would occur in the expanded dumps.

17-4 About 3.5 acres of waters of the United States are located in a narrow band along the drainages that flow through the Giroux Wash area and 0.2 acre along Fisher Canyon. These drainages are about 1 to 10 feet wide and are dry except during and after heavy rainfall and snow melt events. The Giroux Wash drainages are generally devoid of vegetation with the banks supporting sagebrush. The Fisher Canyon drainages are also unvegetated, with sedges, rushes, and scattered willows also present along the banks (see Response to Comment 25-5). No wetlands are present. Since no unique vegetation or wildlife habitat would be lost, no special mitigation has been proposed. The Corps of Engineers was contacted regarding these drainages on August 30, 1991, and November 25, 1992. No need for mitigation has been identified by the Corps. Please refer to Response to Comment 25-6 for further information on Section 404 permitting.

17-5 Comment noted. Please refer to Section 4.4.4 in the Final EIS for a discussion of the environmental consequences of using only native species for reclamation. The seed mixes proposed in the reclamation plan are predominately native species. The test plot program would evaluate which species are most appropriate for the Robinson Project. All species listed on Tables 2-14 and 2-15 would be tested, and the final seed mix would be determined by those results, the cover and composition standards, and seed availability. It is expected that several seed mixes would be used depending on the area of the project to be reclaimed. It is important to keep in mind that a seed mix of native species only may not become established and stabilize an area as rapidly as a mix including introduced species. BLM's first goal for reclamation is to stabilize the soil, so the erodibility of a site and the time required to establish vegetation would be primary factors in selecting the final seed mixes. BLM has determined that it would not facilitate reclamation success to place strict limitations on species selection.

17-6 Range/Woodland Site descriptions were selected as the best measure of the vegetation cover that can be reasonably expected in the five zones affected by the Robinson Project, given site-specific soil and precipitation conditions. Table 2-13 and Section 4.4.3 have been clarified to indicate that the cover standards are based on site descriptions for <u>undisturbed</u> areas. Different zones support different levels of vegetation cover (10 percent to 33 percent) based on these conditions. RMLP would be required to restore disturbed areas in a given zone to 100 percent of its site description cover. BLM has determined that it is unreasonable to require RMLP to revegetate areas to greater than 100 percent.

17-7 Section 311(j) of the Clean Water Act (CWA) and implementing regulations require RMLP, Northern Nevada Railroad, and other companies that ship or store petroleum products (e.g., diesel fuel) to prepare and implement a Spill Prevention Control and Countermeasures Plan (SPCC Plan), 40 C.F.R. § 112.13. SPCC Plans must be reviewed and certified by a Registered Professional Engineer, and copies must be maintained at facilities and made available when requested for on-site review by appropriate officials. There is no requirement that SPCC Plans be "reviewed and approved" by any government agency. However, recent amendments to the CWA require certain "substantial harm facilities" to prepare and submit for review and possible approval by USEPA plans for responding to a "worst-case discharge" and a "substantial threat of such a discharge." <u>See</u> 59 Fed. Reg. 34070, 34097-103 (July 1, 1994). RMLP and other companies would be required to evaluate the applicability of these rules to their facilities and RMLP would comply with any requirements determined to be applicable.

Letter 18

United States Department of the Interior

TAKE PRIDE IN AMERICA

BUREAU OF MINES
Western Field Operations Center
East 360 3rd Avenue
Spokane, Washington 99202-1413

June 17, 1994

Memorandum

To: Kenneth G. Walker, District Manager, Bureau of Land Management, Ely District Office, Ely, Nevada

From: Chief, Branch of Engineering and Economic Analysis

Subject: Comments on the Draft Environmental Impact Statement - Robinson Project

18-1 As discussed in our scoping-process letter dated July 30, 1993 (attached), we maintain strong support that previously mined pits with foreseeable development potential remain open. This allows future accessibility to unmined low grade mineral resources. The accepted alternative should certainly include this option.

Mineral extraction is extremely price dependent. With increased demand, price also increases, making previously uneconomic ores profitable to recover. It is critical for the prudent management of this countries natural resources, to consider the ultimate impact of entombing potential future resources.

Surface mining costs less than most other methods and is therefore the preferable alternative for many low grade deposits. Once these deposits have been backfilled or even partially buried, economic recovery of the resource is precluded.

The Robinson project is an excellent example of an inactive property which is now proposed for production, where pits have remained open subsequent to mine closure.

If we may be of further assistance please do not hesitate to contact us.

Nicholas Zilka
for
John Norberg

Attachment

Response to Letter 18

18-1 Comment noted.

Letter 18 Continued

Response to Letter 18

July 30, 1993

Memorandum

To: Kenneth G. Walker, District Manager, Bureau of Land Management, Ely District, Ely, Nevada

From: Supervisor, Environmental and Regulatory Analysis, Branch of Engineering and Economic Analysis

Subject: Notice of Intent and Scoping for Robinson Project Environmental Impact Statement (EIS)

The Bureau of Mines' concerns for a project of this nature are the wise use and conservation of mineral resources. Minerals are finite and nonrenewable. If we are to ensure that future generations will have the mineral supplies they need, we must ensure that today's actions do not foreclose opportunities to economically mine them in the future. Operation and reclamation plans should be designed to permit the future recovery of lower-grade materials that may not be currently economic to mine.

The current Robinson Project is a good, current example of a future scenario we hope the EIS will consider. If Kennecott Copper Corporation had backfilled its pits when its economic resources for the mining operation had been depleted, Robinson Mining Limited Partnership (RMLP) may not be presently proposing this renewed mining operation. The possibilities of future operations when RMLP's economic resources are depleted should be accounted for in the reclamation plan.

Access to future resources in this area is a real concern to us based on data presented in the Robinson Project EA. This document discusses backfilling pits, such as the Liberty pit, based solely on the presence of economic resources during the life of the project. No apparent consideration is being given to preservation of future access to currently subeconomic resources within those pits. This issue should be analyzed in the EIS and weighted against conflicting issues so that a POO utilizing optimum resource decisions can be made.

Thank you for this chance to submit comments. Please contact Michael Dunn, (509) 353-2700, if you have any questions about them.

Burton B. Gosling

MDDunn:/c:\wp51\blm\robinson

bcc: MGloster
SO
Df

Letter 19

STATE OF NEVADA
DEPARTMENT OF BUSINESS AND INDUSTRY
DIVISION OF MINERALS
400 W. King Street, Suite 106
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BOB MILLER
Governor

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RUSSELL A. FIELDS
Administrator

June 17, 1994
When replying refer to: NDOMLV94-037 (Amends NDOMLV94-036)

Julie Butler
Department of Administration, Budget Division
State Clearinghouse
Blasdel Building, Room 204
209 E. Musser St.
Carson City, NV 89710

SUBJECT: Amended Comment on the Draft EIS Robinson Project

Dear Ms. Butler:

19-1 The Nevada Division of Minerals appreciates the opportunity to comment on the Draft EIS Robinson Project. The Ely District office is to be congratulated for expediting the environmental document once the original EA was remanded by the Director of BLM. We support the Robinson Project based on its significant new production of metal necessary for the nation's well-being, the economic benefits to White Pine County and eastern Nevada, the potential for the project to leave the mined area in a better environmental condition then currently exists and Magma's commitment as a responsible corporate citizen.

There are several areas of concern which we feel should be addressed in regard to the proposed alternative. They are summarized as follows:

1. **BACK-FILLING OF LIBERTY PIT**

19-2 In general, the Division of Minerals does not support the back-filling of pits, especially when a resource remains undeveloped which may be of economic value at some future date. One needs only look at Magma's Robinson Project to see that back-filling by Kennecott twenty years ago would have prohibited the project today.

2. **RECLAMATION OF SIDESLOPES**

19-3 The proposal to reclaim sides slopes at a ratio of 3:1 rather than 2.5:1 is unwarranted. Besides the expense and time involved, 2.5:1 is a commonly used slope among many operations. In addition, a survey of the hills in the vicinity will show that many naturally occurring hills are very steep walled, especially the rhyolite flows between Ely and Ruth. A 2.5:1 sideslope would not be uncharacteristic of natural features in the area. It will also minimize disturbance by reducing the surface area covered by waste dumps by 10 to 20%.

(O)-26

Response to Letter 19

19-1 Comment noted.

19-2 Comment noted.

19-3 Comment noted.

Letter 19 Continued

Julie Butler
Amended Comment on the Draft EIS Robinson Project
June 17, 1994
Page 2

3. **SPECIFIC VEGETATION DIVERSITY REQUIREMENT**

19-4 We caution the use of very specific revegetation standards as far as absolute percentages of cover and species mix. A property of this size needs flexibility in meeting reclamation standards. We urge reasonable standards which take into account local variations. The clause of no noxious weeds (Table 2-12) should be modified to a reasonable percentage as it would be impossible to eliminate all noxious weeds from the entire reclamation site.

Sincerely,

Walt Lombardo

Walt Lombardo
Chief, Las Vegas Office

das

cc: Russ Fields
Mr. Kenneth Walker, District Manager
BLM Ely District
HC33, Box 33500
Ely, NV 89301

Response to Letter 19

19-4 Your comment regarding the reclamation standards is noted. Please refer to Response to Comment 17-6 for additional information. Please note that noxious weeds are defined by the Nevada State Department of Agriculture as referenced on Table 2-12. RMLP must make a reasonable attempt to eradicate such weeds found in reclaimed areas since State law requires efforts to control and eradicate noxious weeds; noxious weeds cannot be included as an allowable percentage of the vegetation composition.

Peter G. Morros, *Director*

Address Reply To:
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BOB MILLER
Governor

STATE OF NEVADA

Department of Conservation and Natural Resources

ADVISORY BOARD ON NATURAL RESOURCES

CARSON CITY, NEVADA 89710

RECOMMENDATION

ROBINSON MINING PROJECT

WHEREAS: the Magma Nevada Mining Company proposes to reestablish a mining operation in the Robinson District of White Pine County; and

WHEREAS: the Robinson District has been the site of extensive mining operations for at least a century; and

WHEREAS: a draft environmental impact statement has been prepared for the project and is currently being circulated for public review and comment; and

WHEREAS: the proposed reestablishment of mining will primarily occur in the area previously disturbed by extensive mining activity with existing pits being enlarged, existing former waste materials being processed, and existing material dumps utilized; and

WHEREAS: the only significant area not previously disturbed by mining to be used by the new operation is limited in scope relative to the overall area mining operation being proposed, and is an integral part of the proposed operation; and

WHEREAS: new mining technology and standards will be utilized in the renewed mining activity with environmental safeguards required, necessary mitigation measures instituted and reclamation techniques made part of the mining operation; and

WHEREAS: land reclamation and rehabilitation will be applied on all areas involved in the reestablished mining activity to the benefit of a very large area already disturbed by a former mining activity which is not now subject to reclamation; and

Letter 20 Continued

WHEREAS: the Advisory Board on Natural Resources has toured the site of the proposed mining operation and has heard a presentation on the project during a public meeting held in Ely during June, 1994; and

WHEREAS: the renewed mining operation will be a substantial economic and environmental benefit to the citizens of White Pine County, the State and the Nation.

20-1 NOW THEREFORE, BE IT RECOMMENDED that the Advisory Board on Natural Resources in a meeting on June 16, 1994 in Ely Nevada, feels that the proposed project will be of benefit economically and providing no severe adverse environmental impacts are projected to occur or brought to light by virtue of public comment and because reclamation will improve the status of long existing disturbed sites, the Board encourages completion of the EIS process and the start up of this project.

Barbara Curti

Barbara Curti, Vice Chairman
Advisory Board on Natural Resources

Dated this 17th
day of June, 1994.

Response to Letter 20

20-1 Comment noted.

Letter 21

TEL:1-202-887-1875 Jun 20 94 8:18 No.001 P.01

MINERAL POLICY CENTER

~~1325 MASSACHUSETTS AVENUE NW #550 • WASHINGTON DC 20005 • 202-737-1872~~

• 1612 K Street, NW, Suite 808, Washington, DC 20006 • 202-887-1872 •

20 June 1994

Daniel R. Netcher,
EIS Team Leader
Egan Resource Area, Ely District
Bureau of Land Management
Ely, Nevada
via fax: 702-289-8465

Dear Dan:

My comments on the Robinson Project draft EIS were mailed on Friday, as instructed. Since the U.S. Postal Service seems to be operating with unpredictable results, I thought I'd better fax the comments to you, too. See following eight pages.

Congratulations on getting the Robinson Project EIS so much improved over the EA. While I still have concerns, as the comments show, the EIS does cover many areas in much better fashion than the EA did.

I know that took a lot of work by you and other folks. I thank you for it; I am sure it will pay off in the long run.

Please call me if you any part of these comments is unclear, or if I can help in any other way to move this process forward.

Sincerely,

Philip M. Hocker,
President

Enclosure:
MPC Comments on dEIS, 17June1994.

Response to Letter 21

Letter 21 Continued

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* 1612 K STREET, NW, SUITE 808, WASHINGTON DC 20006 * 202-887-1872 *

17 June 1994

Daniel R. Netcher, EIS Team Leader
Egan Resource Area, Ely District
Bureau of Land Management
HC 33, Box 33500
Ely, Nevada 89301

Dear Mr. Netcher:

re: Robinson Project,
draft Environmental Impact Statement,
NV-46-92-004P/3809 (NV-040), April, 1994:

Following are the comments of Mineral Policy Center regarding the draft Environmental Impact Statement for the Robinson Project, NV-46-92-004P/3809 (NV-040), dated April, 1994 ("the dEIS"). The comments are mailed as instructed in BLM's cover letter dated April 18, 1994.

Mineral Policy Center ("MPC") is a national non-profit organization, concerned with environmental damage from mineral development. We appreciate this opportunity to comment on the dEIS.

21-1 Unfortunately, many of the comments which we have submitted previously regarding deficiencies in the Environmental Assessment, and on the Scoping Document, for the Robinson Project are still applicable to this dEIS. Those submissions by MPC are incorporated by reference into these comments.

Preparation of an Environmental Impact Statement

Approval of the Robinson Project clearly is a "major Federal action significantly affecting the quality of the human environment." Therefore, an Environmental Impact Statement is required to comply with

Response to Letter 21

21-1 BLM notes that the commenter purports to "incorporate by reference" unspecified comments submitted in connection with prior phases of review of the Robinson Project. This is inconsistent with CEQ's NEPA regulations, which require that comments on a Draft EIS be as specific as possible (40 C.F.R. § 1503.3). Accordingly, BLM is responding in this Final EIS only to those comments specifically provided by the commenter on the Draft EIS that merit individual discussion.

Letter 21 Continued

Section 102(2)(C) of the National Environmental Policy Act of 1969. We appreciate the decision, which BLM made after Mineral Policy Center and others filed an appeal of the previous FONSI, to prepare a full Environmental Impact Statement for this decision.

21-2 The dEIS is a great improvement over the previous Environmental Assessment for this project. We believe that further improvements are necessary before the Final EIS can support a go/no-go decision on the project; we believe those improvements can be made, and that an improved agency decision will result from the effort.

More Complete Preparer Disclosure Is Necessary:

21-3 The use of third-party consultants for analysis of the effects of major Federal agency decisions invites conflict-of-interest problems. When the third-party consultant is paid by the company which wants the project to be approved, and when the consultant's future business is likely to come from that company or other similar companies, the problem is acute.

MAGMA of course wants the Robinson Project approved with as little environmental control cost added as it can persuade BLM to accept. There is very strong pressure on any consultant paid by MAGMA to minimize the statement of environmental risks in the dEIS.

Because of this pressure, MPC believes that third-party consultants paid for by the project proponent should not be used by BLM and other Federal agencies. We raised this concern in meetings regarding the Robinson Project EIS in June and August, 1993, and in correspondence with BLM Director Baca's office in September, 1993.

As a compromise, MPC offered to accept the use of third-party contractors paid by MAGMA for the Robinson Project, _if_ the EIS fully disclosed:

* That the document was prepared not by BLM staff, but by a third-party contractor; the identity of the contractor; the approximate amount of the contract; and the name(s) of the party or parties which paid for the costs.

Response to Letter 21

21-2 Comment noted.

21-3 The use of third-party contractors for the preparation of EISs has been an accepted method since it was approved by the CEQ in November 1978 (40 CFR 1506.5[c]). CEQ further clarified third-party contracting in its *40 Most Asked Questions* published in March 1981 (Federal Register [FR] Vol. 46, No. 55, pp. 18026 through 18038), and third-party contracting has been reviewed and approved in the courts. For the Robinson Project EIS, the BLM has followed its internal guidelines in Handbook 1790.1, Appendix 7, Part B, for selecting and directing the activities of the third-party contractor. <u>BLM has reviewed, approved, and is responsible for the content of the Draft EIS, as well as this Final EIS</u>.

The List of Preparers in Section 6.0 of the Final EIS identifies the third-party contractor (ENSR Consulting and Engineering) and lists the BLM and contractor personnel involved in the preparation of the Draft and Final EIS. This section follows CEQ guidelines (Question No. 27) for the level of detail on responsibility and experience to be presented for each person. The only item requested in your comment that was not included in the Draft EIS is the amount of the third-party contract. BLM has determined that it is inappropriate to provide this information in the Final EIS. However, it may be requested under the Freedom of Information Act.

CEQ regulations (40 CFR 1502.17) specify that information be provided on persons responsible for the analyses contained in the EIS "including analyses in background papers". PTI Environmental Services prepared the groundwater resources technical report *The Hydrogeochemistry of the Robinson Project, White Pine County, Nevada* that was referenced in the Draft EIS. This work was conducted under direct contract to Magma Nevada Mining Company, but with direct review and coordination by BLM and Shepherd Miller, Inc. (third-party subcontractor to ENSR). BLM and the third-party team were in constant communication with PTI as the technical studies were designed and conducted and as the Draft EIS was prepared. This approach was consistent with CEQ regulations (40 CFR 1506.5[a]) in that BLM assisted Magma "by outlining the types of information required" and "independently evaluated the information submitted and is responsible for its accuracy". Dr. Tom Olsen (BLM, Denver Service Center) and Dr. Bob Berry (Shepherd Miller, Inc.) were primarily responsible for the independent evaluation and are included in the List of Preparers. Since PTI was not part of the BLM's third-party contract and did not write any sections of the Draft EIS, they were not included in the List of Preparers. However, since groundwater issues were of great interest to a number of reviewers and for the sake of completeness, a listing of PTI's technical experts, their areas of responsibility on the technical report, and their experience is provided in the List of Preparers of this Final EIS.

Letter 21 Continued

21-3

* The identities and technical qualifications of the staff of the consultants who prepared the document.

* The names, roles, and technical qualifications of all BLM personnel responsible for the oversight and review of the document.

We offered this as a reasonable compromise for this project. The public, and the agency decision-maker, should have full information regarding the sources of information and analysis which form the EIS, in order to evaluate the document and form an improved agency decision.

The "List of Preparers and Reviewers," dEIS pp.6-1 to 6-3, does not disclose in any understandable form the relationship between BLM, MAGMA, and the EIS preparers. It does not disclose what roles the listed preparers played in the preparation of the total document and underlying studies. The information listed above must be included, in clear and understandable form, for the final EIS to comply with NEPA requirements.

A simple listing of names, or of names and a minimal qualification statement, does not meet the need to communicate to a reader which preparers were paid by MAGMA, and what their roles in the total study and analysis were. CEQ regulations specifically require that:

> "Where possible the persons who are responsible for a <u>particular analysis</u>, including analyses in background papers, shall be identified."
> -- CEQ NEPA regulations, 40 CFR § 1502.17, emphasis added.

Many issues raised by the Robinson Project are not black-and-white. They require the application of close and objective professional judgment. The public should know who is paying the experts on whose judgment we will all rely. Similarly, the specific roles and responsibilities of the BLM staff who oversee the project must be clearly stated.

I have raised these concerns repeatedly, and had been told by BLM that the Bureau would comply. BLM has not kept its word. The Final EIS must fully disclose this information to be legally acceptable.

Response to Letter 21

Letter 21 Continued

Reclamation Plan:

21-4 The discussion of post-mining reclamation in the dEIS is too vague to form a basis for decision, and violates NEPA. The EIS must "[r]igorously explore and objectively evaluate" reclamation alternatives (40 CFR § 1502.14(a).

21-5 Broad generalities such as "The topography of the reclaimed mine and process facility sites would be consistent with the anticipated post-mining land use" (dEIS,p.2-49), while the "post-mining land use" is not identified, do not form a basis for reasonable analysis.

The post-mining land uses should be established in the current decision; reclamation topography and costs should be planned based on that post-mining land use. No reviewer can evaluate the environmental costs of this project when the usability of the post-mining landscape is completely unresolved. No decisionmaker can establish appropriate bonding levels without a cost analysis of post-mining restoration.

MPC recognizes that the decision regarding post-mining land use may be revisited during the life of the mine. That can be handled with amendments to the Plan of Operations, and supplements to the EIS (with public notification and comment). BLM cannot comply with the direction in Section 302(b) of the Federal Land Policy and Management Act of 1976, 43 USC 1732, that the Secretary shall "prevent unnecessary or undue degradation of the lands" without addressing these issues up-front.

Alternatives Analysis:

21-6 The description of alternatives, and the analysis provided as a basis for a decision, is generally cursory and inadequate. It should be improved and expanded to form a basis for final agency action.

For example, the discussion of alternatives for lining the Giroux Wash tailings disposal area simply gives raw cost estimates, and then makes statements such as "the synthetic liner would not be economically feasible" (dEIS, p.2-79). No basis for that statement is offered.

Response to Letter 21

21-4 The description of the Robinson Project Reclamation Plan presented in Section 2.2.15 is a summary of the more detailed reclamation plan that is part of RMLP's POO. The POO is part of the project record and has been thoroughly reviewed by the BLM, NDEP, and EIS team during preparation of the Draft and Final EISs. The CEQ regulation that you cite requires the evaluation of "reasonable alternatives" rather than reclamation alternatives.

21-5 In Sections 2.2.15.1 and 4.1.13.2 of the Final EIS, the post-mining land uses are identified as rangeland, wildlife habitat, and dispersed recreation for public lands, and industrial uses for private lands. These uses were compared to all aspects of the reclamation plan, including topography, to ensure that they would be compatible. The post-mining land uses are in conformance with the Egan RMP. No inconsistencies were identified. It should be noted that if BLM approves the Robinson Project, it will approve the detailed reclamation plan contained in the POO and not the summary plan contained in the Final EIS.

21-6 It is BLM's determination that the alternatives analysis is adequate to provide a basis for a decision. CEQ guidelines require that reasonable alternatives to the Proposed Action be analyzed in an EIS. "Reasonable Alternatives include those that are <u>practical, or, feasible</u> from the technical and economic standpoint..." (FR Vol. 46, No. 55, pp. 18027). Further, the range of alternatives analyzed includes both the alternatives considered in detail and the alternatives eliminated from detailed analysis (FR Vol. 46, No. 55, pp. 18026). The basis for stating that a synthetic liner would not be economically feasible is presented in Section 2.6.2 of the Final EIS, specifically that this type of liner would cost $36.4 million. As also pointed out on page 2-79, given the limited impact to groundwater quality from tailings water infiltration, the ability of a synthetic liner to reduce but not eliminate infiltration, and the high cost of a liner, BLM did not judge this alternative to be reasonable, regardless of other factors relating to project economics.

Letter 21 Continued

21-6 The "economic feasibility" of any given alternative is a function of its cost in relation to potential benefits, and to overall project economics. BLM cannot make a decision that a given alternative is "economically unfeasible" simply because it costs money. That decision must be based on a disclosure of total expected project costs and revenues. Those numbers involve uncertainties, of course; the uncertainties should be stated. If MAGMA refuses to disclose the project economics, BLM cannot rule that any alternative is "economically unfeasible."

21-7 The specific method of tailings disposal can cause major differences in the permeability and retained water content of the final impoundment. These alternatives, such as "thin-lift deposition," and different under-drain designs, should be evaluated and discussed in the EIS.

21-8 Overall, the tailings management proposed is relatively unsophisticated and low-cost. More criteria for permeability management, erosion control (West Unit diversion channel), and groundwater monitoring are needed (dEIS p.2-17).

Response and Corrective Action Plans:

Project planning for a long-term large mining endeavor like the Robinson Project must include detailed criteria for environmental monitoring and responsive action and operation shutdown if design or operator errors crop up.

21-9 However, the dEIS is very vague on this critical area. Groundwater monitoring is described simply by "Implement groundwater monitoring program" (dEIS p.2-59 and 4-19), and **groundwater is totally omitted from the "Potential Mitigation and Monitoring"** section (dEIS § 4.5, p.4-102 to 4-104).

A detailed description of measures to be taken to monitor water quality and quantity impacts from the Robinson Project must be included in the EIS. This must be coupled with a specific statement of the steps which BLM will take if damage to groundwater or surface waters is detected.

Response to Letter 21

21-7 The proposed method of tailings deposition is in fact a form of "thin lift deposition" (also known as "sub-areal deposition"), although it does not incorporate some of the aspects often associated with "thin-lift deposition" such as deposition of tailings around the entire perimeter, and use of an underdrain system in the impoundment area. The overall length and shape of the perimeter would make it extremely difficult to construct, operate, and maintain spigots around the entire impoundment. With the system proposed, tailings deposition would be done along the entire 2.2-mile length of the embankment. By constructing the majority of the embankment from cycloned tailings sand, it would be possible to minimize impoundment size and surface disturbance. The overall impoundment would need to be approximately 9 percent larger in order to contain all the tailings if the embankment were constructed of borrow material.

The maximum tailings depth in the impoundment would be approximately 200 feet; an underdrain system would have very limited success for an impoundment of this depth. Based on laboratory testing, the permeability of the tailings is expected to be approximately 1×10^{-6} cm/sec by the time a 20- to 25-foot thickness of tailings has been deposited. The tailings at that point would effectively act as a liner to block the flow of fluid draining out of the tailings into the underdrain system. The remaining 180 feet of tailings would be deposited with no benefit derived from the underdrain system.

In addition, climatic constraints at the Robinson site limit the effectiveness of "thin lift deposition" of tailings during winter operation when temperatures average below freezing. The drying and consolidation of tailings deposited in thin layers are dependent on a combination of evaporation at the surface and drainage from below. Climatic data indicate that during about 4 months each winter, the temperature averages below freezing and there is no evaporation occurring. Since each lift would freeze as it was deposited, the water could not be removed from below with an underdrain system. Unless the rate of rise for the impoundment were less than 18 inches per year for tailings placed in 6-inch lifts, the frozen tailings would be covered before they were drained. Given the climatic conditions at the Robinson site, approximately one-third of all tailings would be deposited in sub-freezing temperatures, making the use of "thin-lift deposition" methods much less beneficial during winter months and the use of an underdrain system ineffective for one-third of the year regardless of tailings depth.

The tailings would be deposited by moving six cyclone skids back and forth along the crest of the embankment, and there would be a limited area of the impoundment under deposition at any given time. This would allow drying and consolidation of tailings in areas away from the cyclones during the warmer months. The water pool would always be located at the upstream edge of the tailings pond. As the impoundment fills, the water pool would get farther from the embankment and the slope of the deposited tailings would get flatter, resulting in thinner layers of tailings spread out over larger areas. The tailings would be deposited in thinner and thinner lifts with more time to dry before subsequent deposition of additional tailings. By keeping the water pool at the upstream end of the impoundment against steeper slopes, the total area of the pool would be kept smaller than if the pool were surrounded by flat tailings slopes on all sides due to tailings deposition around the entire perimeter of the impoundment. The selected method of tailings deposition would also result in a water pool which is continually moving upstream over the life of the impoundment, resulting in a shorter time for maximum seepage directly under the water pool for any given location.

Letter 21 Continued

21-10 The dEIS statement that "[a]cid drainage is not anticipated" (dEIS p.4-21) is contradicted at 4-14 where the dEIS states that lowering the groundwater level "could result in additional leaching... and generation of acid sulfate water that could percolate downward to the water table." Acid mine drainage predictions must be supplemented with response plans to be followed if acid drainage does occur. The prediction of acid mine drainage is not an exact science, and many recent mines have generated acid drainage which was not expected.

Perfect predictions cannot be expected, but thorough response plans to address unexpected events are necessary for good BLM management and to meet the requirement of 40 CFR § 1502.22 (Incomplete or unavailable information).

21-11 Mineral Policy Center opposes the use of a monitoring point 1500 feet downgradient from the tailing impoundment to verify groundwater quality compliance (dEIS p.4-19). This generous dilution factor, coupled with an established prediction that groundwater closer to the impoundment will <u>not</u> meet NDEP standards, does not provide adequate protection of the environment. If the predictions are too optimistic (MAGMA is paying for them, after all), there is no margin of protection.

Copper Leach Heap Closure:

21-12 The copper leaching heaps should be rinsed to remove residual acid prior to final closure. The proposal to omit rinsing (dEIS p.2-38) should not be adopted. An alternative should be presented and evaluated on this issue.

Although the dEIS offers "capping" and revegetation as an alternative to rinsing (dEIS p.2-38 to 39), elsewhere the dEIS admits that soil may not be available and revegetation success is not assured (dEIS p.2-54). These two positions are not consistent, and the net result is to fail to guarantee environmentally-sound closure of the heaps.

Response to Letter 21

It should be noted that while "thin-lift deposition" does provide higher density tailings over the short-term (operational life), the ultimate long-term tailings density would be essentially the same, since the consolidation due to loading from overlying material is greater than that due to drainage, except for the upper few feet of tailings. In 50 to 100 years, the final tailings density would be approximately the same for either method of deposition.

21-8 Details of the tailings embankment and impoundment design are contained in the POO, including embankment drainage and seepage collection and surface runoff diversion. Please refer to Response to Comment 17-2 for a discussion of groundwater monitoring and Response to Comment 21-7 regarding permeability management.

The diversion channel along the west side of the impoundment has been designed to divert the 100-year, 24-hour storm event. Due to the flat gradient and large size of the channel, normal yearly storm events should do very little erosional damage to the channel. If the design storm (100-year) occurs during the 15- to 20-year project life, the peak flows may result in greater erosional damage to the channel itself. However, the channel would still carry the design flows. Following a major storm event, maintenance of the diversion channel would be required. The diversion ditch would be periodically cleaned and maintained throughout the life of the facility. Refer to Sections 2.2.6.5 and 2.2.16 of the Final EIS. The facilities have been designed to contain all sedimentation within the project boundaries.

21-9 See Response to Comment 17-2. The reason no groundwater mitigation measures are presented in Section 4.5 is that nearly two pages of water quantity and quality protection measures are presented in Section 2.2.16.

21-10 This comment appears to be based on a misinterpretation of the cited CEQ regulation, 40 C.F.R. § 1502.22. There is no requirement under section 1502.22 to develop response plans to address unexpected events. As discussed in detail in the Responses to Comments 7-4, 17-2, and 35-5, however, implementation of the Robinson Project will be subject to appropriate monitoring requirements and enforcement authorities under applicable law, including the possible imposition of response plans or other contingency measures.

21-11 See Responses to Comments 7-3, 7-4, 17-2, and 35-7. BLM disagrees with the comment regarding predicted exceedence of state standards.

21-12 Comment noted. Capping the copper heaps without rinsing is the Proposed Action. This method has been proposed by RMLP because of the way the heaps would be constructed, i.e., with relatively impermeable layers between the lifts. This would make effective rinsing very difficult or impossible. However, final closure plans for the heaps must still be approved by NDEP, which could require modifications. Please refer to Mitigation Measure V-1 in Section 4.5 of this Final EIS and Responses to Comments 7-5 and 26-10 for additional information on reclamation of the copper heaps.

Letter 21 Continued

Vagueness of Decision

21-13 BLM approval must apply to a specific set of activities. It is not acceptable for BLM to issue a general "approval to mine" in the Project Area. BLM is required to "make sure the proposal... is properly defined" (40 CFR § 1502.4(a)).

The Project is a large undertaking, extended over a long time. The dEIS contains many statements regarding possible changes in the scope of the mining activity. It is very unclear what the BLM approval decision for this Project would cover. Any decision must be much more clearly delineated than this dEIS accomplishes, to qualify for NEPA evaluation. NEPA aside, administration of this project over time will be the subject of incessant dispute between BLM and the Project operators, due to the vagueness regarding what is and what is not approved pursuant to this dEIS. The Final EIS must remove this uncertainty.

Conclusion:

21-14 These Comments are a partial indication of concerns we have over this project and its NEPA compliance.

21-15 A proper BLM decision cannot be made on the basis of this draft Environmental Impact Statement. To prepare for a decision which protects the public interest, BLM must address the issues raised in this letter and by other commenters.

Mineral Policy Center wishes to stay closely informed of any further BLM steps or decisions regarding the Robinson Project. Please notify me promptly of any further action taken on this project. Please note our new address.

I believe these problems can be solved, and I look forward to working together with the Ely District to reach a sound decision on this Project. Thank you.

Sincerely,

Philip M. Hocker

Philip M. Hocker
President

Response to Letter 21

21-13 The commenter correctly observes that, as with any major project of this nature, the Record of Decision, Final EIS, and POO include and evaluate certain operating and other contingencies. However, the comment that it is unclear what the BLM approval decision would cover in this case is incorrect. The Final EIS and POO define precisely the Proposed Action and the maximum geographic extent of the Federal lands that would be impacted by the Robinson Project, and provide a detailed and comprehensive analysis of the environmental impacts that may be anticipated, regardless of the occurrence of any of the contingencies referenced in the Draft EIS. BLM has established procedures (in 43 CFR 3809) for the review and approval of modifications to the POO that may become necessary for operational and/or economic reasons as the project proceeds through its 17 years of construction/operation and 7 years of final reclamation.

