PLANNING DEPARTMENT

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PUBLIC WORKS GROUP

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VALERY PILMER
Director of Planning

December 9, 1996

RESPONSIBLE AND TRUSTEE AGENCIES
INTERESTED ORGANIZATIONS AND INDIVIDUALS

RE: NOTICE OF AVAILABILITY FOR THE DRAFT EIR ON THE MOLYCORP MOUNTAIN PASS MINE EXPANSION

Dear Reader/Reviewer:

Enclosed for your review and comment is the Draft EIR for the Molycorp Mountain Pass Mine Expansion. The purpose of the document is to identify and describe the probable environmental impacts that would result from the proposed expansion of Molycorp's existing mine and processing plant complex located at Mountain Pass, California. Mountain Pass is within the unincorporated portion San Bernardino County along Interstate 15 approximately 30 miles northeast of Baker and approximately 14 miles southwest of the Nevada stateline. The proposed quarry and waste rock areas would add 696 acres of disturbance to the existing mine site, resulting in a total disturbed area of approximately 1,044 acres.

This document has been prepared to meet the State requirements of the California Environmental Quality Act. The Draft EIR has been prepared under the supervision of the County of San Bernardino Planning Department.

The public comment period will end on January 27, 1997. Written comments should be addressed to:

<u>County of San Bernardino, Planning Department</u>
385 N. Arrowhead Avenue, Third Floor
San Bernardino, CA 92415-0182
Attn: Randy Scott

Sincerely,

Randy Scott

Randy Scott, Planning Manager,
San Bernardino County Planning Department

Molycorp Mountain Pass Mine Expansion Project

Mountain Pass, California

Draft
Environmental Impact Report
SCH 92092040

December 1996

Prepared For:
County of San Bernardino

Proponent:
Molycorp, Inc.
Mountain Pass, CA

Prepared By:
ENSR
Camarillo, CA

Molycorp Mountain Pass
Mine Expansion Project
Mountain Pass, California

Draft Environmental Impact Report
SCH 92092040

December 1996

Prepared for

County of San Bernardino

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1.0 INTRODUCTION

1.1 Introduction

1.1.1 Purpose and Authority

The California Environmental Quality Act (CEQA) requires that the environmental impacts of proposed projects be evaluated and that feasible methods to reduce, avoid, or eliminate identified significant adverse impacts of these projects be considered. To fulfill the purpose and intent of CEQA, the County of San Bernardino, as the CEQA lead agency, directed the preparation of this Draft Environmental Impact Report (EIR), which addresses the potential environmental impacts associated with the Molycorp Mountain Pass Mine Expansion Project. Environmental review of this project is also required by the State of California Surface Mining and Reclamation Act (SMARA) of 1975 and the San Bernardino County Development Code.

Under CEQA, lead agency means "the public agency which has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment" (CEQA Section 21067). Initially, this project was to be evaluated as a joint CEQA and National Environmental Policy Act (NEPA) EIR/Environmental Impact Statement (EIS), with the Bureau of Land Management (BLM) serving as NEPA lead agency. The County of San Bernardino and the BLM were determined to be the appropriate lead agencies because the County is responsible for approving projects on private lands within County jurisdiction and the BLM is responsible for approving projects on federal public lands. The BLM subsequently participated with Molycorp in a transfer of public lands for private lands (BLM 1994). Therefore, the County of San Bernardino is the sole lead agency.

While the County of San Bernardino is the lead agency for preparation of this EIR, the CEQA Guidelines (Section 15082) requires that responsible agencies, trustee agencies, and the public be notified of the intent and scope of the proposed project for the purpose of reviewing and commenting on the project. A Notice of Preparation (NOP) along with an Initial Study (IS) were distributed to the identified responsible and trustee agencies and interested parties on September 3, 1992 for review and comment. Written comments in response to the NOP are provided in Appendix A of this Draft EIR.

1.1.2 Historical Background

Molycorp, Inc. has continuously mined the lanthanide element deposit (bastnasite ore) at the Mountain Pass Mine for more than 40 years using an open pit mining operation. Prior to the passage of SMARA in 1975 and the Federal Land Policy and Management Act (FLPMA) of 1976, mining on public and private lands was largely unregulated. However, both SMARA and FLPMA have instituted requirements for mining that have resulted in Molycorp filing a Mine Reclamation Plan to comply with SMARA in 1980 and a Mine Plan of Operations to comply with FLPMA in 1981. A land exchange in 1992 between Molycorp and the Bureau of Land Management (BLM) resulted in all former federal lands at the mine becoming private land owned by Molycorp. Therefore, the Mine Plan of Operations no longer applies to the project. Because the expansion area exceeds 25 percent of the vested area, the operator is required to obtain a Mining Conditional Use Permit, which is part of this application. This EIR addresses proposed expansion of the mine, which includes revisions to the Reclamation Plan.

1.1.3 Scope and Format of the EIR

The scope of this Draft EIR meets the requirements of a project EIR identified under CEQA Guidelines Section 15161 as an EIR that examines the impacts of a specific development project. A project EIR focuses on the changes in the environment that would result from the project.

This document is organized into nine sections, with the Introduction designated as Section 1. Section 1 also includes a summary of this Draft EIR. The description of the proposed project is provided in Section 2. The existing environmental setting is described in Section 3. The potential impacts associated with the proposed project are analyzed and presented in Section 4. Section 4 also presents mitigation measures designed to reduce, minimize, or eliminate identified significant impacts to the environment.

CEQA requires that alternatives to the proposed project and cumulative impacts of the proposed project in association with other projects in the area be analyzed in the EIR process. Project alternatives and a cumulative impacts analysis are presented in Sections 5 and 6, respectively. Section 7 includes discussions of any significant irreversible changes to the environment and growth-inducing impacts of the project. The organizations and persons consulted and references used in the preparation of this document are provided in Sections 8 and 9, respectively. Plate 1, provided in a pocket at the end of the document, is a figure that shows existing mine operations and the proposed expansion project. Supporting documentation to impact analysis is provided in appendices to this Draft EIR.

1.2 Summary - Section 2: Project Description

Molycorp, Inc. extracts lanthanide elements at its mine in Mountain Pass, California. The ore that is mined is the only deposit of its kind in the world mined solely for lanthanide elements and is presently a major supplier of lanthanide products throughout the world. The properties and applications of lanthanide elements are described in Section 2.

Molycorp is proposing to expand its operations at the Mountain Pass Mine to provide for continued mining for the next 30 years. With approved expansion, mining and processing would end in 2025. The proposed project is planned to occur in three phases of 10 years each, with a final 5-year phase being devoted to reclamation and monitoring.

Expansion of the mine site will consist of the following activities:

- Enlarging the surface area and depth of the open pit mine quarry.
- Expanding the existing overburden stockpiles.
- Expanding the existing North Tailings Pond until circa 2010.

Two future components of the proposed project are also analyzed in this EIR, although at this time these future components of the project are conceptual in nature and, as such, will require the appropriate level of CEQA analysis under a separate discretionary project. However, for the sake of completeness, this EIR analyzes the impacts and discusses mitigation measures of these components based on the design information available to date. These activities include:

- Constructing a new tailings storage impoundment (East Tailings Pond)
- Developing a new borrow source for material for the East Tailings Pond Dam.

Additional area to be disturbed by the proposed project will encompass 696 acres of land owned by Molycorp resulting in a total of 1,044 acres that will have been disturbed and reclaimed at mine buildout in the year 2025.

1.3 Summary - Section 3: Affected Environment

The Mountain Pass Mine is located in eastern San Bernardino County, north of and adjacent to Interstate 15, approximately 30 miles northeast of Baker, California. The mine occupies the highest developed point of elevation along the Interstate 15 corridor (from 4,600 to 4,900 feet above sea level (ASL)) between Barstow, California and Las Vegas, Nevada. Land uses within the vicinity of the mine include public lands managed by the Bureau of Land

Management and open space that is largely undeveloped and is managed by the National Park Service as the Mojave National Preserve. Lands administered by the National Park Service and the Mojave National Preserve are south of Interstate 15 and north and west of the Mountain Pass Mine. A public elementary school is located at Mountain Pass, adjacent to the plant site. A California Department of Transportation highway maintenance station and California Highway Patrol residences are located within close proximity to the mine at Mountain Pass. A detailed description of the existing environment is included in Section 3.

1.4 Summary - Section 4: Potential Environmental Impacts and Mitigation Measures

Table 1.4-1 provides a summary of the identified potential adverse impacts of the proposed project and the level of significance of each impact. The table also includes the level of significance of impacts of the alternatives to the proposed project and the results of the cumulative impacts analysis.

No significant impacts resulting from the project have been identified for the following environmental issues: open space, recreation, agriculture, mineral resources, noise, aviation safety, land use, utilities, transportation/circulation, energy, housing/demographics/socioeconomics, and public services. A significant deterioration of open space has been identified from the cumulative impacts of the proposed project and other projects in the East Mojave Desert region.

Significant adverse impacts have been identified for the following environmental issues: geology, biological resources, cultural resources, air quality, water supply/water quality, scenic resources, soil resources, and hazardous waste. With the exception of geologic and scenic resources and air quality, impacts to all issues can be reduced to less than significant with the application of the mitigation measures identified in Section 4 and summarized on Table 1.4-2.

Impact to the topographic features of the area and the corresponding permanent change to the visual environment is a significant impact to both geologic and scenic resources that cannot be reduced to below a level of significance due to a permanent alteration to the existing environment. Although reclamation of the area is an integral part of the project, portions of the mine site will be irretrievably and permanently altered by the project. Removal of 681 acres of vegetation for the project would be a significant impact that cannot be reduced to below a level of significance due to the size of the acreage lost and the length of time before vegetation could be reestablished.

TABLE 1.4-1
Summary of Potential Environmental Impacts from the Project, Any of the Project Alternatives, or Cumulatively with Other Projects

		Level of Significance				
			Alternatives			
Issue Areas	Potential Impacts	Project	No Project	Reduced Project	Underground Mining	Cumulative
NATURAL HAZARDS						
Geological Environmental	Major changes in topography	S	N	S	S	S
Geological Hazards - Slope Stability	Unstable earth conditions	M	N	M	M	N
Earthquakes	Exposure of people or property to earthquakes	N	N	N	N	N
Landslides	Exposure of people or property to landslides	N	N	N	N	N
Flood Hazards	Exposure of people or property to flood hazards of 100-year flood	M	N	M	N	N
Fire Hazard	Exposure of people or property to wildfire hazards	N	N	N	N	N
Water Erosion	Exposure of people or property to water erosion hazards	N	N	N	N	N

TABLE 1.4-1 (Cont'd)
Summary of Potential Environmental Impacts from the Project, Any of the Project Alternatives, or Cumulatively with Other Projects

Issue Areas	Potential Impacts	Level of Significance				
		Project	Alternatives			Cumulative
			No Project	Reduced Project	Underground Mining	
NATURAL RESOURCES						
Biological Resources	Deterioration of wetlands	M	N	M	M	M
	Disturbance to special-status species	M	N	M	M	M
	Removal of vegetation/habitat	S	N	MS	S	N
	Permanent pit water at project closure	S	N	S	S	M
Cultural/Paleontological	Removal or disturbance to resources	M	N	M	M	N
Air Quality	Increased PM_{10}	S	N	M	S	S
Water Supply/Quality	Decrease in water supply to local wells	M	N	M	M	S
	Impacts from seepage from tailings impoundments	S	N	S	S	M
	Water erosion and seepage through overburden stockpile	M	N	M	M	M
Open Space/Scenic/Recreation	Deterioration of open space	S	N	NS	NS	S
	Change in visual environment	S	N	MS	S	S
	Increased use of recreational facilities	N	N	N	N	N
Soils/Agriculture/Mineral Resources	Disruption of soils	M	N	M	M	N
	Deterioration of agricultural land	N	N	N	N	N
	Restrict development of mineral resources	N	N	N	N	N

TABLE 1.4-1 (Cont'd)
Summary of Potential Environmental Impacts from the Project, Any of the Project Alternatives, or Cumulatively with Other Projects

Issue Areas	Potential Impacts	Level of Significance				
			Alternatives			
		Project	No Project	Reduced Project	Underground Mining	Cumulative
MANMADE HAZARDS						
Noise	Substantial increase in noise	N	N	N	N	N
Aviation Safety	Increased danger to aircraft	N	N	N	N	N
Hazardous/Radioactive Materials	Increase in hazardous waste generation	S	N	S	MS	S
	Increased storage and use of hazardous materials	N	N	N	N	N
	Substantial exposure to radioactive materials or waste	N	N	N	N	N
MANMADE RESOURCES						
Land Use	Change in designated land use or zoning	N	N	N	N	N
Utilities	Increased use of utilities	N	N	N	N	N
Transportation/Circulation	Increased traffic	N	N	N	N	N
Energy	Increased use of energy sources	N	N	N	N	N
Housing/Demographics/Socioeconomics	Inceased demand for housing or schools	N	N	N	N	N
Public Services	Increased use of public services	N	N	N	N	N

Level of Significance

N - No significant impacts.
M - Significant impacts before mitigation; no significant impacts after mitigation.
S - Significant impacts even after mitigation.

TABLE 1.4-2

Proposed Mitigation Measures for Significant Impacts

Issue Area	Impact	Mitigation Measures	Significance After Mitigation
Geological Environment	Major changes in topography	GE1: Restore land surface to extent feasible.	Significant
		GE2: Use overburden material to extent feasible for dam construction.	
		GE3: Extend height of North Tailings Pond Dam, to the extent feasible.	
Geological Hazards-Slope Stability	Unstable earth conditions	GH1: Implement slope stability monitoring.	Less Than Significant
		GH2: Conduct static and pseudo-static analysis of final overburden stockpile slope design.	
Earthquakes and Active Faults	Seismic impact to East Tailings Dam	E1: Incorporate seismic design standards into East Tailings Dam and review by third party.	Less Than Significant
		E2: Permit through Department of Dam Safety if over 25 feet high or stores more than 15 cubic feet of water.	
Flood Hazards	100-year flood	FH1: Qualified independent engineer approve design of diversion structures.	Less Than Significant
Erosion	Increase in erosion offsite	WE1: Treat disturbed areas with wetting agents.	Less Than Significant
		WE2: Keep tailings moist until pond closure. Permanent stabilization required after closure.	
		WE3: Stabilize, treat, or remove windblown tailings dune to ensure no leachable constituents enter groundwater. Report findings to Lahontan Regional Water Quality Control Board (LRWQCB).	

TABLE 1.4-2 (Cont'd)

Proposed Mitigation Measures for Significant Impacts

Issue Area	Impact	Mitigation Measures	Significance After Mitigation
Biological Resources-Vegetation	Removal of vegetation	VE1: Initiate revegetation and reclamation efforts as soon as possible.	Significant
		VE2: Conduct evaluation of site soils as growth medium for revegetation.	
Wetlands	Change to wetlands	VE3: Prepare wetland delineation report for Army Corps of Engineers (COE). Based on results of delineation, VE3a through VE3d may be applied.	Less Than Significant
		VE3a: Consultation with COE on amount of wetlands to be impacted.	
		VE3b: Receive COE written opinion prior to activities in wetland areas.	
		VE3c: Replacement of impacted wetland acres at ratio agreed to with COE.	
		VE3d: Avoid identified wetlands to extent feasible.	

TABLE 1.4-2 (Cont'd)

Proposed Mitigation Measures for Significant Impacts

Issue Area	Impact	Mitigation Measures	Significance After Mitigation
Wildlife	Impacts to special-status wildlife	W1: If grading or clearing during breeding season, survey for raptors and, if found, restrict activities during sensitive periods and establish buffer area. Examine burrows for owls and badgers.	Less Than Significant
		W2: Protect raptors from electrocution hazards.	
		W3: If previously unidentified desert tortoise habitat is identified, conduct appropriate surveys, and consult with U.S. Fish and Wildlife Service (USFWS) for appropriate mitigation.	
		W4: Implement measures to protect wildlife from open water sources.	
		W5: Monitor water quantity at seeps and springs within 3 miles of mine, as required by Bureau of Land Management (BLM), California Department of Fish and Game (CDFG), and County. Provide alternative water source if availability declines due to pit dewatering.	
		W6: Implement monthly monitoring of tortoise-proof fence. Notify USFWS if tortoise found within exclusion area.	
		W7: Implement tamarisk eradication plan.	
		W8: Monitor water quality of pit lake following mine closure. If adverse effects to wildlife identified, install barrier to wildlife.	Significant

TABLE 1.4-2 (Cont'd)

Proposed Mitigation Measures for Significant Impacts

Issue Area	Impact	Mitigation Measures	Significance After Mitigation
Cultural/Paleontological Resources	Impact to sites with cultural or paleontological significance	CR1: Redesign project to avoid impacts or Phase II archaeological investigation.	Less Than Significant
		CR2: Archaeological monitoring during grading/excavation at Nipton Road Borrow Site and previously undisturbed areas of mine.	
		PR1 and PR2: Paleontological monitoring during earth-moving at identified site.	
Air Quality	Increased PM_{10}	AQ1: Water or treat unpaved roads to achieve 80 percent control of PM_{10} emissions.	Significant
		AQ2: Control PM_{10} emissions from ore processing plants by use of baghouses, water sprays, and enclosures to achieve 70 to 99.9 percent control.	
		AQ3: Restrict haul truck speeds to average 20 mph.	
		AQ4: Implement the P-16 Tailings Pond Dust Control Plan to reduce PM_{10} emissions by 80 percent.	

TABLE 1.4-2 (Cont'd)

Proposed Mitigation Measures for Significant Impacts

Issue Area	Impact	Mitigation Measures	Significance After Mitigation
Air Quality (cont'd)	Increased PM_{10} (cont'd)	AQ5: Analyze following additional mitigation measures to effect a 20 percent reduction in PM_{10} emissions and implement those feasible. • AQ5a: Curtail excavation and hauling when winds exceed 30 mph. • AQ5b: Implement 25 mph speed limit for non-haul truck traffic on all unpaved roads. • AQ5c: Stabilize inactive ore and overburden areas with water, mulch, ground cover, wind breaks, and/or chemical dust suppressants and establish reclamation at earliest possible date. • AQ5d: Pave or gravel permanent roadways and parking areas. • AQ5e: Institute periodic washdown program for paved areas. • AQ5f: As haul trucks replaced, evaluate purchase of larger capacity trucks to reduce trips.	
Water Supply	Drawdown due to extraction of production water and pit dewatering	WS1: Monitor groundwater levels in well fields and area wells for increased drawdown and provide alternate supply or change wellfield operations if increased drawdown occurs.	Less Than Significant
		WS2: Provide alternate means of water supply or increase recycling if drawdown is excessive in springs and wells.	
	Potential exceedance of drinking water standards	WS3: Continue monitoring water supply for compliance with drinking water standards. If exceeded, provide alternate source or mix from wellfields.	Less Than Significant

TABLE 1.4-2 (Cont'd)

Proposed Mitigation Measures for Significant Impacts

Issue Area	Impact	Mitigation Measures	Significance After Mitigation
Water Quality	Potential leaks in wastewater pipeline	WQ1: Continue monitoring wastewater pipeline to prevent leaks. Fix leaks. Report leaks to LRWQCB.	Less Than Significant
	Seepage from North Tailings Pond	WQ2: Determine adequacy of seepage control plan for North Tailings Pond. If compliance not achievable, evaluate liner, alternative site, or dry tailings. WQ3: Prepare a detailed closure plan for the project tailings ponds and obtain approval from the LRWQCB.	Significant
	Potential seepage from East Tailings Pond	WQ4: Add seepage control measures, such as a liner or collection system, to design of East Tailings Pond.	Less Than Significant
	Potential groundwater impacts from windblown tailings dune	WQ5: Stabilize, treat, or remove windblown tailings dune to ensure no leachable constituents have entered groundwater. Report findings to LRWQCB.	Significant
	Erosion in Overburden Stockpile	WQ6: Initiate revegetation as soon as practicable to reduce erosion.	Less Than Significant
Scenic Resources	Scenic vistas degraded or obstructed by increased size of Overburden Stockpile and East Tailings Pond Dam	VR1 through VR4: Develop detailed landscape and contouring plan to create a natural-looking effect for Overburden Stockpile and East Tailings Pond Dam to be exposed to public view.	Significant
		VR5: Assess continued use of North Tailings Pond or other locations with fewer visual impacts than East Tailings Pond.	
		VR6: Apply extraordinary vegetation efforts on south-facing slope to soften visual impact.	

TABLE 1.4-2 (Cont'd)

Proposed Mitigation Measures for Significant Impacts

Issue Area	Impact	Mitigation Measures	Significance After Mitigation
Soils	Substantial disruption of soils	SR1: Establish criteria for success of reclamation efforts prior to initiating activities and procedures to develop corrective actions if unsuccessful.	Less Than Significant
		SR2: Conduct technical evaluation of site soils to identify suitable growth medium for revegetation and reclamation.	
Noise	Unforeseen impacts	N1: Limit blasting activities, if feasible, to non-school hours.	Less Than Significant
Hazardous Waste	Increased hazardous waste generation	HW1: Determine adequacy of waste minimization/source reduction program to reduce hazardous waste generated by 10 percent and evaluate options to increase waste reduction beyond 10 percent.	Less Than Significant
		HW2: Estimate annual amount of hazardous waste to be generated and demonstrate contracts in place for disposal of hazardous waste over project life.	
		HW3: Refrain from using concrete pad for hazardous waste storage until closure approved by California Environmental Protection Agency Department of Toxic Substances Control (DTSC).	
Radioactive Waste	Potential state licensing requirements	RW1: Develop and implement radiation monitoring program if general radioactive materials license required by Department of Health Services, Radiologic Health Branch.	Less Than Significant
		RW2: Comply with LRWQCB requirements regarding lead pond closure.	

Long-term quality of the pit lake after closure may be a significant impact even after the implementation of mitigation because the permanent water in the pit could be toxic to wildlife. Emissions of fugitive dust will be a significant impact even after the implementation of mitigation because the mine is in an area that is currently classified nonattainment for particulate matter less than 10 microns (PM_{10}). An increase of PM_{10} is a significant impact in a nonattainment area.

Impacts to groundwater quality will be significant even after the implementation of mitigation due to the existing groundwater contamination at the site and the fact that groundwater remediation plans have not been approved or implemented. Potential impacts of hazardous waste/materials will continue to be significant after mitigation because final remediation, elimination, and disposal plans with specific time frames for compliance have not been approved.

1.5 Summary - Section 5: Project Alternatives

Three alternatives to the proposed project are analyzed in this Draft EIR: the No Project Alternative, the Reduced Project Alternative, and the Underground Mining Alternative. Under the No Project Alternative, the mine would continue to operate under its current permits and approvals, but no expansion of the quarry for the extraction of additional rare earths would occur. Under the Reduced Project Alternative, Phase 3 of the proposed project would be eliminated and the project would be reduced by 10 of its proposed 30 years. In the Underground Mining Alternative, mining would continue as discussed for the proposed project for the first 25 years. At that time, mining would adopt underground methods to reduce the expected overburden to ore stripping ratio. None of the project alternatives would fully achieve Molycorp's plan to extract rare earths from the deposit at Mountain Pass.

1.6 Summary - Section 6: Cumulative Impacts

Two projects with the potential to have cumulative impacts with the Molycorp Mountain Pass Mine Expansion Project have been identified as follows: a golf course currently under development 5 miles west of the California-Nevada state line and the proposed expansion of the Viceroy Castle Mountain Mine gold mining operation, which is located approximately 25 miles south-southeast of the Mountain Pass Mine. These projects and associated cumulative impacts relative to the proposed project are discussed in Section 6 and summarized in Table 1.4-1.

1.7 Summary - Section 7: Other CEQA Topics

CEQA requires a discussion of other topics resulting from a proposed project under CEQA Article 8, Section 15126. These topics include the identification of significant irreversible environmental changes and the identification of growth-inducing impacts of the project. Section 7 includes a discussion of these topics.

2.0 PROJECT DESCRIPTION

2.1 Introduction

Molycorp is proposing to expand its current lanthanide (rare-earth elements) mining operation at its Mountain Pass Mine facility for the next 30 years. The ore mined at this facility contains approximately 43 percent calcite, 25 percent barite and/or celestite, 12 percent strontianite, 12 percent bastnasite, 8 percent silica, and minor amounts of galena, hematite, and monazite. Bastnasite, the mineral of interest, contains 15 individual lanthanide elements in the form of a mixed lanthanide fluorocarbonate. The following eight major products are either concentrated, extracted, or beneficiated at the facility:

- Bastnasite concentrate
- Cerium concentrate
- Mixed purified lanthanide concentration
- Cerium carbonate
- Cerium oxide
- Neodymium oxide
- Yttrium oxide
- Europium oxide

The lanthanide elements have a number of energy, environmental, and lighting applications. Cerium, one of three high-volume products, is used as an internal combustion engine exhaust gas clean-up catalyst. Cerium and bastnasite concentrates are widely used in the glass industry as colorizing and clarifying agents, in the manufacture of polishing agents, and as anti-browning agents and ultraviolet absorbers in television face-plate glass. Purified mixed lanthanide concentrate is used in the manufacture of nonlead batteries and also in the manufacture of catalyst for cracking petroleum crude to increase the yield of gasoline and other petroleum products. Europium is used in phosphor manufacturing for high-efficiency lighting applications. Yttrium and europium are used for color television phosphor. The Mountain Pass Mine is the only deposit of its kind mined solely for lanthanides and is presently a major supplier of these elements throughout the world.

To provide a frame of reference for the proposed project, a summary of the current activities conducted at the mine is briefly described in Section 2.3. Descriptions of the proposed project and project operations are presented in Section 2.4. Section 2.5 provides a discussion of mine decommissioning, and Section 2.6 summarizes alternatives to the proposed project.

2.2 Project Location

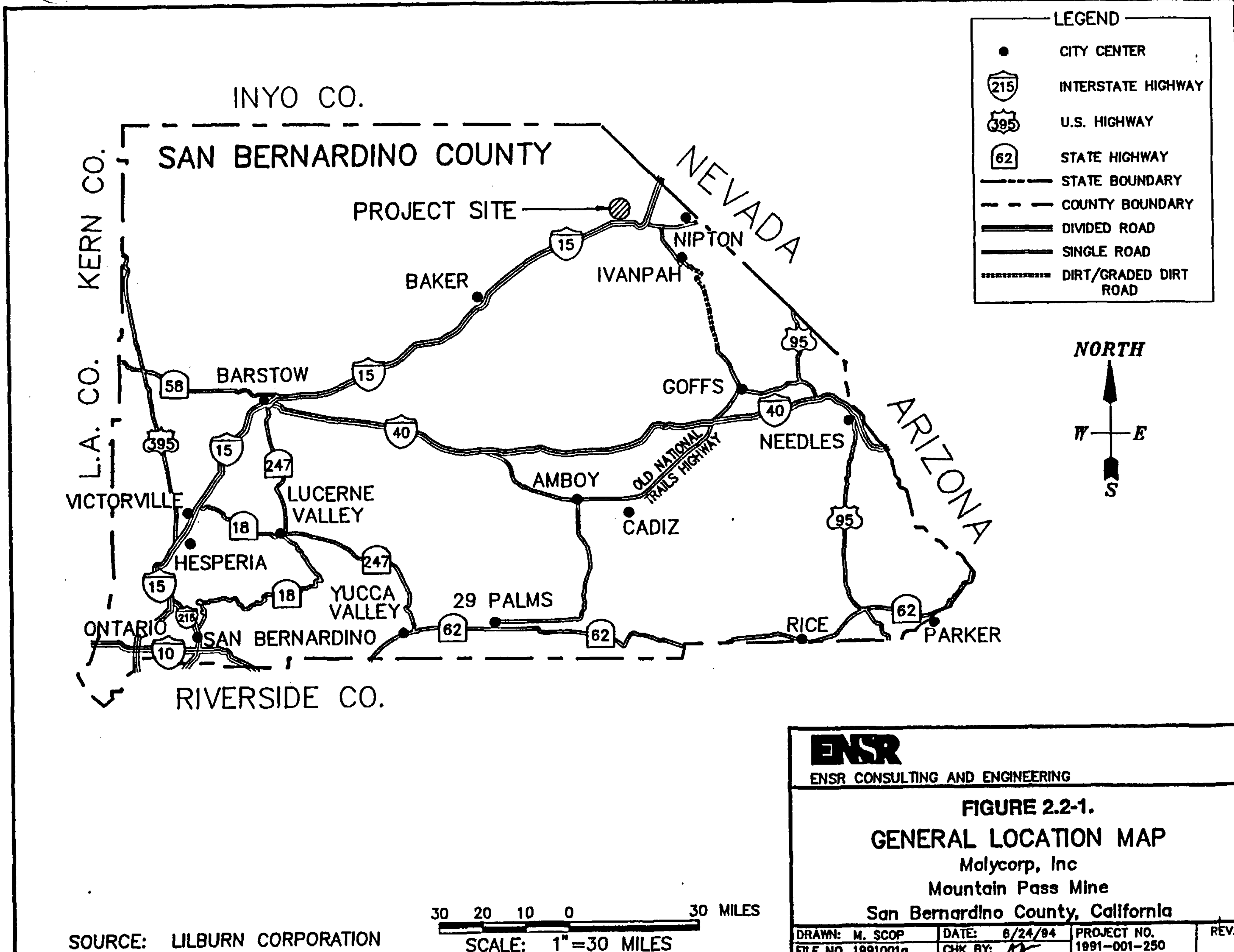
The Mountain Pass Mine is located in San Bernardino County north of and adjacent to Interstate 15, approximately 15 miles southwest of the California-Nevada state line and 30 miles northeast of Baker, California (Figure 2.2-1). The mine is located within the southern portion of the Clark Mountain Range, approximately 4 miles south of Clark Mountain. A topographic map of the project area is provided in Figure 2.2-2. Mine elevations range from 4,500 feet to 5,125 feet ASL, with most of the plant site within the 4,600- to 4,900-foot range. Other offsite property (Figure 2.2-3) owned by Molycorp and used to support mine operations includes the following:

- Nipton Road Borrow Site - located approximately 7 miles east of the mine
- New Ivanpah Evaporation Pond and associated pipelines - located approximately 9 miles northeast of the mine
- Ivanpah Valley Well Field and associated pipelines - located approximately 8 miles east of the mine
- Shadow Valley Well Field and associated pipelines - located approximately 12 miles west of the mine

The major facilities and expansion areas proposed for this project are located on private land owned by Molycorp. Some existing support operations, such as pipelines, are located on BLM and/or National Park Service (NPS) rights-of-way. However, none of these support operations will change as a result of the proposed project.

2.3 Mine History

The history of the Mountain Pass Mine presented in this section has been adapted from information provided by Molycorp, Inc. It seems probable that some of the prospectors attracted to the Mountain Pass area by the 1879-1890 silver boom may have examined what is now known as the Mountain Pass carbonatite because it had about the same strike and dip as nearby limestone beds that sometimes contained silver. The first known claims were surveyed for patent in 1920 and abandoned in 1923. Fred B. Piehl of Goodsprings, Nevada located the Sulphide Queen group (east of the present Open Pit on Molycorp property) soon after, although his interest was only in the gold veins on either side of the carbonatite.



SOURCE: LILBURN CORPORATION

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FIGURE 2.2-1.
GENERAL LOCATION MAP
Molycorp, Inc
Mountain Pass Mine
San Bernardino County, California

DRAWN: M. SCOP	DATE: 6/24/94	PROJECT NO. 1991-001-250	REV.
FILE NO. 1991001a	CHK BY:		

1991-001-850

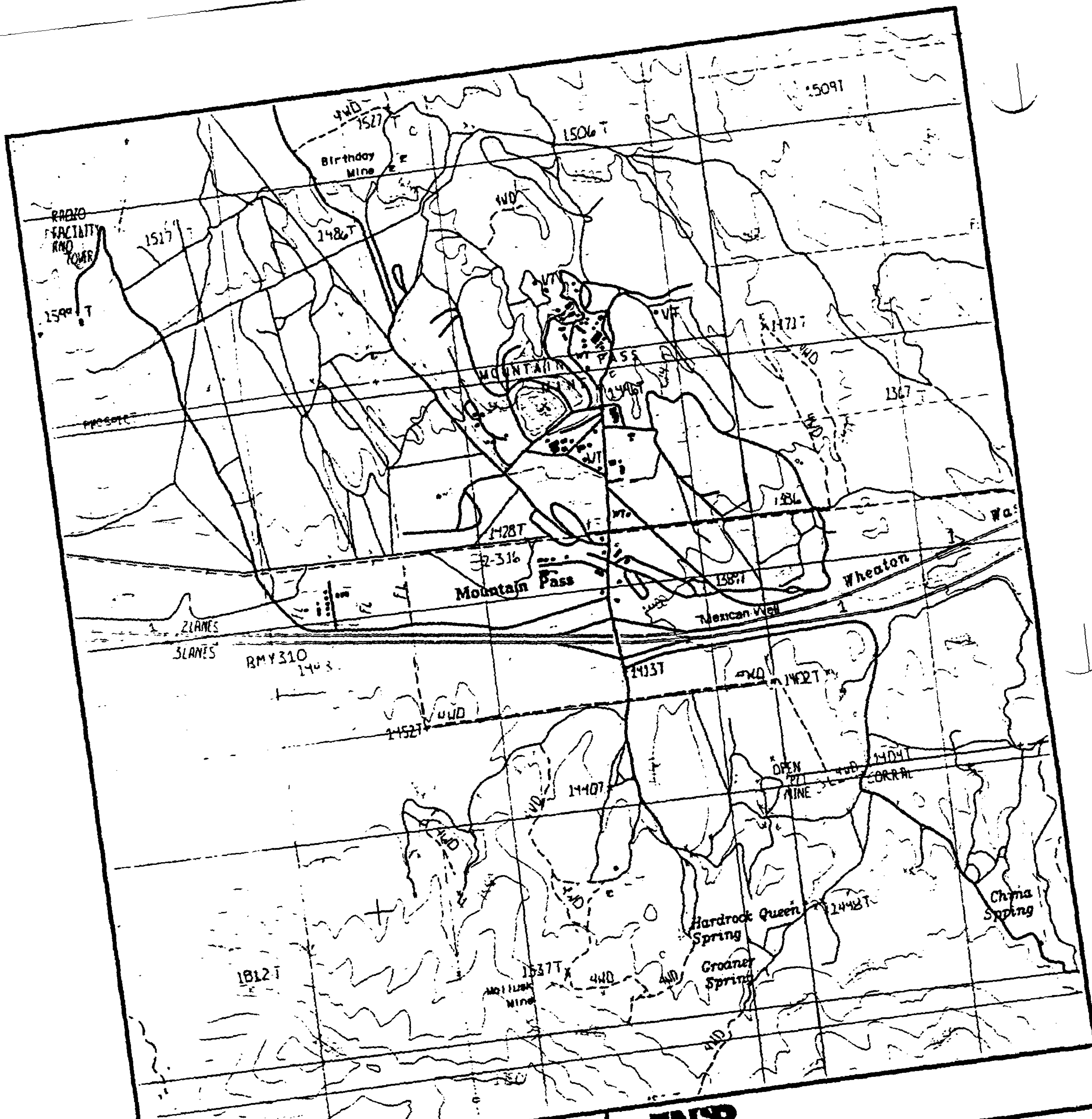

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FIGURE 2.2–2
SITE LOCATION MAP
Molycorp, Inc.
Mountain Pass Mine

SOURCE: USGS 7½ Minute Topographic Quadrangle, Mescal Range

SCALE
0 1/4 1/2 1 MILE

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DRAWN: TEvans	DATE: May 29, 1996	PROJECT NO.: 1991-001-700	REV:
FILE NO.:	CHECKED:		

1991-001-850

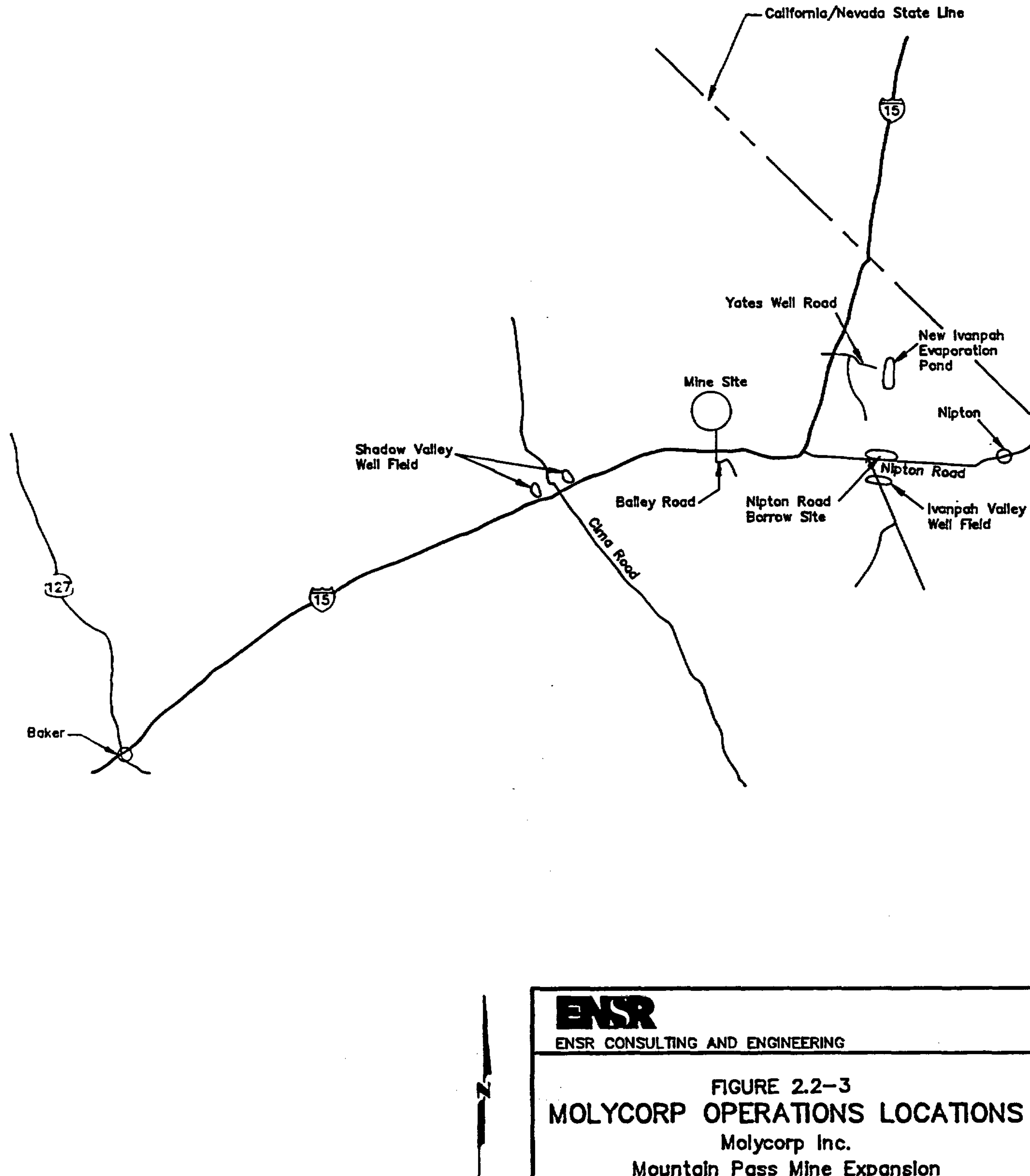

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FIGURE 2.2–3
MOLYCORP OPERATIONS LOCATIONS
Molycorp Inc.
Mountain Pass Mine Expansion

DRAWN: M. SCOP	DATE: 7/22/96	PROJECT NO.	REV.
FILE NO. 1991001N	CHK BY: RG	1991–001–850	

In 1948-1949, a representative of the Atomic Energy Commission visited Goodsprings, Nevada to interest prospectors in the search for uranium. Herb Woodward and Tom Watkins induced "Pop" Simon to buy a Geiger counter, with the stipulation that each would get one-third of anything found. The Geiger counter did not indicate any activity in the Goodsprings area except in Fred Piehl's woodshed, where he stored samples from near his idle gold mine at Mountain Pass.

Woodward and Watkins located the Birthday vein (north of the present Open Pit on Molycorp property) in April 1949. With his own Geiger counter, Piehl also found several veins on his property. Samples taken by Woodward to the Boulder City, Nevada, U.S. Bureau of Mines station were identified as containing thorium instead of uranium and a large amount of the mineral bastnasite, a fluorocarbonate of the rare-earth metals. The U.S. Geological Survey began mapping this area in November 1949, and a public announcement of the discovery was made.

In 1950-1951, Molybdenum Corporation of America optioned the Birthday claims on the chance that this might be a domestic source of lanthanide elements. Following various exploratory efforts, the southwest outcrop of the large carbonatite body was identified as a high grade ore body. Title was subsequently obtained to a major ore body, averaging 5 to 8 percent lanthanide elements. Ore samples were sent to metallurgical laboratories for testing and a flotation scheme was selected. Several diesel plants were purchased for power and a new crushing plant was started.

The concentrating plant began operation in February 1952, and a dormitory was erected and mobile home facilities for the employees were provided. Flotation metallurgy was started in January 1953, and in August 1953 a water pipeline from Ivanpah Valley was put into service. In the fall of 1964, the mineral europium was in critical demand as a red phosphor for color television at a price higher than gold. In response to the high demand for this mineral, a new europium plant was constructed in 1965 and excavation for a new concentrating plant also began that year. Also in 1965, the LRWQCB established discharge requirements for waste discharged into the tailings pond. A new tailings facility (the North Tailings Pond) was constructed in 1967.

In 1974, Molybdenum Corporation of America changed its name to Molycorp Incorporated. In 1977, Molycorp was purchased by Union Oil Company of California and became a wholly owned subsidiary. The separation plant (now the Specialty Plant) was constructed in 1981; the plant facilities have changed very little since that time.

2.4 Existing Operations

A description of current operations involving ore mining and processing is provided below. Plate 1, provided in a pocket at the back of this document, is a map of the mine evaluated in this EIR and identifies the various areas of the operation.

2.4.1 Mining Activities

The bastnasite ore body at Mountain Pass is approximately 200 feet thick and dips about 40 degrees southwest and strikes about 30 degrees northwest from the surface for approximately 1,200 feet. Because of the size and nature of the deposit, open pit mining that involves the application of the slice method is used to remove the ore. Each slice from the pit wall removes overburden (barren rock containing no mineral) to expose the underlying ore (mineralized rock). Mining starts at the surface and deepens the pit one layer (bench) at a time. A typical mining slice is approximately 125 feet wide by 1,200 feet long and consists of 10 or more 30-foot vertical working benches. The pit currently occupies a surface area of about 62 acres. The mining benches are developed by drilling, blasting, and loading the blasted rock into large haul trucks for transport to the plant for ore processing or to the overburden waste piles. The overburden stockpile currently occupies a surface area of about 82 acres, approximately 2,600 feet long, 1,200 feet wide, and 130 feet high. A brief description of mine operations follows.

2.4.1.1 Drilling

Drilling involves the placement of 8-inch-diameter vertical blast holes with track-mounted drills into the rock on an evenly spaced pattern. A typical drill hole pattern consists of 100 holes, each 34 feet deep. Each drill hole suspected of containing ore is sampled and assayed to determine the quality and quantity of the mineralization.

2.4.1.2 Blasting

The drill holes are loaded with low velocity explosives (primarily ammonium nitrate slurry) and timed to ignite in a specific sequence. The blasts are designed to break the rock in a safe, efficient, and cost-effective manner. The blast is timed by placing a non-electric, millisecond delayed blasting cap connected to an ignition cord and a one-pound cast priming booster in each drill hole. The drill hole is then loaded with a predetermined amount of explosives and filled to the surface with crushed rock, leaving the end of the ignition cord exposed. The ends of the ignition cords are connected together with detonation cords. The blast is ignited from a protected area using another length of detonation cord leading to the blast. Molycorp employees who are licensed to conduct blasting design and install the materials needed to time the blast. The explosive agents are provided by a licensed in-the-hole explosives supply contractor.

2.4.1.3 Loading/Hauling

The blasted rock is loaded with front-end loaders and a hydraulic mining shovel. The rock is placed in mine haul trucks and transported from the open pit over roads sloped on a 10-percent grade. The final destination of the rock is determined by its mineral content. Broken rock of ore grade is crushed for milling while the non-ore rock is placed in nearby overburden storage areas west of the open pit mine. Low grade ore (5 to 7 percent lanthanide elements) and prot-ore (2 to 5 percent lanthanide elements) are separately stockpiled for ore blending or future processing. Support equipment, such as water spray trucks for dust control, road graders, and bulldozers, are used to maintain the travel surfaces and loading areas used by the other mining equipment.

2.4.2 Processing Facilities

The bastnasite ore undergoes numerous milling and chemical processes to produce desired rare-earth products of various purities. The facilities utilized and processes performed to further concentrate the ore are identified in Table 2.4-1.

A general process flow diagram of the concentration operations is included as Figure 2.4-1. A brief description of each operation is provided in this section.

2.4.2.1 Crushing/Screening Plant

The Crushing Plant is a three-stage unit utilizing a primary jaw crusher, a hydrocone secondary crusher, and a vertical rock-on-rock tertiary crusher. The ore is dumped into the primary crusher feed hopper by a front-end loader or large haul truck. A front-end loader is used to select feed from the stockpile area so that the feed is blended to a uniform grade.

The primary crusher is intended to take mine run ore down to minus 6-inch material. Crushed product is intended to have 7 to 9 percent lanthanide oxide (LnO) content by weight.

The primary crusher output is transported by conveyor to a screening plant consisting of vibrating screens. The top deck screens off the plus 1-1/2-inch fraction, which is transported by conveyor to the secondary crusher. The second deck screens off the plus 3/8-inch

TABLE 2.4-1

Processing Facilities

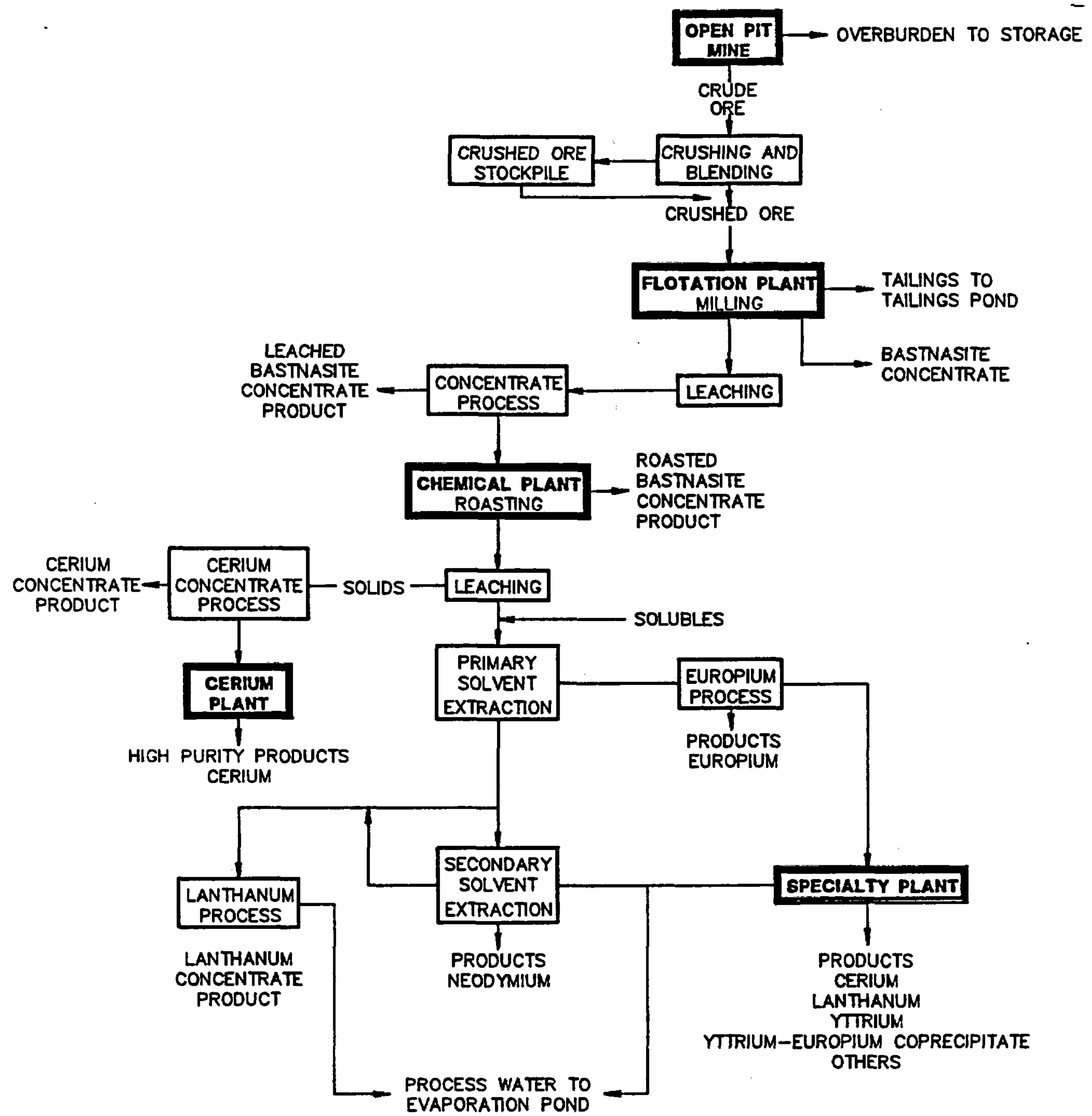
Facility	Process	Size
Mine and Crushing Plant	Drilling Blasting Loading Hauling Crushing Screening Dust Collection	3.7 acres
Flotation Plant, including Small Mill Circuit, Large Mill Circuit, and P-16 Tailings Pond	Grinding Conditioning Flotation Leaching Filtering Drying Packaging Dust Collection	0.5 acre 83 acres (Tailings Pond)
Chemical Plant	Roasting Acid Leaching/Thickening Cerium Drying (2) Cerium Packaging (2) Dust Collection Lead/Iron Removal Solvent Extraction Circuits (2) Off-Gas Scrubbing Precipitation Thickening Filtering Lanthanum Drying Circuits (2) Europium Purification Circuit	3.8 acres
Cerium 96 Plant	Acid Leaching Impurity Removal Precipitation Filtering Drying Cerium Carbonate Packaging Off-Gas Scrubbing Scrubber Solution Neutralization	0.9 acre

TABLE 2.4-1 (Cont'd)

Processing Facilities

Facility	Process	Size
Specialty Plant Lanthanide Salts and Oxides	Dissolution Evaporation Precipitation Solvent Extraction Circuits (4) Filtering Drying Calcination Packaging Gas Scrubbing and Dust Collection	0.9 acre
Waste Disposal Facilities	North Tailings Pond (P-16) New Ivanpah Evaporation Pond Trash Collection for Offsite Disposal Mine Waste Rock Dumps	83 acres 115 acres bins (82 acres)
Support Facilities	Post Office Training Center Analytical Laboratory Office Building Office Addition Product Warehouse A Product Warehouse B Product Warehouse C Mobile Equipment Maintenance Shop* Spare Parts Warehouse Carpenter Shop	2.5 acres

* Existing mobile equipment shop will become an addition to the spare parts warehouse when the new mobile equipment shop is placed in service.



Source: Molycorp, Inc, 1994

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FIGURE 2.4-1

GENERAL PROCESS FLOW DIAGRAM

Molycorp, Inc
Mountain Pass Mine
San Bernardino County, California

DRAWN: T. EVANS	DATE: 8/3/94	PROJECT NO. 1991-001-250	REV.
FILE NO. 1991001D	CHK BY:		

fraction, which is transported by conveyor to the tertiary crusher. The minus 3/8-inch fraction is transported to a product conveyor system where the material is weighed on a belt scale and dumped from a stacker conveyor to a stockpile area for storage as Flotation Plant feed material. The screening plant recirculates material to the secondary or tertiary crushers until all ore is crushed to minus 3/8 inch.

2.4.2.2 Mill/Flotation Plant

The fine ore (minus 3/8 inch) is conveyed to the Flotation Plant where grinding with a ball mill produces a 100-mesh product for four-stage, hot conditioning. Rougher, cleaner, and scavenger flotation cells produce a 55 to 60 percent LnO product. A portion of the 55 to 60 percent LnO product is further concentrated using a hydrochloric acid leach, which dissolves carbonate gangue to yield a slurry from which the solids are thickened, filtered, and dried to yield a 68 to 72 percent LnO content product. Twenty percent of the bastnasite concentrate is packaged and sold while 80 percent of the concentrate is fed to the Chemical Plant.

Primary wastes generated in the crushing and flotation process are tailings.

2.4.2.3 Chemical Plant

Bastnasite concentrate is trucked to the Chemical Plant and pneumatically transferred to storage bins from which an 8-hearth Herreshoff roaster is fed. Oxidizing roasts produce an oxide feed for a selective hydrochloric acid leach that dissolves all the lanthanide elements except cerium. A four-stage countercurrent decantation washes the cerium residue free and the residue is pumped to a filter, which feeds a cerium drying-screening-blending-packaging circuit.

The dissolved lanthanide chlorides, as well as some undesired metal chlorides of lead and iron, then proceed through the following impurity removal process.

- The mixed chlorides are contacted with a solution of soda ash and tailings slurry. The resultant pH raises from a pH of 0.6 to a pH of 3.5. The iron chloride at this pH converts to iron hydroxide, and is precipitated into the tailings. Residual lanthanides in the iron filter cake are recovered and the iron/tailings precipitation product is thickened, washed, neutralized (pH increased to 7.0 or above), and sent to the North Tailings Pond.

- The iron-free lanthanide chloride is treated with sodium hydrosulfide solution in a two-tank cascading system. Lead is precipitated out of solution as lead sulfide, a hazardous waste byproduct, which is thickened and filtered away from the lanthanide chloride solution into a filter cake. The cake is pressed and pressure-dried to a sludge cake containing 50 percent moisture and 5 to 7 percent lead sulfide content. Approximately two 55-gallon drums per day were produced in the past. As part of a separate project, generated lead/iron filter cake material that was formerly stored in the mine hazardous waste storage area is being treated and reinserted into the manufacturing process or disposed offsite at an approved disposal facility. Lead/iron filter cake is no longer produced. The iron is removed in a separate step, as discussed above, and the lead is precipitated as a lead sulfide concentrate; the free moisture is removed in a press to form a filter cake. The lead sulfide filter cake is handled as a hazardous waste and is not stored onsite for more than 90 days. The lead sulfide concentrate is either shipped to a lead recycler as a feedstock for elemental lead or disposed of as a hazardous waste at an appropriately permitted hazardous waste landfill.

The lanthanide chloride solutions proceed to solvent extraction cells where a solvent preferentially collects the heavier elements, and separates the lighter lanthanum-praseodymium-neodymium fraction. Some of the light fraction is precipitated as hydroxide, thickened, filtered, dried, screened, and packaged as lanthanum concentrate. The remaining 20 percent of the light fraction stream is transported to a second-stage of solvent extraction cells, which separate a high purity fraction of neodymium. The neodymium loads on the solvent preferentially as compared to the remaining light fraction. Seventy percent of the loaded neodymium is used as back refluxing scrub in order to recover a high purity (98 percent) neodymium chloride. The neodymium is precipitated as an oxalate and calcined to oxide in the Specialty Plant. The reject light lanthanides from this process are combined with light fractions not fed to this extraction and the combined light fractions are precipitated as lanthanide concentrates either as chlorohydrates using ammonia, or as lanthanide carbonates using soda ash. The products are thickened, filtered, dried, and packaged.

The pregnant solution from the first stage of solvent extraction cells is sent to a batch europium purification section. The finished product from the chemical steps in the purification section is 99.99 percent europium oxide. Heavy lanthanides from this process are sent to the Specialty Plant or combined into the chlorohydrate precipitation step.

Wastes generated at the Chemical Plant include SX Crud, which consists of non-halogenated organics, non-halogenated organic phosphates, non-halogenated chlorides, and silica; waste zinc; and wastewater.

2.4.2.4 Cerium 96 Plant

The Cerium 96 Plant upgrades 60 to 68 percent cerium concentrate to a 96-percent cerium carbonate through a series of leaching, precipitation, thickening, and filtration operations. Wastes generated in the Cerium 96 Plant include a leach residue containing mixed lanthanide fluorides, barium sulfate, and a wastewater stream containing sodium chloride.

2.4.2.5 Specialty Plant

The Specialty Plant, built in 1980-81 for production of samarium oxide and gadolinium oxide, has been converted to other uses because production of samarium and gadolinium is not economically viable in the current world market. The Specialty Plant is currently being used to produce a variety of relatively small volume products the production of which was transferred to Mountain Pass after closure of Molycorp's York, Pennsylvania and Louviers, Colorado plants.

The major product produced at the Specialty Plant is a co-precipitated yttrium/europium oxide. Europium produced at Mountain Pass and purchased yttrium are dissolved in nitric acid and then co-precipitated using oxalic acid as the reagent. The precipitated slurry is washed with deionized water, filtered, and fired to an oxide form prior to packaging.

Other production in the Specialty Plant involves further processing of various Chemical Plant produced concentrates to change their physical and/or chemical forms. Products include lanthanide nitrate solution, lanthanide acetate solutions, solid lanthanide chloride, flaked lanthanide chloride, cerium acetate, and neodymium oxide. Reagents used in this operation include glacial acetic acid, nitric acid, hydrochloric acid, hydrogen peroxide, oxalic acid, sodium carbonate, sodium hydroxide, and aqueous ammonia.

Products are transferred from the plant by truck to onsite warehouse facilities to be held for final shipment offsite.

Wastes generated at the Specialty Plant include SX Crud, which is an organic-based waste stream consisting of non-halogenated organics and chlorides and silica.

2.4.2.6 Pond Product Storage

Various products are stored in ponds located within the facility. The pond designations, construction, and products stored are detailed in Table 2.4-2 and shown on Plate 1.

TABLE 2.4-2

Pond Product Storage

Pond	Construction (Liner)	Product
P-25A	Asphalt berm and bottom	Cerium concentrate which is dried on demand.
P-25B	Membrane lined	Lanthanum concentrate (long-term storage).
P-28	Membrane lined	Lanthanum concentrate - receives excess fresh production for long-term storage.
P-7A	Asphalt pad and liner	Currently holds lanthanum concentrate, but this is being moved to P-25B. This pond will then be used for storage and blending of bastnasite concentrate for Chemical Plant feed.
P-7B	Asphalt pad and liner	Bastnasite concentrate for Chemical Plant feed.
P-2	Concrete	Product storage after liquid decantation during emergency shutdown of Flotation Mill

2.4.2.7 North Tailings Pond

The capacity to store tailings is critical to production of lanthanides. Over 90 percent of each ore ton is rejected in a slurry to the existing North Tailings Pond (P-16) from the Flotation Plant by the milling process. The North Tailings Pond covers approximately 83 acres. Under a separate project, San Bernardino County has issued a Land Use Review (LUR) to increase the pond capacity by raising the dam crest elevation from 4,920 feet to 4,940 feet. A second phase dam raise to increase the elevation to the 4,950-foot level is under consideration by San Bernardino County. At the 4,950-foot elevation, the pond will have approximately 3 additional years of storage capacity available. Future increases in dam elevation and storage capacity are part of the 30-year expansion project. Subsequent CEQA and LRWQCB review will be required.

2.4.2.8 Nipton Road Borrow Site

An existing borrow source owned by Molycorp is located north of Nipton Road, approximately 7 miles east of the mine operations. This borrow pit has been in existence since prior to 1981 and was utilized in 1987 for the development of an access roadway to Molycorp's New Ivanpah Evaporation Pond. Material from this source was also used to provide the cap for closure of the Old Ivanpah Evaporation Ponds. Material is also removed from this site for roadway maintenance as needed. The existing borrow pit is approximately 120 yards wide and 130 yards long (3.2 acres) and the pit depth is 25 feet.

Excavation activities included a 10-percent truck access ramp with pit development expanding northward and eastward. The pit is sloped eastward to natural contours to ensure drainage at a 0.1-percent grade. Side slopes are excavated at a 3 to 1 (horizontal to vertical) ratio.

2.4.2.9 Overburden

Overburden from mining operations in the open pit is stockpiled in four overburden storage areas located south, north, and west of the pit. Approximately 10,000 tons per day of overburden are generated. The current total size of the overburden storage areas is approximately 82 acres. Annually, overburden generation is approximately 2 million tons.

2.4.2.10 Concrete Batch Plant

The batch plant produces cement that is used for various construction activities throughout the mine operations. These construction activities include modifications to processing plants and the pouring of concrete foundations.

2.4.2.11 Wastewater Neutralization Plant

Wastewater from throughout the plant is pH-adjusted at the onsite neutralization plant. LnO and lead are precipitated out of the treated wastewater, and the effluent is piped to the New Ivanpah Evaporation Pond, approximately 9 miles northeast of the facility. The solids are reintroduced into the mill product streams to recover LnO.

2.4.2.12 New Ivanpah Evaporation Pond

The New Ivanpah Evaporation Pond became operational in 1987. This pond is approximately 115 acres and is divided into two cells, one 32 acres and the other 83 acres. It is located approximately 9 miles northeast of the mine boundaries in the Ivanpah Dry Lake bed. It is underlain by low permeability silty clay. Wastewater is transported to the New Ivanpah Evaporation Pond through a pipeline after pH adjustment and clarification at the onsite neutralization plant.

2.4.3 Hazardous Materials and Hazardous Waste Generation and Disposal

The ore processing utilizes a number of chemicals. A summary listing of hazardous materials used during ore processing is provided in Appendix B. Major chemicals and fuels used are also listed on Table 2.4-3. These chemicals are stored in bulk solid form and/or liquid solution in and around the processing buildings. The majority of these chemicals are consumed in ore processing; however, hazardous wastes that are generated are shown in Table 2.4-4.

Hazardous wastes are collected and stored in 55-gallon drums with double plastic liners for less than 90 days and eventual offsite disposal at an approved hazardous waste landfill.

Chemicals considered toxic by the Superfund Amendments and Reauthorization Act (SARA) must be reported on a Toxic Release Inventory. Table 2.4-5 shows the toxic chemicals used and released at the mine in 1995.

As part of a separate project approved by the California Environmental Protection Agency (EPA) Department of Toxic Substances Control (DTSC), the existing Mountain Pass Mine hazardous waste storage area is being closed. Wastes that were stored have been treated for reinsertion into the manufacturing process or have been transported offsite for disposal at an approved disposal facility. A new temporary (less than 90-day) hazardous waste storage facility will be located on the concrete pad adjacent to the Specialty Plant, subject to DTSC approval of the closure plan for the area.

Process water was formerly discharged to 13 lined and unlined evaporation/percolation ponds located entirely onsite within an area tributary to Wheaton Wash. These ponds were in existence in the 1960s and did not have permit requirements. The wastewater ponds contained process water from the Chemical Plant and the sludge removed from the bottom of the wastewater ponds, which was a lanthanide chlorohydrate. Analysis of the water/sludge material has been presented to the LRWQCB and the material was moved to the old West Tailings Pond (P-1) for permanent in-place burial. Twelve of the 13 evaporation ponds were clean-closed between 1987 and 1991 in compliance with the LRWQCB regulations. Closure of P-1 under the jurisdiction of the LRWQCB is currently underway and is anticipated to be complete in 1997. As part of the closure process for P-1, a detailed sampling plan was prepared to characterize all the material in the pond. The sampling plan is under review by the LRWQCB. At the present time, only the New Ivanpah Evaporation Pond is in active use for wastewater disposal.

TABLE 2.4-3

Chemicals and Fuels Used in Ore Processing*

Chemical	Maximum Amount Stored Onsite (1995)
Acetic Acid	11,000 gallons
Ammonium bicarbonate	44,500 pounds
Aqueous Ammonia	65,000 gallons
Barium Chloride	30,000 pounds
Borax	40,000 pounds
Calcium Hydroxide	25,000 pounds
Ethylene Glycol	475 gallons
Hydrochloric Acid	67,100 gallons
Hydrogen Peroxide (<50%)	2,080 gallons
Hydroxylamine Hydrochloride	24,000 gallons
Liquid Nitrogen	9,800 gallons
Nalco Flocculent 7871	8,125 gallons
Nitric Acid	43,273 gallons
Oxalic Acid	100,500 pounds
PAMAK 25 Additive	40,000 pounds
Pamolyn Fatty Acid 125	1,700 gallons
Potassium Chloride	35,000 pounds
Purification Feed/Lanthanide Chloride	11,200 gallons
Sodium Carbonate	324,200 pounds
Sodium Hydrosulfide	8,000 gallons
Sodium Hydroxide	6,110 gallons (20-50%) 21,650 pounds (beads)
Sodium Silicofluoride	20,000 pounds
Sodium Sulfide	1,600 pounds
Sulfuric Acid	1,100 gallons
Superfloc Flocculent	250 gallons 4,100 pounds

TABLE 2.4-3 (Cont'd)

Chemicals and Fuels Used in Ore Processing*

Chemical	Maximum Amount Stored Onsite (1995)
SX-1 and SX-2 Feed Mixture/Lanthanide Chloride	52,500 gallons
Urea, Carbamide	25,000 pounds
Weslig 120CP-1500	8,000 gallons
Zinc Powder	10,000 pounds
Fuels	
Diesel	64,650 gallons
Kerosene	5,555 gallons
Gasoline	2,500 gallons
Oil (motor, gear, lubricating, grease, turbine)	3,440 gallons
Propane	18,158 gallons

Source: Unocal 1994a.
* List complete as of November 1995

TABLE 2.4-4

Hazardous Waste Generated at Mountain Pass Mine* (1995)

Waste Type	Annual Volume	Waste Source	Disposal/Storage
Lead/Iron Filter Cake (5-7% lead)	686,000 pounds (up to 50 percent water) No longer generated	Chemical Plant	Treated onsite and stored for reinsertion in manufacturing process.
Lead Sulfide	800,000 pounds (up to 50 percent water)	Generated prior to August 1989 at Chemical Plant	Treated offsite as recyclable or disposed of as hazardous waste.
Iron Hydroxide Filter Cake	No longer generated	Generated prior to August 1989 at Chemical Plant	Currently storing 505 tons onsite in 1,833 55-gallon drums.
Drained Used Oil Filters	6,000 pounds	Mobile Maintenance Shop and throughout Plant	Disposed offsite in permitted facility
SX Crud (non-halogenated organics and chlorides and silica)	6,000 pounds	Chemical Plant or Specialty Plant	Disposed of as low-level radioactive waste at permitted facility.
Lead Sand Filter Cinders	121,838 pounds No longer generated	Chemical Plant	Treated and then disposed of as low-level radioactive waste at permitted facility.
Spent Zinc Waste	4,000 pounds	Chemical Plant	Recycled at offsite primary smelter.
Hydrocarbon-contaminated waste, including soil, absorbents, rags, clothing	30,000 pounds	Mobile Maintenance Shop and Fueling Locations	Disposed offsite in permitted landfill or recycled offsite as alternative fuel.
Oil-contaminated Drums	12 drums	Mobile Maintenance Shop and throughout Plant	Sold to recyclers for recycling.
Waste Grease	660 gallons	Mobile Maintenance Shop and throughout Plant	Recycled offsite at permitted recycling facility.
Waste Oil	10,000 gallons	Mobile Maintenance Shop and throughout Plant	Recycled offsite at permitted recycling facility.