21-14 Please refer to Response to Comment 21-1.

21-15 Comment noted. BLM has in these responses and the Final EIS addressed all issues raised in the comments on the Draft EIS.

Copies sent to:

- The Honorable Harry Reid, U.S. Senate
- The Honorable Bruce Babbitt, Secretary,
  Department of the Interior; att: Michael Dombeck
- Council on Environmental Quality
  Executive Office of the President
- Jacqueline Wyland, Chief, Office of Federal
  Activities, USEPA Region IX.
- Glenn Miller, Sierra Club, Reno
- Lois Snedden, Chair, Toiyabe Chapter, Reno
- Robert Dreher, Esq., Sierra Club Legal Defense Fund

Letter 22

INTERSTATE COMMERCE COMMISSION
Washington, DC 20423

SECTION OF ENVIRONMENTAL ANALYSIS

June 15, 1994

Bureau of Land Management
Ely District
Mr. Dan Netcher, EIS Team Leader
HC33 Box 35500
Ely, NV 89301

Re: Comments on Robinson Project DEIS, N46-92-0045, 3809 (NV-040), (NV-930.1)

Dear Mr. Netcher:

22-1 We have reviewed the Draft Environmental Impact Statement (DEIS) on the Robinson Project issued by your office on April 18, 1994. This letter comprises our comments. As a preliminary matter, the Interstate Commerce Commission (ICC), through its Section of Environmental Analysis (SEA), requests that it be designated a cooperating agency.

As you are aware, the ICC has jurisdiction over the operation and construction of railroads engaged in interstate commerce. At this time, SEA's interest in the Robinson Project is confined to the proposed construction and operation of approximately 3.126 miles of railroad between Keystone and Riepetown, NV.

Currently, the Northern Nevada Railroad Corporation (NNRC) has filed a petition for exemption with the ICC in Finance Docket No. 32476, <u>Northern Nevada Railroad Corporation -- Construction Exemption -- Approximately 3.126 Miles in White Pine County, NV</u>. In this proceeding, NNRC also has filed an environmental prefiling notice under the ICC's environmental rules at 49 C.F.R. 1105.10 (a)(1). SEA has conducted a site inspection of the project area with representatives of NNRC and SEA's independent third party contractor. This environmental contractor, acting under SEA's direction and supervision, will be preparing an environmental document--either an environmental impact statement or an environmental assessment--for the proposed rail line construction and operation. By necessity, SEA's schedule for completing the environmental analysis will run behind the schedule already underway for the Bureau of Land Management's (BLM) DEIS.

In addition, NNRC plans to reinstitute service and operate as a common carrier by railroad over the 150 mile line between Keystone and Cobre, NV. This may entail the construction of a railroad overpass over the line of the Union Pacific Railroad

Response to Letter 22

22-1 BLM has determined that ICC does not meet CEQ's requirements for a cooperating agency outlined in 40 CFR 1501.6(b), specifically to participate in the scoping process. Since ICC intends to prepare its own environmental document, as noted in Comment 22-1, it may be more appropriate for ICC to incorporate relevant sections of the Robinson Project Final EIS by reference as provided for in 40 CFR 1502.21.

Company at Shafter, NV. It has not been determined what, if any, environmental analysis may be required for this project and NNRC has not yet filed an application with the Commission in this matter. If this latter proceeding is not exempt from the Commission's environmental rules, SEA expects to consider both the 3.126 mile construction and operation and the 150 mile operation in one document.

Clearly, the rail portion of the Robinson Project is a small component of the overall project covered in BLM's DEIS. Nonetheless, the DEIS covers a considerable number of issues relevant to the proposed rail line. These include Chapter 2.2.12, Transportation; the proposed mitigation measures listed at page 2-63 covering the transportation of hazardous materials; and portions of Chapter 4.0, Environmental Consequences.

22-1 cont'd

Given BLM's and SEA's different schedules, we believe that the best course of action is for SEA to prepare its own environmental document for the proposed rail line, incorporating by reference appropriate portions of BLM's Draft and Final Environmental Impact Statements. This would enable SEA to focus on the environmental issues related to the proposed rail line construction and operation, which is subject to the Commission's jurisdiction.

If you have any questions, please call either Vicki Dettmar or Harold McNulty at (202) 927-6217. Also, I have enclosed a copy of our environmental rules for your information. Thank you for the opportunity to comment on the DEIS.

Sincerely,

Elaine K. Kaiser

Elaine K. Kaiser, Chief
Section of Environmental Analysis

hmm\nnrc.blm

Letter 23

BOB MILLER
Governor

STATE OF NEVADA

PETER G. MORROS
Director

R. MICHAEL TURNIPSEED, P.E.
State Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
Capitol Complex
123 W. Nye Lane
Carson City, Nevada 89710
(702) 687-4380

June 16, 1994

Dan Netcher, EIS Team Leader
U.S. Bureau of Land Management
Ely District
HC 33 Box 33500
Ely, Nevada 89301

Re: Draft EIS dated April 1994 for Robinson Project

Dear Mr. Netcher:

This office has reviewed the subject document and has the following comments:

23-1 The tailings dam construction and operation is subject to the terms and conditions set forth in state engineer permit J-413.

Groundwater pumpage for mine process water or pit dewatering is subject to appropriation permits obtained by the operator. Waste of excess water, if any, is unlawful. Unreasonable water level drops in neighboring water wells, adverse impacts to springs or other surface water sources or any related changes in the preexisting flow conditions, that can be attributed to mine operations, may cause this office to regulate mine pumpage or seek mitigation measures. As many constant flow measuring devices as possible should be installed immediately on any water sources that may be impacted by the proposed operation to document existing conditions and changes that may occur during the operation of the mine. This will also help document natural fluctuations in flow conditions.

23-2 Requirements for mitigation to water resource impacts should be clearly defined with appropriate trigger mechanisms before operations begin.

Thank you for the opportunity to comment. If you have any questions please communicate at your earliest convenience.

Sincerely,

Thomas K. Gallagher

Thomas K. Gallagher, P.E.
Hydraulic Engineer III

Response to Letter 23

23-1 Comment noted. Your suggestions have been passed on to RMLP.

23-2 Environmental Protection Measures for water resources can be found on pages 2-58 through 2-60 in the Final EIS. All these measures are part of RMLP's proposed action and would not require a "trigger" before they are implemented.

Letter 24

June 16, 1994

Bureau of Land Management
Ely District
Mr. Dan Netcher, EIS Team Leader
HC 33 Box 33500
Ely, NV 89301

Dear Mr. Netcher:

Following are a number of comments on the DEIS addressing the proposed resumption of mining activity in the Robinson District. Please allow me to go on record as stating that the Draft Environmental Impact Statement is a very thorough document that adequately addresses any concerns of supposed deficiencies in the original EA.

24-1 Reclamation standards as described should be quite adequate in assisting Nature to revegetate disturbed areas. As you know, natural "volunteer" revegetation has been steadily moving onto historic dumps and wastepiles. I believe that in the long term even if no special efforts were made, revegetation of the district's disturbances would take place. With the proposed active programs to re-establish vegetation, there appears little likelihood that any long term "blighted zones" will persist on public lands.

24-2 There has been some mention of possible test-plot programs to experiment with more effective methods of revegetating disturbed areas. I know that such things cost money, and surplus funds are likely to be tight in the BLM or any other federal bureau. Perhaps interested third parties that have sources of outside financing might be approached for contributions to implement such studies.

Possible impacts on water quality was a big issue for some parties that took exception to the original EA. It appears that such concerns were unwarranted, as demonstrated by the very thorough and rigorous PTI study. Concerns may be expressed by some in regards to the proposed new tailings impoundments in Giroux Wash; in particular, in reference to levels of sulfate and total dissolved solutes that might seep into the subsurface from these impoundments. Meaningful assessment of such impacts, of course, must take into account the *pre-existing natural inputs* , such as sulfate minerals that are already present in weathering profiles and/or geologic formations of the area and that are wholly unrelated to mining activity. Otherwise, a strict and uninformed reading of the regulatory letter of the law might require "cleaning up after Nature", which surely is not the intent of the regulations.

It is possible that some might raise any number of "what if" questions in regards to water quality around the tailings impoundments or pits on the mining property, and indeed no one can predict the future with perfect clarity. However, judge from the experience of the past: If for many decades enormous acid drainage or groundwater contamination problems have not occured *in the absence* of environmental regulation and oversight, I see very little substantial scientific reason to fear them in the future when so many regulations and oversights *shall* be in place.

Similar concerns might be voiced about the ultimate fate of waste-rock piles as long-term sources of potential contamination. There would be nothing in a waste-rock pile that was not originally in the ground at the site. One might speculate that rates of natural oxidation releasing "contaminants" would be accelerated in a waste rock pile relative to sulfide-bearing rocks *in situ*. However, experience has shown that sulfide-bearing rocks dumped decades ago in the Robinson District remain largely unoxidized after many years of exposure to weathering. I judge concerns over waste-rock piles as reservoirs of future contamination to be highly exaggerated.

Response to Letter 24

24-1 Comment noted. The test plot program will identify shrub species that have successfully invaded previously disturbed areas.

24-2 The test plot program will be developed by RMLP in cooperation with BLM and others. RMLP would be responsible for costs associated with development and implementation of the test plot program. See also Response to Comment 7-2.

Letter 24 Continued

My thanks to you and your many colleagues for undertaking a very involved and difficult task in putting together the DEIS, and for the diligence you have shown in making the process of comment and review as efficient as possible. I do not believe that any substantial environmental concerns remain to be addressed before allowing the Robinson Project to proceed as has been proposed. Indeed, the sooner the operation might commence, the sooner that many historical impacts now unacceptable to modern sensibilities might begin to be ameliorated.

Thank you for your time and attention.

Sincerely yours,

Richard Hasler
Vice President
People for the West!
White Pine County Chapter
P.O. Box 1243
Ely, NV 89301

P.S. This comment is printed on recycled paper.

Response to Letter 24

Letter 25

United States Department of the Interior

FISH AND WILDLIFE SERVICE
NEVADA ECOLOGICAL SERVICES STATE OFFICE
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

June 17, 1994
File No. BLM 10-4

Memorandum

To: District Manager, Ely District Office, Bureau of Land Management, Ely, Nevada (Attn: Dan Netcher)

From: State Supervisor, Ecological Services, Reno, Nevada

Subject: Draft Environmental Impact Statement, Robinson Mining Project, White Pine County, Nevada (ER 94/0059, Control #94-02034)

The Fish and Wildlife Service (Service) has reviewed the above referenced Draft Environmental Impact Statement (Statement). The Robinson Mining Limited Partnership proposes to reinitiate copper mining and expand gold leaching activities in the Robinson Mining District, White Pine County, Nevada. The proposed action is approval of the project which would include expansion and continued mining in five open pits, expansion of waste rock dumps, and construction of gold and copper heap leach pads and ponds, an ore crushing facility, a copper concentrator, a solvent extraction/electrowinning facility, a 2,174-acre mill tailings disposal facility, a 13.7-mile long electric transmission line, and a pipeline corridor. The proposed project will disturb 5,356 acres, of which approximately 3,216 acres are private land and approximately 2,140 acres are public land. Mining operations are proposed to begin in 1996 and continue for 15 years; reclamation would continue for another 7 years.

Our comments and recommendations regarding the adequacy of the Statement in addressing impacts to vegetation, riparian and wetland areas, wildlife and fisheries resources, and endangered and threatened species are provided below. The Service may provide further comment on water quantity and quality issues in a separate memorandum.

General Comments

25-1 The Statement provides an adequate description of existing fish and wildlife resources and potential impacts of the project on these resources. We are concerned, however, that the proposed mitigation does not compensate for the substantial loss of habitat and associated short- and long-term impacts to wildlife. We do not agree that the

Response to Letter 25

25-1 Comment noted. Please see responses to your specific comments below.

Letter 25 Continued

25-1 proposed reclamation will result in a long-term net benefit to wildlife. In addition, we have concerns regarding mine closure and reclamation alternatives. Our specific comments address these and other issues in more detail.

Specific Comments

Section 4.1.4 Vegetation. Page 4-28 to 4-33.

The Statement describes the vegetation in the project area as predominantly pinyon-juniper woodland on hillsides and mountaintops, with northern desert shrub/sagebrush in valley bottoms and on alluvial fans. Development of the mine area under the proposed action would remove or disturb vegetation on approximately 3,345 acres of undisturbed land; of this acreage, approximately 67 percent is pinyon-juniper woodland with the remainder comprised of northern desert shrub/sagebrush. In addition, approximately 2,011 acres of previously disturbed land would be affected.

25-2 The second paragraph on page 4-29 concludes, "This loss of vegetation is considered minimal since these vegetation types are widely distributed throughout the region." While we agree that the vegetation types to be disturbed are relatively widespread, we are of the opinion that 3,345 acres represents a substantial loss of wildlife habitat. In particular, the pinyon-juniper ecosystem provides high values for many migratory and resident bird species. We are in full agreement with the assessment on page 4-34 of the Statement that, "The greatest direct impact of habitat removal and disturbance to area wildlife species near the mine area would be the loss of nesting or breeding habitat, foraging areas, and cover, with an associated reduction in carrying capacity....Displaced individuals may or may not be able to establish new territories in adjacent habitats, depending on such variables as the species' behavior, density, and individual habitat requirements." In addition to these direct impacts to wildlife, indirect impacts may include loss of reproductive potential, increased competitive pressure on adjacent populations, decreased food resources and habitat quality in adjacent habitats, and long-term impacts to regional populations.

We recommend that the project proponent provide compensation for the loss of 3,345 acres of habitat. Specific comments and recommendations on compensation/mitigation are provided below under section 4.5, Potential Mitigation and Monitoring.

Response to Letter 25

25-2 Comment noted. Please refer to Response to Comment 25-16.

Letter 25 Continued

4.1.4.2 Vegetation: Mine Closure/Reclamation. Page 4-32 to 4-33.

25-3 In reference to Giroux Wash, the Statement indicates that it may take 50 to 100 years for mature pinyon to dominate the site following mine closure and reclamation. We concur with this general estimate and note that, depending on conditions, reestablishment of a mature pinyon-juniper community may take even longer. Wildlife dependent on this type of habitat may, therefore, be adversely affected for a long period of time. Referring to disturbance of native habitats, the second paragraph on page 4-34 states, "Loss of habitat and effects to carrying capacity would occur over a period of 15 to 20 years, until reclamation is achieved." This statement is misleading, given that the majority of habitat lost would be pinyon-juniper woodland and, as noted above, full restoration is likely to take more than 50 years.

25-4 The document states that reestablishment of vegetation on currently unreclaimed areas would increase the total amount of vegetation over the entire site following reclamation. However, as also indicated in the Statement, existing plant communities would be replaced by other plant communities following reclamation. Thus, while there may be "more" vegetation present after reclamation (in terms of biomass, cover, or other measures), the value of the habitat provided may be less than what currently exists. The sections of the Statement that address reclamation raise many questions regarding the potential for success of the reclamation effort and the values of the reclaimed site for wildlife. Various factors, such as insufficient topsoil, disturbance of existing soil profiles, occurrence of weed species on previously disturbed areas, and the unknown suitability of waste rock as a growth medium, will influence the amount of native vegetation reestablished following mine closure. We believe that the Statement does not demonstrate that the proposed additional reclamation of previously disturbed areas will fully compensate for the short- and long-term impacts to wildlife and biological diversity resulting from this project.

4.1.5 Riparian and Wetland Areas. Page 4-33.

25-5 Direct impacts of the proposed action would result in the loss of a 3.9-acre rush/sedge community near the Deep Ruth Shaft and a 0.2-acre riparian parcel near Sunshine Dump, for a total loss of 4.1 acres of riparian habitat. It does not appear that the project proponent proposes any mitigation or compensation for this loss. Riparian habitat is particularly important in this region to many species of wildlife. As noted on page 3-44 of the Statement, "Since available water is a limiting factor, riparian and wetland habitat supports a higher population diversity and density of wildlife species than any other habitat type occurring in the region." We

Response to Letter 25

25-3 Comment noted. See Response to Comment 26-11.

25-4 Comment noted. It was not the intent of the discussions in the Final EIS to indicate that reclamation would result in the equivalent replacement of wildlife habitat disturbed. Reclamation would be designed to meet the post-reclamation land use objectives which include wildlife habitat, livestock grazing, recreation, and industrial uses. Reclaimed areas in both the short- and long-terms may be suitable for different species than was the case prior to disturbance.

25-5 It is acknowledged that riparian habitat is important to wildlife species, and loss of this habitat type would typically be considered a significant impact needing possible mitigation compensation. However, the 4.5 acres of riparian vegetation located within the mine area near Deep Ruth Shaft (4.3 acres) and the Sunshine Dump (0.2 acre) sustain only limited wildlife use. The Sunshine Dump location is a result of surface runoff from the dump and would be lost when the dump is expanded. The original riparian zones along Fisher Canyon were created by water pumping and discharge at Deep Ruth Shaft for previous mining operations (see page 3-12 in the Final EIS). Below the Deep Ruth Shaft, this discharge created an open, linear 3.9-acre rush/sedge community along the drainage, with a 0.4-acre area of willows. Since the end of mining operations in the late 1970s, no water has been present except during heavy runoff, and the riparian vegetation is in the process of reverting to upland species. The remaining willows along the channel perimeter are small and scattered. No sign of wildlife use (e.g., bird nesting) along the open, rocky drainage was recorded during the field reconnaissance. The Proposed Action would not discharge any water into Fisher Canyon to support riparian vegetation. The text on page 3-44 has been expanded to better describe this habitat.

This very limited and somewhat stressed riparian vegetation currently present within these 4.5 acres does not provide the cover and foraging resources that are typically associated with riparian habitats found in this arid environment. In other words, no distinct wildlife species were determined to occupy these areas, due to the limited resources available. The associated habitat value for wildlife was determined to be essentially equal to that of the surrounding areas. It is for these reasons that no mitigation measures were developed for riparian habitat loss.

Letter 25 Continued

25-5 recommend that the project proponent mitigate for this impact by creating or restoring in-kind habitat, at a ratio of at least 2 acres created for each acre lost, in the general vicinity of the project.

25-6 It is not clear from the information provided in the Statement which areas within the project boundaries are regulated by the Army Corps of Engineers (Corps) as wetlands or waters of the United States pursuant to section 404 of the Clean Water Act. The Statement does indicate (on page 3-42) that Giroux Wash and "Several additional intermittent drainages" within the mine area and along the proposed transmission line route are classified as waters of the United States, and are therefore regulated by the Corps. On page 2-14, the document states that approximately 3.5 acres of intermittent stream channel within the area of the tailings disposal facility (Giroux Wash) are subject to regulation by the Corps. The Statement notes further that the total surface area of the stream course affected would be less than 10 acres, and thus would be covered under a Nationwide Permit. However, other references in the document (e.g., mention on page 2-10 of a series of diversion ditches required to re-route storm water from natural drainages, and discussion on page 2-55 of culvert removal and natural drainage reestablishment during road reclamation), suggest that additional waters of the United States may be affected by the project. The final document should specify all streams and intermittent drainages that will be affected, the total acreage affected, and any vegetation associated with these areas. The project proponent should be aware that a 404 permit must be obtained for activities involving the discharge of dredged or fill material into or excavation of wetlands and waters of the United States over the entire project area. The Service likely will recommend to the Corps avoidance of impacts to wetlands and waters of the United States to the fullest extent possible, and full compensation for unavoidable impacts.

<u>4.1.6. Wildlife and Fisheries Resources. Page 4-33 to 4-41.</u>

25-7 Under the Migratory Bird Treaty Act, it is unlawful to destroy the nests, nest contents, or young of migratory birds. Land clearing during the avian nesting season could result in such destruction. One of the potential mitigation measures, described on page 4-102, is to prohibit removal of native vegetation between May 1 and July 30 to protect nesting migratory birds. However, loss of bird nests or nestlings is described several times in the document as a potential impact of the project: Direct loss of less mobile species, including bird nestlings, as a result of habitat disturbance (page 4-34); loss of eggs and nestlings in Giroux Wash as a result of vegetation removal during the breeding season (page 4-33); and loss of loggerhead shrike (*Lanius ludovicianus*) eggs or nestlings if pinyon-juniper habitat were

Response to Letter 25

25-6 RMLP has identified all project areas that would constitute jurisdictional waters of the United States and has consulted with the U.S. Army Corps of Engineers (COE) regarding compliance with Section 404 of the Clean Water Act. On August 30, 1991, RMLP submitted to COE a notice of intent to be covered under the Section 404 nationwide permit program with respect to disturbance of 3.44 acres of intermittent drainage in Giroux Wash. On November 25, 1992, RMLP submitted an amended notice of intent, noting that an additional 0.25 acre of ephemeral stream channel would be filled in Fisher Canyon, resulting in a total of 3.69 acres of waters of the United States that would be affected. These areas of disturbance and locations have been corrected in Sections 2.2.7.2, 4.1.2.1, and 4.7 in the Final EIS. RMLP will comply with applicable requirements under the terms of the nationwide permit. To date COE has not sought to require any mitigation relating to these areas. See also Response to Comment 17-4 above.

25-7 The comment is correct in stating that the EIS analysis identified potential impacts to birds if vegetation were removed during the breeding season. As discussed, these impacts could include loss of nests, eggs, or nestlings. In accordance with NEPA guidelines, the impacts were described as specific environmental consequences in Section 4.1.6.1. Because such impacts would violate the Migratory Bird Treaty Act, Mitigation Measure W-1 (Section 4.5) was developed to minimize potential impacts to nesting birds. If any significant residual impacts remained after application of this measure, they would have been described in unavoidable adverse impacts (Section 4.7). Because of the relatively compressed breeding season in Nevada, it was determined that implementation of this measure would avoid significant impacts to breeding birds from mine development and operation. The construction constraint period (May 1 through July 31) was based on site-specific study results and discussions with NDOW and is consistent with constraint schedules for other ground-disturbing activities in the Egan Resource Area.

25-7 removed during the breeding season (page 4-43). We recommend that land clearing be completely avoided during the avian breeding season, and note that the period May 1 to July 30 may not encompass the breeding season for all species which nest in the project area.

25-8 On page 4-36 the document states, "No impacts to raptor species would result from construction of the 13.8-kV distribution line located within the mine area...the structures would incorporate standard raptor-proof designs to prevent electrocution of birds attempting to perch on the line." The document should specify the methods that will be used to protect raptors. Such measures should be used along the entire length (13.7 miles) of the transmission line.

4.1.7 Threatened, Endangered, and Other Sensitive Species. Page 4-42 to 4-45.

25-9 We are concerned with the likelihood of impacts to several candidate species. As noted in the Statement, the ferruginous hawk (*Buteo regalis*), a category 2 candidate, is a common breeder in the project vicinity. The Nevada Division of Wildlife identified the Egan Resource Area as the most important area within the State for breeding ferruginous hawks. The document states that no nesting activity has been reported near the mine, and no active nest sites are currently known to occur near the transportation corridors. There is no indication, however, of how this determination was made. The document should specify if surveys have been conducted to determine the presence or absence of this species.

25-10 In addition, it appears that the spotted bat (*Euderma maculatum*), loggerhead shrike, and pygmy rabbit (*Brachlagus idahoensis*), all category 2 candidate species, may also be adversely affected by the project. Monte Neva paintbrush (*Castilleja salsuginosa*), a category 1 candidate plant, potentially occurs within the mine area and along the transmission line route. The document states on page 3-54 that, while Monte Neva paintbrush is unlikely to occur within these areas, it is known to be associated with a hot spring "a considerable distance north of the mine area." The document should specify the location of the hot spring in relation to the mine.

4.3 Disposal of Mill Tailings or Waste Rock in Liberty Pit. Page 4-89 to 4-98.

25-11 This section analyzes five scenarios (described in section 2.4 beginning on page 2-65) under the alternative for the disposal of mill tailings or waste rock in Liberty Pit. We recommend the selection of scenario 3, in which a smaller tailings disposal area would be constructed in Giroux Wash (sufficient to support the 7-year mining life of Liberty Pit), the

25-8 Methods to prevent raptor electrocution on smaller distribution lines, such as the 13.8-kV line located within the mine area, could include special structure configurations, addition of insulation, and management of bird perching. Often utilities follow the methods outlined by Olendorff et al. (1981) in the "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1981." Section 2.2.16 includes the committed protection measures for wildlife resources. As indicated, the raptor protection chosen for the 13.8-kV distribution line would be in accordance with the above guidelines. These protection measures would be incorporated into the design for the entire length of the distribution line. This has been clarified by a modification to page 2-61.

The comment refers to incorporating such measures along the, "...13.7-mile of the transmission line." Please review page 4-43 (Section 4.1.7.1). This section discusses the potential for electrocution of raptors along the transmission line (versus a distribution line of 69 kV or less). As discussed, the physical dimensions and configuration of a transmission line of this size would not present an electrocution hazard to area raptors since the distance from phase to phase, or phase to ground, would exceed the greatest wing span of any bird species that may occur in the area.

25-9 The BLM has conducted ferruginous hawk surveys within the areas potentially affected by the project components. Based on the comment, a statement has been added to page 3-51 to clarify the determination of species' presence or absence, relative to the proposed project.

25-10 Please note the impact analysis in Section 4.1.7.1 of the Final EIS for the spotted bat, loggerhead shrike, and pygmy rabbit, and the mitigation measure developed for potential loss of loggerhead shrike habitat in Section 4.5 of the Final EIS. Regarding the location of the Monte Neva paintbrush, it occurs near Monte Neva Hot Springs in Steptoe Valley. The population is located approximately 0.5 mile upgradient of the railroad corridor; therefore, no impacts to this sensitive plant species were anticipated from a potential spill of hazardous materials along the railroad. The exact location of the population is not published to ensure species protection. The location has been clarified, however, on page 3-54 of the Final EIS.

25-11 Comment noted.

Letter 25 Continued

25-11 the remainder of tailings would be put back into Liberty Pit, and Liberty Pit would be reclaimed following mine closure. The benefits to wildlife of reducing the size of the tailings disposal include less acreage subject to removal of pinyon-juniper habitat, additional acreage that can be reclaimed, and a reduction in potential hazards resulting from pit lakes and surface ponding on the tailings disposal site.

25-12 We further recommend that, based on a smaller tailings disposal facility, alternative locations for that facility be reconsidered. Section 2.6, Alternatives Considered But Eliminated From Detailed Discussion, rejects all but the proposed location and the Liberty Pit disposal alternative. In reference to alternative disposal locations, the document states on page 2-75, "Most of the areas within the core project area were also determined unsuitable, primarily because the majority of the area is occupied by known mineral zones or other essential mine facilities..." Giroux Wash, the proposed tailings disposal location, is characterized in the document as an intermittent drainage, regulated by the Corps as a waters of the United States, with predominantly pinyon-juniper woodland vegetation. We question if this is the most suitable location for tailings disposal, and recommend that the project area be reexamined for alternative sites that may avoid impacts to waters of the United States and/or pinyon-juniper habitat.

25-13 The Statement does not evaluate the alternative of backfilling the other four pits, aside from Liberty. On page 2-76, under Alternatives Considered But Eliminated From Detailed Discussion, the document states that the Kimbley, Wedge, Ruth and Veteran-Tripp Pits were deemed unsuitable for tailings disposal due to the sequence of mining. It is not clear, however, why the sequence of mining prohibits the use of one or more additional pits for disposal of tailings or waste rock. If the Veteran-Tripp Pit is the second pit to be mined, as noted on page 2-9, why is it not possible to backfill it with waste rock generated from the last three pits to be mined? The final document should address this issue and consider the alternative of backfilling additional pits.

<u>4.4 Reclamation Alternative. Page 4-98 to 4-102.</u>

25-14 This section evaluates seven reclamation options that could be applied to the project; any option or combination of options could be implemented. We recommend that the following reclamation options be selected: 4.4.2, Removal of All Surface Structures, in which all surface facilities and structures would be removed after completion of mining and surface disturbance reclaimed; 4.4.4, Native Species, which requires that seed mixtures be comprised of only native species; 4.4.5, Undesirable Weeds, which specifies that weeds

Response to Letter 25

25-12 Comment noted. BLM has determined that the alternatives analysis has been comprehensive. Basing the consideration of alternative tailings facility locations on a smaller facility would not change the conclusions reached in the Draft EIS. As pointed out in Section 2.6.1, pages 2-69 and 2-76 of the Final EIS, the criteria used in identifying the most suitable location were based on seven primary factors that would not be size-dependent. In addition, although the impoundment that would result from implementation of the Agency Preferred Alternative (including disposal of tailings into Liberty Pit) would be smaller by 656 acres than under the Proposed Action, the Agency Preferred Alternative (Section 1.5) also clearly leaves open the option to mine additional copper from Liberty Pit and, therefore, deposit more tailings into Giroux Wash or to place all the tailings in Giroux Wash if a Water Pollution Control Permit for disposal into Liberty Pit could not be obtained from the State of Nevada.

25-13 By the time the Veteran-Tripp Pit became available, active mining would be limited to the Ruth Pit, which is located on the far side of the District. The logistics of moving waste rock such distances is impractical and infeasible. New disturbance at Ruth Dump for waste rock disposal would be limited to 125 acres.

25-14 Comment noted.

Letter 25 Continued

25-14 could not comprise any percentage of the required cover; and 4.4.6, Similar Climatic Condition Seed Sources, which specifies that seed sources would be from environments with similar elevation and climatic characteristics.

25-15 We also support options 4.4.3, Cover Standards, in which reclamation cover standards are based on Range/Woodland Site Descriptions, and 4.4.7, Species Diversity Requirements, which specifies vegetation diversity standards, to the extent that these options will aid in reestablishing pre-project conditions. The Statement indicates on page 4-100 that, under the Cover Standards option, the standard would be based on the amount of vegetation cover and composition that currently occurs in the mine area under existing climatic and land use conditions. It is not clear from the discussion, however, if the Range/Woodland Site Descriptions have actual species requirements, representative of the existing vegetation communities, or only cover and life form (i.e., grass, forb, shrub, etc.) requirements. Similarly, under the Species Diversity Requirement, the document states that a specific number of grass, forb, and shrub species would be required to be established in each reclamation zone. It is not clear how the actual plant species required compare to northern desert shrub/sagebrush and pinyon-juniper woodland communities. The document should provide this information. The goal of reclamation should be restoration of natural ecosystems.

<u>4.5 Potential Mitigation and Monitoring. Page 4-102 to 4-104.</u>

25-16 The only mitigation proposed for the loss of 3,345 acres of native vegetation is reclamation following mine closure. As discussed previously, the final outcome of reclamation efforts is uncertain. We are of the opinion that impacts to plant communities and wildlife that will result from this project are significant and are not adequately mitigated. We are concerned about the length of time required for northern desert shrub/sagebrush and pinyon-juniper woodland communities to become reestablished, and the interim loss of habitat available to wildlife dependent on these communities. We recommend that measures, in addition to full reclamation of the project site following mining activities, be developed and required to compensate for impacts that will occur. One possibility is offsite reclamation, concurrent with project activities, of previously disturbed lands in the general vicinity of the mine. This would compensate for temporal loss of habitat on the project site and habitat lost through pit construction. Another potential compensation measure would be placement of monies into a fund for restoration or enhancement of other disturbed areas. Sites used to compensate for permanent or long-term impacts should be set aside in perpetuity by closing these areas to mineral entry.

Response to Letter 25

25-15 The goal of reclamation is to stabilize the soil and achieve vegetation cover and composition that is consistent with the desired post-reclamation land uses. For the Robinson Project, these are wildlife habitat, livestock grazing, recreation, and industrial uses, which are in conformance with the Egan Resource Management Plan (RMP). The reclamation cover and composition standards (Table 2-13) do not include specific species requirements but only life form requirements. Several of the species presented on Table 2-7 and 2-8 are native to the northern desert shrub/sagebrush and pinyon-juniper communities. In addition, native species presented on Tables 2-14 and 2-15 would be included in the test plot program, on which the final species selection would be based.

25-16 Comment noted. The BLM has determined that the RMLP's final Reclamation Plan and the Reclamation Bond agreed upon by the BLM, the State of Nevada, and RMLP are appropriate means to ensure adequate reclamation of the project site to meet the identified post-mining land uses which are in conformance with the RMP.

Letter 25 Continued

25-17 One potential mitigation measure proposed is construction constraints within 0.5-mile of any ferruginous hawk nest located along the transmission line route. The document indicates on page 4-103 that such constraints may be used during "the highly sensitive or early periods of the breeding season (e.g., courtship and incubation)." We recommend that the entire project area, including the transmission line route and pipeline corridors, be surveyed for nesting raptors prior to land clearing or construction activities. If any active nests are located, activities should be restricted until several weeks after young have fledged.

25-18 Another potential measure, described on page 4-104, is to expand the existing monitoring program for the cyanide solution ponds and heap leach facilities "to determine the full extent of bird and mammal mortalities or injuries." Given the history of wildlife mortalities at this mine site as a result of either cyanide poisoning or entanglement in aerial netting (described on page 4-36), stringent monitoring of ponds and pads should be a required measure. The document states that, under this potential mitigation measure, cyanide solution ponds, heap leach pads, and the tailings facility would be examined weekly for wildlife mortality or injury. In addition to surveying for wildlife accidents, all wildlife exclusion devices (e.g., nets, fences, etc.) throughout the project should be checked for damage on a weekly basis. The final document should specifically describe maintenance procedures of wildlife protection devices, including frequency of inspection.

Summary Comments

25-19 The Robinson Project is a large operation with impacts to over 3,000 acres of currently undisturbed native vegetation. The loss of this habitat, the length of time necessary for reclamation to be achieved, and the uncertain outcome of reclamation efforts result in substantial impacts to wildlife, both during the life of the project and for an extended period following mine closure. The Service recommends that the project proponent compensate for these impacts by restoring habitat concurrent with its mining operations. We also recommend that reclamation of the mine site aim to restore, to the extent possible, the existing vegetation and wildlife communities. To assist in achieving this, we support many of the proposed reclamation alternatives. In addition, the final document should consider some potentially less environmentally damaging alternatives for tailings and waste rock disposal. It is our goal to assist the project proponent and the Bureau of Land Management in reducing impacts to fish and wildlife resources.

Response to Letter 25

25-17 Based on the results of surveys conducted by the BLM and the fact that other raptors do not have special management status, Mitigation Measure W-3 has been limited to ferruginous hawks. Preconstruction surveys along the transmission line route would be conducted if disturbance activities were to occur during the breeding season. As indicated in the EIS, the appropriate protection procedures would be developed by the BLM biologists, according to site-specific requirements, in the event an occupied nest may be disturbed.

25-18 Based on your comment, Mitigation Measure W-7 has been modified to include daily monitoring of cyanide solution ponds, heap leach pads, and tailings facility. This modification is presented in Section 4.5. The measure also clarifies that these monitoring activities would focus on examining the integrity of the wildlife exclusion devices (e.g., fencing, netting) associated with these facilities, to ensure the optimal protection of area wildlife. Specific maintenance procedures, as mentioned in the comment, would vary based on the exclusion device used for each facility. Typically, mine personnel inspect the integrity of the enclosures, and any sign of wildlife entry is recorded and reported to the appropriate agency.

25-19 Comment noted.

Letter 25 Continued

We appreciate the opportunity to provide comments on this Statement. The Service may also comment on the final Environmental Impact Statement, as well as any Public Notice issued for a Corps permit pursuant to section 404 of the Clean Water Act. If you have any questions, please contact Tiki Baron at (702) 784-5227.

David L. Harlow

cc:
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Response to Letter 25

Letter 26

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June 17, 1994

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RE: Robinson Mining Limited Partnership Draft Environmental Impact Statement

Dear Mr. Drais:

We appreciate the opportunity to review and provide comments on the subject document. The following are specific comments from our review of the document.

26-1 In Section 2.2.6 Tailings Disposal Facility, the documents discusses the salvage of topsoil to adequately reclaim the Robinson Mining Limited Partnership (RLMP) tailings facility at closure. The text indicates that in areas where 12 inches of soil is not available for salvage, the shortfall will be made up from areas with deeper soils. This is an excellent use of the topsoil resource. Applying 12 inches of topsoil to the tailings will enhance the success of the revegetation effort during reclamation. Allowing the soils to remain in place until the site is needed, thereby reducing the potential for windblown dust or fugitive emissions, will be beneficial to wildlife in addition to leaving native habitat intact for a longer period of time.

26-2 In Section 2.2.7.2 Design and Construction of Copper Heap Leach Facilities, the document indicates the copper leach facilities will be operated in compliance with the Nevada Division of Wildlife's Industrial Artificial Pond Permits standard stipulations. These stipulations include eight foot fencing to protect terrestrial wildlife, a cover or netting to prevent access by birds and bats and appropriate measures to ensure ponding does not occur on the tops of the heaps. The goal of these stipulations is to ensure no open solution is available to wildlife. Our agency is available to provide information on the latest technology available to meet the requirements of this goal.

26-3 In Section 2.2.15.1 General Reclamation and Test Plot Program, the document discussed some good concepts to provide for adequate reclamation of the mining disturbances to benefit wildlife. As

Response to Letter 26

26-1 Comment noted.

26-2 Comment noted. Please refer to Response to Comment 35-9.

26-3 Comment noted.

Letter 26 Continued

Gene Drais
June 17, 1994
Page 2

26-3 stated above, 12 inches of topsoil for the tailings should provide a suitable site for establishing a diverse vegetative community following reclamation.

26-4 In the same section under the Vegetation Establishment, the text indicates because of natural invasion of shrubs over time, the seed mixes will be comprised mostly of grasses. We strongly disagree with this statement. To establish a suitable site for wildlife, the seed mixture should contain a diverse mix of shrubs and forbs as well as grasses. The shrubs and forbs provide habitat requirements to many species of wildlife that grasses do not. Ensuring a diverse biotic community should be the goal of the reclamation effort. This will be accomplished by including an adequate species diversity in the reclamation seed mix. Sagebrush is an easily seeded shrub species, providing the right equipment is available. Later in the same section, the text indicates some areas may be reclaimed by grouping shrubs to increase the habitat diversity. This is an excellent concept. We support this type of reclamation activity over simply seeding grasses and waiting for succession to occur.

26-5 In Tables 2-7, Interim Seed Mixture, and 2-8, Final Seed Mixture, the species selection will provide the basis for suitable sites for wildlife upon completion of the reclamation activity. We suggest that a little more diversity in the shrub component would increase the benefit of the final mix for wildlife. species such as sagebrush, mountain mahogany and bitterbrush would provide valuable habitat for wildlife.

26-6 In Section 2.2.15.11, Post Reclamation Monitoring and Maintenance, the document indicates livestock and wild horses would be excluded from the reclaimed sites until the vegetation was sufficiently established to withstand grazing pressure. This is a good idea and will allow the vegetative communities sufficient time to become self sustaining. Past experiences have demonstrated the importance of providing this type of protection to the developing vegetative communities at mined land reclamation sites.

26-7 In Section 2.2.16, Summary of Environmental Protection Measures, in the discussion under the Wildlife and Fisheries Measures, one measure not discussed would be protecting wildlife from becoming mired in the mud of the tailings pond. This issue is raised later in the document in Section 4.1.6 Wildlife and Fisheries Resources. In the discussion under Water Quality Impacts the document states, "There is a potential for animals to become mired in the tailings, which could result in individual mortalities." We would suggest the mine ensure this type of mortality does not occur.

Response to Letter 26

26-4 Comment noted. The Agency Preferred Alternative as identified in the Draft and the Final EIS, includes reclamation option 3, which requires that cover standards be based on Range/Woodland Site Descriptions. Under this option, there would be five different vegetation areas with five different cover standards. The vegetation composition standard for the five areas has a shrub standard ranging from 20 to 50 percent.

26-5 Comment noted. See Response to Comment 26-4.

26-6 Comment noted.

26-7 Please refer to Section 2.2.6 for a discussion on the tailings facility. Based on the projected configuration of the facility relative to the surrounding topography, land from which the vegetation has been removed would intersect with the tailings pools along the upper portion of the facility, as the pools move upgradient (north). The presence of the solid ground along the front portion of the tailings pools would reduce the potential for miring in that area. Therefore, the lower portion below the pools would be the only area that would present a miring potential for big game that may occasionally try to drink from the tailings water. As indicated in Section 2.2.16, RMLP has committed to providing supplemental water sources for wildlife, depending on resource needs. To address NDOW's concerns, this protection measure has been amended to include the placement of two water sources. The location of these supplemental water sources would be determined by the BLM, NDOW, and RMLP. The availability of water for wildlife outside of the tailings area would reduce the likelihood of wildlife entering the facility. See also Response to Comment 26-14.

Letter 26 Continued

26-8 In Section 2.8, Agency Preferred Alternative, the document discusses the preferred alternatives for reclamation. These include, vegetation cover standards based on the Range/Woodland Site descriptions, weeds not being allowed to comprise any of the cover calculations and requiring specific vegetation diversity requirements. These concepts should ensure reclamation of the mining disturbances that will provide a diverse and productive vegetative community. This will provide benefits to wildlife that surpasses the existing conditions over much of the project area.

26-9 In Section 3.6, Wildlife and Fisheries Resources, the document indicates no bat concentrations have been documented within the immediate mine area. Our nongame biologist has indicated a Townsend bat maternity roost is located in a mine shaft near Ruth. He can be contacted for more specific information.

26-10 In Section 4.1.3, Soils, the document discusses the reclamation vegetation root depth being limited by the compaction of the soil cap on the copper heaps. This will limit the success of shrub species because of the shallow amount of soil available for root growth. How will this fact impact the development of a diverse vegetative community? If this site lacks a suitable shrub component, will additional efforts be made to increase the success of shrubs to meet the reclamation bond release? It is important for wildlife that the reclamation of the mine disturbance results in a diverse vegetative community, including shrubs.

This same issue is discussed further in the document in Section 4.1.4.2, Mine Closure/Reclamation. The discussion in this section goes further, to state "volunteer shrubs with aggressive root systems could breach the topsoil cap, thereby opening a conduit for water into the heap. The contact of the root systems with the heap materials could result in plant mortality, an increase in surface erosion potential, and the potential for a non-point source pollution." It would seem the heaps need to be reclaimed in a fashion that would not produce this many issues or have the potential to degrade the public lands.

26-11 In Section 4.1.6.1, Wildlife and Fisheries Resources, in the first section under General Impacts, the document discusses the impacts on wildlife species from the disturbance created by the proposed action. The document indicates less mobile wildlife will be lost and more mobile species will be displaced. We question whether this is an accurate statement. In most cases the surrounding habitat will be supporting maximum numbers of wildlife. The inclusion of the individuals "displaced" by the additional disturbance will most likely put additional demands on the existing habitat. This would result in either degradation of the existing habitat, causing loss of wildlife, or the direct loss of the "displaced" individuals. In either case carrying capacity of the

Response to Letter 26

26-8 Comment noted.

26-9 The statement in Section 3.6 regarding no known presence of bat concentrations (i.e., roosts, hibernacula) within the immediate mine area was meant to refer to the mine property owned by RMLP and BLM. It is true that bats occupy the project area, and roost or hibernation sites may occur within the mine property. The Environmental Protection Measure in Section 2.2.16 was developed to prevent impacts to such sites that may be disturbed by mine development. Please refer to page 3-46 of the Final EIS for clarification.

26-10 Please refer to Mitigation Measure V-1 in Section 4.5. NDEP noted the same concerns during their review of the preliminary Draft EIS. Measure V-1, which requires placing 24 inches of uncompacted material over the copper heaps, was subsequently developed and included in the Draft and Final EIS. This measure would enhance shrub establishment on the reclaimed heaps and reduce potential sources of pollution.

26-11 The EIS analysis of potential impacts to wildlife from the incremental development of the mine was not intended to assume that displaced animals could disperse into the adjacent habitats with no effect to the existing animals. Adjacent habitats may or may not be at carrying capacity for a given species. The text of the Draft EIS stated, "Displaced individuals may or may not be able to establish new territories in adjacent habitats, depending on such variables as the species' behavior, density, and individual habitat requirements." As the comment indicates, the adjacent habitats may already be at carrying capacity for certain wildlife species, because water availability is a major limiting factor in much of Nevada, including the mine area. As mentioned in the Draft EIS, the incremental development of the mine would aid in animal dispersal, plus the placement of water sources along the mine perimeter would enhance these adjacent habitats for wildlife use. The text on page 4-34 of the Final EIS has been modified to more accurately reflect this impact issue.

Letter 26 Continued

Gene Drais
June 17, 1994
Page 4

26-11 habitat will control the number of individuals utilizing that habitat.

26-12 In the same section, the document discusses the impacts to sage grouse. The text indicates a potential for impacts to sage grouse along the 5.5 mile section of the power line route that does not follow an existing corridor. It would be possible to eliminate this potential impact by rerouting or constructing the power poles in the vicinity of sage grouse leks with anti perching devices. The text also discusses the potential to disturb sage grouse leks if construction occurs within 1/2 mile of a lek during the strutting season. This impact would be eliminated by constructing the power line when the sage grouse are not strutting or nesting. We recommend that power lines not be located within 2 miles of any sage grouse lek.

26-13 In Table 4-6, Wildlife Mortalities Recorded at the Robinson Mine Since January 1992, the final entry indicates the golden eagle died after it became entangled in netting. According to our records, this is inaccurate. The eagle did not become entangled in netting.

26-14 In Section 4.1.8, Wild Horses, the document indicates wild horses will be prevented from gaining access to the tailings pond. We recommend that fencing requirements also address exclusion for big game wildlife species.

26-15 In Section 4.1.11.4, Community Facilities and Services, the documents discusses the impacts to Wildlife Law Enforcement in the vicinity of the proposed project. We agree with the evaluation included in the discussion. There will be grater wildlife law enforcement responsibilities as a consequence of the population increase expected from the development of the proposed project.

26-16 In Section 4.1.14, Grazing Management, the first Section, 4.1.14.1, indicates livestock will be excluded from the tailings disposal area for the life of the project. We recommend that fencing requirements also address exclusion for big game wildlife species.

26-17 In Section 4.4, Reclamation Alternative, the discussion under Section 4.4.3 Cover Standards, discusses having variable cover standards for different locations. This would allow plant cover criteria, tailored by specific plant zones, to offer greater plant diversity and greater options in species selection in the seed mixes. This should benefit wildlife by increasing the diversity of the post mine vegetative community.

26-18 In Section 4.5 Potential Mitigation and Monitoring, Measure V-1 proposes to place 24 inches of uncompacted material on the copper

Response to Letter 26

26-12 The 2-mile buffer area recommended by NDOW is assumed to encompass nesting and brooding habitat, based on previous sage grouse studies. The proposed transmission line corridor does not cross appropriate habitat for sage grouse nesting or brooding. However, Mitigation Measure W-5 has been revised to include a construction constraint period, restricting any construction activities within 0.5 mile of an active sage grouse lek from 2 hours before dawn to 10:00 a.m. during the breeding period of March 1 through May 15. Also, Measure W-4 states that the BLM would conduct a sage grouse lek survey in the spring of 1995, and anti-perching devices would be installed on transmission line structures located within 0.5 mile of an active lek. The revised measures are presented in Section 4.5.

26-13 The comment is correct. The footnote for the golden eagle in Table 4-6 has been omitted. According to the mortality records, the golden eagle death was caused by cyanide ingestion from a heap leach pad where cyanide solution had pooled and was temporarily exposed. Mitigation Measure W-7 imposes requirements intended to avoid such mortalities in the future.

26-14 Please see Response to Comment 26-7, regarding potential big game impacts from access into the tailings facility. The text in Section 4.1.8 has been revised to clarify that the fencing is for <u>security</u> purposes and would surround the entire project area. The presence of the fence would, however, help prevent wild horse access to the impoundment.

26-15 Comment noted.

26-16 Please see Response to Comment 26-7, regarding potential big game impacts from access into the tailings facility. See also Response to Comment 26-14.

26-17 Comment noted.

26-18 Comment noted.

Gene Drais
June 17, 1994
Page 5

26-18 leach pad during reclamation. This would improve shrub establishment. The development of a shrub overstory on the reclaimed heaps would provide more suitable post mine habitat for wildlife.

26-19 All of the proposed mitigation measures for wildlife appear to be acceptable. Our agency is available to assist in any of the proposed activities. It should be noted that Measure W-6 appears to fulfill the requirements of the Division's Industrial Artificial Pond Permit, thus making it a regulatory requirement and not a potential mitigation. In addition, the weekly monitoring may not be sufficient to meet the reporting stipulation found in the IAP Permit. This issue can be discussed with our office during the permitting process.

26-20 As a final note, there was no indication in the DEIS that the Robinson Mine would obtain an Industrial Artificial Pond Permit for the mill tailings pond. According to NRS 502.390, Section 1, Subpart b, "Any operator of a mining operation which develops or maintains an artificial body of water containing chemicals directly associated with the processing of ore, must first obtain a permit from the Division authorizing the development or maintenance of the body of water". We feel that the Robinson Mine must obtain an Industrial Artificial Pond Permit for the mill tailings pond.

Please feel free to contact me for any additional information or comments concerning this letter.

Sincerely,

Larry Barngrover

Larry Barngrover
Wildlife Regional Manager
1375 Mountain City Highway
Elko, NV 89801
(702) 738-5332

RL:km
cc:Habitat Bureau
Doug Zimmerman, Chief, Bureau of Mining Regulation and Reclamation, NDEP
Tin Dyhr, Environmental Coordinator, RMLP
Steve Foree, Sid Eaton, Curt Baughman, Mike Podborny, Pete Bradley, Rich Haskins
File

26-19 Comment noted. Please see Response to Comment 25-18, which indicates that Measure W-7 has been revised to include daily monitoring of the cyanide solution pond, heap leach pads, and tailings facility. This revision is presented in Section 4.5 of the Final EIS.

26-20 RMLP is currently working with NDOW to determine which project facilities would require an Artificial Pond Permit; RMLP would comply with all state permit requirements regarding construction and operation of the tailings facility.

Letter 27

Bureau of Land Management
Ely District
[illegible], EIS Team Leader
HC 33 Box 33500
Ely, NV 89301

Dear Mr. [illegible],

I am the Interim Manager of Mt. Wheeler Power and have sent in comments on behalf of the power company under separate cover but I also wanted to include statements of my own. Sorry I didn't have time to type this because I'm writing you in a motel room because of being off on a business meeting.

Comments start on the next page.

Sincerely,

[illegible signature]

Response to Letter 27

Thank you for your letter. No response necessary.

The following are statements which I would like to make in support of the Magma EIS.

1. As outlined in the Summary, Magma's proposed use is to reactivate a historic mining area. The reclamation standards existing today are far more extensive than those when Kennecott operated. The mine site will be left in far better shape when Magma leaves compared to the way Kennecott left it.
2. As outlined in the Summary, the preferred alternative seems to be the best solution for mining the full resource of the Liberty pit and most cost effective for Magma. Would also have the least effect on water quality issues.
3. As outlined in the introduction, the project mainly consists of private land to begin with and has a limited effect on adjacent Federal lands.
4. As outlined in the introduction the products mined are copper

gold, molybdenum, and other ores. I firmly believe that these are contributing to the not wealth of our nation as a whole and also to the world economy. These products are used by manufacturing entities across the entire U.S. and all over the world.

4. The Environmental Review process outlined in Chapter 1 seems adequate. The permitting required also is adequate.
5. As outlined in Chapter 2, the ratio of mining activity on public lands to private is very minimal and have a minimal impact on public lands. For a mining project of this size, the ancillary uses of additional facilities for water and electrical transmission are really not extreme. The transmission line is relatively short.
6. The dewatering and transferring of water from one pit to another seems to have a minimum impact as possible. The State water permits should exercise appropriate assurances as to effects on ground water flows,

etc.

7. the addressing of the mining processes and stages adequately reflect any concerns for environmental affects on the site. the technology used in today mining protects limits any minimizes detrimental effects which may have existed years ago.

8 the positive impacts to Wheeler Power County are major especially when it comes to jobs created and our enhanced tax base. People like myself who live in the area are looking forward to new services - a swimming pool, parks and recreation, improved schools, business activity. a general overall stimulated economy provided by both the construction phase and operating phase.

9. the manner in which the tailings disposal area is handled is adequate. the most economical method should be the preferred alternative. I believe that minimal seepage will get through to any groundwater supplies and

have a minimal effect on the groundwater.

10 the transmission line has a minimal affect on the project. the power sales are at a basic "break-even" for Mt. Wheeler Power but the residual loads such as residential and business will provide increased sales and revenues. Mt. Wheeler Power is a cooperative and operates on a non-profit basis.

11. I feel that all areas addressing the environment concerning geological, water quality, soils wildlife and fisheries, various threatened and endangered species, wetlands, air quality, noise, etc. have all been adequately addressed. I do not feel this project will have a negative effect on the environment.

12. As far as the social and economical benefits, these should be given a wanted factor from the people who live in the area. this is an economic

boon to our area, employing many people, increasing business sales, providing more entertainment etc. This area has been depressed for so long that all of the local people are waiting on the edge of their seats looking for the simplicity of a normal life. For the past four years the economy has been based on those employed at the Ely State Prison. If it wasn't for the prison being here, Ely would be a ghost town.

13. This project will help pay for facilities which have been committed to - schools, government for city/county, police protection, courts, etc. These institutions have had extreme budget problems and have been bickering because of having to make extreme cuts. Included is fire protection, health care, transportation and the services.

14. The consequences on the

environment or any negative effects, I feel will be kept minimum as compared to all the net benefits that there is really no concern.

15. This Document is extremely well done and very well prepared. I looking forward to a new age of life and prosperity for our little (?) County. I also stress that the EA was adequate and the final reversal by Mr. Bisso wasn't necessary.

Thank you for taking my comments seriously,

JIM J. LEWIS
Jim J Lewis

#1 Clove Dr.

Ely, NV 89301

Letter 28

MT. WHEELER POWER, INC.

1600 SEVENTH STREET EAST • ELY, NEVADA

POST OFFICE BOX 1110
ELY, NEVADA 89301-1110

TELEPHONE (702) 289-8981
TELEFAX (702) 289-8987

June 17, 1994

Bureau of Land Management Office
Mr. Dan Netcher, Team Leader
Hc 33 Box 33500
Ely, NV 89301

Dear Mr. Netcher

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT ROBISON PROJECT

I found the EIS draft to be very complete in addressing both environmental concerns and long term effects the project will have in the area. The EIS was thorough and complete in recognizing all aspects of the mining processes that will take place.

On behalf of myself and Mt. Wheeler Power, I would like to comment on the importance of Magma to the people of White Pine County. In the EIS process, the current situation of the area must be taken into consideration. I feel the mining of the Robison area will have a positive impact on the people of White Pine County. I feel we will see only improvements will be made to the economy and the environment with the future development of this project.

I firmly believe that the EIS in conjunction with the Magma Nevada Mining Company will be an important part of improving all conditions in this area.

Please feel free to contact me with any questions.

Sincerely,

Jim J. Lewis

Jim J. Lewis
Interim General Manager
Resident of White Pine County

"Your Rural Electric Cooperative"

Response to Letter 28

Thank you for your letter. No response necessary.

Letter 29

NEW WHITE PINE SPORTSMAN'S CLUB
Nevada Wildlife Federation - Member
National Rifle Association - Member
P.O. Box 1187
Ely, Nevada 89301

June 17, 1994

Bureau of Land Management
Ely District
HC 33, Box 33500
Ely, NV., 89301

Attention: Dan Netcher, EIS
Team Leader, Robinson Project

At our meeting on May 23rd, our club members voted to forward the following information to you:

1. We consider the draft E.I.S. to be adequate and accurate.
2. We consider this project an excellent project and highly desirable for White Pine County.
3. We recommend that this project be approved as soon as possible.

Robert N. Marcum
Secretary

Response to Letter 29

Thank you for your letter. No response necessary.

Letter 30

BUREAU OF LAND MANAGEMENT
ELY DISTRICT
DAN NETCHER, EIS TEAM LEADER
HC 33 BOX 33500
ELY, NEVADA 89301

JUNE 17, 1994

DEAR MR. NETCHER;

I AM JACKIE URBANS, A RESIDENT OF ELY, NEVADA.

I WOULD LIKE TO GO ON RECORD AS BEING IN SUPPORT OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE ROBINSON MINING PROJECT. AFTER REVIEWING THE EIS ANALYSIS, I FEEL THE BLM, PTI AND MAGMA HAVE MORE THAN SUFFICIENTLY ANSWERED QUESTIONS AND CONCERNS ORIGINALLY BROUGHT UP.

THE NEED FOR COPPER PROJECT TO START UP IMMEDIATELY IS IMPERATIVE AND THESE UNTIMELY DELAYS NEED TO STOP. AS IN THE PAST, " WHAT IF" QUESTIONS AND STATEMENTS CAN "WHAT IF" A PROJECT TO DEATH. LET US NOT LET THIS HAPPEN.

THANK- YOU;

Jackie Urbans

JACKIE URBANS
P.O. BOX 783
ELY, NEVADA 89301

Response to Letter 30

Thank you for your letter. No response necessary.

Letter 31

EASTERN NEVADA REALTY Better Homes and Gardens
618 Aultman St., P.O. Box 488. Ely, NV 89301 TELEPHONE (702) 289-8851

JUNE 17, 19942

BUREAU OF LAND MANAGEMENT
ELY DISTRICT
DAN NETCHER, EIS TEAM LEADER
HC 33 BOX 33500
ELY, NEVADA 89301

DEAR MR. NETCHER:

ON MAY 24, 1994 I MADE VERBAL COMMENTS AT THE PUBLIC MEETING HELD AT THE BRISTLECONE CONVENTION CENTER, 150 6TH STREET, ELY, NEVADA 89301.

THE FOLLOWING ARE THE WRITTEN COMMENTS I WISH TO MAKE:

YOUR MISSION STATEMENT READS AS FOLLOWS: "AS THE NATION'S PRINCIPAL CONSERVATION AGENCY, THE DEPARTMENT OF THE INTERIOR HAS RESPONSIBILITY FOR MOST OF THE NATIONALLY-OWNED PUBLIC LANDS AND NATURAL RESOURCES."

I BELIEVE THE ABOVE TO BE A REASONABLY TRUE STATEMENT, THEREFORE I BELIEVE THE ONLY CONCERN OF THE DEPARTMENT OF THE INTERIOR SHOULD HAVE BEEN 2,140 ACRES OF LAND LOCATED IN THE GIROUX WASH AREA.

31-1 IN AS MUCH AS THE B.L.M. JURISDICTION APPEARS TO BE ONLY ON THE GIROUX WASH 2,140 ACRES, IT DOES NOT SEEM, IT WAS NECESSARY TO STUDY AND REPORT ON THE FOLLOWING.

1. ALTERNATIVES INCLUDING THE PROPOSED ACTION.
2. AFFECTED ENVIRONMENT
3. ENVIRONMENTAL CONSEQUENCES
4. PALEONTOLOGY
5. CONSULTATION AND COORDINATION

Response to Letter 31

31-1 Discussion of the items you mentioned is required by CEQ regulations for implementing the procedural provisions of the National Environmental Policy Act. These requirements are found in the Code of Federal Regulations (40 CFR Parts 1500-1508).

Letter 31 Continued

31-2 WITH RESPECT TO THE 2,140 ACRES LOCATED IN THE GIROUX VICINITY THERE IS A STRONG LEGAL ARGUMENT AS TO WHO HAS THE JURISDICTION. THE DEPARTMENT OF THE INTERIOR OR THE STATE OF NEVADA.

31-3 SHOULD BY CHANCE THE DEPARTMENT OF INTERIOR HAVE JURISDICTION R2EGARDING THE 2,140 ACRES WHICH IS THE OBJECT OF THE ENVIROMENTAL IMPACT STATEMENT THE EFFECT ON THE ECONOMY ON WHITE PINE COUTY SHOULD HAVE BEEN GIVEN CONSIDERATION, ALSO, INDIVIDUAL RIGHTS AND PROPERY RIGHTS SHOULD HAVE BEEN CONSIDERED.

VERY TRULY YOURS,

George N. Swallow

GEORGE N. SWALLOW

GNS/ch

Response to Letter 31

31-2 As presented in Section 2.2.6, the tailings disposal facility would occupy approximately 1,712 acres of public land administered by the BLM and 462 acres of private land owned by RMLP. The question of jurisdiction on public lands in Nevada is outside the scope of this EIS.

31-3 Please refer to Section 4.1.11.2 in the Final EIS for a discussion of effects of the Proposed Action on the economy of White Pine County. Questions of individual rights and property rights are outside the scope of this EIS.

JUN 21 '94 13:23 BLM NEVADA STATE OFFICE P.1/4

BOB MILLER
Governor

STATE OF NEVADA

JOHN P. COMEAUX
Director

677

DEPARTMENT OF ADMINISTRATION

Capitol Complex
Carson City, Nevada 89710
Fax (702) 687-3983
(702) 687-4065

June 13, 1994

Mr. Ron Wenker
Acting State Director
Bureau of Land Management
Nevada State Office
850 Harvard Way
P.O. Box 12000
Reno, NV 89520-0006

Re: SAI NV #94300094 Project: Draft EIS--Robinson Mining Project

Dear Mr. Wenker:

Attached are the comments from the Nevada Wild Horse Commission and the University of Nevada, Reno Bureau of Mines and Geology concerning the above referenced project. To date, no other state agencies have responded to this plan. These comments constitute the State Clearinghouse review of this proposal as per Executive Order 12372. Please address these comments or concerns in your final decision.

Additionally, Ron Sparks is no longer with the State Clearinghouse. The new single point of contact (SPOC) is Julie Butler. She can be reached at 687-6367.

Sincerely,

Maud Naroll

Maud Naroll
State Clearinghouse Coordinator

MN\jb
Enclosures

Letter 32 Continued

NEVADA STATE CLEARINGHOUSE
Department of Administration
Planning Division
Blasdel Bldg., Rm 200

(702) 687-4065

DATE: April 25, 1994

Governor's Office	Legislative Counsel Bureau	Conservation-Natural Resources
Business & Industry	Communications Board	Director's Office
Agriculture	Emp. Training & Rehab. Research Division	State Lands
Minerals	PSC	Environmental Protection
Economic Development	Transportation	Forestry
Tourism	UNR Bureau of Mines	Wildlife
Fire Marshal	UNR Library	Conservation Districts
Human Resources	Wild Horse Commission	State Parks
Aging Services	Historic Preservation	Water Resources
Health Division	Emergency Management	Water Planning
Colorado River Commission	Washington Office	Nuclear Projects Office
		Natural Heritage

Nevada SAI # 94300094 **Project: Draft Environmental Impact Statement-- Robinson Mining Project**

CLEARINGHOUSE NOTES:

Attached, for your review and comment, is a copy of the above mentioned project. Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than June 13, 1994. Use the box below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference.

THIS SECTION TO BE COMPLETED BY REVIEW AGENCY:

____No comment on this project
____Proposal supported as written
____Additional information below
____Conference desired (See below)
____Conditional support (See below)
____Disapproval (Explain below)

AGENCY COMMENTS:

32-1 WILL MINING ACTIVITY IN AREA CAUSE ROADS ACROSS HERD AREA'S? WILL WATER USAGE CAUSE EFFECTS TO WATER TABLE AND STREAM FLOW ~~HERD~~ WITHIN HERD AREAS

c:SHARDATSAICLEAR.FRM

Response to Letter 32

32-1 No roads would be constructed across Wild Horse Herd Management Areas from proposed mine development, and no water sources used by wild horses would be affected. Please refer to Section 4.1.2 and Water Quantity Impacts of Section 4.1.6.1, which discuss surface water and groundwater resources. These points have been clarified as text revisions to page 4-46 of the Final EIS.

JUN 21 '94 13:24 BLM NEVADA STATE OFFICE P.3/4

NEVADA STATE CLEARINGHOUSE
Department of Administration
Planning Division
Blasdel Bldg., Rm 200

(702) 687-4065

DATE: April 25, 1994

Governor's Office	Legislative Counsel Bureau	Conservation-Natural Resources
Business & Industry	Communications Board	Director's Office
Agriculture	Emp. Training & Rehab.	State Lands
Minerals	Research Division	Environmental Protection
Economic Development	PSC	Forestry
Tourism	Transportation	Wildlife
Fire Marshal	UNR Bureau of Mines'	Conservation Districts
Human Resources	UNR Library	State Parks
Aging Services	Wild Horse Commission	Water Resources
Health Division	Historic Preservation	Water Planning
Colorado River Commission	Emergency Management	Nuclear Projects Office
	Washington Office	Natural Heritage

Nevada SAI # 94300094 **Project: Draft Environmental Impact Statement– Robinson Mining Project**

CLEARINGHOUSE NOTES:

Attached, for your review and comment, is a copy of the above mentioned project. Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than June 13, 1994. Use the box below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference.

THIS SECTION TO BE COMPLETED BY REVIEW AGENCY:

___No comment on this project
___Proposal supported as written
___Additional information below
___Conference desired (See below)
___Conditional support (See below)
___Disapproval (Explain below)

AGENCY COMMENTS:

See attached sheet

f:\SHARDAT\SAI\CLEAR.FRM

Letter 32 Continued

JUN 21 '94 13:25 BLM NEVADA STATE OFFICE

P.4/4

NEVADA BUREAU OF MINES AND GEOLOGY

UNIVERSITY OF NEVADA RENO

June 2, 1994

Nevada SAI #94300094
Comment due date: June 13, 1994

My first comment is specifically addressed to the issue of placing mill tailings and waste rock in the Liberty pit.

The Proposed Action of the Robinson Project involves the expanded use of existing waste rock disposal areas and the placing of mill tailings in impoundment areas constructed in Giroux Wash. This plan includes mining ore from the Liberty pit as long as is economically feasible, then mining would stop and resume again only if economics improved.