Source: Unocal 1994a, revised November 1995.

TABLE 2.4-5

Toxic Chemical Use and Release at Mountain Pass Mine (1995)

Chemical	Annual Volume Used	Source	Disposal/Storage
Ammonia	811,500 pounds	Chemical Plant	795,730 pounds discharged as total dissolved solids (TDS) to New Ivanpah Evaporation Pond. 15,770 pounds released to air.
Barium Chloride	172,900 pounds	Cerium 96 Plant	Discharged as barium sulfate to New Ivanpah Evaporation Pond.
Chlorine[1]	1,522,070 pounds	Chemical Plant, Specialty Plant, Cerium 96 Plant	26,007 pounds released to air.
Hydrochloric Acid	36,007,589 pounds	Chemical Plant, Specialty Plant, Purification	22,113 pounds released to air.
Lead Compounds	see Table 2.4-4	----	----
Nitrate Compounds[1]	1,127,327 pounds	Neutralization	Discharged as TDS to New. Ivanpah Evaporation Pond.
Nitric Acid	1,636,328 pounds	Specialty Plant	32,139 pounds released to air.
Sulfuric Acid	30,896 pounds	Purification	All consumed in process.
Zinc Compounds	63,000 pounds	Purification	Discharged as TDS to New Ivanpah Evaporation Pond.

[1] Chlorine and nitrate compounds are not used onsite; however, they are generated during the leaching and neutralization processes, respectively.

The Mountain Pass Mine is currently undergoing monitoring and remediation associated with past discharges of process wastewater. This work is being performed under the direction of LRWQCB Orders No. 6-90-41, 6-91-836 and 6-90-56, which require Molycorp to conduct quarterly monitoring at appropriate existing groundwater monitoring wells. Monitoring for continued offsite subsurface migration of the wastewater from the evaporation ponds required the construction of four monitoring wells surrounding these evaporation ponds. The present monitoring and extraction system includes 72 monitoring wells and 5 shallow trenches. The trenches are located at the toe of the North Tailings Dam and in Wheaton Wash. Samples are also collected from various onsite ponds. Two deep extraction wells are located to the west of the Old Tailings Pond (P-1) in the western drainage (also known as the Western Gap and the Shadow Valley drainage). Presently, process wastewater is generated during operations and is discharged to the New Ivanpah Evaporation Pond.

Ore processing at the Mountain Pass Mine requires large volumes of water. The average annual volume of water used is 407.8 million gallons, or approximately 1,177 acre-feet. This volume is equivalent to 1,050,960 gallons per day or 730 gallons per minute. Additionally, approximately 550,000 gallons per day of water is recycled from the North Tailings Pond for use in the Flotation Plant. Fresh water is drawn from two sources: the Ivanpah Valley to the east and the Shadow Valley to the west. Domestic water supplies from these two sources are blended together prior to distribution because the Ivanpah Valley well field water has a fluoride content of approximately 4 to 5 parts per million (ppm), which exceeds California drinking water standards. However, even the blended water may exceed California drinking water standards. Reverse osmosis systems are used throughout the facility to purify water.

2.4.4 Radiologic Materials and Wastes

The Mountain Pass bastnasite ore contains small concentrations of naturally occurring radioactive materials (NORM). The principal radionuclides contained in the ore are uranium-238 and thorium-232. Rogers & Associates conducted a radiation survey at the Molycorp Mountain Pass Mine in February and March 1993. The objective of the survey was to evaluate radiation exposures in the operating facility and adjoining offsite areas. The information was obtained relative to the request for a radioactive materials license for the Molycorp operations.

After review of the Rogers & Associates study, the California Department of Health Services Radiologic Health Branch determined that licensing of NORM at Mountain Pass was not necessary.

Molycorp possesses a Radioactive Materials license (#3229) from the California Department of Health Services Radiologic Health Branch that regulates the possession and use of radioactive materials within sealed sources used for measuring density and other physical characteristics of materials onsite. Additionally, the California Department of Health Services Radiologic Health Branch has discretion to regulate materials containing radionuclides and chose to license the stabilization, storage, and reinsertion of the lead/iron filter cake.
In 1995, Molycorp obtained an addendum to Radioactive Materials license #3229 to cover the management and possession of uranium and thorium contained within lead/iron filter cake, a mining byproduct of the lanthanide recovery process. The license addendum applies specifically to the activities associated with the stabilization, storage, and reinsertion of stabilized lead/iron filter cake to the process for the purpose of recovering lanthanides.

As of September 27, 1996, approximately 67 percent of the stabilized lead/iron filter cake had been fed to process. The stabilized lead/iron filter cake is the only NORM managed under a radioactive materials license.

2.4.5 Work Force and Equipment

Operations are currently conducted at the mine 7 days per week, 52 weeks per year. The mine currently employs 300 full-time office staff, mine, and plant workers. The type and number of equipment and vehicles associated with current mining operations include:

2	motor graders	8	loaders
16	forklifts	3	tractor dozers
1	ditch witch	1	sweeper (gas)
4	truck cranes	2	road tractors
1	cement mixer truck	1	35-ton haul truck
4	85-ton haul trucks	1	20-ton vibrating compactor
2	water trucks	11	service trucks
36	pick-up trucks (various types-gasoline)	5	vans (gasoline)
1	hydraulic shovel	1	track-mounted backhoe
2	tire-mounted backhoes		

2.5 Proposed Project

Expansion of the mine site will consist of enlarging the surface area and depth of the main pit, expanding existing overburden stockpiles, expanding the existing North Tailings Pond through the year 2000 before constructing a new tailings storage impoundment (East Tailings Pond), and constructing a new borrow pit for material for the new East Tailings Pond dam.

The additional area to be disturbed by these activities is 696 acres, so that at mine buildout a total of 1,044 acres will have been disturbed and reclaimed. The mine expansion will occur over 30 years in three phases of 10 years each with a final monitoring phase of 5 years. Molycorp will also be expanding the Nipton Road Borrow Site from 15.5 acres to approximately 50 acres during closure and reclamation of evaporation ponds.

Descriptions of the four phases are provided below. Plate 1 identifies the areas of the proposed expansion activities, and Figures 2.5-1 through 2.5-3 illustrate the proposed activities of Phases 1 through 3. Table 2.5-1 provides a summary of mine expansion activities by phase and Table 2.5-2 provides a summary of total disturbance expected during the expansion project.

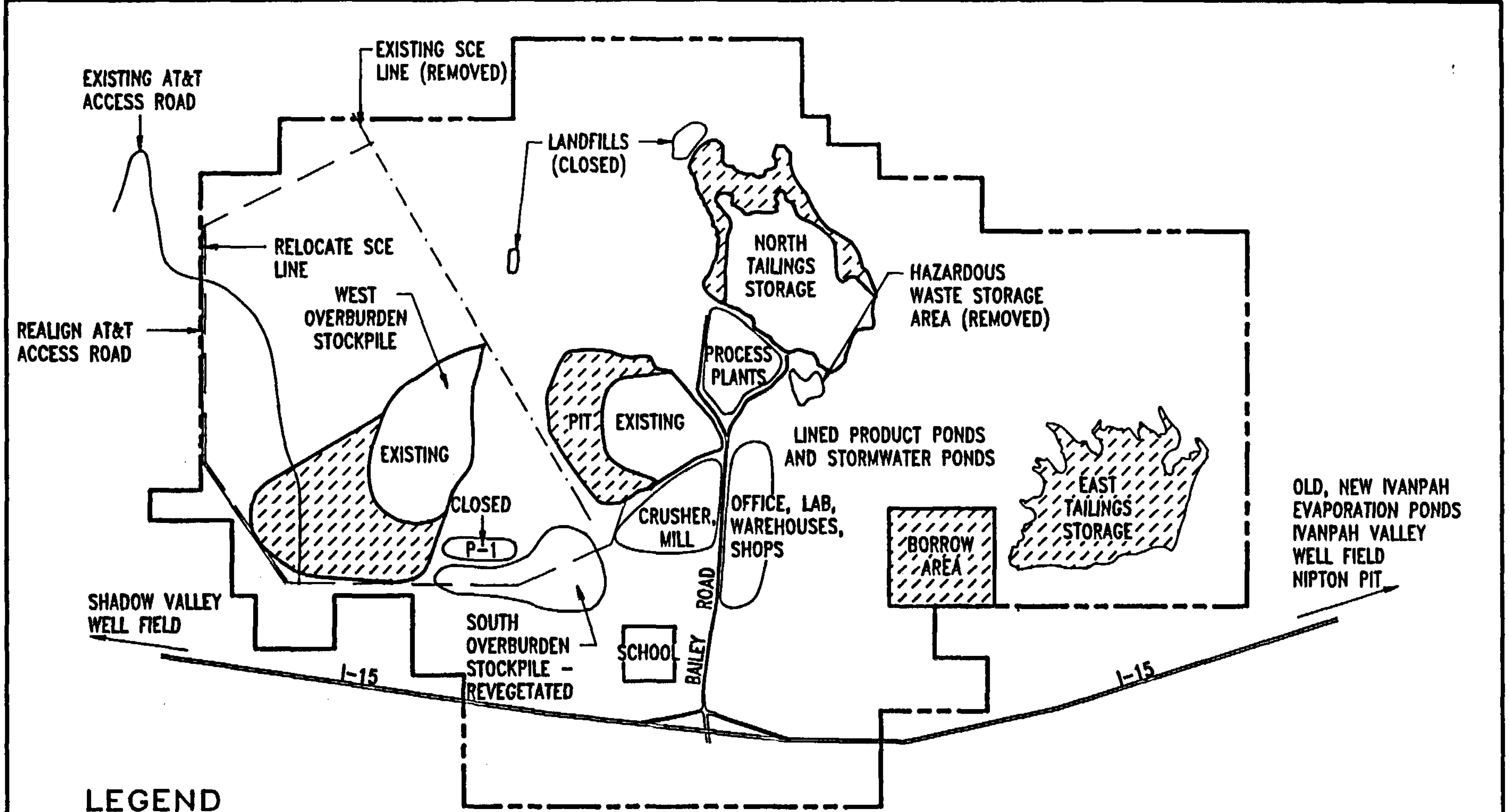
2.5.1 Project Phases

The first three phases will include ongoing biological surveys and revegetation in project areas affected by each phase.

2.5.1.1 Phase I

Phase I of the mine expansion is scheduled from 1995 through 2005. This phase will expand mine operations onto an additional 234 acres and is proposed to include the following activities:

- Continued mining and expansion of the pit westward by 11 acres
- Realignment of two Southern California Edison (SCE) 12-kilovolt (KV) and 33-KV power distribution lines on one set of poles that currently runs north to south, west of the pit to a 1.5-acre corridor west of the Overburden Stockpile
- Installation of the new hazardous waste temporary (less than 90 days) holding area at the former containment pad installed in 1995 for stabilization of existing filter cake material. No new disturbance will occur.
- Expansion of the west Overburden Stockpile by approximately 79 acres.
- Relocation of the AT&T access road to the microwave facility on Mohawk Hill along the SCE easement as the southern portion of the road will be covered by the expansion of the Overburden Stockpile.



LEGEND

EXPANSION

2000 1000 0 2000 FEET

SCALE: 1"=2000'

NORTH

W E S

SOURCE: LILBURN CORPORATION, 1994

ENSR

ENSR CONSULTING AND ENGINEERING

FIGURE 2.5-1

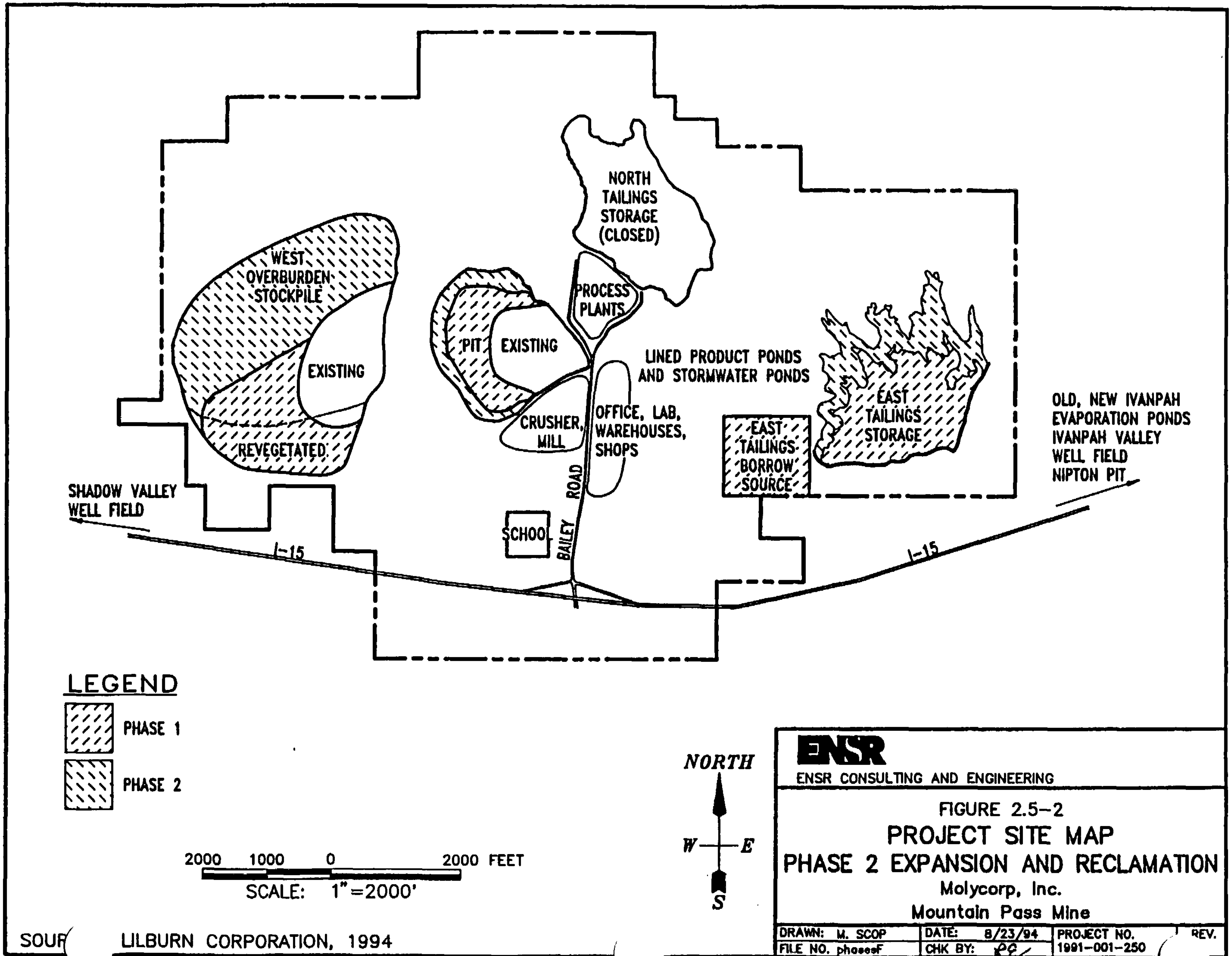
PROJECT SITE MAP

PHASE 1 EXPANSION AND RECLAMATION

Molycorp, Inc.

Mountain Pass Mine

DRAWN: M. SCOP	DATE: 8/23/94	PROJECT NO. 1991-001-250	REV. 1
FILE NO. phasesE	CHK BY:		

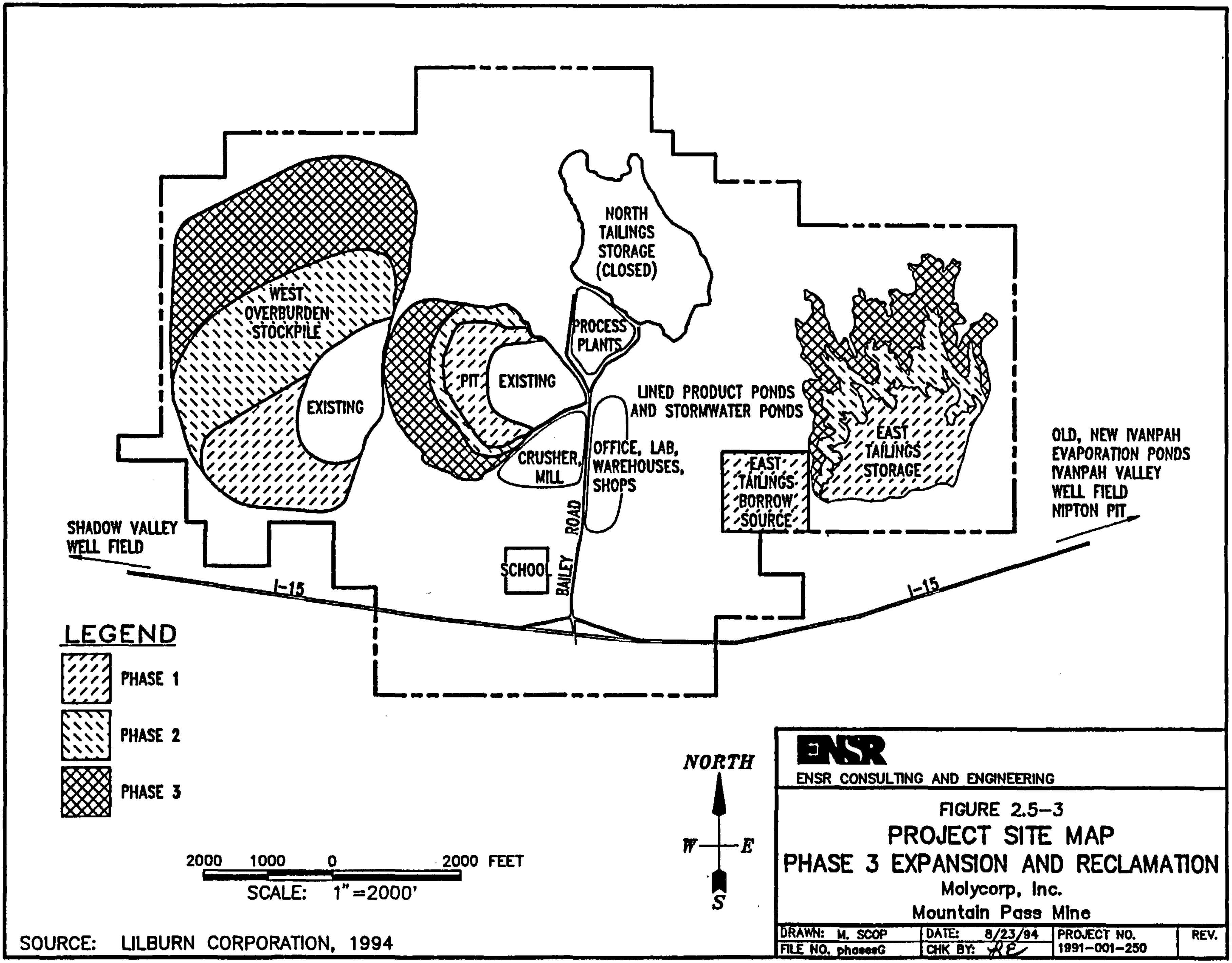


ENSR
ENSR CONSULTING AND ENGINEERING

FIGURE 2.5-2
PROJECT SITE MAP
PHASE 2 EXPANSION AND RECLAMATION
Molycorp, Inc.
Mountain Pass Mine

DRAWN: M. SCOP	DATE: 8/23/94	PROJECT NO. 1991-001-250	REV.
FILE NO. phasesF	CHK BY: PC		

1991-001-850



ENSR CONSULTING AND ENGINEERING

FIGURE 2.5-3
PROJECT SITE MAP
PHASE 3 EXPANSION AND RECLAMATION
Molycorp, Inc.
Mountain Pass Mine

DRAWN: M. SCOP	DATE: 8/23/94	PROJECT NO. 1991-001-250	REV.
FILE NO. phasesG	CHK BY:		

SOURCE: LILBURN CORPORATION, 1994

1991-001-850

TABLE 2.5-1

Project Components by Phase

Component	Phase 1 10 years	Phase 2 10 years	Phase 3 10 years	Phase 4 5 years
Mining and Expansion of Open Pit	11 acres	35 acres	34 acres	Reclamation
Increase Area of Overburden Stockpile	79 acres	127 acres	123 acres	Reclamation
Construct or Increase Area of East Tailings Borrow Site	20 acres (construct)	10 acres (increase)	10 acres (increase)	Reclamation
Construct or Increase Area of East Tailings Pond	70 acres - pond 14 acres-diversion channels (construct)	60 acres (increase)	50 acres (increase)	Reclamation and Closure
Increase Area of North Tailings Pond to 4,950 Elevation	20 acres	Reclamation	Closed	Closed
Construction of Concrete/Asphalt Landfill	✓[1]	—	—	Reclamation
Relocation and Expansion of Mine Equipment Yard	13.8 acres	—	—	Reclamation
Surface Material Stockpile Area (moves as pit expands)	15 acres	—	—	Reclamation
Realign SCE Power Line	1.5 acres	—	—	—
Relocate AT&T Access Road	Along SCE easement	—	—	—
Relocate Shadow Valley Water Line	—	2.5 acres[2]	—	—
Relocate Explosives Magazine	—	✓[1]	—	Reclamation
Construction of Hazardous Waste Storage Area	✓[3]	—	—	Reclamation
Biological Surveys and Revegetation	✓	✓	✓	✓
Termination of Mining	—	—	—	✓
Contouring Mine and Overburden Slopes	—	—	—	✓
Recycling and Reduction of Ore Stockpiles and Tailings	—	—	—	✓
Closure of Hazardous Waste Storage Area	—	—	—	✓

1 No new area of disturbance as site will be located within Overburden Stockpile.
2 On Molycorp property adjacent to utility corridor.
3 No new area of disturbance as site will be located within former temporary treatment unit.

TABLE 2.5-2

Total Disturbance By Component

Component	Total Acres Disturbed
Mining and Expansion of Open Pit	80
Increase Area of Overburden Stockpile	329
Construct or Increase Area of East Tailings Borrow Site	40
Construct or Increase Area of East Tailings Pond	194
Increase Area of North Tailings Pond to 4,950 Elevation	20
Relocation and Expansion of Mine Equipment Yard	13.8
Expansion of Surface Material Stockpile Area	15
Realign SCE Power Line	1.5
Relocate Shadow Valley Water Line	2.5
Total	**695.8**

- Expansion of the existing North Tailings Pond by approximately 20 acres and subsequent initiation of closure. This will include allowing tailings to dry and covering of tailings with overburden to reduce airborne particulates.

- Design and construction of the proposed East Tailings Pond on approximately 70 acres east of the plant site. Additionally, 14 acres will be used for construction of stormwater diversion channels above the proposed tailings impoundment and 20 acres of material from a proposed new onsite borrow site (East Tailings Borrow Site) will be used in the dam construction. A more detailed discussion of the borrow site and the East Tailings Pond is provided in Sections 2.5.2.4 and 2.5.2.5.

- Relocation and expansion of the mine equipment yard to a 13.8-acre area south of the pit.

- Stockpiling of surface material from areas of open pit and stockpile expansion for future reclamation. The stockpile area is proposed to cover approximately 15 acres and would be adjacent to a mine haul road leading to the west Overburden Stockpile scheduled to be included in Phase 2 between 2000 and 2010. The surface material in this stockpile would be used for early reclamation of the lower reaches of the west overburden stockpile facing Interstate 15. Reclamation of the area disturbed by stockpiling would be incorporated with reclamation of the surface mine roads.

2.5.1.2 Phase 2

The 10-year period between 2005 and 2015 is designated as Phase 2 and would expand operations by approximately 232 acres. Activities proposed during this phase include:

- Expansion of open pit by 35 acres

- Increase area of Overburden Stockpile by 127 acres

- Increase proposed East Tailings Borrow Site by 10 acres

- Increase proposed East Tailings Pond size by 60 acres

- Relocate Shadow Valley water supply line to southern portion of Overburden Stockpile (onsite)

- Relocate explosives magazine to north end of inert landfill (onsite)

- Continue reclamation and revegetation of North Tailings Pond and lower slopes of south-facing West Overburden Stockpile

2.5.1.3 Phase 3

Phase 3 is proposed for the period from 2015 to 2025. During this time span, operations will build out an additional 217 acres. Planned activities include:

- Expansion of the open pit by an additional 34 acres
- Increase of the Overburden Stockpile by 123 acres
- Increase the proposed East Tailings Borrow Site by 10 acres
- Expansion of the proposed East Tailings Pond by 50 acres

2.5.1.4 Phase 4

Phase 4 is the final reclamation phase, which is proposed to occur for approximately 5 years (2026 to 2030). The components of this phase will include:

- Termination of mining and contouring of mine slopes to approved designed slope angles for pit wall stability
- Closure of the proposed East Tailings Pond
- Closure of the less than 90-day hazardous waste holding area
- Contouring of the Overburden Stockpile for revegetation and reducing visual impacts
- Recycling and reduction of ore stockpiles and tailings, if feasible
- Spreading of stockpiled surface material on areas to be revegetated
- Revegetation of previously vegetated disturbed surfaces

2.5.2 Project Components

The primary components of the proposed project are discussed in more detail in this section.

2.5.2.1 Open Pit

The open pit will be expanded approximately 80 acres over the 30-year expansion period of the proposed project. The pit will be deepened by about 500 feet to a total depth of approximately 760 feet. Pit dimensions will expand to approximately 2,500 feet north to south and 2,700 feet east to west, with a perimeter of approximately 8,000 feet and overall side slopes consistent with the approved slope stability analysis (Vector Engineering 1995).

2.5.2.2 Nipton Road Borrow Site

Expansion of the Nipton Road Borrow Site for the proposed project will be accomplished in the same manner as current operations (Section 2.4.2.8) when material is needed for pond closures, road construction, etc. The Nipton Road Borrow Site potentially contains up to 850,000 cubic yards of material available for export.

2.5.2.3 Overburden Stockpile

The 39-acre West Overburden Stockpile will be expanded by approximately 329 acres over the 30-year expansion period to an area of 368 acres. At buildout, the Overburden Stockpile will measure approximately 5,000 feet from northwest to southeast, and 5,400 feet from northeast to southwest with a perimeter of approximately 15,000 feet. The amount of overburden material will increase continually with time as the depth to the ore body increases. The increasing overburden to ore stripping ratio will reach a ratio of 14 to 1 near the end of this 30-year time span. The amount of overburden is expected to climb to 7 million tons annually by 2005, the beginning of Phase 2. The cumulative overburden tonnage to the year 2025 equates to approximately 138 million tons. Table 2.5-3 provides Molycorp's estimated overburden to ore stripping rates by year for the 30-year project.

2.5.2.4 Mill Wastes (Tailings Pond)

Table 2.5-3 provides Molycorp's estimated tailings generation by year for the 30-year project.

<u>North Tailings Pond</u>

Molycorp proposes to raise the crest of the North Tailings Pond Dam to an elevation of 4,950 feet from the approved crest elevation of 4,940 feet. Under a separate project, San Bernardino County has issued a LUR to raise the dam elevation from 4,920 feet to 4,940 feet. Raising the dam crest elevation by an additional 10 feet to 4,950 feet would increase its capacity for another 3 years and increase its surface area by 20 acres. The dam expansion would consist of expanding the toe berm, dam face, and dam crest with predetermined sized rock fill at specified compactions. A geotextile liner will be placed between the tailings and the rock fill dam. In addition, an emergency spillway for overflow water will be constructed at the north end of the pond and will connect to existing natural drainage.

LRWQCB Order No. 6-91-836 requires Molycorp to provide a conceptual plan on methods to stop seepage from the North Tailings Pond, and implement the plan by January 1996. The "P-16 Tailings Pond Corrective Measures Feasibility Study" (Environmental Solutions 1994) was submitted to the LRWQCB in October 1994.

Molycorp submitted a report entitled "P-16 Tailings Pond Corrective Action Program" to the LRWQCB in April 1996. The report presents the results of drilling and test pumping programs conducted in compliance with LRWQCB Order 6-91-836. A recovery well was installed to remove groundwater impacted by seepage from the North Tailings Pond (P-16) and three piezometers were installed to provide water level data and determine the capture zone. The LRWQCB is currently reviewing the report and has indicated that the corrective action program does not appear to propose capture zones that would preclude affected groundwater from entering the nearby washes, and no remediation is proposed for groundwater that has already migrated beyond the existing extraction wells (RWQCB 1996a). According to the LRWQCB, seepage from the North Tailings Pond is still occurring.

TABLE 2.5-3

Estimated Thirty Year Ore, Overburden, and Tailings Generation (Tons X 1,000)

Year	Annual Tons			Cumulative Tons			Overburden to Ore Stripping Ratio	
	Ore	Tailings	Overburden	Ore	Tailings	Overburden	Annual	Cumulative
Phase 1								
1	500	450	2,000	500	450	2,000	4.0	4.0
2	500	450	2,180	1,000	900	4,180	4.4	4.2
3	500	450	2,360	1,500	1,350	6,450	4.7	4.4
4	500	450	2,540	2,000	1,800	9.080	5.1	4.5
5	500	450	2,720	2,500	2,250	11,800	5.4	4.7
6	500	450	2,900	3,000	2,700	14,700	5.8	4.9
7	500	450	3,080	3,500	3,150	17,780	6.2	5.1
8	500	450	3,260	4,000	3,600	21,040	6.5	5.3
9	500	450	3,440	4,500	4,050	24,480	6.9	5.4
10	500	450	3,620	5,000	4,500	28,100	7.2	5.6
Phase 2								
11	500	450	3,800	5,500	4,950	31,900	7.6	5.8
12	500	450	3,980	6,000	5,400	35,880	8.0	6.0
13	500	450	4,160	6,500	5,850	40,040	8.3	6.2
14	500	450	4,340	7,000	6,300	44,380	8.7	6.3
15	500	450	4,520	7,500	6,750	48,900	9.0	6.5
16	500	450	4,700	8,000	7,200	53,600	9.4	6.7
17	500	450	4,880	8,500	7,650	58,480	9.8	6.9
18	500	450	5,060	9,000	8,100	63,540	10.1	7.1
19	500	450	5,240	9,500	8,550	68,780	10.5	7.2
20	500	450	5,420	10,000	9,000	74,200	10.8	7.4
Phase 3								
21	500	450	5,600	10,500	9,450	79,800	11.2	7.6
22	500	450	5,780	11,000	9,900	85,580	11.6	7.8
23	500	450	5,960	11,500	10,350	91,540	11.9	8.0
24	500	450	6,140	12,000	10,800	97,680	12.3	8.1
25	500	450	6,320	12,500	11,250	104,000	12.6	8.3
26	500	450	6,500	13,000	11,700	110,500	13.0	8.5
27	500	450	6,680	13,500	12,150	117,180	13.4	8.7
28	500	450	6,860	14,000	12,600	124,040	13.7	8.9
29	500	450	7,040	14,500	13,050	131,080	14.1	9.0
30	500	450	7,220	15,000	13,500	138,300	14.4	9.2

Source: Molycorp data from Lilburn 1994.

Note: This table shows stripping rates and ratios based on a consistent annual ore production of 500,000 tons. Tailings generation is 90 percent of each ore ton. This is a comparative analysis to demonstrate the increase in the estimated stripping ratio and overburden.

East Tailings Pond

A new, approximately 180-acre East Tailings Pond is proposed to be located east of the current plant. This storage pond will be lined and equipped with leak detection and will eventually cover approximately 180 acres by the year 2020, and its proposed capacity will be adequate for the proposed expansion. At this time, this future component of the project is conceptual in nature. As such, it will require the appropriate level of CEQA analysis as a separate discretionary project.

Construction of the new facility is planned to start in approximately 2000, when the North Tailings Pond will reach capacity. The specific conceptual design of the proposed East Tailings Pond has not been identified. Design will be in compliance with applicable regulations of the Division of Dam Safety. The options available include using an open-pipe discharge and a water collection pond or a pond accepting an unsaturated filter cake. The general size and location shown on Plate 1 have been identified based on known operational needs. Construction may will incorporate overburden from the mining operation as well as manufactured and/or synthetic liners. Surface runoff would need to be diverted around the East Tailings Pond, possibly through 14 acres of ditches constructed during Phase 1 activities and identified as east and west diversion channels.

2.5.2.5 East Tailings Borrow Site

A 40-acre borrow site is proposed for use in the construction of the new East Tailings Dam. This material will be primarily utilized for starter dams, bedding material, access roads, and possibly for pond closures and other reclamation activities that require fine-grained material. Molycorp has surface ownership of this area with mineral rights being retained by the Federal government. Accordingly, a minerals material sale will be required. If the volume of material removed exceeds 200,000 cubic yards in a 6-month period, a competitive material sale will be required. Current plans are to use 1.7 million cubic yards of borrow from this source during the latter part of Phase 1 and the early part of Phase 2. The final amount of borrow required will be known when final design of the East Tailings Pond is complete. Condemnation drilling was conducted in 1991 to the east of the East Tailings Borrow Site by Central Oregon Drilling Company to verify that no potential mineralization is present. Drilling was entirely in Precambrian gneiss. The borrow site area has been determined to be deep unmineralized alluvial formations much younger than the mineralized ore body. For this EIR, it is assumed that the entire area outlined on Plate 1 for this borrow site will be disturbed. However, because this component of the project is conceptual in nature, it would require a separate discretionary review under CEQA before Molycorp could proceed with development of this component.

2.5.2.6 Landfill

Molycorp has initiated the permitting process with the San Bernardino County Environmental Health Services Department as the Local Enforcement Agency (LEA) for the California Integrated Waste Management Board (CIWMB) to construct an inert construction debris disposal site. The inert materials to be disposed consist of concrete, fire brick, and possibly asphalt. The material will be disposed of in an area on top of the Overburden Stockpile at the 4,900-foot elevation. A separate nearby area will be used to temporarily store inert material until it is determined that no unsuitable material has been placed in the area. Once the debris is determined to be suitable for final disposal, it will be buried by overburden waste in a central portion of the Overburden Stockpile.

This site is expected to hold construction debris generated over the next 5 to 6 years. It is estimated that the largest annual average could be up to 500 cubic yards (1,000 tons). When this proposed site is full, a similar site would be located within the Overburden Stockpile to receive additional inert debris. Such an additional site would require separate permitting with the LEA.

According to the LEA, Molycorp may qualify for exclusion from new tiered permitting requirements for solid waste that are being developed by CIWMB. If asphalt is to be disposed, it may need to be tested for total petroleum hydrocarbons (TPH). If results are below California action levels, the asphalt could be classified inert, as the concrete is, thereby allowing the exclusion (Nigro 1995).

2.5.2.7 Hazardous Waste Temporary Holding Area

The concrete pad utilized for lead/iron stabilization activities in 1995 has been modified for use as a holding and staging area for the accumulation of hazardous waste for a period not to exceed 90 days from the start of accumulation. Modifications to the pad include the elimination of the northern half of the pad, the reconstruction of a concrete curb to contain surface water run-on and run-off, and the construction of a chain-link fence to restrict access to the area. Molycorp submitted a closure report to DTSC for the concrete pad used for lead/iron stabilization in 1995 and expects approval of the closure in the near future, at which time the pad will be utilized as a temporary hazardous waste holding area. The former drum storage yard will not be used for the storage of hazardous waste.

Wastes to be held in the hazardous waste holding area will be in properly labeled and sealed steel drums placed on 4-inch-high wooden pallets. The 4-inch clearance will prevent any water accumulated during a 24-hour 25-year storm event from reaching the drums. When water accumulates within the curbed area, it will be analyzed for hazardous constituents. If no hazardous constituents are identified, the water will be recycled for use in processing activities. Water with hazardous levels of any elements or out-of-range pH will be disposed of in an approved manner. Hazardous waste will not be held onsite for longer than 90 days; therefore, the area will not be permitted as a treatment, storage, and disposal facility (TSDF).

Hazardous waste types and maximum quantities expected to be generated per month are as follows:

• Lead sulfite concentrate	40 30-cubic-foot (3,000-pound capacity) sling bins per month
• SX Crud	4 drums per month
• Waste grease	2 drums per month
• Used oil filters	4 drums per month
• Oil-contaminated soil	24 drums per month
• Miscellaneous	10 drums per month

The maximum number of drums to be accumulated during each 90-day period will be 372 drums. The hazardous waste holding area will be inspected weekly to ensure that no spills or releases have occurred. If any releases are identified, the material will be immediately cleaned up and repackaged for appropriate disposal. Damaged or deteriorated containers will be immediately repackaged.

2.5.3 Proposed Project Operation

As a result of the proposed expansion activities over a 30-year period, the area of disturbance will increase. However, the proposed project is a continuation of current operations and as such, no substantial changes to wastewater stream volumes generated, water supply requirements, hazardous materials usage, and hazardous waste generation are expected to be associated with the project. Hazardous waste generation is expected to be reduced because iron precipitate is being discharged to the North Tailings Pond and lead sulfide concentrate is being recycled or disposed of offsite as a hazardous waste. Additionally, employment, vehicle use, and traffic levels are not expected to change significantly over the expansion period.

2.6 Project Termination and Decommissioning

The facility will continue ongoing reclamation and closure activities both during the proposed 30-year expansion period and during the Phase 4 reclamation period. These activities will be conducted in accordance with the actions described in the facility's Mine Reclamation Plan (Lilburn 1994) as administered by San Bernardino County.

2.7 Alternatives to the Proposed Project

This EIR analyzes the impacts of the following alternatives to the proposed project:

- No Project Alternative - Under this alternative, the mine would continue to operate under its current permits and approvals. Due to limitations in the current permits, it is assumed that the operations would cease in the year 2000.

- Reduced Expansion Alternative - Under this alternative, the proposed 30-year expansion of the mine would be reduced by one-third to 20 years. Up to 5 million fewer tons of ore would be mined, and 64 million fewer tons of overburden would be generated. Additional disturbance beyond the existing conditions at the mine would be a total of 217 acres or approximately 69 percent less than the proposed project: open pit expansion would account for 34 additional acres, overburden stockpiles would account for 123 acres of disturbance, additional disturbance to borrow sites would account for 10 additional acres, and tailings pond expansion would amount to an additional 50 acres compared to the existing mine.

- Underground Mining Alternative - Under this alternative, the proposed project, as described above, would continue to approximately year 25. At that time, the open pit mining method would be discontinued and underground techniques would be employed. Ore would be developed by drilling and blasting. This alternative would produce 2.1 million tons of ore compared to 2.7 million tons for the proposed project. Compared to the proposed project, up to 33.5 fewer acres would be disturbed, and 37 million fewer tons of waste would be accumulated in the Overburden Stockpile, although the Overburden Stockpile would cover the same area as for the proposed project. The average upper elevation of the Overburden Stockpile would be 4,995 feet ASL as compared to an average upper elevation of 5,120 ASL feet for the proposed project.

The following two additional alternatives have been considered but determined to be infeasible:

- Rolling Pit Construction Option - The rolling pit method of expanding an open pit mine requires that angles of the open pit not exceed 35 to 37° because a sharper angle does not provide the footwall stability necessary for rolling pit construction. In order to expose the ore to be mined, the Molycorp open pit is designed at an angle of 42°.

- Alternative Site - This potential alternative has been determined to be infeasible because the rare-earth ore body to be mined occurs only at the Mountain Pass site. Therefore, it would not be possible for Molycorp to conduct bastnasite (lanthanide elements) mining operations at an alternative site.

2.8 Permits and Approvals

The Mountain Pass Mine Expansion Project will require a number of permits and approvals before project initiation. Table 2.8-1 outlines the federal, state, and local agencies and the various permits and approvals specific to each agency and applicable to the proposed project.

TABLE 2.8-1

List of Federal, State, and Local Agency Permits and Approvals

Agency Permit or Approval	Requirement	Applicability to Project
Local		
San Bernardino County Planning Department	Mining Conditional Use Permit and Reclamation Plan revision	Expansion of mine exceeds 25 percent of vested area. Siting of temporary hazardous waste storage area
San Bernardino County Department of Environmental Health Services	Permit or exemption from permit to operate inert landfill	Inert concrete/asphalt landfill proposed for Overburden Storage area
	Approval of revisions to Risk Management and Prevention Program (RMPP), Business Plan, and waste minimization plan	Revisions to mine operations will require revisions to previously submitted plans.
	Approval of closure and reclamation plans	Closure of mining operations and reclamation
Mojave Desert Air Quality Management District	Dust control plan	Control of air emissions
State		
Regional Water Quality Control Board	Waste discharge requirements	May be necessary for inert landfill, temporary hazardous waste storage area, or proposed East Tailings Pond
State Historic Preservation Office	Consultation	Identified cultural resources in project area.
California Department of Health Services Radiologic Health Branch	Determination of need for general license	Radioactive materials and waste generated during mining.
Federal		
Bureau of Land Management	Post FLPMA oversight	Oversight of post FLPMA lands within mine site and at New Ivanpah Evaporation Pond
Environmental Protection Agency	Hazardous waste generator identification number	Required of all facilities that generate hazardous waste above certain thresholds
Mine Safety and Health Administration	Mining-related permits	Expansion of open pit and mining activities

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

CEQA Guidelines Section 15125 requires that an EIR include a description of the local and regional environment within the vicinity of the project as it exists before the commencement of the project. Consistent with CEQA requirements, this section describes the existing environment around the Molycorp Mountain Pass Mine and associated facilities that could be affected by the project. Environmental topics identified in this section include both a regional and local setting to the extent that local information is available. The analyses included in this section focus on those aspects of the environment that could be adversely impacted by the proposed project.

3.2 Natural Hazards

The San Bernardino County General Plan defines natural hazards as conditions of potential danger for risk to life and/or property resulting from acts of nature. Four major groups of natural hazards have been identified that have the potential to affect or be affected by the project include:

- Geologic
- Fire
- Flood
- Erosion

The existing conditions at the proposed Mountain Pass Mine expansion area relative to each of these groups of natural hazards are included in this section.

3.2.1 Geology and Geological Hazards

The geology of the Mountain Pass Mine area and the Ivanpah Valley (which includes Ivanpah Dry Lake) is summarized in the following sections. The discussion includes physiography (landforms), geologic setting, faulting, and seismicity (earthquake potential). Mineral resources are discussed in Section 3.3.6, and paleontological resources are addressed in Section 3.3.2.

3.2.1.1 Physiography and Geologic Setting

The Mountain Pass Mine and proposed expansion area are located in the eastern Mojave Desert north of and adjacent to Interstate 15, approximately 15 miles southwest of the California-Nevada state line and 30 miles northeast of Baker, California. The area is in the southwestern part of the Great Basin section of the Basin and Range physiographic province, which is characterized by a series of generally north to south-trending mountain ranges separated by broad, low-relief alluvial basins which often have internal drainage (Peterson 1981).

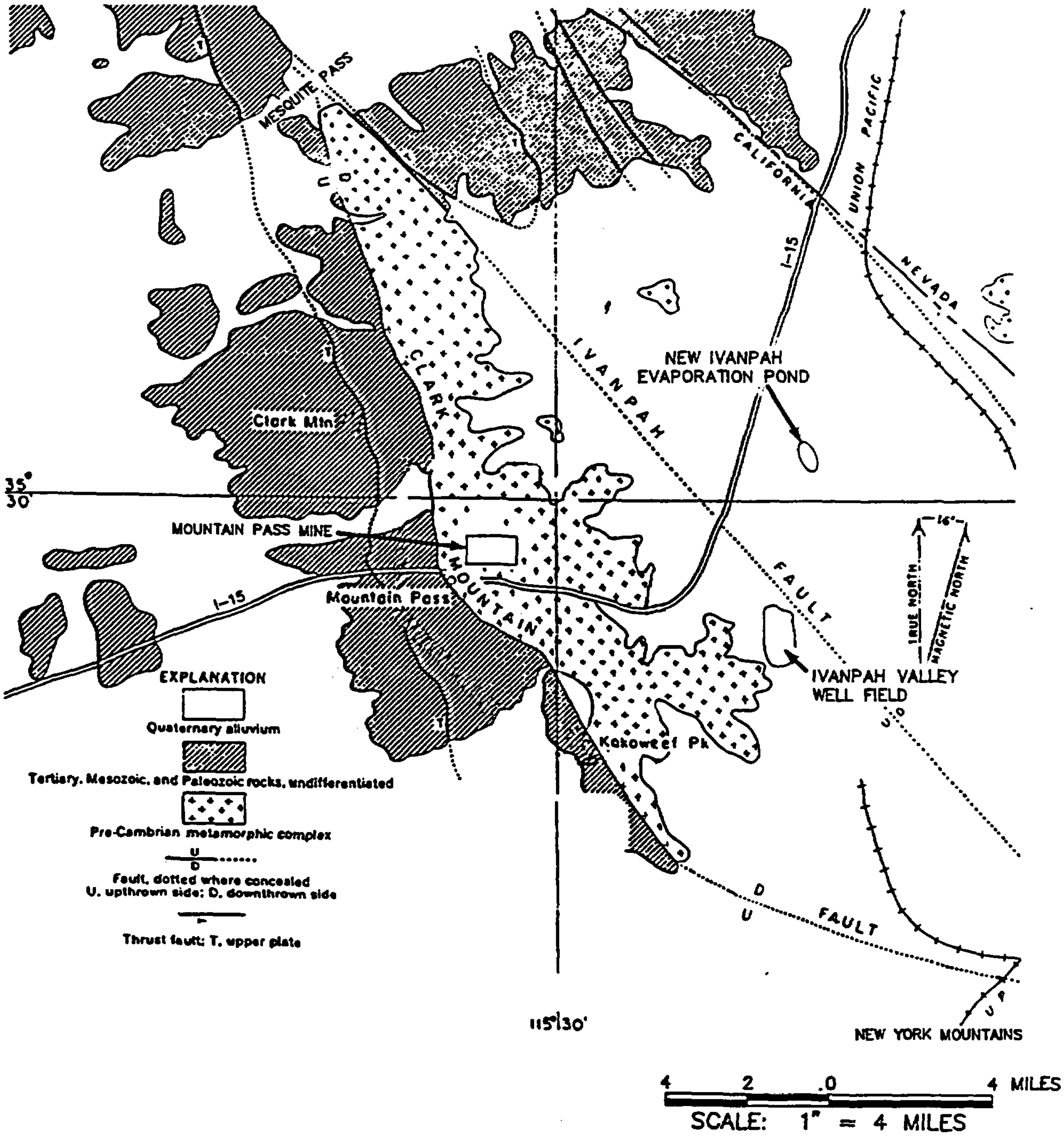
The Mountain Pass Mine occupies the point of highest elevation along Interstate 15 between Barstow, California and Las Vegas, Nevada (Norris and Webb 1990). Elevations onsite range from 4,500 feet to 5,125 feet ASL with most of the site in the 4,600- to 4,900-foot range (Lilburn 1991). The elevation of nearby Clark Mountain is 7,903 feet.

The Mountain Pass Mine is located on a faulted block of Precambrian metamorphic rock at the southern end of the Clark Mountain Range (Figure 3.2-1). The fault block is bounded on the north by the east-west trending North Fault (Evans 1971). The block is bounded on the west by the Clark Mountain Fault (Olson et al. 1954). The boundary of the east end of the block is obscured by the alluvial sediments in the Ivanpah Valley (Figure 3.2-1).

The fault block is a complex assemblage of a variety of metamorphic and igneous rocks. The rock types include gneiss, schist, granite pegmatites, and foliated mafic rocks (Olson et al. 1954). The block is cut by intrusive igneous dikes that are associated with larger intrusive bodies within the rock mass. These intrusive bodies can be up to 6,300 feet long and 1,800 feet wide (Olson et al. 1954). The rocks containing rare-earth bearing minerals are associated with the intrusive igneous rocks. The ore-bearing rocks are carbonatites or carbonate rocks of igneous origin. The carbonatites in the area usually occur as veins less than 6 feet thick, but at the Sulfide Queen Mine a carbonatite mass was reported as being 700 feet maximum width and 2,400 feet long (Olson et al. 1954).

The numerous veins of carbonatite rocks are primarily composed of the mineral calcite and other carbonates. Bastnasite, a fluorocarbonate containing lanthanide elements of the cerium group is the mineral of primary interest. Bastnasite was found at Mountain Pass in April 1949, and subsequent geologic mapping has shown that lanthanide elements deposits occur in a belt about 6 miles long and 1.5 miles wide (Olson et al. 1954).

Ivanpah Valley is situated east and southeast of the mine and is a broad alluvium-filled valley with its lowest area about 2,600 feet ASL. The valley is a closed basin with internal drainage



Source: Hewett, 1956

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FIGURE 3.2-1
REGIONAL GEOLOGY
MOUNTAIN PASS MINE AREA
Molycorp, Inc.
Mountain Pass Mine

DRAWN: M. Scop	DATE: 10/17/94	PROJECT NO.	REV.
FILE NO.	CHK BY: RE	1991-001-850	

and no outlet. Ivanpah Valley contains some of the largest alluvial fans of the eastern Mojave Desert (Hewett 1956). These fans are being built up by drainages that rise in the surrounding high mountains. The unconsolidated deposits in the Ivanpah Valley may be as much as 20,000 feet thick. The strata under Ivanpah Dry Lake, the evaporation pond site, consist of low permeability silty clays (Lilburn 1991).

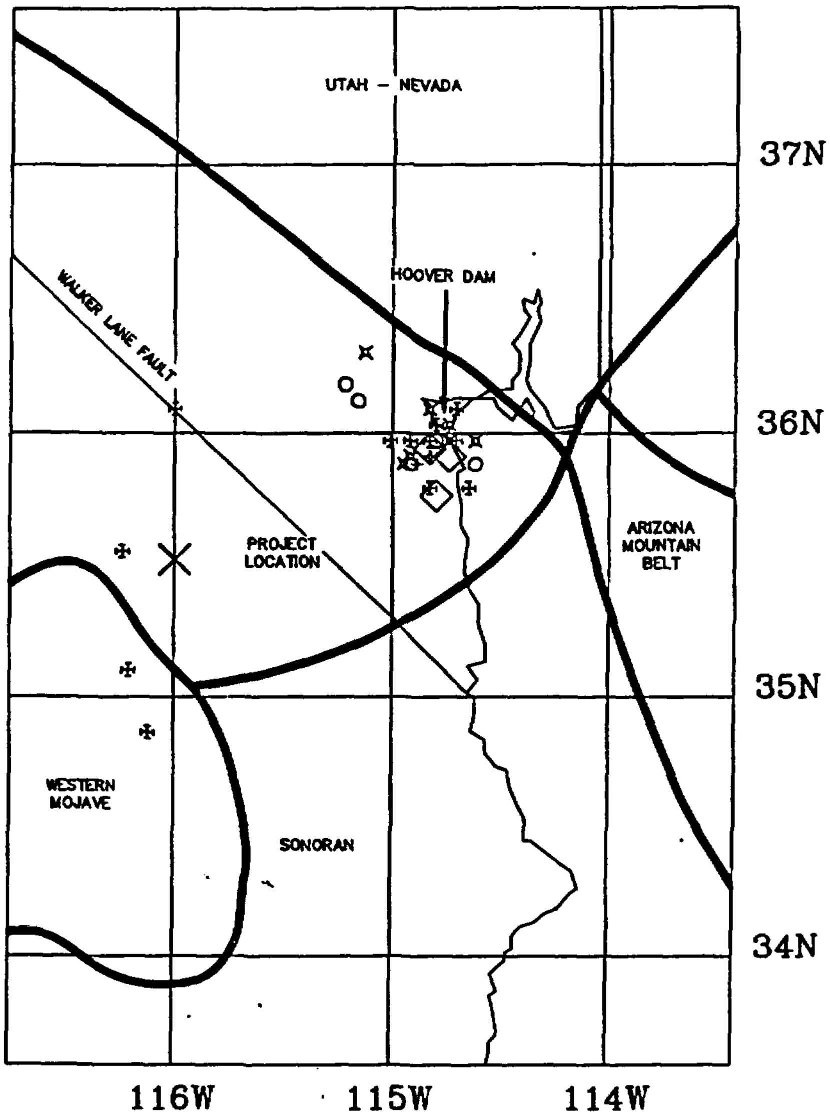
3.2.1.2 Faulting and Seismicity

Faulting

The Mountain Pass Mine area is located near the southern end of the Walker Lane fault region (Howard et al. 1978). The region is an area characterized by normal, oblique, and strike-slip faulting that lies along the southwest Nevada-California border (Figure 3.2-2). Faulting within this region has been active through late Cenozoic time, with Late Quaternary (including Holocene and historic) movement on many of the faults (Howard et al. 1978). Although the Walker Lane fault region is considered highly active (Howard et al. 1978), the project area is not within an Alquist-Priolo Earthquake Fault Zone (Hart 1994 with 1995 supplement), nor have any potentially active faults been identified there (Greensfelder 1974). Most of the seismic activity in the Walker Lane fault region is located in the southern Sierra Nevada mountains, 180 miles northwest of the project area (Real et al. 1978).

Several complex faults are known to exist within or surrounding the Mountain Pass Mine (Figure 3.2-3). The mapped faults are located in uplands where bedrock is exposed. Faults probably underlie thick alluvial deposits south and southwest of the present Molycorp pit, as well as in Ivanpah Valley to the east, but are obscured by the thick alluvial cover.

The Clark Mountain Fault (Figure 3.2-3) was mapped by Olson et al. (1954) as a normal fault. Evans (1971) mapped the Clark Mountain Fault as a thrust fault. Clark Mountain Fault, which trends to the northwest, is 20 miles long. The fault block on which the Mountain Pass Mine is located is on the downthrown side of the thrust. The hanging wall to the west is composed of Paleozoic limestones. The fault is located along the west side of the Clark Mountain Range, and a segment is located along the lower east flank of Mohawk Hill, which is to the west of the project area. Evidence of post-early Tertiary movement exists on the Clark Mountain Fault, as indicated by offsetting of Tertiary andesite dikes (Hewett 1956). Based on its old age (latter part of upper Cretaceous to the Tertiary Eocene) and lack of geological evidence of recent movement, the Clark Mountain Fault is apparently an inactive fault.



U. S. Geological Survey, National Earthquake Information Center
Data taken from the Earthquake Data Base System

MAGNITUDES:

? ○ 1 □ 2 + 3 ¤ 4 ✣ 5 ◇ 6 ✕

Source: Howard et al., 1978
Scale: 1" = 45 miles
Computer graphics by Roger N. Hunter, Geophysicist

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FIGURE 3.2–2
EARTHQUAKE EPICENTERS AND FAULT REGIONS WITHIN A 100 KILOMETER RADIUS OF THE MOUNTAIN PASS MINE
Molycorp, Inc.
Mountain Pass Mine

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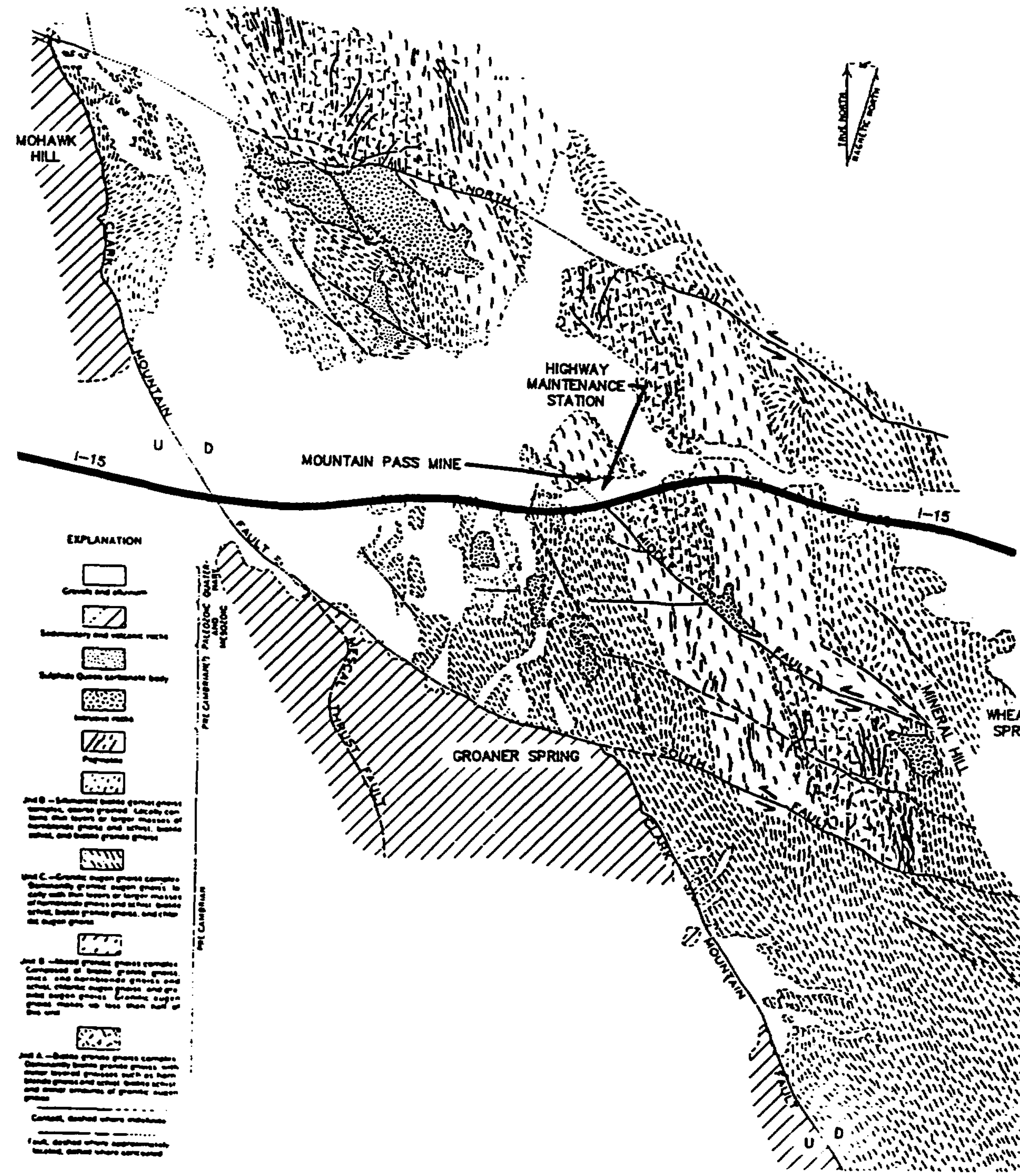
FILE NO.	CHK BY: RE		



Source: Olson et al., 1954

4000 2000 0 4000 FEET

SCALE: 1" = 4000'

NORTH

W E S

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FIGURE 3.2-3

LOCAL GEOLOGY

MOUNTAIN PASS MINE AREA

Molycorp, Inc.

Mountain Pass Mine

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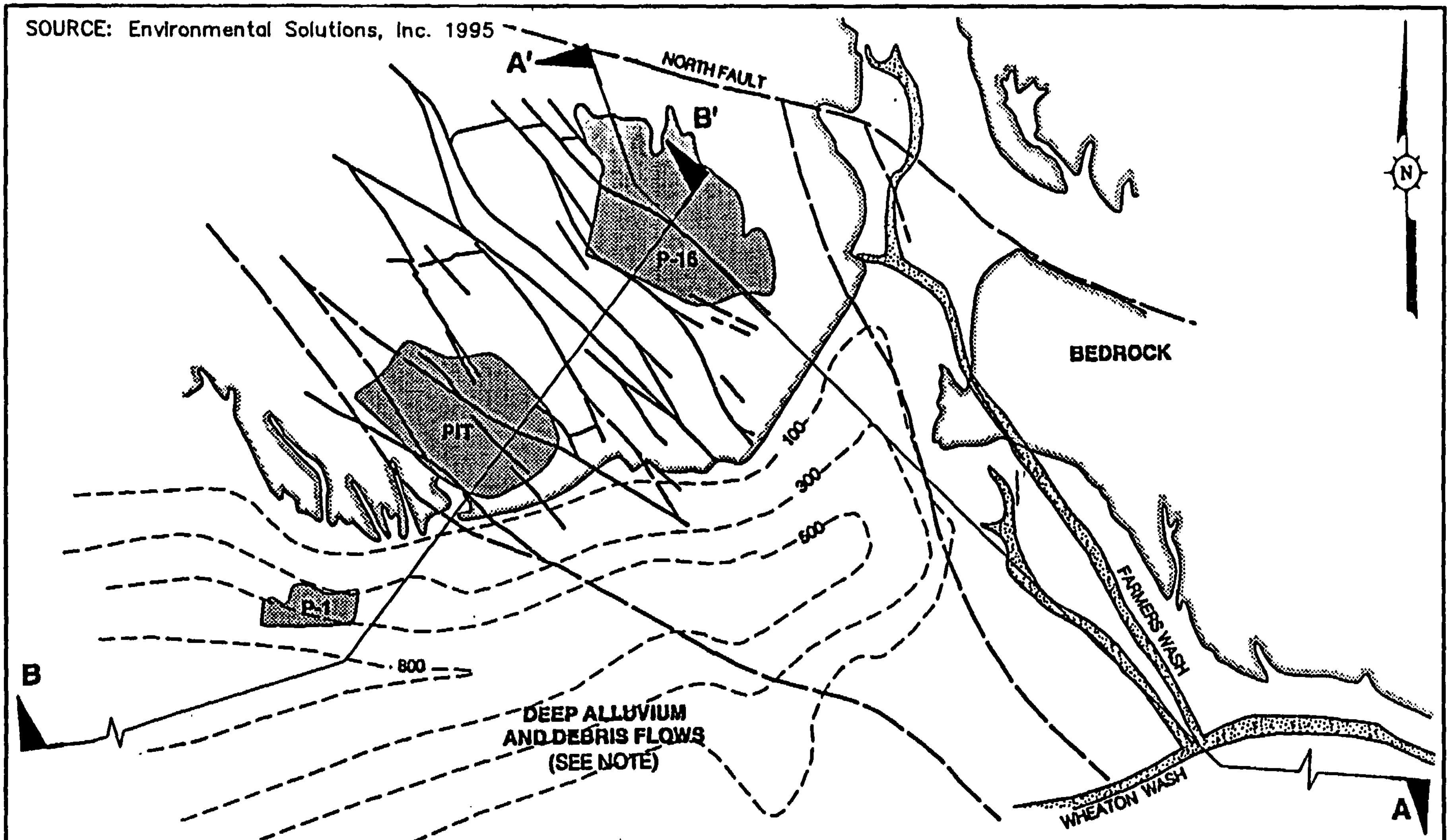
FILE NO.	CHK BY:		

Other faults in the vicinity of the mining operations include: to the north, the transverse left lateral North Fault; and to the southwest, the transverse left lateral South Fault. These faults are reported to dip 65 to 80 degrees to the south-southwest and could have up to one mile of displacement (Lilburn 1994). The North Fault offsets the Clark Mountain Fault by a displacement of about 1,200 feet. The South Fault branches southeastward from a point on the Clark Mountain Fault, southeast of Groaner Spring. The main trend of rare-earth deposits is displaced left-laterally about 6,300 feet by this fault (Olson et al. 1954).

Olson et al. (1954) mapped an additional left lateral fault (Middle fault) trending northwest and dipping 80 degrees southwest to vertical. The Middle fault has been traced from the vicinity of the highway maintenance station southeastward more than two miles to a point just north of the granite body on Mineral Hill (Figure 3.2-3). The southwest block probably has upward movement relative to the northeast side (Olson et al. 1954). The age of these left lateral faults is uncertain (Lilburn 1991).

Because of the alluvial cover south and southwest of the mine pit, little is known about faulting in this area. Several east-west trending faults have been interpreted from a magnetic survey conducted in the area. These faults are interpreted to have both vertical and horizontal movement, and are possibly related to the Clark Mountain thrust (Ellis 1979). Figure 3.2-4 illustrates known or inferred faults at the Mountain Pass Mine Site. In 1994, Geothermal Surveys, Inc. (GSi/water) conducted a detailed geological study of the area around the North Tailings Pond (P-16) to investigate potential faulting in the P-16 area, and, in particular, the characteristics of the North Fault located northeast of P-16. The exposed bedrock around P-16 was mapped, and numerous foliation and jointing attitudes were measured. However, direct evidence of the faults shown by Olson, et al. (1954) was not encountered. Discontinuous syenite dikes and gneissic foliations generally parallel the overall northwest-directed structural fabric (Environmental Solutions 1995).

The Ivanpah Fault is exposed in the bedrock north of the Mountain Pass area in the north end of the Clark Mountains near the Mesquite Pass Road (Figure 3.2-1). The Ivanpah fault is mapped as a normal fault by Hewett (1956). The trace of the fault begins just southeast of the Mesquite Pass road and trends to the southeast for five miles until the fault is covered by the thick alluvium of Ivanpah Valley. The fault has been inferred to extend southeast across the central Ivanpah Valley and join a mapped fault that crosses the New York Mountains near the abandoned town of Vanderbilt (Hewett 1956). However, a 1978 aeromagnetic survey of the area showed no trace of a continuous structure where the Ivanpah Fault is inferred (Anzman 1978). The Ivanpah Fault is not indicated as an active fault by Jennings (1992).



LEGEND

- - - 800- - - DEPTH TO BEDROCK (FEET)

— — —— FAULT (KNOWN OR INFERRED, BASED ON OLSON et. al., 1964, AND CASTOR, 1987)

SHALLOW ALLUVIUM

0 1,500 3,000 FEET
SCALE

NOTE:
CONTOURS SHOWING DEPTH TO BEDROCK INDICATE A HISTORIC CANYON TH[illegible] HAS BEEN FILLED WITH DEBRIS FLOW AND ALLUVIUM.

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FIGURE 3.2-4
FAULTING IN
MOUNTAIN PASS MINE AREA
Molycorp, Inc.
Mountain Pass

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FILE NO.	CHK BY: KE		

Seismicity

A fault that has undergone surface displacement in Holocene time (last 11,000 years) are considered sufficiently active if there is evidence of Holocene surface displacement along one or more of its segments or branches. Faults that have ruptured in the last 11,000 years (Holocene and historic) are considered active and capable of reactivation with return periods of perhaps a few hundred years (Hart 1994, with 1995 supplement).

Historically, the Mountain Pass Mine is in an area of low seismic activity, as evidenced by the lack of epicenters greater than 4.0 magnitude shown on the map compiled by Real et al (1978). A search was conducted by the National Earthquake Information Center (NEIC 1994) for all earthquakes in the historical record with magnitude greater than 4.0 within a 100-kilometer (62-mile) radius of the Mountain Pass Mine area (Figure 3.2-2). Many epicenters within the search radius were located to the east of the project area in the vicinity of Hoover Dam. The largest earthquake recorded within the search area occurred in 1916 and was an estimated magnitude 6.1; the epicenter was located approximately 27 miles west of the present-day mine site.

The strongest historic earthquake in the eastern Mojave Desert region occurred on April 10, 1947, on the Manix Fault about 66 miles west of the site (Real et al. 1978). The earthquake was a magnitude 6.2 event.