The Agency Preferred Alternative, however, consists of the Proposed Action with the major modification of placing a portion of the mill tailings generated during the operation into the Liberty pit. Mill tailings would first be placed in a smaller impoundment area in Giroux Wash then, after the Liberty pit has been economically mined out, mill tailings would be diverted into the presumably abandoned pit. The mining group (Robinson Mining Limited Partnership) estimates that when mining is completed in the Liberty pit, based on current copper market conditions, there will remain unmined in the pit some 212 million tons of mineral resources (page 4-90, Section 4.3.1). This material contains low-grade concentrations of copper and gold not mineable under present conditions. As pointed out in the same section of the report, however, metal markets are volatile and, with increasing metal prices or improvements in recovery technology, the mineral resource could quickly change into an ore reserve. If the Liberty pit is filled with mill tailings, the remaining resource is lost. This would be very short-sighted.

32-2 — I feel that the Proposed Action should be followed, not the Agency Preferred Alternative.

32-3 I have two other comments; first, I believe the gold grade quoted in Section 4.3.1, page 4-90 should be 71 million tons of 0.009 ounces gold per ton, not percent gold; and second, I feel that there is some confusion with the various tonnages and grades listed in this same section. Should the 71 million tons of gold ore be added to the several categories of copper ore to obtain the stated figure of 212 million tons of resources that may be lost, or is the gold ore an included part of the copper tonnage. If the gold portion is barren of copper because it is leached capping–i.e. the copper has been removed leaving only gold behind–then the listed copper reserves might also contain some gold (probably about the same grade as the leached portion). If this is the case, gold values should be listed as part of the potential lost resource.

Response to Letter 32

32-2 Comment noted.

32-3 Based on your comment, text revisions were made to page 4-91 in the Final EIS. The grade of gold should be *ounces per ton*, not *percent*. The estimate of mineral resources that would remain in Liberty Pit after completion of mining are discrete tonnages. Therefore, the 71 million tons of gold ore is separate from the tonnages of copper ore noted. This 71 million tons of leachable gold ore is distinct in that it is oxide ore while the copper tonnages are sulfide ore. The commenter is correct in that there are additional gold values in the copper sulfide ore (60 million tons at 0.54 percent copper and 60 million tons at 0.30 percent copper). However, estimates of gold values have not been made. If similar gold values were contained in this mineral resource as are in the minable copper sulfide ore, the gold grade would average about 0.006 ounces per ton gold. As noted by the commenter, the gold contained in the copper sulfide ore would represent a potential lost resource.

BOB MILLER
Governor

STATE OF NEVADA

JOHN P. COMEAUX
Director

DEPARTMENT OF ADMINISTRATION
Capitol Complex
Carson City, Nevada 89710
Fax (702) 687-3983
(702) 687-4065

Re
6/20

June 16, 1994

Mr. Ron Wenker
Acting State Director
Bureau of Land Management
Nevada State Office
850 Harvard Way
P.O. Box 12000
Reno, NV 89520-0006

Re: SAI NV # 94300094 Project: Draft EIS--Robinson Mining Project

Dear Mr. Wenker:

Attached is an additional comment from the Nevada Natural Heritage Program that was received after our previous letter to you. Please incorporate this comment in your decision making process.

Sincerely,

Maud Naroll

Maud Naroll
State Clearinghouse Coordinator

MN/jb
Enclosure

NEVADA STATE CLEARINGHOUSE

Department of Administration
Planning Division
Blasdel Bldg., Rm 200

(702) 687-4065

DATE: April 25, 1994

Governor's Office	Legislative Counsel Bureau	Conservation-Natural Resources
Business & Industry	Communications Board	**Director's Office**
Agriculture	Emp. Training & Rehab. Research Division	**State Lands**
Minerals	PSC	**Environmental Protection**
Economic Development	**Transportation**	Forestry
Tourism	**UNR Bureau of Mines**	**Wildlife**
Fire Marshal	UNR Library	Conservation Districts
Human Resources	**Wild Horse Commission**	State Parks
Aging Services	**Historic Preservation**	**Water Resources**
Health Division	Emergency Management	Water Planning
Colorado River Commission	Washington Office	**Nuclear Projects Office**
		Natural Heritage

Nevada SAI # 94300094 **Project: Draft Environmental Impact Statement-- Robinson Mining Project**

CLEARINGHOUSE NOTES:

Attached, for your review and comment, is a copy of the above mentioned project. Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than **June 13, 1994**. Use the box below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference.

THIS SECTION TO BE COMPLETED BY REVIEW AGENCY:

____No comment on this project
____Proposal supported as written
__✓__Additional information ~~below~~ enclosed
____Conference desired (See below)
____Conditional support (See below)
____Disapproval (Explain below)

AGENCY COMMENTS:

Glenn Clemmer

s: SHARDAT SAI\CLEAR.FRM

Nevada Natural Heritage Program

Department of Conservation and Natural Resources
123 West Nye Lane * Carson City, Nevada 89710
(702) 687-4245

16 May 1994

Comments on Nevada SAI # 94300094, Draft Environmental Impact Statement, Robinson Mining Project.

Comment due date June 13, 1994.

33-1 1. Page 2-46, Vegetation Establishment: We support the statement that "As much as practical, an effort would be made to obtain seeds of native species from sources as close as possible to the project area." Further introductions of non-native plant species to Nevada should be avoided wherever possible. This concurs with reclamation options 4 and 6 (page 2-70), which we recommend be incorporated into the proposed action along with the proposed native seed mixtures on pages 2-73 and 2-74.

33-2 Also, on page 2-96, Table 2-18, Comparison of Reclamation Options: since only positive resource impacts are identified for option 6 (Similar Condition Seed Sources), and these would mitigate the possible negative impacts identified for option 4 (Native Seed Mixes), options 4 and 6 could be adopted together in the final action without adverse consequences.

33-3 2. We commend the use of both vernacular and Latin scientific names for plants in Table 2-12 (p. 2-70), and recommend that Latin names also be included on pages 2-47,2-48, Seed Mixture tables. Because vernacular names for plant species have no scientifically recognized standard, the seed mixtures on these pages cannot be evaluated with certainty unless the Latin scientific names are also given.

33-4 3. Page 2-96, Table 2-18, Comparison of Reclamation Options: for option 5, No Weeds In Cover Standard, the effect on vegetation is described as "adjacent areas less likely to be invaded by weed species." We are concerned that this may be misleading, since the description of this option on page 2-70 states that "beyond the required cover, there is no limit on weeds."

Because many undesirable weeds are, by definition, capable of rapidly invading native vegetation, their presence in any quantity (either within or beyond any required cover values for reclaimed vegetation) makes it likely that adjacent areas would be invaded, the statements on pages 2-83, 2-96 and 4-101 notwithstanding. We recommend that all possible measures be taken to avoid further spread of undesirable weeds onto the lands of Nevada.

33-5 4. Page 2-70, Table 2-12, footnote 1, undesirable weeds: Loco weed (Astragalus spp.) and poverty weed (Iva axillaris) are native species which may occur naturally on site, and should not be included as undesirable weeds. Some species of Astragalus are rare and of conservation concern. Also, this table does not appear to be complete, since Whitetop (Cardamine pubescens) is not included. Others may be missing as well.

33-6 5. Page 3-55, Special Status Plants: the significance of a statement at the top of this page is unclear. The statement reads "These areas [where special status plant species could occur] have also been subjected to livestock grazing, which further reduces the probability that the special status species would occur within the mine area and along the transmission line."

Response to Letter 33

33-1 Comment noted.

33-2 Please refer to Sections 4.4.4 and 4.4.6 for a discussion of the environmental consequences of the native species and similar climatic condition seed sources reclamation options. These options are not without limitations (e.g., longer time to establish vegetation and potential shortage of desired seeds). Since RMLP has committed in their reclamation plan to use native species and climate-adapted seed sources as much as practical, BLM has determined that it is not necessary to place strict limitations on species selection and/or seed source, especially if these limitations could adversely affect reclamation speed and seed availability. Thus, reclamation options 4 and 6 were not included in the Agency Preferred Alternative. Also see Response to Comment 17-5.

33-3 Comment noted. In response to your comment, the scientific names have been added for the species listed in Tables 2-7 and 2-8 in the Final EIS.

33-4 Comment noted. Please refer to Response to Comment 19-4 for a discussion of noxious weed control. See also Response to Comment 33-5.

33-5 The species identified as undesirable weeds on Table 2-12 of the Final EIS are designated as undesirable because they are not palatable and would not be beneficial in meeting the post-mining land uses of livestock grazing, wildlife habitat, recreation, and industrial. Whitetop is not on the list since it is included in the noxious weed list cited in footnote[2] on pages 2-70 and 2-71 of the Final EIS. Species identified by the Nevada State Department of Agriculture as noxious have been added to Table 2-12.

33-6 Please refer to the clarification to the text on page 3-55 of the Final EIS. As indicated in the next paragraph, ground surveys did not locate any special status species in these areas.

Letter 33 Continued

Comments on Nevada SAI # 94300094 by Nevada Natural Heritage Program, Page 2 of 2.

33-6 Do prior negative impacts from other activities somehow lessen the significance of potential negative impacts from a new activity? Or do they rather increase that significance by adding to past cumulative impacts? If this statement was part of the rationale for concluding that no special status plant species occur within the project area, then that conclusion is flawed and should be re-evaluated. Otherwise, the meaning of this statement should be explained.

33-7 6. The Draft EIS should address how it will carry out the requirements of N.R.S. 527.060 to 527.120 inclusive, which regulates the removal of commercial quantities of cactuses, yuccas, and christmas trees (as defined in the statute), all three of which may occur on the project site.

Response to Letter 33

33-7 RMLP does not plan to remove cactus, yucca, or Christmas trees in commercial quantities. Under N.R.S. 527.050, cactus, yucca, and trees that would be cut or destroyed on privately owned land by the landowner and would not be removed from the property do not require registration or permitting by state or Federal agencies. Any products removed from Federal land in anticipation of project actions would be under Federal permit. Any commercial quantities removed would be transported with a shipping permit in cooperation with the Nevada Division of Forestry.

BOB MILLER
Governor

STATE OF NEVADA

JOHN P. COMEAUX
Director

DEPARTMENT OF ADMINISTRATION
Capitol Complex
Carson City, Nevada 89710
Fax (702) 687-3983
(702) 687-4065

June 20, 1994

Ron Wenker
Acting State Director
Bureau of Land Management
Nevada State Office
850 Harvard Way
P.O. Box 12000
Reno, NV 89520-0006

Re: SAI NV # 94300094 Project: Draft EIS--Robinson Mining Project

Dear Mr. Wenker:

Attached are additional comments from the Nevada Department of Transportation and the Nevada Division of Minerals that were received after our previous letter to you. Please incorporate these comments into your decision making process.

Sincerely,

Julie Butler

for Maud Naroll
State Clearinghouse Coordinator

MN/jb
Enclosures

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
1263 S. Stewart Street
Carson City, Nevada 89712

BOB MILLER, Governor

GARTH F. DULL, P.E., Director

June 13, 1994

. In Reply Refer to:

PSD 7.02

John Walker, Coordinator
Nevada State Clearinghouse
Department of Administration
Budget Division
Blasdel Building, Room 204
Carson, City, NV 89701

Dear Mr. Walker:

The Nevada Department of Transportation, has reviewed the project titled Draft Environment Impact Statement-Robinson Mining Project, SAI #94300094.

Based on the information submitted we have the following comments on the proposed project.

34-1 Reference 4.1.12.1, page 4-75, "...an accident is not anticipated during the life of the project". An accident is an unexpected occurrence, not a planned incident. The statement is a totally fallacious assumption. Also, only single vehicle accidents are addressed. No attention is paid to interaction with other vehicles on the road.

34-2 While no new accesses to state highways are discussed, petitioner must be made aware of the necessity to apply for conditional encroachment permits if the need for new accesses occurs.

Thank you for the opportunity to review this project.

Sincerely,

D. Keith Maki
Assistant Director
Planning

DKM:JWC:dg

cc: Robert Hilderbrand
Don Pray

Response to Letter 34

34-1 The probability of a release of a hazardous material (diesel fuel, sulfuric acid, or hazardous waste) was investigated using a national spill statistic that is based on the number of releases per million vehicle miles traveled. This analysis is presented in Section 4.1.12.1. The spill statistic (a release rate of 0.28 per million vehicle miles traveled) does not distinguish the type of accident (single versus multi-vehicle) that results in a release or the types of vehicles involved, but only the number of miles traveled by the transporters. Assumptions were made to quantify diesel and acid spills in the Draft EIS, and further assumptions were made to quantify hazardous waste releases in the Final EIS.

34-2 Comment noted.

06/17/94 16:49 NEVADA DEPT. OF MINERALS P.02

STATE OF NEVADA
DEPARTMENT OF BUSINESS AND INDUSTRY
DIVISION OF MINERALS
400 W. King Street, Suite 106
Carson City, Nevada 89710
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BOB MILLER
Governor

June 17, 1994
When replying refer to: NDOMLV94-037 (Amends NDOMLV94-

Julie Butler
Department of Administration, Budget Division
State Clearinghouse
Blasdel Building, Room 204
209 E. Musser St.
Carson City, NV 89710

SUBJECT: Amended Comment on the Draft EIS Robinson Projec

Dear Ms. Butler:

The Nevada Division of Minerals appreciates the opportunity to comment on the Draft EIS Robinson Project. The Ely District office is to be congratulated for expediting the environmental document once the original EA was remanded by the Director of BLM. We support the Robinson Project based on its significant new production of metal necessary for the nation's well-being, the economic benefits to White Pine County and eastern Nevada, the potential for the project to leave the mined area in a better environmental condition then currently exists and Magma's commitment as a responsible corporate citizen.

There are several areas of concern which we feel should be addressed in regard to the proposed alternative. They are summarized as follows:

1. **BACK-FILLING OF LIBERTY PIT**

   In general, the Division of Minerals does not support the back-filling of pits, especially when a resource remains undeveloped which may be of economic value at some future date. One needs only look at Magma's Robinson Project to see that back-filling by Kennecott twenty years ago would have prohibited the project today.

2. **RECLAMATION OF SIDESLOPES**

   The proposal to reclaim sides slopes at a ratio of 3:1 rather than 2.5:1 is unwarranted. Besides the expense and time involved, 2.5:1 is a commonly used slope among many operations. In addition, a survey of the hills in the vicinity will show that many naturally occurring hills are very steep walled, especially the rhyolite flows between Ely and Ruth. A 2.5:1 sideslope would not be uncharacteristic of natural features in the area. It will also minimize disturbance by reducing the surface area covered by waste dumps by 10 to 20%.

Response to Letter 34

Duplicate of Letter 19. Please see Responses to Comments 19-1 through 19-4.

Letter 34 Continued

Julie Butler
Amended Comment on the Draft EIS Robinson Project
June 17, 1994
Page 2

3. **SPECIFIC VEGETATION DIVERSITY REQUIREMENT**

We caution the use of very specific revegetation standards as far as absolute percentages of cover and species mix. A property of this size needs flexibility in meeting reclamation standards. We urge reasonable standards which take into account local variations. The clause of no noxious weeds (Table 2-12) should be modified to a reasonable percentage as it would be impossible to eliminate all noxious weeds from the entire reclamation site.

Sincerely,

Walt Lombardo
Chief, Las Vegas Office

das

cc: Russ Fields
Mr. Kenneth Walker, District Manager
BLM Ely District
HC33, Box 33500
Ely, NV 89301

Response to Letter 34

Letter 35

United States Department of the Interior

FISH AND WILDLIFE SERVICE
NEVADA ECOLOGICAL SERVICES STATE OFFICE
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

June 24, 1994
File No. BLM 10-4

Memorandum

To: District Manager, Ely District Office, Bureau of Land Management, Ely, Nevada (Attn: Dan Netcher)

From: State Supervisor, Ecological Services, Reno, Nevada

Subject: Draft Environmental Impact Statement, Robinson Project, White Pine County, Nevada

The Division of Environmental Contaminants of the Fish and Wildlife Service (Service) has reviewed the draft environmental impact statement (EIS) for the Robinson Project. The Robinson Mining Limited Partnership proposes to reinitiate copper mining and expand gold leaching activities in the Robinson Mining District, White Pine County, Nevada. The proposed action is approval of the project which would include expansion and continued mining of five open pits, expansion of waste rock dumps, and construction of gold and copper leach pads and ponds, an ore crushing facility, a copper concentrator, a solvent extraction/electrowinning facility, a 2,174-acre mill tailings disposal facility, a 13.7-mile long electrical transmission line, and a pipe line corridor. The proposed project will disturb 5,356 acres, including 2,140 acres of public land administered by the Bureau of Land Management. The Service has previously provided comments addressing impacts to vegetation, riparian and wetland areas, wildlife and fisheries resources, and endangered and threatened species (June 17, 1994, File BLM 10-4). Comments provided in this memorandum concern water quality and quantity issues.

General Comments

35-1 The proposed action and alternatives will significantly impact wildlife resources. We believe that alternatives, as described below, are available to greatly reduce these impacts. Such alternatives should be further explored in the final EIS.

Specific Comments

35-2 Section 2.4 Disposal of Mill Tailings or Waste Rock in Liberty Pit. Pages 2-65 to 2-69.
The draft EIS offers six scenarios for the disposal of mill tailings materials or waste rock in Liberty Pit. While we believe these alternatives may reduce impacts to wildlife, we are uncertain why the scope of each alternative was limited. The

Response to Letter 35

35-1 Comment noted. Your suggested alternatives are discussed under your specific comments.

35-2 Both waste rock and tailings could not be disposed of in Liberty Pit because there is not sufficient volume in the pit to hold the amounts of material that would be generated. This has been clarified in Section 2.4 of the Final EIS. Please refer to Response to Comment 25-13 for a discussion of the use of other pits for the disposal of tailings or waste rock.

Letter 35 Continued

35-2 draft EIS offers no justification as to why disposal of waste rock in Liberty Pit would preclude tailings disposal in the pit. It is unclear why the scenarios are mutually exclusive. Similarly, we question why Liberty Pit is the only pit considered for tailings or waste rock disposal.

Disposal of mill tailings material and waste rock in abandoned mine pits offers several environmental benefits and may greatly reduce impacts of the proposed action to wildlife. Perhaps most notable includes: 1) The amount of surface disturbance required for tailings and waste rock disposal could be substantially reduced; 2) the potential for acid generation and hazardous materials mobilization from tailings and waste rock disposal areas would be reduced; 3) potential offsite transport of metals or other hazardous materials from tailings and waste rock would be reduced; 4) the chances of long-term degradation of pit lake water quality would be reduced; and 5) the potential for adverse effects of substandard water quality to wildlife could be reduced or eliminated. 35-3 We, therefore, recommend that alternatives which evaluate increased use of Liberty and other pits for disposal of both mill tailings material and waste rock should be considered.

35-4 <u>Section 4.1.2 Water Quantity and Quality. Pages 4.3 to 4.20</u> Ore in the project area has the potential to generate acid. Acid generation has occurred in existing waste rock dumps and may have contributed to the acidification of existing pit lakes. In arid and semi-arid environments, sufficient water may not be available to continuously flush acid from rock. However, acid may accumulate and be flushed when sufficient water is available (Steffens, Robertson, and Kirsten, Inc., 1989). Therefore, the quality of drainage and runoff from all disturbed areas in the proposed project area should be monitored. Monitoring should include runoff from these facilities during and following precipitation events.

35-5 Analysis of rock provides a first approximation of the potential to generate acid and mobilize potentially toxic constituents (Caruccio et al. 1988). Once acid generation is initiated, it is extremely difficult to control. Therefore, remedial measures should be identified in the event that acid generation does occur. The feasibility and practicality of these measures should be discussed.

35-6 The expected life of the diversion channels and other structures designed to control runoff to and from mine facilities should be discussed. The environmental consequences of the eventual failure of these structures should be identified.

35-7 Pit lakes are surface impoundments and should be discussed under the Surface Water section. The draft EIS indicates that MINTEQA2 modeling was used to predict quality of water in pit lakes. The

Response to Letter 35

35-3 Comment noted. Please refer to Responses to Comments 25-13 and 35-2 for additional information on the use of mined pits for the disposal of tailings and waste rock.

35-4 Based on the analysis conducted for the EIS (PTI 1994), acid generation from waste rock is not expected. As part of its permitting under the National Pollutant Discharge Elimination System (NPDES), RMLP has developed a Stormwater Pollution Prevention Plan. This plan has been submitted to NDEP for review and approval. As part of its stormwater plan, RMLP will monitor the water quality in sedimentation basins to detect potential problems such as acid generation from waste rock dumps. The requirements for the Stormwater Pollution Prevention Plan and other permits and plans are part of the POO.

35-5 RMLP's POO has incorporated many measures that are <u>preventative</u> (see Section 2.2.16) rather than remedial. In addition, as part of the POO, RMLP has developed a Seep Contingency Plan for the prevention of surface and groundwater pollution. This plan defines procedures for the systematic inspection of project facilities and the development of remediation actions if an acid generation problem is identified. Corrective measures could include:

- Trench/pit excavation;
- Interceptor trenches;
- Caisson installation;
- Toe drain installation;
- Lined collection/evaporation impoundment installation; and
- Interceptor well installation.

The specific measures to be implemented would depend entirely on the characteristics of the problem identified (e.g., location, topography, water source) and the most effective way to eliminate or collect and treat the acidic drainage.

35-6 The diversion channel around the tailings impoundment would be designed and constructed as a permanent feature. The text on page 2-18 of the Final EIS has been appropriately clarified. It would follow natural topographic contours and/or stream courses and could change in location through normal erosion/deposition processes without causing environmental consequences. Please refer to Response to Comment 21-8 for additional information on the diversion channel. The stormwater control structures located around project facilities would be maintained for the life of the project. Following successful revegetation, they would be removed as one of the last steps of reclamation.

35-7 strengths, weaknesses, and confidence intervals of this model should be identified. Assumptions used in modeling efforts should also be discussed in the draft EIS. The stability of pit water quality equilibrium and the potential for long-term degradation of pit water quality should be discussed in detail. The significant factors which influence pit water quality and equilibrium (i.e., acid generation, ground water quality, evaporation, precipitation, etc.) should be discussed in the draft EIS. Because modeling is an approximation, environmental consequences of pit lake acidification or significant water quality degradation should be identified. Remedial actions available in the event that acidification of pit lakes occurs should be identified.

Section 4.1.6 Wildlife and Fisheries Resources. Pages 4-33 to 4-41.

35-8 Several reagents will be used during various phases of the milling and concentrating circuit (Table 2.3). Substantial amounts of these materials will be discharged to the tailings impoundment. Because migratory bird access to the tailings impoundment will not be prevented, the potential effects of mill reagents to wildlife need to be identified. The behavior and persistence of these materials in the environment should be discussed. Discussions should include potential toxic, teratogenic, carcinogenic, and mutagenic characteristics of each compound. If materials have the potential to adversely affect wildlife, measures to preclude wildlife access should be identified.

35-9 Cyanide related mortalities of migratory birds at gold leach pads indicate that wildlife will use available surface pools and impoundments. The potential for ponding of process solutions on both gold and copper leach pads should be discussed. The pH or other toxic characteristics of acid leach solution and potential effects to migratory birds or other wildlife should be discussed. If acid leach solutions have the potential to adversely affect wildlife, measures to restrict access to process solution at all locations should be identified.

We appreciate the opportunity to provide comments on this matter. If you have questions, please contact Peter Tuttle or Stanley Wiemeyer at (702) 784-5227.

Charles Bingham
for David L. Harlow

35-7 The majority of the comments on the water quality of the pit lakes are addressed in the technical supporting document, *The Hydrochemistry of the Robinson Project, White Pine County, Nevada* (PTI 1994) which is available in BLM's Ely office. The assumptions used in the model to predict pit lake quality are described in detail (Section 4.1.1, Conceptual model of pit lake chemogenesis). The confidence intervals assigned to the predicted values for each constituent were determined using the Monte Carlo method (Section 4.3.3, Monte Carlo analysis of uncertainty in predicted pit lake chemistry). The parameters to which the model results are most sensitive were identified, and the uncertainty in these parameters was then quantified (Section 4.3.4, Assessment of uncertainty in model parameters). Uncertainty resulting from the application of the USEPA's equilibrium geochemical model MINTEQA2 was found to be much smaller than the uncertainty introduced by other aspects of the overall pit lake chemical model. Using the Monte Carlo method, parameter uncertainty was propagated through the model calculations, and predicted aqueous concentrations of all major chemicals were presented in terms of their probability distribution (Section 4.4.8, Predicted initial pit lake conditions). Finally, the long-term compositions in the pit lakes was evaluated using the composition of the inflowing groundwater, the effects of evaporation and precipitation, and the initial composition of the pit lakes (Section 4.4.9, Predicted steady-state pit lake composition).

Regarding potential environmental consequences and remedial actions in response to substantially degraded pit lake water quality, the uncertainty associated with the predicted water quality compositions makes it impossible to identify completely the range of remedial alternatives. The best estimate (i.e., 50th percentile value) of post-mining water quality indicates that the pH of the water in the pit lakes will be between 7.1 and 8.0 when the lakes initially fill (e.g., 20 years after cessation of mining). In the longer term, the pit lakes would become more strongly buffered at a near-neutral pH due to evaporative concentration of inflowing alkaline groundwater. Ranges of pH values measured in the existing Liberty, Ruth, Kimbley, and Tripp/Veteran pits in September 1993 ranged from 3.2 to 3.3, 3.9 to 5.7, 7.4 to 7,6 and 8.0 to 8.4, respectively. Thus, it is predicted that the Implementation of the Proposed Action would generally improve water quality relative to current conditions by increasing the pH and thus lowering the concentrations of heavy metals.

Results of the groundwater flow modeling and equilibrium chemical reactions (PTI 1994) indicate that the chemical composition of the pit lakes ultimately would be dominated by the inflow of alkaline groundwater, and thus, the presence of long-term acidic conditions in the pit lakes is considered to be extremely unlikely. However, water quality in each pit lake would be monitored following cessation of mining. In the event that water quality was substantially degraded in a specific pit, particularly with respect to formation of acidic pH, then a site-specific corrective response would be evaluated. Remedial responses for an acid pit lake might include addition of Ely limestone ($CaCO_3$) waste rock, or "quick lime" (CaO) to the pit to increase the pH and buffering capacity of the water or controlling the source of the acidity. The specific response would depend on the observed geochemistry of the pit lake, and thus cannot be specified in detail at this time.

Letter 35 Continued

cc:
Administrator, Nevada Division of Environmental Protection, Carson City, Nevada
Administrator, Nevada Division of Wildlife, Reno, Nevada
Regional Manager, Nevada Division of Wildlife, Elko, Nevada
State Director, Bureau of Land Management, Reno, Nevada
Assistant Regional Director, Ecological Services, Fish and Wildlife Service, Portland, Oregon

<u>References</u>

Caruccio, F. T., L. R. Hossner, and G. Geidel. 1988. Pyriticmaterials: acid drainage, soil acidity, and liming, <u>in</u> F. T. Hossner, ed., Reclamation of Surface-mined Lands, Vol. I. CRC Press, Boca Raton, Florida.

Steffens, Robertson, and Kirsten, Inc. 1989. Draft Acid RockDrainage Technical Guide, Volume 1. Steffens, Robertson, and Kirsten, Inc., Vancouver, British Columbia.

Response to Letter 35

35-8 Based on your comment, text additions are included in Section 4.1.6.1 (page 4-39) of the Final EIS and Table B-6 has been added to Appendix B.

35-9 Please refer to Responses to Comments 17-1, 25-18, and 26-20 regarding the analysis of potential water chemistry effects on wildlife species and the additional protection measure for monitoring of the water sources located in the mine area. Also, refer to Section 2.2.16, page 2-61, of the Final EIS for the environmental protection measures that address potential cyanide effects. Wildlife access to process solutions would be restricted wherever solutions are expected to pond.

6.0 LIST OF PREPARERS AND REVIEWERS

Responsibility	Name	Qualifications
PREPARERS:		
BLM, Ely District		
Team Leader, Mineral Resources	Daniel Netcher	B.S. Geology; 10 years experience
Assistant Team Leader, NEPA Review, Socioeconomics	Jake Rajala	M.A. Anthropology, M.S. Forestry and Range Management, B.A. Anthropology: 17 years experience
Area Manager, Document Review	Gene Drais	B.S. Zoology; 19 years experience
Associate District Manager, Overall Review	Timothy B. Reuwsaat	B.S. Range and Forest Management; 17 years experience
Paleontological Resources/ Cultural Resources/Native American Religious Concerns	Brian C. Amme	B.A. Anthropology; 10 years experience
T&E Plants	Chris Mayer	B.S. Range Management; 17 years experience
T&E Animals/Wetland/ Riparian Habitat	Mark Barber	B.S. Wildlife Management; 14 years experience
Recreation, Wilderness, VRM	Michael Bunker	B.S. Forestry, Outdoor Recreation; 19 years experience
Wildlife, Fisheries	Michael Perkins	B.S. Wildlife Science; 20 years experience
Woodland Resources	Harry T. Rhea	B.S. Forestry; 15 years experience
Water, Air	Loran Robison	A.A. Science; B.S. Forestry and Range Management; 20 years experience
Wild Horses and Burros	Joe Stratton	B.S. Wildlife; 3 years experience
Reclamation	Lynn Bjorklund	M.S. Biology, B.S. Biology, Agronomy; 18 years experience
Wastes: Hazardous and Solid	William D. Robison	B.S. Geology; 15 years experience
Range Conservation, Vegetation	Grant Hoggan	B.S. Range Management, B.S. Fisheries and Wildlife; 3 years experience

Responsibility	Name	Qualifications
Land Use Access	Michael W. McGinty	B.S. Forest Management; 17 years experience
Soil, Reclamation	Jack Norman	B.S. Soil Science; 6 years experience
Reclamation	Mike Main	B.S. Range Management; 5 years experience
Socioeconomics	Paul Myers	B.S., Economics 26 years experience
BLM, Nevada State Office		
Mineral Resources	Larry Steward	B.S. Geology; 25 years experience
BLM, Denver Service Center		
Water Resources	Tom Olsen	Ph.D. Geological Engineering; 15 years experience
Magma Nevada Mining Company		
Project Description	Timothy M. Dyhr	B.S. Biology; 20 years experience
ENSR Consulting and Engineering - EIS Contractor		
Project Manager	Drew Ludwig	M.S. Resource Planning and Conservation; B.S., M.S. Zoology; 21 years experience
Assistant Project Manager	Sophie Sawyer	M.Ed. Science Education; B.A. Biology; 14 years experience
Project Coordinator, Land Use, Access, Recreation, Grazing, Visual Resources, Noise, Transport of Hazardous Materials	Bill Theisen	M.S. Recreation Resources; B.S. Natural Resources; 11 years experience
Social and Economic Values	Karin Sable	B.A. Economics; 5 years experience
Vegetation, T&E Species, Wetlands/Riparian	Jon Alstad	M.S. Range Science; B.S. Animal Science; 8 years experience

Responsibility	Name	Qualifications
Wildlife, T&E Species, Wild Horses	Lori Nielsen	B.S. Wildlife Ecology/Management; 9 years experience
Soils, Cultural Resources, Paleontology	Karen Caddis-Burrell	B.A. Geography/Anthropology/ Journalism; B.S. Resource Management; 10 years experience
Air Quality	Vince Scheetz	M.S. Systems Management; B.S. Mathematics; 24 years experience
Reclamation	Phil Hackney	B.S. Botany; 16 years experience
Technical Editor	Nancy Beauprez	B.S. Journalism; M.Ed Adult Education/English; 16 years experience
Shepherd Miller, Inc. - EIS Subcontractor		
Water Resources	Donald D. Runnells	Ph.D. Geology, Geochemistry, B.S., M.A. Geology; 30 years experience
Geology/Minerals, Groundwater	Robert C. Berry	Ph.D. Geochemistry, B.S. Geology, Prof. Degree Hydrogeology; 18 years experience
Reclamation Plan	Barry Carlson	B.S. Agricultural Engineering; 5 years experience
REVIEWERS:		
U.S. Environmental Protection Agency	Jeanne Geselbracht	
Nevada Department of Environmental Protection	Thomas Fronapfel/Doug Zimmerman	
Nevada Department of Transportation	Glenn Mouritsen	
White Pine County	Wayne Cameron	
City of Ely	Dave Olsen	

PTI Environmental Services
Hydrology and Geochemistry Technical Support
(Not Part of the Third-Party Contract)

Responsibility	Name	Qualifications
Program Manager, Geochemistry, Water Quality	Andy Davis	Ph.D. Geochemistry; M.S. Geochemistry; B.S. Aquatic Biology; 18 years experience
Project Manager, Water Quantity	Connie Travers	M.S. Applied Hydrogeology; B.S. Geology; 7 years experience
Project Manager, Geology	Jeff Deen	Ph.D. Geology M.S. Geology B.S. Geology 13 years experience
Giroux Wash, Unsaturated Zone Flow and Transport	Dave Atkins	M.S. Environmental Engineering; M.S. Physics; B.S. Physics and Mathematics 7 years experience
Pit Lake Geochemistry	Houston Kempton	M.S. Geology B.S. Geology and Geography 11 years experience
Waste Rock Geochemistry	Mark Bloom	Ph.D. Geochemistry M.S. Geology B.S. Geology 21 years experience