Algermissen, et al. (1982) shows the Mountain Pass project area to lie within a seismic source zone in which the maximum credible earthquake (MCE) was estimated to be magnitude 6.1. The probabilistic earthquake acceleration map of the United States shows that the horizontal acceleration from a MCE in the area would result in ground motion of less than 7.5 percent of the acceleration of gravity (0.075 g) with a 90-percent probability of not being exceeded within any given 50-year time span (Algermissen et al. 1990).

Based on the work of Mualchin and Jones (1992), the Pahrump-Stateline Fault, located approximately 11 miles east of the Mountain Pass site at the California-Nevada Border, is the controlling fault for the site in terms of MCE. This fault has been characterized as being last active in the Pleistocene (700,000 to 1,600,000 years ago) (Jennings 1992). A peak acceleration of 0.25 g on rock has been estimated for the Mountain Pass site, assuming a MCE of 7.5 at the fault, although this magnitude cannot be confirmed (Vector Engineering 1995).

3.2.1.3 Landslides

The Mountain Pass Mine project is located in an area of low landslide incidence and susceptibility (Radbruch-Hall, et al 1980). The aridity of the Mojave desert contributes to the lack of landslides in the area (Radbruch and Crowther 1973). The major landslide hazard in the Mojave Desert region may result from strong earthquakes that could cause rockfalls and slumps in the banks of dry washes.

3.2.2 Flood Hazards

The Mountain Pass Mine is not within a San Bernardino County Flood Plain Safety or Dam Inundation Overlay District (San Bernardino County 1992). However, several natural drainage courses are present in the mine area as indicated on the U.S. Geological Survey Mescal Range 7.5-minute quadrangle topographic map (provisional revision, 1983). The drainages in the study area are intermittent and only rarely have flows except during heavy precipitation events (Lilburn 1991).

3.2.3 Fire Hazards

The Mountain Pass Mine is not located within a San Bernardino County Fire Safety Overlay District (San Bernardino County 1992). The project is located in an arid environment with sparse, largely succulent vegetation without a significant herbaceous understory, and as such, lacks a fuel source to support a wildfire. The BLM maintains a response capability for wildland fires on public lands. The closest BLM station is approximately 90 miles south of the mine. In addition, Molycorp maintains a fire protection system as required by the San Bernardino County Fire Warden, who inspects the mining operation at regular intervals. Fire protection and emergency response for structures are discussed in Section 3.5.6.1.

3.2.4 Erosion

Native soils are inherently vulnerable to wind and water erosion. The thin surface crust which exists on most study area soils protects the underlying material from erosion if not disturbed. If disturbed, wind erosion in particular, can occur, especially during the windy periods which occur from November to March (See Section 3.3.3, Air Quality). Water erosion is discussed in Section 3.3.4.1.

A preliminary evaluation indicates up to 50,000 cubic yards of windblown tailings may have been deposited on the east-facing canyon slope adjacent to the southeastern portion of the North Tailings Pond (P-16) (Environmental Solutions 1994b). The windblown deposits are estimated to range from 5 to 10 feet in thickness over an approximate 1-acre area, and from 0 to 5 feet over an approximate 5-acre area. A partial thin veneer is spread over a wide area. Deposits up to 3 feet thick are present in localized areas in the canyon bottom. Analytical results of samples taken from the main dune of the windblown tailings indicate that the windblown material contains elevated levels of strontium (24,000 milligrams per kilogram (mg/kg)), barium (8,100 mg/kg), and lead (1,800 mg/kg) (Environmental Solutions 1994b). Molycorp has submitted a plan for control of the windblown tailings to the RWQCB. At this time, no response has been received from the RWQCB. The plan is designed to first achieve control of the tailings source area within the impoundment, and then address remediation or stabilization of the windblown deposits. The relatively large volume of material and steep topography of the affected area impose significant constraints on potential reclamation/remediation effort for this windblown material. The proposed source control alternative comprises an expanded sprinkler system coupled with wind fences at the southeast perimeter of the North Tailings Pond and on the new (raised) embankment. The proposed remediation of the windblown material is containment by wind fences and revegetation.

3.3 Natural Resources

The San Bernardino County General Plan groups natural resources found in the county into the following seven categories:

- Biological Resources
- Cultural/Paleontological Resources
- Air Quality
- Water
- Open Space/Recreation/Scenic
- Soils/Agriculture
- Minerals

This section presents the existing environment in the proposed project area of each of the identified natural resources.

3.3.1 Biological Resources

3.3.1.1 Vegetation

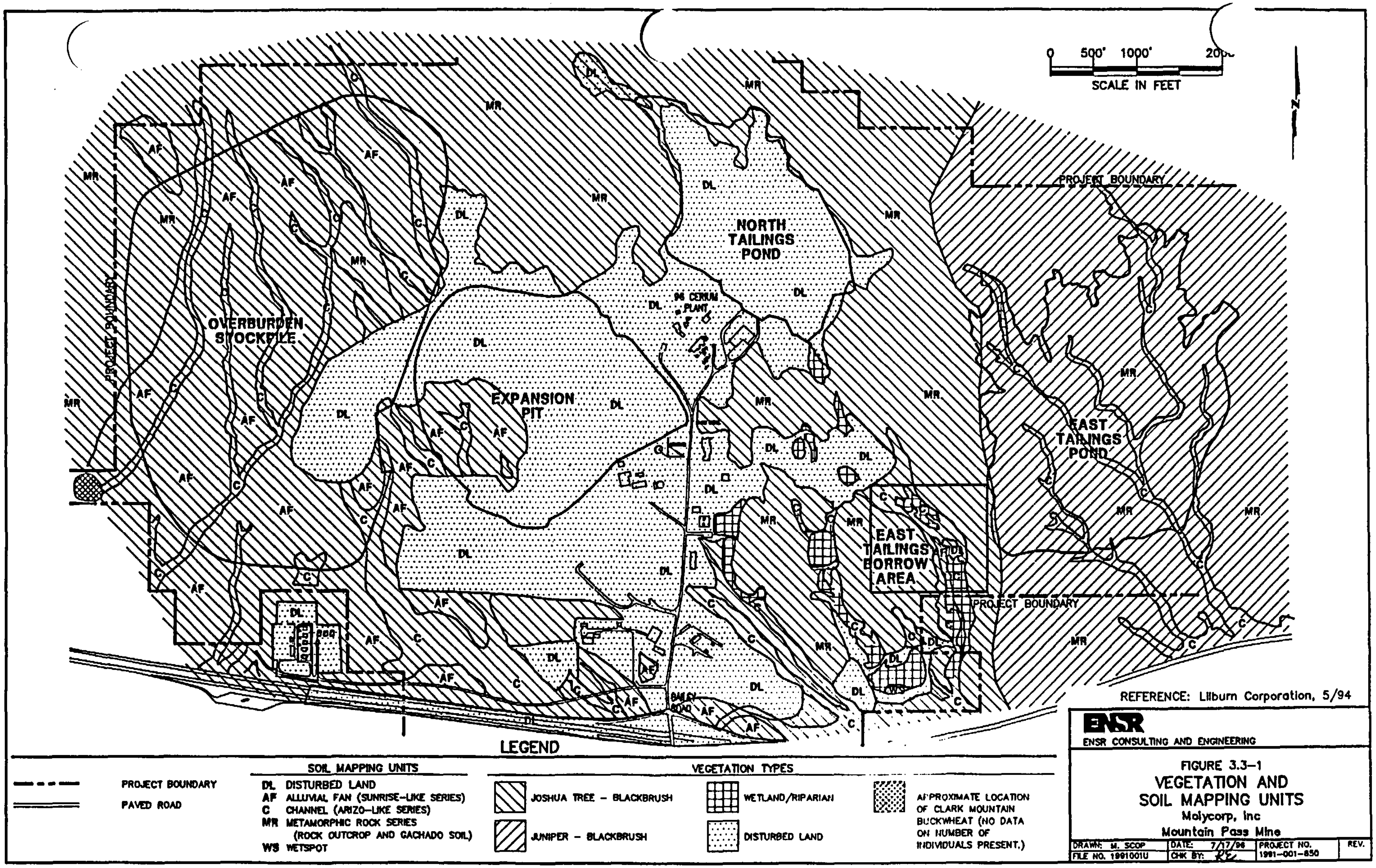
The project area is located in the Mojave Desert province (CNPS 1988). This province is a transitional floristic zone positioned between the colder Great Basin Desert to the north and the warmer Sonoran Desert to the south. Mojave Desert scrub vegetation types include creosote bush scrub at lower elevations and blackbrush scrub and Joshua tree woodland at slightly higher locations (CNPS 1988a).

The project area includes the Mountain Pass Mine site, the Nipton Road Borrow Site, the New Ivanpah Evaporation Pond, and the Shadow Valley Well field. Vegetation present at the mine site consists of a mixture of species, each of which are typically associated with specific vegetation types which include blackbrush scrub, Joshua tree woodland, and juniper woodland (Figure 3.3-1). The intergradation of species commonly associated with these vegetation types has resulted in the formation of two plant communities which include the Joshua tree-blackbrush and Utah juniper-blackbrush communities. Additional plant communities that occur at the mine site include the wetland/riparian community and ruderal community, which occurs on previously disturbed land.

The Joshua tree-blackbrush community occurs in the western portion of the mine site predominantly on alluvial fans and in intermittent drainages (channels), which are generally formed from deposition of transported alluvial material, and are excessively drained and weakly developed. Figure 3.3-1 illustrates these soil units, which are described in Section 3.3.6.1. This plant community is dominated by an overstory consisting of tree and shrub species. Joshua tree (*Yucca brevifolia*) is the only species that occurs in this plant community that attains small tree size stature. Shrub, cacti, and grass species that commonly occur in this community include:

Shrubs

- Mojave yucca (*Yucca schidigera*)
- Banana yucca (*Yucca baccata*)
- Paper-bag bush (*Salazaria mexicana*)
- Anderson thornbush (*Lycium andersonii*)
- Peach-thorn (*Lycium cooperi*)
- Blackbrush (*Coleogyne ramosissima*)
- Winterfat (*Ceratoides lanata*)
- Nevada joint-fir (*Ephedra nevadensis*)
- California buckwheat (*Eriogonum fasciculatum*)
- Hop-sage (*Grayia spinosa*)
- Thamnosma (*Thamnosma montana*)
- Spiny twinberry (*Menodora spinescens*)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SCALE IN FEET
N
PROJECT BOUNDARY
NORTH TAILINGS POND
96 CERIUM PLANT
OVERBURDEN STOCKPILE
EXPANSION PIT
EAST TAILINGS POND
EAST TAILINGS BORROW AREA
BAILEY ROAD
DL
AF
C
MR
WS
REFERENCE: Lilburn Corporation, 5/94
LEGEND
PROJECT BOUNDARY
PAVED ROAD
SOIL MAPPING UNITS
DL DISTURBED LAND
AF ALLUVIAL FAN (SUNRISE-LIKE SERIES)
C CHANNEL (ARIZO-LIKE SERIES)
MR METAMORPHIC ROCK SERIES (ROCK OUTCROP AND GACHADO SOIL)
WS WETSPOT
VEGETATION TYPES
JOSHUA TREE – BLACKBRUSH
JUNIPER – BLACKBRUSH
WETLAND/RIPARIAN
DISTURBED LAND
APPROXIMATE LOCATION OF CLARK MOUNTAIN BUCKWHEAT (NO DATA ON NUMBER OF INDIVIDUALS PRESENT.)
ENSR
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FIGURE 3.3–1
VEGETATION AND SOIL MAPPING UNITS
Molycorp, Inc
Mountain Pass Mine
DRAWN: M. SCOP
DATE: 7/17/96
PROJECT NO. 1991-001-850
REV.
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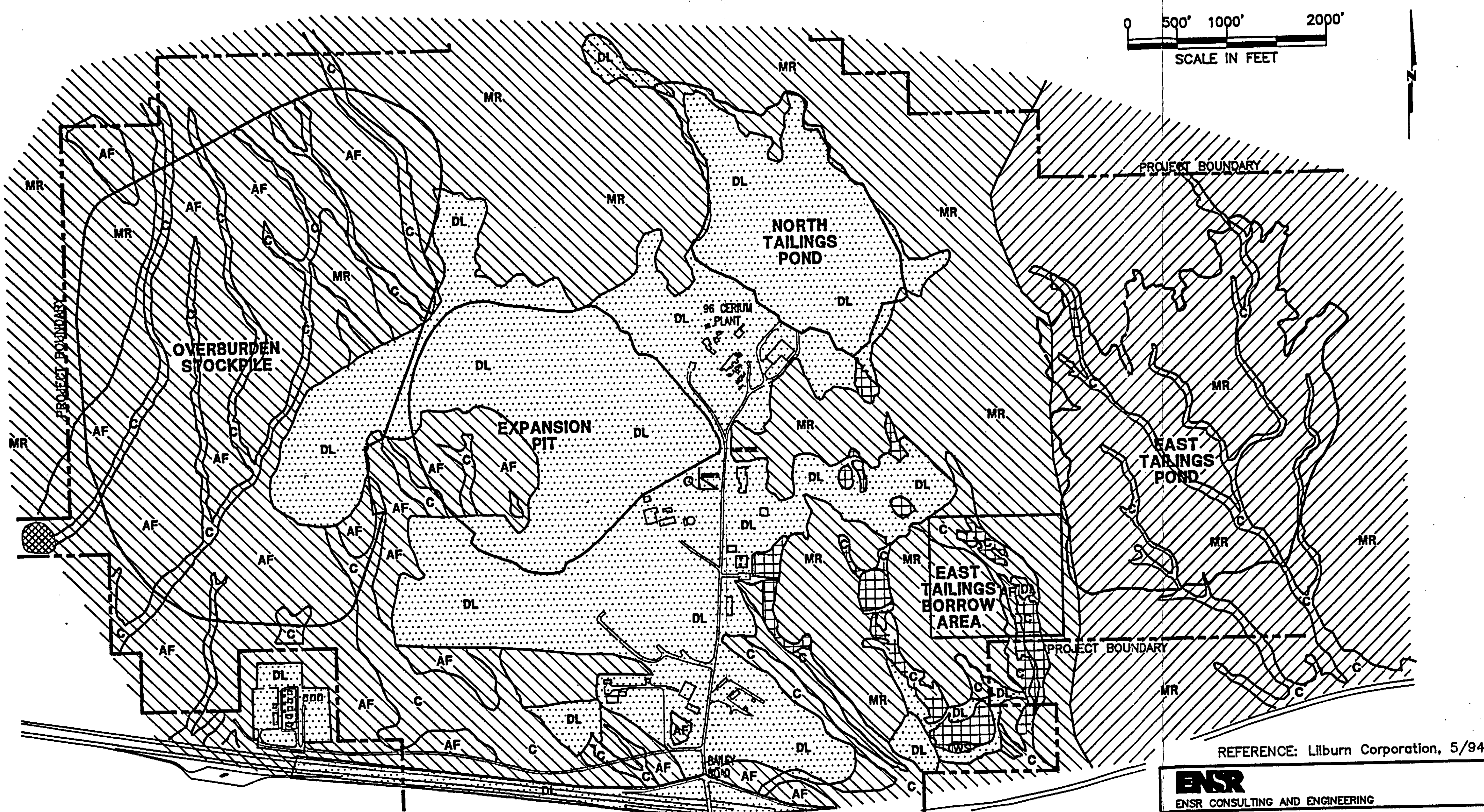

REFERENCE: Lilburn Corporation, 5/94

LEGEND

— — —	PROJECT BOUNDARY
═══	PAVED ROAD

SOIL MAPPING UNITS

- **DL** DISTURBED LAND
- **AF** ALLUVIAL FAN (SUNRISE-LIKE SERIES)
- **C** CHANNEL (ARIZO-LIKE SERIES)
- **MR** METAMORPHIC ROCK SERIES (ROCK OUTCROP AND GACHADO SOIL)
- **WS** WETSPOT

VEGETATION TYPES

- JOSHUA TREE – BLACKBRUSH
- JUNIPER – BLACKBRUSH
- WETLAND/RIPARIAN
- DISTURBED LAND
- APPROXIMATE LOCATION OF CLARK MOUNTAIN BUCKWHEAT (NO DATA ON NUMBER OF INDIVIDUALS PRESENT.)

ENSR
ENSR CONSULTING AND ENGINEERING

FIGURE 3.3–1
VEGETATION AND SOIL MAPPING UNITS
Molycorp, Inc
Mountain Pass Mine

DRAWN: M. SCOP	DATE: 7/17/96	PROJECT NO. 1991-001-850	REV.
FILE NO. 1991001U	CHK BY: RE		

1991-001-850

Cacti

- Beavertail (*Opuntia basilaris*)
- Deer-horn cholla (*Opuntia acanthocarpa*)

Grasses

- Big galleta grass (*Hilaria rigida*)
- Desert stipa (*Stipa speciosa*)

The Utah juniper-blackbrush community occurs in the eastern portion of the mine site and is dominated by an overstory consisting of tree and shrub species which are established on hillsides with shallow to moderately shallow soils. This community is primarily associated with the metamorphic rock mapping unit shown on Figure 3.3-1 and described in Section 3.3.6.1. Utah juniper (*Juniperus osteosperma*) is the only tree species that is present in this community. Shrub species typically associated with Utah juniper include blackbrush and other shrubs that commonly occur in the Joshua tree-blackbrush community.

Fourteen wetland/riparian areas occur in the southeastern portion of the mine site and are located in intermittent drainages which are tributaries to Wheaton Wash. These areas correspond with the wetspots mapping unit shown on Figure 3.3-1 and described in Section 3.3.6.1. These wetland/riparian areas are saline seeps that feed sedimentation ponds that were constructed to retain water that had seeped through the tailings dams as well as water discharged from other existing mine facilities. Molycorp has been ordered by the LRWQCB to eliminate the seepage that is the source for the wetland/riparian areas. The wetland/riparian community has a limited floral diversity and is dominated by an overstory consisting of tamarisk (*Tamarisk chinensis*), an invasive, non-native species. Herbaceous species present in these wetlands include narrow-leaf cattail (*Typha angustifolia*), phacelia species (*Phacelia spp.*), and various other forbs.

The ruderal community occurs in the central portion of the mine site and at the New Ivanpah Evaporation Pond. This plant community corresponds with the disturbed land mapping unit shown on Figure 3.3-1 and described in Section 3.3.6.1. These areas have been subjected to complete or partial removal of soil and vegetation as a result of past mining and construction activities; existing soils and vegetation in other areas have been buried by soil or waste rock stockpiles. Vegetation present in the partially disturbed areas of the mine site includes a mixture of native plant species associated with the Joshua tree-blackbrush community and ruderal (i.e., weedy) species that have invaded these areas. Ruderal species that occur in these areas include New Mexico thistle (*Cirsium neomexicanum*), yellow tansy mustard (*Descurania pinnata*), Russian thistle (*Salsola iberica*), and red-stem filaree (*Erodium cicutarium*) (Lilburn 1991). The New Ivanpah Evaporation Pond is located in a previously disturbed playa area that is typically barren, although some isolated ruderal species may occur.

Vegetation present at the Nipton Road Borrow Site expansion area is associated with the creosote bush-bursage community. This plant community is characterized by a dominant shrub layer and a subdominant herbaceous layer. Shrub, cacti, and other herbaceous species commonly present in this community include:

<u>Shrubs</u>

- Creosote bush (*Larrea tridentata*)
- Burrobush (*Ambrosia dumosa*)
- Cheesebush (*Hymenoclea salsola*)
- Fourwing saltbush (*Atriplex canescens*)

<u>Cacti</u>

- Diamond cholla (*Opuntia ramosissima*)
- Beavertail
- Silver cholla (*Opuntia echinocarpa*)

<u>Other Herbaceous Species</u>

- Red-stem filaree
- Desert mallow (*Sphaeralcea ambigua*)
- Abu mashi (*Schismus arabicus*)

The Shadow Valley well field contains a highly disturbed example of Mojave creosote bush scrub and Joshua tree woodland. The Joshua tree woodland elements are replaced by Mojave creosote bush scrub elements as the water line goes from the Mountain Pass operations west to the Shadow Valley well field. This area has been heavily impacted by cattle ranching activities, and pipeline and buried telephone line right-of-ways. The plant species include:

<u>Shrubs</u>

- Creosote bush (*Larrea tridentata*)
- Burrobush (*Ambrosia dumosa*)

- Joshua tree (*Yucca brevifolia*)
- Mojave yucca (*Y. schidigera*)
- Banana yucca (*Y. baccata*)
- Nevada joint fir (*Ephedra nevadensis*)
- Calico cactus (*Echinocereus engelmannii*)
- Cheesebush (*Hymenoclea salsola*)
- Winter fat (*Ceratoides lanata*)
- Catclaw (*Acacia greggii*)
- Turpentine-broom (*Thamnosma montana*)
- Little-leaved ratany (*Krameria parvifolia*)
- Desert mallow (*Sphaeralcea ambigua*)
- Wishbone plant (*Mirabilis bigelovii*)
- Giant four-o'clock (*M. froebellii*)
- Palmer's beard-tongue (*Penstemon palmeri*),
- Bladder-sage (*Salazaria mexicana*)
- Box-thorn (*Lycium andersonii*)
- Peach thorn (*L. cooperi*)

<u>Cacti</u>

- LeConte's barrel cactus (*Ferocactus acanthodes* var. *lecontei*)
- Golden cholla (*Opuntia echinocarpa*)
- Beavertail cactus (*O. basilaris*)

<u>Other Herbaceous Species</u>

- Big galleta grass (*Pleuraphis rigida*)
- Galleta (*Pleuraphis jamesii*)
- Indian rice grass (*Achnatherum hymedoides*)

<u>Special-Status Plant Species</u>

Thirty-four special-status plant species have been identified by the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game-Natural Diversity Data Base (CNDDB) (CNDDB 1994; CNDDB 1991; USFWS 1992) as occurring in the project vicinity. These species may therefore potentially occur in the project area (Table 3.3-1).

TABLE 3.3-1

Special-Status Plant Species That Occur or Potentially Occur Within the Project Area

Common Name	Scientific Name	Federal Status (1)	CNPS Status (2)	Potential for Occurrence (3)
Clark Mountain agave	*Agave utahensis* var. *nevadensis*	3C	4	U
Small-flowered androstephium	*Androstephium breviflorum*	--	2	U
White bear poppy	*Arctomecon merriamii*	3C	2	U
Cima milkvetch	*Astragalus cimae* var. *cimae*	3C	1B	U
Mat grama grass	*Bouteloua simplex*	--	2	U
Red grama grass	*Bouteloua trifida*	--	2	U
Alkali mariposa lily	*Calochortus striatus*	C2	1B	U
Booth's evening-primrose	*Camissonia boothii* ssp. *boothii*	--	4	U
Scaly cloak fern	*Cheilanthes cochisensis*	--	2	U
Cloak fern	*Cheilanthes limitanea* var. *limitanea*	--	2	U
Wooton's lace fern	*Cheilanthes wootonii*	--	2	U
Desert bird's beak	*Cordylanthus eremicus* ssp. *eremicus*	C2	4	U
Purple bird's beak	*Cordylanthus parviflorus*	--	2	U
New York Mountains cryptantha	*Cryptantha tumulosa*	3C	4	U
Gilman's cymopterus	*Cymopterus gilmanii*	--	2	U
Nine-awned pappus grass	*Enneapogon desvauxii*	--	2	U
Narrow-leaved yerba santa	*Eriodictyon angustifolium*	--	4	U
Clark Mountain buckwheat	*Eriogonum heermannii* var. *floccosum*	3C	4	P
Juniper buckwheat	*Eriogonum umbellatum* var. *juniporinum*	--	2	U
Hairy erioneuron	*Erioneuron pilosum*	--	2	U
Viviparous foxtail cactus	*Escobaria vivipara* var. *rosea*	3C	1B	U

TABLE 3.3-1 (Cont'd)

Special-Status Plant Species That Occur or Potentially Occur Within the Project Area

Common Name	Scientific Name	Federal Status (1)	CNPS Status (2)	Potential for Occurrence (3)
Clark Mountain spurge	*Euphorbia exstipulata* var. *exstipulata*	–	2	U
Yerba desierto	*Fendlerella utahensis*	–	4	U
Munz's bedstraw	*Galium munzii* ssp. *munzii*	–	4	U
Pungent glossopetalon	*Glossopetalon pungens*	C2	1B	U
Jaeger's ivesia	*Ivesia jaegeri*	–	4	U
Rice grass	*Oryzopsis micrantha*	–	2	U
Cliff brake	*Pellaea truncata*	–	2	U
Western polypody	*Polypodium hesperium*	–	2	U
Abert's sanvitalia	*Sanvitalia aberti*	–	2	U
Mojave spike-moss	*Selaginella leucobryoides*	–	4	U
Rusby's desert mallow	*Sphaeralcea rusbyi* ssp. *eremicola*	C2	1B	U
Mormon needle grass	*Stipa arida*	–	2	U
Plummer's woodsia	*Woodsia plummerae*	–	2	U

(1) Federal:
C2= Federal candidate species - category 2: a species that may be listed as federally threatened or endangered, but conclusive biological data to support this listing are not currently available.
3C= former Federal candidate - category 3C: a species that was previously considered a federal candidate but additional information indicates that the species is too widespread or is not threatened at the present time.
(2) California Native Plant Society (CNPS):
1B= Plants rare, threatened, or endangered in California and elsewhere.
2= Plants rare, threatened, or endangered in California, but more common elsewhere.
4= Plants of limited distribution-a watch list.
(3) P= Present in project area.
U= Unlikely to occur, based on known conditions or habitats.

Surveys have been conducted for 33 of these special-status species within the project area by the Lilburn Corporation in May 1991 and May 1992, based on information available from the CNDDB in 1991. The results of the 1991 survey indicated that one population of Clark

Mountain buckwheat occurred in the extreme western portion of the mine site (Figure 3.3-1) (Lilburn 1991). However, this population does not occur in the proposed mine expansion areas. Additional populations of special-status species were not observed in the project area during the May 1991 and May 1992 surveys.

A survey was not conducted for pungent glossopetalon (*Glossopetalon pungens*) since this species only occurs in Forsellesia Canyon (approximately 4.9 air miles from Mountain Pass) on Clark Mountain between 5,500 and 6,500 feet. This site is characterized by limestone cliffs with pinyon-juniper and scattered white fir (Munz 1974 and CNDDB 1995). Potential habitat for this species does not occur in the project area since the appropriate geologic substrate, associated vegetation, and elevation are not present within the project boundaries.

Gilman's cymopterus is ranked by the CNPS as a List 2 species (CNDDB 1994). This species occurs on limestone and gypsum slopes at 3,000 to 6,000 feet. Vegetation typically associated with this species includes blackbrush, yucca, saltbush, and other species commonly associated with Mojavean desert scrub. One known population occurs approximately 1.1 miles northwest of the Mine site (CNDDB 1994). Favorable habitat for this plant is only located on the western edge of the site, and this area has been surveyed a number of times with no plants found.

3.3.1.2 Wildlife

The Mountain Pass Mine project area is located southeast of the Clark Mountain Range, immediately north of the Mescal Range. The Mojave National Preserve is located to the north, west, and south of the mine (see Figure 3.3-2).

The BLM designated a portion of the Clark Mountain Range as an Area of Critical Environmental Concern (ACEC), based on the unique natural resource values associated with this area. Clark Mountain ACEC extends from about 1.5 miles northwest of the mine site north approximately 7 miles to Kearny Pass. This mountain range contains some of the most diverse and unique wildlife communities in the California desert (BLM 1986).

The diversity of wildlife species inhabiting the project area is unique for the Mojave Desert. This diversity is predominantly attributed to the site elevation, which experiences higher

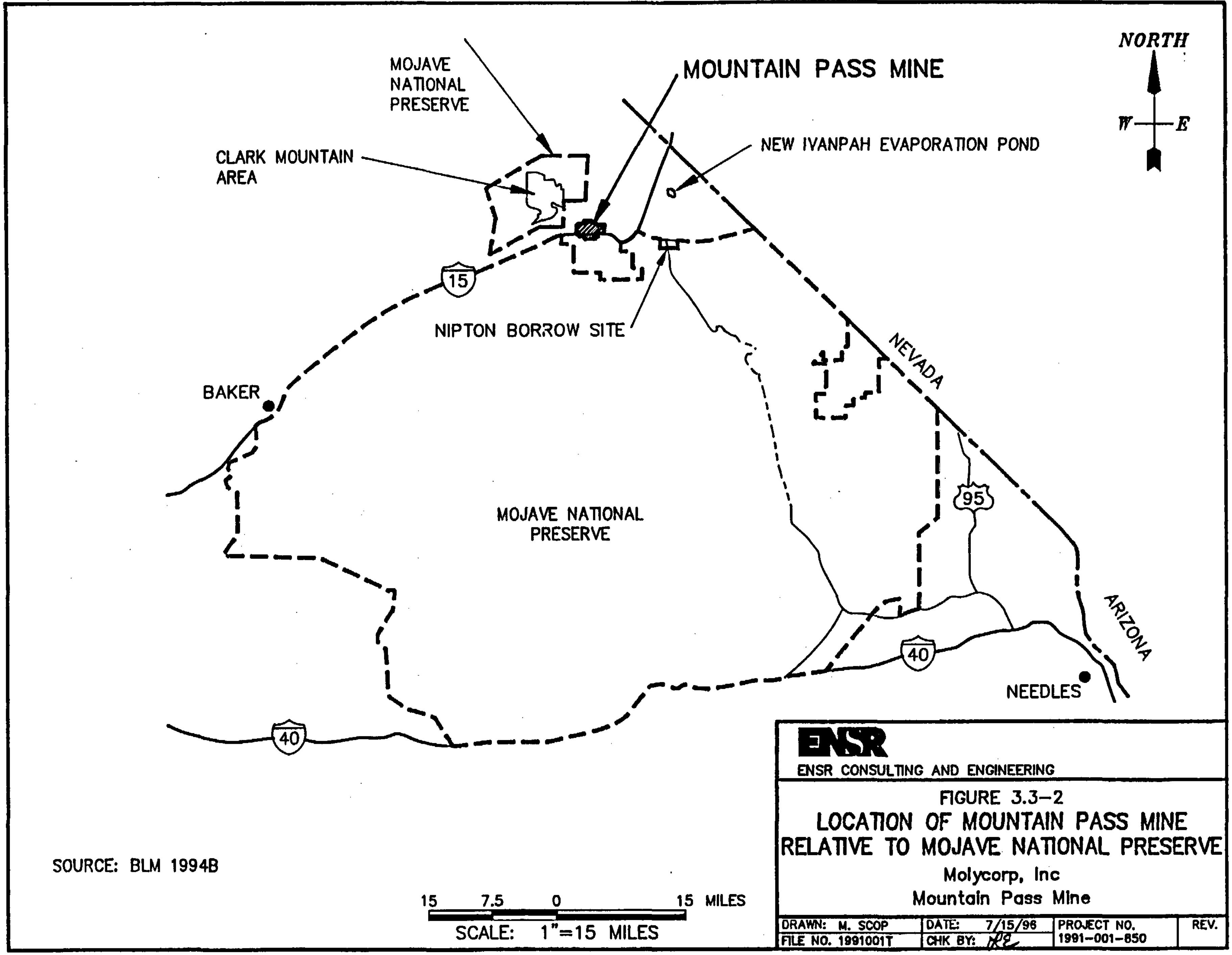

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FIGURE 3.3–2
LOCATION OF MOUNTAIN PASS MINE RELATIVE TO MOJAVE NATIONAL PRESERVE

Molycorp, Inc
Mountain Pass Mine

DRAWN: M. SCOP	DATE: 7/15/96	PROJECT NO. 1991-001-850	REV.
FILE NO. 1991001T	CHK BY: [illegible]		

precipitation and colder temperatures, and the distinctive habitats within the Clark Mountain ACEC and surrounding areas. Plant communities denote habitat types, which typically determine what wildlife species inhabit an area, with some species using a number of habitats to fulfill basic requirements, whereas other species are largely restricted to a single habitat type. The wildlife species that may occur within the project area are typical of those occupying the Joshua tree-blackbrush and Utah juniper-blackbrush communities. Wildlife resources found near the Nipton Road Borrow Site and the New Ivanpah Evaporation Pond are limited in comparison with resources associated with the Clark Mountains. Species occurring in these areas would be representative of the lower elevation, Mojave creosote bush-scrub communities and desert playas.

Surface water resources within the immediate project area are limited to intermittent drainages and the existing artificial water bodies of the mine site. No natural, perennial water sources occur on or adjacent to the project area. Based on available information, open water associated with the existing North Tailings Pond, the office lagoon, New Ivanpah Evaporation Pond, and onsite product storage ponds may be used by both resident and migratory bird species. Other species' use of these resources is limited due to access limitations (e.g., steep embankments) or ongoing mine activities.

A total of 4.8 acres of habitat classified as wetland/riparian occur within the mine site. Since available water is the limiting factor for population densities in the project area, riparian or wetland habitat typically supports a higher population diversity than any other habitat type occurring in the region. However, these riparian areas are dominated by tamarisk as the major plant species. Tamarisk is an exotic invader species that will provide cover for certain wildlife species, but is considered as low wildlife habitat value plant. Additionally, these wetland/riparian areas have been created by seepage onsite. The LRWQCB has ordered Molycorp to eliminate the seepage that is the source for the wetland/riparian areas.

Section 3.3.4.1 identifies naturally-occurring seeps and springs that occur around the mine area. The value of these water resources depends on the extent of available water to wildlife and the associated riparian vegetation. Seeps that are limited to wet soils with some vegetation may provide only cover or forage for area wildlife whereas springs that contain open water and emergent vegetation would be critical to those wildlife species dependent on them.

As discussed in Section 3.3.4.1, a number of naturally occurring seeps and springs were identified on the USGS topographical maps in the vicinity of the mine area. A variety of wildlife resources depend on these water resources, depending on the extent of available water and associated riparian vegetation. Of the three offsite springs (i.e., Hardrock Queen, Groaner, and China) that occur along the north-facing slope of the Mescal Range south of the mine area, it appears that Groaner Spring contains water year-round and has been developed for livestock use. Wheaton Spring, located 2.75 miles east of the mine, also provides year-round water (in most years) for both livestock and wildlife and is known to be frequented by wild burros and bighorn sheep. Within 0.5 mile of Wheaton Spring, two unnamed springs contain surface water through most years and are both undeveloped for either livestock or wildlife use. Burro Springs is located 1.75 miles north of the mine. This source contains water through a majority of the year, but has been trampled and severely damaged by wild burros (Yumiko 1995). Other seeps and springs in the area include Ivanpah, Willow, Whiskey, and Pachalka, but many of these are located over 4 miles from the mine or have been degraded by livestock and wild burro use.

Artificial water sources for wildlife use have been installed in the nearby Clark Mountains by the California Department of Fish and Game (CDFG). Two guzzlers contain water year-round (Lapp 1995), which provides important drinking water for a variety of animals that occupy the area north of the mine.

Reptile Species

General amphibians and reptiles reported for the mine site include, but are not limited to, the red-spotted toad, zebra-tailed lizard, long-nosed leopard lizard, desert spiny lizard, side-blotched lizard, Great Basin whiptail, red racer, desert night snake, Mojave rattlesnake, and desert tortoise (Lilburn 1993; BLM 1992). Additional information on the desert tortoise is presented below in the discussion on Special-Status Wildlife Species. Because of the lack of perennial water bodies, no fisheries occur on or adjacent to the project area.

Bird Species

Bird species are numerous and diverse throughout the varied habitat types of the Clark Mountains located to the north of the project area. Concentrations of species in the Clark Mountain area are most apparent during migration periods and the breeding season. Bird species recorded in the vicinity of the mine site include the cactus wren, scrub jay, Gambel's quail, common raven, red-tailed hawk, mourning dove, Say's phoebe, western kingbird, common raven, phainopepla, loggerhead shrike, black-chinned sparrow, and golden eagle (Lilburn 1993; BLM 1992). Species diversity increases in the Clark Mountains and within the surrounding valleys, which provide a variety of suitable nesting and foraging habitats for a number of bird species (BLM 1986). Bird use of the project area would be typically limited to those species associated with the Joshua tree-blackbrush, Utah juniper-blackbrush, and Mojave creosote bush-scrub communities.

BLM conducted a raptor survey in 1977 to record raptor breeding in and around the project area. No raptor nests were observed within the mine site during those surveys. An inactive golden eagle nest and inactive red-tailed hawk nest were recorded approximately 1.4 and 1.2 miles south of the mine site, respectively. Both nest sites occurred south of Interstate 15 from the mine site. The potential for golden eagle occurrence is discussed further under Special-Status Wildlife Species. The majority of nests observed surrounding the project area during 1977 surveys were stick nests associated with cliffs, rock outcrops, power line structures, and joshua trees.

Mammal Species

Mammals potentially occupying the project area include the desert kangaroo rat, western pipistrelle, black-tailed jackrabbit, desert cottontail, white-tailed antelope squirrel, desert woodrat, coyote, kit fox, California ground squirrel, badger, an occasional bobcat, mule deer, and Nelson's bighorn sheep, although the bighorn sheep have never been sighted within the project area (Lilburn 1993; BLM 1986 and 1992).

No existing shafts, adits, or other underground workings have been identified as potentially supporting resident bat species (i.e., hibernacula, nursery colonies, bachelor roosts) (Yumiko 1994). No big game concentration areas or seasonal ranges occur in or adjacent to the mine site, Nipton Road Borrow Site, or the New Ivanpah Evaporation Pond (Pauli 1994). Mule deer sporadically occur in the project area, especially south of Interstate 15, and bighorn sheep are found throughout the Clark Mountains and adjacent ranges. A bighorn sheep lambing area is located in a steep canyon near Pachalka Spring, approximately 1 mile east of the Molycorp property. These sheep are part of the Clark Mountain population, consisting of 125 to 150 animals (Pauli 1996). However, none of the proposed project areas intersect with known big game migration corridors.

Special-Status Wildlife Species

A number of special-status wildlife species are known to occur within the Clark Mountain ACEC; however, the number of these protected species decreases near the project area due to different habitat types (for example, elevation) and increased activity and disturbance (for example, mine site, Interstate 15, Nipton Road). Special-status species are defined as wildlife species federally listed as threatened by the USFWS; wildlife species formally identified as sensitive by the BLM; and species listed as endangered or of special concern by the CDFG. The listed species are protected under the federal Endangered Species Acts of 1973, as amended, and the California Endangered Species Act of 1970 (amended 1984). The USFWS revised the federal candidate species lists, omitting the category 2 listing and developing a "candidate" list only. This Notice of Review was published in the Federal Register on February 28, 1996. The BLM subsequently developed interim guidelines for the protection and conservation of the category 1 and category 2 species that are not currently included on the USFWS' new candidate list. These species are now considered BLM sensitive species, as depicted on Table 3.3-2 for the Arizona toad.

Relatively few sightings of federally or state-protected wildlife species have been recorded near the mine site or its ancillary facilities. Occurrence data for all special-status wildlife species were requested from the appropriate state and federal agencies for both historical and current resource information. Special-status wildlife species that have been identified by the USFWS, BLM, and the CNDDB as potentially occurring in the project area are listed in Table 3.3-2.

Amphibians and Reptiles

- **Desert Tortoise**

The desert tortoise (*Gopherus agassizii*) is both federally and state-listed as threatened. A number of biological surveys have been conducted in the project area, documenting tortoise habitat and tortoises onsite (Lilburn 1993 and 1996; BLM 1980 and 1986). Although desert tortoises have been found at elevations as high as 7,300 feet, they infrequently occur above 3,280 feet (Luckenbach 1982). The mine site is between 4,600 and 5,125 feet in elevation. The land associated with the project was previously unclassified for desert tortoise habitat; however, due to tortoise presence, the BLM has classified the area as Category III habitat (BLM 1992). It appears that individuals may have moved into the project area from the west, as habitat was modified and the area became more open (Lilburn 1993).

The BLM manages most desert tortoise habitat in the Mojave region and issued a habitat management plan for conservation throughout the tortoise range in the United States (Spang et al. 1988). The plan categorizes tortoise habitat according to four criteria: 1) habitat importance in maintaining viable populations, 2) resolvability of conflicts, 3) tortoise density, and 4) population status. The BLM applies different management levels that are consistent with Category goals. The BLM is committed to maintaining viable tortoise populations in Category I and Category II habitats. Category III habitat indicates that the area is of lower value in sustaining viable populations of tortoises. Therefore, lower habitat management planning may be applied for tortoises in this area (USFWS 1994).

TABLE 3.3-2

Special-Status Wildlife Species Potentially Occurring Within the Project Area

Common Name	Scientific Name	Federal Status[1]	State Status[2]	Potential for Occurrence[3]
Desert tortoise	*Gopherus agassizii*	T	T	P
Arizona toad	*Bufo microscaphus microscaphus*	S[4]		N
Banded gila monster	*Heloderma suspectum cinctum*		CSC	U
Golden eagle	*Aquila chrysaetos*	S		U
Cooper's hawk	*Accipiter cooperi*		CSC	N
Sharp-shinned hawk	*Accipiter striatus*		CSC	N
Prairie falcon	*Falco mexicanus*		CSC	N
Northern harrier	*Circus cyaneus*		CSC	U
Long-eared owl	*Asio otus*		CSC	N
Burrowing owl	*Athene cunicularia*		CSC	U
Mearn's gilded flicker	*Colaptes chrysoides*		E	N
Bendire's thrasher	*Toxostoma bendirei*		CSC	L
Crissal thrasher	*T. dorsale*		CSC	U
Gray vireo	*Vireo vicinior*		CSC	U
Virginia's warbler	*Vermivora virginiae*		CSC	N
Hepatic tanager	*Piranga flava*		CSC	N
Summer tanager	*P. rubra*		CSC	N
California gray-headed junco	*Junco hyemalis caniceps*		CSC	N
American badger	*Taxidea taxus*		CSC	L
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	S	HP	U

Sources: CNDDB 1994; Yumiko 1994; BLM 1992; Lilburn 1992.

[1] Federal: T = Federally listed as threatened; a species that is likely to become endangered within the foreseeable future through all or a significant portion of its range.
S = BLM sensitive species.

[2] State: E = State listed as endangered: a species that is in danger of extinction throughout all or a significant portion of its range within the state.
CSC = *The CDFG Species of Special Concern.*
HP = Hunting allowed by permit only for the Clark-Kingston-Mesquite meta population.

[3] Occurrence Potential: P = Present in Project Area.
L = Likely to occur in Project Area, within the appropriate habitat types.
U = Unlikely to occur, based on known conditions or habitats.
N = No appropriate habitat types occur within the Project Area.

[4] Previously a federal candidate-category 2 species.

The desert tortoises that occur in the mine area are often active in late summer and early fall. Because the region receives both winter and summer precipitation, two distinct annual floras or plant communities support the local tortoise population. These desert tortoises inhabit a variety of vegetation types and feed on both summer and winter annuals, cacti, and herbaceous perennials. They have been found to often den singly in caliche caves, bajadas, and dry washes (USFWS 1994).

The most recent desert tortoise monitoring and clearance survey for the Mountain Pass Mine was conducted in October and November 1995 (Lilburn 1996a) during the construction of a tortoise-proof fence around Molycorp's western overburden stockpile expansion area. The undisturbed portion of the approximately 90-acre overburden stockpile expansion area is located within a Joshua tree woodland, with an understory of blackbush scrub. Dominant plant species include the Joshua tree, Mojave yucca, fleshy-fruited yucca, and blackbush (Lilburn 1996a).

During the monitoring and clearance survey, the cooler fall temperatures precluded desert tortoise activity. Desert tortoise sign was recorded, but only one live desert tortoise was observed during site monitoring hibernating in a caliche den located directly south of the project boundary. This individual remained in its den throughout the survey period, and no disturbance of the tortoise or its burrow occurred during project activities. This tortoise had been observed previously during the tortoise surveys performed in the western portion of the Molycorp site (Lilburn 1990, 1991, and 1992). The only other tortoise sign observed during these surveys included a small number of tortoise scat located in the center of the proposed overburden stockpile expansion area. A few unoccupied caliche dens also were found in test trenches (Lilburn 1996a).

The BLM prepared a Biological Assessment that addresses the desert tortoise and submitted it to the USFWS for their review and comment. Analysis of potential effects to this federally listed species was in compliance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended. The USFWS subsequently prepared a Biological Opinion on the mine expansion project and submitted the Opinion to the BLM on July 1, 1992, stating that the proposed project was "not likely to jeopardize the continued existence of the desert tortoise...and no critical habitat would be affected." The Opinion delineated specific mitigation measures, identified the incidental take number, presented reasonable and prudent measures, and established the project terms and conditions relative to the proposed project. This process is discussed further in Section 4.3.1.2.

- **Arizona Toad**

The Arizona toad (*Bufo microscaphus microscaphus*) is currently a BLM sensitive species, as discussed above. The habitat of this species is washes, streams, and arroyos in semiarid parts of the Southwest U.S. (largely in drainage along the Colorado River). This species is unlikely to occur within the project area, based on habitat availability (Yumiko 1994).

- **Banded Gila Monster**

The banded gila monster (*Heloderma suspectum cinctum*) is a CDFG Species of Special Concern. The banded gila monster has been documented in the mountain ranges of the eastern Mojave Desert; however, the potential for this species to occur on or near the project area is anticipated to be minimal (Yumiko 1994). This species is extremely rare, and only four localities in southern California have verified records of the species. Appropriate habitat exists in the eastern area of the mine expansion but no sightings have been recorded (BLM 1986; Lilburn 1993).

Raptors

Special-status raptor species that have been listed as potentially occurring in the project area include the golden eagle (*Aquila chrysaetos*), Cooper's hawk (*Accipiter cooperi*), sharp-shinned hawk (*A. striatus*), prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), long-eared owl (*Asio otus*), and burrowing owl (*Athene cunicularia*). The golden eagle is listed as a BLM sensitive species; the other species are considered California Species of Special Concern. All of these birds are protected under the Migratory Treaty Act.

A number of golden eagle nests have been recorded for the Clark Mountain area; however, the closest active nest site recorded during the 1977 BLM surveys occurred approximately 3.8 miles from the mine site. Golden eagles may occasionally forage in the project area. The Cooper's hawk, sharp-shinned hawk, and long-eared owl likely breed in the Clark Mountains, but the appropriate habitat for these species does not occur in the project area. Similarly, the prairie falcon and northern harrier may move through the project area during migration or foraging activities, but neither species would be anticipated to nest in the close vicinity, based on habitat types associated with the mine site and the ancillary facilities. The burrowing owl occupies existing underground burrows during nesting and may occur within the project area. However, this species is uncommon in the Mojave Desert.

A raptor nest survey was performed on the undisturbed portions of the western overburden stockpile expansion area on October 25-26 and on November 8-10 and 14-16, 1995 (Lilburn

1996b). The survey was conducted to determine if raptor nests were currently present on the site. The expansion area will be located west and south of the existing overburden stockpile in the western portion of the mine site, encompassing the Joshua tree woodland community. Potential nest sites (both above ground and potential burrowing owl dens) were investigated. There was no evidence of nesting raptors using the site during the breeding season. However, the Cooper's hawk, red-tailed hawk, and merlin were observed utilizing the site for foraging activities during this period. Although no historic nesting activity was documented on the mine site, breeding individuals may move into the area, depending on population levels and habitat availability.

Songbirds

A number of special-status passerine (or songbird) species were listed as potentially occurring in the project area. The Northern gilded flicker (*Colaptes auratus chrysoides*) is state-listed as endangered. This species typically nests in saguaro cactus and cottonwood/willow associations. Based on these habitat requirements, this flicker would not occur within the specific project area. The remaining seven passerine species listed on the CNDDB as potentially occurring in the project area are all California Species of Special Concern. These species include the Bendire's thrasher (*Toxostoma bendirei*), crissal thrasher (*T. dorsale*), gray vireo (*Vireo vicinior*), Virginia's warbler (*Vermivora virginiae*), hepatic tanager (*Piranga flava*), summer tanager (*P. rubra*), and California gray-headed junco (*Junco hyemalis caniceps*). The Bendire's thrasher breeds in Joshua tree habitats, nesting in cholla, yucca, and small trees (England and Laudenslayer 1989) and likely occurs in the project area. The remaining six bird species listed would not likely occur within the project area due to the lack of appropriate habitat types. The majority of these species, however, would occupy the Clark Mountain area to the north of the mine site.

Mammals

The two mammals listed as special-status species for the area are the American badger (*Taxidea taxus*) and the Nelson's bighorn sheep (*Ovis canadensis nelsoni*). The badger is listed as a California Species of Special Concern and would likely occur in the project area. The bighorn sheep is considered a sensitive resource in the Clark Mountain area and is managed by the CDFG. The bighorn population within the Clark Mountains and surrounding ranges is known as the Clark-Kingston-Mesquite meta population and is currently estimated to total 140 animals (Yumiko 1994). Although this species is protected in other areas within its range, the CDFG allows hunting for the Clark-Kingston-Mesquite population by permit only. Annual permits are issued, based on a lottery system (Pauli 1994). Bighorn migration corridors occur between the northern and southern portions of the Clark Mountain Range through Kearny Pass, and from the northern portion of the range northeast into Nevada (BLM 1980 and 1986).

The BLM manages the Clark Mountain Herd Management Area (HMA), which encompasses the northern and eastern portions of the Clark Mountain Range. This HMA is covered under the BLM's East Mojave Herd Management Area Plan (Madsen 1996). No wild horses have been documented in this HMA; however, the burro population has risen and is estimated to be between 200 and 300 animals (McGill 1994). Because of limited forage availability, a population of 44 burros has been identified by the BLM as the level to be maintained in the least sensitive portion of the HMA. Additional animals are removed by the BLM, when necessary. The mine area is not located within an area currently classified by the BLM as either a retention or concentration area for these feral burros. Although the BLM has organized burro gathers in the southeast end of the HMA near Mineral Springs and in the Ivanpah Valley, individual burros may occur throughout the project area. Continued removal of the burros by the BLM will be required to maintain adequate reductions in burro numbers (Yumiko 1994; BLM 1986).

3.3.2 Cultural/Paleontological Resources

3.3.2.1 Background

The cultural setting of the project area is described in detail in the *Class III Cultural Resource Evaluation: Molycorp Mountain Pass Mine Facility and Nipton Road Borrow Source* and *Class III Cultural Resource Evaluation: Molycorp Mountain Pass Mine Land Exchange* prepared for this EIR and available from San Bernardino County.

Native American populations historically occurring in this area (at the time of first contact with European explorers) are described as being the Chemehuevi. The Chemehuevi are generally considered to be closely related to the Southern Paiute, who were members of a larger group (based on language) generally known as the Shoshoneans. The Shoshoneans are believed to have been established in the Southern California area since about the year 400 A.D.. Evidence also suggests they may have been in Southern California as early as 1000 B.C. and are believed to have displaced existing groups of Chumashan and Yuman coastal peoples. The Chemehuevi subsided on hunting and gathering as their primary means of obtaining food and other related products (e.g., animal skins). Farming was used (in the form of small gardens) where feasible.

The first Europeans to enter the area were Spanish soldiers and padres and early explorers and trappers. These first Europeans are generally assumed to have begun entry into the area during the late 1700s beginning with Francisco Garces, a padre who entered the area in 1776. The Molycorp Mountain Pass area lies between two major land routes, the Mojave Trail and the Salt Lake Trail, which were used by these explorers (the East Mojave Heritage Trail does cross through the project area on Bailey Road). Most of these explorers did not stay in the area but continued their travels over the Cajon Pass to the southwest into the Southern California coastal area.

The first long-term European communities to be established in the area were associated with mining operations. These operations were generally operated on boom-and-bust cycles and primarily produced gold, silver, copper, and lead. Mining activities began in the late 1800s and continue today with the Molycorp Mountain Pass Mine and other mines in the eastern Mojave Desert. Agricultural-related homesteading activities never achieved a strong foothold in the area because of the scarcity of both water and quality growing soils.

The paleontological setting of the project area is described in detail in *Paleontologic Resource Assessment Proposed Molycorp, Inc. Mountain Pass Mine Expansion* prepared for this EIR and available from San Bernardino County.

3.3.2.2 Cultural/Paleontological Resources of the Area

<u>Cultural Resources</u>

A review of available literature, site archives and surveys, and historical maps was conducted as part of this investigation. This review indicated that 19 archaeological sites, one pending archaeological resource, and one artifact have been recorded within 1 mile of the Mountain Pass Mine site, and five archaeological sites have been recorded within 1 mile of the Nipton Road Borrow Site.

As a part of this EIR, specific site surveys of the project area were conducted. Fourteen cultural sites were identified during the course of the surveys. Of the archaeological sites recorded within the proposed project area, three appear to be of little archaeological significance, four are outside of project impact areas, and three appear to be eligible for inclusion in the National Register of Historic Places (NRHP). The three sites that appear to be eligible to the NRHP are located in the general vicinity of the proposed East Tailings Pond and Dam. The prehistoric artifacts and sites were found on landforms subject to periods of heavy erosion with established ephemeral drainage channels throughout. It is possible for these artifacts to have been moved by weathering processes from locations at higher altitudes or to have been unearthed from buried locations. Previous activity at nearby mining facilities could have resulted in the movement of these artifacts.

The apparent significance of site CA-SBR-7803H is in its evident mixed origin, possibly indicative of repeated employment by successive cultures, and its conspicuous relation to the mapped location of Mexican Well. The site deposit located here may thus provide significant data relevant to the history of Mexican Well, as well as to the patterning of aboriginal and Euroamerican occupations within the Mountain Pass area.

Materials noted at CA-SBR-7801H appear to indicate repeated use of the landform as a casual disposal area. Due primarily to the apparent repeated use of this area over an extended period of time by Euroamerican populations for the disposal of refuse, the site may provide additional data significant to the interpretation of social evolution in the project area. However, the site has been so severely compromised that it is not regarded as eligible to the NRHP.

Sites CA-SBR-7811H and CA-SBR-7813H consist of intact and remnant structures associated with 20th century mining operations in the Mountain Pass area, and are key elements in the historical landscape created to exploit local mineral deposits.

CA-SBR-7811H, the Birthday Mine, is a complex of structures developed to exploit the Birthday claims. These claims document the initial discovery of lanthanide elements in the vicinity and were instrumental in the foundation and continuance of what has developed into the present Molycorp facility.

The significance of site CA-SBR-7813H, the Sulphide Queen Mine, rests not only in its gold-producing history during the second mining boom in the Clark Mining District, but in the role it played in the discovery of the bastnasite deposit responsible for the development of the current Molycorp facilities.

One theme clearly dominates the cultural heritage of the Mountain Pass area for the lasting impacts it has left: the exploration and excavation of mineral resources. The most significant associated events were the discovery of the lanthanide element deposit in 1949 and the concomitant development of today's Mountain Pass Mine facilities. Because of their close association to these events, Sites CA-SBR-7811H (the Birthday Mine) and CA-SBR-7813H (the Sulphide Queen Mine) appear to be potentially eligible for inclusion in the NRHP — in the case of CA-SBR-7811H, when it reaches the NRHP's 50-year age requirement.

Sites CA-SBR-7806 through CA-SBR-7809 evidence prehistoric exploitation of the Mountain Pass vicinity. Three of these sites are located within proposed project impact areas, and two one is peripheral to any foreseen impact. According to the Environmental Assessment prepared for the transfer of federal and private lands at the Mountain Pass Mine, the

California SHPO and the BLM have determined that CA-SBR-7806 is ineligible for the NRHP (BLM 1994a). CA-SBR-7807 through CA-SBR-7809 are believed significant under NRHP criteria due to their apparent ability to contribute information regarding general patterns of archaeological site formation and aboriginal lifeways in the vicinity of Mountain Pass.

The three archaeological sites (CA-SBR-7807, CA-SBR-7808, and CA-SBR-7809) recorded in the eastern project area appear related to extensive prehistoric exploitation of the surrounding landforms. However, as discussed in Sections 2.5.2.4 and 2.5.2.5, the proposed development of a tailings pond in this area is conceptual in nature. The archaeological sites, as well as nearby isolated artifacts, occurred in close association to a seasonal water source. Together, the prehistoric resources indicate repeated occupation of the project area by aboriginal populations. Based primarily on the form of milling implements represented, it appears these occupations were seasonal in nature and focused on gathering and processing hard seed vegetable resources (Wheat 1967).

The apparent grouping of aboriginal sites in the eastern project area may be an effect of modifications made to the landform in the main plant area. Activities related to plant storage, erosion control, and construction of outlying facilities such as the former trailer park and camp areas have resulted in extensive damage to natural surfaces that may have resulted in the removal or destruction of any evidence for prehistoric occupation.

All of the prehistoric resources were confined to landforms subject to periods of heavy erosion, with extensive sheet wash activity, and established ephemeral drainage channels, noted throughout. The presence of these remains within actively eroding areas has given rise to questions concerning the nature of their primary deposition and the effects of natural forces in the movement of soils and their constituents across the landform.

Paleontological Resources

The proposed mine expansion area is underlain by two rock units (Precambrian metamorphic rocks, Pleistocene nonmarine deposits). The Precambrian metamorphic rocks are unfossiliferous. With two exceptions, the overlying Pleistocene nonmarine deposits probably are too coarse-grained to contain fossil remains, and, therefore, are considered to have a low potential for yielding fossil remains in most of the expansion area. However, two fossil sites are reported from this rock unit in the expansion area. One site (SBCM 1.1.27) yielded land mammal remains in the crushing plant vicinity along the southeastern margin of the mine pit in the disturbed area, but could not be relocated during the field survey conducted for this EIR. The site and the fossiliferous bed probably are now inaccessible or no longer exist. Moreover, the remains could not be located at the San Bernardino County Museum (SBCM), and it cannot be determined if these remains are old enough to be considered fossilized. The other site (MAR 11-19-92) was discovered during the field survey and yielded plant remains in the footprint of the proposed East Tailings Pond. This site and the fossiliferous rocks at and in the immediate vicinity of the site are considered to have a high potential for yielding additional fossil remains. The Nipton Road Borrow Site is underlain by alluvium, which probably is too coarse-grained to contain fossil remains and is considered to have only a low potential for yielding fossil remains.

3.3.3 Air Resources

3.3.3.1 Climate and Meteorology

On May 30, 1996, the California Air Resources Board (CARB) approved the creation of the new Mojave Desert Air Basin (MDAB). CARB's actions resulted in dividing the former Southeast Desert Air Basin (SEDAB) into two new air basins; the MDAB, which includes the former SEDAB portions of Kern and Los Angeles Counties, and all areas under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD); and the Salton Sea Air Basin, which encompasses the remaining portion of the former SEDAB.

The Mountain Pass project site is located in the eastern San Bernardino County portion of the MDAB. The MDAB includes the eastern portions of San Bernardino, Kern, and Los Angeles counties, and the Blythe area of Riverside County. The MDAQMD regulates air quality in the San Bernardino County and Blythe portions of this air basin.

Baseline meteorology, air quality, and dispersion conditions at the Mountain Pass site were estimated from on-site data and air quality data records from Ivanpah, which is about 15 miles southeast of the project. The onsite wind data are supplemented with a more detailed data set from Las Vegas that provides wind distribution information and a wind climatology representative of the region. Las Vegas is located about 40 miles north of the mine site. Additional air quality data are presented from two other monitoring sites within the MDAB, Barstow and Twentynine Palms, which are about 80 miles west and southwest, respectively (Figure 2.2-1).

Regional winds are presented in Figure 3.3-3 based on a windrose for Las Vegas for 1981. These data indicate that nearly 50 percent of the winds in this area come from the south through west-southwest sectors. Wind speeds average between 3 and 6 meters per second (6 to 13 miles per hour). These data indicate that wind speeds in the region are usually above levels necessary to promote good mixing, thereby reducing the potential for stagnation

WIND DIRECTION	WIND SPEED (M/SEC) <= 1.5	<= 3.3	<= 5.4	<= 8.5	<=10.8	>10.8	TOTAL	AVG SPEED
N	0.21	1.63	1.16	0.79	0.24	0.06	4.09	4.34
NNE	0.39	1.70	1.50	0.51	0.08	0.01	4.19	3.70
NE	0.67	2.44	1.83	0.90	0.06	0.03	5.94	3.69
ENE	0.43	2.11	1.70	0.31	0.01	0.01	4.58	3.39
E	0.38	1.44	1.11	0.22	0.01	0.00	3.15	3.33
ESE	0.24	1.16	0.64	0.15	0.00	0.01	2.20	3.21
SE	0.30	1.46	0.79	0.33	0.06	0.00	2.93	3.55
SSE	0.30	1.15	1.16	1.29	0.24	0.02	4.17	4.78
S	0.32	1.87	3.23	4.57	1.05	0.03	11.07	5.52
SSW	0.16	1.67	3.39	4.37	1.43	0.31	11.32	5.90
SW	0.29	2.58	4.75	3.65	2.10	0.59	13.96	5.75
WSW	0.25	4.12	6.52	1.31	0.51	0.09	12.81	4.17
W	0.16	3.48	3.40	0.27	0.02	0.00	7.34	3.48
WNW	0.35	2.67	1.29	0.13	0.01	0.01	4.46	3.15
NW	0.56	1.71	0.66	0.34	0.15	0.05	3.47	3.57
NNW	0.30	1.24	0.58	0.70	0.66	0.13	3.61	5.28
CALM	0.71						0.71	
TOTAL	6.00	32.45	33.71	19.84	6.63	1.36	100.00	

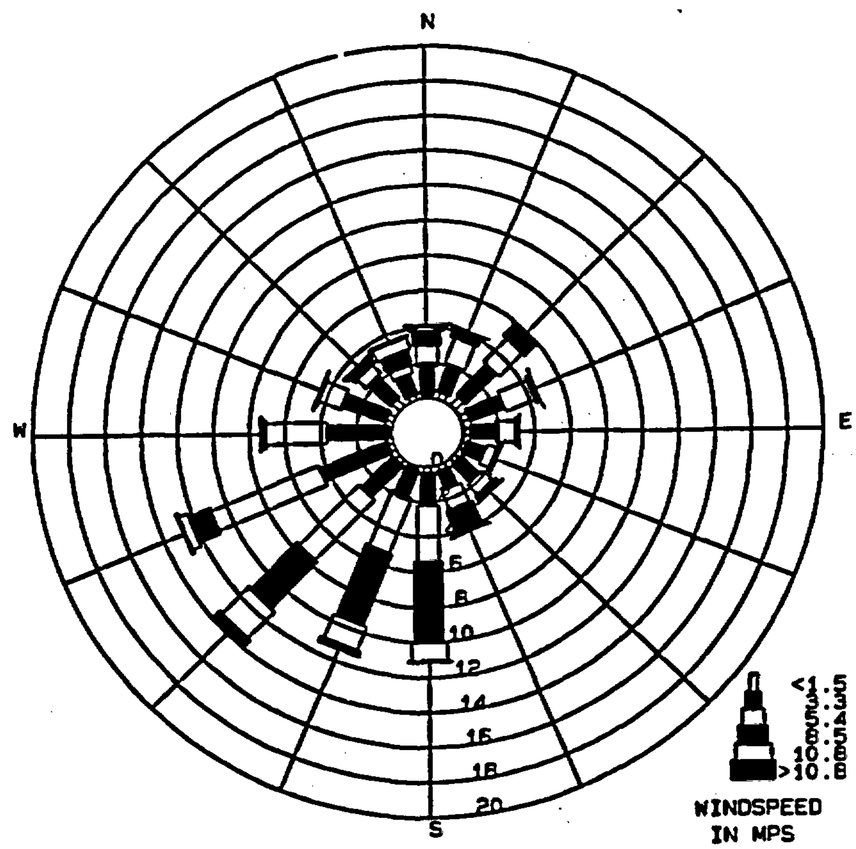

FIGURE 3.3–3. Wind Rose for Las Vegas (1981)

that can otherwise create conditions for poor air quality. Summer and winter winds are similar, generally blowing from the south and west. Vertical air dilution is generally good because of the area's high surface temperatures, creating strong daytime thermal mixing. Thermal mixing and moderate winds generally tend to disperse occasional nighttime inversions.

The project area is located in complex terrain where winds are likely to be strongly affected by local topographic influences. Limited onsite meteorological data are presented in Table 3.3-3, which shows maximum, minimum, and average values of wind at the mine site and at Ivanpah for 1990. These values are graphically illustrated in Figures 3.3-4 and 3.3-5. The climate of the Basin is generally hot and dry in the summer and mild in the winter, with limited precipitation and cloudiness. According to data compiled at Molycorp's onsite meteorological station, precipitation at the mine site averages about 8 inches per year. Precipitation most frequently occurs during winter months, but a significant portion of the annual rainfall can occur as summer thunderstorms, which may result in heavy rainfall and flash floods. Monthly totals of precipitation at the mine site and Ivanpah during 1990 are shown in Figures 3.3-6 and 3.3-7, which show the mid-winter and mid-summer maxima. The annual total for 1990 was less than 7 inches at the Mountain Pass Mine and only about 4 inches at Ivanpah.

While little climatic variation exists throughout the Basin, temperature data indicate the relatively wide diurnal and seasonal variability typical of desert climates. According to data compiled at Molycorp's onsite meteorological station, warmest temperatures occur in late July or early August and coldest temperatures usually occur in January. From late fall to early spring, daily high temperatures are moderate, averaging 60 to 85 degrees Fahrenheit (°F). Nights are cooler, with low temperatures averaging 40 to 60 °F. Winter temperatures are occasionally below freezing, and can be below 10 °F. During summer, temperatures are often 100 to 110 °F during the day and about 80 °F at night. Monthly temperature data from 1990 for the mine site and Ivanpah are shown on Figures 3.3-8 and 3.3-9 and listed on Table 3.3-3.

3.3.3.2 Air Quality

National and California Ambient Air Quality Standards (NAAQS and CAAQS) reflect the maximum levels of air pollutants permitted in the atmosphere. These standards are shown in Table 3.3-4, and include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), and particulate matter less than 10 microns in diameter (PM_{10}).

TABLE 3.3-3

1990 Meteorological Data

Month	Temperature (°F)			Wind (mph)			Precipitation (in) Monthly Total
	Max	Min	Average	Max	Min	Average	
MOUNTAIN PASS MINE							
January	69.8	24.0	41.2	25.8	2.6	7.0	0.4
February	65.5	17.0	40.1	35.2	2.5	8.5	0.3
March	74.0	25.3	51.4	31.6	3.8	9.0	0.0
April	81.2	41.6	54.4	26.8	4.5	9.0	0.2
May	88.4	43.1	61.2	27.7	6.0	9.3	0.3
June	94.9	43.1	76.6	23.5	3.7	7.6	2.0
July	102.2	63.2	79.4	16.3	3.5	6.1	0.7
August	105.2	55.8	77.0	13.4	3.6	5.3	1.1
September	98.5	55.0	76.8	12.5	4.0	4.8	1.9
October	80.9	42.4	62.8	12.6	2.2	3.8	0.0
November	69.7	17.6	49.4	23.2	2.0	4.1	0.0
December	62.0	7.0	37.9	16.4	2.0	4.4	0.0
					Annual Precipitation		6.9
IVANPAH							
January	78.7	18.8	42.3	21.2	2.0	5.2	0.9
February	77.9	20.7	44.0	43.3	3.5	7.6	0.1
March	88.1	24.3	56.5	27.2	2.5	7.5	0.2
April	91.5	40.7	54.4	33.6	4.6	8.3	0.0
May	91.0	44.2	70.9	26.4	5.1	10.5	0.0
June	108.7	49.2	83.3	23.2	3.3	8.4	0.4
July	106.7	67.1	88.1	25.0	4.0	8.1	0.9
August	105.7	60.4	81.0	25.4	3.5	6.7	0.7
September	103.9	50.3	78.3	23.7	3.0	5.9	0.7
October	92.5	34.7	65.8	24.8	1.7	5.3	0.0
November	75.6	23.4	45.3	32.8	2.0	7.8	0.0
December	68.9	5.0	36.3	28.2	1.0	5.2	0.0
					Annual Precipitation		3.8
Source: Molycorp							

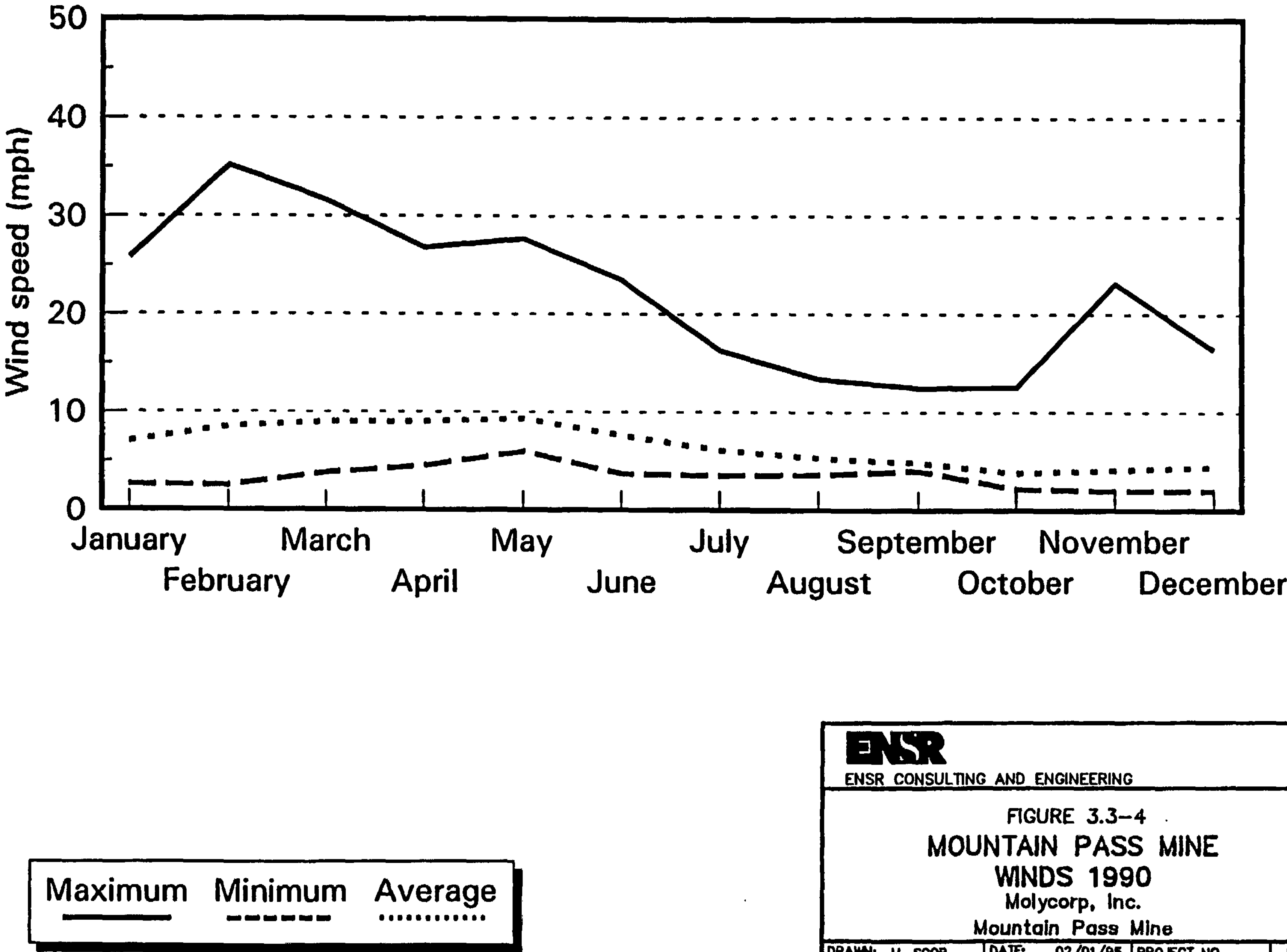

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FIGURE 3.3-4
MOUNTAIN PASS MINE
WINDS 1990
Molycorp, Inc.
Mountain Pass Mine

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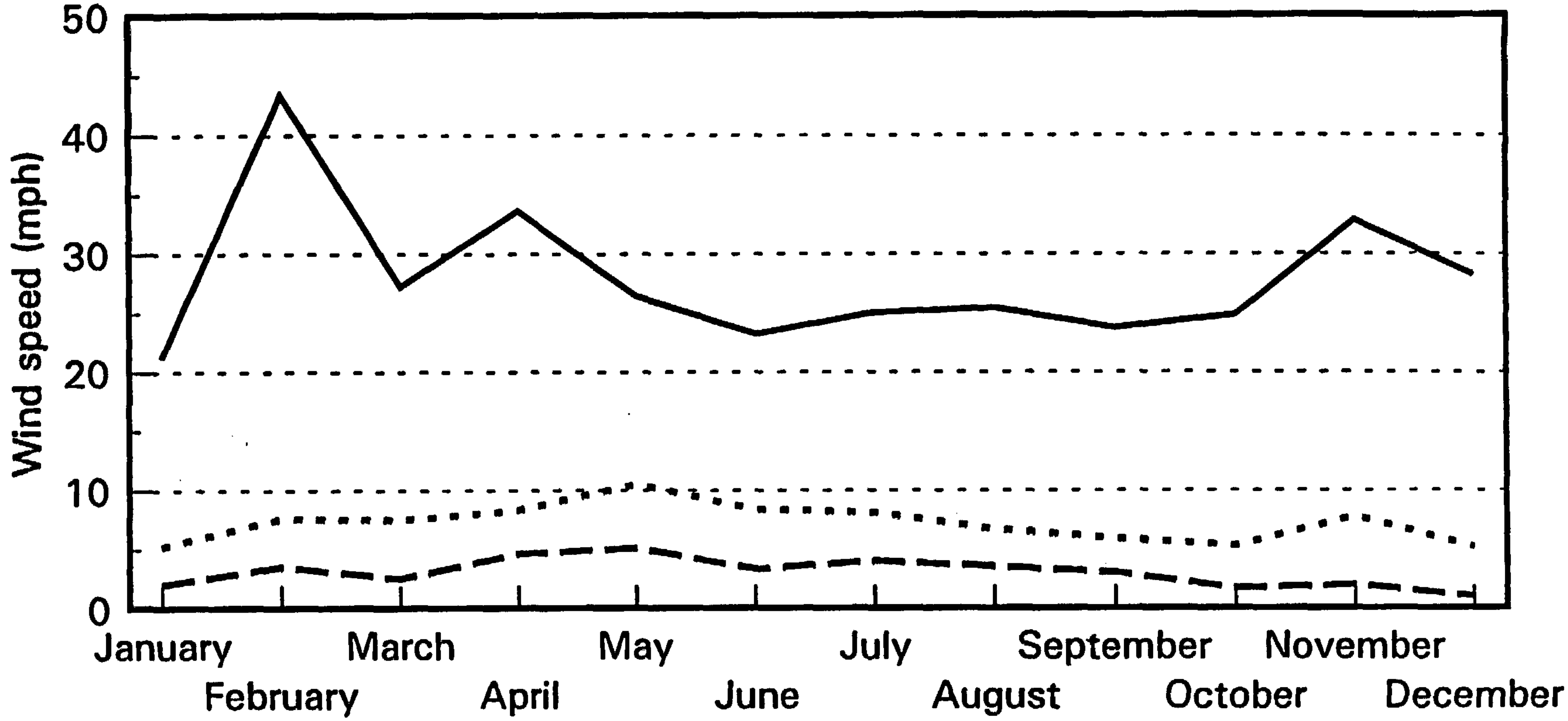
1991-001-850



Maximum Minimum Average

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FIGURE 3.3-5

IVANPAH WINDS 1990

Molycorp, Inc.

Mountian Pass Mine

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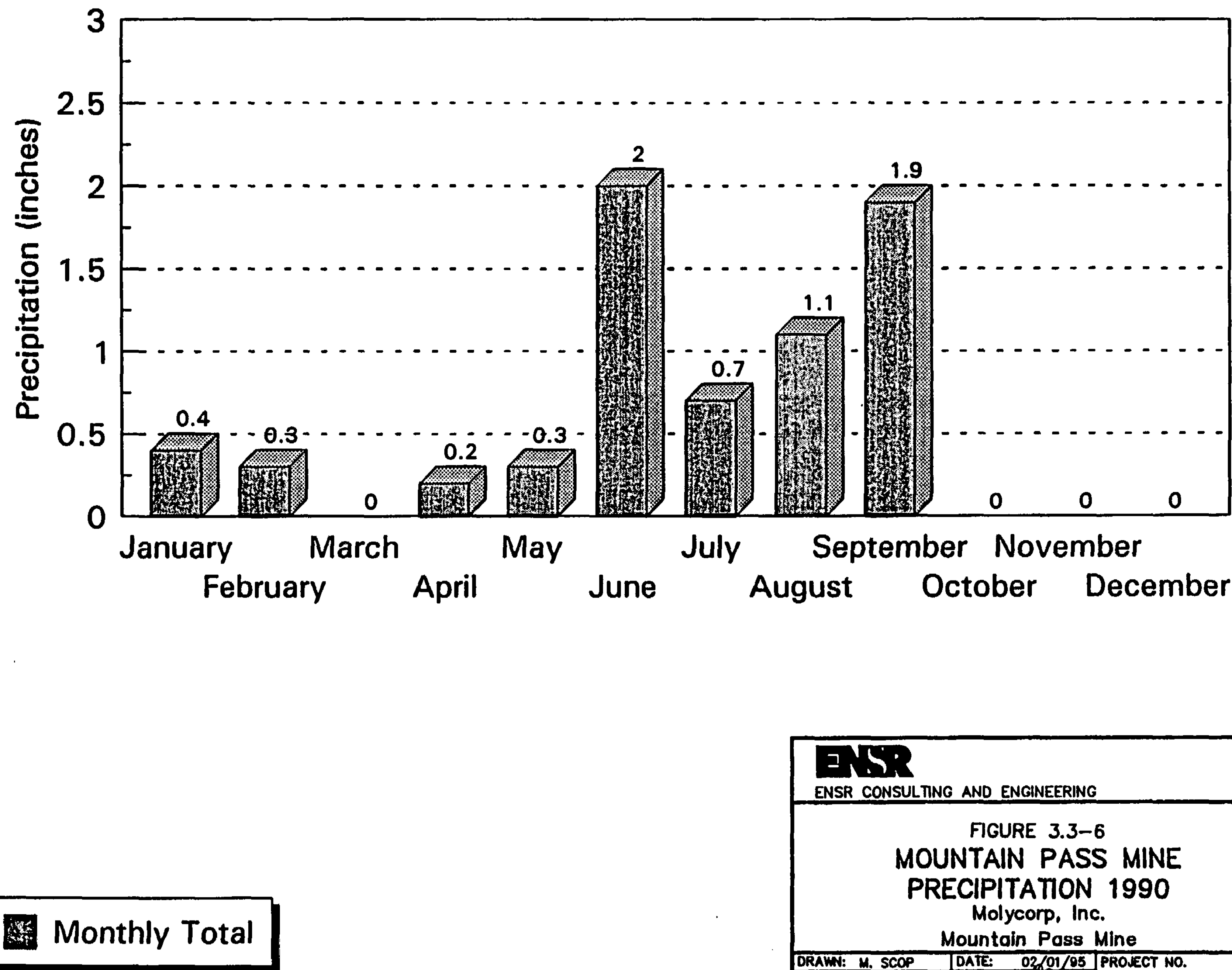

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FIGURE 3.3-6

MOUNTAIN PASS MINE
PRECIPITATION 1990

Molycorp, Inc.
Mountain Pass Mine

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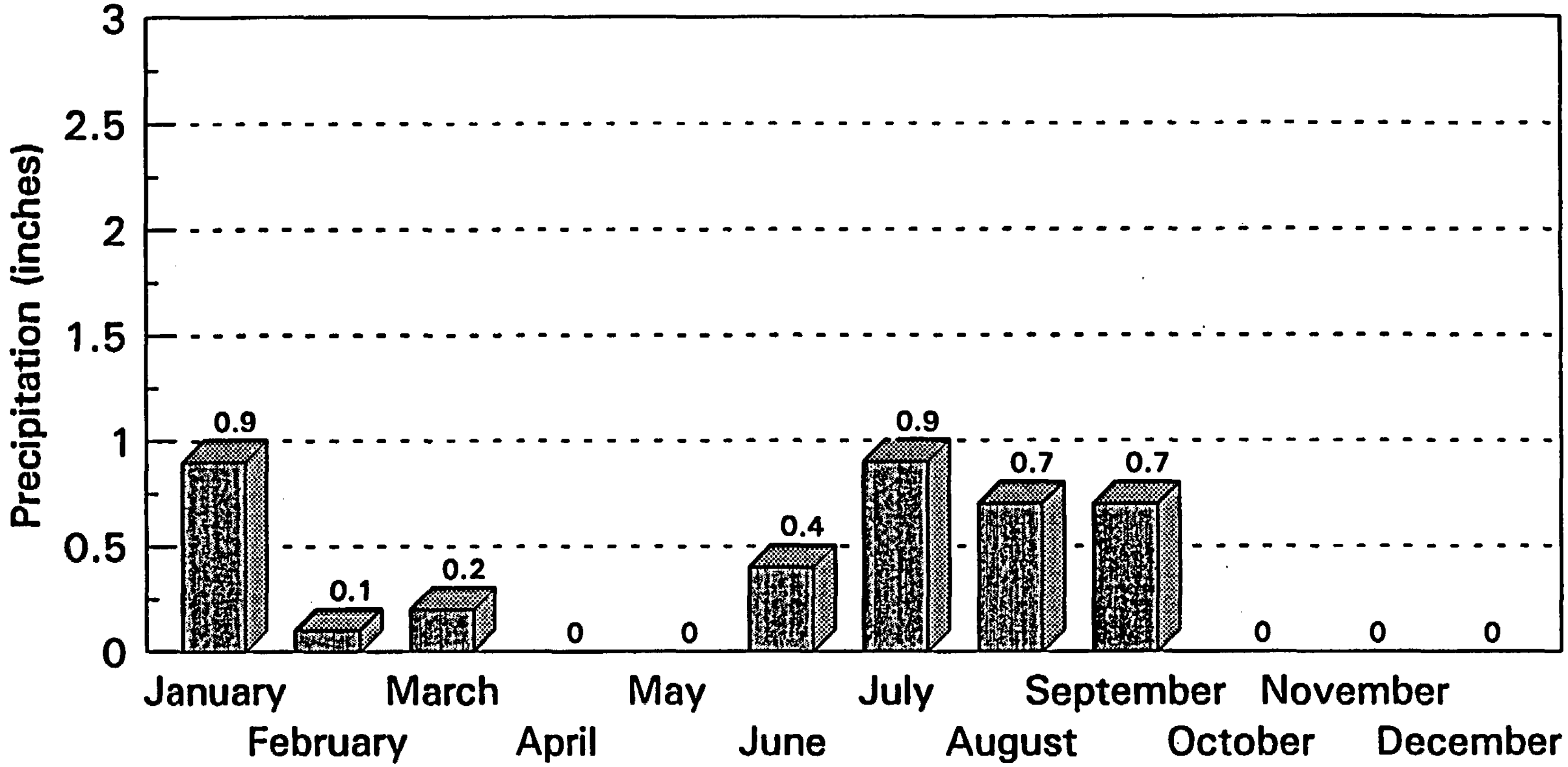
FILE NO.	CHK BY:	1991-001	

1991-001-850



Monthly Total

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FIGURE 3.3-7
IVANPAH PRECIPITATION 1990
Molycorp, Inc.
Mountian Pass Mine

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FILE NO.	CHK BY:		

1991-001-850

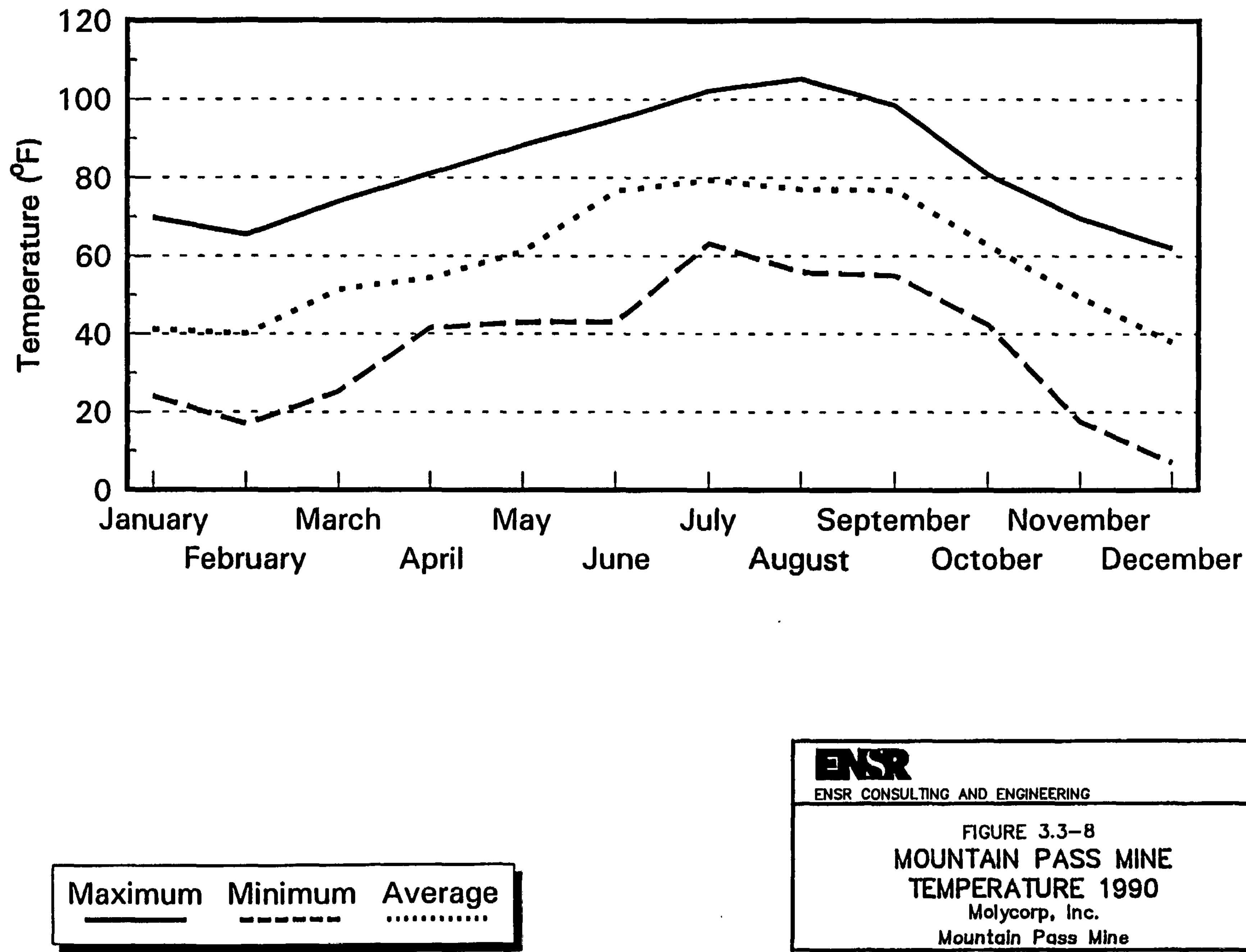

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FIGURE 3.3-8
MOUNTAIN PASS MINE
TEMPERATURE 1990
Molycorp, Inc.
Mountain Pass Mine

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FILE NO.	CHK BY:	1991-001	

1991-001-850

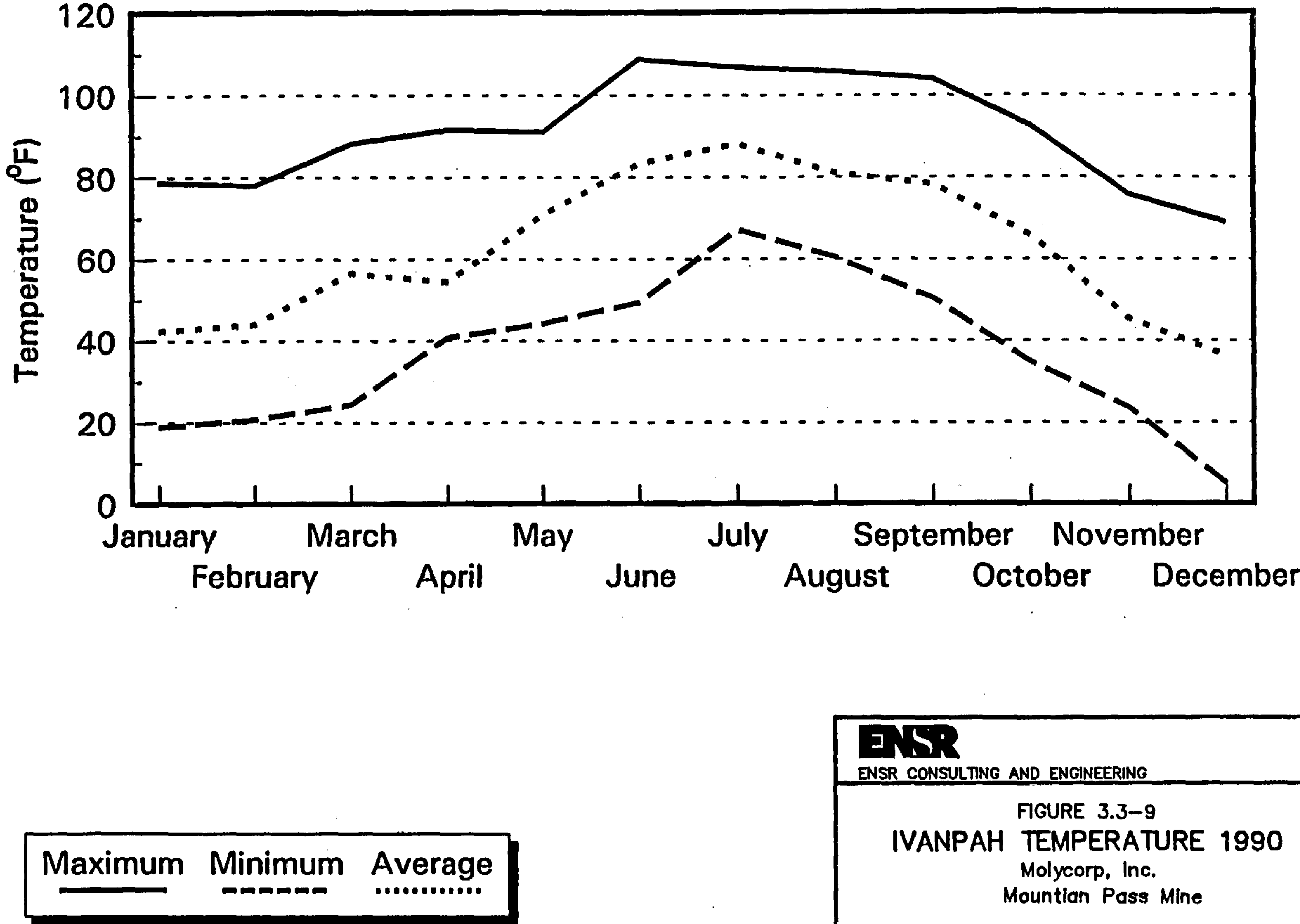

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FIGURE 3.3-9
IVANPAH TEMPERATURE 1990
Molycorp, Inc.
Mountian Pass Mine

DRAWN: M. Scop	DATE: 1/17/95	PROJECT NO. 1991-001	REV.
FILE NO.	CHK BY:		

1991-001-650

TABLE 3.3-4

Summary of Ambient Air Quality Data From the Monitoring Station Closest to the Mountain Pass Mine

Pollutant	Averaging Time	California Standards	National Standards Primary	National Standards Secondary	Ivanpah Measured Values[1]
Ozone (O_3)	1 hour	0.09 ppm	0.12 ppm	0.12 ppm	0.099 ppm[2]
Carbon monoxide (CO)	1 hour	20 ppm	35 ppm	35 ppm	1.1 ppm
Nitrogen dioxide (NO_2)	Annual average	—	0.05 ppm	0.05 ppm	0.010 ppm
	1 hour	0.25 ppm	—	—	0.125 ppm
Sulfur dioxide (SO_2)	Annual average	—	0.03 ppm	—	0.001 ppm
	24-hour	0.04 ppm	0.14 ppm	—	0.007 ppm
	3-hour	—	—	0.5 ppm	0.009 ppm
	1-hour	0.25 ppm	—	—	0.011 ppm
Particulates (PM_{10}) [3]	Annual geometric mean	30 $\mu g/m^3$	—		
	Annual Average	—	50 $\mu g/m^3$	50 $\mu g/m^3$	18 $\mu g/m^3$
	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$	299 $\mu g/m^3$[3,4]

1 Source: Ivanpah Dry Lake Power Plant Preconstruction Monitoring Data, SCE (provided by URS 1989). Data were collected in 1982.
2 Although this value is in excess of the CAAQS, MDAQMD officials consider the region to currently be in attainment with the CAAQS.
3 PM_{10} values indicate measured TSP values scaled by the estimated percent of PM_{10} in the TSP (about 63 percent), per CARB guidelines.
4 Highest recorded 24-hour value at the Ivanpah lake bed in 1982.

Ambient air quality standards have been developed for air contaminants that exhibit known detrimental health effects and can be traced to direct emissions from a source (CO, SO_2, PM_{10}), or from chemical reactions between emitted pollutants downwind of a facility (NO_2, O_3, PM_{10}).

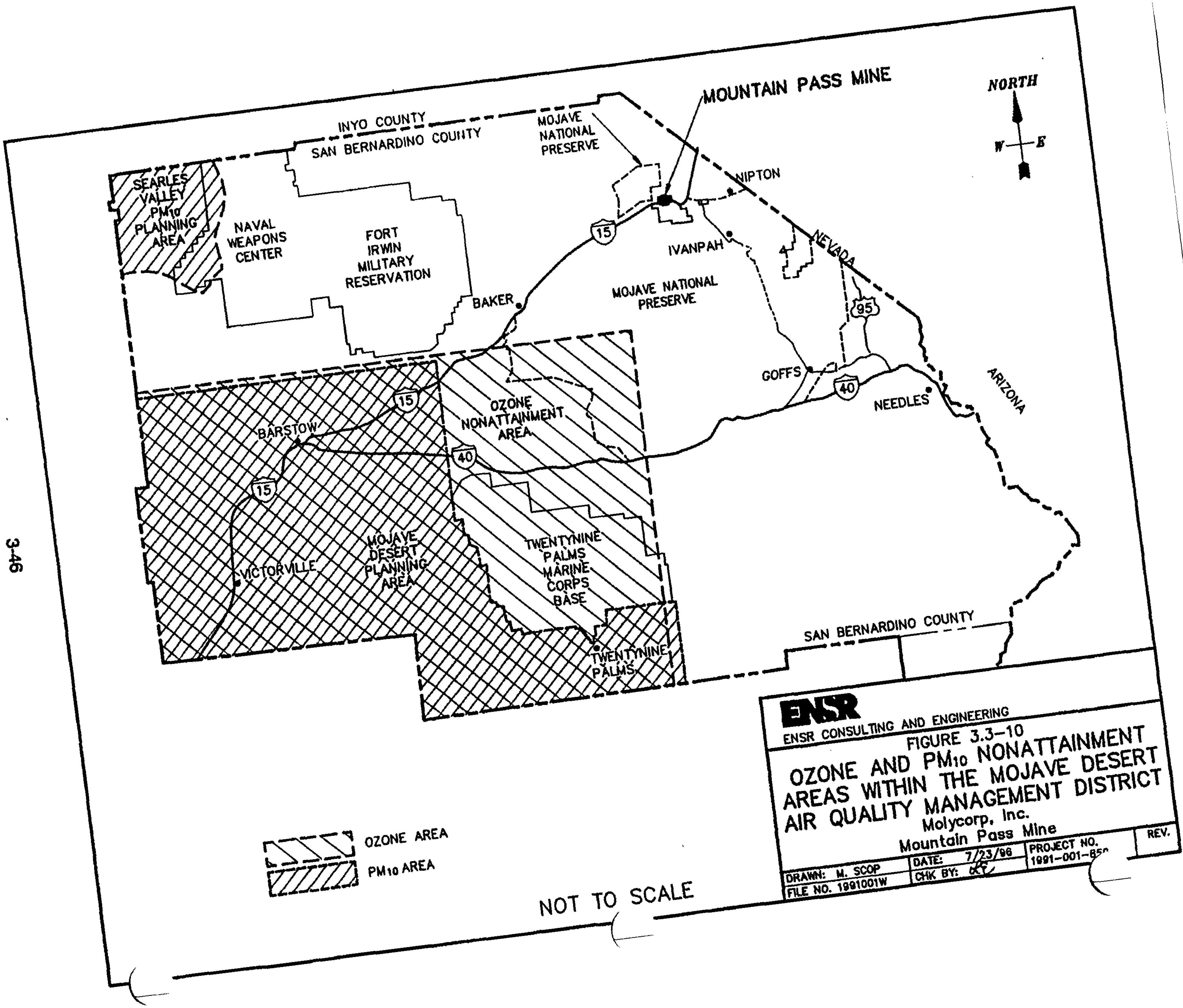
The latter class of air pollutants is referred to as secondary pollution, because it results not from direct emission from an air pollution source, but from chemical reactions of precursor pollutants in the atmosphere. Since it is more difficult to regulate the emission of these secondary air pollutants, air quality regulatory agencies focus their regulations upon precursor pollutant emissions.

Nitrogen oxides (NO_x) are precursors to ozone, NO_2, and nitrate formation. Point source exhaust is normally in the form of nitric oxide (NO) that does not convert to NO_2 until after it has drifted downwind of the emission point. Thus, a conservative approach assumes that 100 percent of the estimated NO_x emissions from a fuel combustion source are emitted as NO_2. Ozone results from the reaction of NO_2, reactive organic compounds (ROC), and sunlight. It is important to monitor the emission (or formation) of NO_2 and ROC in order to control ozone formation in the atmosphere. PM_{10} results from both the direct emission of particulate matter and from photochemically produced sulfate and nitrate particles.

The Mountain Pass Mine area is currently classified by the EPA as attainment/unclassified for all criteria pollutants except PM_{10}. The Searles Valley was classified by the EPA as non-attainment for PM_{10} in 1990, and the rest of the MDAQMD was classified non-attainment in 1994. However, MDAQMD has requested that the EPA reclassify the Searles Valley Planning Area as attainment and reduce the nonattainment area to only include the southwestern portion of San Bernardino County within the Mojave Desert region. The MDAQMD calls this smaller non-attainment area the Mojave Desert Planning Area, and adopted a Federal Particulate Matter (PM_{10}) Attainment Plan for this area in July 1995, which is currently under review by EPA. These PM_{10} planning areas and the ozone nonattainment portion of the MDAQMD are shown in Figure 3.3-10.

Neighboring Clark County in Nevada is also currently classified as being in attainment for O_3 and nonattainment for PM_{10}. However, unlike MDAQMD, PM_{10} levels have generally been increasing, so redesignation to attainment is unlikely. Also, Clark County is designated as nonattainment for CO, as is common for major urban centers, since motor vehicles are a major source of CO.

Current ambient air quality data are not available specifically for the project site. The closest location to the Mountain Pass Mine where air quality data were collected is the Ivanpah



MOUNTAIN PASS MINE
NORTH
W
E
INYO COUNTY
SAN BERNARDINO COUNTY
MOJAVE NATIONAL PRESERVE
NIPTON
SEARLES VALLEY PM10 PLANNING AREA
NAVAL WEAPONS CENTER
FORT IRWIN MILITARY RESERVATION
15
IVANPAH
NEVADA
BAKER
MOJAVE NATIONAL PRESERVE
95
GOFFS
40
NEEDLES
ARIZONA
OZONE NONATTAINMENT AREA
15
BARSTOW
40
15
MOJAVE DESERT PLANNING AREA
VICTORVILLE
TWENTYNINE PALMS MARINE CORPS BASE
TWENTYNINE PALMS
SAN BERNARDINO COUNTY
OZONE AREA
PM10 AREA
NOT TO SCALE
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FIGURE 3.3-10
OZONE AND PM10 NONATTAINMENT AREAS WITHIN THE MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
Molycorp, Inc.
Mountain Pass Mine
DRAWN: M. SCOP
FILE NO. 1991001W
DATE: 7/23/96
PROJECT NO. 1991-001-85
REV.

1991-001-850

Valley. These data from 1982 are summarized in Table 3.3-4 and indicate that maximum recorded one-hour O_3 levels were 0.099 ppm and 0.086 ppm for the second highest one-hour value. In comparison, the one-hour O_3 NAAQS is 0.12 ppm and the CAAQS is 0.09 ppm. The annual average O_3 value was 0.031 ppm. There are no annual O_3 standards. More recent O_3 data are available from Barstow and Twentynine Palms sites, located about 80 miles west and southwest of the mine, respectively. The maximum one-hour values at these sites are shown in Table 3.3-5. While these sites are more distant from the mine, they lie in the predominantly upwind direction, as shown on the wind rose in Figure 3.3-2. Maximum hourly ozone values from the Las Vegas area, 40 miles downwind of the site in the prevailing wind direction, are also given in Table 3.3-5.

TABLE 3.3-5

Maximum Hourly Ozone Values (ppm)

City	1992	1993	1994
Barstow	0.13	0.13	0.13
Twentynine Palms	0.12	0.13	0.12
Las Vegas	0.10	0.10	0.10
Note: NAAQS is 0.12 ppm, CAAQS is 0.09 ppm.			

At the time monitoring was conducted in Ivanpah Valley, the standard for particulates was established based upon the amount of total suspended particulates (TSP) present. Currently, the standard is based upon that portion of TSP which is respirable, i.e., the portion smaller than 10 microns in diameter known as PM_{10}. For the Mountain Pass project site, PM_{10} is assumed to be 63 percent of the TSP in accordance with California Air Resources Board guidelines. The average annual mean PM_{10} concentration derived with this factor from 161 24-hour TSP samples collected at the Ivanpah Valley monitoring site was 18 micrograms per cubic meter ($\mu g/m^3$). The maximum 24-hour PM_{10} value has been calculated as 299 $\mu g/m^3$, and the second highest value has been calculated as 131 $\mu g/m^3$. Both of these measurements occurred in December during periods of high, gusty winds. These data indicate a common desert environmental condition where high levels of blowing dust can occur naturally during windy periods.

PM_{10} data are currently collected at many sites in the MDAQMD, including Barstow and Twentynine Palms, and in the Las Vegas area.

The maximum values at these sites during 1992 through 1994 are given in Table 3.3-6, with the annual averages plotted in Figure 3.3-11 and maximum 24-hour values shown in Figure 3.3-12.

TABLE 3.3-6

Maximum Daily and Annual PM_{10} Values ($\mu g/m^3$)

City	Maximum 24-Hour			Annual Average		
	1992	1993	1994	1992	1993	1994
Barstow	68	49	140	31	27	28
Twentynine Palms	46	39	79	26	21	21
Las Vegas (E. Sahara monitoring station)	99	134	236	34	40	40

Note: NAAQS are 150 $\mu g/m^3$ 24-hour, 50 $\mu g/m^3$ annual arithmetic mean; CAAQS are 50 $\mu g/m^3$ 24-hour, 30 $\mu g/m^3$ annual geometric mean.

Although PM10 was not specifically measured at the mine site, the following assumptions can be made based upon the above observations:

- The MDAQMD considers the area to be in attainment of PM10 standards.
- The annual PM_{10} background concentrations should be below the applicable standards.
- Exceedances of PM_{10} 24-hour standards can be occur during periods of high winds and low rainfall.
- MDAQMD attributes high daily PM_{10} concentrations to intensive construction activities in the more populated areas (e.g., Barstow and Lucerne Valley).

The average annual NO_2 concentration measured at Ivanpah was 0.010 ppm and the maximum one-hour value was 0.125 ppm. NO_2 showed little seasonal variation in average values. Recorded sulfur dioxide levels at this site were very low, with an annual average of 0.001 ppm, a maximum 24-hour value of .007 ppm, a maximum 3-hour value of 0.009 ppm, and a maximum one-hour value of 0.011 ppm. Carbon monoxide values also were low, the measured maximum one-hour value being 1.1 ppm. These values are all well within the

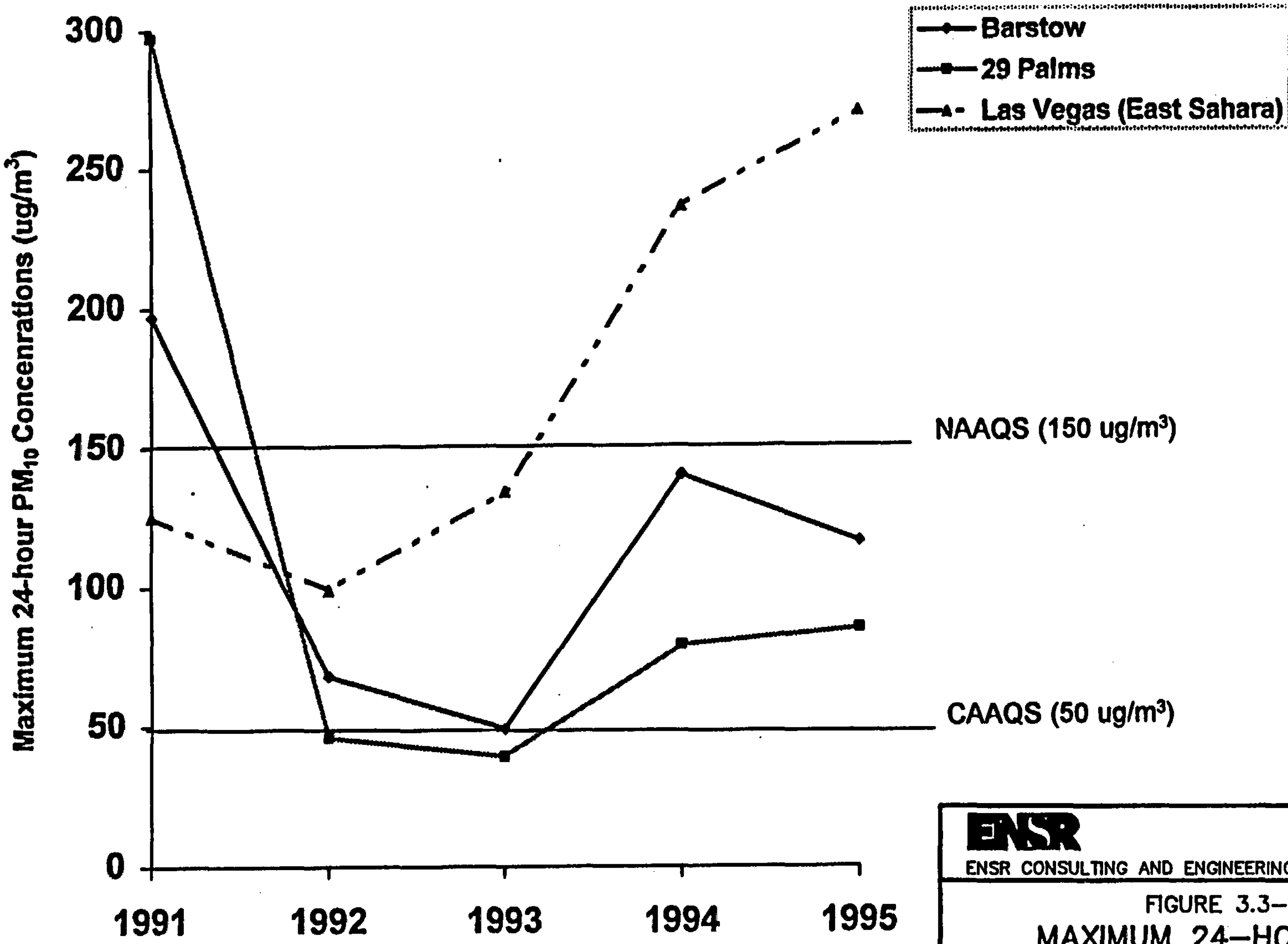

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FIGURE 3.3-11

MAXIMUM 24-HOUR PM $_{10}$ CONCENTRATIONS

Molycorp, Inc.

Mountain Pass

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FILE NO.	CHK BY:		

1891-001-850

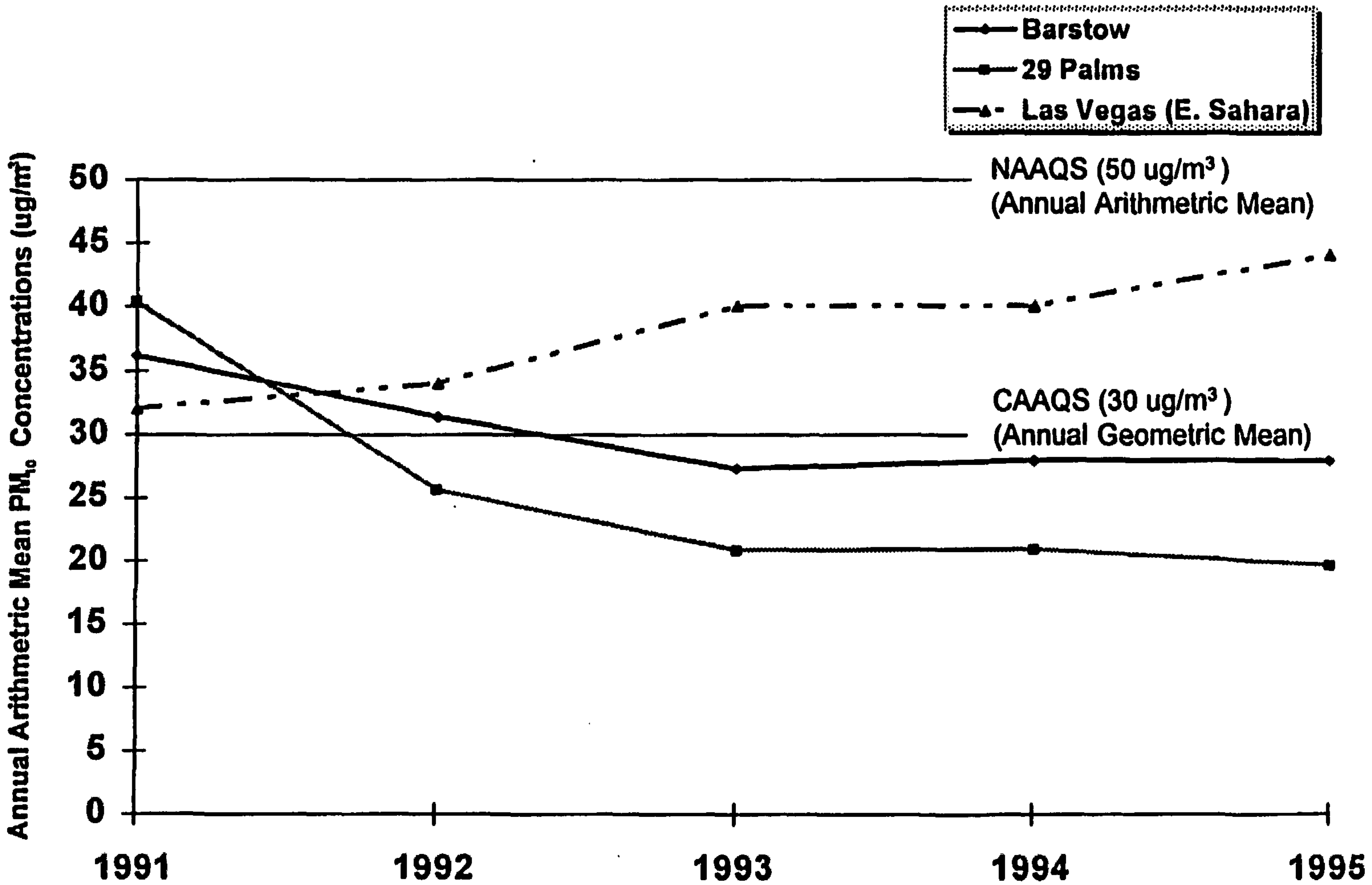

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FIGURE 3.3–12

ANNUAL ARITHMETIC MEAN PM_{10} CONCENTRATIONS

Molycorp, Inc.

Mountain Pass

DRAWN: M. Scop	DATE: 7/25/96	PROJECT NO. 1991–001	REV.
FILE NO.	CHK BY:		

1991-001-650

applicable standards given in Table 3.3-4 and are consistent with concentrations found more recently at other sites in the Mojave Desert Air Basin. No ROC values have been measured by agencies or project applicants in the vicinity of the Mountain Pass project site.

3.3.4 Water Supply/Water Quality

3.3.4.1 Hydrologic Setting

Climate in the Mountain Pass region is arid to semi-arid. Precipitation on the valley floor is approximately 3 inches per year while the higher elevations typically receive as much as 18 inches per year. Temperature extremes on the valley floor range from 10°F to 115°F (Glancy 1968). Annual temperatures within the mountains range from 0°F to 110°F. Infiltration of precipitation into the saturated groundwater zone is estimated to be between one and five percent of precipitation (Geocon 1987).

<u>Surface Drainage</u>

The mountain ranges flanking the Mountain Pass mine form two distinct watersheds that discharge surface and groundwater to the east and west of the mine site. Due to the arid to semi-arid conditions, surface runoff is ephemeral in nature and occurs in response to intense summer thunderstorms or snow melt runoff. Precipitation falling north of the mine on the south flank of Clark Mountain runs off into natural arroyos flowing westward into Shadow Valley and eastward into the Ivanpah Valley. The easterly watershed drains to Wheaton Wash and the westerly watershed drains to Shadow Valley.

The mine site is graded to drain sheet flow and normal runoff away from facilities. Surface runoff originating from the area above and surrounding the plant buildings is directed by open channels to the Jack Myers Pond (P-20A). Culverts are used to route flow beneath haul roads and plant access roads. The Jack Myers Pond is designed to store less than 15 acre feet of runoff with overflow draining to pond P-20D farther downstream. Runoff originating upstream of the North Tailings Dam is impounded behind the dam and ranges from 0.29 to 2.96 acre feet annually (GSi/Water, Inc. 1988).

<u>Groundwater</u>

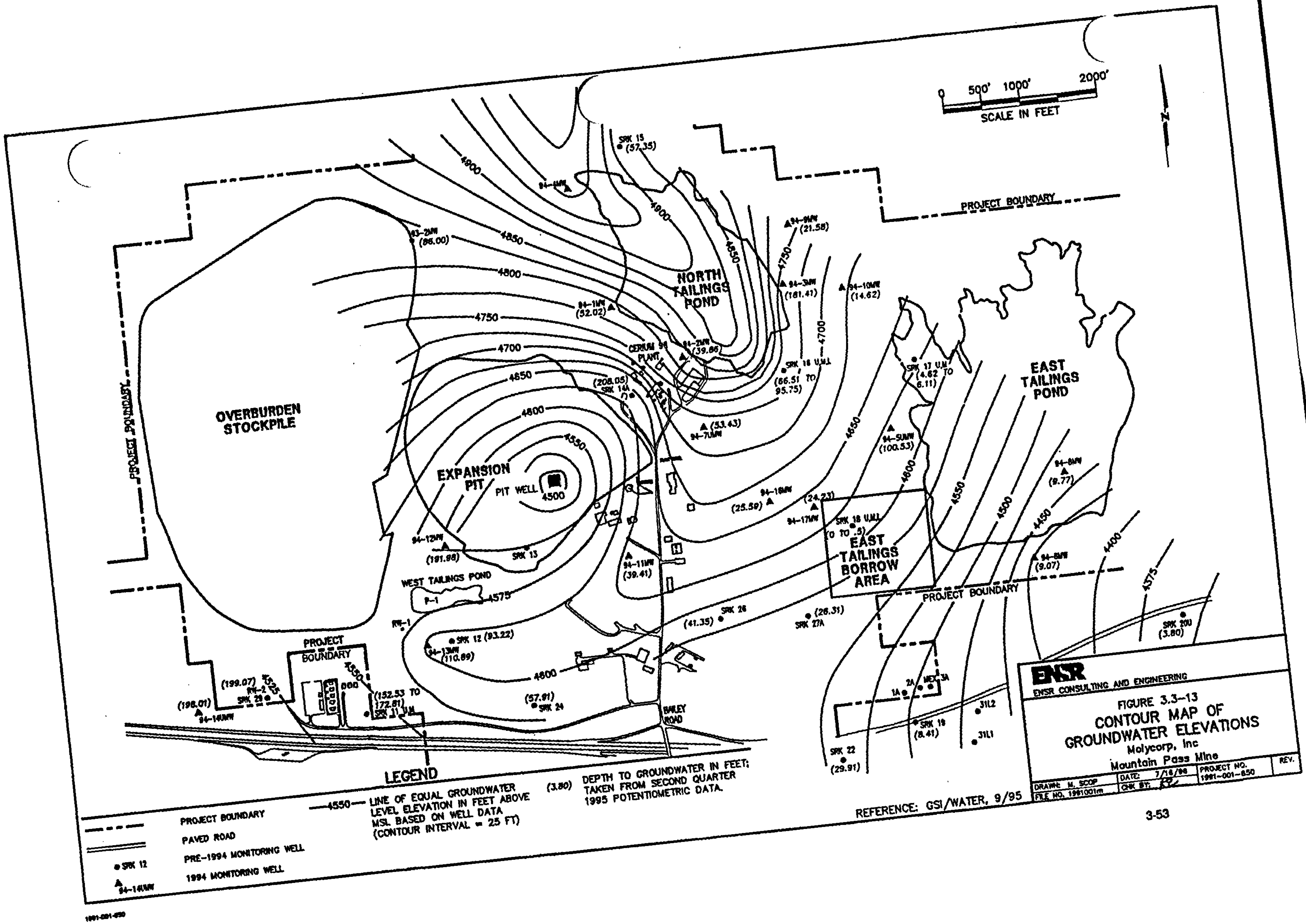
Groundwater in the vicinity of the mine occurs within coarse, unconsolidated alluvial sediments and within underlying fractured Precambrian bedrock. In general, the majority of groundwater flows eastward through the alluvium toward Ivanpah Valley and westward toward Shadow Valley. Water used at the mine is pumped from production wells located in both valleys within permeable alluvial fan deposits occurring on the margins of the valley floors. The valley centers are occupied by intermittent lakes, or playas, that are underlain by fine-grained lake-bed sediments of low permeability containing poor-quality water.

Near the mine and processing area at the crest of Mountain Pass, groundwater occurs in alluvial deposits that fill an area between the Open Pit and the mountains immediately south of Interstate 15. The pit and the North Tailings Pond (P-16) are underlain by Precambrian granite and gneiss. The axis of the alluvial deposit extends east to west and ranges in thickness from less than 10 feet southeast of the mine in Wheaton Wash to more than 800 feet southwest of the mine near the western drainage, which is the drainage extending toward Shadow Valley.

Figure 3.3-13 is a contour map of groundwater elevations that shows the general direction of groundwater flow in the vicinity of the mine. From north of the mine area, groundwater flows south through fractured bedrock and into alluvial materials. The mine pit forms a depression in the groundwater surface due to pit dewatering. The North Tailings Pond causes mounding of the groundwater surface due to local recharge by infiltrating tailings water. Groundwater flow divides near the Open Pit and flows to the southeast toward Wheaton Wash and to the southwest toward the western drainage. Groundwater contaminated by seepage from the North Tailings Pond and the inactive tailings impoundment (P-1) is intercepted and is withdrawn by a series of extraction wells in Wheaton Wash and the western drainage (Figure 3.3-13).

Seeps and small springs are located in the drainage immediately east of the mine and in Wheaton Wash where it begins to narrow. In most cases, these springs are wet areas which support woody vegetation but where the water table is just below the ground surface. Open water is only evident in the seepage collection ponds downstream of the North Tailings Pond. The seeps in Wheaton Wash are the result of thinning of the alluvial aquifer, which forces groundwater to appear at or near the ground surface.

Several springs were also identified on the U.S. Geological Survey topographic maps covering the mine area. Hardrock Queen, Groaner, and China springs are located to the south of the mine on the north facing slope of the Mescal Range. The springs are nearly half way up the mountain slopes more than 1 mile from the mine and across the major drainage leading from the mine. Flow to these springs is most likely related to infiltration of precipitation higher up in the Mescal Range. Wheaton Spring is located about 2.75 miles east of the mine in a tributary to Wheaton Wash on the upper edge of the alluvial apron extending into Ivanpah Valley. Flow from this spring is located downgradient of the mine. Burro Springs is located about 1.75 miles north of the mine and flows northeast into



0 500' 1000' 2000'
SCALE IN FEET
N
PROJECT BOUNDARY
OVERBURDEN STOCKPILE
EXPANSION PIT
PIT WELL
NORTH TAILINGS POND
CERIUM PLANT
EAST TAILINGS POND
EAST TAILINGS BORROW AREA
WEST TAILINGS POND
P-1
BAILEY ROAD
4900
4850
4800
4750
4700
4650
4600
4575
4550
4525
4500
4450
4400
4375
SRK 15 (57.35)
94-9MW (21.58)
94-3MW (161.41)
94-10MW (14.62)
83-2MW (86.00)
94-1MW (52.02)
94-2MW (39.86)
SRK 16 U.M. (66.51 TO 95.75)
SRK 17 U.M. (4.62 TO 6.11)
(208.05) SRK 14A
(53.43) 94-7UMW
94-5UMW (100.53)
94-8MW (9.77)
94-16MW (25.59)
(24.23) 94-17MW
SRK 18 U.M. (0 TO .5)
94-6MW (9.07)
94-12MW (191.88)
SRK 13
94-11MW (39.41)
SRK 26 (41.35)
(26.31) SRK 27A
SRK 20U (3.80)
RW-1
SRK 12 (93.22)
94-13MW (110.89)
(199.07) RW-2 SRK 29
(198.01) 94-14MW
(152.53 TO 172.81) SRK 11 U.M.
(57.81) SRK 24
1A 2A MEX-3A
31L2
SRK 19 (8.41)
31L1
SRK 22 (29.91)
LEGEND
PROJECT BOUNDARY
PAVED ROAD
SRK 12 PRE-1994 MONITORING WELL
94-14MW 1994 MONITORING WELL
4550 LINE OF EQUAL GROUNDWATER LEVEL ELEVATION IN FEET ABOVE MSL BASED ON WELL DATA (CONTOUR INTERVAL = 25 FT)
(3.80) DEPTH TO GROUNDWATER IN FEET; TAKEN FROM SECOND QUARTER 1995 POTENTIOMETRIC DATA.
REFERENCE: GSI/WATER, 9/95
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FIGURE 3.3-13
CONTOUR MAP OF GROUNDWATER ELEVATIONS
Molycorp, Inc
Mountain Pass Mine
DRAWN: M. SCOP
DATE: 7/18/96
PROJECT NO. 1991-001-650
REV.
FILE NO. 1991001m
CHK BY:
1991-001-650

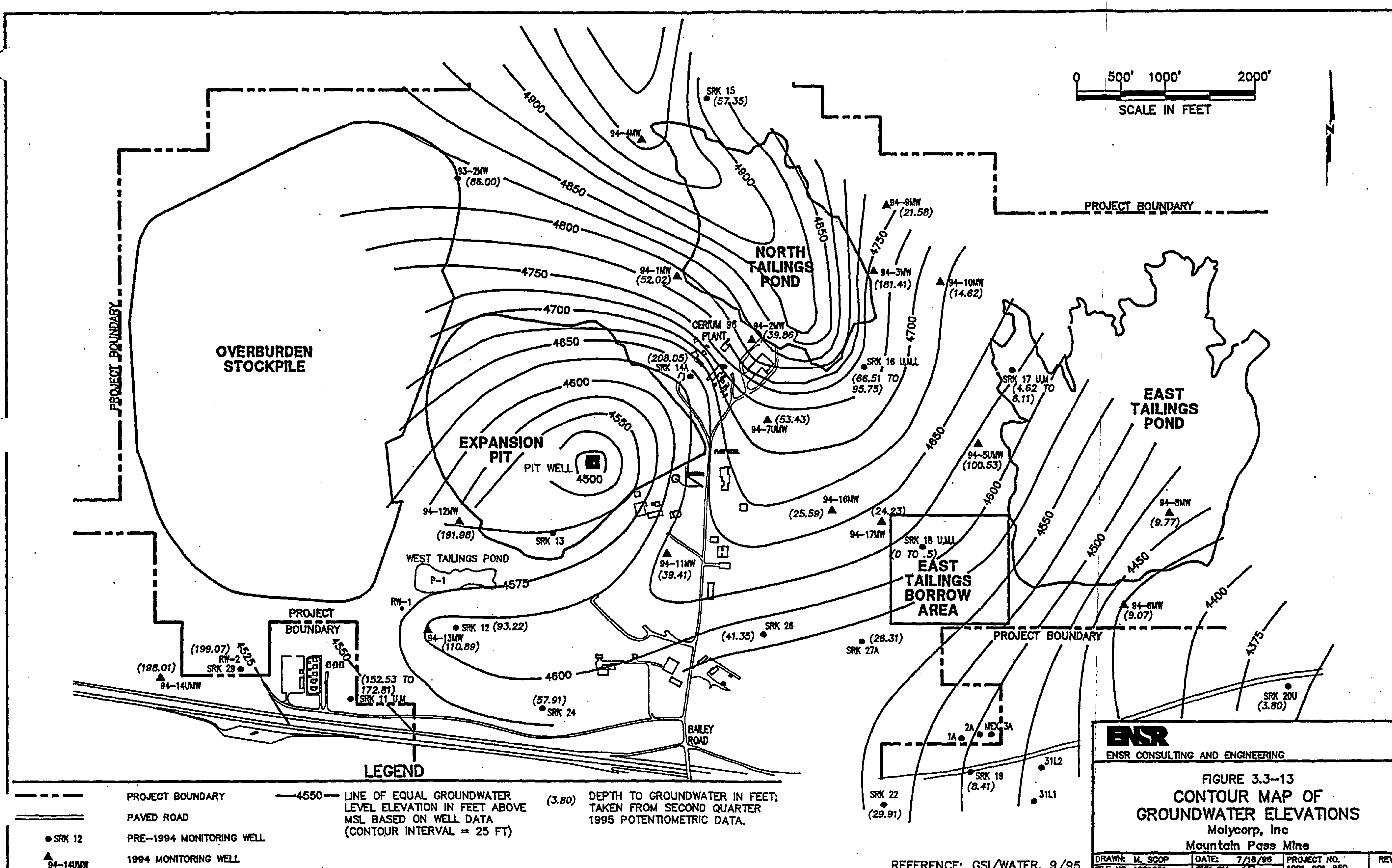
0 500' 1000' 2000'
SCALE IN FEET
N
PROJECT BOUNDARY
OVERBURDEN STOCKPILE
NORTH TAILINGS POND
EXPANSION PIT
PIT WELL
EAST TAILINGS POND
EAST TAILINGS BORROW AREA
WEST TAILINGS POND
CERIUM 96 PLANT
BAILEY ROAD
LEGEND
PROJECT BOUNDARY
PAVED ROAD
SRK 12 PRE-1994 MONITORING WELL
94-14UMW 1994 MONITORING WELL
4550 LINE OF EQUAL GROUNDWATER LEVEL ELEVATION IN FEET ABOVE MSL BASED ON WELL DATA (CONTOUR INTERVAL = 25 FT)
(3.80) DEPTH TO GROUNDWATER IN FEET; TAKEN FROM SECOND QUARTER 1995 POTENTIOMETRIC DATA.
REFERENCE: GSI/WATER, 9/95
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FIGURE 3.3-13
CONTOUR MAP OF GROUNDWATER ELEVATIONS
Molycorp, Inc
Mountain Pass Mine
DRAWN: M. SCOP
FILE NO. 1991001m
DATE: 7/16/96
CHK BY:
PROJECT NO. 1991-001-850
REV.

1991-001-850

Antimony Gulch, which in turn flows east-northeast into Ivanpah Valley. This spring crosses the surface drainage divide north of the mine within a different drainage basin. Ivanpah, Willow, Whiskey, and several unnamed springs are located more than 4 miles north of the mine on the east side of the Clark Mountains. There is no evidence that any of these springs have been developed for commercial, domestic, or agricultural use.

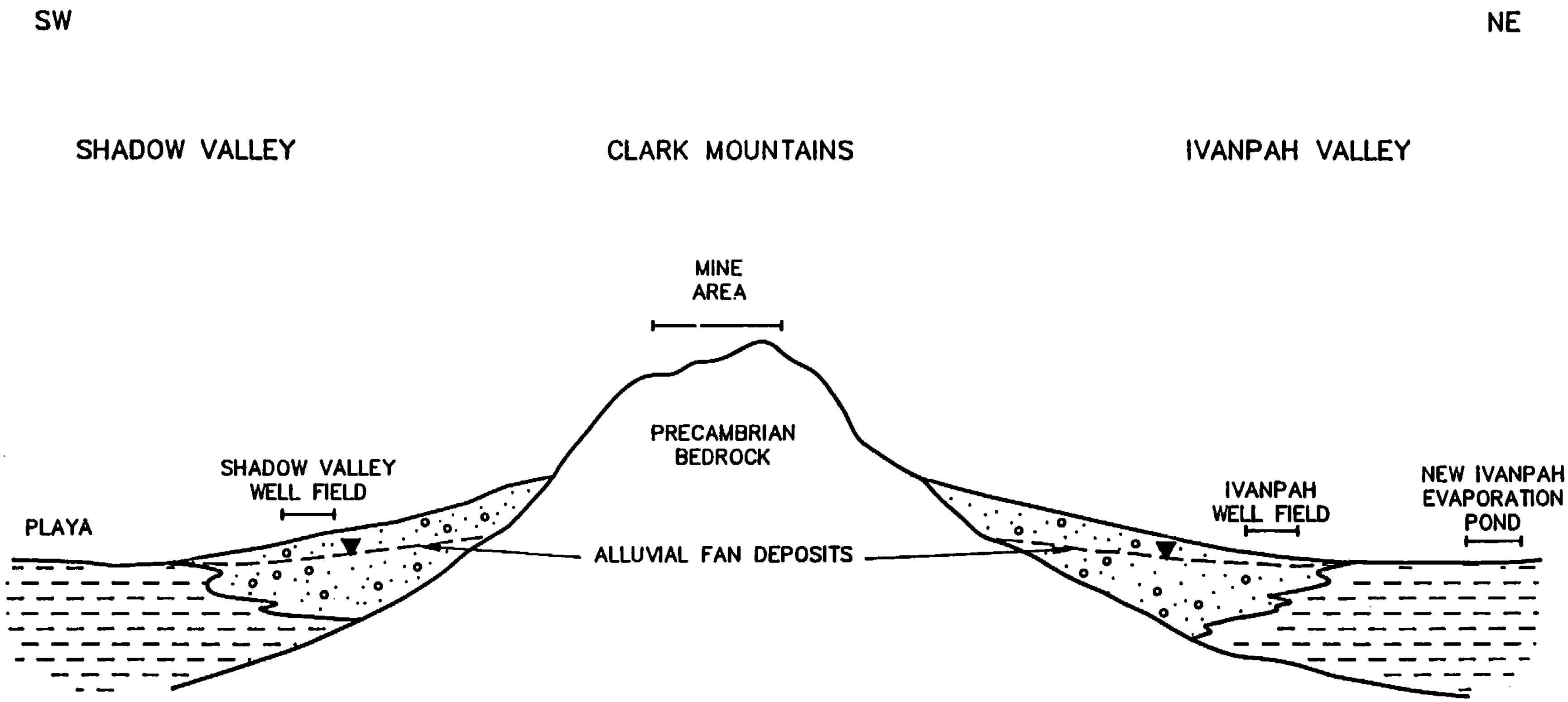
Production wells for the mine's fresh water supply are located in alluvial fan deposits in Ivanpah Valley and Shadow Valley. Figure 3.3-14 shows an idealized cross section through the Clark Mountains and the valleys to the east and west. In general, groundwater within the alluvial fan deposits is recharged by both groundwater and surface water flowing from the mountains. Groundwater flows through the fan deposits toward the center of each valley and discharges via evaporation at the playa margins or slowly seeps into the fine-grained playa deposits. The mine currently disposes of wastewater at the New Ivanpah Evaporation Pond, located near the center of the Ivanpah playa, which is the most downgradient location in the overall groundwater system within the vicinity of the mine.

Previous and current operations at the mine have impacted the local groundwater quality in the mine area due to infiltration and migration of fluids from wastewater ponds that are no longer in use and closed. Water quality and the closure status of surface impoundments are discussed in Section 3.3.4.3. The two likely sources at the mine area that continue to impact groundwater are as follows:

- P-16, North Tailings Pond, located northeast of the mine pit; seepage from the bottom of the tailings pond has migrated to the southeast toward Wheaton Wash and to the southwest toward the mine pit; and

- P-1, the old (inactive since 1984) tailings pond, located southwest of the mine pit; seepage from this pond has migrated to the southwest into the western drainage.

A major portion of the seepage from the North Tailings Pond is captured by three intercept trenches and pumped to the water treatment system. Groundwater impacts consist of high levels of total dissolved solids (TDS) which include strontium, calcium, and sodium. Groundwater extraction systems are in place in the western drainage and Wheaton Wash to intercept and withdraw contaminated groundwater and dispose of it in the New Ivanpah Evaporation Pond.



NOT TO SCALE

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FIGURE 3.3-14

IDEALIZED CROSS SECTION THROUGH MINE AREA AND ADJACENT VALLEYS

Molycorp Inc.

Mountain Pass Mine

DRAWN: M. SCOP	DATE: 2/15/95	PROJECT NO. 1991-001	REV.
FILE NO. 1991001R	CHK BY:		

1991-001-850

Section 3.2.4 includes a discussion of windblown tailings that have been deposited on the east-facing canyon slope adjacent to the southeastern portion of the North Tailings Pond (P-16). Analytical results of samples of the windblown material indicated that soluble lead was detected at a maximum concentration of 0.009 milligrams per liter (mg/l). The Soluble Threshold Limit Concentration (STLC) for lead is 5 mg/l. Soluble strontium was detected at a concentration of 0.3 mg/l and barium at 2.0 mg/l. A STLC has not been established for strontium, and the barium STLC is 100 mg/l. The Environmental Solutions report theorized that the detected soluble concentrations are due to suspended particles and not true solubility, as the source sulfate minerals and sulfides are considered to be insoluble. General mineral analyses did not indicate leachable constituent levels in excess of background and secondary water quality objectives, which are esthetic-based and non-enforceable drinking water standards listed in CCR Title 22 §64449 (Environmental Solutions 1994b).