7.0 REFERENCES

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ACRONYMS AND ABBREVIATIONS

ACEC	area of critical environmental concern
ACHP	Advisory Council on Historic Preservation
ACGIH	American Council of Governmental Industrial Hygienists
A.D.	Anno Domini
AFH	amorphous ferric hydroxide
AIRFA	American Indian Religious Freedom Act of 1978
ARS	Archaeological Research Services
AUM	animal unit month
BACT	Best Available Control Technology
BCCRT	basic city-county relief tax
BLM	Bureau of Land Management
BMP	Best Management Practices
B.P.	before present
C-14	carbon 14
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
COE	U.S. Army Corps of Engineers
$CuSO_4$	copper sulfate
CWA	Clean Water Act of 1972
dBA	decibels on the A-weighted scale
dstph	dry short tons per hour
EA	Environmental Assessment
EIS	Environmental Impact Statement
ERA	Egan Resource Area
ESA	Endangered Species Act
ESD	Ecological Site Description
FAA	Federal Aviation Administration
FLPMA	Federal Land Policy and Management Act of 1976
FONSI	finding of no significant impact
FS	USDA Forest Service
GED	General Education Diploma
gpm	gallons per minute
HazMat	Hazardous Materials
HCN	hydrogen cyanide
hp	horsepower
HDPE	high-density polyethylene

ICC	Interstate Commerce Commission
ISA	Instant Study Area
Kennecott	Kennecott Copper Corporation
kV	kilovolt
L_{dn}	day and night sound levels
MCL	Maximum Contaminant Level
mcy	million cubic yards
$\mu g/m^3$	micrograms per cubic meter
mgd	million gallons per day
mph	miles per hour
MMPA	Mining and Mineral Policy Act of 1970
M-RCD	McGill-Ruth Consolidated Water and Sewer General Improvement District
MSHA	Mine Safety and Health Administration
MSL	mean sea level
MTL	Maximum Tolerable Level
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAGPRA	Native American Grave Protection and Repatriation Act of 1990
NDEM	Nevada Division of Emergency Management
NDEP	Nevada Division of Environmental Protection
NDIR	Nevada Department of Industrial Relations
NDOT	Nevada Department of Transportation
NDOW	Nevada Division of Wildlife
NDWR	Nevada Department of Water Resources
NDF	Nevada Division of Forestry
NEPA	National Environmental Policy Act
NESD	Nevada Employment Security Department
NHPA	National Historic Preservation Act of 1986
NNHP	Nevada Natural Heritage Program
NNRC	Northern Nevada Railroad Corporation
NO_x	nitrogen oxide
NOAA	National Ocean and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	National Response Center
NRHP	National Register of Historic Places
NSCED	Nevada State Commission on Economic Development

NSPS	New Source Performance Standards
NWI	National Wetland Inventory
OSHA	Occupational Safety and Health Administration
OHV	off-highway vehicle
ORV	off-road vehicle
OTT	optional transportation tax
PA	Programmatic Agreement
PLS	pregnant leach solution or percent live seed
PM-10	particulate matter with an aerodynamic diameter of 10 microns or less
POO	Plan of Operations
ppm	parts per million
PSD	Prevention of Significant Deterioration
PZ	precipitation zone
R	Range
RA	Resource Area
RCRA	Resource Conservation and Recovery Act
RFA	reasonable foreseeable action/s
RMLP	Robinson Mining Limited Partnership
RMP	Resource Management Plan
ROD	Record of Decision
RPC	Regional Planning Commission
RQ	Reportable Quantities
RUSLE	Revised Universal Soil Loss Equation
RV	recreational vehicle
SCCRT	supplemental city-county relief tax
SCS	Soil Conservation Service
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures Plan
SWIP	Southwest Intertie Project
SX/EW	solvent extraction and electrowinning
T	Township
T&E	threatened and endangered
TDS	total dissolved solids
TSP	total suspended particulates
TSS	total suspended solids
TU	tritium units
U.S.	United States
USDI	United States Department of the Interior
USDOT	United States Department of Transportation

USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VLDPE	very low-density polyethylene
VRM	visual resource management
WCRM	Western Cultural Resource Management, Inc.
WPCEDP	White Pine County Economic Diversification Program
WPPP	White Pine Power Project
WSA	Wilderness Study Area
ybp	years before present

GLOSSARY

Alluvium	A general term for all detrital deposits resulting from the operations of modern rivers, including the sediments laid down in riverbeds, floodplains, lakes, and fans at the foot of mountain slopes and estuaries.
Ambient (air)	The surrounding atmospheric conditions.
Aquifer	A stratum of permeable rock, sand, etc, which contains water. Water source for a well.
Archaeology	The science that investigates the history of peoples by the remains belonging to the earlier periods of their existence.
Archival	Pertaining to or contained in documents or records preserved in evidence of something.
Artifact	Any object showing human workmanship or modification especially from a prehistoric or historic culture.
Azurite	Deep-blue to violet-blue monoclinic copper carbonate mineral.
Block caving	Type of mining in which mine roof collapses.
Braunite	Brittle, brownish-black or steel-gray tetragonal mineral.
Caldera	Large, basin-shaped volcanic depression.
Candidate, Category 1 (C1)	Taxa for which USFWS has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher-priority listing work.
Candidate, Category 2 (C2)	Taxa for which the USFWS has information to indicate that the listing as threatened or endangered is possibly appropriate. Additional information is being collected.
Candidate, Category 3 (C3)	Taxa that were once being considered for listing as endangered and threatened but are no longer receiving such consideration.
Chrysocolla	Blue, blue-green, or emerald-green copper silicate mineral.
Clean Water Act	Federal Water Pollution Control Act, as amended.
Contrast	The effect of a striking difference in the form, line, color, or texture of an area being viewed.
Cretaceous	Span of time between 136 and 65 million years ago

Critically endangered	State of Nevada Wildlife Species Status Code. State status based on NRS 527.260 - .300.
Cultural resources	Any site or artifact associated with cultural activities.
Distribution line	An electric power line operating at a voltage of less than 69 kilovolts.
Endangered species	Any species in danger of extinction throughout all or a significant portion of its range. This definition excludes species of insects that the Secretary of the Interior determines to be pests and whose protection under the Endangered Species Act of 1973 would present an overwhelming and overriding risk to man.
Environment	The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.
Ephemeral (streams)	Flowing in response only to direct precipitation
Erosion	The group of processes whereby earth or rock material is loosened or dissolved and removed from any part of the earth's surface.
Fault	A fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.
Fault scarp	Steep rock faces formed by shearing of rock.
Floodplain	That portion of a river valley, adjacent to the river channel, built of sediments and inundated with water at least once every 100 years.
Geology	The science that relates to the earth, the rocks of which it is composed, and the changes that the earth has undergone or is undergoing.
Graben	Fault block valley; elongated, depressed crustal block bounded by faults on its long sides.
Habitat	A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.
Hematite	Common iron oxide mineral occurring in metallic-looking crystals.
Hemimorphite	A white or colorless zinc silicate mineral.

Horst	Elongated, uplifted crustal block bounded by faults on its long sides.
Hydrology	The science that relates to the water of the earth.
Hypogene	When a mineral deposit or enrichment is formed by ascending solutions commonly at elevated temperatures.
Impact	A modification in the status of the environment brought about by the Proposed Action.
Intrusive rock	Igneous rock formed within surrounding rock as a result of magma intrusion.
Jarosite	Ocher-yellow or brown minerals consisting of hydrous potassium iron sulfate.
Jasperoid	Dense, usually gray, chert-like, siliceous rock; silicified limestone.
Jurisdictional wetlands	Areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
Landform	A term used to describe the many types of land surfaces that exist as the result of geologic activity and weathering, e.g., plateaus, mountains, plains, and valleys.
Limonite	Brown, amorphous, naturally occurring hydrous ferric oxides whose real mineralogic identities are unknown.
Magma	Naturally occurring mobile rock material from which igneous rocks are formed.
Malachite	Bright-green monoclinic copper carbonate mineral.
Mantle	Zone of the earth below the crust and above the core with transition zone between.
Mil	1/1000 inch
Mineralization	Process by which minerals are introduced into a rock, resulting in an economically valuable or potentially valuable deposit.
Monocline	Unit of strata that dips or flexes from the horizontal in one direction only.

One-hundred-year flood	A flood with a magnitude that may occur once every 100 years. A 1-in-100 chance of a certain area being inundated during any year.
Paleontology	The science that deals with the life of past geological ages through the study of the fossil remains of organisms.
Paleozoic	Span of time from end of Precambrian to beginning of Mesozoic ranging from about 570 million to 250 million years ago.
Particulate(s)	Minute, separate particles, such as dust or other air pollutants.
pH	The measure of acidity or basicity of a solution.
Physiographic province	Region in which all parts have similar geologic structure and climate and whose landforms differ significantly from those of other regions.
Pluton	Body of rock formed by intrusion of molten mass; intrusive igneous rock.
Porphyry intrusion	Igneous rock containing phenocrysts in a fine-grained, sugary-textured groundmass.
Precambrian	About 90 percent of geologic time more than 2.5 billion years old; precedes Paleozoic.
Pyrolusite	Soft, iron-black or dark steel-gray tetragonal manganese oxide mineral.
Raptor	A bird of prey.
Region	A large tract of land generally recognized as having similar character types and physiographic types.
Rhyolitic	Extrusive igneous rock with phenocrysts of quartz and alkali feldspar in a glassy groundmass.
Right-of-way	Strip of land over which the powerline, access road, or maintenance road would pass.
Riparian area	A form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the

	presence of vegetation dependent upon free water in the soil.
Sedimentary rock	Rock resulting from consolidation of loose sediment that has accumulated in layers.
Seismicity	The likelihood of an area being subjected to earthquakes. The phenomenon of earth movements.
Sevier orogeny	Deformations of Cretaceous and early Tertiary age along the eastern edge of the Great Basin in Utah and southern Nevada.
Silicated	When a rock is converted into or replaced by silicate minerals.
Sill	Igneous intrusion that parallels the structure of surrounding rock.
Skarn	Swedish mining term expanded to refer to rocks containing silicate minerals derived from nearly pure limestone and dolomite.
Smithsonite	White or nearly white to yellow, gray, brown, or greenish zinc carbonate mineral.
Species	A group of individuals of common ancestry that closely resemble each other structurally and physiologically and in nature interbreed producing fertile offspring.
Stock	Chimneylike ore body; igneous intrusion less than 40 square miles in surface exposure.
Stoping	Extraction of ore from an underground mine by working horizontally in a series of levels or steps.
Stratigraphy	Form, arrangement, geographic distribution, chronologic succession, classification, and relationships of rock strata.
Study area	A given geographical area delineated for specific research.
Substation	A facility in an electrical transmission system with the capacity to route and control electrical power and to transform power to a higher or lower voltage.
Supergene	When a mineral deposit or enrichment is formed by descending solutions by a process generally associated with weathering of rocks.
Tectonics	Large-scale structural features of the upper part of the earth's crust.
Tertiary	Span of time between 65 and 3 to 2 million years ago.

Threatened species	Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range.
Transmission line	An electric power line operating at a voltage of 69 kilovolts or greater.
Tuff	Compacted deposit of volcanic ash and dust that may contain up to 50 percent sediments, such as sand or clay.
Uplift	Structurally high area in the crust produced by an upthrust of rocks.
Visual Resource Management classes (VRM)	Classification of landscapes according to the kinds of structures and changes that are acceptable to meet established visual goals (BLM designation).
Vuggy	Pertaining to a vug, which is any opening in a rock, from size of small pea upwards.
Wetlands	Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. BLM Manual 1737, *Riparian-Wetland Area Management*, includes marshes, shallow swamps, lakeshores, bogs, muskegs, wet meadows, estuaries, and riparian areas as wetlands.

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APPENDIX A

HAZARDOUS MATERIALS AND HAZARDOUS WASTE

Table A-1

Hazardous Materials Management
Robinson Project

Substance	Rate of Use (lbs/yr)	TPQ[1] (lbs)	Use	Amount Stored (Typical)	Storage Method	Waste Management[4]
Sodium cyanide	1 million	100	Gold leaching	30,000 lbs	Bulk tank	Portions are recycled or neutralized and left in place.
Sulfuric acid	408 million	1,000	Copper leaching	2.3 million lbs	Bulk tank	Portions are recycled or neutralized and left in place.
Nitric acid	24,000	1,000	Filtration	1,200 lbs	Bulk tank	Portions are recycled or neutralized and left in place.
Hydrofluoric acid	800	100	Lab	400 lbs	1-gallon bottles	Transported to an off-site TSD[2] facility.
Hydrochloric acid	140,000		Gold refinery	70,000 lbs	Bulk tank	Portions are recycled or neutralized and left in place.
Ammonium nitrate	25 million		Mining	2 million	Bulk tank	Material is recycled with remainder left in place.
Ethylene glycol (50%)	32,000		Mobile equipment	16,000	Drums	Sent to recycling facility.
Sodium hydrosulfide	12.8 million		Moly plant	1.5 million	Bulk tank	Portions are recycled and used within a self-contained area.
Sodium hydroxide	60,000		Gold refinery	60,000	Bulk tank	Portions are recycled within a self-contained area.
Mercuric chloride[3]	10	500	Lab standard	10 lbs	Bottles	Clean up in a self-contained area. Unconsumed portion shipped to TSD.

Table A-1 (Continued)

Substance	Rate of Use (lbs/yr)	TPQ[1] (lbs)	Use	Amount Stored (Typical)	Storage Method	Waste Management[4]
Potassium cyanide[3]	1	100	Lab testing	1 lb	Bottles	Clean up in a self-contained area. Unconsumed portion shipped to TSD.

[1] Extremely hazardous substance threshold planning quantity designated by SARA, Title III.

[2] Treatment, storage, or disposal facility regulated under the Resource Conservation and Recovery Act.

[3] Use would not exceed TPQ.

[4] Majority of these materials listed are consumed in the project process. The unconsumed portions are treated as shown.

Table A-2

Hazardous Waste Inventory and Management
Robinson Project

Waste Type	U.S. EPA[1] Hazardous Waste Code	Generation Rate (lbs/yr)	Waste Description	Final Disposition
Lead-bearing solid waste	D008	4,000	Cupels, crucibles, slag	Highway 36 Land Development Company, Inc., Deer Trail, Colorado
Lead-bearing mixed waste	D008	4,000	Off-spec flux, lab baghouse dust	Same as above
Corrosive liquid waste	D002	4,000	Mixture of water, n-butyl acetate, nitric acid, HCl, and thiourea	Same as above
Lab clean-out chemical waste		400	Various chemical waste	Same as above
Lead acetate	D008	5	Lab clean-out product	Same as above
Solvents w/petroleum naptha	D039 D001	15,000	Combustible degreaser with tetrachloroethylene	Same as above
Grease/solvent mix	D001 F003	500	Ignitable waste with xylenes	Same as above
Oil/solvent mix	D001 F003	2,500	Ignitable waste with xylenes	Same as above

[1] U.S. Environmental Protection Agency.

APPENDIX B

WATER RESOURCES DATA

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Table B-1

Identification of Wells

Well Number	Well Name/Site Location/Information
AB-1	South of Ruth Pit by Kellinske Shaft
AB-3	Keystone area
AB-4	Northeast of Keystone Dump
AB-5	Northeast of Keystone Dump
SKKR-12	Saxton Peak near SKKR-13M
SL-1	South of Liberty Pit near Stillwater Dump
K-2M	North of Kimbley Pit by Keystone Dump
K-2P	Near K-2M
K-3M	South of K-2M but north of Keystone Dump
NRC-2M	North Robinson Canyon, Sec. 34, T17N, R62E
NRC-3M	North Robinson Canyon, Sec. 34, T17N, R62E
MKP1	Near AB-3 northeast of Keystone Dump
Ruth Shaft	Deep Ruth Shaft
LDW-1, 2, 3A, 4	Liberty Pit monitor wells
WCC-1M	Saxton Peak
WCC-2M	Tonopah Canyon
WCC-3M	Saxton Peak
WCC-4M	Tonopah Canyon
WCC-5M	South of Liberty Pit
WCC-6M	Saxton Peak
SKKR-13M	Saxton Peak
WCC-G1	Giroux Wash valley
WCC-G2	Head of Giroux Wash
WCC-G3	East side of Giroux Wash
R-A	Lane City, at toe of Ada Canyon Dump
R-B	Lane City, 2,300 feet southeast of R-A
R-C	East of Ruth Pit

Table B-1 (Continued)

Well Number	Well Name/Site Location/Information
R-D	Dry North of Liberty Pit
R-E	South of Stillwater Dump
R-F	Monitor well near Riepetown
R-G	North of Sunshine/Puritan Dump by Ruth. Dry
R-H	Junction Ingersoll Canyon and Gleason Creek
R-I	South of Ruth Pit. No well data available
R-J	Southeast of Ruth Pit between Jupiter and Saxton faults at head of Ada Canyon. No well data available
SKVE-3	Veteran Pit monitor well. Dry
SKVE-4	Veteran Pit monitor well. Dry
SKVE-5	Veteran Pit monitor well. Dry
SKVE-7	Veteran Pit monitor well. Dry
SKVE-9	Veteran Pit monitor well. Dry

Table B-1 (Continued)

Well or Boring	Well Depth or Current Boring Depth[1]	Top of Well or Boring Elevation[1]	Effective Open Interval[1]	Water Level Elevation[1]	Water Level Date	Formation of Effective Open Interval	Model Layers Screened	Location (northing) (easting)
WCC-1M	1,000	7,508.1	6608-6494	6,623	10/2/91	Ely Limestone	4	95956.5N 118544.6E
WCC-2M	1,095	7,414.1	6634-6321	6,624		Limestone, Sandstone	3,4,5	96445.1N 107175.9E
WCC-3M	1,189	7,765.4	6865-6578	6,822		Limestone	3,4	97726.9N 122589.0E
WCC-4M	1,105	7,468.1	6648-6365	6,622		Limestone, Sandstone	3,4,5	93125.7N 111106.1E
WCC-5M	1,098	7,415.6	6637-6320	6,624		Limestone	3,4,5	101302.3N 101345.2E
WCC-6M	620	7,016.1	6646-6388	6,669		Chainman Shale, Quartzite	3	99782.4N 116003.2E
SKKR-13M	320	7,019.2	6739-6684	6,737		Chainman Shale, Quartzite	3	100146.8N 116393.9E
WCC-G1	1,002	6,592.7	5780-5567	5,818		Alluvial Gravels	7	88922.6N 87539.4E
WCC-G2	315	6,868.2	6596-6539	6,629	9/29/91	Arcturus Limestone, Shale, Sandstone	4	102132.0N 86330.8E
WCC-G3	520	6,714.2	6245-6164	6471	1991	Arcturus Limestone, Clay	5,6	88844.9N 92274.5E
R-A	66	6,561.3	6521-6495	6551	1987	Gravel, Sand, Clay, Limestone	4	103579.2N 119947.3E
R-B	70	6,548.9	6504-6479	6526	1987	Gravel, Limestone	4	102831.3N 121338.6E
R-C	472	6,956.2	6603-6484	6686	1989	Arcturus Limestone, Gypsum, Siltstone	4	101674.3N 113100.8
R-D	0	N/A	7200-6200			Silicified Limestone		105517.6N 110034.8E
R-E	797	7,299.3	6627-6502	6630	1989	Limestone	3,4	100097.1N 104593.3E
R-F	349	7,096	6863-6747	7052	1989	Monzonite	3	105681.2N 99292.2E

Table B-1 (Continued)

Well or Boring	Well Depth or Current Boring Depth[1]	Top of Well or Boring Elevation[1]	Effective Open Interval[1]	Water Level Elevation[1]	Water Level Date	Formation of Effective Open Interval	Model Layers Screened	Location (northing) (easting)
R-G	N/A	N/A	6959-6248			Dolomitic Marble, Shale, Sandstone, Dolomite	3	108071.9N 103817.5E
R-H	216	6,688.9	6527-6463	6592	1989	Silicified Limestone	4	105085.6N 115275.9E
AB-1	800	7246.9	7247-6447	6635	1990	Ely Limestone	2,3,4	100892.7N 110484.2E
AB-3	307	6767.2	6767-6460	6630	1990	Arcturus Sandy Limestone	3,4	110303.6N 109811.0E
AB-4	100	6779.7	6780-6680	6738		Rhyolite	3	109902.9N 109314.3E
AB-5	100	7095.9	7096-6996	7049		Monzonite	2	105086.4N 98892.7E
SKKR-12	72	7005.1	7005-6993	6945	1988	Ely Limestone	3	100986.8N 116405.3E
SKVE-9	203	N/A	N/A					104614.6N 90823.4E
SKVE-3	426	N/A	7283-6857			Ely Limestone Silicified and Jasperiod		106283.9N 91310.5E
SKVE-4	166	N/A	7322-7156			Ely Limestone Silicified and Jasperiod		106132.7N 91942.5E
SKVE-5	1,000	N/A	7289-6289			Ely Limestone Silicified, Monzonite		105678.3N 91361.2E
SKVE-7	900	N/A	7237-6337			Ely Limestone Silicified, Monzonite		105136.0N 91354.2E
SL-1	1,105	7406.04	7356-6301	6627	1991	Ely Limestone	2,3,4,5	104676.7N 109438.7E
K-2M	1,180	6821.93	6772-5622	6571	1991	Arcturus Sandy Limestone, Ely Limestone	3,4,5,6,7	108939.9N 110849.0E

Table B-1 (Continued)

Well or Boring	Well Depth or Current Boring Depth[1]	Top of Well or Boring Elevation[1]	Effective Open Interval[1]	Water Level Elevation[1]	Water Level Date	Formation of Effective Open Interval	Model Layers Screened	Location (northing) (easting)
K-2P	1,137	6806.0	6756-5663	6571	1991	Arcturus Limestone, Ely Limestone	3,4,5,6,7	109305.0N 110860.4E
K-3M	990	6850	6800-5850	6568	1991	Arcturus Limestone, Sandstone, Ely Limestone	3,4,5,6	108183.9N 111159.4E
NRC-2M	1,195	6,950.0	6900-5750	6397	1991	Arcturus/ Guilmette Limestone	3,4,5,6,7	116087.6N 102336.1E
NRC-3M	1,510	6,950	6900-5430	6258	1991	Arcturus/ Guilmette Limestone	3,4,5,6,7	116840.8N 102599.7E
MKP1	500	6776.5	6777-6277	6626	1991	Arcturus Calcareous Sandstone	3,4,5	109618.3N 110113.8E
Ruth Shaft	1360	6,903.0	6903-5543	6548	1954	Flow rate of 1,000 gpm		105814.2N 108203.9E
Ruth Pit	N/A		7000-6420	6640	1991			102812.3N 109752.0E
Liberty Pit	N/A		7000-6500	6687	1991			103175.4N 100430.8E
Tripp Pit	N/A		7200-6665	6695	1991			103466.4N 94945.4E
Veteran Pit	N/A		7200-6665	6665	1991			105177.6N 92776.2E
Kimbley Pit	N/A			6723	1991			102963.2N 113217.4E
Wedge Pit	N/A							104375.0N 114747.7E

[1] In feet.

TABLE B-2
BASELINE WATER CHEMISTRY

1) SEEPS AND WASTE DUMP EFFLUENTS (mg/l)

CONSTITUENTS	Veteran Seep	Intera Upper	Pond Lower	Liberty L-1	Pit L-2	Seeps L-3	Vet-Tripp Dump Seep
COMMON IONS:							
pH	4.68	2.7	2.84	5.54	3.13	2.25	2.67
Chloride	22.2	58.6	94.6	60.7	25.5	2080	47.3
Sulfate	5450	13600	14500	2970	7040	30100	37200
Total Diss. Solids (TDS)	9360	21233	21800	4520	11600	46700	47400
Bicarbonate	0	0	0	111	0	0	0
Nitrate as N	0.08	0.48	0.47	0.045	0.04	0.44	0.19
Calcium	475	524	456	500	257	489	459
Magnesium	497	840	1010	284	93.9	478	1680
Potassium	13.4	10	10	11.5	29.1	50	10
Sodium	20.3	42.7	42.4	56.5	35.5	33.7	7.52
METALS:							
Arsenic	0.005	0.005	0.005	0.005	0.163	2.86	0.005
Barium	0.02	0.02	0.66	0.02	0.022	0.858	0.34
Cadmium	0.43	0.45	0.5	0.231	35	1.75	1.36
Chromium	0.17	0.76	0.708	0.056	1.67	2.61	1.63
Copper	0.15	552	621	0.116	522	678	2030
Iron	1690	807	351	278	1260	7580	792
Lead	0.005	0.005	0.005	0.025	0.005	0.005	0.005
Manganese	175	252	285	96.5	32.2	50.8	268
Mercury	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Nickel	1.3	2.9	5.01	0.864	1.75	1.9	4.25
Selenium	0.005	0.005	0.005	0.005	0.005	1.38	0.005
Silver	0.17	0.12	0.1	0.1	0.13	0.6	0.12
Zinc	25.4	105	111	79.7	391	35.5	219
Thallium	0.005	0.005	0.005	0.025	0.05	0.005	0.005
MISCELLANEOUS:							
D.O. (mg/l)							
Cyanide (W.A.D.)	0.005	0.005	0.005	0.005	0.005	0.005	0.024
Alk. as CaCO3	0	0	0	111	0	0	0
TSS							
Temp. (deg. C)							
Boron							
Fluoride	35.5	112	6.64	2.71	12.2	9.63	401
Silica	25.2	266		18.7	215		0
Aluminum	18.7	1073	1210	4.31	480	1860	3250
Cobalt	3.73	4.99	6.01	1.4	0.86	7.13	11.7
Molybdenum	0.1	0.1	0.1	0.1	0.1	5.22	0.1
Rock Type,Dump, etc							"Green" "Stream"

TABLE B-2

2) WELLS (mg/l)

	SAXTON PEAK						GIROUX WASH					
	WCC-3M	WCC-1M	SKKR-13M			WCC-6M	WCC-G1		WCC-G2		WCC-G3	
CONSTITUENTS COMMON IONS:	WCC	PTI	WCC	PTI	WCC	PTI	WCC	PTI	WCC	PTI	PTI	WCC
pH	8.6	7.8	8.7	6.98	7.1	7.5	7.9	7	10.5	8.15	8.69	10.2
Chloride	15.1	10.3	11.9	11.4	12	31.9	16.9	20.6	40	33.2	80.8	18
Sulfate	21.8	23.6	21.4	368	332	440	25.7	31.1	29.9	27.9	40.3	37.5
TDS	182	246	169	729	688	872	486	618	237		286	174
Bicarbonate	113	153	94	109	124	96	115	82.3	175	96.8	62.2	55
Nitrate as N	1.2	0.15	0.4	0.02	0.05	0.05	46	69.4	6.7	7.2	0.126	0.3
Calcium	36.6	43.2	36.7	147	163	113	80.4	106	47.3	45	39.8	4.7
Magnesium	14.4	16.9	15.6	22.9	24.9	30.3	11.2	13.8	1.7	13.5	4.49	1
Potassium	5	1.22	5	3.79	5	11.6	10.4	12	5	2.87	9.84	6.6
Sodium	12.8	10.5	10.2	21.2	19.3	129	21.8	26.4	12.3	11.7	42.2	51.7
METALS:												
Arsenic	0.005	0.005	0.005	0.031	0.017	0.005	0.005	0.005	0.012	0.05	0.057	0.081
Barium	0.023	0.03	0.04	0.022	0.044	0.036	0.017	0.023	0.01	0.05	0.04	0.01
Cadmium	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Chromium	0.01	0.01	0.01	0.016	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Copper	0.02	0.006	0.02	0.005	0.02	0.02	0.02	0.013	0.02	0.005	0.005	0.02
Iron	0.1	0.58	0.1	8.08	6.2	5.9	0.1	0.722	0.1	0.05	0.184	0.63
Lead	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.03	0.005	0.005
Manganese	0.053	0.008	0.062	0.281	0.64	0.26	0.04	0.02	0.01	0.005	0.008	0.01
Mercury	0.0002	0.0002	0.0002	0.022	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Nickel	0.04	0.015	0.04	0.015	0.04	0.04	0.04	0.015	0.04	0.015	0.015	0.04
Selenium		0.005	0.005	0.005	0.01	0.005	0.005	0.005	0.005	0.05	0.005	0.009
Silver	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Zinc	0.005	0.016	0.17	0.007	1.2	0.37	0.11	0.02	0.02	0.005	0.005	0.02
Thallium		0.005		0.005				0.005		0.1	0.005	
MISCELLANEOUS:												
D.O. (mg/l)												
Cyanide (W.A.D.)												
Alk. as CaCO3	113	153	100	109	124	96	115	82.3	217	96.8	72.3	95
TSS	500		2610		1540	180	1160		656			4555
Temp. (deg. C)												
Boron	0.1		0.1		0.1	0.13	0.1		0.16			0.81
Fluoride	0.05		0.43	2.07	2.1	1.6	0.23	0.27	0.5	0.28	1.87	2.1
Silica	7.8		2.2	6.3	7.2	5.6	52.3	68.5	20.4		17.8	16
Aluminum		0.258		0.344				1.32		0.323	0.29	
Screened Lith.	Ely Ls	Ely Ls		Chnmn Sh		Chnmn Sh	Alluvium		Arctur Ls		Arctur Ls	

TABLE B-2

3) WELLS (mg/l)

	LANE CITY & GLEASON CREEK														TONOPAH CANYON					RUTH
CONSTITUENTS	R2	R3	R4	R8	R22	RA		RB	RC	RE	RF	RH	RAB	AB-4	WCC-1M	WCC-2M	-2M	WCC-3M	WCC-4M	R21
COMMON IONS:						PTI	WCC									PTI	WCC			
pH	8.78	8.94	8.88	7.27	8.55	5.85	8	6.7	7.27	7.58	7.47	7	7.49	8.89	7.77	7.72	8.8	7.7	8	7.08
Chloride	49.8	60	24	21	23	2.85	15.1	23.8	43	3.78	35.5	50	25.4	25.4	10.3	3.15	4.4	0.05	4.3	51
Sulfate	1051	824	449	714	2130	1940	1780	1150	1150	32.8	319	1540	40.2	1480	23.8	26.2	27.3	21.8	9	66
TDS	1953	1552	663	1380	2969	3025	2840	2000	1980	207		2920	348	3020	248	223	223	113	221	400
Bicarbonate	240	205	70	275	105	12.1	155	477	101	181	186	488	224	566	153	185	164	182	170	200
Nitrate as N	13	20.2	0.73	0.35	0.4				0.02	0.5	0.058	0.02	6	0.189	1.14	0.47	0.2		0.38	1.79
Calcium	368	324	48	287	393	528	489	352	399	49.1	170	479	59.7	895	43.2	47.1	45.3	36.8	52.8	79
Magnesium	93	70.1	80.2	78.4	140	91.8	81.1	88	73.5	23.2	30.7	189	30.8	83	18.9	22.1	28.4	14.4	19.3	12.3
Potassium	8.5	8.9	5.2	8.1	18.5	14.2	12.3	8.9	4.68	1.31	2.54	7.94	2.4	13.4	1.22	1.37	5	5	5	2.2
Sodium	45	46	33	29	44	34.5	25.3	30.9	13.3	5.22	23.2	87.4	14.5	39.4	10.9	4.57	5	12.8	5	19
METALS:																				
Arsenic			0.013	0.01		0.005	0.005	0.006	0.005	0.005	0.05	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.043
Barium						0.002	0.012	0.013	0.002	0.042	0.023	0.002	0.105	0.002	0.03	0.048	0.018	0.023	0.029	
Cadmium	0.006	0.02	0.02	0.03	0.04	0.035	0.008	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01
Chromium	0.01	0.02	0.01	0.02	0.03	0.066	0.01	0.01	0.039	0.01	0.013	0.05	0.01	0.064	0.01	0.01	0.01	0.01	0.01	0.02
Copper		0.04	0.19	0.07	0.14	0.06	0.02	0.02	0.005	0.005	0.005	0.12	0.005	0.005	0.005	0.005	0.02	0.02	0.02	0.01
Iron	0.13	17.3	18.1	7.9	193	181	127	13.9	3.73	0.48	0.54	0.18	0.18	0.05	0.05	0.1	0.56	0.1	1.3	0.43
Lead		0.02	0.01	0.13	0.023	0.005	0.005	0.005	0.005	0.005	0.03	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01
Manganese	0.04	0.1	0.15	0.17	13.1	3.99	3.2	2	0.127	0.014	0.05	2.62	0.005	1.06	0.006	0.006	0.094	0.05	0.2	0.01
Mercury						0.0002	0.002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.002	0.0002	0.0002	0.0002	0.0002	0.002	
Nickel		0.07	0.01	0.08	0.13	0.29	0.2	0.04	0.033	0.015	0.015	0.038	0.015	0.057	0.015	0.015	0.04	0.04	0.04	0.01
Selenium	0.025	0.013				0.005	0.01	0.005	0.01	0.005	0.05	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Silver	0.01	0.01	0.01	0.01	0.02	0.01	0.014	0.015	0.005	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Zinc	1.4	0.08	0.26	2.5	0.12	1.01	1.5	0.15	0.005	0.005	0.005	1.96	0.091	0.005	0.007	0.008	0.01		0.51	0.03
Thallium						0.005			0.01	0.02	0.1	0.005	0.005	0.005	0.005	0.005				
MISCELLANEOUS:																				
D.O. (mg/l)																				
Cyanide (W.A.D.)																				
Alk. as CaCO3	99	117	25	144	5	12.1			101	181	188	466	224	566	153	185		113		184
TSS	1.2	25	30.2	29.8	84.2		502	1240									2260		3690	1.1
Temp. (deg. C)	13.5	13	14	14	11.5												0.13			14
Boron							0.1	0.1											0.1	
Fluoride						0.02	3.8	2	1.34	0.32	1.82	1.37	0.15	0.115	0.15	0.33	0.2	1.2	0.2	
Silica						25.2	18.4	23.9	39.2	11.8		18.9	19.9	45.2		10.8	9	12.8	5.4	
Aluminum						4.18			0.28	0.42	0.47	0.296	0.208	0.223	0.28	0.25		0.06		
Screened Interval						Alluvium		Alluvium	Evaporite	Ely Ls	Monzonite	Ely Ls	Dom. Well	Rhyolite	Ely Ls	Ely Ls		Ely Ls	Ely Ls	