3.3.4.2 Water Supply

Figure 3.3-15 is a schematic diagram of the water supply/disposal system for the Mountain Pass Mine showing approximate annualized average flow rates. The source of fresh water is from production wells in the valleys east and west of the mine. Recycled water from mine processing is also used. Water from production wells is blended at the mine and provided for domestic supply and for mine processing. General discharge from the Mountain Pass Mine occurs as evaporation from surface water bodies, seepage to groundwater, and disposal of wastewater to the New Ivanpah Evaporation Pond. Wastewater discharge from processing activities is gathered in a surge tank and treated prior to discharge to the New Ivanpah Evaporation Pond. The following subsections describe the elements of the existing mine water supply system in greater detail.

<u>Well Fields</u>

The Molycorp well field in Ivanpah Valley, 8 miles east of the mine, includes six producing wells, one 8-inch-diameter and one 10-inch-diameter 8-mile-long pipelines leading to the Mountain Pass Mine, and three booster pumping stations to lift the water 2,500 feet to the mine. The well depths range from 760 to 1,000 feet. Total water production from the Ivanpah Valley well field was 193 million gallons per year (Mgy), or 367 gallons per minute (gpm) or 592.4 acre feet per year, in 1993.

Well logs indicate that the main Ivanpah Valley aquifer occurs within a zone of unconsolidated sands, gravels, and lenses of red and brown clay that have been deposited from ground surface to a depth of about 350 feet. Sediments below this depth are essentially impermeable clays that are likely lacustrine in origin and reach a depth of 1,000 feet at Well

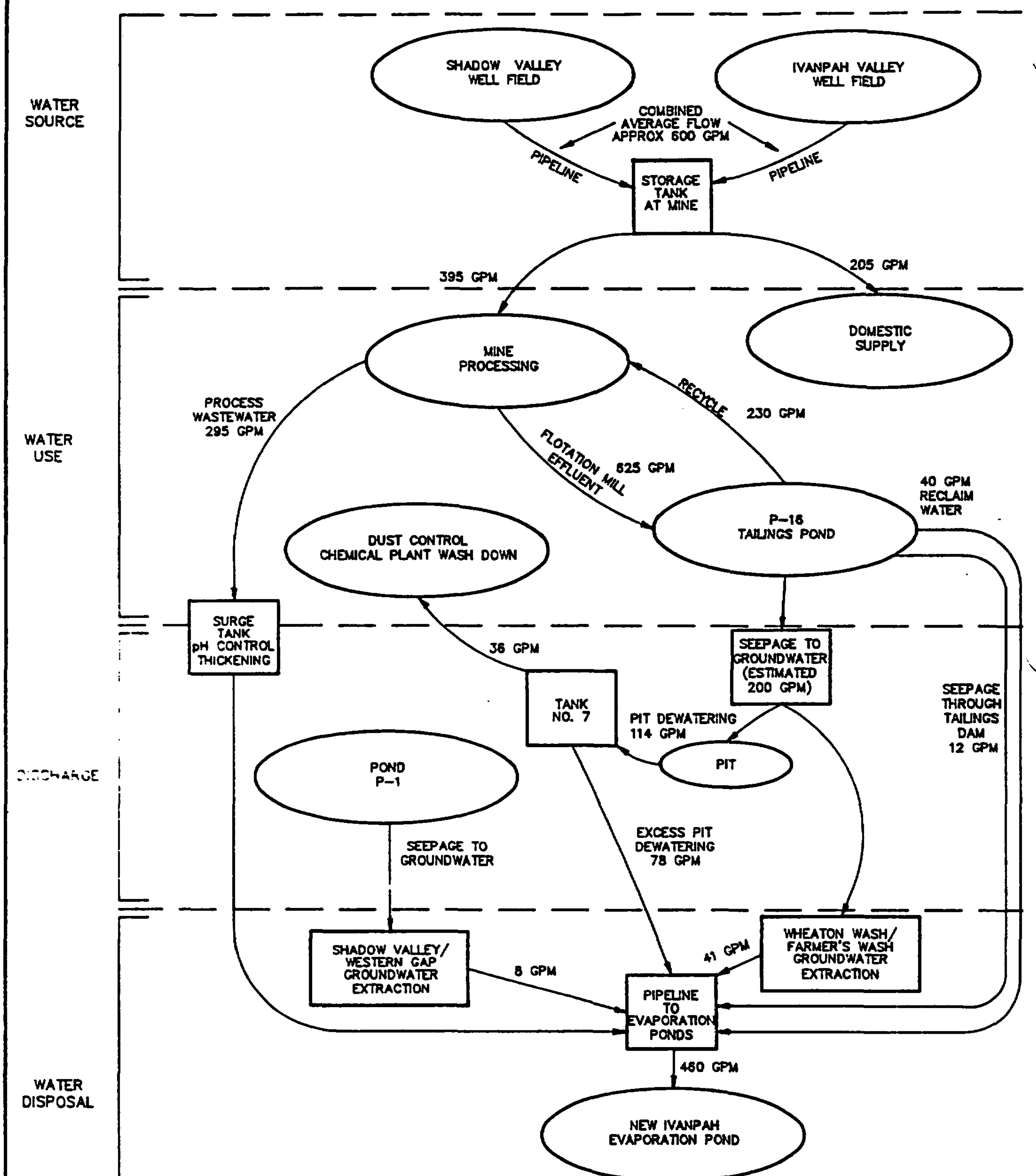


FIGURE 3.3–15. Schematic Diagram of the Water Supply/Disposal System

No. 7, but may be at greater depths in the north and east of the well field. The base of the upper water-bearing zone dips slightly eastward, essentially parallel to the ground surface. The saturated thickness of the zone ranged from 130 feet at Well No. 1 to about 170 feet at Well No. 7 during July 1979.

Individual well discharges in the Ivanpah Valley well field range from 92 to 225 gpm. The total capacity of all Molycorp Ivanpah Valley well field wells is about 1,200 gpm; however, when all wells are being pumped simultaneously, the yield is decreased because of mutual well interference and resulting excessive drawdown (Crandall and Associates 1979). Transmissivity in a north-south direction was found to be about 5,000 gallons per day per foot (gpd/ft), and about 15,000 gpd/ft in an east-west direction. Permeabilities are about 50 and 150 gallons per day per square foot (gpd/ft^2), respectively.

The water supply pipeline from Ivanpah Valley has experienced leaks in recent years on land owned by the federal government and managed by the National Park Service (NPS). Under a separate project, Molycorp has completed an Environmental Assessment (EA) with the NPS to replace the water supply pipeline (Jensen 1995). The leaks have been relatively small in terms of volume of water lost, and the pipeline is shut down when leaks are detected. Currently, the pipeline is visually monitored three times per day (once each shift). Construction of the new pipeline was completed in August 1995.

Groundwater elevations in the vicinity of the Molycorp Ivanpah Valley well field have declined an average of 2 feet per year since pumping began in the early 1950s (Leroy Crandall 1979). The total water level decline of approximately 40 feet suggests that water is being extracted at a rate greater than the natural recharge to the alluvial fan aquifer. Aquifer recharge in a typical desert basin, such as Ivanpah Valley, is minimal and is mainly derived at irregular intervals from ephemeral streams with headwaters in the mountainous areas (Lohman 1979). What little precipitation occurs either evaporates or is transpired by vegetation before it can percolate down to the groundwater. Groundwater depth is currently about 200 feet below ground surface and is expected to decline still more if the current pumping rates are maintained.

Additional fresh water for the mine operation is supplied by producing wells located in Shadow Valley, 12 miles west of the mine site. The Molycorp Shadow Valley well field includes four producing wells, a 14-inch, 12-mile-long pipeline leading to the mine, and a single booster pumping station to lift the water 1,500 feet to the mine. Total water production from the Shadow Valley well field was 152 Mgy (290 gpm) in 1993.

Groundwater beneath the eastern side of Shadow Valley occurs in alluvial fan materials, and Paleozoic carbonate rocks. Five water-bearing zones within the alluvial fan materials yield groundwater in the vicinity of Wells No. 1 and 2. Wells No. 3 and 4 are located about 2.5 miles southwest of Wells No. 1 and 2 and are in the vicinity of the Prospect Mountain Thrust fault. The Goodsprings Dolomite in this area has been fractured by faulting or contains extensive joint systems and is capable of yielding moderate volumes of groundwater.

It is likely the groundwater elevations in the vicinity of the Molycorp Shadow Valley well field have declined since pumping began in the early 1980s. The groundwater resource in Shadow Valley is likely similar to that in Ivanpah Valley in that aquifer recharge is minimal and is mainly derived at irregular intervals from ephemeral streams with headwaters in the mountainous areas (Lohman 1979). It is likely that water levels will continue to decline if the current pumping rates are maintained.

Combined fresh water production from the Molycorp Shadow Valley and Ivanpah Valley well fields is 600 gpm. Water from both well fields is fed into common holding tanks located northwest of the mine's processing facility. To ensure that the domestic water supply is in compliance with all California Code of Regulations Title 22 standards, Molycorp collects a monthly sample for bacteriological analysis. Five different locations are sampled on a rotating basis. A general mineral analysis is performed on a sample collected at each wellhead every 3 years. Radiological testing is performed for four consecutive quarters every 4 years in accordance with a sampling plan that has been approved by the San Bernardino County Health Services Division of the Public Health Department.

Water Recycling

Water from the North Tailings Pond (P-16) is recycled for use in mine processing. The tailings/water slurry deposited in the North Tailings Pond separates by gravity, forming a pond overlying the settled tailings. This water is collected by a floating pump and recycled through the Flotation Plant. The Flotation Plant processes require approximately 900,000 gallons of water per day or 625 gpm. Approximately 330,000 gallons per day (230 gpm) of this water is recycled from the North Tailings Pond, 40 to 100 gpm is supplied from pit dewatering and the remainder is made up of fresh water from the well fields.

Pit Dewatering

The mine pit dewatering system maintains the groundwater level below mining activity. This flow is pumped from a single dewatering well and has averaged 19.1 Mgy (36 gpm) for the years 1987 through 1991. From June to November 1993, the pit well pumped an average of

127 gpm to depress the water table below the 4,510-foot mining level. The effluent from the pit is directed to a water storage tank for use by the Flotation Plant, Chemical Plant as washdown water, and in repulping for the tailings neutralization of leach solution. When the tank is full, a bypass in the pit pipeline diverts excess flow into the pipeline to the New Ivanpah Evaporation Pond. Approximately 40.8 Mgy (78 gpm) is diverted in this manner to the evaporation pond. However, when the Flotation Plant is in operation, it utilizes all water from pit dewatering.

Wastewater Disposal

As shown on Figure 3.3-15 wastewater from the mine is piped from the mine to the New Ivanpah Evaporation Pond. Process wastewater consisting of discharge from the Chemical Plant, Specialty Plant, and the Cerium Plant is piped to a thickener and treated prior to release into the pipeline to the evaporation ponds. Treatment consists of the addition of caustic soda for pH control and in-line thickening to recover metals precipitated during buffering. The sludge produced by this process is recycled through the mine processing system to remove valuable products. Wastewater from contaminated groundwater extracted from Wheaton Wash and the western drainage is added to the pipeline to the New Ivanpah Evaporation Pond downstream of the thickener. The reclaim water from the North Tailings Pond, excess pit water, and seepage collected downstream of the North Tailings Dam is piped to the thickener for treatment prior to discharge to the pipeline to the New Ivanpah Evaporation Pond. The total annualized average flow rate to the New Ivanpah Evaporation Pond from all sources is approximately 315 Mgy (600 gpm).

Between 1988 and 1991, there were approximately five incidents of leaks from the wastewater pipeline. The largest leak lasted 12 to 14 hours and released an estimated 450,000 gallons of wastewater. Subsequently, Molycorp initiated a policy of monitoring the pipeline by driving its length three times a day (once each shift). Molycorp reports leaks over 1,000 gallons to the LRWQCB, which has required that wastewater pipeline leaks be reported annually in the facility Waste Discharge Report. Any leak on BLM land, NPS land, or public land is reported to the BLM and CDFG.

3.3.4.3 Water Quality

Water Quality Standards

Under the Safe Drinking Water Act (SDWA), the EPA established maximum contaminant levels (MCLs), which are enforceable standards set for public water supply systems. Generally, these standards are applied for assessment of groundwater that is a current or a potential source of drinking water, as are the Ivanpah Valley and Shadow Valley basins. MCLs incorporate factors such as detection limits, technical feasibility of achieving standards, and cost of achieving standards. In addition, secondary drinking water standards are established based on the esthetic properties of the water such as taste, odor, and color.

DTSC Sanitary Engineering Branch has adopted the federal MCLs and in some cases established more stringent drinking water MCLs. The MCLs constituents in CCR Title 22 §64431 et. seq. that may be affected due to materials and processes currently in use at the mine are listed in Table 3.3-7.

Strontium, which does not have a MCL, has also been detected in effluent from the site. As listed in CCR Title 22 §64431, fluoride also has a MCL ranging between 1.4 and 2.4 micrograms per liter (µg/L) depending upon the temperature of water.

Secondary esthetic-based and non-enforceable drinking water standards listed in CCR Title 22 §64449 are included in Table 3.3-8.

National ambient water quality criteria (WQC) have been established for evaluating the toxic effects of compounds on human health and aquatic organisms. WQCs will generally apply when no MCL exists for a contaminant, or when the contaminated water is discharged to surface water where the contaminant could affect aquatic organisms. Since the site does not support aquatic organisms, WQCs may only be applicable if MCLs are not available for compounds of concern.

Groundwater from the Ivanpah and Shadow Valley well fields is the source of potable water to other users, including the nearby school and Caltrans and California Highway Patrol (CHP) offices, and may be classified as "potential source of drinking water and water having other beneficial uses" (Groundwater Protection Strategy, U.S. EPA, 1984), which is a Class IIA designation. For these reasons, MCLs and acceptable levels (ALs) established by the DTSC are relevant.

Proposition 65 no-significant-risk levels (NSRLs) have been established for known human carcinogens and reproductive toxins (CCR Title 22, §12701 et. seq.); NSRLs are converted into concentrations in water and used by the State Water Resources Control Board to draft WQC. Levels of exposure deemed to pose no significant risk may be determined by the lead agency pursuant to the guidelines set forth in CCR Title 22 §12703. If these NSRLs are exceeded, there may be reporting requirements for the site.

TABLE 3.3-7

Maximum Contaminant Levels (MCLs) of Materials Used Onsite Organic and Inorganic Chemicals

Constituent	Maximum Contaminant Level (mg/l)
Benzene	0.001
Ethylbenzene	0.680
Xylene	1.750
Barium	1.0
Fluoride	1.4 to 2.4 depending on air temperatures
Lead	0.015
Nitrate (as NO_3)	45
Source: CCR Title 22 §64431 and §64444.	

TABLE 3.3-8

Secondary Drinking Water Standards

Constituents	Maximum Contaminant Levels		
Color	15 units		
Copper	1.0 mg/L		
Corrosivity	Relatively low		
Iron	0.3 mg/L		
Manganese	0.05 mg/L		
Odor - Threshold	3 units		
Foaming Agents	0.5 mg/L		
Thiobencarb	0.001 μg/L		
Turbidity	5 units		
Zinc	5.0 mg/L		
	Recommended	Upper[1]	Short Term[2]
Total Dissolved Solids, mg/l	500	1,000	1,500
Specific Conductance, micromhos	900	1,600	2,200
Chloride, mg/l	250	500	600
Sulfate, mg/l	250	500	600

1 Constitute concentrations ranging to the upper contaminant level are acceptable if it is neither reasonable nor feasible to provide more suitable waters.
2 Constitute concentrations ranging to the short term contaminant level are acceptable only for existing systems on a temporary basis pending construction of treatment facilities or development of acceptable new water sources.
Source: CCR Title 22 §64449. (December 15, 1994)

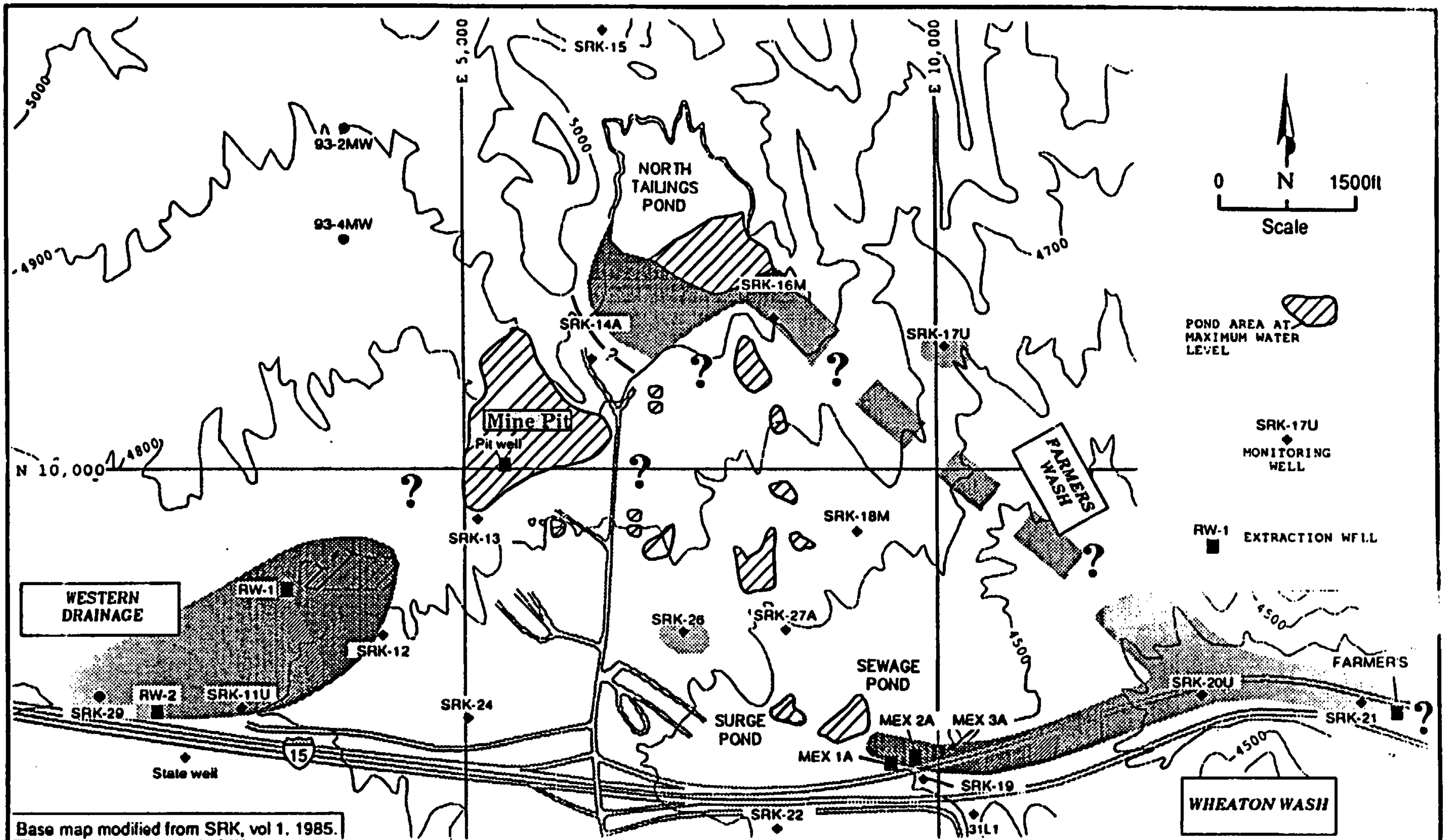
Production Well Quality

The chemical character of groundwater pumped from the Ivanpah Valley well field is predominantly described by its elevated concentration of sodium chloride content, which is characteristic of arid zone groundwater basins. The water is generally suitable for drinking water with the exception of the fluoride concentration, which exceeds California drinking water standards.

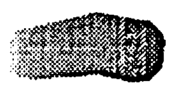
The chemical character of water pumped from the Shadow Valley well fields is generally described as sodium/calcium sulfate (Leroy Crandall 1980a, 1980b, 1982). Conductivity ranges from 750 to 1,000 micromhos, which is below the MCL of 1,600. Trace elements are present at levels below the MCLs or at levels below the detection limit. The MCL for fluoride is dependent on the annual average maximum daily air temperature, which must be obtained for a minimum 5-year period (Title 22 CCR §64431 (a)(b)). Molycorp is collecting air temperature data to develop a 5-year record. Meanwhile, the MCL can only be estimated based on short-term temperature records. Previous samplings of one of Molycorp's wells in Shadow Valley indicated that the fluoride levels exceed the MCL while the remaining wells are at or below the MCL. Recent testing indicates that fluoride levels in all Shadow Valley wells are below the MCL. Nevertheless, water from all wells in the well field is mixed and treated by reverse osmosis to ensure delivery of potable water with fluoride levels below the MCL. The water testing program conducted by the mine on the domestic water supply is designed to ensure that the actual fluoride levels within drinking water are in compliance with MCLs.

Groundwater Quality in Mine Area

Previous and existing operations at Mountain Pass have resulted in impacts to groundwater due to the infiltration and migration of highly mineralized water from tailings impoundments. The impacts are due to two main sources: historic seepage from the inactive tailings pond (P-1) southwest of the open pit, and seepage from the North Tailings Pond (P-16) located northeast of the pit. Figure 3.3-16 shows the distribution of contamination from these two sources. Contaminated seepage from the North Tailings Pond moves to the southeast toward Wheaton Wash and to the southwest toward the Open Pit. Contaminated groundwater under P-1 has migrated to the southwest of the pond and will continue to migrate toward the western drainage where it is intercepted by deep groundwater extraction wells. However, the gradient under P-1 has been reversed and, due to the cone of depression under the pit, is now moving toward the northeast (see Figure 3.3-13). Contamination also appears to come from the sewage pond and from former unlined wastewater ponds and moves to the east toward Wheaton Wash. The surge pond has been out of service since January 1989 and was clean-closed in 1991.



Explanation



In process interpretation of extent of impact on ground water using velocity calculations and distribution of impacted and non-impacted wells

Base map contour interval = 100ft

Reference: GSI/Water 4/25/94

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FIGURE 3.3–16
DISTRIBUTION OF CONTAMINATION IN GROUNDWATER
Molycorp, Inc.
Mountian Pass Mine

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Groundwater Migration Rates and Transport Distances

Contaminant transport pathways from the North Tailings Pond (P-16) to the south and east are not clearly defined but estimates of seepage velocity confirm that contaminants from the pond could have migrated to Wheaton Wash since the pond was constructed in 1966. GSi/Water (1988) estimated the maximum extent of contaminant migration eastward along Wheaton Wash at 6.5 miles. Data summarized by Environmental Solutions, Inc. (1994) suggest the likelihood of contaminant migration down Farmer's Wash to the head of Wheaton Wash. The most permeable deposits on the site are the shallow alluvial deposits located within ephemeral washes. Weathered and fractured bedrock occurring within the 30 feet underlying the bedrock-alluvium interface is also reportedly permeable with seepage velocities ranging from 300 to 1,800 feet per year (Environmental Solutions, Inc. 1994). Travel time southeast from the impoundment to the head of Farmer's Wash through the most permeable fractured bedrock was estimated at 1 year (Environmental Solutions, Inc. 1994).

Using hydraulic data summarized by Environmental Solutions, Inc. (1994a) and Darcy's Law, seepage from the North Tailings Pond could migrate to the east through fractured bedrock to the shallow alluvium in Farmer's Wash and then down to Wheaton Wash within approximately 4 years. From the map of groundwater elevations (Figure 3.3-13), it can be seen that the gradient at the southeast corner of the North Tailings Pond is to the southeast toward Farmer's Wash. Seepage velocity (v) from Darcy's Law (Freeze and Cherry 1979) is defined as follows:

$$v = Ki/n$$

where:

K = hydraulic conductivity
i = hydraulic gradient
n = effective porosity

Substituting distance (d) divided by time (t) for velocity and rearranging, the travel time (t) may be expressed as:

$$t = dn/Ki$$

Travel time down Farmer's Wash to the head of Wheaton Wash was calculated at 3 years assuming a hydraulic conductivity for the shallow alluvium of 1×10^{-2} centimeters per second (cm/sec) (SRK 1985), hydraulic gradient of approximately 5 percent, effective porosity of 0.25, and distance of about 6,000 feet. By adding this result to the travel time for seepage to migrate from the impoundment to Farmer's Wash, the result is 4 years. These calculations are based on the reasonable assumption that groundwater will follow the path of least resistance and will flow through the aquifer with the highest hydraulic conductivity, i.e. the shallow alluvium. In addition, the common ions of concern which comprise total dissolved solids (TDS) are known to travel at the advective velocity; that is, at the same rate as groundwater.

Molycorp has established a groundwater monitoring and extraction program to control the movement of contaminated groundwater to the east and west from the mine and processing area. Table 3.3-9 presents a summary of monitoring wells and their general locations in the mine area. Monitoring well locations are shown on Figures 3.3-13 and 3.3-16. Groundwater is extracted from several locations and piped to the New Ivanpah Evaporation Pond for disposal. Extraction wells RW-1 and RW-2 are located downgradient from inactive pond P-1 to control seepage of contaminated groundwater down the western drainage toward Shadow Valley.

Extraction well locations are also shown on Figure 3.3-16 and Plate 1. Extraction wells MEX 1A, MEX 2A, and MEX 3A are located in Wheaton Wash downgradient of the sewage pond, near a bedrock outcrop. The Farmer's Wash extraction well is located in Wheaton Wash downstream of the confluence with Farmer's Wash. Seepage flowing to the southwest from the North Tailings Pond is drawn into the Open Pit by the current dewatering operation. Hence, the pit well functions secondarily as an extraction well for contaminated groundwater control.

On October 7, 1994, Molycorp met with the LRWQCB to plan additional seepage control activities for the North Tailings Pond. Molycorp agreed to install additional trenches and extraction wells that will divert seepage back to the pond. In April 1996, Molycorp submitted its conceptual plan to capture seepage from the North Tailings Pond. As discussed in Section 2.5.2.4, this plan presents the results of drilling and test pumping programs conducted in compliance with LRWQCB Order 6-91-836.

Table 3.3-10 presents a summary of groundwater quality for monitoring wells installed in the vicinity of the Mountain Pass Mine. Wells representative of each area of interest (Wheaton Wash, western drainage, pit well) are summarized from the most recent summary of hydrologic data for the mine (GSi/Water 1994). The highest levels of contamination occur in monitoring wells SRK-11U, SRK-12, and SRK-29, which are located in the western drainage downgradient of inactive tailings pond P-1. Extraction wells RW-1 and RW-2 contain similar concentrations of contamination as they were installed to extract contaminated groundwater and control movement of contaminants toward the western drainage. TDS are present at average levels ranging from 10,300 mg/l to 39,100 mg/l, as compared to the MCL for TDS of

TABLE 3.3-9

Monitoring Well Locations

Well Location	Well Identifier
Western Drainage	SRK-11U, -11M, -12, -24, and -29, 94-13, 94-14U&L
Central Mine Site	SRK-26, SRK-27A, 94-7U&L, 94-11, 94-16, and 94-17
Wheaton Wash Gravel Overburden	SRK-19, -20U, -21, and 94-15U
Wheaton Wash Bedrock	SRK-22 and -20M, and 94-15L
Farmers Wash	SRK-17U, 94-6 (gravel overburden) and SRK-17M, 94-8 (bedrock)
North Tailings Pond (P-16)	SRK-16U, -16M, and -16L (bedrock-south); SRK-18U and -18L (gravel overburden); SRK-15 (bedrock-north); 94-1, 94-2, 94-3 (bedrock)
Company Landfill	93-1, 94-4
Community Landfill	93-2, 93-4
New Ivanpah Evaporation Pond	MW-1, MW-2, MW-3, MW-4
Old Ivanpah Evaporation Pond	IER-1, IER-2, IER-3

1,000 mg/l. Since the fourth quarter 1991, lead has not been detected in concentrations exceeding the MCL. Prior to the fourth quarter 1991, higher detection limits were reported and there were wells that had lead concentrations above the detection limit.

The average lead concentrations shown on Table 3.3-10 may be artificially high since data from as far back as 1985 is utilized to calculate the average. The occasional lead hits and higher detection levels prior to 1991 artificially bias the data to show higher lead levels than actually exist. Molycorp believes that lead will continue to occur below the detection level and below the MCL in the future. Contaminant levels are similar for the remaining monitoring wells because they are impacted by seepage from the North Tailings Pond.

Monitoring well SRK-29 is located downgradient of extraction well RW-2, and contains contaminants that may have migrated beyond the extraction well prior to its installation in 1985 (Table 3.3-10). Monitoring wells installed in 1994 (94-14UMW and 94-14LMW) indicate that contamination may extend only 300 feet to the west of SRK-29. Hence, the leading edge of a contaminated groundwater plume is slowly moving to the west toward Shadow Valley, although it is reduced from the original source by the extraction wells.

TABLE 3.3-10

Summary of Concentrations in Groundwater (mg/l)

Well Identification No.	TDS	Lead[1]	Strontium	Barium	Nitrate
Pit Well	3,133	0.0015	64.8	0.13	25.1
Wheaton Wash					
SRK-19	2,191	0.0188	15.8	0.12	15.8
SRK-20U	5,834	0.0224	38.2	0.21	7.0
Mexican	3,389	0.0141	40.4	0.13	34.7
Farmer's	3,542	0.0053	35.9	0.20	14.4
94-15UMW	744	0.0020	2.6	0.17	1.2
94-15LMW	2,310	0.0018	20.7	0.11	7.4
SRK-20M	570	0.0854	3.0	0.11	0.3
SRK-22	697	0.0499	4.6	0.11	1.9
SRK-21/21A	3,838	0.0565	38.3	0.10	25.8
Western Drainage					
SRK-11U	16,507	0.2629	206.0	1.65	29.6
SRK-12	37,861	0.1250	404.5	10.77	45.9
SRK-29	10,590	0.0041	41.1	2.65	20.1
RW-1	16,733	0.0196	338.1	8.70	19.5
RW-2	11,383	0.0017	40.6	3.05	15.6
94-12UMW	7,953	0.0054	36.5	1.29	103.8
94-13UMW	37,000	0.0081	811.3	6.51	3.0
94-14UMW	17,429	0.0076	35.0	5.21	12.2
94-14LMW	459	0.0327	0.6	0.31	2.8
SRK-11M	808	0.0423	13.1	0.25	3.9
SRK-24	1,020	0.0481	5.3	0.30	12.8
New Ivanpah Evaporation Pond					
MW-1	—	0.13	28.4	—	6.89
ME-4	—	0.05	7.5	—	6.27
MW-2	—	0.16	6.1	—	39.41
MW-3	—	0.09	7.0	—	87.04
MW-4	—	0.03	5.7	—	5.98
ME-3	—	0.06	1.39	—	6.72
ME-8	—	0.07	4.2	—	3.46
ME-5	—	0.11	23.7	—	2.15
ME-2	—	0.11	21.2	—	6.61
ME-7	—	0.15	13.0	—	7.33
MCL	1,000	0.015	—[2]	1.0	45

1 High lead levels encountered in sampling from the fourth quarter of 1985 to the third quarter of 1991. Since the fourth quarter of 1991, lead levels have been below detection levels.
2 There is currently no MCL for strontium.

Source: GSI/Water 1996b.

The alluvial aquifer through which the majority of groundwater flow and contaminant transport occurs is more than 900 feet thick near the wells in the western drainage. Monitoring well SRK-29 is about 250 feet deep while extraction well RW-2 is about 520 feet deep. Hence, the full depth of groundwater contamination has not been completely delineated, and it is possible that the contaminants may bypass RW-2 at depths not intercepted by well pumping. Hence, groundwater contamination control for the western drainage wells does not appear to be completely effective, and contaminated groundwater could be moving to the west toward Shadow Valley.

The Farmer's Wash extraction well is located in Wheaton Wash where shallow bedrock, as indicated by the presence of bedrock outcrops, and thin alluvium forces the majority of groundwater flow to within 10 feet of the ground surface. The full depth of the alluvium and the extent of groundwater flow within the alluvium are well defined. Two monitoring wells downgradient of the Farmer's Wash extraction well (94-15UMW and 94-15LMW) indicate reduced level of contaminants from groundwater (see Table 3.3-10).

Groundwater Quality in Ivanpah Valley

Table 3.3-10 shows groundwater quality for one monitoring well in Ivanpah Valley near the New Ivanpah Evaporation Pond. Monitoring well ME-4 is located at sufficient distance from the pond to be considered representative of background water quality (GSi/Water 1994). The ponds were designed to allow seepage of about 10 percent of the total inflow to the ponds. The salinity of the pond inflow (average of about 22,000 mg/l) is roughly half the salinity (about 55,000 mg/l) of the groundwater underlying the playa.

Wastewater Quality

Wastewater from the extraction wells, excess pit dewatering, and reclaim water from the North Tailings Pond is collected and piped to the New Ivanpah Evaporation Pond. Discharge to the evaporation pond is via a 13-mile-long, 8-inch-diameter pipeline. Total average annual discharge to the evaporation ponds is approximately 315 Mgy (600 gpm), as follows:

- 221 Mgy (420 gpm) or 475.6 acre feet per year from processing activities
- 26 Mgy (49 gpm) or 79.8 acre feet per year from the extraction wells
- 41 Mgy (78 gpm) or 125.8 acre feet per year from the pit dewatering
- 27 Mgy (51 gpm) or 82.8 acre feet per year from the North Tailings Pond reclaim water

To ensure that no liquid hazardous wastes are discharged to the New Ivanpah Evaporation Pond from mine operations, a 369,000-gallon surge tank is used to treat collected wastewater from the Chemical Plant, Specialty Plant, and the Cerium Plant, and provide surge control. Wastewater is treated with caustic soda for pH adjustment, and two in-line thickeners remove, recover, and recycle solids that contain metals which precipitate during buffering. The New Ivanpah Evaporation Pond has been permitted as an evaporation-infiltration pond under LRWQCB Order 6-90-41, and was designed to allow maximum evaporation of the wastewater. As designed and permitted, approximately 10 percent of the discharge is expected to be lost as seepage to the playa subsurface (GSi/Water, Inc. 1994). This could result in local subsurface mounding and potential lateral spreading as the wastewater mixes with the underlying groundwater.

The New Ivanpah Evaporation Pond is underlain by low permeability silty clay saturated with saline groundwater (average salinity concentration of 50,000 mg/l, approximately 90 feet below ground surface). Comparison to drinking water and livestock standards of 1,000 and 10,000 mg/l TDS, respectively, indicates that this groundwater is not potable and not desirable for livestock. TDS concentrations in the wastewater range from 20,000 to 50,000 mg/l. Table 3.3-11 shows a summary of wastewater quality characteristics for discharge to the New Ivanpah Evaporation Pond.

Hydrological assessments found that there were no active lateral groundwater migration routes from the evaporation pond to the playa margins where usable groundwater is found.

A perimeter dike of compacted clay material was constructed to prevent any possible lateral movement of ponded wastewater.

Groundwater extracted from extraction wells at the western drainage and Farmer's Wash and Mexican well extraction systems (49 gpm) is not treated prior to discharge at the New Ivanpah Evaporation Pond. Seepage from the North Tailings Dam (51 gpm) is either discharged into the wastewater pipeline from the Specialty Plant, pumped into a surge tank for recycling in the Flotation Plant, or pumped to the North Tailings Pond through a sprinkling system to enhance evaporation and for dust control.

Table 3.3-12 lists the current status of closed and inactive, lined and unlined impoundments, and Table 3.3-13 lists active surface impoundments and their use related to the Mountain Pass Mine project. The West Tailings Pond (P-1) is undergoing active closure under the direction of the LRWQCB. The wastewater ponds collected process water from the Chemical Plant similar in composition to what is currently being sent to the New Ivanpah Evaporation Pond. Sludge removed from the bottom of the wastewater ponds (basically a lanthanide

TABLE 3.3-11

Summary of Wastewater Discharge Characteristics - New Ivanpah Evaporation Pond

Parameter	Range*
pH	7.5-9.0
TDS	20,000-50,000 mg/l
Calcium	100-2,000 mg/l
Magnesium	60-100 mg/l
Sodium	100-2,000 mg/l
Chloride	1,000-25,000 mg/l
Sulfate	100-800 mg/l
Nitrogen (as Nitrate)	60-200 mg/l
Lead	<0.02 mg/l
Strontium	400-2,000 mg/l
Zinc	2-130 mg/l

* Ranges developed from Molycorp 1989 monitoring data for New Ivanpah Evaporation Pond discharge.

TABLE 3.3-12

Closed and Inactive Mountain Pass Mine Surface Impoundments

Pond Number	Description	Use	Closure Date
Previously Closed Ponds			
P-5	Barite Storage	Barite Product	1990
P-9	Russell's Pond	Storage Sm/Gd Liquor	1987
P-10	Above Ground	Prod. Stor. after Liquid	1994
P-12	Unlined Pond	Decant	1990
P-13	Unlined Pond	Collect Cerium Product	1990
P-14	Frosty's Overflow	Collect Cerium Product	1987
P-18	Surge Pond	Tailings Water	1990
P-20B	Wastewater	Waste Management	1987
P-20C	Wastewater		1987
P-20E	Wastewater		1987
P-20F	Wastewater		1987
P-20G	Wastewater		1987
P-	Wastewater		1987
21/3A	Wastewater		1987
P-22A	Wastewater		1987
P-22C	Wastewater		1987
P-22D	Tails Seepage		1987
P-23C	Old Ivanpah Evaporation Ponds	Tailings Water	1991

Planned for Closure (Inactive)			
P-1	West Tails	Tailings and Wastewater	1997
P-3	South Pond	Tailings	1997
P-4	Leach Liquor Overflow	Leach Liquor	1997
P-15	Reagent Spillage and Intermediate Ore Concentrate	Mill Reagents	1997
	Seepage Control		
P-23A	Seepage Control	P-16 Seepage	1998
P-23B		P-16 Seepage	1998
Inactive Lead Ponds			**Classification**
P-8	Old Lead Pond	Lead Sulfide	Inactive, initial stages of closure
P-11	New Lead Pond	Lead Sulfide	"
P-24	Old Lead Ponds	Lead Sulfide	"

TABLE 3.3-13

Active Mountain Pass Mine Surface Impoundments

Pond Number	Description	Use	Classification
P-2	Mill Containment System	Prod. Stor. after Liquid Decant	Storage
P-6	Fresh Water Lagoon	Office Pond	Storage
P-7A	Asphalt Pad	Filter Cake Storage	Storage
P-7B	Asphalt Pad	Filter Cake Storage	Storage
P-16	Main Tailings Pond	Tailings Impoundment	Disposal
P-19	Sewage Lagoon	Sewage Treatment	Disposal
P-20A	Stormwater Runoff	Stormwater Runoff Control	Control
P-20D	Stormwater Runoff	Stormwater Runoff Control	Control
P-25A	Asphalt Pad	Storage of Dewatered Products	Storage
P-25B	Membrane-lined Pond	Prod. Stor. after Liquid Decant	Storage
P-28	Membrane-lined Pond	Product Storage	Storage
---	New Ivanpah Evaporation Pond	Process Wastewater	Disposal

Reference: Lilburn Corporation 1994

chlorohydrate) was transferred to the West Tailings Pond (P-1) for permanent in-place burial. All lined and unlined ponds used for wastewater disposal have been clean-closed and none of these former pond areas are currently being utilized.

3.3.5 Open Space/Recreation/Scenic

3.3.5.1 Open Space/Recreation

There are no developed or dispersed recreation resources, or identified open space areas on the project site. Existing open space/recreation resources in the general vicinity (Figure 3.3-17) of the project area include:

- Clark Mountain Wilderness Study Area, a portion of the Mojave National Preserve that is administered by the NPS, is located approximately 1.3 miles north/northwest of the project area.

- Mojave National Preserve, an area consisting of federal lands totaling approximately 1.5 million acres. The Mojave National Preserve has been so designated largely for its special scenic qualities. This remote area of the "Old West" is a territory of natural landscapes, historic resources, and open space. Also called the "lonesome triangle", the Mojave National Preserve is roughly bounded by Interstates 15 and 40, and the Nevada state line. The BLM has previously taken actions to emphasize retention of the natural scenic qualities of the area while allowing continuation of mining, livestock grazing, and dispersed recreational use. The Mojave National Preserve is located north, west, and south of the project area.

- Mojave Heritage Trail consists of a series of existing roads, including mining roads, in the general vicinity of the project area. A branch of the trail passes to the west of the mine along Clark Mountain Road. At present, the Mojave Heritage Trail receives little public use. However, with the recent publication of guide books that describe the location and characteristics of the trail, public use is expected to increase as time goes on.

- The Clark Mountains are generally located north/northeast of the project area. A canyon on the south side facing Mountain Pass is used for primitive camping. Hiking opportunities are abundant in the Clark Mountain area.

- Dinosaur Trackway is located approximately 3 miles south/southeast of the project area. This is the only site in California where dinosaur tracks are known to exist.

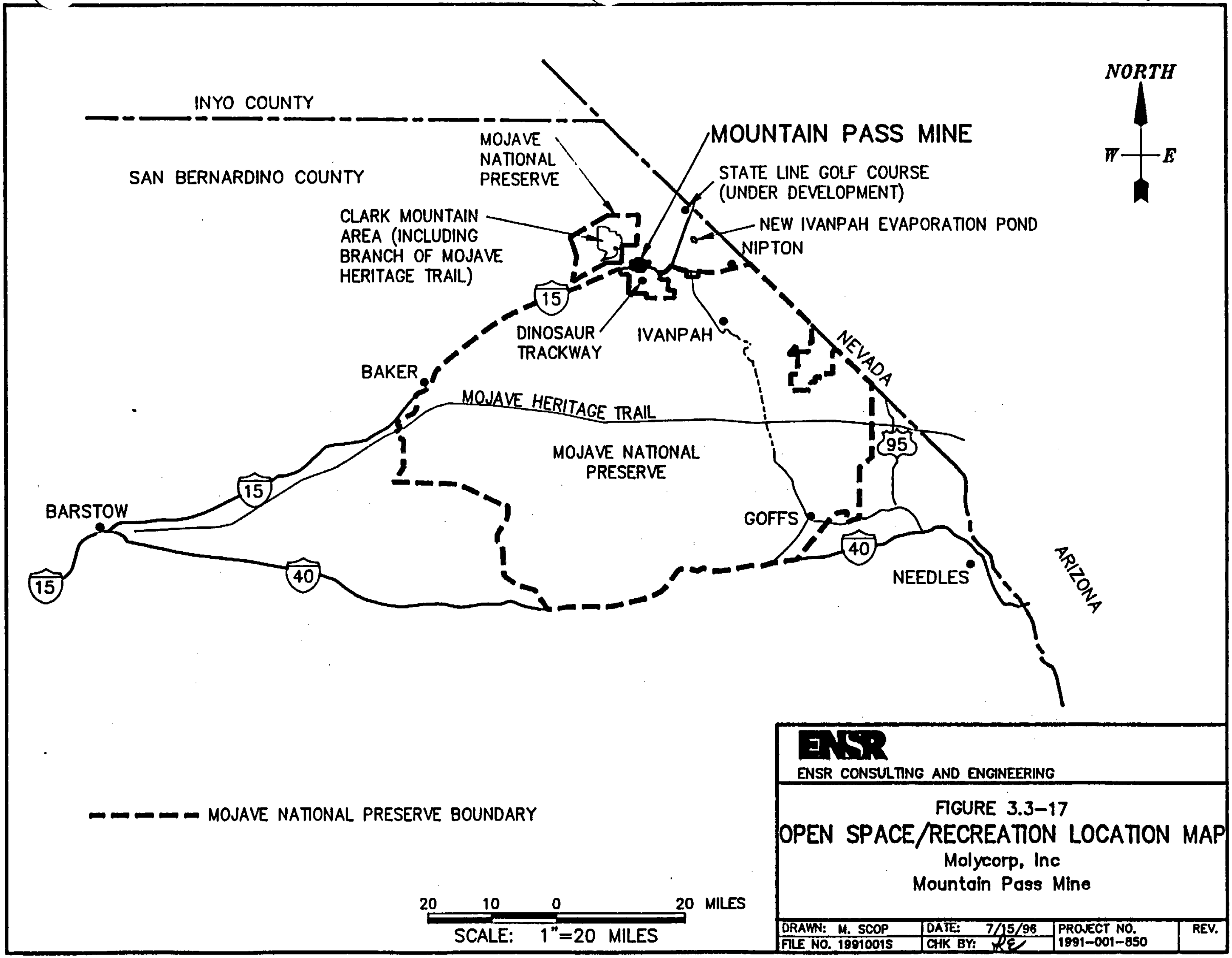

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FIGURE 3.3-17

OPEN SPACE/RECREATION LOCATION MAP

Molycorp, Inc

Mountain Pass Mine

DRAWN: M. SCOP	DATE: 7/15/96	PROJECT NO. 1991-001-850	REV.
FILE NO. 1991001S	CHK BY:		

1991-001-850

3.3.5.2 Scenic Resources

The high desert region in which the Mountain Pass Mine is located is characterized by broad, sweeping valleys separated by rugged north-trending mountain ranges. Topography in the immediate vicinity of the project consists of rolling hills and gently sloping plains backed by sharply rising higher peaks and ridges. The Clark Mountain Range rises to the north of the project. The Mescal Range rises to the south. The landscape drops into broad valleys to the east and west.

Vegetation in the project area has a relatively consistent appearance. Vegetation is characterized by various yuccas with a predominance of Joshua tree, larger shrubs such as paper-bag bush, thornbushes, a host of lower shrubs such as blackbrush and hop-sage, cacti which include beavertail and deer-thorn cholla, and grasses including big galleta grass and desert stipa. Areas of ongoing disturbance in the project area are barren. Vegetation colors range from bright green to grey-green with olive, brown, and golden tan.

Creekbeds in the project area, when noticeable at all, appear as dry washes most of the year. Natural colors in the vicinity of the project are limited to muted earth tones. The gravelly, sandy soils show a range of colors from light to medium brown. These are tinted with tones of grey and tan with some subtle hints of red.

Human-made structures in and around the project area include roads (Interstate 15, two-lane paved roads, and a network of unpaved roads), overhead utility lines ranging from extra-high voltage transmission lines supported by steel lattice towers to electrical distribution lines strung on wood poles, communications facilities on prominent peaks, and a variety of buildings, most of which are concentrated in the central and eastern portions of the Mountain Pass Mine site.

During the past 40 years, mining activities have created a single Open Pit for the extraction of ore and substantial Overburden Stockpiles that contain non-ore bearing waste rock. Very little of the pit area is visible from a distance.

The dominant visual features of the project area include the Overburden Stockpiles and, to a lesser extent, the concentration of buildings (offices, warehouses, and processing facilities). All buildings and processing facilities are painted with exterior colors that reflect the muted earth tones found in the surrounding landscape.

Substantial areas within the mine site appear disturbed. Total disturbance at present is approximately 350 acres although not all disturbed areas are visible to the public.

Overburden Stockpiles are the most readily apparent disturbances. Some of these large scale forms, with their even, uniform side slopes and flat, level tops, are within approximately ¼ mile of Interstate 15 and are readily visible to passing motorists. Areas of disturbance are seen extending northward approximately 1 mile from Interstate 15. Approximately 32 acres of previously disturbed areas, including those close to the highway, have been revegetated. To the average observer, the revegetated areas appear indistinguishable from surrounding, undisturbed lands.

The west Overburden Stockpile is the most prominent visual feature of the project area. It is currently about 38 acres in area, approximately 100 feet high, and is roughly 1,000 feet wide along the south-facing side, which is viewed from Interstate 15. The base of the south-face slope is just under 1/2-mile from the highway. Although it is a large feature, it appears comparable in scale with nearby natural landforms. Its visual prominence stems more from its uniform, geometric shape than any other characteristic, although a complete absence of vegetation also draws attention. The colors and texture of material it contains appear similar to those found in surrounding, undisturbed areas. Presently, the west Overburden Stockpile appears in front of Clark Mountain, obstructing the view of its lower, east-facing slope.

The Nipton Road Borrow Site is located approximately 3½ miles east of Interstate 15 at the intersection of Nipton Road and Ivanpah Road. This area is not in view from Interstate 15 or other key observation points. The New Ivanpah Evaporation Pond is located within Ivanpah Dry Lake, approximately 1½ miles east of Interstate 15. Although this area is within view from the highway, the visual character of the pond facility is such that it is an unobtrusive feature.

The mine site, although in close proximity to the Mojave National Preserve, is physically and visually separated from this highly sensitive area by a series of rugged hills. The hills prevent views of the mine from within the Mojave National Preserve. The primary location from which the mine is viewed by large numbers of the public is Interstate 15, the major travel route between the Los Angeles basin and the Las Vegas region. Bailey Road provides access from Interstate 15 north into the mine site via a controlled gate. Public access into the Mountain Pass Mine site does not routinely occur.

Except for a small U.S. Post Office, no commercial services (food, gas, lodging) are available at the Bailey Road interchange. Clark Mountain Road leads west from Bailey Road running immediately north of and parallel to Interstate 15 for approximately 0.9 mile to the California Department of Transportation's (Caltrans) Mountain Pass Highway Maintenance Facility. Beyond the Caltrans maintenance yard, the Clark Mountain Road pavement ends. Continuing as a gravel road, it turns to the northwest providing access to various communications facilities on nearby peaks to the west. Along the way, it intersects with a number of other publicly accessible dirt/gravel roads that head off in various directions. Beyond the Caltrans maintenance yard, Clark Mountain Road also serves as a leg of what is known as the Mojave Heritage Trail. The trail represents another location, in addition to Interstate 15, that provides the public with potential opportunities to view the mine site.

3.3.6 Soils/Agriculture/Mineral Resources

3.3.6.1 Soils

Limited soils data are available for the project area. Only that part of the project area south and east of Interstate 15 has had a previous soil survey. Results of this survey were included in a reconnaissance soils inventory of the East Mojave Planning Unit (Hansen et al. 1976).

A reclamation-oriented, topsoil salvage soil survey was conducted on Molycorp property north of Interstate 15. Soils were investigated in the numerous, large, existing backhoe pits that were created throughout the area during mineral exploration. In addition, smaller excavations also were completed with the use of spades to complete further soil investigations. Soils were characterized in the field and soil mapping units were delineated for the mine site (Figure 3.3-1). This section presents a brief description of the soils observed to be present in the project area.

Two soils dominate the proposed Overburden Stockpile expansion area. The first soil (the Sunrise-like soil series) is found on the extensive alluvial fans which cover the western part of the study area (west of the current Open Pit). These fans extend from the higher elevation Clark Mountain terrain to the north and meet the Wheaton Wash drainage just north of Interstate 15. In some parts of the Overburden Stockpile expansion area, the surface soil layer is disturbed from earlier mining exploration, construction access, and vehicle use. The total area covered by the Sunrise-like soil series is estimated to exceed approximately 15 percent of the total expansion area. This soil is characterized by a coarse-loamy texture and consists of mixed, alluvial materials. The soil is also found on alluvial fan surfaces south of Interstate 15.

Undisturbed Sunrise-like soils on the alluvial fans (mapping unit AF) are typically located on slopes of less than 3 percent on alluvial fan tops, and up to 20 percent on fan sideslopes above intermittent drainages which intersect the alluvial fans. These soils support a plant community dominated by Joshua trees and blackbrush; these soils are generally formed from deposition of transported alluvial material, and are excessively drained and weakly developed. The soils are moderately deep to deep sandy loams (surface layer), have poor water retention properties, and contain stratified lenses of sand and gravels at depth. Loams generally consist of a mixture of silt, clay, sand, and organic material. Some lenses contain cobbles or stones. All observed profiles had a calcium-cemented layer usually just below the surface layer, at an average depth of about 7 inches.

The surface layer of the Sunrise-like soil series is a light yellowish brown gravelly to very gravelly or cobbly sandy loam about 7 inches thick. Surface coarse fragments of gravel and cobble average about 25 percent of the total volume. The horizon is very friable (i.e., easily crumbled by hand pressure), slightly sticky and slightly plastic, moderately alkaline (pH 8.3), and moderately effervescent when exposed to a mild acid. This layer is suitable for reclamation.

The next layer (soil substratum) of the Sunrise-like soil is a white, hardened, very gravelly to cobbly loamy sand, calcium-cemented horizon. The structure is massive and the degree of hardness varies from somewhat soft to extremely hard. The soils present in this layer are moderately or strongly alkaline. Beneath this layer are alternating calcium-cemented lenses and loose sand and gravel layers. Neither the soil substratum nor the underlying material is ideal for reclamation use but may be suitable for this environment. Coarse soils can be beneficial in the desert environment as they contain surface micro habitats around the rocks for windblown soil fines and seeds. These coarse soils also act as a rock mulch to retain moisture. Many of the native plants in the Mojave Desert are adapted to these coarse soils and rapid precipitation infiltration rates.

The second of the two most dominant soils (the Arizo-like soil series) observed in the project area is found in the intermittent drainage channels and low terraces that intersect the alluvial fans. This soil series (mapping unit C) occupies the drainage channels that intersect the alluvial fans. Up to 10 or more channels or channel tributary segments are present in the proposed Overburden Stockpile area. In addition, about five drainage channels or channel tributary segments are located in the eastern portion of the mine site at the proposed location for the East Tailings Pond and Dam. The surface layer is a light yellowish brown to brown gravelly loamy sand to sandy loam layer about 12 inches thick on average. The layer is weakly coherent with single grain structure, very friable, non-sticky and non-plastic, and moderately alkaline (pH 8.2). This layer is suitable for reclamation even though soil texture can be coarse.

The underlying material ("C" horizon substratum) to a depth of 50 inches or more is a very pale brown very gravelly coarse sand, with over 60 percent gravel. The soil is excessively drained, and permeability is very rapid. Surface runoff is slow except during thunderstorms when runoff from higher-lying soils exceeds the infiltration rate. The underlying material is not suitable for reclamation due to very coarse texture and high volume of coarse fragments.

The hard, metamorphic rock that is found from the existing Open Pit to the eastern portion of the mine site contains Rock Outcrop and the Gachado soil family (mapping unit MR). Rock outcrop comprises approximately 80 percent of the unit and typically occupies ridges. Gachado family, about 20 percent of the unit, occupies hill and mountain slopes. Rock outcrop is mostly barren but does include some plants that have become established in fissures or pockets of soil material.

The Gachado family consists of very shallow and shallow, well-drained soils that were formed largely from weathered granite rock. Slopes are moderately steep to steep. The surface layer is a brown very cobbly fine sandy loam about 2 inches thick. The underlying material to hard bedrock, which is encountered at an average depth of about 10 inches, is a reddish brown gravelly sandy clay loam. The soil is unsuitable for reclamation due to the dominant bedrock presence, steep slope, and coarse fragments.

Previously disturbed soils occur in areas that have been subjected to historic mining activities and other development activities. Soils present in these areas have been compacted, mixed with other soils and coarse fragments (i.e., gravel or rock), or buried by mine tailings. Therefore, these soils have been physically degraded from their natural state as a result of historic development activities and are considered lower valued soils than soils that occur in adjacent undisturbed areas.

Wet soils occur in one sedimentation pond located in the southeastern portion of the mine site. These soils are wet throughout most of the year and support wetland vegetation (see Section 3.3.1).

Soils that occur at the Nipton Road Borrow Site are very deep, sandy, very gravelly, excessively drained soils formed in mixed alluvium (Hansen et al. 1976). The surface soil is approximately 2 inches in depth and is a very pale brown, loamy sand that is very friable and moderately alkaline. The substratum ranges from 2 to 50 inches in depth and is a very pale brown, very gravelly coarse sand that is moderately alkaline (Hansen et al. 1976).

3.3.6.2 Agriculture

As discussed in Section 3.3.6.1, soils in the project area do not exhibit the typical physical and chemical properties (i.e., high sediment, silty clay, limited saline content, valley and river bottoms) of prime farmland soils. The soils in the project area are sandy and coarse-grained with high saline content and high erosion potential, underlain by bedrock.

There are no agricultural practices being conducted in the project area, which includes the mine site, the Nipton Road Borrow Site, and the New Ivanpah Evaporation Pond.

3.3.6.3 Mineral Resources

Molycorp has been mining bastnasite ore in the Mountain Pass area for over 40 years. It is the only deposit of its kind in the world mined solely for lanthanide elements and is presently a major supplier of rare-earth products throughout the world (Lilburn 1991).

The Mountain Pass Mine ore deposit (Sulphide Queen carbonatite body) consists of a family of rocks of unusual mineralization known as carbonatites. Often of Precambrian age, carbonatites are found in association with potash-rich, sodium-rich, and magnesium-rich igneous rocks. Certain barium and strontium minerals are also found in this deposit, and are concentrated in the tailings, which may become a future source of these metals. The lanthanide ore of the Mountain Pass Mine contains a mineral assemblage of 43 percent calcite, 25 percent barite and/or celestite, 12 percent strontianite, 12 percent bastnasite, 8 percent silica, and trace amounts of galena, hematite, and monazite (Lilburn 1991).

The carbonatite ore body (Sulphide Queen or Mountain Pass Mine ore body) is intruded into Precambrian gneiss. Striking to the northwest and dipping at 42 degrees southwest, the intrusion is about 2,300 feet long and usually over 200 feet thick, although it narrows to less than 100 feet in thickness on the northern end (Lilburn 1991).

The bastnasite ore is a fluorocarbonate mineral that contains lanthanide elements of the cerium group. Bastnasite is tan to yellow-brown in color and generally occurs in tabular hexagonal crystals flattened on the base. The length of the crystals is generally one-eighth of an inch, but may be as long as 4 inches in high-grade veins (Lilburn 1991).

Bastnasite contains 15 individual lanthanide elements in the form of a mixed lanthanide fluorocarbonate. Eight of these elements are either concentrated, extracted, or beneficiated at the Molycorp plant: *cerium concentrate, mixed purified lanthanide concentration, cerium* carbonate, cerium oxide, neodymium oxide, yttrium oxide, and europium oxide. The lanthanide element ratio does not appear to vary within the mineral bastnasite.

The Mountain Pass area has also been mined for gold, lead, copper, tin, silver, zinc, and antimony and has been prospected for radioactive metals. The barite that occurs with bastnasite in the carbonatite intrusives is high enough to make the barite portion of the lanthanide a prospective commodity (Olson et al. 1954) However, the lanthanide deposits are by far the most valuable from an economic standpoint.

The California Department of Conservation Division of Mines and Geology (DMG) has classified the mine a mineral resource zone (MRZ) 2a. This classification is assigned to areas underlain by mineral deposits where geologic data indicate that significant measured or indicated resources are present (DMG 1995).

3.4 Manmade Hazards

The San Bernardino County General Plan identifies manmade hazards as conditions of potential impact resulting from acts of man. Specific hazards include the following:

- Noise
- Aviation Safety
- Hazardous Waste/Materials

A brief summary of the regulations applicable to each hazard area and the existing conditions associated with the operation of the Mountain Pass Mine is provided below for each of the three manmade hazards.

3.4.1 Noise

3.4.1.1 Descriptors and Regulations

Noise is usually defined as undesirable or unwanted sound because it interferes with speech communication and hearing, is intense enough to damage hearing, or is otherwise annoying. The characteristics of sound waves include amplitude, frequency, and duration, which are defined as follows:

- Amplitude - the magnitude of the sound pressure waves
- Frequency - the number of times per second the sound pressure oscillates
- Duration - the length of time during which the sound occurs

Sound can vary over an extremely large range of amplitudes. The decibel (dB) is the accepted standard unit for measuring the amplitude of sound because it accounts for these large variations in amplitude and reflects the way people perceive changes in sound amplitude. Figure 3.4-1 illustrates sound pressure levels of various sound sources between dB (threshold of hearing) and 140 dB (threshold of pain) (McGraw Hill 1971, EPA 1976, EPA 1974).

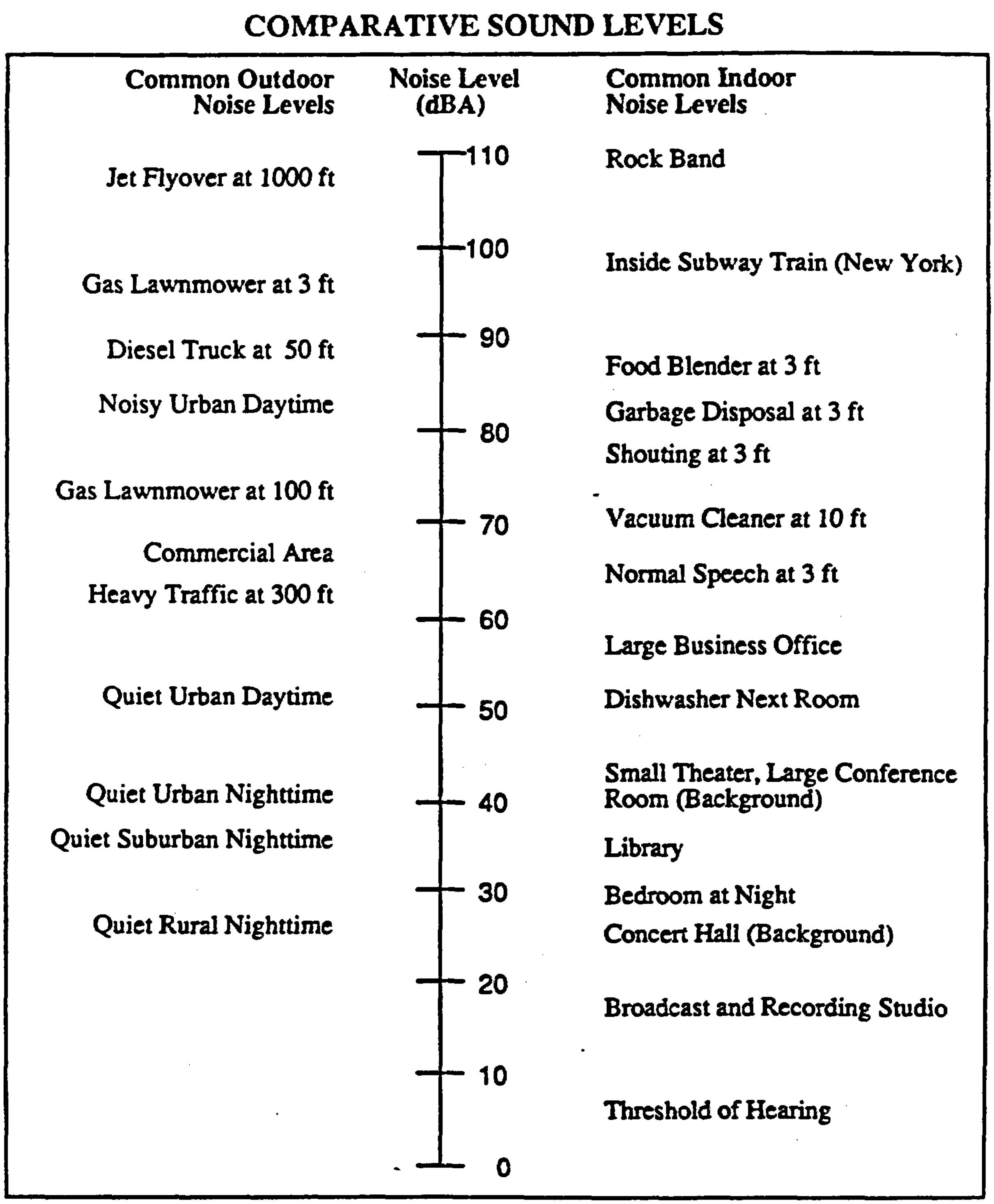


FIGURE 3.4-1. Range of Sound Levels

San Bernardino County Noise Regulations

The Noise Element of the San Bernardino County General Plan indicates that areas within the County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards identified in Tables 3.4-1 and 3.4-2.

3.4.1.2 Existing Setting

The Mountain Pass Mine is surrounded by the following land uses:

- North - Open space, NPS, and BLM-managed public land.
- East - Open space, BLM-managed public land.
- South - Interstate 15. Additionally, a public school located on 10 acres is located in the southern portion of the mine property and is surrounded by the mine property south of the processing area.
- West - Open space, NPS, and BLM-managed public lands. A California Department of Transportation (Caltrans) maintenance station, and California Highway Patrol residences are also located to the west of the mine property.

The offsite Caltrans and California Highway Patrol facilities are located approximately 400 feet south of the southern face of the Overburden Stockpile, which rises approximately 200 feet above the natural contour in this area. Traffic on Interstate 15 moves in an east/west direction through the southern portion of the mine property. Mountain Pass School is located within approximately one-half to one mile of the primary mine operations.

The Nipton Road Borrow Site is located to the north of and adjacent to Nipton Road approximately 7 miles east of the Mountain Pass Mine property, 4 miles south of the New Ivanpah Evaporation Pond, and 3½ miles east of Interstate 15. Adjacent surrounding land uses comprise open, undeveloped land managed by the NPS or the BLM.

The New Ivanpah Evaporation Pond is located within the Ivanpah Dry Lake bed approximately 8 miles northeast of the Mountain Pass Mine property, 4 miles north of the Nipton Road Borrow Site, and 1½ miles east of Interstate 15. The New Ivanpah Evaporation Pond is completely surrounded by the Ivanpah Dry Lake bed.

Noise generating activities associated with the operation of the Mountain Pass Mine include the use of mobile vehicles for grading and transporting the ore and stationary activities including blasting, crushing, and milling.

TABLE 3.4-1

San Bernardino County Interior/Exterior Noise Level Standards Mobile Noise Sources

Land Use		Ldn (or CNEL)[1] (dB)	
Categories	**Uses**	**Interior[2]**	**Exterior[3]**
Residential	Single and multi-family, duplex, mobile homes	45	60 [4]
Commercial	Hotel, motel, transient lodging	45	60[4]
	Commercial, retail, bank, restaurant	50	NA
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	NA
Institutional/Public	Hospital, nursing home, school classroom, church, library	45	65
Open Space	Park	NA	65

1 Ldn is the day-night average sound level; CNEL is the community noise equivalent level. The difference between Ldn and CNEL values is usually within 1 dB.

2 Indoor environment, excluding bathrooms, kitchens, toilets, closets, and corridors.

3 Outdoor environment, limited to: Private yard of single-family dwellings; Park picnic areas; Multi-family private; patios or balconies; School playgrounds; Mobile home parks; Hotel and motel recreation; Hospital/office building patios areas

4 An exterior noise level of up to 65 dB Ldn (or CNEL) will be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB Ldn (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level will necessitate the use of air conditioning or mechanical ventilation.

Source: San Bernardino County General Plan

TABLE 3.4-2

San Bernardino County
Hourly Noise Level Performance Standards
Locally Regulated Sources[1]

Land Use Category	7 a.m. - 10 p.m.		10 p.m. - 7 a.m.	
	Leq[2]	Lmax[3]	Leq	Lmax
Residential or other noise-sensitive receivers	55 dBA	75 dBA	45 dBA	65 dBA

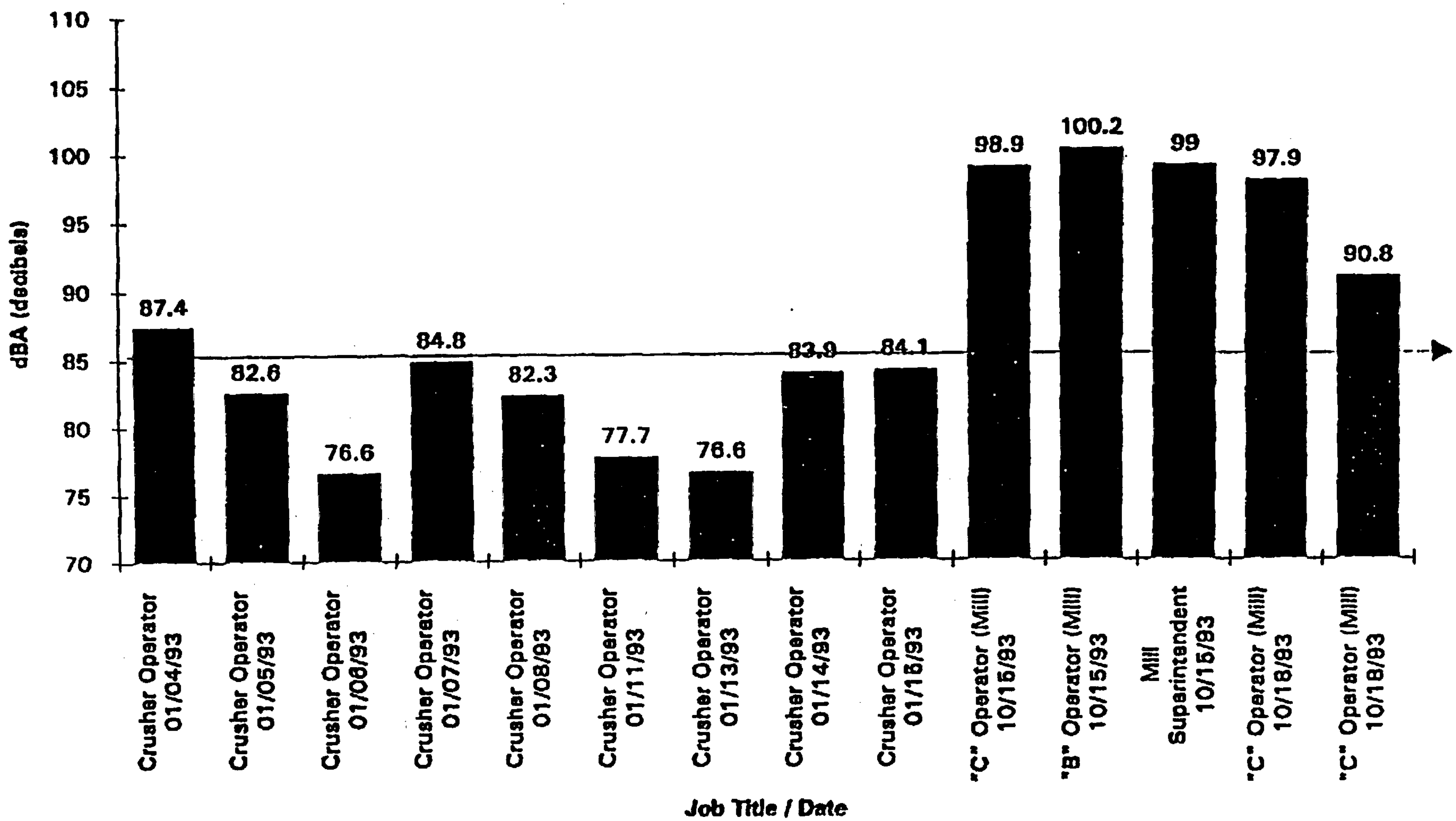
1 Noise sources which are stationary and not pre-empted from local noise control. Pre-empted sources include vehicles operated on public roadways, railroad line operations and aircraft in flight.
2 Leq is the energy average of the time-varying sound level over a stated time period.
3 Lmax is the maximum sound level.

Source: San Bernardino County General Plan

Occupational noise monitoring performed by Molycorp indicates that localized areas of high noise levels within the mine have been identified. Personnel who work in areas with noise dosimetry results above 85 dBA are enrolled in the Mine's Hearing Conservative Program. Hearing protection is mandatory for all employees whose time-weighted average exposure to noise cannot be lowered to levels below the permissible exposure level (PEL) of 90 dBA. Personal noise dosimetry results for 1993 and 1994 are shown on Figures 3.4-2 and 3.4-3. As shown on the figures, high noise level activities are confined to areas well within the boundaries of the facility and as such, noise levels have not been measured in exceedance of County parameters beyond these boundaries to offsite receptors.

3.4.2 Aviation Safety

San Bernardino County has established Land Use Compatibility guidelines for those areas identified as aviation safety areas. These areas are delineated on Safety Overlay Districts in the San Bernardino County General Plan. The Mountain Pass Mine is not located within an Airport Safety Overlay District.



ACTION LEVEL: 85dBA
PEL: 90dBA

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FIGURE 3.4-2
1993 NOISE DOSIMETRY RESULTS
Molycorp, Inc.
Mountain Pass

DRAWN: M. Scop	DATE: 3/31/95	PROJECT NO.	REV.
FILE NO.	CHK BY:	1991-001	

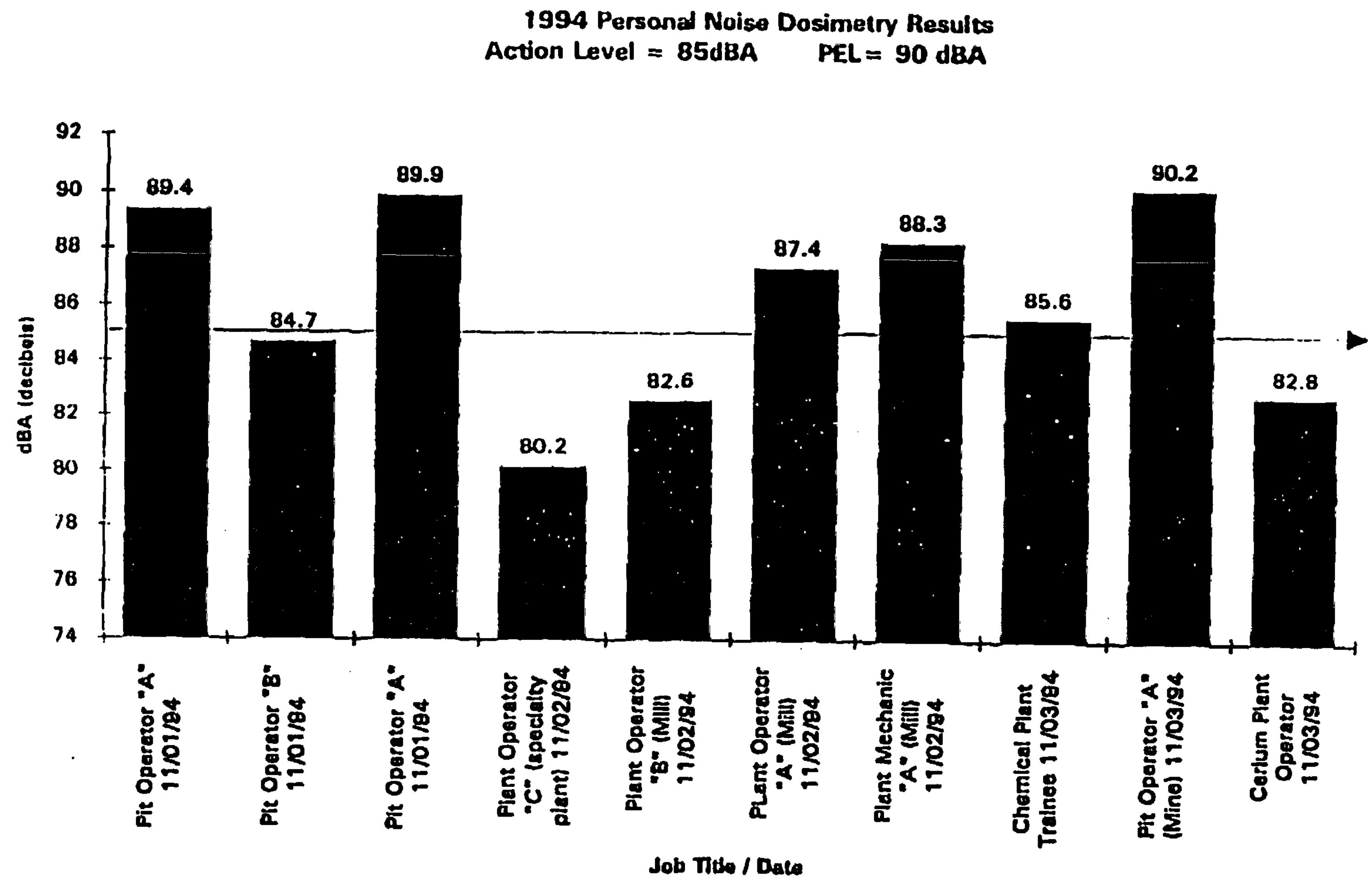

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FIGURE 3.4-3

1994 NOISE DOSIMETRY RESULTS

Molycorp, Inc.

Mountain Pass

DRAWN: M. Scop	DATE: 3/31/95	PROJECT NO.	REV.
FILE NO.	CHK BY:	1991-001	

ACTION LEVEL: 85dBA

PEL: 90dBA

3.4.3 Hazardous and Mining Waste/Materials

3.4.3.1 Descriptors and Regulations

State and Federal Regulations

Hazardous Materials

The use and storage of hazardous materials, which are defined as unused substances that exhibit hazardous characteristics and/or contain hazardous components, are not subject to the same range of regulations as hazardous waste. Many of the regulations applicable to these materials are administered by the California Occupational Safety and Health Administration (Cal-OSHA) and apply to occupational personnel working with and around the materials.

In addition, facilities that use and store hazardous materials must comply with specific reporting requirements under the federal Superfund Amendment Reauthorization Act (SARA) Title III (Emergency Planning and Community Right-to-Know). California also requires the completion of a Hazardous Materials Business Plan (Business Plan). The primary purpose of the Business Plan is to provide local fire departments with an inventory of hazardous materials and their onsite locations. The plan also details available onsite emergency response equipment. The San Bernardino County Health Services Division of the Public Health Department is the administering agency for Business Plans.

Facilities that store and use acutely hazardous materials, which are materials that pose more of a potential health hazard if released, are required to prepare a risk management and prevention plan (RMPP). In addition to requiring some of the same components of a Business Plan, an RMPP requires that users of acutely hazardous materials conduct an assessment of the processes, operations, and procedures of the business and use this information to prepare hazard operability and offsite consequence analyses.

Radioactive Materials

Hazardous radioactive material is defined in California Code of Regulations (CCR) Title 17 as any "highway-route controlled quantity" of radioactive material as defined in 49 Code of Federal Regulations (CFR) 173.403. This Department of Transportation regulation applies to single shipments of radioactive materials and limits the total amount of curies allowed in the shipment.

Facilities that use and store hazardous materials with a radioactive component are regulated by the California Department of Health Services CCR Title 17. A determination of the type and quantity of radioactive material indicates the need for a California Radioactive Materials License. The requirements for radioactive material licensees include training; assurances of adequate protection of health, life and property; radiation surveys; documentation; reporting; fees and satisfaction of all applicable sections of the Act (CCR Title 26 Division 17).

Title 10 CFR Part 20 defines source material as uranium or thorium, or any combination thereof; or ores which contain 1/20 of one percent (0.05) percent) or more of uranium or thorium, or any combination thereof. Under 10 CFR 40.13, exemptions to the licensing of source material are granted for lanthanide elements and compounds, mixtures, and products containing not more than 0.25 percent by weight thorium, uranium, or any combination thereof. CCR Title 17 provides similar exception for source material; however, the lanthanide compound or mixture exemption applies only to products, not wastes.

Hazardous Waste

The regulation of hazardous wastes in California is governed by a complex system of interlocking state and federal statutes and regulations. The majority of these requirements are contained in the Hazardous Waste Control Law (HWCL) in Health and Safety Code section 25100, et seq. and in the implementing regulations found in CCR Title 22 commencing with Section 66260.1. Applicable federal requirements are contained in the Resource Conservation and Recovery Act of 1976 (RCRA) and in the implementing regulations found in 40 CFR Parts 260 through 270 (Rosegay 1993). The State of California received final authorization under RCRA in August 1992 to conduct its own hazardous waste program in lieu of the federal program under RCRA. The state hazardous waste program is administered by the DTSC.

The implementing regulations of the Porter-Cologne Water Quality Control Act apply to the management of hazardous waste in land disposal units defined as either landfills, surface impoundments, land treatment units, or waste piles. This Act is administered by the State Water Resources Control Board (SWRCB) and the nine RWQCBs.

Hazardous wastes in California fall into two major groups: RCRA and non-RCRA. "RCRA hazardous waste" includes all hazardous wastes that are identified or listed as hazardous waste under RCRA and which are regulated by the federal Environmental Protection Agency (EPA) under that program. "Non-RCRA hazardous waste" includes all RCRA hazardous wastes that are excluded from regulation under the EPA definition and other wastes that exhibit only California hazardous waste characteristics (Rosegay 1993).

The California Health and Safety Code identifies several wastes that are exempt, or conditionally exempt, from regulation as hazardous wastes, regardless of their physical or chemical properties. Exempted waste includes those materials resulting from the extraction, benefication, or processing of ores, so long as the waste is not managed in surface impoundments. Residuals of ores and minerals remaining after physical or chemical treatment or processing of the ore or mineral are also typically exempt. The process wastewater generated by Molycorp and discharged to the North Tailings Pond and the New Ivanpah Evaporation Pond are classified as Group B mining wastes. However, these wastewaters are regulated under the Porter-Cologne Act. One overburden stockpile at the mine is known as the low-level overburden stockpile because waste rock that contains 2 to 5 percent rare earths that are currently not economically feasible to extract is stored in this stockpile, which has been officially classified as Group C mining waste and is therefore not subject to hazardous waste regulations. The material is predominantly a carbonate rock with no acid-generating potential due to the absence of sulfides other than galena.

Generators are required to store hazardous wastes in a designated area that must be secure and inspected on a routine basis. This area must also be equipped with specific emergency equipment. A generator is required to prepare a Contingency Plan that, when implemented, would minimize the hazards associated with an unplanned or sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water.

Radioactive Waste

Mixed wastes are those that meet both the Nuclear Regulatory Commission's (NRC) definition of low-level radioactive waste in 10 CFR Part 61.2 and the EPA's definition of hazardous waste in 40 CFR Part 261.31-33. In 1986, the EPA informed states that had been authorized to administer the RCRA program that they must have the authority to regulate the hazardous component of mixed waste in order to remain authorized. California was authorized to administer the RCRA program on August 1, 1992. The NRC authorizes use, possession, transfer, and disposal of radioactive materials through a system of granting licenses to commercial users. The NRC also may relinquish authority to a state to regulate facilities that use source material (a material with greater than 0.05 percent uranium and thorium content).

Radioactive materials in California are regulated under CCR Title 17. No user of radioactive materials may release into air or water in any uncontrolled area (area not controlled by the user for purposes of radiation safety) any concentration of radioactive material exceeds the limits specified in Appendix A to Title 17. Section 30285 of Title 17 requires that disposal of any radioactive material as waste must be by transfer to a person holding a specific license to receive the radioactive waste.

Applicable federal regulations governing low-level radioactive waste are contained in 10 CFR Part 61 and have been adopted by reference by the State of California.

According to the California Department of Health Services Radiologic Health Branch, wastes from the Molycorp Mountain Pass operation "...contain only naturally occurring radioactive materials (NORM) and not radioactive waste generated under a California Radioactive Materials License." A California Radioactive Materials License is required for operations that generate wastes that meet the definition of low-level radioactive waste under 10 CFR Part 61.2. Therefore, the wastes at the Molycorp Mountain Pass operation are not mixed wastes and are not subject to NRC regulations for mixed radioactive and mixed wastes.

The California Radiologic Health Branch has provided approval to dispose of Mountain Pass wastes at any site authorized to dispose of NORM. There is presently no site in California that is authorized to receive NORM or any other radioactive waste for onsite disposal. NORM wastes from the Mountain Pass Mine will be disposed of at Envirocare in Utah.

<u>County of San Bernardino Requirements</u>

California Assembly Bill (AB) 2948, commonly referred to as the Tanner Bill, authorized counties to prepare Hazardous Waste Management Plans (HWMP). The HWMP is designed to serve as the primary planning document for the management of hazardous waste within the counties. The San Bernardino County HWMP, as approved by the state in February 1990, identifies the types and amounts of wastes generated in the County; establishes programs for managing these wastes; identifies an application process for the siting of specified hazardous waste facilities; identifies mechanisms for reducing the amount of waste generated in the County; and identifies goals, policies, and actions for achieving effective hazardous waste management.

The San Bernardino County HWMP requires businesses that handle acutely hazardous materials in excess of 55 gallons, 500 pounds, or 200 cubic feet to obtain a conditional use permit. Additionally, County approval of a land use permit for modifications to an existing business requires submittal of the facility's business plan, waste minimization plan, and RMPP to the County Department of Environmental Health Services (DEHS).

The HWMP requires a site approval (conditional use permit) for the siting of specified hazardous waste facilities. New facilities must comply with the provisions of the Tanner Act

(AB 2948); Chapter 1504; California Statutes of 1986) and specified Hazardous Waste Facility Overlay of the County General Plan.

<u>Mining Waste</u>

Mining waste is exempt from federal regulations (Title 40 Code of Federal Regulations Section 261.4(b)(7)). The California Code of Regulations (CCR) Title 23, Section 2571 identifies mining waste as waste from the mining and processing of ores and mineral commodities. Mining waste includes overburden, waste rock, and the sludges, solid residues, and liquids from the processing of ores and mineral commodities. Section 2571 further classifies mining wastes as either Group A, Group B, or Group C based on an assessment of the potential risk of water quality degradation posed by the waste and gives authority to the RWQCBs to assign wastes to a particular group based on the following criteria:

- Group A includes wastes that must be managed as hazardous waste if the RWQCB finds that the waste poses a significant threat to water quality.
- Group B includes wastes that consist of or contain hazardous waste but are not required to be managed as hazardous waste if the RWQCB finds that the waste poses a low threat to water quality; or wastes that are essentially nonhazardous but contain soluble pollutants in concentrations that may exceed water quality objectives or cause degradation of water.
- Group C includes wastes that are in compliance with the applicable water quality control plan.

The RWQCB may find that a waste is a Group B or Group C waste based on the following factors:

- the waste contains hazardous constituents only at low concentrations
- the waste has no or low acid-producing potential
- because of its intrinsic properties, the waste is readily containable by less stringent measures.

3.4.3.2 Existing Setting

Hazardous Materials

As shown on Tables 2.4-3 and 2.4-5, the facility currently utilizes a large number of hazardous substances in the processing of lanthanide products. Molycorp's Business Plan and RMPP address the storage and use of these materials. The RMPP has been filed with San Bernardino County for the handling of the following acutely hazardous materials: anhydrous ammonia, sulfuric acid, and nitric acid. Prior to the County's approval of the RMPP, Molycorp made a decision to eliminate use of anhydrous ammonia in processing activities, and discontinued onsite storage of anhydrous ammonia in July 1994. Anhydrous ammonia was delivered to the facility at the same frequency (two tanker truckloads per day) but instead of storing it prior to use, it was immediately converted to and stored as a 15-percent aqueous ammonia solution. Molycorp amended the RMPP to include only the unloading and conversion process (Unocal 1994b). In mid-1995, a decision was made to switch from aqueous ammonia to caustic soda. The system to convert anhydrous ammonia to aqueous ammonia is being left in place for possible use in the future.

As indicated in Table 2.4-2, the ponds currently utilized for product storage include P-2, P-7A, P-7B, P-25A, P-25B, and P-28. Historic ponds were also used to store product. These ponds (P-5, P-9, P-10, P-12, and P-13) have been closed under the direction of the LRWQCB.

Radioactive Materials

The Mountain Pass bastnasite ore contains small concentrations of naturally occurring radioactive materials (NORM). The principal radionuclides contained in the ore are uranium-238 and thorium-232. The concentration of radionuclides in the ore and overburden is small enough that health or environmental impacts from these materials are within the natural variability of background concentrations within the United States and not a significant concern when assessing impacts to health, safety, or the environment.

However, these radionuclides are further concentrated in different locations within the mineral recovery process. Therefore, the concentration of radionuclides within some Mountain Pass lanthanide products, intermediate products, and wastes and their impact on health, safety, and the environment has been a focus of regulatory attention.

In order to assess the concentrations and impacts of radionuclides, Molycorp commissioned a study to inventory and analyze various wastes, feedstock, and products. The study is summarized in a report prepared by Rogers & Associates for Molycorp in April 1993. This report was submitted to the California Department of Health Services, Radiologic Health Branch in 1993.

Rogers & Associates conducted a radiation survey at the Molycorp Mountain Pass Mine in February and March 1993. The objective of the survey was to evaluate radiation exposures in the operating facility and adjoining offsite areas. The information was obtained relative to the request for a radioactive materials license for the Molycorp operations. Measurements conducted included external gamma exposures, airborne radioactive material, radon and personnel urine bioassay sampling.

Findings of the Rogers & Associates survey are as follows:

- Ionizing radiation exposures to workers are below 25 percent of the CCR Title 17 radiation safety criteria. The report states that direct monitoring of personnel for external gamma radiation exposure is not needed.

- Control of areas for the purposes of radiation safety is not required.

- The Bastnasite Packaging, Bastnasite Delivery and Cerium Packaging Shed may be about 25 percent or more of the airborne concentration specified in CCR Title 17 Appendix A. The report recommended that these areas be posted "Airborne Radioactive Areas" with controlled entry.

- The implementation of radiation surveys, control areas, air sampling, bioassay program, environmental surveillance and health and safety training was recommended for the facility.

One of the less concentrated lanthanide-bearing minerals that is present at the site is monazite. The monazite is radioactive, with thorium and uranium concentrations of less than 0.2 percent. The thorium content in the mined ore is about 0.02 percent and the uranium concentration is about 0.002 percent (Rogers & Associates 1993).

After review of the Rogers & Associates study, the California Department of Health Services Radiologic Health Branch determined that licensing of NORM at Mountain Pass was not necessary.

Molycorp possesses a Radioactive Materials license (#3229) from the California Department of Health Services Radiologic Health Branch that regulates the possession and use of radioactive materials within sealed sources used for measuring density and other physical characteristics of materials onsite. Additionally, the California Department of Health Services Radiologic Health Branch has discretion to regulate materials containing radionuclides and chose to license the stabilization, storage, and reinsertion of the lead/iron filter cake. In 1995, Molycorp obtained an addendum to Radioactive Materials license #3229 to cover the management and possession of uranium and thorium contained within lead/iron filter cake, a mining byproduct of the lanthanide recovery process. The license addendum applies specifically to the activities associated with the stabilization, storage, and reinsertion of stabilized lead/iron filter cake to the process for the purpose of recovering lanthanides. Stabilization of the lead/iron filter cake is complete, and the stored material is currently being reinserted to the Chemical Plant process. The license does not apply to the other processes associated with lanthanide recovery at Mountain Pass.

Some materials produced at the Mountain Pass facility contain elevated concentrations of radionuclides. Table 3.4-3 shows the average concentration of various radiocnuclides in some materials at the Mountain Pass facility. All radioactive materials onsite are considered NORM.

Hazardous Wastes

Table 2.4-4 lists the hazardous wastes presently generated within the mine. The annual volumes generated and the methods of disposal are also provided. The only two ponds currently used for the disposal of process wastewater are the North Tailings Pond (P-16) and the New Ivanpah Evaporation Pond. Waste discharged into the North Tailings Pond is mainly from the Flotation Plant and the pit well. Two other wastewater streams that are discharged to the North Tailings Pond are the cerium fluoride and tailings neutralization. Both of these discharges are authorized by the LRWQCB. Both ponds are regulated under Board Orders issued by the LRWQCB. Wastes discharged to these two ponds have been deemed non-hazardous by the DTSC (DTSC 1983, DTSC 1986, RWQCB 1988). A more detailed discussion of these ponds is provided in Section 3.3.4.

Prior to legislation that regulated the generation and disposal of hazardous wastes, the hazardous wastes generated at the facility were discharged into onsite ponds for disposal. These ponds have since undergone closure activities under order of the LRWQCB, while others are inactive and are planned for closure. A more detailed discussion of these ponds is included in Section 3.3.4.

TABLE 3.4-3

Average Concentration of Radionuclides in Selected Materials

Material	TH-232 (pCi/g)	U-238 (pCi/g)	Annual (tons)
Bastnasite Ore	25[1]	7[1]	450,000[2]
Tailings	14[1]	4[1]	427,000[2]
Bastnasite Concentrate	85[1]	4[1]	22,150[2]
Mine Overburden	[3]	[3]	2,700,000[3]
Low Grade Ore (2 to 5% LnO)	[2]	[2]	90,000[2]
Stabilized Lead Iron Filter Cake	32	1,150	NA[4]
Pond Lead Iron Residue	42	1,540	NA[4]
Lead Sulfide Concentrate	5	74	650[5]
SX Crud	15	760	125[6]

Th-232: Thorium 232
U-238: Uranium 238
pCi/g: picoCuries per gram
(1) Radiological Monitoring Data for Molycorp Site, Rogers and Associates, April 1993
(2) Annual production rates based on mine production records and are the average of production during the years 1986 through 1995. An existing stockpile of 827,000 tons of low grade ore exists onsite.
(3) Although waste rock has not been analyzed to determine uranium and thorium concentrations, it is expected to contain about the same concentration of radionuclides as soils in the vicinity of Clark Mountain. The production rate of overburden is based on an extrapolation of current mining and overburden stripping rates over a future 5-year period.
(4) Stabilized lead iron residue and pond lead iron residue are no longer produced as a result of operations. The existing inventory of stabilized lead iron filter cake is approximately 6,250 tons. This material is currently being fed to process at a rate of 8 to 19 tons per day. Approximately 3,500 to 4,000 tons of pond lead iron residue is estimated to exist onsite in surface impoundments.
(5) Based on the current rate of stabilized lead reentry. Rate is valid for 1996 and 1997.
(6) Estimate based on the past 3 years of production SX Crud.

As part of a separate project under the direction of DTSC, the former Mountain Pass Mine hazardous waste storage area is undergoing closure. The concrete pad utilized for lead/iron stabilization activities in 1995 has been modified for use as a holding and staging area for the accumulation of hazardous waste for a period not to exceed 90 days from the start of accumulation. Modifications to the pad include the elimination of the northern half of the pad, the reconstruction of a concrete curb to contain surface water run-on and run-off, and the construction of a chain-link fence to restrict access to the area. In October 1995, Molycorp submitted a closure report to DTSC for the concrete pad used for lead/iron stabilization and expects approval of the closure in the near future, at which time the pad will be utilized as a temporary hazardous waste holding area. The former drum storage yard will not be used for the storage of hazardous waste.

Molycorp applied to the federal EPA for a RCRA interim status permit in 1980. This application was denied because the facility was found to be exempt from RCRA regulation. The State of California granted interim status in 1981 in accordance with the conditions provided in the Part A application submitted by Molycorp. Following a Corrective Action Order issued by DTSC in May 1991, a revised Part A application was filed in June 1991.

In 1992, a Preliminary Assessment (PA) of the Mountain Pass Mine was conducted by the EPA. Based on the PA, one of four recommendations could be made: 1) no further remedial action planned under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); 2) conduct a higher priority Site Investigation (SI) under CERCLA; 3) conduct a lower priority SI under CERCLA; or, 4) defer to other authority (e.g., RCRA). The PA concluded with the recommendation to refer the review of the PA to RCRA staff and indicated that a RCRA staff member would review the PA and decide if Corrective Action was appropriate. To date, Molycorp has had no further correspondence from EPA or RCRA staff.

Radioactive Waste

From 1984 to 1994, lead/iron filter cake was generated at the Mountain Pass facility. This material contained 5 to 10 percent lead and natural uranium concentrations up to 2,000 pCi/g. The lead/iron filter cake also contained significant concentrations of lanthanides. The lead/iron filter cake was treated to render lead insoluble as determined by the toxicity characteristic leaching procedure (TCLP) test specified in RCRA. Stabilization was performed under the terms of a March 1995 Settlement Agreement between Molycorp and DTSC, which stemmed from a 1991 DTSC Corrective Action Order. The stabilization process was also performed under the conditions of a Radioactive Materials license administered by the California Department of Health Services, Radiologic Health Branch. Stabilization occurred during the period between April 9 and August 9, 1995. The Radioactive Materials License required the training of occupational workers, ongoing monitoring of exposure of workers to radiation, and adequate decommissioning of facilities associated with the storage and reinsertion of the stabilized lead/iron filter cake. The Radioactive Materials license also requires the adequate monitoring of sealed radiological sources used for industrial process control on the site.

Under terms of the Settlement Agreement, Molycorp is required to either feed stabilized lead/iron filter cake to the chemical process for the recovery of lanthanides or dispose of stabilized material at an approved disposal facility within 3 years after the conclusion of stabilization activities. Therefore, by August 1998, all stabilized lead/iron filter cake will have been fed to process for the recovery of lanthanides or disposed of in an appropriate manner off the property. As of September 27, 1996, approximately 67 percent of the stabilized lead/iron filter cake had been fed to process. The stabilized lead/iron filter cake is the only NORM managed under a radioactive materials license.

Molycorp generates small volumes of SX Crud in the Chemical Plant in solvent extraction cells used for the separation and recovery of lanthanides. SX Crud is an insoluble organic complex containing significant concentrations of both uranium and thorium.

Prior to 1984, Molycorp deposited lead/iron residues in three small surface impoundments (P-8, P-11, and P-24). This residue is similar in character to the lead/iron filter cake, containing lead, uranium, and thorium. Molycorp is required under LRWQCB Order 6-91-836 to submit a plan for the final closure of these lead ponds. Molycorp submitted a proposal to LRWQCB on May 31, 1996 to reintroduce the lead residue from Pond P-11 and Pond P-24 to the Chemical Plant leach circuit for recovery of lanthanides in a manner similar to the current reinsertion of stabilized lead/iron filter cake. Molycorp also proposes to recover lanthanides from Pond P-8 through reinsertion of the pond material into the Mill Flotation circuit, which will result in a small increase of total lead to the North Tailings Pond. However, the lead will be discharged to the tailings pond at a pH above neutral and will be unavailable to the environment. Closure of the lead ponds by reinsertion of the pond residues into the mine process is anticipated to occur over a 2-year period. At this time, LRWQCB is reviewing Molycorp's proposal for closure of the lead ponds.

A lead sulfide concentrate product is being generated as a result of the ongoing feed of stabilized lead/iron filter cake to process and the continued generation of lead as a byproduct during lanthanide recovery. As a result of process changes instituted by Molycorp, radionuclide concentrations within the lead sulfide concentrate product are being held below 0.05 percent combined uranium and thorium by weight concentration.

3.5 Manmade Resources

The San Bernardino County General Plan defines manmade resources as those characteristics and services, facilities, and activities for which man is directly responsible. Manmade resources include:

- Land Use
- Utilities/Infrastructure
- Transportation/Circulation

- Energy
- Housing/Demographics/Socioeconomics
- Public Resources

Existing conditions at the proposed Mountain Pass Mine expansion area relative to these manmade resources are presented in this section.

3.5.1 Land Use

3.5.1.1 Land Use Policies

The San Bernardino County General Plan (adopted July 1989; revised August 14, 1991) divides the County into three broad development categories for planning purposes. The Mountain Pass Mine and associated facilities are located within a portion of the County that is characterized as rural, which is generally suitable for lower density/intensity land uses by meeting one or more of the following criteria:

- Used for agriculture, general open space, or as a watershed for a public water supply

- Isolated subdivided areas and commercial centers which are not adjacent to incorporated cities

- Divided into parcels of 20 acres or larger, next to an urban incorporated area

- Subdivided areas that use onsite wastewater management systems which are adjacent to, but not surrounded by incorporated areas

The General Plan identifies 14 Official Land Use Districts (OLUDs) in San Bernardino County. OLUDs are combined zoning and General Plan designations. The County Development Code permits mining in any land use district within the County subject to a conditional use permit. Three different OLUDs are assigned to the mine and associated facilities and are defined as follows:

- **Planned Development** provides for a combination of residential, commercial, industrial, agricultural, open space and recreation uses, and similar and compatible uses.

- **Resource Conservation** provides for open space and recreational activities, single-family homes on very large parcels, and similar and compatible uses.

- **General Commercial** provides for stores, lodging services, office and professional services, recreation and entertainment services, wholesaling and warehousing, contract/construction services, transportation services, open lot services, and similar and compatible uses.

The Mountain Pass Mine and associated facilities are located within San Bernardino County Improvement Overlay District 5. Improvement Overlay Districts are part of a system adopted by the County for matching development intensity with essential improvements. Five improvement levels were established ranging from 1, which is applied to very urban areas, to 5, which is applied to very rural areas.

Based on the improvement level assigned to an area, future development of that area is expected to provide the appropriate infrastructure facilities prior to or at the same time as actual development. The San Bernardino County General Plan stipulates that improvement levels will be applied to:

- All divisions of land
- All commercial, industrial, and institutional use applications
- Multiple-family residential use applications
- Discretionary single-family residential use applications

Improvement level 5 is applied to areas with little or no development potential, and where only sparse development is expected in the long term. Improvement standards required of developments within this overlay district in the desert of San Bernardino County include the following:

- Legal and physical access

- Grants of easements, including rights-of-way for transportation and circulation, drainage and flood control facilities, and utilities

- Septic systems

3.5.1.2 Mountain Pass Mine

The Molycorp Mountain Pass Mine is located in northeastern San Bernardino County, approximately 15 miles southwest of the Nevada-California state line. The Mojave National Preserve is located to the north, west, and south of the mine (see Figure 3.3-2). The Molycorp property includes approximately 2,937 acres of patented land. Two non-contiguous portions of post Federal Land Policy and Management Act of 1976 (FLPMA) patented land are located roughly in the midportion of the mine processing plant (Plate 1). Although Molycorp is the owner of these post-FLPMA lands, FLPMA provisions assign oversight responsibility to the BLM for public lands patented after the passage of FLPMA in 1976. According to the BLM, oversight responsibility includes ensuring that public lands adjacent to post-FLPMA patented lands are not adversely impacted from activities on the patented land.

The California State Lands Commission retains mineral rights to approximately 400 acres within the mine boundaries (Plate 1). This land is located at the southernmost area of the mine, adjacent to the Bailey Road/Interstate 15 interchange. Molycorp has surface ownership of this property, and does not extract minerals from it.

The Mountain Pass Mine is located to the north of and adjacent to Interstate 15 within the southern portion of the Clark Mountain Range, approximately 4 miles south of Clark Mountain. The mine and processing operations occupy portions of Sections 11, 12, 13, and 14 of Township 16 North, Range 13 East, and Sections 30 and 31 of Township 16 North, Range 14 East, San Bernardino Base and Meridian (SBBM). The mine and processing operations currently utilize approximately 272.7 acres of patented land. A number of public service and utility easements and rights-of-way are located within the mine boundaries, including a Southern California Edison (SCE) electric utility easement and an American Telephone and Telegraph (AT&T) right-of-way for an access road to an AT&T facility on Mohawk Hill.

Adjacent surrounding land uses include the following:

- North: Open space, NPS land, and BLM-managed public land, which includes parcels of patented mining claims.
- East: Open space, BLM-managed public land, which includes parcels of patented mining claims.

- South: Open space, Interstate 15, with NPS land south of Interstate 15. Additionally, a public school located on 10 acres is located in the southern portion of the mine property and is surrounded by the mine property.

- West: Open space, NPS land, and BLM-managed public lands. A California Department of Transportation (Caltrans) maintenance station, and California Highway Patrol residences are also located to the west of the mine property.

3.5.1.3 Nipton Road Borrow Site

The Nipton Road Borrow Site is located to the north of and adjacent to Nipton Road approximately 7 miles east of the Mountain Pass Mine property, 4 miles south of the New Ivanpah Evaporation Pond, and 3½ miles east of Interstate 15. The Nipton Road Borrow Site occupies portions of Sections 20 and 21 of Township 15½ North, Range 15 East, SBBM. The present excavated area of the Nipton Road Borrow Site is located on 3.2 acres of patented land owned by Molycorp.

Adjacent surrounding land uses comprise open, undeveloped land owned primarily by the federal government, including the Mojave National Preserve to the south. The land use district designated by the San Bernardino County General Plan (Adopted July 1989, Revised August 14, 1991) for the Nipton Road Borrow Site is Resource Conservation (RC).

3.5.1.4 New Ivanpah Evaporation Pond

The New Ivanpah Evaporation Pond is located within the Ivanpah Dry Lake bed on post-FLPMA patented land approximately 8 miles northeast of the Mountain Pass Mine property, 4 miles north of the Nipton Road Borrow Site, and 1½ miles east of Interstate 15. The New Ivanpah Evaporation Pond occupies portions of Sections 5, 8, and 9 of Township 16 North, Range 15 East, SBBM. The New Ivanpah Evaporation Pond is located on 115 acres of patented land owned by Molycorp and comprises two cells, one 32 acres and the other 83 acres.

The New Ivanpah Evaporation Pond is completely surrounded by the Ivanpah Dry Lake bed. A number of unpatented mill site claims are also located within the lake bed. The land use district designated by the San Bernardino County General Plan for the New Ivanpah Evaporation Pond is Resource Conservation (RC).

3.5.2 Utilities/Infrastructure

Utilities and infrastructure components discussed in this section include the following:

- Power systems (electricity)
- Communications systems
- Sewer systems
- Water supply systems
- Storm water drainage systems
- Solid (nonhazardous) waste handling (for hazardous waste handling, refer to Section 3.4.3)

3.5.2.1 Power Systems

Current power utilities at the Molycorp facility include electricity supplied by SCE. No natural gas is supplied to the facility. Section 3.5.4 includes a discussion of non-utility power systems, including propane, gasoline, kerosene, and diesel fuel usage. Electricity usage averages 3.5 million kilowatt hours (kwh) per month with a demand of 6 megawatts (MW).

3.5.2.2 Communication Systems

Current communications systems (telephone) at the Molycorp facility consist of a Mitel SX200 PBX switch. The Mitel SX200 supports 11 outside lines consisting of five Pacific Bell local lines, three Unocal network lines, and three AT&T/Centel lines. The system also supports 63 inside extensions. In addition to these telephone lines, there are also 16 direct Pacific Bell lines used for computer modems, facsimile machines, and process alarms.

3.5.2.3 Sewer Systems

Sanitary wastewater flow at the Molycorp facility is collected in individual septic tanks near its points of origin. Gray water is routed by pipeline to the Sewerage Pond (P-19) (Plate 1). Section 3.3.4 includes a discussion of water quality and wastewater activities at the plant. The Mountain Pass school sanitary system is connected with the plant system near the main entrance.

Process wastewater generated at the plant is routed via pipelines to the wastewater treatment system located near the Flotation Plant (see Plate 1). Wastewater is neutralized in the treatment system and then pumped through a pipeline to the New Ivanpah Evaporation

Pond, or is discharged directly to the wastewater pipeline without pretreatment (Sections 3.3.4.2 and 3.3.4.3).

3.5.2.4 Water Supply Systems

Fresh Water

The Mountain Pass Mine obtains its water from well fields located in Ivanpah Valley to the east and Shadow Valley to the west (see Plate 1). The domestic water withdrawn from the well fields is permitted by the San Bernardino County Department of Environmental Health Services. Section 3.3.4 includes a detailed discussion of water supply systems.

The 10-year annual average of water pumped from the two well fields is 407.8 million gallons (1,177 acre-feet), which is equivalent to 1,050,960 gallons per day or 730 gallons per minute. The Ivanpah Valley Well Field includes six producing wells, two 8-mile long pipelines, and three booster pumping stations that lift the water 2,500 feet to the plant. The Shadow Valley Well Field includes four producing wells, one 12-mile long pipeline, and one booster station to lift the water 1,500 feet to the plant.

Water from both well fields is fed into common holding tanks located to the northwest of the processing facility where water from the two well fields is blended to dilute the 4 to 5 ppm fluoride level in the Ivanpah Valley Well Field. Reverse osmosis units in the processing facility further reduces the fluoride content of the drinking water. Water is sampled and analyzed by a California-certified laboratory once per month for bacteriological content.

Recycled Water

Water is recycled from the North Tailings Pond (P-16) for use as process water in the Flotation Plant. Approximately 550,000 gallons of water from the North Tailings Pond is used at the Flotation Plant per day, which represents about 60 percent of the total water demand at the Flotation Plant. The water is collected from the North Tailings Pond by means of a floating pump.

Section 3.3.4 includes additional information regarding sources and uses of water at the plant site.

3.5.2.5 Storm Water Drainage Systems

The plant site is currently graded to drain storm water away from existing facilities. In addition, open channels direct storm water originating from above the Chemical Plant and the Specialty Plant to the Jack Myers Pond (P20-A). Runoff collected at the "Y" above the mobile equipment shop is channeled east of the shop to an arroyo that leads to the Jack Myers Pond. The Jack Myers Pond has a capacity of approximately 15 acre feet after which overflow would be directed to Pond P20-D farther downstream. Section 3.3.4 includes a discussion of the ponds at the plant site.

Runoff from above the North Tailings Pond is directed to the North Tailings Pond (P-16). This runoff averages from 0.29 to 2.96 acre-feet annually. Stormwater from the north mine area (south flank of Clark Mountain) flows into natural arroyos leading to Shadow Valley to the west and Ivanpah Dry Lake to the east. A portion of this runoff reports to a minor tributary crossing the west mine dump haul road. Two culverts placed along the flow line at the haul road are designed to handle seasonal runoff. Another culvert routes the runoff across the plant access road to the natural drainage leading to the Ivanpah Dry Lake.

3.5.2.6 Solid Waste Handling

General plant refuse (nonhazardous solid waste) is currently disposed of at the Apex Landfill, a municipal/industrial landfill located in Las Vegas, Nevada. The Apex Landfill is projected for closure in 2083. Currently, approximately 3 percent of its total capacity has been utilized (Rogers 1996). Molycorp disposes of an estimated 310 tons per year of solid waste at the Apex Landfill. Additionally, approximately 270 tons per year of scrap metal, packaging material, and used pallets are sold to recyclers and approximately 250 tons per year of construction debris is disposed at the mine in a selected area of the Overburden Stockpile that is currently being permitted as an inert disposal area by San Bernardino County as local enforcement agency (LEA).

Two inactive solid waste landfills are located at the mine site; both are currently undergoing closure activities under separate projects. One of these landfills was used for the disposal of plant refuse and is located northwest of the North Tailings Pond (P-16). The second landfill currently undergoing closure was a community landfill used for the disposal of solid waste generated at the now-closed Mountain Pass mobile home community. Section 3.4.3 includes a discussion of hazardous waste activities at the Mountain Pass Mine.

3.5.3 Transportation/Circulation

Interstate 15 is a divided four-lane highway with controlled access in the area of the mine site, the Nipton Road Borrow Source, and the New Ivanpah Evaporation Pond (Figure 3.5-1). In 1992, average daily traffic (ADT) counts (total traffic eastbound and westbound) on Interstate 15 performed by Caltrans in this vicinity were as follows (Coyazo):

- Cima Road Interchange: 22,900
- Bailey Road Interchange (mine site): 23,500
- Nipton Road Interchange (Nipton Road Borrow Source): 24,500
- Yates Well Road Interchange: 24,700

The Bailey Road interchange is the main access to the mine. It operates at level of service A, as do all of the interchanges in the vicinity (Coyazo). Level of service definitions are provided in Table 3.5-1.

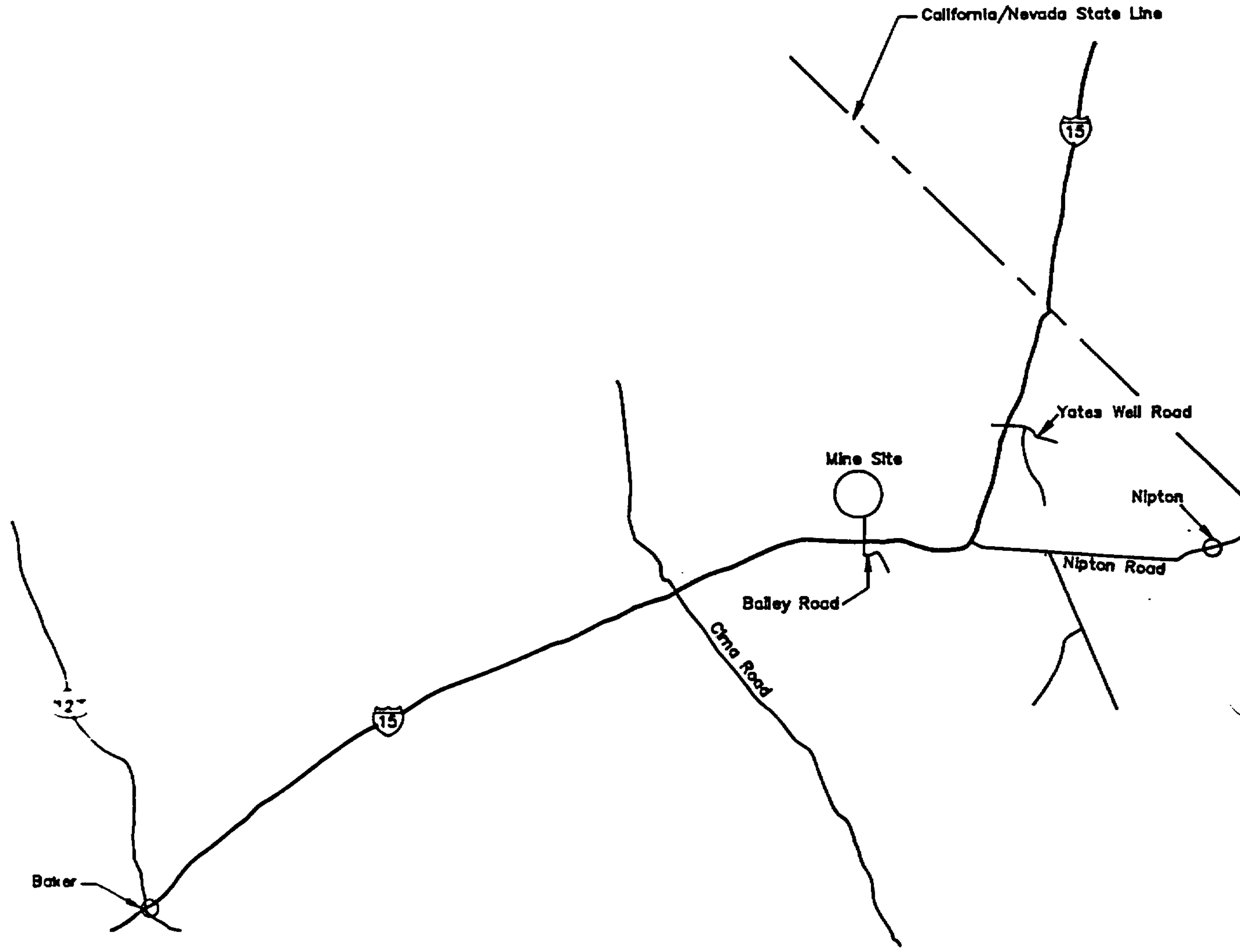
The current total number of employees at the Mountain Pass Mine is 300, working over three shifts, seven days a week. Mean commuting distance is 60 miles one way.

Approximately 0.5 percent of the employees access the mine from the west while the remaining 99.5 percent access the mine from the east. The majority of employees live in the greater Las Vegas area. Approximately 145 light trucks and cars access the mine each day. Employees are encouraged to use car and van pools. Currently, employees lease five 14-passenger and one 8-passenger vans from VPSI. Other employees have formed informal car pools.

Approximately 75 to 80 truckloads (18-wheel semi-trucks) of product are shipped from the plant each month over public roads. For the first six months of 1994, 479 trucks traveled north on Interstate 15 and 318 trucks traveled south on Interstate 15. Additionally, approximately 15 truckloads of hazardous waste are transported from the site each year to offsite landfills, and various material deliveries amount to approximately 550 to 650 trucks per month.

3.5.4 Energy

Energy sources used at the Mountain Pass Mine and associated facilities to power stationary process equipment, stationary support equipment (e.g., water heaters, stoves, etc.), portable equipment, and vehicles include propane, diesel fuel, unleaded gasoline, and gas oil. Electricity is described in Section 3.5.2.1.



NOT TO SCALE

ENSR

ENSR CONSULTING AND ENGINEERING

FIGURE 3.5–1

HIGHWAYS IN PROJECT VICINITY

Molycorp Inc.

Mountain Pass Mine Expansion

DRAWN: M. SCOP	DATE: 7/17/98	PROJECT NO.	REV.
FILE NO. 1991001V	CHK BY:	1991–001–850	

TABLE 3.5-1

Level of Service Definitions

Level of Service	Expected Delay to Traffic
A	Little or no delay
B	Short traffic delays
C	Average traffic delays
D	Long traffic delays
E	Very long traffic delays
F	Severe congestion, warrants improvement

Source: Transportation Research Board 1985

Current propane usage is approximately 8,500 gallons per month. Propane is stored in one 30,000-gallon main storage tank and nine 500- to 1,000-gallon tanks that are located throughout the plant site and are used by specific operations.

Current kerosene usage is approximately 5,500 gallons per year. Kerosene is stored in an 11,000-gallon aboveground tank and one 55-gallon drum. It is used in the solvent extraction circuit in the Specialty Plant and the Chemical Plant.

In 1993, diesel usage was approximately 1.2 million gallons per year for mill/drying operations and Chemical Plant/roasting operations. Approximately 270,000 gallons per year of diesel are used for mobile equipment. Diesel fuel is stored in aboveground tanks throughout the plant as shown below:

- Mill and Flotation Plant — Two 10,000-gallon tanks; One 12,000-gallon tank
- Chemical Plant — Two 11,500-gallon tanks; One 22,000-gallon tank
- Mobile Equipment Diesel Fueling Station — Two 10,000-gallon tanks

In 1993, unleaded gasoline usage was approximately 105,500 gallons per year with the fuel being used for mobile equipment. Unleaded gasoline is stored in one 3,000-gallon aboveground storage tank located at the Mobile Shop Area.

In 1993, No. 4 gas oil usage was approximately 1 million gallons, with the gas oil being used to fuel the 1,000 horsepower boiler at the Flotation Plant.

3.5.5 Housing/Demographics/Socioeconomics

Regionally, relatively little housing is available within close proximity to the Mountain Pass Mine. Therefore, mine employees commute an average of 60 miles one way from their homes. Las Vegas, Nevada and the nearby communities of Henderson, North Las Vegas, and Boulder City are located 50 to 60 miles to the northeast and are the nearest sources of dependably available housing.

The small community of Mountain Pass is located approximately 0.4 mile west of the mine site main gate. Approximately 35 people live in the community, including employees of the California Highway Patrol and Caltrans. The Caltrans maintenance office is also located at Mountain Pass. Three Molycorp employees live in Mountain Pass.

Residential distribution of mine employees as of 1994 is shown in Table 3.5-2.

The sparse population of the region offers few employment opportunities. Regional employment centers on agriculture (cattle grazing), mining operations, and tourism-related industries, especially at State Line, Nevada, approximately 15 miles northeast of the mine. A limited number of service-related businesses are located along Interstate 15 at various interchanges.

3.5.6 Public Services

Public services discussed in this section include the following:

- Fire protection and emergency medical response
- Police protection
- Schools
- Parks/Recreation
- Maintenance of public facilities

3.5.6.1 Fire Protection and Emergency Medical Response

Regional fire protection and emergency medical response are available from the Baker Fire Department (approximately 30 miles southwest), Searchlight Fire and Rescue (approximately 40 miles east), Cal-Nev-Ari Fire and Rescue (approximately 50 miles southeast), Las

TABLE 3.5-2

Residential Distribution of Mine Employees (1994)

Community	Direction from Mine	Percent of Employees
Albuquerque, NM	Southwest	0.3
Baker, CA	Southwest	2.6
Boulder City, NV	Northeast	5.0
Cal-Nev-Ari, NV	Southeast	0.6
Fredonia, AR	East	0.3
Goodsprings, NV	North	1.3
Henderson, NV	Northeast	24.8
Hesperia, CA	Southwest	0.3
Jean, NV	Northeast	2.3
Kanab, UT	Northeast	0.6
Las Vegas, NV	Northeast	40.0
Mission Viejo, CA	West	0.3
Moccasin, AZ	Southeast	0.3
Mountain Pass, CA	West	6.3
Newberry Springs, CA	Southwest	0.6
North Las Vegas, NV	Northeast	3.0
Nipton, CA	East	0.6
Pahrump, NV	Northeast	0.3
Sandy Valley, NV	North	3.6
Searchlight, NV	East	6.3

Vegas Fire Department (approximately 50 miles northeast), and Flight for Life also from Las Vegas. Average response time to the mine from each of these services is one hour after notification. Each of these services have advanced life support capabilities.

The BLM maintains a response capability for wildland fires on public lands. The closest BLM station is approximately 90 miles south of the mine.

Molycorp does not maintain an onsite fire brigade at the Mountain Pass Mine; instead, all employees are trained in basic defensive firefighting techniques and in operation of firefighting equipment that is maintained onsite. As required by MSHA, the equipment includes self-contained breathing apparatus (SCBA), hand-held dry chemical fire extinguishers, 350-pound wheeled dry chemical fire extinguisher, fire hoses, and a fire truck.

Also located onsite are a private basic life support ambulance and 18 certified emergency medical technicians (EMTs), who provide 24-hour advanced first aid coverage. All employees are trained in basic first aid and cardiopulmonary resuscitation (CPR).

The nearest hospital with full emergency services is St. Rose Dominican Hospital located in Henderson, Nevada, approximately 45 miles northeast of the mine.

3.5.6.2 Police Protection

Law enforcement in the area of the Mountain Pass Mine in eastern San Bernardino County is provided by the CHP and the San Bernardino County Sheriff upon request. The CHP can respond in as little as 5 minutes. Three CHP officers are assigned to the Mountain Pass area. All three officers also live in the community of Mountain Pass. The nearest sheriff's station is in Baker, approximately 30 miles to the southwest. Response time from Baker is approximately one hour (California Highway Patrol 1994).

The Mountain Pass Mine maintains a security force hired from a private security company. The force includes four security officers: one for each 8-hour shift on a 24-hour basis and one as a relief officer. The officers are privately trained and are also required to undergo Molycorp orientation training as required by the Mine Safety and Health Administration (MSHA). The orientation training includes the MSHA-required 14 safety elements for new and experienced miners, including certified first aid training and CPR.

3.5.6.3 Schools

Mountain Pass School is entirely surrounded by land owned by Molycorp. The school serves grades kindergarten through 6, and draws students from the communities of Mountain Pass, Nipton, and other outlying areas. The school is part of the Baker Valley Unified School District. Enrollment as of August 1994 was 28, with an estimated capacity of 68 (Taylor 1994, 1995).

A unified middle school-high school serving grades 7 through 12 is located in Baker, approximately 30 miles southwest of the mine. Enrollment as of August 1994 was 90, with an estimated capacity of 170 (Taylor 1994, 1995). An elementary school is also located in Baker, with 120 students in grades kindergarten through 6 as of August 1994 (Taylor 1994).

3.5.6.4 Parks/Recreation

Recreational opportunities in the project area are discussed in Section 3.3.5.1.

3.5.6.5 Maintenance of Public Roads

Caltrans and the San Bernardino County Division of Highways maintain Interstate 15 and the tributary roads in the area. Many outlying roads in the area are not paved. Six Caltrans road maintenance employees are permanently assigned to the Mountain Pass office; all six also live in the community of Mountain Pass (Stinnett 1994).

4.0 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Introduction

This section provides an assessment of potential environmental impacts associated with the Molycorp Mountain Pass Mine expansion project. Impacts to the existing environment of each resource/issue discussed in Section 3 are delineated in this section.

In keeping with the requirements of CEQA, this section focuses on those impacts which are considered potentially significant. An impact has been considered significant if it leads to a "substantial, or potentially substantial, adverse change in the environment." Impacts from the project may fall within one of the following areas:

No impact - There would be no impact to the identified resource resulting from this project. For example, a project constructed in an area of an existing facility which has previously been disturbed and contains no cultural resources would produce no impact to that resource.

Adverse but not significant - Some impacts may result from the project; however, they are judged not to be significant. Impacts are frequently considered nonsignificant when the changes are minor relative to the size of the available resource base or would not change an existing resource. For example, removal of a small amount of marginal habitat from a species with a widespread distribution would probably not be a significant impact. Similarly, the addition of an industrial structure within an existing industrial facility complex would probably not produce a significant impact on visual resources.

Potentially significant but capable of being mitigated to less than significant - Significant impacts may occur; however, with proper mitigation, the impacts can be reduced to below a level of significance. For example, a project affecting traffic flow during construction may have mitigation calling for temporary traffic controls that will keep the impacts to within acceptable limits.

Potentially significant and not capable of being mitigated to less than significant - Impacts may occur that would be significant even after mitigation measures have been applied to lessen their severity. For example, a project could require a considerable number of workers during construction. If the additional construction labor pool required the commitment of more workers than reasonably available, the impact to this resource could be significant and not capable of being mitigated to below a level of significance. Under CEQA, a significant impact would require the preparation of a Statement of Overriding Considerations, i.e., the project benefits must outweigh the significant damage to the environment, in order for the project to be approved.

Beneficial - Impacts will have a positive effect on the environment. For example, a project may produce a needed product.

Mitigation measures propose methods for minimizing the effect of the project on the environment or reducing the effect to a level where it is no longer significant. This section also provides suggested mitigation for effects that are temporary in duration and will not have a long-term adverse impact on the environment. Mitigation measures for adverse significant impacts are also provided in this section.

This section also analyzes the potential impacts of the proposed East Tailings Pond and the East Tailings Borrow Site. At this time, these future components of the project are conceptual in nature and, as such, will require the appropriate level of CEQA analysis under a separate discretionary project. However, for the sake of completeness, this EIR analyzes the impacts of these components based on the design information available to date.

4.2 Natural Hazards

4.2.1 Geology and Geologic Hazards

4.2.1.1 Significance Criteria

Geologic impacts include both impacts of geologic hazards to the project and the impact of the project to the affected geological environment. The following conditions would be considered significant if the proposed project results in any of the following:

- Major changes in topography or ground surface relief features
- Disturbance or destruction of unique geological features or physical features
- Unstable earth conditions
- Exposure of people or property to geologic hazards such as earthquakes, active faults, landslides, mudslides, ground failure, or similar hazards

4.2.1.2 Impacts

<u>Geological Environment</u>

The changes to topography because of pit development and building of the Overburden Stockpile will be significant, unavoidable, and permanent. The mine pit will be deepened by about 500 feet to a total depth of approximately 760 feet. Current pit surface elevation is 4,760 feet and final pit bottom will be at the 4,000-foot level. The pit dimensions will expand to approximately 2,500 feet north to south and 2,700 feet east to west, with a perimeter of 8,000 feet and will cover 80 acres. After the cessation of mining, the Open Pit is expected to fill with water to a static level of 4,600 feet, 200 feet below the surface of the pit opening. The Overburden Stockpile will rise 200 feet over the level of the natural ground surface and will cover 329 acres with dimensions of approximately 5,000 feet from northwest to southeast and 5,400 feet from northeast to southwest, with a perimeter of approximately 15,000 feet. The effects of changes in topography to visual resources, stormwater runoff, and erosion are discussed in relevant subsections of this section.

The purpose of the proposed project is to continue ongoing mining of lanthanide element resources to its economically feasible limit. Therefore, major alterations to topography will occur with the continued disturbance of the existing disturbed site as the pit is deepened and the Overburden Stockpile is increased in size and height. Excavation of the Nipton Road Borrow Site and the East Tailings Borrow Site would contribute to significant alterations of topography. *Although overburden is used in dam construction, the fine-grained material from* the borrow sites is also necessary for fill in the dam, as pond closure material, and as roadway construction material. The project will not result in impacts to unique geologic or physical features.

<u>Geological Hazards</u>

Slope Stability

The slope in the Open Pit presents the greatest potential for unstable earth conditions. Failure of the pit slope could result in interruption of mine operations, damage to equipment, and loss of life. The stability of the rock slope is affected by structural discontinuities in the rock, groundwater, and blasting forces. Structural discontinuities that can contribute to slope instability include joints, foliation planes, shear, or fault zones (Brawner Engineering 1985). These factors contribute to instability in relation to the orientation of the discontinuities to the face of the rock slope. Groundwater intrusion may affect slope stability by any of the following: reducing shear strength of the rock, creating seepage forces which may act on the face of the slope causing water pressure to build in tension cracks, and reducing cohesion of the rocks (Brawner Engineering 1985). Blasting can affect stability by breaking rock and opening discontinuities behind the rock face (Brawner Engineering 1985).

Molycorp monitors the rock slope stability of the pit and will continue monitoring as the pit is excavated. The pit will be excavated in benches 30 to 42 feet in width and heights of about 60 feet. Face angles will have slopes that average 63 degrees, but overall pit wall slopes will conform to the approved slope stability analysis (Vector Engineering 1995). The height of benches and angles of slopes may vary depending on the nature of rock discontinuities (e.g. faults), inclination of the ore body, groundwater, rock strength, and blasting methods. The slopes will be subject to review by the federal Mine Safety and Health Administration (MSHA). Blasting at the pit will be controlled and monitored to prevent unstable conditions from occurring.

Mine slopes are designed based on experience and on the advice of slope stability consultants and in accordance with MSHA regulations. The active pit walls are designed at 45 degrees with added flattening due to interim truck haulage ramps. The permanent east wall (footwall) of the pit is constructed at 38.5 degrees overall from the crest to the current bottom. The lower reaches of the footwall will eventually conform to the dip of the ore deposit, or some 42 degrees overall.

A 1985 slope stability report suggested a 46-degree overall slope for the pit walls. Molycorp engineers use flatter pit slopes to ensure that the walls are stable during the operating years and to provide truck access to the bottom of the pit. Molycorp's mining method consists of multiple slices from the walls of the pits over a relatively long period of time (from 1952 to 2020 as projected by the 30-year pit designed in 1990). No analysis has been made of the overburden slopes or pit wall slopes for seismic stability.

As required by Section 3704(f) of SMARA, a slope stability study of the Open Pit has been prepared for Molycorp (Vector Engineering 1995). The study concluded that the proposed final pit geometry will be stable, and adequate slope stability factors of safety will be achieved. The ultimate pit slopes of the Mountain Pass Mine were analyzed for planar, wedge, toppling, circular, and block-type failures. The analyses were based on a limited field study, field and laboratory testing, one oriented core hole, existing geologic and hydrogeologic data, and exploration core hole logs. The study included both a static and pseudo-static (seismic) analysis. The report indicates that the nearby State Line fault has a maximum ground acceleration of 0.21g for a probable earthquake of 7.0 and a maximum ground acceleration of 0.25g for a credible earthquake of 7.5. The pseudo-static analysis used a maximum ground acceleration of 0.17g for the stability analysis, which represents two-thirds of the anticipated maximum peak ground acceleration.

The study indicated that, while small ravelling slope failures involving one or two benches may occur, it is unlikely that any large deep-seated slope failures will occur for the proposed final pit geometry (approximately 760 feet deep with overall side slopes of 42 degrees or less on all sides). *Post Closure Pit Slope Stability Analyses for the Mountain Pass Mine in San Bernardino County, California* is available for review at the County of San Bernardino Planning Department.

The slopes of the Overburden Stockpile may also be subject to instability if the slopes are too steep, are eroded so the base of slopes are undercut, or are subjected to seismic ground motion. The sides of the Overburden Stockpile will have an overall horizontal to vertical slope ratio of 3:1. Horizontal benches 100 feet in width will be constructed into the sides of the stockpile. The benches and sides will be landscaped to reduce erosion and to facilitate revegetation, which will contribute to overall slope stability.

Earthquakes and Active Faults

Earthquakes can cause ground motions and induce ground failure (such as soil liquefaction) that can result in damage to roads, structures, and utilities, and loss of life. Given the relative lack of potential seismic activity in the vicinity and the low ground motions that could be expected from a maximum credible event over the lifetime of the project, ground motion from earthquakes is not expected to have an impact on the project.

Movement on active faults also has the potential for causing damage to roads, structures, and utilities, and actual rupture or displacement of the ground surface. Displacement of the ground surface from the movement of active faults is not expected to have an impact on the project because no potentially active faults have been identified in the Mountain Pass project area (Jennings 1992 and Hart et al. 1988).

Soil liquefaction at the mine site is not expected to impact the mine site given the depth to groundwater, the relative lack of seismic activity in the vicinity, and the fact that much of the site lies directly on exposed bedrock.

Landslides and Mudslides

Given the low ground motions due to earthquakes that could be expected over the lifetime of the proposed project, earthquake-induced landslides or mudslides are not expected to impact the proposed project. The project is not expected to cause landslides except potentially as discussed above under Slope Stability.

4.2.1.3 Mitigation Measures

Geological Environment

Permanent impacts to topography will occur as a result of the project. It is not expected that impacts can be mitigated to a level that is less than significant. However, Molycorp will minimize impacts to the extent feasible by:

- GE1: Incorporating project design that shapes the Overburden Stockpile and East Tailings Pond Dam to blend with the natural land form and restores the land surface as much as possible during project reclamation.

- GE2: Using overburden material to the extent feasible during construction of the East Tailings Pond Dam in order to minimize the size of the East Tailings Borrow Source.

- GE3: To the extent feasible, Molycorp will further extend the height of the existing North Tailings Dam to minimize disturbance in the East Tailings Dam area.

Geological Hazards

Slope Stability

A preliminary review of the pit wall slope stability analyses indicates that the conclusions regarding slope stability are adequate, given the implementation of the following mitigation measures:

- GH1: The report indicated that additional slope stability analyses may be necessary as mining progresses. A slope stability monitoring plan will be developed and implemented.

- GH2: A static and pseudo-static analysis of the final overburden stockpile slope design will be conducted prior to initiation of the proposed project. The results of the analysis will be used to determine the actual height to vertical bench configurations necessary to ensure overburden slope stability.

Earthquakes and Active Faults

No significant impacts are expected from earthquakes. However, the following mitigation is designed to preclude significant impacts from the proposed East Tailings Pond Dam.

- E1: Seismic design standards will be incorporated into the design of the East Tailings Pond Dam and will be reviewed by an independent third party geotechnical engineer.