TABLE B-2

4) PIT WATER CHEMISTRY (mg/l)

CONSTITUENTS	Liberty Pit Magma	Liberty Pit 0-2m	Liberty Pit 2-10.2m	Liberty Pit Surface	Ruth Pit Magma	Ruth Pit Surface	Ruth Pit 0-55m	Ruth Pit 55-56.9m	Kimbley Pit 0.5m	Kimbley Pit 5.1m	Kimbley Pit Surface	Veteran Pit Leach Pnd	Veteran Pit East	Veteran Pit West
	2-3-94	PTI	PTI	WCC	2-3-94	WCC	PTI	PTI	PTI	PTI	WCC	PTI	PTI	PTI
COMMON IONS:														
pH(1)	5.6	3.2	3.2	2.9	4.51	8	4.3	6	7.61	7.41	7.6	4.7	7.9	8.42
Chloride	45.9	49	48.5	44.9	46.7	60.6	53	56.6	286	319	264	2350	66.4	327
Sulfate	3050	3600	3900	3626	2760	1521	2810	2530	1600	1620	1607	5680	2730	5800
TDS	4100	6300	6400	6160	4120	2700	4050	3750	3580	3510	3310	11400	4070	9470
Bicarbonate		0	0	0		72.5	0	0	189	195	190	0	144	1022
Nitrate as N	0.25U	0.04	0.052	1.53	0.599	2.6	1.3	1	0.02	0.02	1	0.2	0.02	0.06
Phosphorus as P														
Calcium	560	500	500	633	553	619	570	566	605	615		593	626	614
Magnesium	306	345	363	406	216	57.3	210	200	156	156	158	1090	306	1040
Potassium	14.3	6.3	4.3	4.6	7.46	6.6	6.8	7	11.4	11.1	9.9	191	16.9	63.1
Lithium														
Sodium	49.4	54	55	50.1	60.6	101	82.2	63.5	95.3	93	60	743	41.3	169
METALS:														
Arsenic	< 0.001	0.005	0.005	0.18	< 0.005	0.18	0.005	0.005	0.005	0.005	0.16	0.005	0.005	0.005
Barium	< 0.003	0.16	0.008	0.002	< 0.002	0.027	0.005	0.005	0.002	0.013	0.009	0.002	0.002	0.002
Beryllium														
Bismuth	0.03U													
Cadmium	0.172													
Cobalt	0.602	0.63	0.75	0.86	0.356	0.007	0.37	0.35	0.005	0.005	0.007	0.162	0.005	0.005
Chromium	0.003	0.1	0.11	0.05	0.073	0.01	0.1	0.1	0.061	0.063	0.01	0.104	0.067	0.095
Copper	2.49	37.5	44	46.5	25.9	14.9	28	23	0.06	0.064	0.172	6.65	0.027	0.028
Iron	169	62.3	266	36.3	1.26	0.53	3.8	0.06	0.05	0.05	0.45	7.59	0.067	0.05
Gallium														
Lead	< 0.005	0.005	0.005	0.05	< 0.005	0.05	0.005	0.005	0.005	0.005	0.05	0.005	0.005	0.005
Manganese	58.3	115.5	143	143	64.5	0.61	65	65	0.17	0.534	0.45	46.1	1.11	0.12
Mercury	<0.0002U	0.0002	0.0002	1.31	0.0006	0.5	0.0008	0.001	0.002	0.0002	0.84	0.0002	0.0002	0.0002
Molybdenum	0.002U													
Nickel	0.3	0.74	0.9				0.65	0.61	0.056	0.064		0.308	0.055	0.046
Phosphorus	0.05U													
Scandium														
Selenium	0.005	0.005	0.005	0.13	0.043	0.13	0.005	0.005	0.005	0.005	0.13	0.005	0.005	0.014
Silver	0.007	0.02	0.05	0.02	0.016	0.02	0.03	0.04	0.021	0.01	0.02	0.01	0.01	0.01
Zinc	17.7	51.5	66	71.2	30.2	0.29	32	26.9	1.81	2.49	243	29.3	0.064	0.005
Thallium	0.01U	0.005	0.005				0.005	0.007	0.006	0.005		0.04	0.005	0.005
Tin	0.03U													
Strontium	0.712													
Titanium	0.004U													
Vanadium	0.003U													
MISCELLANEOUS:														
D.O. (mg/l)(1)		6	0.1						6.3	0.072			7.65	
Cyanide		0.005	0.005	0.005	0.492	11.1	7.5	27	0.005	0.005	0.005	0.005	0.005	0.005
Alk. as CaCO3	156	0	0	0	0	72.5	0	0	169	195	190	0	144	150
TSS				11		14					4			
Temp. (deg. C)		12	6.5				12	10.2	15.5	13.5			13.5	
Boron				0.137		0.157			0.22		0.22			
Fluoride	5	17.8	21.5		5.665	3.2			3.01	3.78	261	0.2	7.15	17.7
Silica		56.5	70	38.7		22.9			22.1	21.8	28		9.7	204
Aluminum	4.61	68.2	90				20	11	0.105	0.13		4.75	0.165	0.245
Antimony	0.058													
Lithology												Leach Effl.		

(1)Analyzed immediately after sampling. All other results reported by SVL Analytical Lab.

TABLE B-2

5) WELLS (mg/l)

		Keystone Junction			Deep Ruth Shaft						
	R23	AB-3	AB-4		Magma	R24	R24	R-C		R-E	R-F
CONSTITUENTS COMMON IONS:			PTI	WCC	2-3-94	PTI	WCC	PTI	WCC		
pH	7.99	7.3	6.69	6.7	6.32	6.37	7	7.27	7.4	7.5	7.4
Chloride	4	46.5	25.4	20.3	30.4	32.1	27.1	43	70.1	3.8	34.9
Sulfate	113	570	1480	1390	1210	1130	819	1150	1200	29.5	312
TDS	239	1260	3020	2400	1970	133	1770	1980	1770	242	756
Bicarbonate	115	627	0	582		1970	210	101	106	171	164
Nitrate as N		1.3	0.189	0.05	0.333	0.77	1.93	0.02	0.5	0.44	0.05
Calcium	35	275	695	553	376	365	344	399	482	46.9	172
Magnesium	14	37.6	83	70.8	79.1	72.8	64.4	73.5	86.3	22.5	33.3
Potassium	7	10.7	13.4	11.2	7.67	6.39	5.4	4.68	5.3	5	5
Sodium	12	42	39.7	317	41.6	39.2	30.1	13.3	15.8	5	22
METALS:											
Arsenic		0.005	0.005	0.005	< 0.005	0.005	0.18	0.005	0.005	0.005	0.005
Barium		0.03	0.002	0.022	< 0.002	0.002	0.015	0.002	0.018	0.04	0.026
Cadmium		0.005	0.005	0.005	0.008	0.02	0.007	0.005	0.005	0.005	0.005
Chromium	0.42	0.01	0.064	0.01	0.039	0.041	0.01	0.04	0.01	0.01	0.01
Copper	0.09	0.02	0.005	0.02	0.022	0.227	0.191	0.005	0.02	0.02	0.02
Iron	22	0.01	0.05	0.1	45.2	54.3	22	3.73	3.3	0.01	1.2
Lead		0.01	0.005	0.005	< 0.005	0.005	0.05	0.005	0.005	0.005	0.005
Manganese	0.21	0.12	1.06	1.3	13.6	11.8	6.37	0.127	0.13	0.018	0.11
Mercury		0.0002	0.002	0.0002	< 0.0002	0.0002	0.5	0.0002	0.0002	0.0002	0.0002
Nickel		0.02	0.057	0.04		0.12		0.033	0.04	0.04	0.04
Selenium		0.01	0.005	0.005	0.016	0.013	0.13	0.005	0.01	0.005	0.01
Silver		1.2	0.01	0.014	< 0.01	0.01	0.02	0.01	0.01	0.01	0.01
Zinc			0.005	0.13	13.1	1.5	4.1	0.005	0.02	0.02	0.02
Thallium			0.005			0.005		0.005			
MISCELLANEOUS:											
D.O. (mg/l)											
Cyanide		0.01		0.01	< 0.005		0.005			0.01	0.01
Alk. as CaCO3	28	627	0	582	171	133	210	101	106	171	164
TSS	64.6	9760	566	1280			72		10	5	10
Temp. (deg. C)	9.4										
Boron		0.11		0.16			0.16			0.1	0.1
Fluoride		0.05	0.115	0.02	2.79	2.78	1.28	1.34	2	0.2	1.4
Silica		38.4	45.2	32		18.9	23.9	39.2	41.7	11.2	55.6
Aluminum			0.22			0.994		0.26			
Lithology, etc.		Sndy Ls	Rhyolite					Evaporite		Ely Ls	Monzonite

TABLE B-2

6) MINED AREA WATERS (mg/l)

CONSTITUENTS	R-H PTI	R-H WCC	R-1	R-13S	LDW-3A	Shaft Wtr R24
COMMON IONS:						
pH	7	6.9	2.3	6.5	7.72	6.6
Chloride	50	46.4	46.6	12	18.5	25
Sulfate	1540	1790	952	441	59.4	898
TDS	2920	2960	1800	799		1690
Bicarbonate	466	489	228	185	175	245
Nitrate as N	0.02	0.5	2	0.37	0.54	2.46
Calcium	479	549	374	206	57.9	311
Magnesium	169	195	103	13.6	22.7	72.3
Potassium	7.94	10	5	2.9	1.48	5.7
Sodium	87.4	107	50.5	13	8.4	33
METALS:						
Arsenic	0.005	0.005	0.005	0.005	0.05	0.032
Barium	0.002	0.028	0.013		0.05	
Cadmium	0.005	0.01	0.005		0.005	0.03
Chromium	0.05	0.02	0.01		0.007	0.03
Copper	0.12	0.14	0.02		0.017	0.5
Iron	0.181	0.2	0.2	5.27	0.527	19.8
Lead	0.005	0.04	0.1		0.03	0.02
Manganese	2.62	2.4	0.032	0.49	0.122	7.3
Mercury	0.0002	0.0002	0.0002		0.0002	
Nickel	0.038	0.8	0.04	0.03	0.015	0.11
Selenium	0.005	0.01	0.01	0.004	0.05	
Silver	0.01	0.02	0.01		0.01	0.01
Zinc	1.96	2.2	0.5		0.042	2.3
Thallium	0.005				0.068	
MISCELLANEOUS:						
D.O. (mg/l)						
Cyanide						
Alk. as CaCO3	466	489	228	114	175	161
TSS		5410	9	14.9		48.2
Temp. (deg. C)				3.5		16.5
Boron			0.28	3.72		
Fluoride	1.37	2	2		0.44	
Silica	18.9	19.3	21.4			
Aluminum	0.296				0.45	
Lithology, etc.	Silic. Ls			Mine Tnl		Deep Ruth

TABLE B-2

7) SPRINGS (mg/l)

CONSTITUENTS	Murry Springs		Ward Mtn Springs	Lyon Springs		West Camp Springs	Riepe Springs
	WCC	PTI		PTI	WCC		
COMMON IONS:							
pH	7.38	7.77	7.1	7.64	6.5	9	7.82
Chloride	1	2.94	0.4	5.46	5	11	7.35
Sulfate	12	10.3	24	13.2	14	122	7.5
TDS	205	167	235	199	235	406	182
Bicarbonate	225	183	235	168	200	95	164
Nitrate as N	0.94	0.69	0.36	1.68	0.26	0.1	0.96
Calcium	41	42.8	57	61.8	54	38	56.2
Magnesium	19.5	18.2	13.5	7.83	2	20.6	4.77
Potassium	1.1	1	1	1	0.8	5.5	1
Sodium	5	3.74	5	11.5	10	32	9.96
METALS:							
Arsenic	0.02	0.005		0.005	0.008	0.008	0.005
Barium		0.031		0.018		0.05	0.093
Cadmium	0.01	0.005	0.01	0.005			0.005
Chromium	0.02	0.01	0.02	0.01		0.01	0.01
Copper	0.03	0.005	0.04	0.005	0.35	0.82	0.005
Iron	0.11	0.16	0.19	0.22	0.27	5.29	0.156
Lead		0.005	0.005	0.005		0.45	0.005
Manganese	0.01	0.005		0.005	0.02		0.005
Mercury		0.0002		0.0002		0.08	0.0002
Nickel		0.015		0.015	0.13		0.015
Selenium		0.005		0.005	0.004		0.005
Silver	0.01	0.01	0.01	0.01	0.02		0.01
Zinc	0.02	0.005	0.02	0.011	0.13	0.04	0.005
Thallium		0.1		0.005			0.005
MISCELLANEOUS:							
D.O. (mg/l)							
Cyanide							
Alk. as CaCO3	153	183	131	168	165	85	164
TSS	0.4		6.5			431	
Temp. (deg. C)	13		8.5		15	22.5	
Boron							
Fluoride		0.14		0.15			0.16
Silica		8.5		12.5			16.1
Aluminum		0.2		0.365			0.228
Lithology, etc.							

TABLE B–2

8) PORE WATERS IN PIT IN–FILL WASTE ROCK (mg/l)

	Veteran Pore		Kimbley Pore		Ruth Pore		Liberty
	V–1	V–2	K–1	K–2	R–1	R–2	L–1
CONSTITUENTS							
COMMON IONS:							
pH	7.56	7.53	4.77	7.36	3.58	2.2	6.08
Chloride	73.2	96.6	483	368	58.6	119	60.7
Sulfate	2000	2170	2610	1830	3460	11700	2560
TDS	4300		4130	3590	5060	20800	4080
Bicarbonate	134	145	0	152	0	0	600
Nitrate as N	0.056		0.15	0.18	1.39	0.18	0.44
Calcium	600	430	450	570	540	480	528
Magnesium	300	265	200	165	282	970	320
Potassium	16.3	16.4	40	12.1	10	10	32
Sodium	40	58	110	103	92	62	46.5
METALS:							
Arsenic	0.01	0.01	0.04	0.005	0.005	0.022	0.005
Barium	0.02	0.02	0.002	0.002	0.002	0.05	0.002
Cadmium	0.05	0.05	0.01	0.005	0.72	0.46	0.008
Chromium	0.07	0.05	0.055	0.062	0.096	2.25	0.066
Copper	0.4	0.1	1.23	0.069	61.5	348	0.06
Iron	1.01	0.05	140	2.3	11.8	1050	102
Lead	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Manganese	0.3	0.09	5.6	0.4	123	101	62.7
Mercury	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002
Nickel	0.2	0.04	0.05	0.055	1.46	8	0.275
Selenium	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Silver	0.01	0.01	0.01	0.01	0.027	0.12	0.015
Zinc	0.37	0.02	3.6	1.6	51.2	66.1	10.7
Thallium	0.005	0.005	0.005	0.005	0.005	0.005	0.005
MISCELLANEOUS:							
D.O. (mg/l)							
Cyanide	0.005		0.005	0.005	0.5	0.71	
Alk. as CaCO3	139	145	0	152	0	0	600
TSS							
Temp. (deg. C)							
Boron							
Fluoride	6.23		1.91	3.87	13.8	184	
Silica					35.2	254	
Aluminum	0.52	0.247	2.27	0.32	45.8	975	1.6
Lithology							

Table B-3

Summary of Pumping Test Results

Well Number	Screened Formation	Effective Open Interval (feet)	Transmissivity (gpd/ft)	Hydraulic Conductivity (ft/d)	Storage Coefficient
R-A	Alluvium	6521-6495	15	0.1	
R-B	Alluvium	6504-6479	580	3.9	
R-C	Arcturus	6603-6484	26	0.35	
R-E	Ely	6627-6502	1,700	15	
R-F	Monzonite	6863-6747	4	0.05	
R-H	Ely (silicified)	6527-6473	4	0.01	
K-2M	Arcturus, Ely	6772-5622	127,500	18	0.001/0.012
K-2P	Arcturus, Ely	6756-5663			
K-3M	Arcturus, Ely	6800-5850	133,750	25	0.001
Deep Ruth Shaft		6903-5543	52,332		
NRC-1P	Arcturus, Guilmette Limestone				
NRC-2M NRC-3M	Arcturus, Guilmette Limestone	6900-5430	208,000	21	0.008/0.17

Notes:

Alluvium tested was Gleason Creek.

Arcturus, Ely in K-2M and K-3M is in Keystone area.

Pumping Test data from Dames and Moore (1990) and Hydro-Search (1990).

Table B-4

Concentrations of Dissolved Metals Estimated for Future Pit Water and the Locked-Cycle Tailings Test Water Compared to Various Criteria (micrograms per liter - µg/l)

Material	Veteran/Tripp Pit	Liberty Pit	Ruth Pit	Kimbley Pit	Representative Future Tailings Water[1]	USEPA MCLs[2]	Nevada Stock Water Standards	NRC MTL[3]
Aluminum	14	14	16	9				200,000
Antimony[4]	159	159	159	159				70,000-150,000
Arsenic	<1	<1	<1	<1	2		200	50,000
Barium					10	2,000[5]		20,000
Cadmium	<1	<1	<1	3	5	5	50	500
Calcium	460,000	410,000	280,000	620,000	409,000			
Chromium	12	9	6	16	10	100	1,000	1,000,000
Copper	<1	<1	<1	25	10	1,300	500	25,000
Cyanide[4]	5	5	5	5				
Fluoride					4,300			
Iron	<1	<1	<1	25	60			500,000
Lead	<1	<1	<1	<1	20	5/p	100	30,000
Magnesium	66,000	47,000	32,000	74,000				
Manganese	33,000	32,000	27,000	33,000	10			400,000
Mercury[4]	0.2	0.2	0.2	0.2	0.2	2	10	2,000
Molybdenum[4]	10	10	10	10				5,000
Nickel	<1	<1	<1	26				50,000
Nitrate[4]	20	20	20	20	200	10,000		
Nitrite[4]	10	10	10	10		1,000		

Table B-4 (Continued)

Material	Veteran/Tripp Pit	Liberty Pit	Ruth Pit	Kimbley Pit	Representative Future Tailings Water[1]	USEPA MCLs[2]	Nevada Stock Water Standards	NRC MTL[3]
Selenium	84	52	47	82	24	50	50	2,000
Silver					10			100,000
Sulfate	1,400,000	1,200,000	840,000	1,900,000	978,000			
Thallium	82	49	60	83				
TDS					1,550,000			
Zinc	<1	<1	<1	73	109	110+	25,000	300,000
pH	7.8	7.8	7.9	5.7				

<u>FOOTNOTES</u>:

[1]Concentrations (μg/l) in the Locked-Cycle Test.

[2]USEPA Drinking Water Maximum Contaminant Levels (MCLs).

[3]National Research Council (1980) Maximum Tolerable Levels (MTLs). Some domestic animals (horses) generally had lower MTLs than other animals. The lowest MTL is presented.

[4]The estimated levels of these elements in future pit water were not available, based on the modeling methodology. For the concentrations of dissolved metals in future pit water, the existing Kimbley Pit water quality was used for analog, as it is considered to be the most representative of final pit water quality.

[5]Proposed criteria.

Table B-5

Representative Humidity Cell Results

SKEM-47: Weary Flats pluton (Km)
Experiment Start Date: 10/26/93 (3)

Weeks Elapsed	pH	Iron mgl	Sulfates mgl
0	7.19	1.5	460
3	6.68	0.14	920
5	7.45	na	600
7	7.01	3.6	400
9	7.01	0.01 u	300
11	6.59	0.01 u	184
13	7.18	0.009 u	101
15	7.68	0.009 u	52.7
17	7.51	0.009 u	92.8
19	7.16	0.352	70.6
21	7.40		

LPR-2&4: Acidified dump
Experiment Start Date: 10/26/93 (4)

Weeks Elapsed	pH	Iron mgl	Sulfates mgl
0	2.41	1100	16000
3	2.74	330	5400
5	2.75	na	3400
7	2.93	140	2400
9	2.90	51.8	6450
11	2.96	45.8	2550
13	2.96	23.6	1940
15	3.08	16	1430
17	2.99	26	2050
19	3.01	15.7	1770
21	3.19		

MLP-10: Monzonite porphyry
Experiment Start Date: 10/26/93 (8)

Weeks Elapsed	pH	Iron mgl	es mgl
0	7.81	2.3	860
3	6.83	0.01 u	1500
5	7.52	na	780
7	7.41	0.02	740
9	7.28	0.01 u	521
11	7.40	0.01 u	366
13	7.49	0.012	237
15	8.03	0.009 u	291
17	7.65	0.009 u	280
19	7.62	0.009 u	220
21	7.58		

VEC-2: Ely marble
Experiment Start Date: 10/26/93 (9)

Weeks Elapsed	pH	Iron mgl	Sulfates mgl
0	7.68	0.01	10 u
3	6.99	0.01 u	670
5	7.53	na	460
7	7.40	0.01 u	370
9	7.03	0.01 u	470
11	7.41	0.01 u	218
13	7.59	0.009 u	120
15	7.85	0.009 u	134
17	7.32	0.009 u	124
19	7.80	0.009 u	219
21	7.08		

Table B-5 (Continued)

DH11: Tertiary rhyolite
Experiment Start Date: 11/08/93 (25)

Weeks Elapsed	pH	Iron mgl	Sulfates mgl
0	7.87	0.02	120
2	4.93	na	170
4	5.38	0.01 u	150
6	6.41	0.012 u	83.5
8	6.70	0.01 u	27
10	6.45	0.009 u	23
12	6.38	0.0248	16.3
14	6.96	0.011	8.95
16	6.64	0.0145	5.71
18	4.10	0.358	4.97
20			

RM2: Ely skarn
Experiment Start Date: 11/08/93 (30)

Weeks Elapsed	pH	Iron mgl	Sulfates mgl
0	7.85	0.01 u	330
2	7.57	na	350
4	6.64	0.01 u	220
6	6.40	0.012 u	115
8	7.31	0.01 u	92
10	6.42	0.406	83
12	7.46	0.0196	249
14	8.00	0.009 u	76.5
16	7.78	0.013	57.1
18	7.49	0.0096	42.7
20			

RPR5: Chainman Shale, hornfels
Experiment Start Date: 11/08/93 (32)

Weeks Elapsed	pH	Iron mgl	Sulfates mgl
0	7.79	0.01 u	750
2	7.29	na	260
4	6.74	0.01 u	140
6	6.62	0.012 u	126
8	7.51	0.01 u	83
10	6.94	0.06	76
12	7.49	0.0091	93.9
14	7.93	0.181	77
16	7.67	0.009 u	93.2
18	7.17	0.0133	60.6
20			

Table B-5 (Continued)

RUTH ORE FLOAT: Tailings
Data from EA

Weeks Elapsed	pH	Iron mgl	Sulfates mgl
1	6.59	0.03 u	171
2	6.69	0.03 u	338
4	6.68	0.03 u	168
6	7.26	0.03 u	168
8	7.10	0.03 u	91
10	7.81	0.03 u	48
12	7.83	0.03 u	24
14	7.85	0.03 u	23
16	7.92	0.03 u	18
18	7.77	0.03 u	12
20	7.81	0.03 u	20
22	6.42	0.03 u	17
24	7.76	0.03 u	10 u
26	7.43	0.03 u	20

TM-8: Composite skarn
Data from EA

Weeks Elapsed	pH	Iron mgl	Sulfates mgl
1	6.68	0.03 u	108
2	6.91	0.03 u	459
4	6.78	0.03 u	310
6	7.55	0.03 u	285
8	7.37	0.03 u	253
10	7.87	0.03 u	140
12	7.98	0.03 u	90
14	7.98	0.03 u	38
16	8.08	0.03 u	31
18	7.89	0.03 u	26
20	7.99	0.03 u	28
22	6.79	0.03 u	18
24	7.96	0.03 u	19
26	7.37	0.03 u	18

Table B-6

Estimated Risk of Potential Mill Reagents

Trade Name	Manufacturer	Chemical Name	Maximum Theoretical Concentration (mg/L)	Effects on Aquatic Life[1]	Effects from Ingestion[1]	Aquatic Effects Ratio[2]	Ingestion Effects Ratio[2]	Comments
AX343	CYTEC	Sodium isopropyl xanthate	0.88	Rain. Trout 96-H LC_{50}=595 mg/L	Rat Oral LD_{50}=930 mg/kg	0.0015	0.0009	No data on mutagenic or teratogenic properties
AX350	CYTEC	Potassium amyl xanthate	0.88	Rain. Trout 96-H LC_{50}=12 mg/L; Daphnia sp. 48-H LC_{50}=3.9 mg/L	Rat Oral LD_{50}=1000-2000 mg/kg	0.2256	0.0009	No data on mutagenic or teratogenic properties
AERO 3477	CYTEC	Sodium diisobutyl dithiophosphate	0.35	Rain. Trout 96-H LC_{50}>125 mg/L; Daphnia sp. 48-H LC_{50}=132 mg/L	Rat Oral LD_{50}=3540 mg/kg	0.0028	0.0001	No data on mutagenic or teratogenic properties
AERO 404	CYTEC	Mercapto-benzothiazol	0.44	Goldfish, fatal conc.=2 mg/L[3]	Rat Oral LD_{50}=8900 mg/kg	0.22	0.00005	No data on mutagenic or teratogenic properties
MIBC	Unknown	Methyl isobutyl carbinol (methyl amyl alcohol)	17.54	Goldfish 24-H LD_{50}=360 mg/L[3]	Rat Oral LD_{50}=2590 mg/kg[3]	0.0487	0.0068	No data on mutagenic or teratogenic properties
AERO 242	CYTEC	Diaryl dithiophos-phoric acid	0.26	Rain. Trout 96-H LC_{50}=66 mg/L	Rat Oral LD_{50}=250 mg/kg	0.0039	0.0010	No data on mutagenic or teratogenic properties
AERO 5500	CYTEC	Alkoxy carbonyl alkyl thiourea	0.53	Rain. Trout 96-H LC_{50}=8.8 mg/L; Bluegill 96-H LC_{50}=19 mg/L; Daphnia sp. 48-H LC_{50}=42 mg/L	Rat Oral LD_{50}=461 mg/kg	0.0602	0.0011	Not active in the Ames Assay for mutagenicity
MINEREC 1331	MINEREC	Methyl n-butyl thionocarbamate	0.53	No data available	No data available	NA	NA	No data on mutagenic or teratogenic properties
CO 125	Phillips 66	n-dodecyl mercaptan	0.44	No data available	No data available	NA	NA	No statistically significant findings of embryo/fetotoxicity or malformations in rats

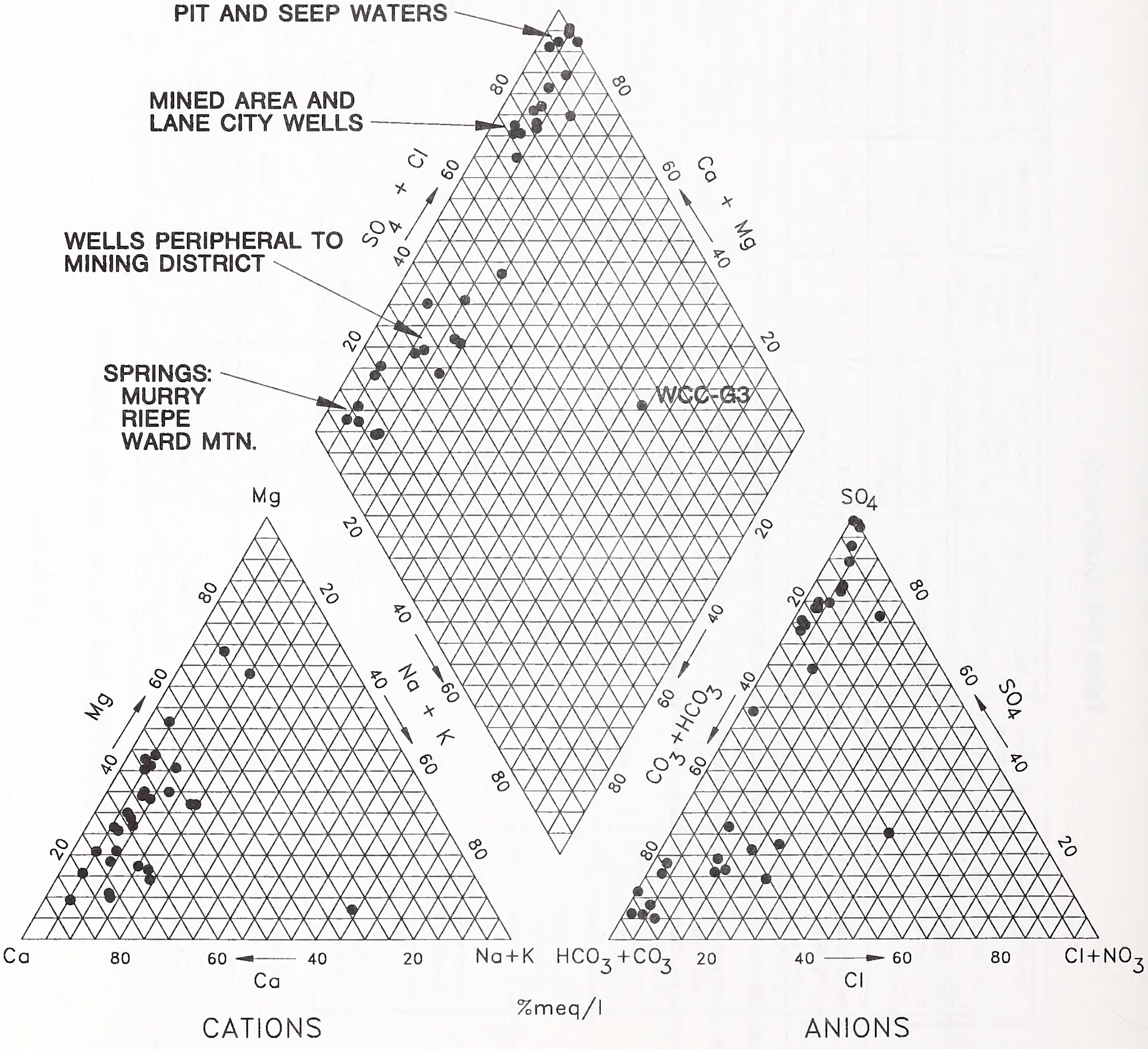
Table B-6 (Continued)

Trade Name	Manufacturer	Chemical Name	Maximum Theoretical Concentration (mg/L)	Effects on Aquatic Life[1]	Effects from Ingestion[1]	Aquatic Effects Ratio[2]	Ingestion Effects Ratio[2]	Comments
DP-6	CYTEC	Anionic polymer	17.54	No data available	Rat Oral LD_{50}>10000 mg/kg	NA	0.0017	No data on mutagenic or teratogenic properties
AEROFROTH 65	CYTEC	Polypropylene glycol methyl ether	8.77	No data available	Rat Oral LD_{50}=2410 mg/kg	NA	0.0036	No data on mutagenic or teratogenic properties

[1]Effects values obtained, where possible, from Material Safety Data Sheets. Other sources are footnoted and listed below.