- E2: If design of the East Tailings Pond Dam indicates it will be over 25 feet in height or store more than 15 cubic feet of water, it will be permitted through the California Department of Dam Safety.

Landslides and Mudslides

Since no impacts are expected from landslides and mudflows, no mitigation measures are proposed, except as discussed under Slope Stability.

4.2.2 Flood Hazards

4.2.2.1 Significance Criteria

Impacts resulting from flood hazards could be considered significant if the proposed project causes any of the following to occur:

- Major alterations to the flow of flood waters

- Major changes in absorption rates, drainage patterns, or the rate and amount of surface runoff

- Exposure of people or property to water-related hazards such as flooding or dam inundation

4.2.2.2 Impacts

Proposed mine activities that may cause alterations to flow of flood waters, absorption rates, drainage patterns, and rate of surface runoff are not expected to be significant since the changes in these parameters are expected to be minor. Effects to local runoff will occur in and adjacent to the Open Pit, the Overburden Stockpile, and both tailings dams. Runoff in these areas will be diverted through the use of berms and slopes. Molycorp has established a system of drainage channels that direct sheet flows onsite into the offsite natural drainage courses. Diversion channels will be constructed on the west side of the Overburden Stockpile and on the north, east, and west sides of the East Tailings Pond to assist with controlling runoff and to minimize the potential effects of a 100-year flood event (see Plate 1). In instances of heavy precipitation, stormwaters are channeled into Jack Myers Pond for retention and desedimentation (Lilburn 1991). The project is not expected to expose people and property to flood hazards because the plant site is graded so that sheet flow and runoff is diverted away from mine facilities.

4.2.2.3 Mitigation Measures

No significant impacts from flood hazards are expected to occur. However, in order to minimize the potential effects of a 100-year flood,

- FH1: Molycorp will submit project design for permanent diversion structures for review and approval by a qualified engineer.

4.2.3 Wildfire Hazards

4.2.3.1 Significance Criteria

Wildfire hazards would be considered significant if people or property are exposed to high-intensity wildland fires due to the proximity of substantial wildland fuel volumes.

4.2.3.2 Impacts

Because the mine project area is heavily disturbed and lacks substantial vegetation for natural fuel sources, no significant impacts are expected from wildland fires. Section 4.4.6 includes a discussion of impacts expected from non-wildfire hazards.

4.2.3.3 Mitigation Measures

No mitigation measures are necessary or proposed for potential impacts from wildland fires.

4.2.4 Erosion

4.2.4.1 Significance Criteria

Impacts from erosion would be considered significant if there is a large increase in erosion on or off the site.

4.2.4.2 Impacts

The proposed project may result in increases in the amount of wind erosion during mining and reclamation. Molycorp submitted a plan (Environmental Solutions 1994b) for control of the windblown tailings from the North Tailings Pond (P-16) to the RWQCB. As part of the plan, a fate and transport evaluation of the windblown tailings was performed. This evaluation concluded that the windblown deposits are essentially innocuous and do not pose a significant threat to drinking water aquifers and to the environment in general and should be considered a designated waste under Title 23 and managed as a Group C mining waste. The evaluation determined that the largely insoluble metal constituents in the windblown deposits are derived from the natural minerals comprising the ore body, which are classified a Group B mining waste when they are contained within the North Tailings Pond. The report further concluded that the windblown deposits would not impact human receptors via wind transport due to the remoteness of the area.

The plan to control the windblown tailings includes an expanded sprinkler system combined with perimeter fences at the North Tailings Pond to control the source of the windblown deposits. The plan proposes that the existing windblown tailings dune be stabilized through a combination of wind fences and revegetation. The plan recommends that both source control and reclamation be delayed until the North Tailings Dam has been extended to its final design height. At this time, no response to the windblown tailings control plan has been received from the RWQCB. However, implementation of the plan would achieve substantial reductions in windblown tailings.

Wind erosion may also occur from overburden stockpiles and the haul road and eroded areas of the pit wall. Section 4.3.3.3 includes additional discussion of impacts expected from wind erosion. Successful implementation of the Mine Reclamation Plan (Lilburn 1994) during and after mine operations will minimize soil erosion caused by wind and water. The 100-foot benches to be constructed on the Overburden Stockpile will minimize potential water erosion. Section 4.3.4.2 includes further discussion of impacts expected from water erosion.

4.2.4.3 Mitigation Measures

The following mitigation measures, as discussed in the Mine Reclamation Plan, will effectively minimize the potential impacts of erosion.

- WE1: During mining and reclamation, areas that are disturbed will be treated with water sprays and water-retaining treatment chemicals, such as sodium lignon sulphonate.

- WE2: Tailings will be kept moist until pond closure, which will reduce wind erosion of tailings. Permanent stabilization will be required following closure.

- WE3: Stabilize, treat, and/or remove windblown tailings dune to ensure no windblown leachable constituents enter groundwater. Monitor to ensure effectiveness and report findings to LRWQCB.

Wind erosion of the pit will be minimal because of the predominance of rock materials in this area. Additional mitigation for potential wind erosion impacts is presented in Section 4.3.3.4. Mitigation for water erosion is presented in Section 4.3.4.3.

4.3 Natural Resources

4.3.1 Biological Resources

4.3.1.1 Vegetation

Significance Criteria

Impacts to vegetation and special-status plant species would be considered significant if the proposed project results in any of the following:

- Loss, reduction, or deterioration of habitat and/or change in diversity of species of plants

- Reduction in the numbers of any unique, rare, threatened, or endangered species of plants

- Introduction of exotic species of plants into an area, or in a barrier to the normal replenishment or migration of existing species

Impacts

Impacts to vegetation include the removal of vegetation during mining activities. Table 4.3-1 lists the acres of vegetation that will be removed in the project area according to plant community and mine component. Mine expansion and reclamation would remove 681 acres of vegetation within the project area. The plant communities and the acres of vegetation that would be removed by mining activities include the following:

- Joshua tree-blackbrush community - 375.5 acres
- Utah juniper-blackbrush community - 189.9 acres
- Ruderal community - 107.8 acres
- Creosote bush-bursage community - less than 3 acres, depending on amount of borrow used during reclamation from the Nipton Road Borrow site.
- Wetland/riparian areas - 4.8 acres

A wetland delineation has not been completed in the proposed mine expansion areas nor has a wetland determination been made by the U.S. Army Corps of Engineers (COE) regarding the presence and extent of jurisdictional wetlands (Szijj 1994). The estimated acreage of wetland/riparian areas that would be impacted by mine expansion activities was based on interpretations of aerial photography and observations made during field reconnaissance activities. Therefore, the potential impacts are based on the maximum number of acres of wetlands that may be present. Final project design will determine if all identified areas qualify as jurisdictional wetlands.

Section 4.3.4.2 identifies the potential impacts to groundwater resources from seepage and dewatering at the mine. As discussed, the proposed mine operations could result in dewatering effects to area seeps and springs, possibly resulting in decreased water availability for wetland and riparian vegetation. Available water is the limiting factor for most of the wetland areas in the Mojave Desert. Loss of water and the associated riparian vegetation from mine dewatering would be considered a significant impact to vegetation resources.

The removal of 681 acres of vegetation would be a significant impact due to the size of the acreage lost and the length of time before vegetation could be reestablished. Reclamation and subsequent establishment of vegetation in these areas would partially replace vegetation

TABLE 4.3-1

Acres of Vegetation Impacted at the Mine Site and Ancillary Facilities[1]

Mine Component	Joshua Tree - Blackbrush	Utah Juniper - Blackbrush	Previously Disturbed Lands	Cresote Bush - Bursage Community	Wetland/ Riparian Areas
Open Pit	25.8	--	54.2	--	--
Overburden Stockpile	289.0	--	40.0	--	--
North Tailings Pond (P-16) and North Tailings Dam	8.6	--	11.4	--	--
East Tailings Pond and East Tailings Dam	1.0	178.3	--	---	0.7
Surface Material Stockpile	13.5	--	1.5	--	--
East Tailings Borrow Site	35.2	--	0.7	--	4.1
Diversion Channels	2.4	11.6	--	--	--
Nipton Road Borrow Site	--	--	--	3.0	--
Total	375.5	189.9	107.8	3.0	4.8

1 No vegetation is present at the New Ivanpah Evaporation Pond.

that was present in these areas prior to the initiation of mining activities. Reclamation of the proposed project component areas would not be completed until 2030, 35 years after the initiation of mine expansion. However, reclamation activities will begin within 10 years after the initiation of mine expansion during Phase 2 when reclamation activities occur at the North Tailings Pond (P-16) and North Tailings Dam and other areas in the southern portion of the mine site. Reclamation of the lower portions of the south-facing slopes of the Overburden Stockpile will be ongoing as each lift is completed.

Species diversity within the project vicinity is not anticipated to change as a result of mining activities. Plant species present within the proposed disturbance area also occur in the project vicinity. Reclamation activities will include collecting native species, such as Joshua trees, yuccas, cacti, and other plants in proposed disturbance areas and subsequent transplanting these species in reclaimed areas. In addition, seeds from plants present within the proposed disturbance areas will be collected, to the extent possible, for potential use during reclamation activities. These reclamation measures are procedures that are intended to meet state reclamation standards with respect to species diversity and abundance within the project area.

Implementation of the revegetation monitoring program described in the Mine Reclamation Plan will be used to evaluate the effectiveness of revegetation activities. Appropriate corrective measures (e.g., adjustments to seed application rate, seeding or planting period, and seed mixture) will be implemented during the monitoring program to increase the potential for reclamation success based on the SMARA reclamation guidelines. Additional plant materials will be obtained from the project vicinity if an inadequate number of plants or seed supplies are recovered from the project area.

Surface soils within the proposed disturbance areas will be salvaged, stockpiled, and used for future reclamation activities. Desert soils are shallow and difficult to salvage. The organic component of the soil deteriorates over time, which reduces the soil viability during stockpiling. The physical and chemical properties of these soils hinder the successful reclamation of the various mine components. Appropriate corrective measures (e.g., addition of soil amendments and partial crushing of rock) will be implemented if results from the revegetation monitoring plan indicate that physical and chemical properties of the soils are impeding the revegetation of disturbed areas.

Special-Status Plant Species

Special-status species were not observed in the project area during the May 1991 and May 1992 surveys (Lilburn 1991, 1995). Significant impacts to special-status plant species are not anticipated as a result of mine expansion activities since special-status plant species were not observed in the project area during the 1991 and 1992 surveys.

<u>Mitigation Measures</u>

The proposed project includes a reclamation phase (Phase 4) that is designed to return impacted areas over the life of the project to native vegetation. Additionally, reclamation will occur continuously throughout Phases 2 and 3 of the project, as discussed in Section 2.5.1. However, the removal of 681 acres of vegetation would be a significant impact that may not be reduced to less than significant even after the implementation of mitigation.

- <u>VE1:</u> Initiate revegetation and reclamation efforts at earliest feasible time.

- VE2: Conduct a technical evaluation of site soils to identify most suitable material for growth medium for revegetation.

- VE3: A wetlands delineation will be completed within the proposed mine expansion areas and a wetland delineation report will be written and provided to the COE for review. Based on the results of the wetlands delineation, the following additional mitigation measures will be applied:

  - VE3a: Consultation with the COE will be initiated by Molycorp to determine the amount of wetlands that may be impacted by the project.

  - VE3b: Receipt of COE's written opinion regarding wetlands to be impacted prior to initiation of project activities in identified wetlands areas.

  - VE3c: Replacement of wetland acres impacted by the project at a ratio agreed to with the COE

  - VE3d: Avoidance of identified wetlands to the extent feasible.

Even after early implementation of the project revegetation and reclamation efforts, the permanent loss of 681 acres of native habitat would be considered a significant impact.

4.3.1.2 Wildlife

Significance Criteria

The following significance criteria for impacts to wildlife were derived from regulatory standards, research information, and/or standards based on the best professional judgement of resource specialists.

- Impacts to resident and migratory wildlife (e.g., game species, raptors) would be considered significant if critical ranges or habitats (e.g., wintering areas, migratory routes, breeding grounds, nests) are affected during the season of use.

- Loss of native riparian habitat or other plant communities important to wildlife would be significant.

- Visible or measurable toxic effects (e.g., direct mortality, bioaccumulation) to resident or migratory wildlife that can be attributed to ingestion of water sources associated with the proposed project would be considered significant.

- Loss of individuals or long-term loss of habitat for federally or state-listed threatened or endangered wildlife species would be significant.

Impacts

The primary activities identified for the first three project phases that would affect resident and migratory wildlife in the project area include direct habitat loss from mine expansion and the potential indirect water quality effects.

Development of the proposed project, including the Open Pit expansion, Overburden Stockpile placement, East Tailings Pond and dam construction, and East Tailings Borrow Site development would result in the loss of approximately 375.5 acres of previously undisturbed Joshua tree/blackbrush, 189.9 acres of previously undisturbed juniper/blackbrush, and 4.8 acres of previously undisturbed wetland/riparian habitat. However, the riparian vegetation associated with these 4.8 acres consists predominantly of tamarisk, as discussed in Section 3.3.1.2.

Development of the proposed offsite project components, including the Nipton Road Borrow Site and the New Ivanpah Evaporation Pond, would remove less than 3 acres of creosote brush - bursage community at the Nipton Road Borrow Site. Based on these estimates of vegetation removal, the total loss of Joshua tree/blackbrush, juniper/blackbrush, creosote bush-bursage, and wetland/riparian habitat types for development of the proposed project would be 375.5, 189.9, 3.0, and 4.8 acres, respectively. No loss of vegetation will occur at the New Ivanpah Evaporation Pond.

The loss of up to 4.8 acres of habitat potentially considered as wetland/riparian within the mine area would typically be considered a significant impact to the wildlife species dependent on them. However, a number of factors associated with these wetlands are not optimal for animal use. As discussed in Section 3.3.1.2, tamarisk, which is an exotic, invader species, is the predominant plant species associated with these wetlands. Tamarisk can provide cover for desert wildlife, but is considered low in forage value. Removal of tamarisk vegetation would not be a significant loss of resources for wildlife, as defined in the applicable significance criteria.

Loss of available water to wildlife from effects to these wetlands would be important, particularly in Wheaton Wash. Loss of open water and any native riparian habitat would be considered a significant impact. However, a decrease in the open water areas associated with the artificially created wetlands (seepage collection ponds) below the North Tailings Pond would not necessarily be detrimental to wildlife. As discussed below, some risk may exist for wildlife species that consume the tailings pond water, although the high TDS concentrations may make it somewhat unpalatable.

As presented in Section 4.3.4.2, both water quality and water quantity may be impacted by this project. Proposed pit dewatering during Phases 1 through 3 could affect water availability and riparian vegetation in outlying seeps and springs commonly used by wildlife. It is calculated that drawdown influences to groundwater could extend from approximately 1 to 3.1 miles from the pit. A total of five springs occur within 3 miles of the mine pit, and an additional four to six springs occur over 4 miles from the mine. It is estimated that there is a low potential of impacting seeps and springs within 1 to 3 miles of the pit, but a high potential for adverse effects to water sources within 1 mile of the mine pit expansion. In the event that mine pit dewatering results in the decline of groundwater levels, thereby impacting the open water or riparian vegetation, it could result in significant, adverse impacts to resident and migratory wildlife dependent on these areas, depending on the levels of effect to groundwater resources.

Disturbance of native habitats as a result of the proposed project would result in the direct loss of smaller, less mobile species (e.g., small mammals, bird nestlings, reptiles) and the displacement of more mobile species (e.g., medium-sized and large mammals, adult birds). The greatest direct impact of habitat removal and disturbance to area wildlife species within the project area would be the loss of breeding habitat, foraging areas, and cover, with an associated reduction in carrying capacity. Loss of habitat and effects to carrying capacity would occur over a period of 30 to 35 years, until reclamation is achieved. 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. Because the mine would be developed incrementally, however, animals would disperse over the development period.

Realignment of the SCE power supply line, relocation of the AT&T microwave facility access road, and relocation of the Shadow Valley water supply pipeline would primarily affect less mobile wildlife species within the disturbance areas. 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 operation but would return to nesting habitats located adjacent to the disturbed areas following project reclamation. If vegetation were removed during the breeding season, eggs and nestlings may be lost, adversely affecting the birds' annual productivity.

Potential impacts to both resident and migratory raptor species would include the possible loss of nest sites from removal of the native desert habitat and potential electrocution hazards from small distribution lines located within the mine area. Raptor species, such as the red-tailed hawk, may use native Joshua trees for nesting, and burrowing owls may occupy burrows within the native habitats. Removal or disturbance of active nest sites during mine expansion may result in the loss of eggs or young, also affecting the annual breeding productivity of the raptor species. The potential for electrocution of perching raptors would apply to small distribution lines (less than 69 kV) only. On these smaller power lines, the physical dimensions and configurations may present an electrocution hazard for area raptors that attempt to perch on the structures, since the distance from phase to phase, or phase to ground, would be less than a typical raptor's wing span. No data are currently available on any raptor mortalities that may have previously resulted from distribution line electrocution within the project area. The proposed project involves the relocations of a 12-kV and a 33-kV power line. Loss of special-status raptor individuals from either mine development or operation would be considered significant. In addition, effects to resident or breeding raptors from mine pit dewatering during project operation could result in significant impacts to birds dependent on riparian vegetation and naturally occurring area springs. Long-term impacts to raptors could occur from the attraction of the mine pit lake that is expected to remain after mine closure.

The hunting territories of raptors and mammalian predators would not be significantly impacted by the disturbance of native habitats associated with the mine area expansion. Because most local predators (e.g., coyote, kit fox, gray fox, bobcat, red-tailed hawk) 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.

Impacts to big game species are expected to be minimal to nonexistent in the mine area. Mine development and related components would not affect any big game seasonal ranges or migration corridors. No mule deer concentration areas (e.g., fawning areas) occur in the project area, and the nearest Nelson's bighorn sheep habitat is located north of the mine site, in the higher elevations of the Clark Mountain Range. Indirect effects to big game species from mine dewatering could be significant if utilized springs and seeps were affected.

Effects from mine development to game birds are expected to be low. The lack of water sources and riparian habitat in the mine area limits use by Gambel's quail and mourning dove.

Indirect effects to upland game species from pit dewatering could occur if the use of naturally occurring springs and seeps in the mine vicinity was eliminated.

Other than the potential significant effects from mine dewatering, as discussed above, indirect impacts to area wildlife during project development and operation are not expected to be significant, or to exceed current levels in the overall project area. The proposed project is a continuation of current operations and as such, no significant changes to the processing facilities, wastewater stream volumes generated, water supply requirements, hazardous materials usage, and hazardous waste generation are expected to be associated with the project. Employment, vehicle use, and traffic levels are not expected to change significantly over the expansion period. No additional law enforcement needs have been identified for protection of wildlife resources from implementation of the proposed project.

Noise generated during project development and operation would result in minor impacts to area wildlife, but is not expected to exceed current levels. Common responses of animals to noise disturbances are either avoidance or accommodation. Except at extreme levels, the more secretive and smaller animals are expected to 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).

There are no known shafts, adits, or other underground workings associated with past mining activities on or near the mine site, that could support bats (i.e., hibernacula, nursery colonies, bachelor roosts) and other nongame species, such as passerine birds, amphibians, and reptiles. No significant impacts to such species are likely to occur.

Impacts to area wildlife species related to water quality and quantity issues associated with the proposed project are based on the analysis presented in Section 4.3.4. Particularly, waterfowl, shorebird, and bat species may use existing ponds as a water source; however, no data on any avian mortalities associated with on-site water sources are currently available.

If open water sources associated with mining operations are determined to be toxic to wildlife, violation of the federal and state Endangered Species Acts, Migratory Bird Treaty Act, or the Bald and Golden Eagle Protection Act may occur.

The concentrations of various materials in the water of the North Tailings Pond (P-16) and the associated seepage collection ponds were compared to various criteria and standards or effects levels to determine if there might be potential risk to wildlife from the tailings pond water. The criteria or effects levels that were examined included the U.S. EPA maximum contaminant level (MCL) for drinking water (human health) (U.S. EPA 1986) and the National Research Council maximum tolerable levels (MTLs) for domestic animals (NRC 1980). As there are no known California agricultural standards that could be used to compare the tailings pond concentrations, the State of Nevada Irrigation and Watering of Livestock Standards were also used. There are currently no national criteria in existence that are directly applicable to non-contact consumption of water by terrestrial wildlife, although that issue has been raised by EPA and workshops have addressed the issue (U.S. EPA 1989).

The metals examined were lead, strontium, and barium (Table 4.3-2). The effects levels for strontium are those described in NRC (1980). All of the sources examined had criteria, standards, or effects levels for lead.

All of the strontium concentrations measured in the four quarters were less than the NRC effects level. Barium concentrations were less than the NRC effects level, but were slightly higher than the proposed U.S. EPA MCL. Barium can be toxic when absorbed with indications being stimulation of muscles of all types (NRC 1980). Because the barium concentrations are substantially lower than the NRC MTLs and the U.S. EPA MCLs are designed to address human consumption, it is believed that barium would not be a risk to mammalian or avian species that might use the North Tailings Pond water as an interim source of water until closure/capping.

All lead concentrations were higher than both the proposed U.S. EPA MCL (0.005 mg/l) and the Nevada Watering of Livestock standard (0.1 mg/l). These exceedances indicate that some risk may exist for mammalian or avian species that consume the tailings pond water. However, other characteristics of the tailings pond water may make consumption unlikely. As shown on Table 4.3-2, the total dissolved solids (TDS) concentrations during all four quarters of sampling were very high. Although there are no TDS standards applicable to wildlife, the TDS concentration in the fourth quarter (17,000 mg/l) is over half the salinity of typical seawater (30,000 mg/l). Composition of TDS in the pond includes chloride (average 5,800 mg/l), sulfate (average 546 mg/l), sodium (average 2,064 mg/l), and strontium (average 875 mg/l).

The high TDS of the pond water may make it unpalatable to wildlife. Lead and any other metals that may ordinarily pose a risk to wildlife may therefore be unavailable to organisms due to the unlikelihood of the intake of a large volume of water. Ingestion of food sources is

TABLE 4.3-2

Concentrations of Selected Materials in Water from the North Tailings Pond and Associated Seepage Collection Ponds Relative to Associated Criteria and Standards (mg/l)

Parameter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Mean	NRC MTL[1]	Nevada Irrig.[2]	Nevada Live.[3]	USEPA MCL[4]
TDS	3,500	9,500	9,000	17,000	9,750	--	--	--	--
Carbonate + Bicarbonate	530	2,100	600	NA	1,076.7	--	--	--	--
Lead	1.2	0.8	1.1	0.28	0.845	30	5	0.1	0.005 /p[5]
Strontium	17	20	22	1100	289.75	2,000	--	--	--
Barium[6]	2.9	3.3	<1	<10	4.3	20	--	--	2 /p

1 National Research Council (1980) Maximum Tolerable Levels.
2 State of Nevada Irrigation Standards.
3 State of Nevada Watering of Livestock Standards.
4 U.S. EPA Drinking Water Maximum Contaminant Levels.
5 /p = Proposed criteria.
6 Detection levels (1 and 10, respectively) were used to calculate the mean.

Source: Molycorp 1993 Quarterly Report to LRWQCB.

not expected to be affected by the pond water due to the lack of vegetation near the pond. Therefore, significant impacts to wildlife from the North Tailings Pond are not expected to occur.

The chemistry of the New Ivanpah Evaporation Pond water (Table 4.3-3) indicates a very saline waterbody. Based on the TDS concentration, the salinity of the evaporation pond water exceeds that of average seawater. The various ions (including metals) are present at concentrations that could have adverse impacts on any organisms that would consume the water over an extended period of time. Measured strontium and zinc concentrations are at or above one or more of the standards or effects levels examined. However, the extremely high concentrations of both cations (e.g., calcium and sodium) and anions (e.g., chloride and sulfate) would almost certainly prevent wildlife from consuming evaporation pond water. Consumption of this water is therefore not considered a significant risk to wildlife.

Section 4.3.4 identifies the potential impacts to groundwater resources from seepage and dewatering at the mine. As discussed, the proposed mine operations could result in dewatering effects to area seeps and springs, possibly resulting in decreased water availability for wildlife. Available water is the limiting factor for most of the wildlife populations in the Mojave Desert. Loss of water and the associated riparian vegetation from mine dewatering is considered a significant impact to wildlife resources.

Following mine closure, a specific goal of revegetation is the reestablishment of wildlife habitat by using the appropriate native species, enhancing through the development of cover and the creation of habitat diversity, as discussed in Molycorp's Reclamation Plan. As human activity in the area decreases and revegetation proceeds upon mine closure, wildlife use of the area would likely increase accordingly.

Potential water quality impacts to wildlife resources also would involve the eventual development of a pit lake following mine closure. The evolution of pit lake morphology and ecology is difficult to predict. The resulting configuration of the pit walls; vegetation establishment, composition, and structural diversity; and water depth are factors that relate to the habitat value and associated level of use by wildlife resources. The establishment of vegetation (i.e., cover and forage) typically depends on the water depth, slope failures, sediment accumulation, seed sources, protection from wind, chemical constituents, and nutrient availability. Weedy annuals would colonize the substrate, if feasible, followed by secondary herbaceous and woody species, as the soil depth and organic levels increase.

TABLE 4.3-3

Concentrations of Selected Materials in Water from the New Ivanpah Evaporation Pond Relative to Associated Criteria and Standards (mg/l)

Parameter	Range	NRC MTL[1]	Nevada Irrig.2	Nevada Live.[3]	USEPA MCL[4]
TDS	20,000-50,000	N/A	N/A	N/A	N/A
Calcium	100-2000	Var.[5]	N/A	N/A	N/A
Lead	<0.02	30	5	0.1	0.005 /p[6]
Strontium	400-2000	2000	N/A	N/A	N/A
Zinc	2-130	300	2	25	N/A
Magnesium	60-100	Var.[5]	N/A	N/A	N/A
Sodium	100-2000	Var.[5]	N/A	N/A	N/A
Chloride	1000-25000	Var.[5]	N/A	N/A	N/A
Sulfate	100-800	N/A	N/A	N/A	N/A
Nitrate	60-200	N/A	N/A	N/A	10

1 National Research Council (1980) Maximum Tolerable Levels.
2 State of Nevada Irrigation Standards.
3 State of Nevada Watering of Livestock Standards.
4 U.S. EPA Drinking Water Maximum Contaminant Levels.
5 Tolerable levels are presented as percent of the diet; tolerable levels vary depending upon other components of the diet.
6 /p = Proposed criteria.
7 N/A: Standards not available for these materials.

Source: Molycorp 1989 Monitoring Data for the New Ivanpah Evaporation Pond.

It has been estimated that the pit lake would fill to approximately 550 feet deep, limiting wildlife use to periodic resting on the body of the lake, particularly during migration. However, depending on the factors listed above, additional habitat may become established through time that could support breeding and foraging individuals. As the lake approaches equilibrium, limited littoral substrate may become established, forming small, discrete pockets along the lake margin. Small mammals and birds would be the most common species to utilize these areas.

It is difficult to predict the final pit lake water quality effects on wildlife resources that may use this area. The limited amount of water sources in the region would certainly attract animals to the lake; however, the depth of the lake would restrict many species, as discussed above. In the event that the resulting water quality is poor in the pit lake, use of the water by resident and migratory animals may result in adverse impacts. Acute effects could occur, depending on the constituents in the water column and sediments. Chronic effects may occur, but would be limited to species that would continually use the lake water and associated vegetation.

Sensitive Wildlife Species

The impact assessment for sensitive wildlife species focuses on the potential effects to the species identified in Section 3.3.1; therefore, only the applicable project components are discussed for each species examined. Species that are not likely to occur in the project area have been acknowledged, although no impacts to these species are anticipated.

As discussed in Section 3.3.1.2, a number of studies have been conducted for the federally listed desert tortoise within the project area (Lilburn 1993; BLM 1988). These surveys determined that desert tortoises do occur in the project area, although the species is not considered common, due to the higher elevation. The BLM has classified the area as Category III tortoise habitat.

Implementation of the proposed project could result in a "take" of the species, resulting in a significant impact to this species. The federal Endangered Species Act defines "take" as a means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Suitable habitat has been delineated, observed tortoise sign has been recorded, tortoise fences have been erected near the Overburden Stockpile, and clearance surveys have been conducted within the appropriate habitat types.

In 1992, the BLM prepared and submitted a Biological Assessment to the USFWS on Molycorp's proposed expansion of the Overburden Stockpile, affecting an estimated 28.5

acres of desert tortoise habitat. The assessment identified potential impacts to the desert tortoise from construction and operation of this proposed project. The USFWS reviewed the BLM assessment and subsequently prepared a Biological Opinion that delineated the incidental take number, reasonable and prudent measures, and formal terms and conditions for protection of the desert tortoise from the proposed mine expansion. The "may affect" determination under Section 7 resulted in applicable protection measures that were developed to avoid a jeopardy decision for this species. Since 1992, the BLM has concluded a land exchange with Molycorp. The USFWS reviewed this exchange under an informal Section 7 consultation process and concurred with the BLM findings. Under the Section 7 process, Molycorp exchanged 1,902.18 acres of Category I habitat in Johnson and Chemehuevi Valleys for 878.93 acres of Category III habitat located within the project area. The 1994 land exchange EA (BLM 1994a) indicates that the Section 7 consultation is not valid for the lands now owned by Molycorp and recommends a Section 10(a)(1)(b). However, the USFWS (Waln 1996) has indicated that an incidental take permit under Section 10(a)(1)(b) is not required if the mine expansion does not extend beyond the existing tortoise-proof fence and the fence is maintained to preclude tortoises from entering the expansion area.

Suitable tortoise habitat occurs within the project area, although this habitat is limited, encompassing the three plant communities identified for the mine and processing operations and the Nipton Road Borrow Site. To facilitate the offsite mitigation compensation for the desert tortoise, an assumption was made that the 878.93 acres of property identified for the land exchange equalled suitable habitat (Category III). This figure was used to establish the parameters used in the exchange for Category I habitat. No increase in indirect impacts to the tortoise is expected, since the estimated number of mine personnel would not significantly change over the four project phases.

Only the Bendire's thrasher and American badger are other sensitive wildlife species identified that would likely occur within the project area. The proposed expansion activities would affect the available habitat for these species, although neither of these species is anticipated to be prominent in the project area. Molycorp's commitment to replace the Joshua trees and to use native plant species during reclamation will aid in minimizing impacts to avian species, such as the Bendire's thrasher. Effects to the badger may encompass direct mortality during project construction and habitat loss for the life of the project. The badger is a State species of concern, and compensation is not required by the CDFG at this time. Based on area habitat availability, committed protection measures, and the limited species' presence, impacts are not anticipated to be significant for either of these species.

No impacts are anticipated for the Arizona toad or banded gila monster, due to the lack of habitat and rare occurrences, respectively. A few of the sensitive bird species listed for the project area (e.g., golden eagle, prairie falcon, crissal thrasher) may move through during migration or during foraging activities, as discussed in Section 3.3.1. However, no significant impacts to any of these species have been identified. Impacts to the burrowing owl are not likely due to the low potential for occurrence within the project area. Many of the species examined do occur in the Clark Mountains, but would not likely occupy the habitats associated with the lower elevations of the project area. Similarly, the Nelson's bighorn sheep do not occur in the project area; therefore, no impacts to this protected species would occur. Finally, no impacts to wild horses or burros in the region are anticipated, since no project components intersect with the Clark Mountain HMA.

Mitigation Measures

The following mitigation measures are designed to reduce the impacts of the project to wildlife to less than significant.

- W1: If grading or clearing is initiated during the breeding season (April 1 - June 1), a nest survey for active raptor nests will be conducted in undisturbed desert habitat prior to vegetation removal. The surveys will focus on Joshua trees (e.g., red-tailed hawk) and burrows (i.e., burrowing owl) within the undisturbed habitats. In the event an active nest site is located, an appropriate buffer area (e.g., 200-foot radius) will be flagged around the nest, depending on the species affected, and activities will be restricted within this area until the sensitive period (e.g., courtship, incubation, fledgling) has passed. Burrows will be examined for nesting burrowing owls. If young are present, the burrows will be avoided until fledgling. If grading or clearing occurs outside of the nesting season, burrows will still be examined for owls. If owls are present, they will be flushed out and the burrows destroyed. Larger burrows will be examined for badger presence, and, if badgers are encountered, they will be trapped and relocated.

- W2: The new 12-kV and 33-kV distribution lines constructed within the project area will incorporate the design requirements for raptor protection from electrocution. Design elements may include those identified in Olendorff et al. 1981, "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1981."

- W3: In the event that the proposed project expansion affects suitable desert tortoise habitat not previously considered suitable habitat, appropriate field surveys will be conducted in accordance with USFWS survey guidelines. These guidelines require that a habitat and presence/absence survey be completed to determine whether the area is "suitable" tortoise habitat and the relative habitat quality. Loss of suitable tortoise habitat would require mitigation, which may include offsite habitat compensation.

- W4: Open water sources associated with mining operations that are exposed to wildlife may adversely impact wildlife species that use these sources. In the event that project water sources are determined to be toxic to wildlife (i.e., mortalities become apparent), Molycorp will implement the appropriate protection measures, based on the issue identified and associated species' use. Applicable mitigation may include netting, hazing, enclosing, or providing supplemental water sources.

- W5: Long-term monitoring of seeps and springs will be conducted at naturally occurring seeps and springs located within 3 miles of the mine pit, as determined by the BLM, NPS, CDFG, and the County of San Bernardino. An alternative water supply, such as drinkers and guzzlers, will be provided, in the event that water availability declines significantly from pit dewatering activities. In addition, off-site riparian habitat enhancement will be conducted to mitigate loss of valuable riparian habitat (e.g., willows, cottonwoods), as determined by the applicable government agencies.

- W6: During project operation, Molycorp will implement a monthly monitoring program to ensure the integrity of the tortoise-proof fence. The fence will be maintained to preclude tortoise access to the exclusion area. Molycorp will coordinate with the USFWS and the County of San Bernardino to determine the applicable measures for the mine area. In the event that a desert tortoise is found within the exclusion fence, Molycorp will immediately contact the USFWS to determine the appropriate procedures for removing the tortoise from the area.

- W7: Offsite mitigation for general loss of habitat will include the development and implementation of a tamarisk eradication plan for Farmer's Wash and Wheaton Wash, or at other locations as determined to be appropriate by BLM and/or CDFG.

- W8: Long-term monitoring of the resulting water quality associated with the pit lake will be conducted to determine potential acute or chronic effects to wildlife resources that may use this water following mine closure. If adverse effects are identified, Molycorp will install barriers to preclude wildlife from accessing the pit lake.

Long-term quality of the pit lake after closure may be a significant impact to wildlife that cannot be reduced to below a level of significance due to potential toxic effects to wildlife.

4.3.2 Cultural/Paleontological Resources

4.3.2.1 Significance Criteria

Impacts to identified artifacts/sites and potentially undiscovered cultural and paleontological resources are considered significant if the proposed project causes one or more of the following to occur:

- Affect sites, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP)
- Cause loss or destruction of significant scientific, cultural, or historical resources
- Affect Native American sites significant to their traditional physical universe or belief systems
- Result in significant reduction of access to traditional Native American use areas or sacred sites
- Result in the disturbance, loss, or burial of fossil remains, associated geologic and geographic data, fossil sites, and fossiliferous or potentially fossiliferous rocks.

4.3.2.2 Impacts

<u>Cultural Resources</u>

Impacts to cultural resources are discussed in detail in *Class III Cultural Resource Evaluation: Molycorp Mountain Pass Mine Facility and Nipton Road Borrow Source* and *Class III Cultural Resource Evaluation: Molycorp Mountain Pass Mine Land Exchange* prepared for this EIR available at the San Bernardino County Planning Department.

The prehistoric artifacts and sites discussed in Section 3.3.2 were found on landforms subject to periods of heavy erosion with established ephemeral drainage channels throughout. It is possible for these artifacts to have been moved by weathering processes from locations at higher altitudes or to have been unearthed from buried locations. Also, previous activities from nearby mining activities could have resulted in the movement of these artifacts.

Impacts to the cultural sites and artifacts discussed in Section 3.3.2 can be divided into three categories:

- Cultural sites and artifacts that are outside the project boundary and therefore are not likely to be impacted by the project.

- Cultural sites and artifacts that are inside the project boundary and therefore likely to be impacted by the project but whose significance is of little value (i.e., not eligible for entry) to the NRHP or whose cultural value was substantially documented during the Class III Cultural Resource Evaluation.

- Cultural sites and artifacts that are inside the project boundary and likely to be impacted by the project and whose significance is of value (i.e., eligible for entry) to the NRHP or whose cultural value was not fully assessed during the Class III Cultural Resource Evaluation.

The isolated artifacts (A2261-4 through A2261-13) discussed in Section 3.3.2 were substantially documented during the Class III Cultural Resource Evaluation and have little field data potential left. Therefore, the archaeological study conducted for this EIR concluded that any impacts to these isolated artifacts as a result of the project will be insignificant.

Of the 14 cultural sites discussed in Section 3.3.2, three sites in the Mountain Pass Mine area (CA-SBR-7804H, CA-SBR-7805H, and CA-SBR-7812H), as well as all of the sites at the Nipton Road Borrow Site (CA-SBR-7800H, CA-SBR-7801H, and CA-SBR-7802H), appear to be of little historical significance. These sites are of limited scientific value because of their contents (i.e., general refuse of recent origin) and are associated with well documented activities occurring in the Mountain Pass area. Also, no significant historical event or persons are associated with these sites in the literature reviewed, and the sites have already been inventoried and archaeological site forms completed. Potential project impacts to these sites are expected to be insignificant.

Five of the sites (CA-SBR-7803H, CA-SBR-7808H, CA-SBR-7810H, CA-SBR-7811H, and CA-SBR-7813H) are not located in the project area but appear to be significant based on NRHP criteria. The importance of CA-SBR-7803H and CA-SBR-7810H is centered around the evidence that the sites have had repeated use by different cultures. Site CA-SBR-7808H is of a prehistoric nature and could potentially contribute information regarding general patterns of Native American life in the Mountain Pass area. Sites CA-SBR-7811H AND CA-SBR-7813H are potentially important because of the historical benefit from intact and remnant structures associated with twentieth century mining operations in the area. However, potential project impacts to these sites are expected to be insignificant since they are located outside the project area.

Three of the sites (CA-SBR-7806, CA-SBR-7807, AND CA-SBR-7809) are prehistoric sites which are either located within or on the periphery of the project boundary in the general vicinity of the proposed East Tailings Pond and Dam. The sites are all of prehistoric nature with various artifacts present. These artifacts indicate repeated seasonal occupation of the project area by Native Americans who gathered and processed seed products. However, the California SHPO and the BLM (BLM 1994a) have determined that CA-SBR-7806 is ineligible for the NRHP. CA-SBR-7807 and CA-SBR-7809 appear to be eligible for the NRHP. CA-SBR-7807 and CA-SBR-7809 are located in the eastern mine area and may be potentially affected by future activities in that area.

Paleontological Resources

Impacts of the proposed project on paleontological resources are discussed in detail in *Paleontologic Resource Assessment Proposed Molycorp, Inc. Mountain Pass Mine Expansion* prepared for this EIR and available from San Bernardino County.

Impacts in portions of the expansion area underlain by unfossiliferous metamorphic rocks would be of no significance. With one exception (MAR 11-19-92 in the tailings storage area footprint), the Pleistocene nonmarine deposits are probably too coarse-grained to contain fossil remains. Therefore, adverse impacts on paleontological resources resulting from expansion of the mine pit, excavation of the borrow sites, removal of topsoil, and burial by the tailings dam and stored tailings and overburden in areas underlain by this rock unit would be of low paleontological significance in nearly all of the disturbed area and the areas to be disturbed because of the low potential for disturbance, loss, or burial of any scientifically important fossil remains or as yet unrecorded fossil site.

Alluvium underlies the Nipton Road Borrow Site and is probably too coarse-grained to contain any fossil remains. Therefore, adverse impacts on the paleontological resources of the borrow site resulting from excavation of borrow material would be of low paleontological significance because of the low potential for disturbance or loss of any fossil remains or as yet unrecorded fossil sites.

4.3.2.3 Mitigation Measures

Cultural Resources

Three sites (CA-SBR-7806, CA-SBR-7807, and CA-SBR-7809) within the project boundary may be adversely impacted by the proposed project. Two of these sites, CA-SBR-7807 and CA-SBR-7809, appear eligible for the NRHP. Also, significant impacts could occur to as yet unidentified, buried, sites or artifacts at the Mountain Pass Mine or the Nipton Road Borrow Site. These impacts include destruction as a result of surface scarification or burial underneath overburden piles.

- CR1: If possible, redesign project in area of prehistoric resources in the general vicinity of the proposed East Tailings Pond and Dam. If this is not possible, prior to any earth-disturbing work being conducted in the areas of the CA-SBR-7807 and CA-SBR-7809 sites, an archaeological investigation will be conducted. This investigation will ascertain the nature and integrity of the known cultural artifacts/sites. At a minimum, the investigation will include additional ethnographic and historical research and will implement a field testing program. An assessment of the cultural significance of each identified site, a treatment plan, and detailed mitigation measures will be prepared and implemented prior to construction/excavation activities taking place.

- CR2: Because there is a possibility of discovering buried prehistoric and historic artifacts/sites during excavation activities at the Nipton Road Borrow Site and during grading/excavation activities in previously undisturbed areas of the Mountain Pass Mine, these activities will be monitored by a qualified archaeologist. If additional cultural artifacts/sites are discovered, they will be evaluated in consultation with the California SHPO and appropriate Native American groups prior to further excavating. The archaeologist will have the authority to halt work in the discovery area until evaluations are complete. If a newly discovered site is determined to be significant by NRHP criteria, a mitigation plan (i.e., data recovery and excavation) shall be prepared and implemented prior to further excavation work.

Paleontological Resources

- PR1: Mitigation of impacts to paleontological resources should be implemented by the development of a monitoring and recovery program prepared by a qualified paleontologist approved the San Bernardino County Museum (SBCM), and would include monitoring of earth-moving activities in areas underlain by the fossiliferous bed at and in the immediate vicinity of MAR 11-19-92 in the East Tailings Pond footprint, collection of fossil remains uncovered by these activities, and, if warranted, recovery of fossiliferous rock samples to process for smaller fossil remains.

- PR2: No mitigation measure would be required elsewhere in the project area unless fossil remains were uncovered by earth-moving activities, at which time impacts on the fossil site would be stopped and a paleontologist would be called to the site to remove the remains, and if warranted, to develop additional mitigation measures. Fossil remains and associated data would be deposited in the SBCM.

4.3.3 Air Quality

4.3.3.1 Significance Criteria

For the Mountain Pass Mine expansion project, the thresholds and standards to determine air quality environmental significance are:

- **Emissions:** MDAQMD Rule 1301 (amended March 25, 1996) contains a definition (EEE) of what the agency considers a "significant" net emissions increase for criteria pollutants. These levels are shown in Table 4.3-4.

- **Health Standards:** As discussed in Section 3.3.3.2, both National and California Ambient Air Quality Standards have been established to protect public health (see Table 3.3-4). The proposed project area is currently designated as being in attainment of or unclassified for these standards for all criteria pollutants except PM_{10}. Although the MDAQMD has requested that the project area be reclassified as attainment/unclassified for PM_{10} as well, while the area is classified as nonattainment, an increase in PM_{10} emissions from the project would be considered significant. An increase in emissions sufficient to cause an exceedance of these criteria pollutant standards would also be a significant impact.

- **Nuisance:** A potential for a project to cause a nuisance or adversely impact a nearby sensitive receptor, such as schools or hospitals, would be a significant impact.

- **Air Toxics:** An increase in air toxic emissions that has the potential to cause significant health risks is considered significant. Significant health risks have been defined under the California Air Toxics "Hot Spot" Act (AB 2588) by the MDAQMD. For example, a potential to increase cancer risk by ten in one million or more is considered a significant impact.

4.3.3.2 Estimated Project Emissions

The emissions from the proposed mine expansion project will be regulated by the MDAQMD. At a minimum, the project must comply with MDAQMD's prohibitory rules, such as Rule 403: Fugitive Dust. Additionally, an increase in emissions above currently permitted levels of

TABLE 4.3-4

MDAQMD Significant Net Emissions Increase (tons per year)

Pollutant	Attainment or Unclassified Area	Severe Ozone Nonattainment Area	Moderate PM_{10} Nonattainment Area
CO	100	100	100
NO_x	40	25	40
ROG	40	25	40
SO_2	40	40	40
PM_{10}	ND	ND	15
Lead	0.6	0.6	0.6

ND - not determined.

affected pollutants from stationary equipment due to the proposed mine expansion will require Molycorp to obtain new air permits. If the affected facility emissions are greater than the thresholds in MDAQMD Rule 1303 (i.e., 15 tons per year (TPY) PM_{10}, 25 TPY NO_x, etc.) offsets will be required for the applicable emissions. The MDAQMD will review any future air permit applications to ensure emissions do not exceed applicable regulations and expected impacts do not impede attainment of ambient air quality standards.

The proposed mine expansion is not expected to increase ore mining or reclamation activities over existing levels from the Mountain Pass Mine during the course of the project. Because the expansion is a continuation of current activities, no major changes in the ore production and ore processing facilities are proposed. In addition, employee related traffic levels are not expected to change significantly during the expansion period. As a result, it is assumed that there will be no additional emissions or impacts from the ore handling and processing facilities.

There will potentially be increases in air emissions from the proposed project due to the removal, handling, transport, and storage of ore, overburden, and tailings. The major change in future mine operations will be due to the location of the bastnasite ore body, which dips about 40 degrees southwest from the surface for a distance of over 1,200 feet. Up to the present time, the mining of the ore produced a minimum of overburden. As excavation increases in depth to follow the ore body, the amount of overburden will increase. The current ratio of overburden to ore is estimated at 4 to 1. As shown in Table 2.5-3, this stripping ratio is calculated to increase to about 14 to 1 by the end of the 30-year project life. This means that the amount of ore produced is expected to remain fairly constant at about 500,000 tons per year, but that the overburden will increase from about 2 million tons per year to over 7 million tons per year. Additional fugitive dust will be generated since blasting operations and hauling waste rock by truck from the mine pit to storage areas will increase to handle this additional overburden. More area will be devoted to storage of the overburden spoils, increasing the surface area and hence the dust emissions from wind erosion of storage areas.

The primary air pollutant generated as a result of the expansion project is expected to be particulate matter from blasting, mining, hauling, and overburden storage. The expected magnitudes of PM_{10} emissions for each mining phase are listed in Table 4.3-5 and shown on Figure 4.3-1. A more detailed discussion of the derivation of these emission estimates is provided in Appendix C.

These emission estimates assume that watering of haul roads is done to control dust emissions. In 1995, 4.4 million gallons of water were used on the haul roads for dust control. Seventy-five percent of this water was from dewatering of the mine pit, in order to minimize the consumption of fresh water. This proportion may change as more of the pit water is used in the Chemical Plant. Although haul road PM_{10} emissions are projected to triple using current equipment, a relatively small increase in water use should maintain the same control efficiency.

4.3.3.3 Impacts

As shown in Table 4.3-5, blasting and hauling are the principal emission sources for the mine. The crushing plant and boilers are the primary emission source for ore processing, but these emissions are not projected to increase since the amount of ore stays constant. Due to the large increase in overburden handled, PM_{10} emissions are projected to increase by about 220 percent over the life of the project. Mining emissions impacts are most pronounced during dry conditions when strong winds pick up dust particles and carry them downwind. Impacts from emissions due to blasting at the mine are expected to be highly localized. However, impacts due to fugitive dust generated during the removal, hauling, and storage of additional overburden material are significant.

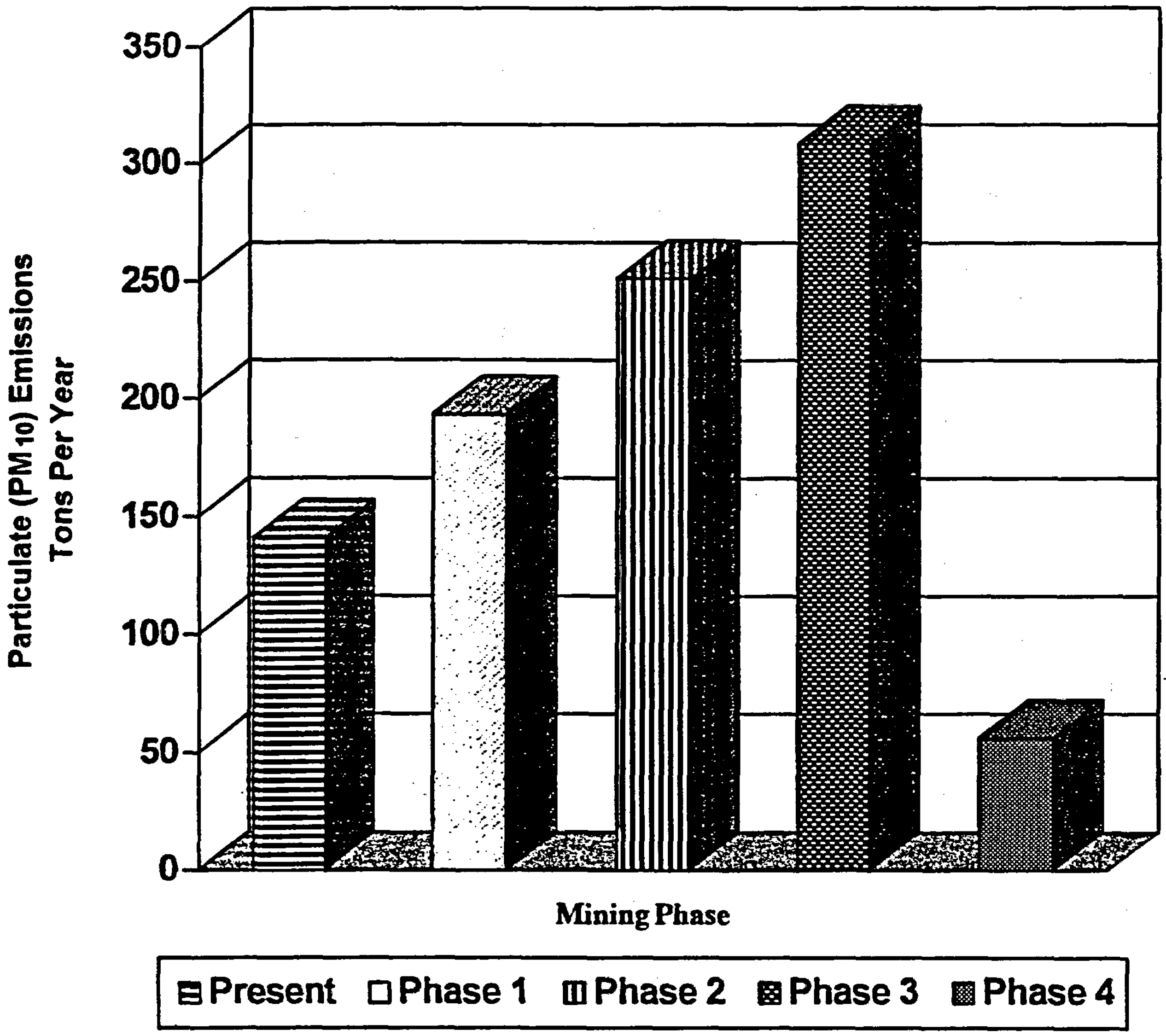
Since the overburden contains trace amounts of heavy metals, the fugitive dust emissions from the removal, hauling, and storage of additional overburden will also be a source of toxic emissions into the air. These emissions were calculated by multiplying the increase in annual

TABLE 4.3-5

Estimated Particulate Emissions Mining Phases 1 through 4 (tons per year)

Source	Present	Phase 1	Phase 2	Phase 3	Phase 4
Ore Production[2]	26.6	26.6	26.6	26.6	0
Crushing Plant	21.3	21.3	21.3	21.3	0
Drilling	1.1	1.9	2.6	3.2	0
Blasting	30.9	50.1	68.7	86.8	0
Loading	1.6	2.6	3.7	4.8	1.6
Hauling	50.4	83.1	119.4	155.7	50.0
Unloading	1.6	2.6	3.7	4.8	1.6
Miscellaneous Vehicles	2.7	2.7	2.7	2.7	0
Tailings Storage (Wind Erosion)	4.3	0.9	0.9	0.9	0.9
Overburden Storage (Wind Erosion)	0.5	0.9	1.5	1.5	1.5
Total[3]	141.0	192.7	251.1	308.3	55.6
Increase over present	–	51.7	110.1	167.3	–

[1] Present based on 1991 fuel usage rates in combustion equipment with some adjustment for current equipment.
[2] Includes boilers, dryers, furnaces, and baghouses.
[3] Totals do not match exactly the totals given in Appendix C due to rounding.



Inhalable Particulates (PM-10)

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FIGURE 4.3–1
PARTICULATE EMISSIONS BY PHASE OF MINE DEVELOPMENT
Molycorp, Inc.
Mountain Pass

DRAWN: T. Evans	DATE: 7/30/96	PROJECT NO. 1991–001	REV.
FILE NO.	CHK BY:		

PM_{10} emissions, shown in Table 4.3-5, by the weight fraction of the various heavy metals in the overburden. These calculations are presented in Appendix C.

The health risks associated with the calculated increase in air toxic emissions were evaluated by applying a conservative screening approach using the EPA-approved Industrial Source Complex Short Term model, version 3 (ISCST3). In this simplified modeling approach, all project-related emissions were treated as a single source situated over the expanded pit. Cancer risk and chronic noncarcinogenic risks were estimated for receptors at the nearby Mountain Pass School and California Highway Patrol living quarters. The calculation of the health risks is discussed further in Appendix D. The results, which are based on conservative assumptions, such as 24-hours-per-day, 365-days-per-year exposure for a lifetime of 70 years and consumption of produce grown at the receptor locations, indicate an increase in maximum individual cancer risk (MICR) of less than 5 in one million and a maximum chronic hazard index (CHI) of 0.52. These are less than the significance criteria of 10 in one million for MICR and 1 for CHI. In fact, when these conservative incremental risks are added to the baseline facility risks, which were calculated previously (Aerovironment 1991) for AB 2588, the California Air Toxics Hot Spots Program, the cumulative risks are still less than the significance criteria. The impact of the project's air toxic emissions are therefore not significant.

In summary, criteria pollutant air quality impacts from the proposed Mountain Pass Mine during future mining phases are expected to be similar in nature to the existing mining operations, although actual emissions of fine particulate matter will increase. The impacts of air toxics emissions associated with this particulate matter are not significant.

4.3.3.4 Mitigation Measures

The Mountain Pass Mine expansion will create additional PM_{10} impacts due to increased removal, handling, transport, and storage of ore, overburden, and tailings. Mitigation measures are proposed to reduce fugitive dust emissions.

Molycorp currently practices several mitigation measures which must continue to be implemented throughout the mine expansion project. The emission reductions expected through these control measures have been assumed in the emission estimates shown in Table 4.3-5. These measures include:

- <u>AQ1:</u> Water or use approved dust palliatives on unpaved roads sufficiently to achieve 80 percent control (one to two times per day depending on rainfall).

- AQ2: Use baghouses, water sprays, enclosures, and other controls in the ore processing plant to control PM_{10} emissions from crushing, screening, handling, and packaging (70 to 99.9 percent control).

- AQ3: Restrict haul truck speeds to average speed of 20 mph.

- AQ4: Implement the P-16 Tailings Pond Dust Control Plan (Environmental Solutions 1994b) (80 percent control).

Even after implementation of these measures, significant PM_{10} emissions increases are projected from blasting and hauling. Therefore, the following mitigation measure must be accomplished in order to show that all feasible mitigations have been included.

- AQ5: Prepare an analysis of additional mitigation measures to effect a 20 percent reduction in PM_{10} emissions and implement those found to be feasible. The analysis will include the following:

  - AQ5a: Curtail excavation and hauling when sustained winds exceed 30 mph.

  - AQ5b: Implement 25 mph speed limit for non-haul truck traffic on all unpaved roads.

  - AQ5c: Stabilize inactive ore and overburden storage areas with water, mulch, vegetative ground cover, gravel, wind breaks and/or chemical dust suppressants by establishing revegetation and reclamation program at earliest possible date.

  - AQ5d: Pave or cover with gravel frequently used permanent roadways and parking areas.

  - AQ5e: Institute a periodic washdown program for paved areas.

  - AQ5f: As haul trucks are replaced, evaluate purchase of larger capacity trucks to reduce number of haul trips.

The air quality impacts from PM_{10} emissions will be significant even after mitigation. The project area is currently classified as nonattainment for PM_{10}, so an increase in PM_{10} emissions is considered significant. As shown in Table 4.3-5, PM_{10} emissions are expected to more than double by Phase III, with an increase over current levels of 167 tons per year by

Phase III. Most of these emissions (51 percent) are due to increased truck traffic on unpaved roads to remove the additional overburden from the mine. Current control activities, including watering, are included in the estimate. Although Molycorp will be required to obtain revised air permits from the MDAQMD for new or modified pollutant emitting equipment related to the mine expansion, fugitive dust from unpaved road travel is exempt from permit. Therefore, these emissions are not subject to further control requirements or offsets.

4.3.4 Water Supply/Water Quality

During the first three phases of the proposed project mine development and construction activities will include open pit mine expansion and associated dewatering, overburden stockpiling, and tailings disposal. Phase 4 involves reclamation of the area following cessation of mining. These activities have the potential to impact water supply and/or water quality.

Water supply may be impacted by groundwater level declines associated with continued pumping at the well fields in either Shadow Valley or Ivanpah Valley. Water quality may be impacted by excess soil erosion from overburden stockpiles, continued or increased seepage from tailings impoundments, and continued pumping from well fields. Reclamation of the mine will involve regrading/recontouring, topsoiling, and revegetating disturbed areas, which will impact the infiltration and erosive characteristics of the surface. Following reclamation, groundwater may accumulate in the pit due to cessation of dewatering activities.

4.3.4.1 Significance Criteria

Water Supply

Impacts to water supply will be considered significant if:

- A substantial increase in both additional potable water required from the Shadow Valley and Ivanpah Valley well fields and volume of wastewater discharged to the New Ivanpah Evaporation Pond impacts the existing capacity of these resources; or

- The project interferes substantially with groundwater recharge, thereby affecting the use of the resource.

Water Quality

Impacts to water quality will be considered significant if any of the following conditions are met:

- Measures to control surface runoff are not available;
- The project substantially degrades surface water quality, affecting current or future uses;
- The project degrades groundwater resources, substantially affecting current or future uses; or
- The project causes contamination of potable water aquifers.

4.3.4.2 Impacts

Water Supply

Well Fields

Groundwater elevations in the vicinity of the Molycorp Ivanpah Valley well field have declined an average of 2 feet per year since the early 1950's (Leroy Crandall 1979) suggesting that water is being extracted at a rate greater than the natural recharge to the alluvial fan aquifer. Therefore, groundwater elevations can be expected to continue declining if the current pumping rates are maintained.

Although no groundwater levels were available for the preparation of this report, the situation is likely the same in the Shadow Valley well field where pumping began in the early 1980's. According to Crandall (1980), the total annual recharge to the Shadow Valley groundwater system ranges from 1,600 to 3,500 acre-feet per year. At the average withdrawal rate from the well field of 600 gpm, the annual withdrawal is approximately 1,000 acre-feet per year, which is less than the total recharge to the valley. However, only a portion of the total recharge to the Shadow Valley groundwater system is intercepted by the Molycorp production wells suggesting the potential for continued reduction in water levels in the vicinity of the well field. Further declines in groundwater levels could diminish potential wellfield productivity.

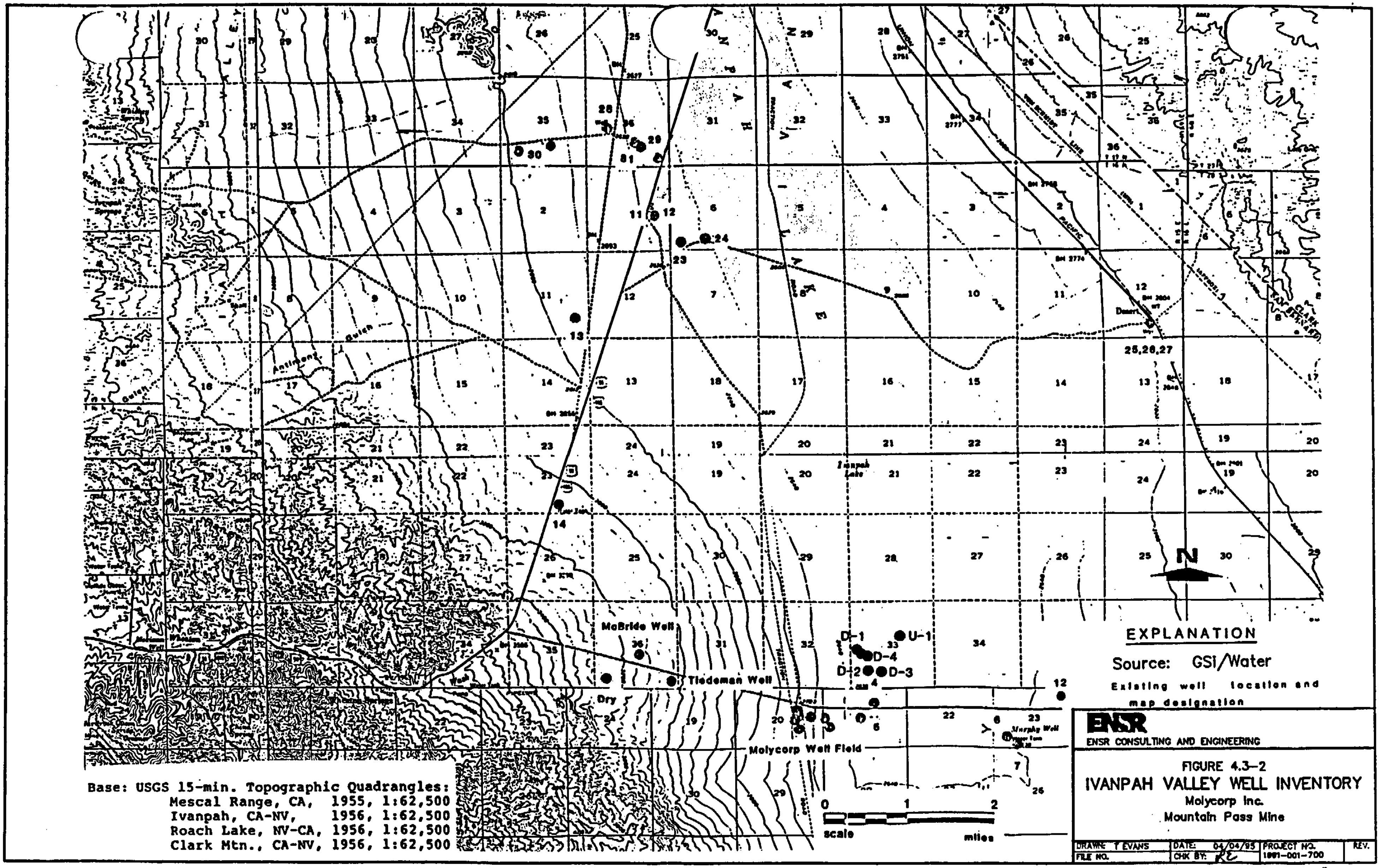
EXPLANATION
Source: GSI/Water
Existing well location and map designation
McBride Well
Tiedeman Well
Dry
Molycorp Well Field
Murphy Well
D-1
D-2
D-3
D-4
U-1
Ivanpah Lake
25,26,27
N
scale
0 1 2
miles
Base: USGS 15-min. Topographic Quadrangles:
Mescal Range, CA, 1955, 1:62,500
Ivanpah, CA-NV, 1956, 1:62,500
Roach Lake, NV-CA, 1956, 1:62,500
Clark Mtn., CA-NV, 1956, 1:62,500
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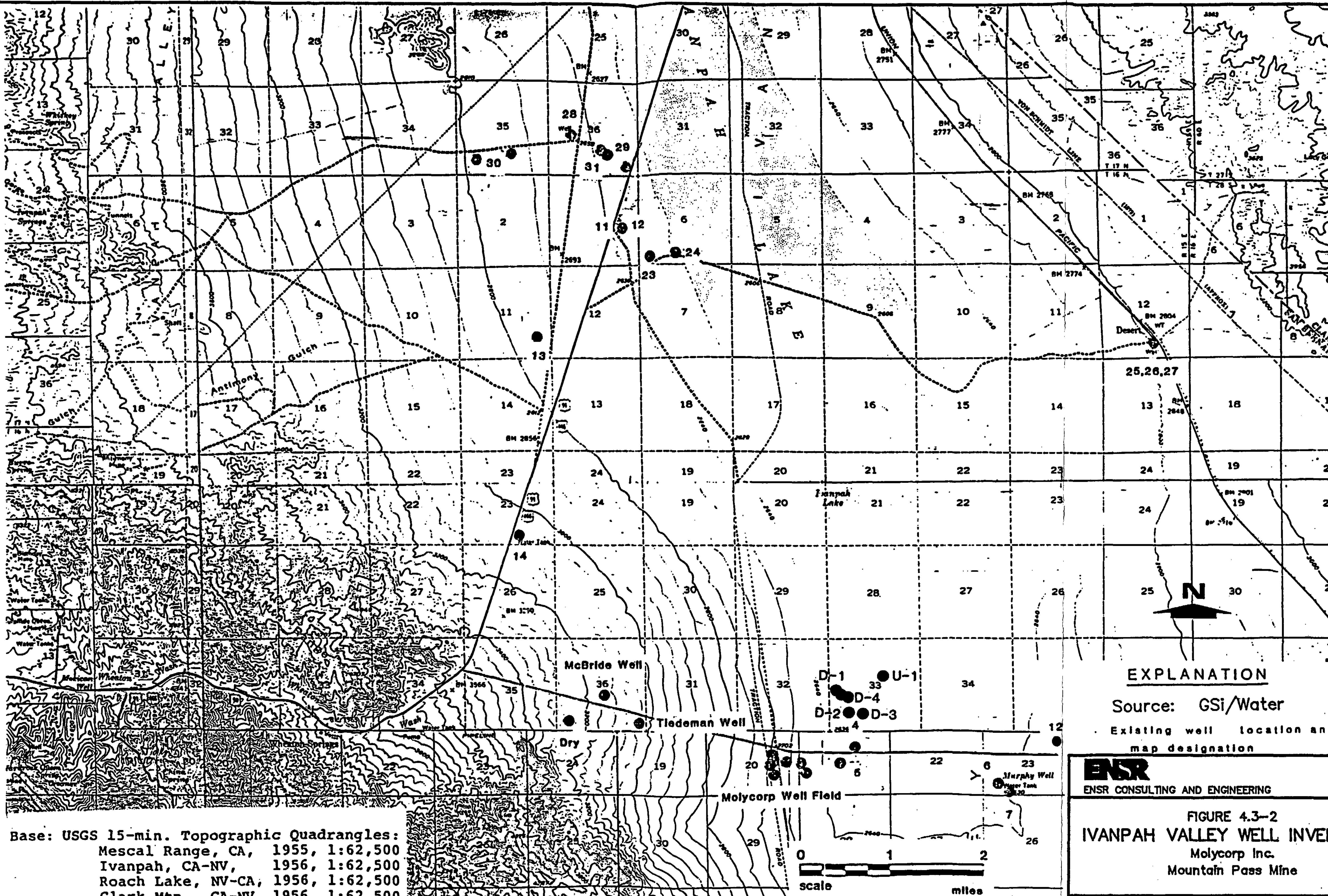
FIGURE 4.3-2
IVANPAH VALLEY WELL INVENTORY
Molycorp Inc.
Mountain Pass Mine
DRAWN: T EVANS
DATE: 04/04/95
PROJECT NO. 1991-001-700
REV.
FILE NO.
CHK BY:



Base: USGS 15-min. Topographic Quadrangles:
Mescal Range, CA, 1955, 1:62,500
Ivanpah, CA-NV, 1956, 1:62,500
Roach Lake, NV-CA, 1956, 1:62,500
Clark Mtn., CA-NV, 1956, 1:62,500

EXPLANATION

Source: GSi/Water

• Existing well location and map designation

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FIGURE 4.3-2
IVANPAH VALLEY WELL INVENTORY
Molycorp Inc.
Mountain Pass Mine

DRAWN: T EVANS	DATE: 04/04/95	PROJECT NO. 1991-001-700	REV.
FILE NO.	CHK BY: RE		

1991-001-850

Drawdown induced by pumping of the water supply wells in either Ivanpah Valley or Shadow Valley could impact the groundwater resource in nearby wells. The impact would range from a reduction in well yield by decreasing the saturated thickness in the well to loss of yield because groundwater levels are below the well screen. Figure 4.3-2 shows the offsite wells in the vicinity of the Molycorp well field in Ivanpah Valley. The two closest non-Molycorp wells to the east (map numbers 4 and 5) are not used. The two closest wells to the west (McBride and Teideman) have water levels similar to that of the well field suggesting either artesian conditions at these wells or drawdown similar to that in the pumping wells. Both wells have significant (150 to 250 feet) saturated thickness available for pumping.