[2]Effects Ratio = Max. Theor. Conc. (in ppm)/Lowest Effects Concentration (in ppm)

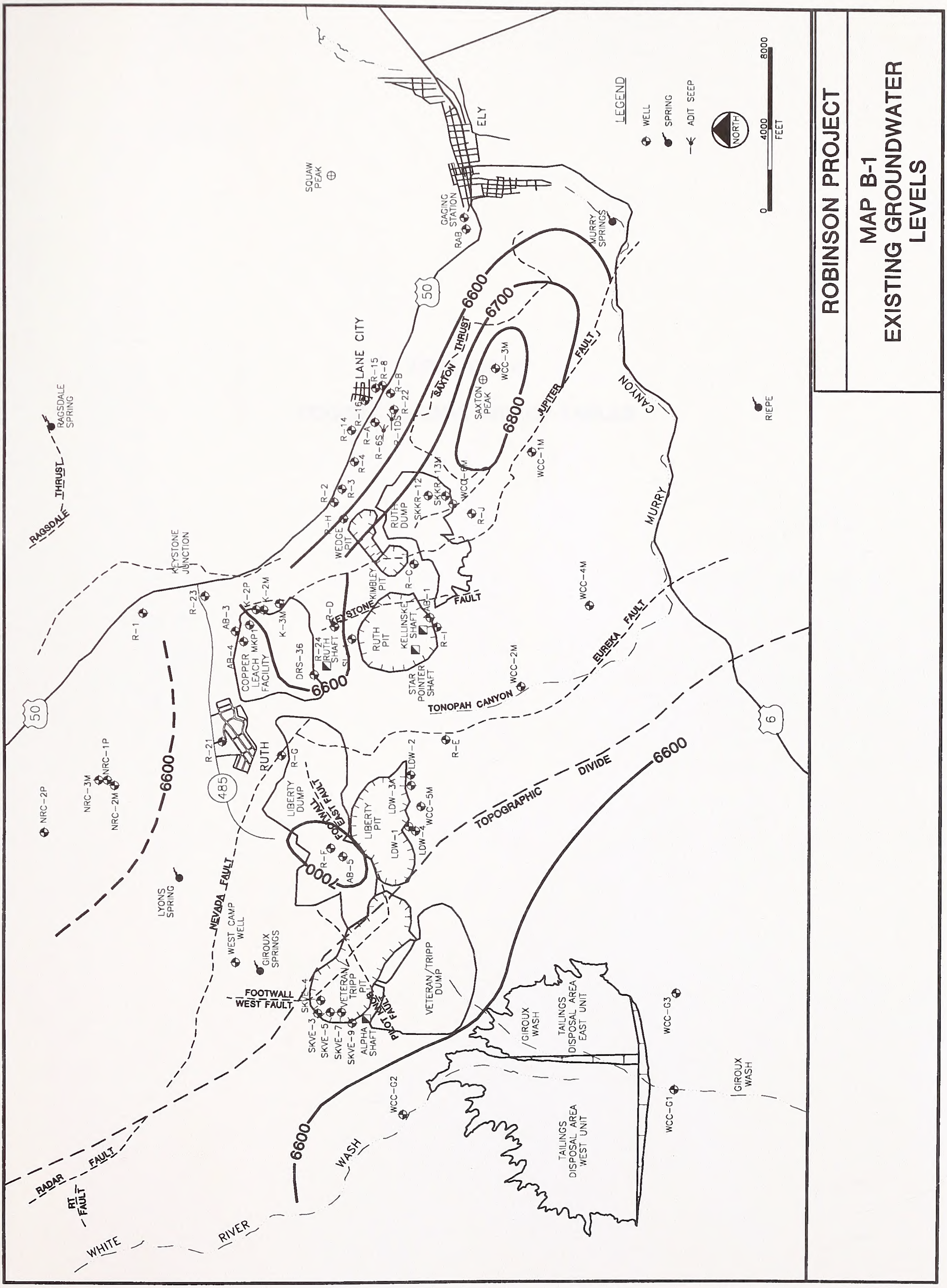
[3]Data from: Verschueren, K. 1983. Handbook of environmental data on organic chemicals, 2nd ed. Van Nostrand Reinhold Co., New York. 1310 pp.



ROBINSON PROJECT

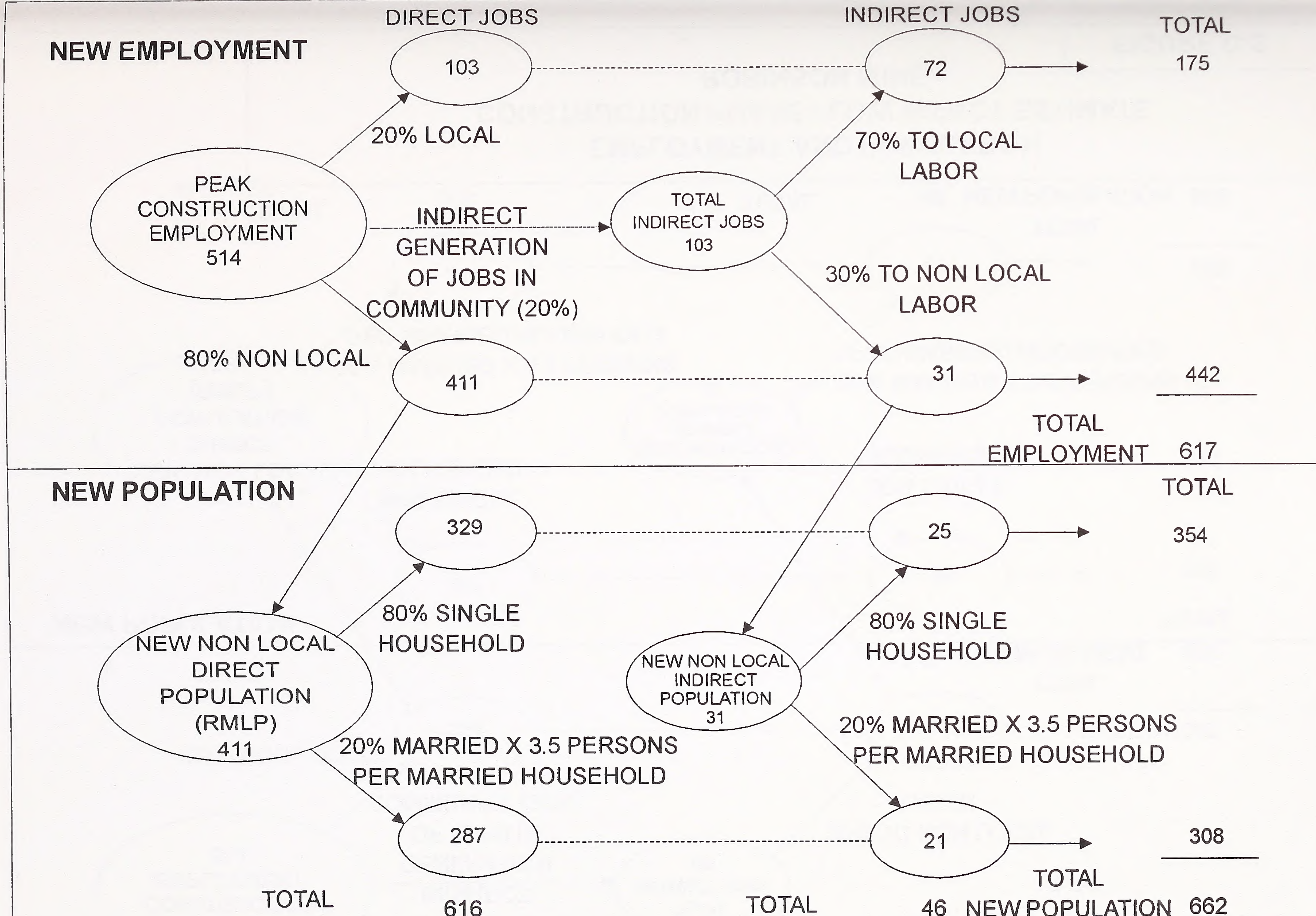
FIGURE B-1
PIPER DIAGRAM
BASELINE WATER CHEMISTRY

DATE: FEB., 1994	ACAD FILE: PIPER-1


ROBINSON PROJECT
MAP B-1
EXISTING GROUNDWATER LEVELS
LEGEND
WELL
SPRING
ADIT SEEP
NORTH
0
4000
8000
FEET
ELY
SQUAW PEAK
GAGING STATION
RAB
MURRY SPRINGS
LANE CITY
SAXTON THRUST
JUPITER FAULT
SAXTON PEAK
WCC-3M
WCC-1M
6600
6700
6800
7000
MURRY
CANYON
RIEPE
RAGSDALE SPRING
RAGSDALE THRUST
KEYSTONE JUNCTION
R-1
R-2
R-3
R-4
R-14
R-15
R-16
R-8
R-B
R-22
R-A
R-6S
R-10S
R-H
R-23
R-21
R-C
R-D
R-I
R-J
R-E
R-G
R-F
K-2P
K-2M
K-3M
AB-1
AB-3
AB-4
AB-5
MKP1
DRS-36
R-24
WEDGE PIT
RUTH DUMP
SKKR-12
SKKR-13M
WCC-6M
KIMBLEY PIT
KEYSTONE FAULT
RUTH PIT
KELLINSKE SHAFT
RUTH SHAFT
STAR POINTER SHAFT
COPPER LEACH FACILITY
WCC-4M
WCC-2M
EUREKA FAULT
TONOPAH CANYON
50
6
485
RUTH
NRC-2P
NRC-3M
NRC-1P
NRC-2M
LIBERTY DUMP
LIBERTY PIT
EAST FAULT
FOOTWALL
LDW-1
LDW-2
LDW-3A
LDW-4
WCC-5M
TOPOGRAPHIC DIVIDE
LYONS SPRING
NEVADA FAULT
WEST CAMP WELL
GIROUX SPRINGS
FOOTWALL WEST FAULT
SKVE-3
SKVE-4
SKVE-5
SKVE-7
SKVE-9
VETERAN TRIPP PIT
ALPHA SHAFT
PILOT KNOB FAULT
VETERAN/TRIPP DUMP
GIROUX WASH
TAILINGS DISPOSAL AREA EAST UNIT
TAILINGS DISPOSAL AREA WEST UNIT
WCC-G1
WCC-G2
WCC-G3
RADAR FAULT
RT FAULT
WHITE RIVER WASH

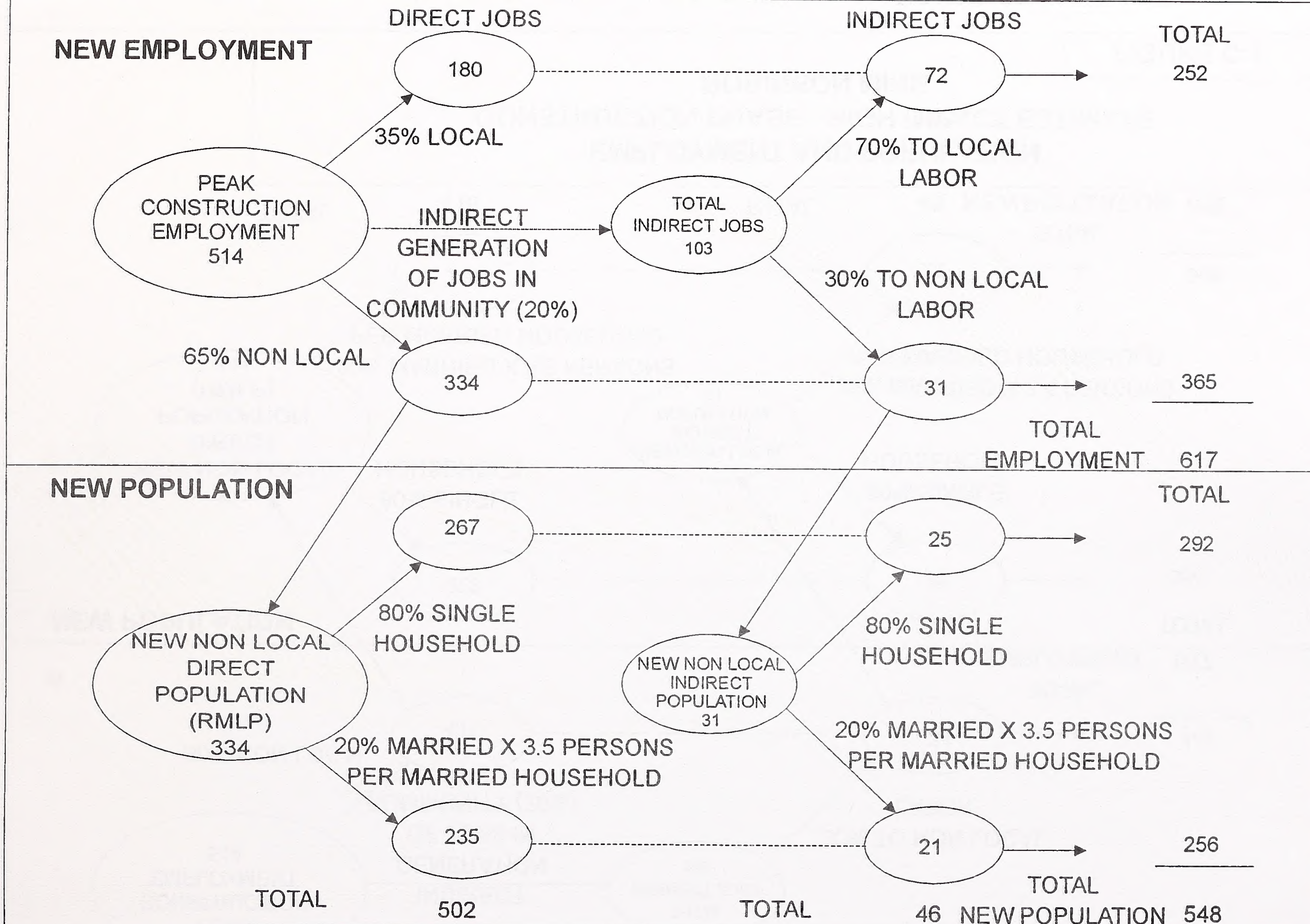
APPENDIX C

SOCIOECONOMIC IMPACT TABLES



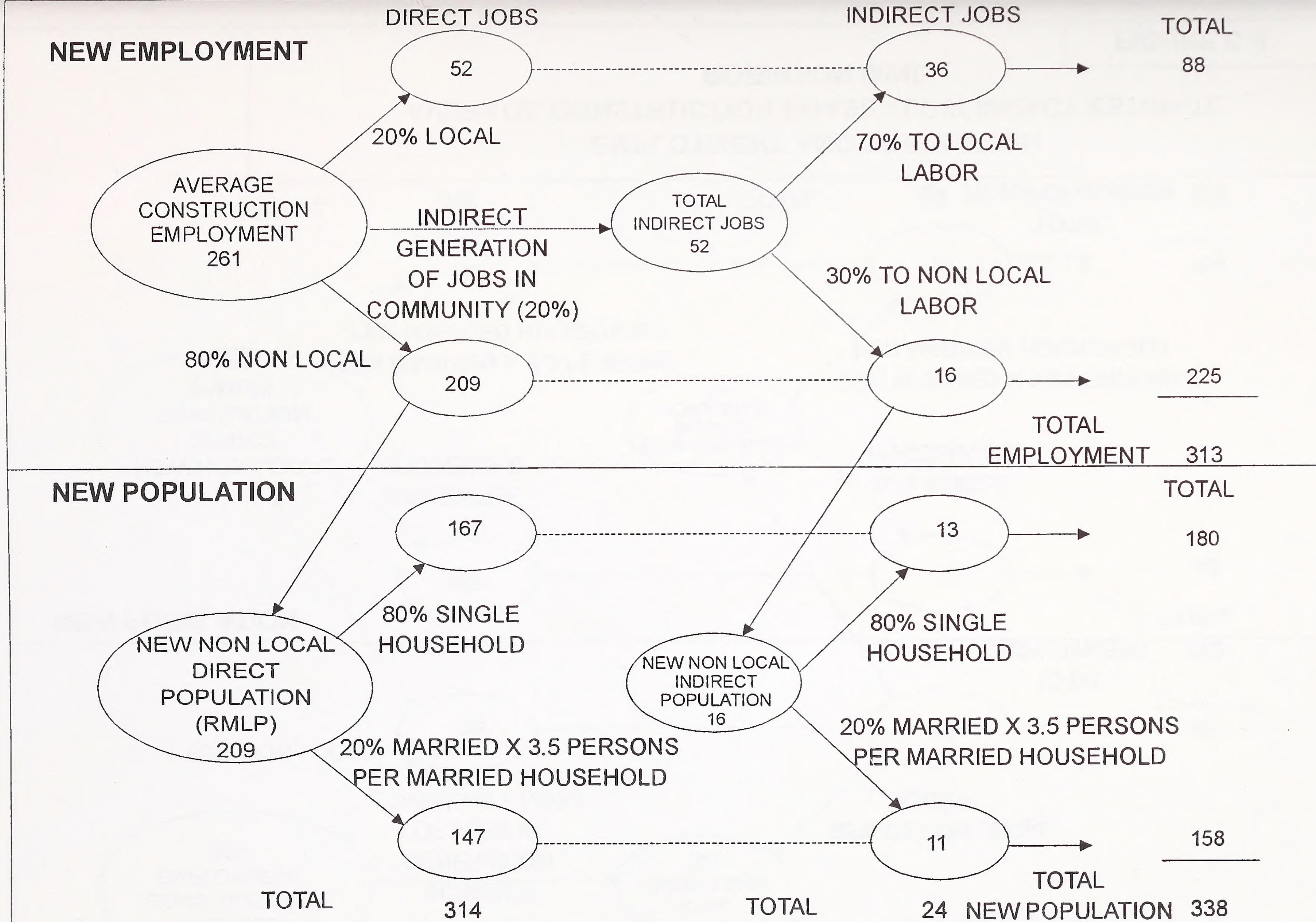
EMPLOYMENT AND POPULATION
CONSTRUCTION PHASE - HIGH IMPACT ESTIMATE
ROBINSON MINE

FIGURE C-1



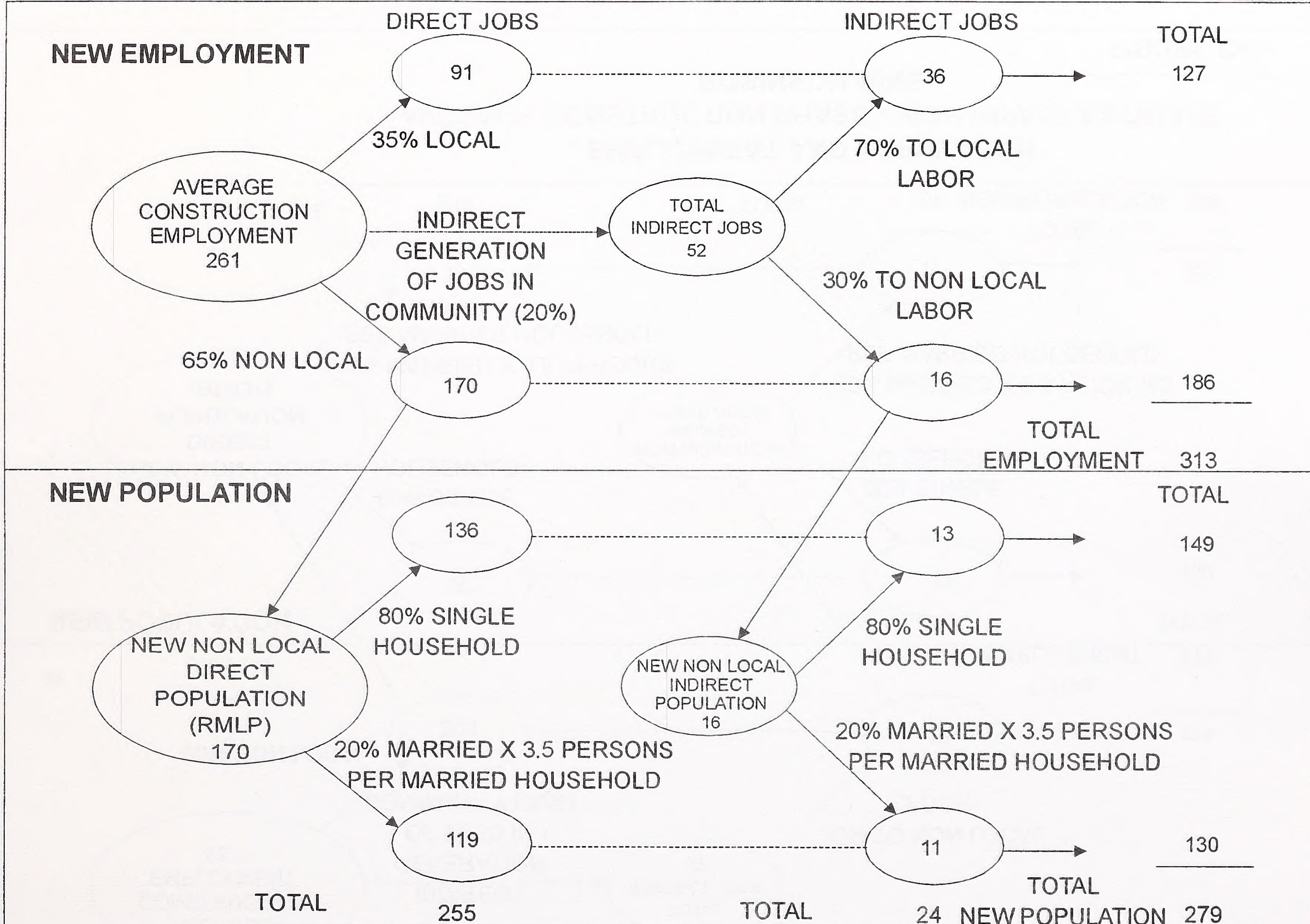
EMPLOYMENT AND POPULATION
CONSTRUCTION PHASE - LOW IMPACT ESTIMATE
ROBINSON MINE

FIGURE C-2



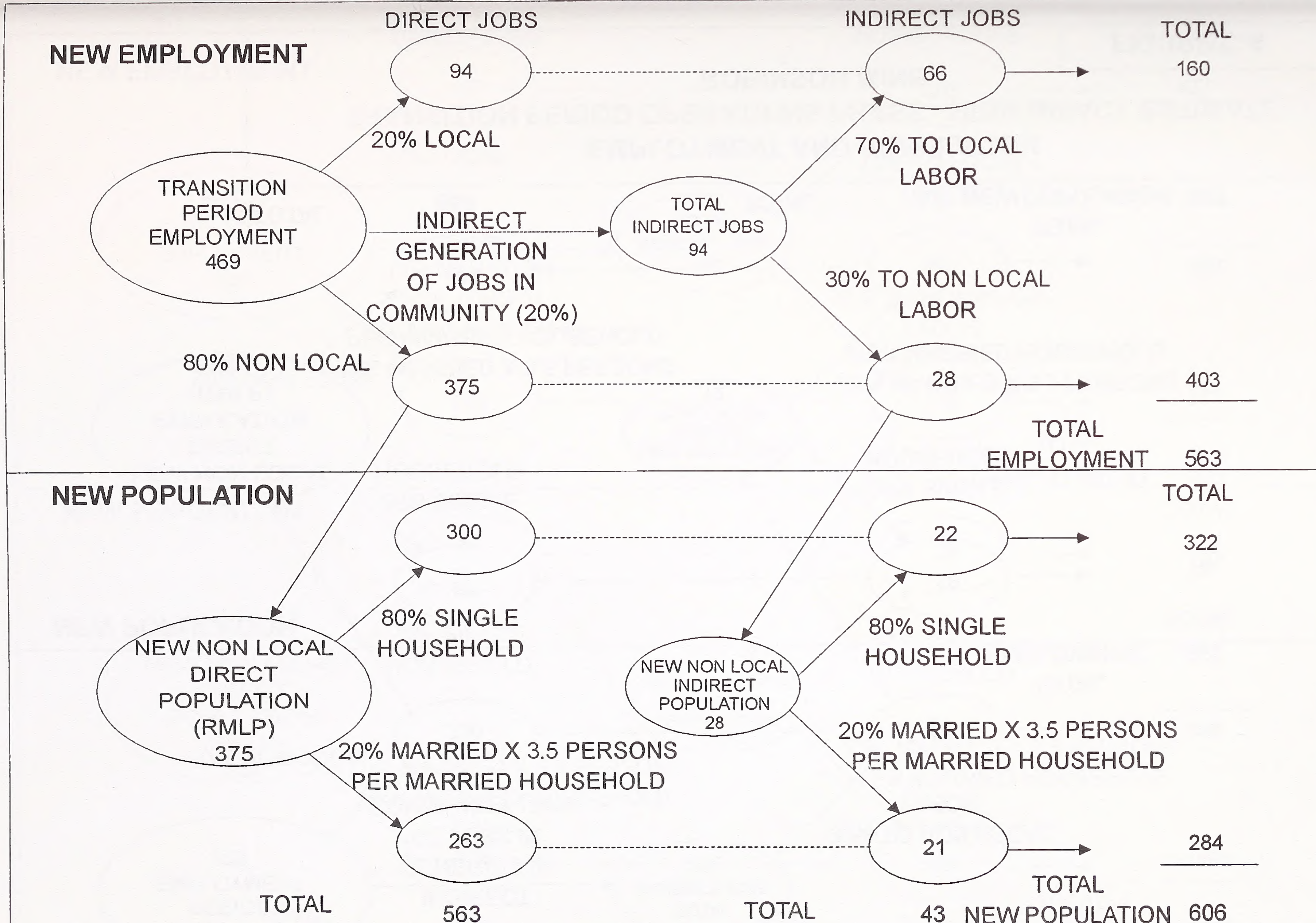
EMPLOYMENT AND POPULATION
AVERAGE CONSTRUCTION PHASE - HIGH IMPACT ESTIMATE
ROBINSON MINE

FIGURE C-3



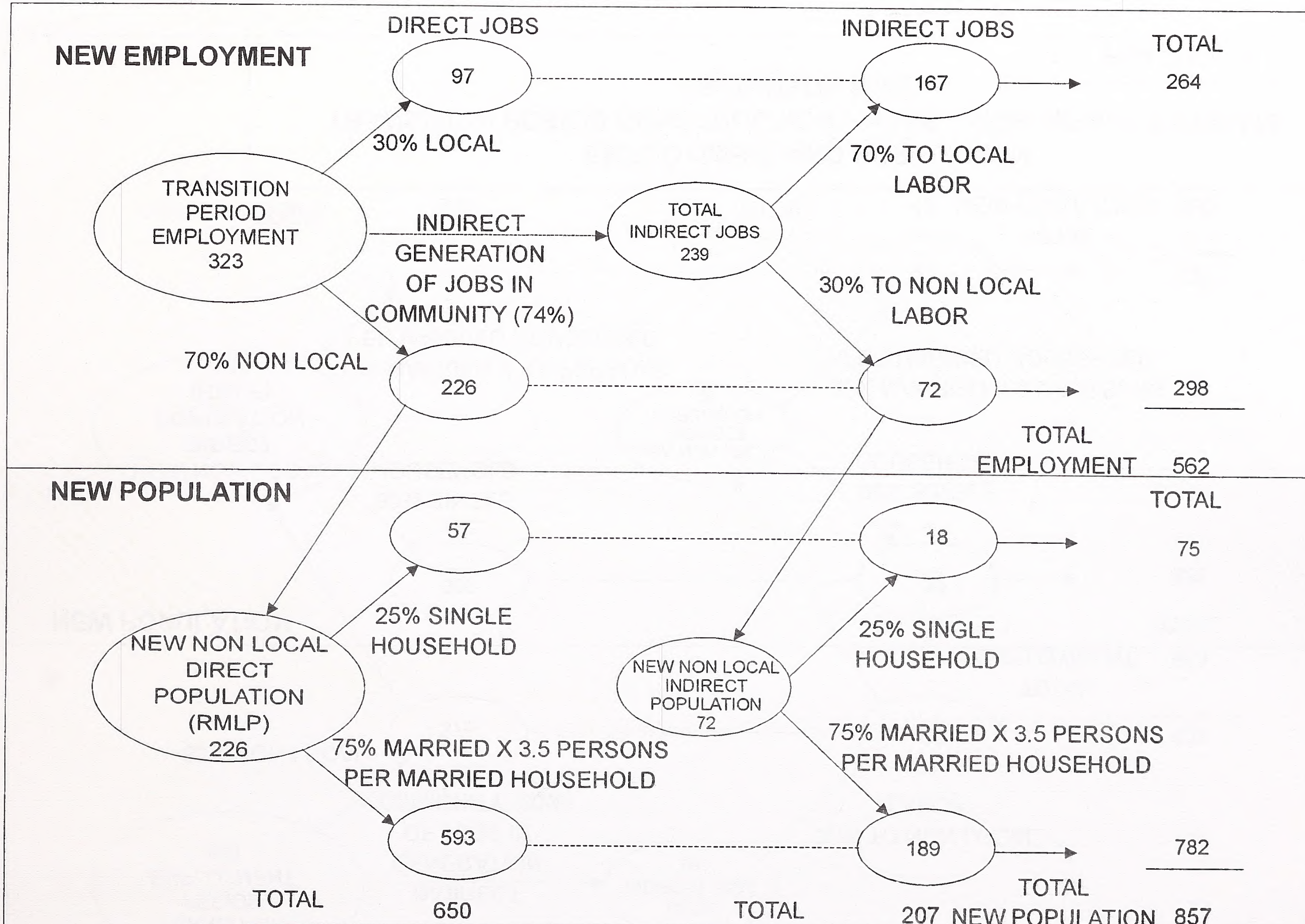
EMPLOYMENT AND POPULATION
AVERAGE CONSTRUCTION PHASE - LOW IMPACT ESTIMATE
ROBINSON MINE

FIGURE C-4



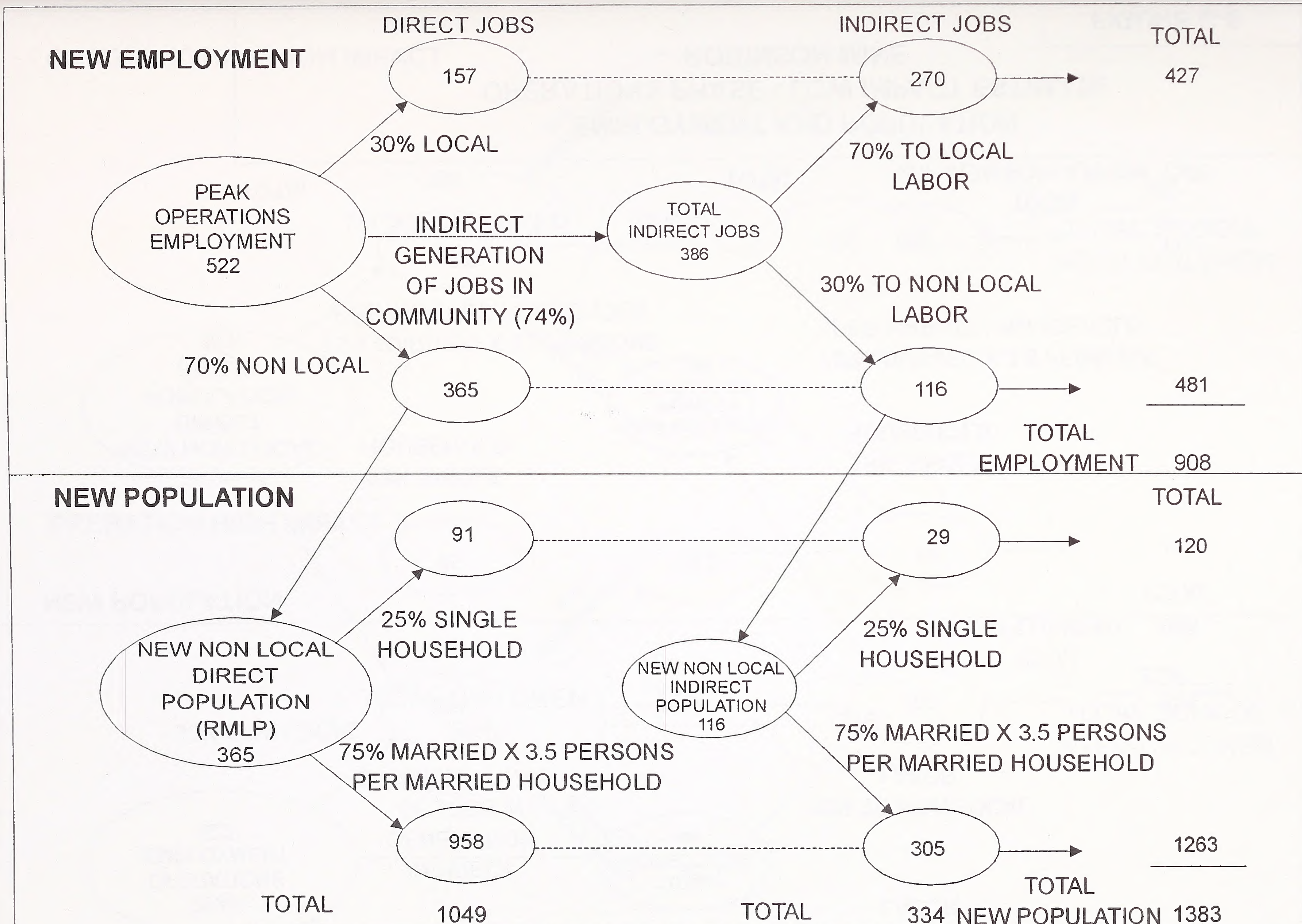
EMPLOYMENT AND POPULATION
TRANSITION PERIOD CONSTRUCTION PHASE - HIGH IMPACT ESTIMATE
ROBINSON MINE

FIGURE C-5



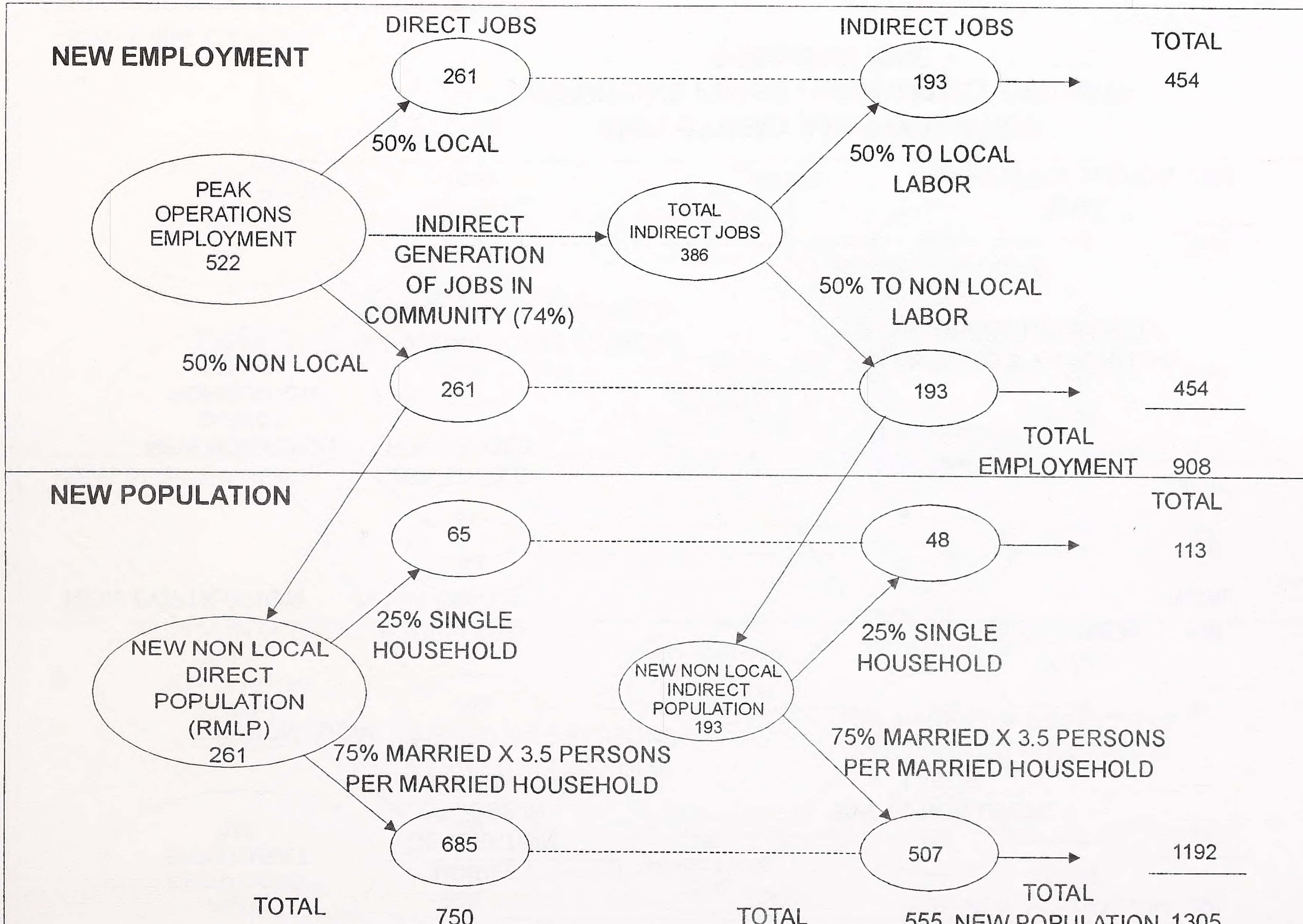
EMPLOYMENT AND POPULATION
TRANSITION PERIOD OPERATIONS PHASE - HIGH IMPACT ESTIMATE
ROBINSON MINE

FIGURE C-6



EMPLOYMENT AND POPULATION
OPERATIONS PHASE - HIGH IMPACT ESTIMATE
ROBINSON MINE

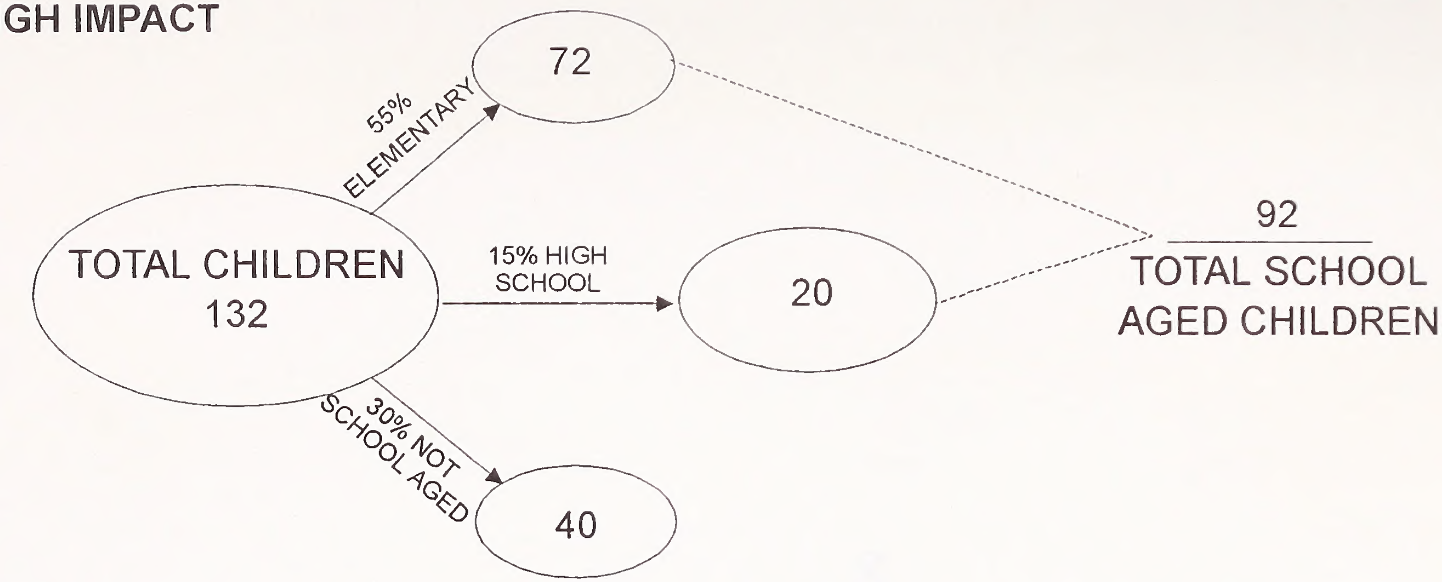
FIGURE C-7



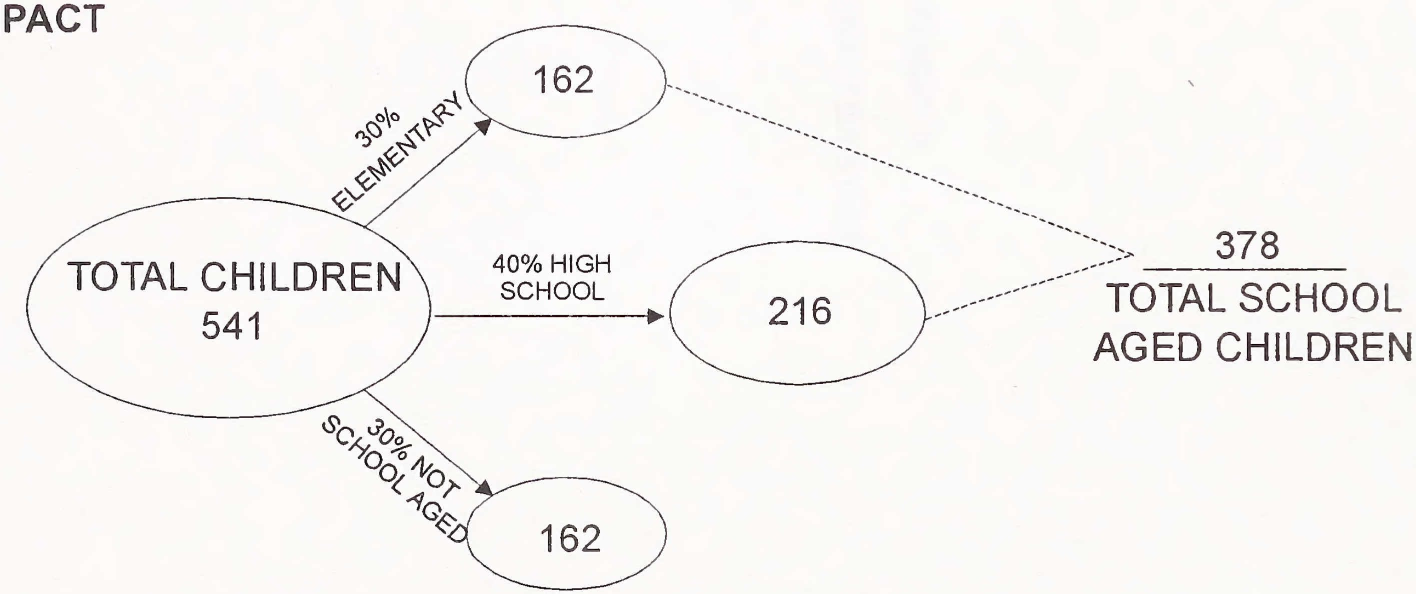
EMPLOYMENT AND POPULATION
OPERATIONS PHASE - LOW IMPACT ESTIMATE
ROBINSON MINE

FIGURE C-8

CONSTRUCTION HIGH IMPACT



OPERATION HIGH IMPACT



SCHOOL ENROLLMENT PROJECTIONS
(DERIVED FROM 3.5 PERSONS PER MARRIED HOUSEHOLD)
ROBINSON MINE

FIGURE C-9

APPENDIX D

SOIL CHARACTERISTICS

Table D-1A

Soil Characteristics

Map Unit	Soil Association	Landscape Position and Parent Material	Slope (%)	Depth (inches)	Texture	Dominant Vegetation
100	Pookaloo-Cavehill-Rock Outcrop:					
	Pookaloo (40[1])	South-facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	19	0-4" Very gravelly loam 4-19" Very gravelly silt loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
	Cavehill (30)	North-facing side slopes; residuum and colluvium from limestone and dolomite.	15-50	27	0-15" Very gravelly silt loam 15-27" Very gravelly loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
	Rock Outcrop (15)	Mountain crests and side slopes; limestone and dolomite.	--	--	--	--
108	Pookaloo-Tecomar-Rock Outcrop:					
	Pookaloo (40)	North facing mountain slopes; residuum and colluvium from limestone and dolomite.	15-50	19	0-4" Very gravelly loam 4-19" Very gravelly silt loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
	Tecomar (30)	South facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	18	0-3" Extremely gravelly silt loam 3-18" Extremely cobbly silt loam	Black sagebrush, bluebunch wheatgrass.
	Rock Outcrop (15)	Mountain crests and side slopes; limestone and dolomite.	--	--	--	--
119	Zimbob-Palinor					
	Zimbob (45)	Hill crests and side slopes; residuum and colluvium from limestone and dolomite.	8-30	12	0-12" Very gravelly loam	Black sagebrush, Indian ricegrass, needle-and-thread.
	Palinor (40)	Fan-piedmont remnants; alluvium from limestone and dolomite.	8-30	60	0-10" Gravelly loam 10-18" Extremely gravelly loam 18-30" Indurated duripan 30-60" Extremely gravelly sandy loam	Black sagebrush, Indian ricegrass, needle-and-thread.

Table D-1A (Continued)

Map Unit	Soil Association	Landscape Position and Parent Material	Slope (%)	Depth (inches)	Texture	Dominant Vegetation
124	**Tecomar-Pookaloo**					
	Tecomar (55)	Upper and lower south-facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	10-18	0-3" Extremely gravelly silt loam 3-18" Extremely cobbly silt loam	Singleleaf pinyon, black sagebrush, bluebunch wheatgrass.
	Pookalo (30)	North-facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	19	0-4" Very gravelly loam 4-19" Very gravelly silt loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
179	**Tulase-Pern**					
	Tulase (60)	Inset fans; silty alluvium from mixed rock influenced by volcanic ash.	2-4	60	0-60" Silt loam	Wyoming big sagebrush, winterfat, basin wildrye, Indian ricegrass, thickspike wheatgrass.
	Pern (30)	Inset fans; mixed alluvium	0-2	60	0-60" Silt loam	Basin big sagebrush, basin wildrye.
185	**Pyrat-Heist-Tulase**					
	Pyrat (35)	Beach plains; mixed alluvium	2-8	60	0-6" Gravelly sandy loam 6-17" Very gravelly sandy loam 17-27" Very gravelly loam 27-39" Very gravelly sandy loam 39-60" Extremely gravelly loamy sand	Wyoming big sagebrush, needle-and-thread.
	Heist (30)	Fan skirts; mixed alluvium	0-4	60	0-3" Silt loam 3-36" Fine sandy loam 36-60" Gravelly fine sandy loam	Winterfat, Indian ricegrass.
	Tulase (25)	Fan skirts; silty alluvium from mixed rock influenced by volcanic ash.	0-4	70	0-70" Silt loam	Wyoming big sagebrush, winterfat, basin wildrye, Indian ricegrass, thickspike wheatgrass.
189	**Pyrat-Linoyer**					
	Pyrat (-)	Beach plains; mixed alluvium	2-8	60	0-6" Gravelly sandy loam 6-17" Very gravelly sandy loam 17-27" Very gravelly loam 27-39" Very gravelly sandy loam 39-60" Extremely gravelly loamy sand	Wyoming big sagebrush, needle-and-thread.

Table D-1A (Continued)

Map Unit	Soil Association	Landscape Position and Parent Material	Slope (%)	Depth (inches)	Texture	Dominant Vegetation
	Linoyer (-)			60		
286	**Palinor-Shabliss**					
	Palinor (60)	Fan-piedmont remnants; alluvium from limestone and dolomite.	2-8	60	0-10" Gravelly loam 10-18" Extremely gravelly loam 18-30" Indurated duripan (caliche-like layer) 30-60" Extremely gravelly sandy loam	Black sagebrush, Indian ricegrass, needle-and-thread.
	Shabliss (25)	Fan-piedmont remnants; mixed alluvium with a mantle of loess high in volcanic ash.	2-8	55	0-13" Gravelly loam 13-55" Strongly cemented duripan	Wyoming big sagebrush, Indian ricegrass, needle-and-thread.
296	**Palinor-Urmafot**					
	Palinor (50)	Fan-piedmont remnants; alluvium from limestone and dolomite.	4-15	60	0-10" Gravelly loam 10-18" Extremely gravelly loam 18-30" Indurated duripan (caliche-like layer) 30-60" Extremely gravelly sandy loam	Black sagebrush, Indian ricegrass, needle-and-thread.
	Urmafot (20)	Upper fan piedmont remnants; mixed alluvium.	4-15	60	0-8" Very gravelly loam 8-14" Gravelly loam 14-32" Indurated duripan 32-60" Extremely gravelly coarse sandy loam	Black sagebrush; bluebunch wheatgrass.
321	**Palinor (90)**					
	Palinor (90)	Fan-piedmont remnants; alluvium from limestone and dolomite.	4-15	60	0-10 Gravelly loam 10-18 Extremely gravelly loam 18-30 Indurated duripan 30-60 Extremely gravelly sandy loam	Black sagebrush, Indian ricegrss, needle-and-thread.
351	**Heist-Tulase**					
	Heist (60)	Inset fans and fan skirts; mixed alluvium.	0-2	60	0-3" Silt loam 3-36" Fine sandy loam 36-60" Gravelly, fine sandy loam	Winterfat, Indian ricegrass.
	Tulase (30)	Fan skirts and inset fans; silty alluvium from mixed rock influenced by volcanic ash.	0-2	60	0-60" Silt loam	Wyoming big sagebrush, winterfat, basin wildrye, Indian ricegrass, thickspike wheatgrass.

Table D-1A (Continued)

Map Unit	Soil Association	Landscape Position and Parent Material	Slope (%)	Depth (Inches)	Texture	Dominant Vegetation
411	Cassiro					
	Cassiro (85)	Fan-piedmont remnants; mixed alluvium.	4-15	60	0-5" Stony loam 5-60" Very gravelly clay	Mountain big sagebrush, bluebunch wheatgrass.
436	Pookaloo-Hyzen-Cavehill					
	Pookaloo (45)	Lower south-facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	19	0-4" Very gravelly loam 4-19" Very gravelly silt loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
	Hyzen (20)	Upper south-facing mountain side slopes; residuum and coluvium from limestone and dolomite.	15-50	12	0-12" Extremely stony loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
	Cavehill (20)	North-facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	27	0-15" Very gravelly silt loam 15-27" Very gravelly loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
480	Pioche-Cropper					
	Pioche (-)	South-facing mountain side slopes; residuum and colluvium from andesite and conglomerate.	15-50	15	0-3" Extremely stony loam 3-15" Very cobbly clay	Singleleaf pinyon, Utah juniper, Mountain big sagebrush, bluebunch wheatgrass.
	Cropper (-)	North-facing mountain side slopes; residuum and colluvium from andesite and conglomerate.	15-50	16	0-4" Very cobbly loam 4-16" Extremely gravelly sandy clay loam	Singleleaf pinyon, curlleaf mountain mahogany.
484	Pioche-Birchcreek-Cropper					
	Pioche (50)	South-facing mountain side slopes; residuum and colluvium from andesite and conglomerate.	15-50	15	0-3" Extremely stony loam 3-15" Very cobbly clay	Singleleaf pinyon, Utah juniper, Mountain big sagebrush, bluebunch wheatgrass.
	Birchcreek (20)	Slightly concave mountain side slopes; residuum and colluvium from andesite and conglomerate.	15-50	28	0-3" Very cobbly loam 3-10" Very cobbly clay loam 10-28" Very cobbly loam	Antelope bitterbrush, mountain big sagebrush, bluebunch wheatgrass.
	Cropper (15)	North-facing mountain side slopes; residuum and colluvium from andesite and conglomerate.	15-50	16	0-4" Very cobbly loam 4-16" Extremely gravelly sandy clay loam	Singleleaf pinyon, curlleaf mountain mahogany.

Table D-1A (Continued)

Map Unit	Soil Association	Landscape Position and Parent Material	Slope (%)	Depth (inches)	Texture	Dominant Vegetation
486	Pioche-Cropper-Upatad					
	Pioche (50)	South-facing mountain sideslopes; residuum and colluvium from andesite and conglomerate.	15-50	15	0-3" Extremely stony loam 3-15" Very cobbly clay	Single leaf pinyon, Utah juniper, Mountain big sagebrush, bluebunch wheatgrass.
	Cropper (20)	North-facing mountain sideslopes; residuum and colluvium from andesite and conglomerate.	15-50	16	0-4" Very cobbly loam 4-16" Extremely gravelly sandy clay loam	Single leaf pinyon, curlleaf mountain mahogany.
	Upatad (20)	Convex mountain sideslopes; residuum and colluvium from andesite	15-50	15	0-3" Very gravelly silt loam 3-15" Very gravelly silty clay loam	Black sagebrush, bluebunch wheatgrass, Thurber needlegrass.
822	Pits-Dumps Complex					
	Pits-Dumps (100)	Mountains; limestone and dolomite.	0-75 (pits) 0-50 (dumps)	0-60	Fragmental	Barren with scattered areas of naturally re-established native and weedy species.
851	Grink-Onkeyo-Xine					
	Grink (35)	Upper mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	19	0-7" Very stony loam 7-19" Very gravelly loam	Curlleaf mountain mahogany, mountain bif sagebrush, bluebunch wheatgrass.
	Onkeyo (30)	Upper mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	15	0-8" Very gravelly silt loam 8-15" Very cobbly silty clay loam	Mountain big sagebrush, bluebunch wheatgrass.
	Xine (20)	Lower concave mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	35	0-7" Very gravelly loam 7-35" Very cobbly loam	Mountain big sagebrush, bluebunch wheatgrass.
991	Devilgate-Duffer-Kunzler					
	Devilgate					
	Duffer					
	Kunzler					

Table D-1A (Continued)

Map Unit	Soil Association	Landscape Position and Parent Material	Slope (%)	Depth (Inches)	Texture	Dominant Vegetation
1141	**Shabliss-Pyrat**					
	Shabliss (70)	Fan-piedmont remnants; mixed alluvium with a mantle of loess high in volcanic ash.	2-4	55	0-13" Gravelly loam 13-55" Strongly cemented duripan	Wyoming big sagebrush, Indian ricegrass, needle and thread.
	Pyrat (20)	Inset fans; mixed alluvium	0-2	60	0-6" Gravelly sandy loam 6-17" Very gravelly sandy loam 17-27" Very gravelly loam 27-39" Very gravelly sandy loam 39-60" Extremely gravelly loamy sand	Wyoming big sagebrush, needle and thread.
1201	**Biken-Orr**					
	Biken (45)	Hill summits and side slopes; mixed alluvium over weathered tuff.	8-30	30	0-18" Very gravelly fine sandy loam 18-30" Partially decomposed tuffaceous sandstone	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
	Orr (40)	Slightly concave hill side slopes; mixed alluvium and colluvium from tuff.	2-8	60	0-5" Gravelly sandy loam 5-35" Gravelly sandy clay loam 35-60" Gravelly sandy loam	Big sagebrush, basin wildrye, bluegrass, thickspike wheatgrass.
1202	**Biken-Urmafot**					
	Biken (eroded 40%, other 30% = 70)	Hill summits and side slopes; mixed alluvium over weathered tuff.	8-30	30	0-18" Very gravelly fine sandy loam 18-30" Partially decomposed tuffaceous sandstone	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass, black sagebrush, Indian ricegrass, needle-and-thread.
	Urmafot (15)	Fan-piedmont remnants adjacent to hills; mixed alluvium.	4-15	60	0-8" Very gravelly loam 8-14" Gravelly loam 14-32" Indurated duripan 32-60" Extremely gravelly coarse sandy loam	Black sagebrush, bluebunch wheatgrass.
1260	**Urmafot**					
	Urmafot (very gravelly loam - 70)	Lower fan-piedmont remnants; mixed alluvium.	4-15	60	0-8" Very gravelly loam 8-32" Indurated duripan 32-60" Extremely gravelly coarse sandy loam	Black sagebrush, bluebunch wheatgrass.
	Urmafot (gravelly loam - 15)	Upper fan-piedmont remnants adjacent to mountains; mixed alluvium.	4-15	60	0-9" Gravelly loam 9-32" Indurated duripan 32-60" Extremely gravelly ocarse sandy loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.

Table D-1A (Continued)

Map Unit	Soil Association	Landscape Position and Parent Material	Slope (%)	Depth (inches)	Texture	Dominant Vegetation
1800	Pookaloo-Onkeyo-Cavehill					
	Pookaloo (40)	South-facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	19	0-4" Very gravelly loam 4-19" Very gravelly silt loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.
	Onkeyo (25)	Slightly concave north-facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-30	15	0-8" Very gravelly silt loam 8-15" Very cobbly silty clay loam	Mountain big sagebrush, bluebunch wheatgrass.
	Cavehill (20)	North-facing mountain side slopes; residuum and colluvium from limestone and dolomite.	15-50	27	0-15" Very gravelly silt loam 15-27" Very gravelly loam	Singleleaf pinyon, Utah juniper, mountain big sagebrush, bluebunch wheatgrass.

[1] Percentage of soil map unit; contrasting inclusions make up the remaining percentage to total 100 percent.

Source: SCS 1991.

Table D-1B

Soil Characteristics (Erodibility)

Map Unit	Soil Association	Soil Erodibility (K)	Erodibility Group[1]	Erosion Hazard[2] Water	Erosion Hazard[2] Wind	Slope at Potential High Erosion[3] (%)	Organic Matter (%)	Salinity (mmhos/cm)	Alkalinity	Soil Reaction (pH)
100	**Pookaloo-Cavehill-Rock Outcrop:**									
	Pookaloo (40[4])	0.20	6	Moderate	Slight	50	1-2	≤2	Moderate	7.9-8.4
	Cavehill (30)	0.15-0.17	8	Moderate	Slight	53	4-6	≤2	Moderate	7.9-9.0
	Rock Outcrop (15)	--	--	--	--	--	--	--	--	--
108	**Pookaloo-Tecomar-Rock Outcrop:**									
	Pookaloo (40)	0.20	6	Moderate	Slight	50	1-2	≤2	Moderate	7.9-8.4
	Tecomar (30)	0.10-0.17	8	Moderate	Slight	47-80	1-2	≤2	Strong	7.9-9.0
	Rock Outcrop (15)	--	--	--	--	--	--	--	--	--
119	**Zimbob-Palinor**									
	Zimbob (45)	0.10	6	Slight	Slight	80	1-2	≤2	Moderate to Strong	7.9-9.0
	Palinor (40)	0.05-0.24	5	Moderate	Slight	33	1-2	≤2-4	Moderate	7.9-9.0
124	**Tecomar-Pookaloo**									
	Tecomar (55)	0.17	8	Moderate	Slight	47	1-2	≤2	Moderate to Strong	7.9-9.0
	Pookalo (30)	0.20	6	Moderate	Slight	40	1-2	≤2	Moderate	7.9-8.4
179	**Tulase-Pern**									
	Tulase (60)	0.55	4	Slight	Slight	14.5	1-2	≤2	Moderate to Strong	7.9-9.0
	Pern (30)	0.37	4	Slight	Slight	21.6	1-2	≤2	Moderate	7.9-8.4
185	**Pyrat-Heist-Tulase**									
	Pyrat (35)	0.15	4	Slight	Slight	53	1-2	2-4	Moderate to Strong	7.9-9.0
	Heist (30)	0.55	4	Slight	Slight	14.5	0.6-1	≤2-4	Moderate to Strong	7.9-9.0

Table D-1B (Continued)

Map Unit	Soil Association	Soil Erodibility (K)	Erodibility Group[1]	Erosion Hazard[2] Water	Erosion Hazard[2] Wind	Slope at Potential High Erosion[3] (%)	Organic Matter (%)	Salinity (mmhos/cm)	Alkalinity	Soil Reaction (pH)
	Tulase (25)	0.55	4	Slight	Slight	14.5	1-2	≤2	Moderate to Strong	7.9-9.0
189	Pyrat-Linoyer									
	Pryat	0.05-0.15	4	Slight	Slight	53-160	1-2	2-4	Moderate	7.9-9.0
	Linoyer	0.43-0.49	3			16-19	0.5-1	<2		7.9-9.0
286	Palinor-Shabliss									
	Palinor (60)	0.05-0.24	5	Slight	Slight	33	1-2	≤2-4	Moderate	7.9-9.0
	Shabliss (25)	0.32-0.37	5	Slight	Slight	21.6-25	1-2	≤4	Moderate	7.9-8.4
296	Palinor-Urmafot									
	Palinor	0.05-0.24	5-6	Slight to Moderate	Slight	33-160	1-2	<2-4	Moderate	7.9-9.0
	Urmafot	0.02-0.20	7	Slight	Slight	>40	2-4	<2	Moderate	7.9-8.4
321	Palinor (90)									
	Palinor (90)	0.24	Moderate	Moderate	Slight	33	1-2	<2-4	Moderate	7.9-9.0
351	Heist-Tulase									
	Heist	0.24-0.55	4	Slight	Slight	14.5-33	0.6-1	<2-4	Moderate to Strong	7.9-9.0
	Tulase	0.55	4	Slight	Slight	14.5	1-2	<2	Moderate to Strong	7.9-9.0
411	Cassiro									
	Cassiro	0.10-0.17	6	Slight	Slight	47-80	1-2	<2	Neutral	6.1-7.3
436	Pookaloo-Hyzen-Cavehill									
	Pookaloo (45)	0.20	6	Moderate	Slight	40	1-2	≤2	Moderate	7.9-8.4
	Hyzen (20)	0.15-0.17	8	Moderate	Slight	47-53	2-5	≤2	Moderate	7.9-8.4
	Cavehill (20)	0.15-0.17	8	Moderate	Slight	47-53	4-6	≤2	Moderate	7.9-9.0

Table D-1B (Continued)

Map Unit	Soil Association	Soil Erodibility (K)	Erodibility Group[1]	Erosion Hazard[2] Water	Erosion Hazard[2] Wind	Slope at Potential High Erosion[3] (%)	Organic Matter (%)	Salinity (mmhos/cm)	Alkalinity	Soil Reaction (pH)
480	**Pioche-Cropper**									
	Pioche (-)	0.15	Slight	Slight	8	53	1-3	≤2	Mild	6.6-7.8
	Cropper (-)	0.05-0.15	Moderate	Slight	8	53-160	1-4	≤2	Neutral	6.6-7.8
484	**Pioche-Birchcreek-Cropper**									
	Pioche (50)	0.15	Slight	Slight	8	53	1-3	≤2	Mild	6.6-7.8
	Birchcreek (20)	0.05-0.10	Slight	Slight	8	80-160	1-3	≤2	Neutral	6.6-7.8
	Cropper (15)	0.05-0.15	Moderate	Slight	8	≥53-160	1-4	≤2	Mild to Neutral	6.6-7.8
486	**Pioche-Cropper-Upatad**									
	Pioche	0.15	8	Moderate	Slight	53	1-3	<2	Mild	6.6-7.8
	Cropper	0.05-0.15	8	Moderate	Slight	53-160	1-4	<2	Neutral to Mild	6.6-7.8
	Upatad	0.10-0.15	7	Moderate	Slight	53-80	2-4	<2	Mild to Moderate	7.4-8.4
822	**Pits-Dumps Complex**									
	Pits-Dumps (100)	0.00	8	--	--	--	≤0.1	≤2	--	--
851	**Grink-Onkeyo-Xine**									
	Grink (35)	0.17	7	Moderate	Slight	47	2-5	≤2	Moderate	7.4-8.4
	Onkeyo (30)	0.05-0.10	6	Slight	Slight	≥80-160	2-4	≤2	Moderate	7.4-8.4
	Xine (20)	0.10	7	Slight	Slight	80	2-4	≤2	Moderate	7.4-9.0
991	**Devilsgate-Duffer-Kunzler**									
	Devilsgate	0.32-0.37	4			22-25	2-4	<4		7.9-9.0
	Duffer	0.49	4			16	<1	>8		>7.8
	Kunzler	0.24-0.37	4			22-33	1-2	<2-16		>7.8
1141	**Shabliss-Pyrat**									
	Shabliss	0.32-0.37	5	Slight	Slight	22-25	1-2	<4	Moderate	7.9-8.4

Table D-1B (Continued)

Map Unit	Soil Association	Soil Erodibility (K)	Erodibility Group[1]	Erosion Hazard[2] Water	Erosion Hazard[2] Wind	Slope at Potential High Erosion[3] (%)	Organic Matter (%)	Salinity (mmhos/cm)	Alkalinity	Soil Reaction (pH)
	Pyrat	0.05-0.15	4	Slight	Slight	53-160	1-2	2-4	Moderate to Strong	7.9-9.0
1201	Biken-Orr									
	Biken (45)	0.17	5	Slight	Slight	47	1-2	≤2	Strong	8.5-9.0
	Orr (40)	0.15-0.20	4	Slight	Slight	40-53	1-3	≤2	Mild to Neutral	6.1-7.8
1202	Biken-Urmafot									
	Biken (eroded 40%, other 30% = 70)	0.17	5	Slight	Slight	47	1-2	≤2	Strong	8.5-9.0
	Urmafot (15)	0.10-0.20	7	Slight	Slight	40-80	2-4	≤2	Moderate	7.9-8.4
1260	Urmafot									
	Urmafot (very gravelly loam - 70)	0.10-0.20	7	Slight	Slight	40-80	2-4	≤2	Moderate	7.9-8.4
	Urmafot (gravelly loam - 15)	0.20	6	Slight	Slight	40	2-4	≤2	Moderate	7.9-8.4
1800	Pookaloo-Onkeyo-Cavehill									
	Pookaloo (40)	0.20	6	Moderate	Slight	40	1-2	≤2	Moderate	7.9-8.4
	Onkeyo (25)	0.05-0.10	6	Slight	Slight	80-160	2-4	≤2	Moderate	7.4-8.4
	Cavehill (20)	0.15-0.17	6	Moderate	Slight	47-53	4-6	≤2	Moderate	7.9-9.0

1 Erodibility Group = Erosion Value :
≤4 = low erosion potential
4 - 8 = moderate erosion potential
≥8 = high erosion potential

2 Erosion hazards on generally level surfaces.

3 Slope at potential high erosion determined by dividing the high potential erosion value (8) by the K factor.

4 Percentage of map unit; contrasting inclusions make up the remaining percentage to total 100 percent.

Source: SCS 1990.

ASSUMPTIONS USED IN THE REVISED SOIL LOSS EQUATION (RUSLE) CALCULATIONS

The RUSLE program is based upon the Universal Soil Loss Equation:

$$A = R \times K \times LS \times C \times P$$

Where: A = Estimated soil loss in tons/acre/year
R = Erosivity factor
K = Soil erodibility factor
LS = Slope length and steepness factor
C = Cover/management factor
P = Support practices factor

The R factor was derived from SCS isopleth maps for Ruth, Nevada (USDA-SCS 1993). In this area the R factor is represented by Rt where:

$$R_t = R + R_s$$

R represents rainfall and R_s represents snowfall. The R_t factor for the Robinson Mining District is 29.

The K factor is dependent on soil type and was determined from SCS soil characteristic data for the proposed mine area (USDA-SCS 1991). For the tailings impoundment, two different soil types were analyzed that represent the majority of the soil located in the tailings disposal area that would be used in reclamation activities; Biken-Orr (1201) and Urmafot (1260). The highest K factor for the two soils, 0.20, was used in the RUSLE program.

The RUSLE program computes the LS factor based upon slope steepness, slope length, and soil conditions. The existing plan includes breaks in the 2.5H:1V slope every 100 feet, limiting slope lengths to 100 feet. Erosional losses for 100-foot segments were calculated by RUSLE. SCS Soil Condition Number 2 was selected; this condition is characterized by soils with moderate rill to interrill erosion ratios, moderately consolidated soil, and little to moderate cover.

It was assumed that growth medium stockpiles and tailings disposal facility embankment faces would have moderate vegetative growth. Based upon a 30 percent canopy cover and a 60 percent ground cover for the embankment face, the C factor used was 0.035. The Reclamation Plan indicates that contour furrows would be present following reclamation. The P factor for this support practice is 0.72.

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