In Shadow Valley, the four wells that make up the well field are located in pairs approximately 2.5 miles apart. Wells #1 and #2 are northeast of wells #3 and #4. A well at the former Stuckey's restaurant on Interstate 15 is located approximately ½ mile south of the midpoint between the two well pairs, and a hand-dug well at Valley Wells is located about 1/2 mile north of the same point. A third well is located about 1/2 mile southeast of wells #3 and #4. The California Department of Transportation maintains a water well for a rest area near the Cima Road offramp of Interstate 15. The rest area is adjacent to Molycorp's Shadow Valley Well #4. Water level records were not available for the preparation of this report to confirm the extent of drawdown associated with the well field and whether the three nearby wells are currently impacted. However, the potential exists for these wells to be impacted given continued withdrawal at the current rates. The Stuckey's well is the only well known to be in use, or potentially in use, as a drinking water supply.

Pit Dewatering

During Phases 1 through 3, the mine pit will be expanded in area and in depth, and dewatering will continue to allow mining within the pit. After 30 years of mining, the bottom of the pit will be at elevation 4,000 feet, or approximately 650 feet below the pre-mining groundwater elevation of 4,650 feet. The cone of depression around the pit due to dewatering will expand causing an increase in the drawdown of the water table in the vicinity of the pit. Any springs within the cone of depression would decrease in flow rate or go dry.

Pumping from the pit well averaged about 114 gpm from 1987 to 1991. Pit inflow is estimated to increase to 1,000 gpm by the year 2025 when mining of the pit will be completed to elevation 4,000 feet. This projection is based upon a simplified calculation using Darcy's Law, which assumes

- steady-state radial flow to the pit;
- unconfined conditions;

- constant pumping rate from the pit;
- uniform hydraulic conductivity, K, for bedrock of 1 X 10^{-4} cm/sec; and
- no recharge.

An alternate calculation for determining pit inflow shows the inflow to be approximately 100 gpm at the present, potentially increasing to several hundred gpm (GSI/Water 1995). This calculation is shown in Appendix E. For purposes of impact analysis, the most conservative calculation was used.

The extent of drawdown due to pit dewatering was estimated using two analytical approaches yielding a range in estimated extent of drawdown.

The first approach used an empirial relationship developed by Sichardt where the radius of influence (R) is estimated as follows:

$R = 300.5.(K)^{0.5}$;

where:

S = drawdown in meters, and
K = hydraulic conductivity.

The estimated radius of influence, or extent of drawdown, in calculated to be 1,950 feet. This probably represents the low end of the range of likely estimates for the extent of drawdown. Given the complex geology of the site, it is possible for the radius of influence to be greater in localized zones with permeable fractures.

The second approach assumed that drawdown impacts will extend to an area sufficient to intercept infiltration from precipitation equal to the rate of pit dewatering. Using this method and assuming a circular area of influence, drawdown impacts are estimated to extend 3.1 miles from the pit. Therefore, once the cone of depression due to pumping extends to approximately 3.1 miles, it is likely to reach steady-state conditions and will no longer spread outward. This is likely an overestimate because groundwater mounded within mountains around and above the pit was not accounted for in making the estimate (GSI/Water 1995).

These estimates are based upon available data, professional judgment, and reasonable assumptions which simplify site conditions (see Appendix E for a presentation of calculations). The greatest source of uncertainty in these calculations is the value for hydraulic conductivity which could easily vary by two orders of magnitude in the complex, fractured bedrock terrain found at the site.

An alternate calculation (see Appendix E) of drawdown impacts shows a cone of influence of approximately 1 mile (GSi/Water 1995). For the purpose of impact analysis, the most conservative calculation was used.

There are five springs within 3 miles of the mine pit and another four to six springs just over 4 miles north of the mine. It is highly unlikely that springs more than 3 miles from the pit would be impacted by pit dewatering; however, there is a low potential for impact to springs within 1 to 3 miles of the pit and a high potential for springs within 1 mile of the pit to experience reduced flow or go dry altogether. No wells within the mine and processing area are used for drinking water or as a supply for process water. All onsite wells are used for monitoring the quality of groundwater and for extracting contaminated groundwater. All potable and process water is obtained from Shadow Valley and Ivanpah Valley. Therefore, drawdown from the pit will not impact any water supply wells in the vicinity of the mine.

Water Quality

Surface runoff is infrequent in this arid environment and typically contains high concentrations of suspended sediment. The proposed project does not include modifications or additions to the plant and processing areas. Therefore, there will be no impact to the quality of storm water which flows to the Jack Myers pond. The borrow pit area in Ivanpah Valley may cause limited accelerated erosion of sediment into surface water.

Well Fields

As shown in Section 3.3.4.3, water from the Ivanpah Valley and Shadow Valley well fields meets MCLs in samples collected in 1982 with the exception of fluoride. Current monitoring shows no significant change in major ion concentrations in Shadow Valley wells (Table 4.3-6). No water quality impacts due to continued pumping of the well fields are anticipated.

Open Pit

The pit well currently intercepts seepage from the North Tailings Pond and as the pit is expanded and deepened, the amount of seepage intercepted would increase, thereby continuing to impact the quality of water extracted by the pit well. The TDS concentration from this well has ranged from 3,200 to 4,100 mg/l in 1990 and 1992. These levels would decrease as seepage from the North Tailings Pond is controlled.

TABLE 4.3-6

Shadow Valley Wells Monitoring (mg/l)

Constituent	Well and Year			
	Shadow Valley #2		Shadow Valley #4	
	1980	1994	1982	1994
Calcium	145	150	35	42
Magnesium	50	55	22	21
Sodium	24	21	104	97
Potassium	4	NA	6	NA
Bicarbonate (HCO_3)	219	NA	208	NA
Bicarbonate ($CaCO_3$)	NA	150	NA	160
Chloride	20	15	29	27
Sulfate	410	420	191	210
Fluoride	0.43	0.39	1.2	1.3
Nitrate as NO_3	4	NA	16	NA
Nitrate as N	NA	0.59	NA	1.9
Iron	NA	<0.1	0.64	<0.1
Manganese	NA	0.14	0.05	<0.015

NA: Not available

After mining, the pit will gradually fill with groundwater as the levels rebound to nearly premining levels. Assuming seepage from the North Tailings Pond has been controlled and no new sources develop, it is likely that water in the open pit would be similar in quality to unimpacted groundwater.

Wastewater Disposal Pipeline

The wastewater disposal pipeline experienced approximately five leak incidents between 1988 and 1991. Molycorp is monitoring the pipeline three times per day in compliance with RWQCB requirements. Although monitoring is ongoing, potential future leaks could impact offsite property.

Tailings Impoundments

Highly mineralized water is currently seeping from the floor of the North Tailings Pond (P-16) and is impacting groundwater to the southwest and southeast. Impact to the groundwater will continue as long as the tailings facility is operated and seepage control measures are not in place. Molycorp has developed a plan for mitigation of the tailings seepage (GSI/Water 1996) and is working to obtain approval of this plan from the LRWQCB. The LRWQCB is currently reviewing the plan and has indicated that preliminary assessment suggests that the plan will need to be revised to propose capture zones to preclude affected groundwater from entering the nearby washes. Additionally, the LRWQCB indicates that, under the plan, no remediation is planned for groundwater that has migrated beyond the existing extraction wells. The LRWQCB staff may recommend that the North Tailings Pond be lined or seepage capture wells installed as a condition of the revised LRWQCB permit (RWQCB 1996). Once implemented with LRWQCB revisions, the plan is expected to reduce the effects of seepage from the North Tailings Pond.

A common concern at mine sites is the development of acid mine drainage (also known as acid rock drainage or ARD). ARD results from the oxidation of sulfide minerals and the subsequent formation of acid runoff or seepage and associated release of heavy metals into solution. ARD may be mitigated by the presence of acid-consuming materials, such as limestone, which neutralize the acid. The runoff or seepage from the Mountain Pass Mine is unlikely to be acidic due to the occurrence of abundant calcite and due to the fact that laboratory results demonstrate that mine tailings have an order of magnitude higher neutralization potential than acid-producing potential.

A new tailings impoundment (East Tailings Pond) is proposed as part of Phase I for a location east of the North Tailings Pond. This site is upgradient of Wheaton Wash so that potential seepage from the proposed impoundment would migrate to the southeast and into the wash. The proposed impoundment would cover seeps in the drainage east of the mine. Detailed plans for the new impoundment are not yet developed and would have to be approved by the LRWQCB. Geologic mapping indicates the site is underlain by precambrian gneiss, which may be fractured near the surface and form granular soils that are relatively permeable.

Windblown Tailings

As discussed in Section 3.2.4, Molycorp submitted a plan (Environmental Solutions 1994b) for control of the windblown tailings from the North Tailings Pond (P-16) to the LRWQCB. The plan to control the windblown tailings includes an expanded sprinkler system combined with perimeter fences at the North Tailings Pond to control the source of the windblown deposits. At this time, no response to the windblown tailings control plan has been received from the LRWQCB.

Additional impacts to groundwater resources from implementation of the windblown tailings control plan are expected to be minimal, assuming that contaminated groundwater extracted from the pit well is not used as the source of the sprinkler system water. Evaporation of the sprinkler water in the arid desert environment will inhibit infiltration of substantial quantities of the water sprayed on the surface of the North Tailings Pond and the volume of seepage would therefore be minimal. If minimal amounts of water do infiltrate the pond, it should be intercepted by the interception system installed below the North Tailings Pond Dam. Monitoring of groundwater beneath the windblown tailings dune will assist in ensuring that groundwater resources are not impacted.

Overburden Stockpiles

The results presented in Table 4.3-7 for the tailings are a worst-case representation of the potential acid-producing potential of the waste rock. The formation of ARD is not expected to impact water quality due to the high acid-neutralizing capacity of the waste rock, lack of sulfide minerals, and low precipitation in the area, which would lead to low seepage volumes through the waste rock. Overburden/waste rock at the mine has been classified by the LRWQCB as a Group C mining waste, which is the category assigned to mining wastes from which any discharge would be in compliance with water quality objectives, other than turbidity (Title 23 CCR Section 2571). During mining, overburden stockpiles will be disturbed areas likely to contribute to sediment in runoff due to accelerated erosion. Due to the low precipitation rate in the project area, erosion is expected to be minimal during mining. Following mining, the overburden stockpiles would be regraded, topsoiled, and seeded to minimize future erosion impacts.

TABLE 4.3-7

Acid/Base Potential of Tailings

	Borehole B101	Borehole B102		Borehole B103	
	CRS-3	C-1	C-5	C-2	C-5
Neutralization Potential Percent Calcium Carbonate (% $CaCO_3$) Equivalent	+43.	+49.	+33.	+45.	+45.
Potential Acidity % $CaCO_3$ Equivalent	0.05	0.05	-0.3	0.05	0.05
Total Sulphur %	3.8	3.8	3.6	6.1	3.7

Source: SRK 1985

4.3.4.3 Mitigation Measures

Implementation of the following mitigation measures will reduce significant impacts on water supply in the area and surface water quality to less than significant.

- WS1: Monitor groundwater levels on an annual basis in the vicinity of the Ivanpah Valley and Shadow Valley well fields for drawdown due to extraction of production water. If non-Molycorp water supply wells in the area are demonstrated to be impacted by drawdown due to Molycorp's extraction of production water due to the well user being unable to extract water at their past usage rates, an alternate means of water supply will be provided by Molycorp or Molycorp will change wellfield operations to minimize drawdown.

- WS2: In the same manner, if monitoring of springs, seeps, and wells surrounding the mine for water quantity impacts indicates that pit dewatering has impacted water supply to area wells due to the well user being unable to extract water at their past usage rate or wildlife is no longer able to use the water resource, Molycorp will provide an alternate water supply or increased recycling of onsite water will be instituted.

- WS3: Continue monitoring of water supply to the mine for compliance with drinking water standards. If drinking water standards are exceeded, Molycorp will provide an alternate supply of water or provide alternate mixing from wellfields to bring into compliance with standards.

- WQ1: Continue monitoring of wastewater pipeline for compliance with LRWQCB requirements to prevent leaks. Correct cause of leaks at earliest feasible time. Report leaks to LRWQCB, and other agencies as appropriate.

- WQ2: Determine adequacy of seepage control plan for the North Tailings Pond. If the seepage extraction system does not bring the pond into compliance, evaluate use of a liner, alternate storage site, or depositing only unsaturated tailings.

- WQ3: Prepare a detailed closure plan, including capping, for the project tailings ponds and obtain plan approval from the LRWQCB.

- WQ4: Institute seepage control measures that will retain seepage within the East Tailings Pond to prevent infiltration to underlying groundwater. Such control measures may include a liner system and/or a collection and recovery system. Ensure that design of pond will prevent seepage of contaminants.

- WQ5: Stabilize, treat, and/or remove windblown tailings to ensure no leachable constituents reach groundwater. Monitor to measure effectiveness of corrective action and report findings to LRWQCB.

- WQ6: Amend the reclamation plan to reduce or eliminate accelerated erosion of overburden stockpiles and seepage from tailings through recontouring, topsoiling, and revegetation.

Even after the successful implementation of the mitigation measures discussed above, the proposed project will have a significant impact on groundwater quality due to the existing groundwater contamination at the site and the fact that final plans to remediate the groundwater have not yet been approved or implemented. Existing groundwater contamination would continue to significantly impact groundwater quality at the site; however, this contamination may eventually be mitigated by existing remediation systems or through implementation of additional groundwater monitoring systems.

4.3.5 Open Space/Recreation/Scenic

4.3.5.1 Significance Criteria

Significance criteria for open space/recreation resources are based on the compatibility of the proposed project with existing and future open space/recreation areas and resources. Impacts would be considered significant if:

- Designated open space/recreation areas are directly or indirectly impacted by the proposed project's construction or operation.
- Existing wilderness areas or wilderness study areas are directly or indirectly impacted by the proposed project's construction or operation.
- The proposed project conflicts with established open space/recreation uses at the project location.
- The proposed project conflicts with adopted open space/recreation planning goals applicable to the project location.

Based on the Open Space Element of the San Bernardino County General Plan, visual impacts associated with the proposed Mountain Pass Mine expansion project shall be considered significantly adverse if

- landform alterations obstruct important scenic vistas or views presently open to the public; or
- the visual contrast between landscape alterations associated with proposed mining activities and the natural, surrounding setting creates an aesthetically offensive site open to public view; or
- the visual contrast between landscape alterations associated with proposed mining activities and the natural, surrounding setting degrades scenic values for the traveling public and those seeking a recreational driving experience.

4.3.5.2 Impacts

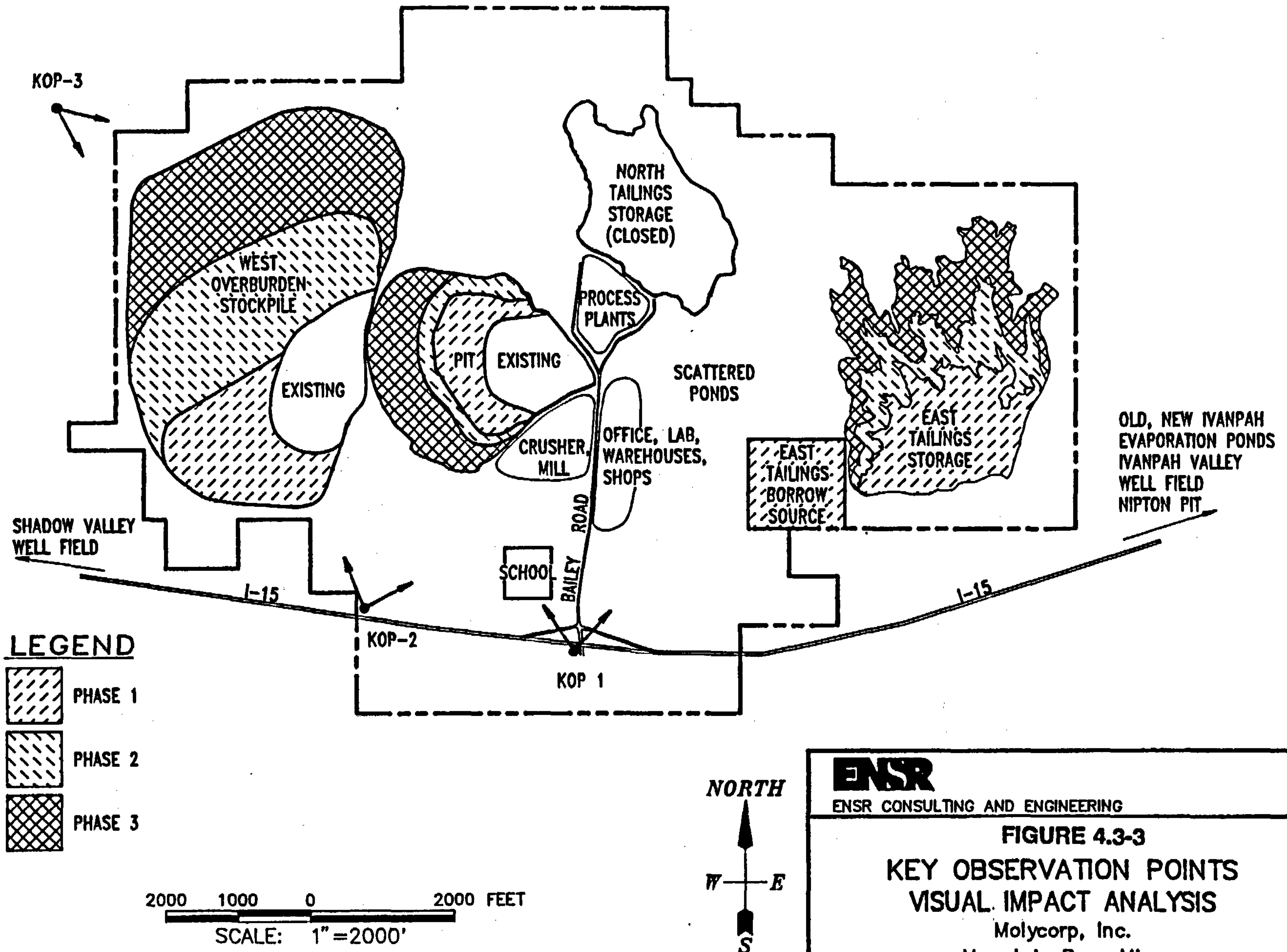
The proposed project would have no direct impacts on any open space/recreation resources or uses, existing wilderness areas, or wilderness study areas. The existing recreation use in the project area is relatively light and the region has abundant acreage of public open space lands available. Potential indirect impacts to these resources and areas would primarily be attributable to visual impacts, which are discussed below. The proposed project would not conflict with the Open Space Element of the San Bernardino County General Plan as it relates to recreation.

The investigation of scenic resources for the proposed project was based on standard BLM procedures as established in the BLM Manual, Section 8400, Visual Resource Management (VRM). Under the VRM system, the affected visual environment is characterized through an inventory and evaluation process that addresses scenic quality, viewer sensitivity, and the distance between viewers and proposed modifications to the landscape resulting from the proposed project. Visual impacts have been evaluated based on the standard BLM Contrast Rating Process in conjunction with computer modeling and the preparation of visual simulations. The BLM Contrast Rating Process involves an assessment of the degree and type of landscape change between the existing and future conditions as seen from key observation points (KOPs).

The scenic resource area that would be affected by the project is defined as the project's viewshed, or the area from which the project would be visible. The project lies immediately north of Interstate 15 at Mountain Pass approximately 15 miles southwest of the California-Nevada state line in an otherwise undeveloped area that is enclosed by surrounding natural topographic features. Interstate 15 threads its way east-west between two enclosing mountain ranges, the Clark Mountain Range and the Mescal Range, cresting at Mountain Pass Summit at an elevation of 4,730 feet. West of the Mountain Pass Mine, the highway slowly descends into Shadow Valley. To the east of the mine, the highway turns northeast and quickly drops into Ivanpah Valley. The arrangement of major topographic features surrounding the mine site restricts the project's maximum viewshed (including partial views and glimpses) to a stretch along Interstate 15 of about 4¾ miles. Open, uninterrupted views of various portions of the project occur along approximately 1½ miles of Interstate 15.

KOPs for detailed visual impact studies are chosen based on conditions of user volume and sensitivity. For the Mountain Pass Mine expansion project, three such locations qualify as KOPs. They include two different points along Interstate 15 and one on a branch of the Mojave Heritage Trail (Clark Mountain Road). Figure 4.3-3 provides a map showing the KOP locations and direction of view.

To aid in the evaluation of the proposed project's impact on the visual resources of the area, a three-dimensional computer model of the mine site representing project features at their maximum proposed size and extent was constructed. By viewing the model from points that



SOURCE: LILBURN CORPORATION, 1994

ENSR
ENSR CONSULTING AND ENGINEERING

FIGURE 4.3-3

KEY OBSERVATION POINTS VISUAL IMPACT ANALYSIS

Molycorp, Inc.
Mountain Pass Mine

DRAWN: M. SCOP	DATE: 8/23/94	PROJECT NO.	REV.
FILE NO. phases	CHK BY: RE	1991-001-250	

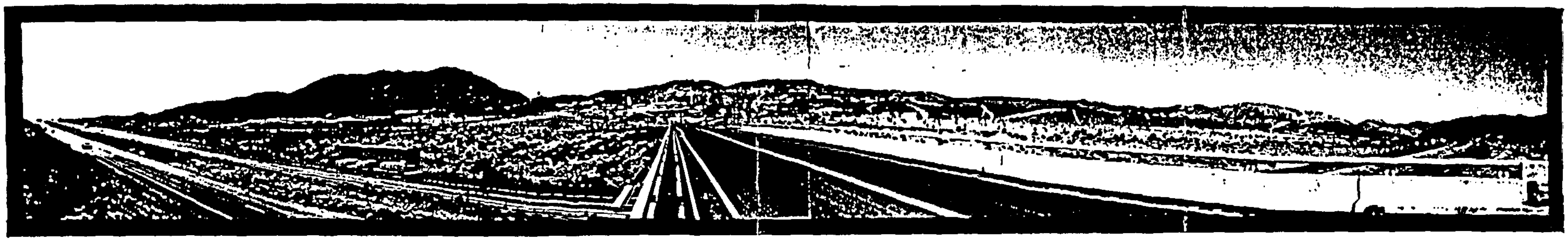
1991-001-850

correspond to actual KOPs, the effect of proposed features on existing views and vistas from KOPs were determined. Direct observations were then made to determine if project features obstruct those views. Also, the visual contrast that would be created by the proposed project was analyzed using standard procedures set forth in the BLM's Visual Resource Contrast Rating handbook. The system evaluates the degree of contrast created by project-related modifications to the visual environment by comparing the characteristics of proposed features with those of the existing setting. The basic visual elements of line, form, color and texture are used to determine anticipated levels of contrast with respect to landform, vegetation, and structures (i.e., buildings, etc.). To aid in this evaluation, photo-realistic visual simulations of future project conditions, as they would appear at the height of mining, were prepared. The degree of contrast identified was then considered in terms of its total effect on the existing character and visual quality of the project area, providing the basis for determining whether the proposed project would create an aesthetically offensive site and whether scenic values will be degraded.

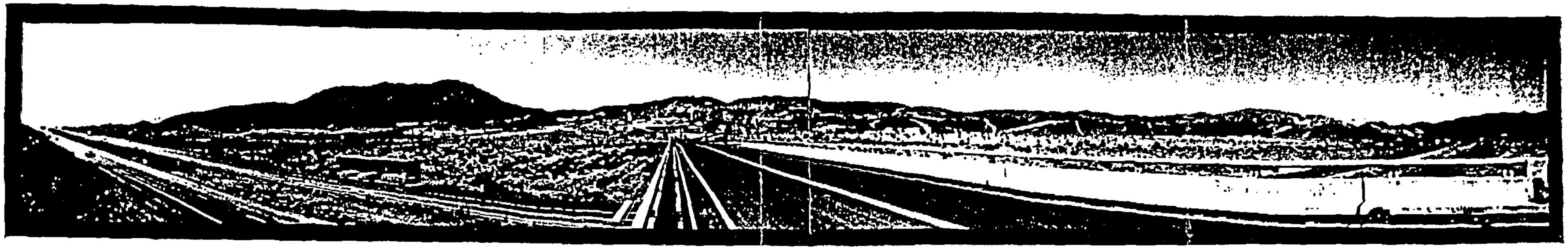
Contrast ratings were conducted from the three KOPs. KOP 1 is on the Bailey Road overpass above the eastbound lanes of Interstate 15. This location provides a direct view of the central and eastern portions of the mine site, especially the concentration of buildings. It is intended to represent the view toward the project experienced by westbound motorists as they approach and pass the Bailey Road interchange. Figure 4.3-4 is a photograph of the existing view from KOP 1. KOP 2 is located along Interstate 15, on the shoulder of the westbound lanes, at the west boundary of Section 13. It represents the view of the project experienced by eastbound motorists. From this area, the west Overburden Stockpile is the most prominent feature of the site. The stockpiles almost completely block views of the buildings that are farther to the east.

Figure 4.3-5 is a photograph of the existing view from KOP 2. KOP 3 is on Clark Mountain Road, approximately 1 mile beyond the Caltrans maintenance yard, at the point where the dirt road makes a switchback turn as it leads to a communications facility. From this somewhat elevated location, panoramic views, including the western portion of the project area, occur. The west Overburden Stockpile is the primary project-related feature of the view. Almost none of the buildings are visible from this point. No photographs are included for KOP 3.

Under the proposed project, future mining activities would be carried out in three phases of 10 years each. A fourth phase involves closure of the entire facility and final reclamation.



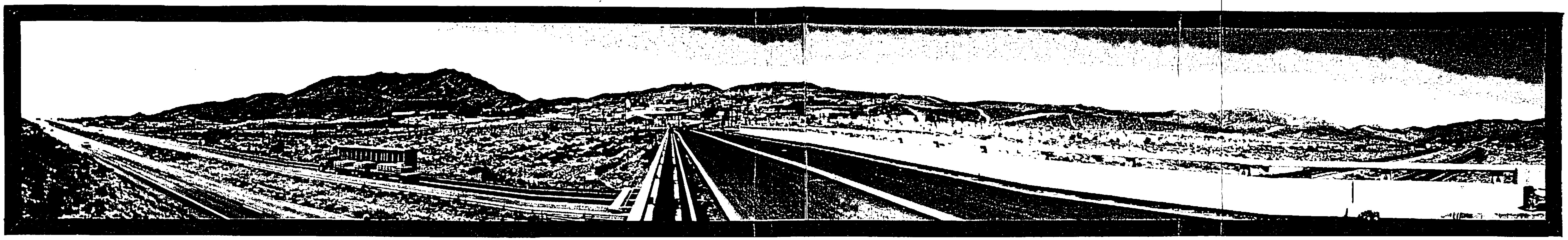
Existing View From KOP 1 on Bailey Road Overpass



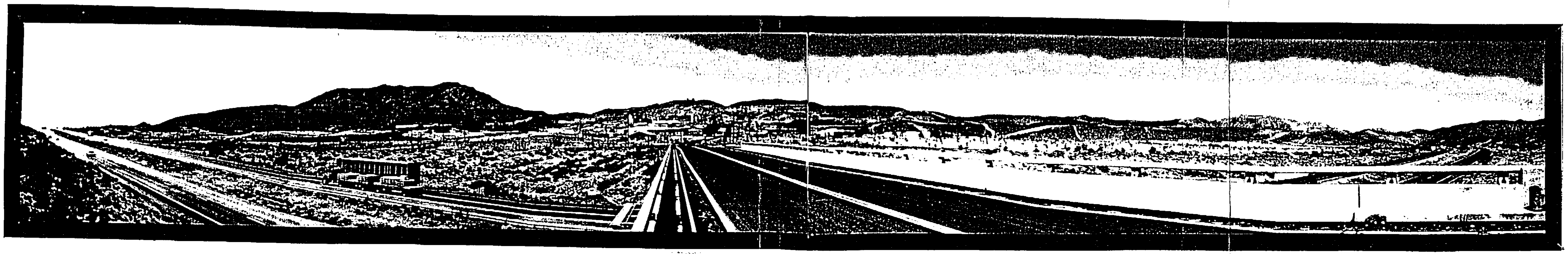
Simulated Image of Future Conditions From KOP 1

1991-001-080

FIGURE 4.3-4. Existing and Simulated View from KOP 1



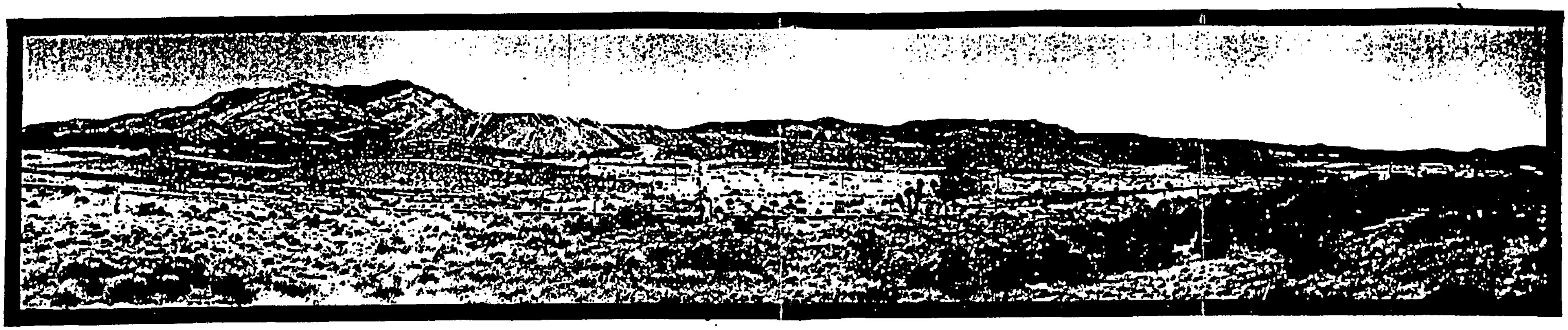
Existing View From KOP 1 on Bailey Road Overpass



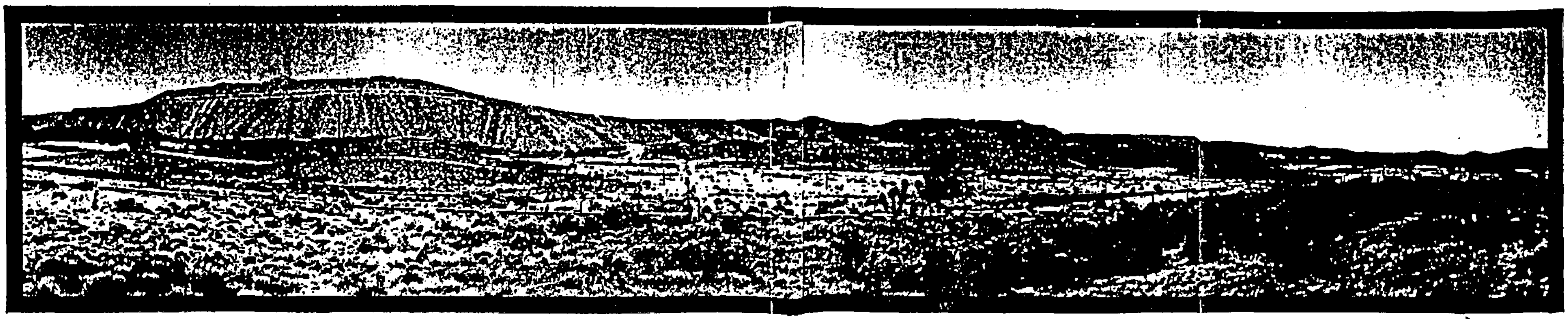
Simulated Image of Future Conditions From KOP 1

1991-001-850

FIGURE 4.3-4. Existing and Simulated View from KOP 1

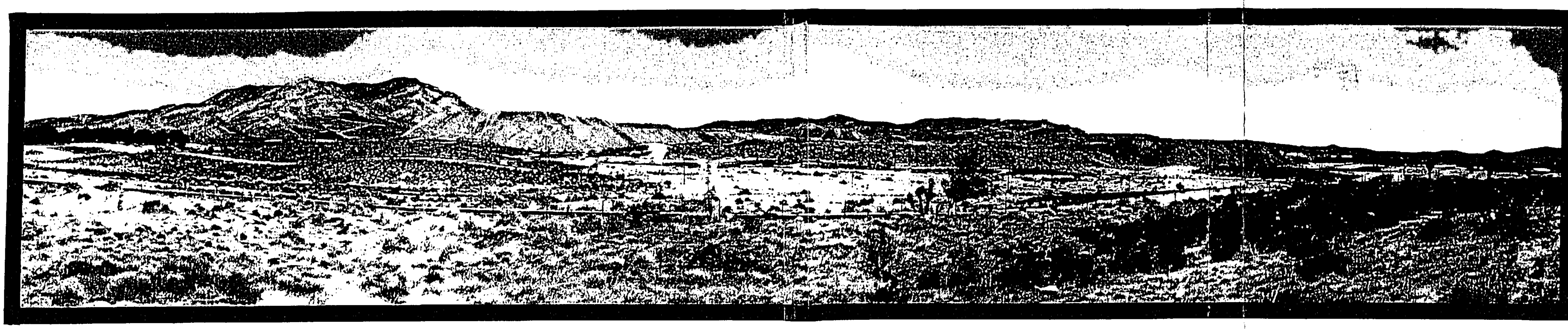


Existing View From KOP 2 on Interstate 15

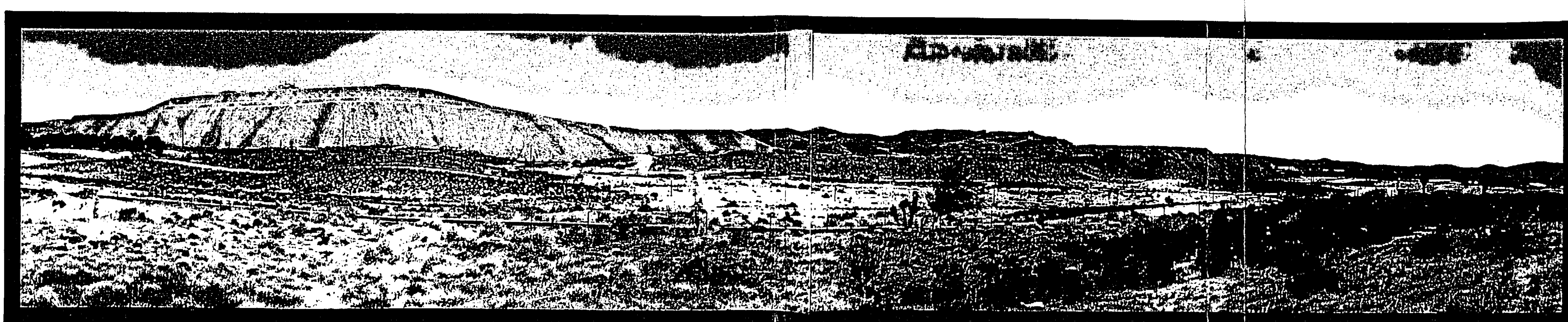


Simulated Image of Future Conditions From KOP 2

FIGURE 4.3-5. Existing and Simulated View from KOP 2



Existing View From KOP 2 on Interstate 15



Simulated Image of Future Conditions From KOP 2

1991-001-850

FIGURE 4.3-5. Existing and Simulated View from KOP 2

Throughout the project's 30 years of expansion, no significant changes to the mine plant area are expected. Therefore, the visual character of the plant area will be relatively consistent for the next 30 years.

The nature of changes in the visual environment as a result of the Mountain Pass Mine expansion project would be similar to the changes that have been ongoing at the site during the past 40 years of mining. However, the scale of future changes, i.e. the extent of disturbance and the size of landforms that would be created, would increase significantly over present conditions.

Near the end of Phase 3, the Overburden Stockpile will have increased in area by about 10 times as compared to its size today. It would be as much as 320 feet in height from the toe of the south-facing slope to its ultimate highest point, more than three times its present height. The south face would be 200 feet high. The toe of the slope would be within approximately 1,400 feet of Interstate 15, about 1,000 feet closer than it is today. The sides of the Overburden Stockpile exposed to view from Interstate 15 would be approximately ½-mile wide. Because of its actual size and the relatively close distance at which it would be viewed by the public, it would appear considerably larger in scale than other landscape features within view. In short, at its ultimate proposed size, the Overburden Stockpile would, by far, be the most visually dominant landform of the project area. Due to its side slopes and flat, level top, it would be readily recognized as a human-made feature, immense in size.

As part of the proposed project, the southern perimeter of the Overburden Stockpile will be constructed with an uneven face but will have two benches. The south face will also have "islands" for vegetation. These "islands" along with the benches and the top of the Stockpile will be covered with available surface material and revegetated. Even so, remaining evidence of uniform slopes and straight lines from haul roads, benches, side slopes, or top surfaces associated with any of the mining-related landform modifications during the years of active mine operation or after final reclamation would reveal the human-made nature of the facilities. Depending on how apparent these unnatural characteristics are, the area could potentially be viewed by the public as substantially visually impacted within an otherwise highly scenic region. This would result in a significant adverse impact to visual resources.

At final buildout during Phase 3, the proposed East Tailings Pond, east of the plant process area, would feature a south-facing earth dam approximately 3,000 feet wide with a crest 150 to 200 feet above the existing elevations at its base. It would lie approximately 2,000 feet from Interstate 15. Motorists on a ½-mile segment of the highway directly south of the East Tailings Pond would view the entire the dam. Due to its even, uniform face and flat, level top, it would appear as a large scale, human-made feature in contrast to the immediately surrounding, natural landforms.

During Phase 4 final reclamation, the Overburden Stockpile would be contoured to overall slopes of 3 feet in height to every 1 foot vertical (3H:1V), including catchment benches that will vary in width, but will be approximately 100 feet wide. Beginning in Phase 2 and continuing through Phase 4, the south-facing slope would be constructed with an uneven face. Specific areas (islands) would be revegetated rather than the entire south face. The surface of the East Tailings Pond would be covered with overburden and seeded, although no treatment of the dam face and crest exposed to view from the highway is proposed. All unnecessary buildings and equipment associated with the process plants would be removed and the area would be seeded.

From KOP 1, the Bailey Road overpass, a portion of the East Tailings Pond Dam would be visible. Judging by the appearance of the dam of the existing North Tailings Pond, the color contrast of the proposed East Tailings Pond Dam is expected to be low. However, the strong horizontal line created by the top of the dam along its crest and the uniform slope of the dam face will cause a high degree of contrast with the immediately surrounding landforms. An absence of vegetation on the dam face would result in a moderate contrast with surrounding areas. Although the East Tailings Pond would be similar in appearance to the existing North Tailings Pond, the dam would be larger (about 85 feet higher and 1,300 feet wider) and would be located about 3,500 feet closer to Interstate 15.

The appearance of the process plant area would remain much as it is today. As the Open Pit is enlarged, some additional exposure of the upper portions of the north pit wall may occur. Judging by the appearance and low contrast of the presently exposed portions of the north pit wall, future additional exposure is expected to result in low levels of contrast.

The proposed expansion of the Overburden Stockpile would be viewed at a distance of approximately 4,000 feet from KOP 1. The south and southeast faces would be exposed. Judging by the appearance of the existing Overburden Stockpiles and the contrast they create, no new contrast in color, line, or texture is expected. However, the increase in the mass and scale of the facility (extent and height) would make it the most visually dominant feature of the landscape. As the stockpile grows to its ultimate size, the westbound traveler's view of Mohawk Hill and of Clark Mountain will be increasingly obstructed. Uniform slopes and straight lines from haul roads, benches, side slopes, or top surfaces associated with any of the mining-related landform modifications during the years of active mine operation or after final reclamation would reveal the human-made nature of the facilities. Depending on how apparent these unnatural characteristics are, the area could potentially be viewed by the public as substantially visually impacted. This would result in a significant adverse impact to visual resources from Interstate 15. Figure 4.3-4 includes the simulated image of future conditions as viewed from KOP 1.

From KOP 2 along the westbound lanes of Interstate 15, the proposed East Tailings Pond would be almost completely beyond view. Nearly all of the buildings in the process plant area are also beyond view. The Overburden Stockpile, seen immediately to the north and northwest, would dominate the view. The leading edge of the stockpile would be less than 2,000 feet from the edge of the highway at KOP 2. The south face would rise to an ultimate height of at least 200 feet above the existing grade and would feature two horizontal benches. An additional tier, rising another 120 feet but placed several hundred feet back from the crest of the south face, would form the very top of the stockpile. As with KOP 1, no new contrasts in color, line, or texture are expected beyond those associated with the existing Overburden Stockpile. However, the size of the proposed stockpile would make it the most visually dominant feature of the landscape. From this location and the immediately adjacent sections of the highway, the proposed stockpile would obstruct the existing view of the east slope of Mohawk Hill and all but the highest points of Mohawk Hill and Clark Mountain, particularly for westbound travelers.

Developing the Overburden Stockpile with uneven faces and islands of vegetation on the exposed sides, as proposed, would help to lessen its human-made, highly unnatural character. However, readily visible evidence of even, uniform slopes and straight lines from haul roads, benches, side slopes, or top surfaces on any of the mining-related landform modifications would contrast strongly with the natural character of the surrounding setting. These unnatural characteristics, and the resulting realization that the area has been significantly disturbed, could potentially be viewed by the public as substantially visually impacted. This would result in a significant adverse impact to visual resources from Interstate 15. Figure 4.3-5 includes the simulated image of future conditions as viewed from KOP 2.

From KOP 3 on the Mojave Heritage Trail, the project would not create visible disturbances of a different nature than those presently in view, but would increase the extent of visible mining disturbances by a substantial amount. Therefore, no new contrasts in color, line, or texture are expected. Over time, the view toward the project would become dominated by the Overburden Stockpile. From this vantage point, virtually the entire surface of the Overburden Stockpile would be visible, extending to the southeast for nearly ¾ of a mile at its ultimate size. Its leading edge would be within approximately ¼ mile of KOP 3. As the stockpile increases in height, the buildings in the process plant area would no longer be visible, thereby eliminating the contrast they now create.

Along the section of trail between the Caltrans maintenance yard and the location of KOP 3, the trail would be run virtually along the toe of the southwest and west sides of the Overburden Stockpile. In this area, the stockpile would loom as high as 200 feet above with Mohawk Hill rising immediately to the west, creating a canyon-like effect. As the trail gains in elevation to the location of KOP 3, the view would slowly open to a broad panorama.

Since the route of the Mojave Heritage Trail characteristically includes mining roads, it is assumed that views of mining activities are not uncommon and would be considered an accepted part of the experience of traveling along the trail. However, since the enactment of the Desert Protection Act creating the Mojave National Preserve in this area, the magnitude of the visual changes at the Mountain Pass Mine would result in a significant adverse impact from this location. Simulated images were not prepared from KOP 3.

The Open Space element of the San Bernardino County General Plan describes the County's goals and policies/actions regarding scenic resources. The Scenic Resource goals of the County are to:

Preserve and protect the outstanding scenic resources of San Bernardino County for their continued future enjoyment.

Restrict development along scenic corridors.

Provide for visual enhancement of existing and new development through landscaping.

As part of the County's Scenic Resources policies and actions, Interstate 15 north of the Fontana City Limit to the Nevada State Line, which includes the portion that passes immediately south of the Mountain Pass Mine site, is designated as a "scenic highway". Scenic corridors are defined as extending 200 feet on either side of the route of a designated scenic highway. The Overburden Stockpile is the feature of the project that is located closest to the highway, although it is approximately 900 feet away. However, due to its size the Overburden Stockpile is still a substantial visual impact. It is the County's policy to review proposed development along scenic highways to ensure preservation of scenic values for the traveling public and those seeking a recreational driving experience.

4.3.5.3 Mitigation Measures

Even after implementation of the following mitigation measures, the significant adverse impacts identified in Section 4.3.5.2 will not be reduced to a level of less than significant.

However, with the application of these mitigation measures, adverse visual impacts will be reduced.

- VR1: Molycorp will prepare and submit, within one year of project approval, a detailed development plan for the west, south, and southeast sides of the Overburden Stockpile. A similar plan shall be prepared in conjunction with the design of the East Tailings Pond Dam that would be exposed to view from Interstate 15. The plan will be prepared by a qualified, licensed landscape architect working in conjunction with Molycorp mine engineers and will address, in detail, contouring and revegetation.

- VR2: The plan will provide for the development of the south face of the Overburden Stockpile in layers in order to reclaim the final south-facing slopes to a natural-appearing state as early as possible. The initial stage of each overburden layer will extend to a final southern limit in order to reclaim the south-facing slope as area to the north is filled in. As each layer is completed, the next higher layer will be extended to a final southern limit while repeating the ongoing storage and reclamation process.

- VR3: A detailed grading plan will be developed specifying how the south face and top edge of the Overburden Stockpile and the East Tailings Pond Dam will be contoured. The goal of the plan will be to create faces visible from Interstate 15 that the average observer would perceive as natural, undisturbed conditions. Contours will strongly mimic those of natural, surrounding landforms and the top edge of the Overburden Stockpile and East Tailings Dam will also appear to represent natural topographic conditions. Revegetation efforts will include the dam and the entire face of the Overburden Stockpile. The planting plan will reflect the types, patterns, and densities of naturally occurring vegetation found on nearby, undisturbed hillsides. The plan will be reviewed and approved by San Bernardino County prior to project initiation.

- VR4: Vegetative patterns and the topographic variation of the side and top surfaces of the Overburden Stockpile and the East Tailings Pond Dam will be made to match the character of nearby, undisturbed hills, thus minimizing adverse visual impacts.

- VR5: Assess continued use of the North Tailings Pond or other locations with fewer impacts prior to development of the East Tailings Pond.

- VR6: Molycorp will apply extraordinary vegetation efforts on the south-facing slope of the Overburden Stockpile to soften the visual impact.

4.3.6 Soils/Agriculture/Mineral Resources

4.3.6.1 Significance Criteria

Soils/Agriculture

Impacts to soils and agriculture would be significant if the proposed project resulted in

- substantial disruption, displacement, compaction, or overcovering of the soil;
- loss of substantial agricultural soils; or
- reduction in acreage of agricultural crop.

Mineral Resources

Impacts of the project to mineral resources would be considered significant if the project prohibits or restricts the development of mineral resources, as designated by the California Department of Conservation Division of Mines and Geology (DMG).

4.3.6.2 Impacts

Soils/Agriculture

Soils that will be impacted by the proposed project are listed in Table 4.3-8 according to mine component and soils name. The purpose of the proposed project is to continue the ongoing open pit mining of lanthanide element resources to its economically feasible limit. Therefore, impacts to soils as a result of the proposed mine expansion project will include substantial disruption, displacement, compaction, and overcovering of soils within the mine expansion areas. Therefore, significant impacts to soils will result from mining activities. Mining activities, such as stripping of surface material and transportation of up to 138 million tons of waste rock to the overburden stockpiles, will result in the disruption and displacement of soils. The excavation of up to 850,000 cubic yards of soil material from the Nipton Road Borrow Site and up to 1.7 million cubic yards from the East Tailings Borrow Site for tailings dam construction will also disrupt and displace soil material. Soils will also be subjected to compaction and overcovering during mining activities.

TABLE 4.3-8

Approximate Acres of Soils Impacted by the Proposed Project

Mine Component	Sunrise-like Soil (Mapping Unit AF)	Arizo-like Soil (Mapping Unit C)	Rock Outcrop/ Gachado Soil (Mapping Unit MR)	Previously Disturbed Soils (Mapping Unit DL)
Open Pit	22.9	2.9	–	110.0
Overburden Stockpile	239.6	46.8	33.4	36.0
North Tailings Pond (P-16) and North Tailings Dam	–	–	8.0	78.6
East Tailings Pond (proposed) and East Tailings Dam	–	17.8	162.4	–
East Tailings Borrow Site	1.1	10.4	25.4	0.7

Reclamation activities that will affect soils will occur in four phases. Impacts to soils will be minimized by the planned salvaging of surface material located in mine expansion areas and the stockpiling of surface materials for subsequent use during Phase 2, 3, and 4 reclamation activities. During Phase 1, approximately 150,000 cubic yards of surface material at an average depth of 6 inches will be removed from proposed mine expansion areas (approximately 194 acres) and the upper portion of the Open Pit will be mined to produce stable slopes. Surface material will be salvaged at the proposed locations for the Overburden Stockpile (79 acres), Open Pit (11 acres), East Tailings Pond and Dam (approximately 70 acres), Diversion Ditches (14 acres), and East Tailings Borrow Site (20 acres). Phase 2 will include the reclamation of the North Tailings Pond and south-facing slopes of the Overburden Stockpile, and the removal and stockpiling of 118,000 cubic yards of surface material. Phase 3 reclamation activities will include revegetating of 184 acres and other disturbed areas that are no longer being utilized during mining operations. Phase 4 will include the contouring, scarification, and covering of unreclaimed portions of the Overburden Stockpile and reclamation of the remaining disturbed areas.

Approximately 268,000 cubic yards of surface material will be salvaged from proposed expansion areas and utilized during reclamation activities, which will occur during Phases 2, 3, and 4 of the proposed project.

Reclamation of disturbed lands will reduce the rate of soil erosion caused by water and wind. However, stockpiled surface material will be subjected to soil erosion caused by water and wind during all phases of the proposed project (approximately 35 years). Sections 4.2.4 and 4.3.3 discuss the impacts expected from water and wind erosion.

Agricultural practices are not being conducted in the project area. As discussed in Section 3.3.6.1 and shown on Figure 3.3-1, the soils in the project area do not exhibit the chemical and physical properties of prime farmland soils. Therefore, significant impacts to agricultural soils and crops are not anticipated as a result of the proposed project.

Mineral Resources

DMG classifies the Molycorp area as MRZ-2a, which signifies areas underlain by mineral deposits where geologic data indicate that significant measured or indicated resources are present. The project will not adversely impact (prohibit or restrict) the development of mineral resources. The project will facilitate the continued development of a unique mineral resource, the lanthanide deposits that are presently being mined at the Mountain Pass Mine. Some of the surface stockpile may be a future source of lanthanide elements if new refining processes are developed and implemented or if market value of the metals increases.

4.3.6.3 Mitigation Measures

Soils/Agriculture

Soil reclamation measures include the removal and stockpiling of surface material, contouring of slopes and benches, and scarification (loosening) of compacted soils. Reclamation activities will be completed for all proposed mine component areas except for the Open Pit expansion area (approximately 80 acres). The Open Pit will be allowed to fill with water.

Stockpiled surface material will be subjected to erosion caused by water and wind. Surface material stockpiles will be covered with a mulch or will be temporarily reclaimed with an interim reclamation seed mixture during Phases 1 and 2 to minimize the amount of soil erosion. Surface materials will be subjected to erosion during Phases 1, 2, 3, and 4 of the proposed project. Additional mitigation measures for water and wind erosion impacts are presented in Sections 4.2.4 and 4.3.3.4.

The following measures will be incorporated into the Mine Reclamation Plan to mitigate potential impacts:

- SR1: Establish criteria for success of reclamation efforts prior to initiating reclamation activities on disturbed land. Incorporate these criteria in the Reclamation Plan.

- SR2: Conduct a technical evaluation of site soils to identify the most suitable material to be used as a growth medium for the site revegetation and reclamation.

Significant impacts to agricultural practices are not anticipated. Therefore, no mitigation is necessary or proposed.

Mineral Resources

Since there are no impacts to the development of mineral resources, no mitigation measures are necessary or proposed.

4.4 Manmade Hazards

4.4.1 Noise

4.4.1.1 Significance Criteria

Significance criteria for noise are based on compatibility of the proposed project with the generation of existing or future exterior noise levels that exceed the standards identified in the Noise Element of the San Bernardino County General Plan. Noise impacts will be considered significant if noise generated from either mobile or stationary sources in conjunction with the proposed project exceeds the San Bernardino County General Plan standards identified on Tables 3.4-1 and 3.4-2.

4.4.1.2 Impacts

The proposed project will not increase the levels of noise currently generated at the Mountain Pass Mine during mining and processing operations. The proposed project involves the continuation of ongoing activities at the mine for an additional 30 years. No processing modifications are proposed. Noise sources will continue to be the mobile vehicles that grade and transport the ore, overburden, and tailings and stationary sources, which include blasting and operation of processing equipment.

Occupational noise monitoring performed by Molycorp indicates that localized areas of high noise have been identified in processing areas well within the boundaries of the plant area.

Molycorp also conducted a noise survey on November 1, 1994, which indicated that background noise outside the Mountain Pass school building was 71 dBA on an 8-hour time-weighted average. Noise calculations for a separate project involving diesel truck deliveries to the Molycorp warehouse adjacent to the school indicated that the noise impact from the trucks to the school at a distance of 500 feet would be 68 dBA. Therefore, noise impacts from the closest adjacent Molycorp facility to the school would be below background conditions (DTSC 1994).

4.4.1.3 Mitigation Measures

No increase in noise levels would exceed the significance criteria identified in Section 4.4.1.1 and thereby create a significant impact to offsite receptors. No mitigation is necessary or proposed. However, in order to mitigate unforeseen noise impacts, Molycorp will

- N1: Limit blasting activities to non-school hours to the extent feasible or notify the school in advance when blasting is planned.

4.4.2 Aviation Safety

4.4.2.1 Significance Criteria

Impacts to aviation safety will be considered significant if the proposed project is not compatible with land use compatibility guidelines as delineated in the Airport Safety Overlay District as defined in the San Bernardino County General Plan.

4.4.2.2 Impacts

No impacts to aviation safety are expected to occur as a result of the proposed project. The project will continue ongoing operations at the Mountain Pass Mine. The mine is not located within an Airport Safety Overlay District, and is thus not subject to the requirements of the Overlay District.

4.4.2.3 Mitigation Measures

No impacts are expected to occur; therefore, no mitigation is necessary or proposed.

4.4.3 Hazardous and Mining Waste/Materials

4.4.3.1 Significance Criteria

Impacts of hazardous wastes and materials used and generated as a result of the proposed project will be considered significant if the following conditions are met:

- Management of the hazardous waste/materials is not in compliance with the San Bernardino County Hazardous Waste Management Plan, and applicable state and federal hazardous waste/material management regulations, as identified in Section 3.4.3.1.

- The generation and disposal of hazardous waste exceeds the capacity of designated landfills.

- The onsite storage of hazardous waste/materials causes a risk to human health, livestock, or wildlife.

4.4.3.2 Impacts

Hazardous Materials

Tables 2.4-3 and 2.4-5 and Appendix B are lists of the hazardous materials and substances Molycorp currently uses at the Mountain Pass Mine for the processing of lanthanide products. These hazardous materials are handled and stored in accordance with Molycorp's Hazardous Materials Business Plan, submitted to the San Bernardino County Department of Environmental Health Services in April 1994 (revised November 1995). Hazardous materials are stored throughout the Mountain Pass facility, as shown on the hazardous materials list provided in Appendix B. No hazardous materials are stored adjacent to offsite receptors. Depending on market conditions, the proposed expansion of operations at the Mountain Pass Mine may increase or decrease processing rates; and may increase or decrease the volumes of hazardous materials used, stored, or handled at the mine.

Acutely Hazardous Materials

Molycorp submitted a Risk Management and Prevention Plan (RMPP) to the San Bernardino County Department of Environmental Health Services in October 1994 revised February 1995) for the handling and storage of the following acutely hazardous materials (AHMs): sulfuric acid and nitric acid, and for the handling of anhydrous ammonia. Anhydrous ammonia is no longer stored onsite or used in processing activities but was instead converted to a 15-percent aqueous ammonia solution upon delivery at the mine. Therefore, the RMPP addresses only the unloading and conversion process of the anhydrous ammonia. However, in mid-1995 a decision was made to convert from aqueous ammonia to caustic soda. Currently, no ammonia is used onsite.

The aqueous ammonia make station is located at a point to the south of the Specialty Plant and east of the Chemical Plant. Sulfuric acid is used and stored in the Chemical Plant, and nitric acid is used and stored in the Specialty Plant. Table 4.4-1 provides the approximate distance from these use and storage areas to the nearest sensitive receptors, which are located adjacent to the Mountain Pass Mine property line.

The transportation of hazardous materials can result in offsite releases through either accidents or equipment failure. The hazardous material that is transported in largest bulk quantities to the Mountain Pass Mine is anhydrous ammonia.

Hazardous Wastes

Hazardous wastes generated at the Mountain Pass Mine are listed in Table 2.4-4. The proposed project will not involve modifications to processing operations; therefore, the volumes and types of hazardous waste generated are not expected to be changed substantially.

Under a separate project (DTSC 1994), Molycorp is storing treated hazardous waste consisting of stabilized lead/iron precipitate formerly generated in the Chemical Plant for up to 3 years in Product Warehouse B, located approximately 500 feet east of the Mountain Pass School. The lead/iron precipitate was formerly stored in approximately 17,000 55-gallon drums in the former hazardous waste storage area. As part of the project, the contents of all the drums have been treated at the temporary treatment unit. The former hazardous waste storage area is undergoing closure for hazardous waste storage in accordance with DTSC regulations and, upon closure, will be used to store equipment, reagents, and products for the Chemical Plant. The treatment project, which was granted an emergency permit by the DTSC, is storing the treated material in 3,000-pound-capacity sling bins prior to reinsertion into the process or offsite disposal. To consider potential impacts to offsite receptors from the storage of this stabilized waste in Product Warehouse B, a qualitative risk assessment was conducted that compared exposure to distance from the stored waste and concluded that there would be no significant risk to human health from the location of the lead/iron precipitate waste (DTSC 1994).

TABLE 4.4-1

Approximate Distances From Offsite Receptors to Acutely Hazards Materials

Receptor	Approximate Number of Individuals	Distance (ft) to Chemical Plant (Sulfuric Acid)	Distance (ft) to the Aqueous Ammonia Make Station	Distance (ft) to Specialty Plant (Nitric Acid)
California State Highway Patrol Camp		5,400	5,400	6,000
Adults	15			
Children	16			
Interstate Highway 15		4,500	4,200	4,800
Adults	N/A			
Children	N/A			
Mountain Pass Community		5,800	3,100	6,300
Adults	2			
Children	2			
Mountain Pass Elementary School		3,600	3,000	4,000
Adults	7			
Children	27			
Sandoz Family Residence		6,400	6,200	6,800
Adults	4			
Children	3			
U.S. Post Office		3,800	3,400	4,100
Adults	1			
Children	0			

The proposed 30-year expansion project includes the development of a new hazardous waste temporary holding area. The concrete pad utilized for lead/iron stabilization activities in 1995 has been modified for use as a holding and staging area for the accumulation of hazardous waste for a period not to exceed 90 days from the start of accumulation. Modifications to the pad include the elimination of the northern half of the pad, the reconstruction of a concrete curb to contain surface water run-on and run-off, and the construction of a chain-link fence to restrict access to the area. Molycorp submitted a closure report to DTSC for the concrete pad used for lead/iron stabilization in October 1995 and expects approval of the closure in the near future, at which time the pad will be utilized as a temporary hazardous waste holding area. Molycorp will obtain a conditional use permit (CUP) from San Bernardino County, as required by the County HWMP. A Contingency Plan will be prepared for the facility to comply with the Tanner Act (AB2948) Chapter 1504 of California Statutes of 1986 and the Hazardous

Waste Facility Overlay of the San Bernardino County General Plan. Additionally, the facility will conform to the seismic safety standards presented in 40 CFR, Part 264.18(a) and Part 270.14. The proposed facility will not be located within a 100-year floodplain.

The North Tailings Pond (P-16) closure is anticipated in approximately the year 2000, after it has reached a crest of 4,950 feet in elevation. The Pond will be closed in accordance with Molycorp's Reclamation Plan (Lilburn 1994) and LRWQCB procedures.

During Phase 4 of the proposed project, all hazardous waste facilities will be closed and reclaimed as described in Molycorp's Reclamation Plan (Lilburn 1994) in accordance with Title 22 of CCR §66265.111, and SMARA.

<u>Radioactive Waste</u>

The California Department of Health Services Radiologic Health Branch has previously indicated that waste streams identified in Section 3.4.3.2 are naturally occurring radioactive materials (NORM) and therefore do not require licensing by the state. However, this agency is currently reviewing the processes and activities at the Mountain Pass Mine that involve the use and generation of radioactive materials/wastes to determine if a license is required for handling these materials (Bailey 1994). It is possible that, due to process variability or changes in the recovery process, lead/iron filter cake containing more than 0.05 percent by weight uranium and thorium could be generated in the future. In this event, under Title 10 CFR Part 20, the material would be classified as a source material. If lead/iron filter cake containing more than 0.05 percent by weight uranium and thorium is generated, control measures would be required. If it is determined that a radioactive materials license is required for the Mountain Pass Mine, a comprehensive radiation monitoring program would have to be developed and implemented for those areas required to be controlled at the facility, as discussed in Section 3.4.3.2.

In May 1996, Molycorp submitted a plan to LRWQCB to recover lanthanides during the closure of three lead ponds. At the present time, LRWQCB is reviewing the plan. The plan proposes to recover lanthanides in a manner similar to the current reinsertion of stabilized lead/iron filter cake. As such, the plan would be beneficial to achieving closure of the ponds within the next 2 years, although a comprehensive sampling and monitoring program would be necessary to ensure adequacy of the closure.

4.4.3.3 Mitigation Measures

The following mitigation is proposed to reduce potential adverse impacts of hazardous waste/materials resulting from the proposed project. Upon implementation of the mitigation measures, potential impacts of hazardous waste/materials will continue to be significant because final remediation, elimination, and disposal plans with specific timeframes for compliance have not been approved.

- HW1: Determine adequacy of the mine's existing waste minimization/source reduction plan that will reduce by up to 10 percent the volume of hazardous waste disposed from the Mountain Pass Mine. Evaluate further means to reduce hazardous waste generation, such as reuse and process recycling. Revise plan accordingly to achieve more than 10 percent reduction in volume of hazardous waste disposed.

- HW2: Molycorp will provide estimates of the amount of hazardous waste to be generated by year for each of the 30 years of the expansion project and will demonstrate that contracts or memoranda of understanding are in place with an approved disposal facility to receive these wastes over the project lifetime.

- HW3: Molycorp will not use the concrete pad formerly associated with lead/iron stabilization activities for the temporary storage of hazardous waste until closure of the pad for use in the lead/iron stabilization project has been approved by DTSC.

- RW1: Molycorp will develop and implement a comprehensive radiation monitoring program for mine areas required to be controlled if the California Department of Health Services Radiologic Health Branch determines that a radioactive materials license is required for the mine.

- RW2: Molycorp will comply with the LRWQCB recommendations when they become available relative to closure of three lead ponds.

4.5 Manmade Resources

4.5.1 Land Use

4.5.1.1 Significance Criteria

Significance criteria for land use are based on the compatibility of the proposed project with existing and future land uses and with established policies and regulations. Impacts will be considered significant if:

- The proposed expansion project is neither compatible nor consistent, in terms of use of intensity, with land use plans, regulations, or controls adopted by local, state, or federal governments.

- The project conflicts with the established recreational, scientific, educational, religious, or scientific uses of the area.

4.5.1.2 Impacts

Activities of the proposed expansion project will occur on three non-contiguous areas: the mining and processing facility (Mountain Pass Mine), an existing borrow source located approximately 7 miles east of the Mountain Pass Mine (Nipton Road Borrow Site), and an existing wastewater evaporation pond located approximately 5 miles north of the borrow site (New Ivanpah Evaporation Pond). The San Bernardino County General Plan allows mining and related activities within any land use district within the County; therefore, the proposed expansion project is consistent with land use policies in the County.

The mine expansion project is located within San Bernardino County Improvement Overlay District 5, which requires minimal improvements for development of land within that district. Prior to development, Molycorp will obtain a Conditional Use Permit from San Bernardino County that details the improvements required for the expansion project. As stated in Section 3.5.1.1, such improvements may include legal and physical access and grants of easements.

Until recently, land within the mine expansion project was owned by Molycorp as patented land or was managed by the BLM as unpatented, public land. However, 880 acres of BLM public land has been exchanged with Molycorp for private land elsewhere that has been determined to be of equal value. Therefore, all lands within the expansion project are now privately owned by Molycorp and are under the regulatory jurisdiction of San Bernardino County. No new property will be acquired as part of this project.

In January 1994, the U.S. Congress enacted the California Desert Protection Act of 1994, which established various wilderness areas, the Death Valley and Joshua Tree National Parks, and the Mojave National Preserve. Establishment of the Mojave National Preserve, which is located to the north, west, and south of the Mountain Pass Mine (Figure 3.3-2), abolished the former East Mojave National Scenic Area. The Mountain Pass Mine, including the proposed expansion area, is not located within the boundaries of the Mojave National Preserve and therefore remains subject to the land use policies of the County of San Bernardino.

Two non-contiguous parcels of land within the mine area and all of the New Ivanpah Evaporation Pond are post-FLPMA lands, with the BLM having oversight responsibility to ensure that public lands adjacent to these post-FLPMA lands are not adversely impacted by activities on Molycorp patented land. Section 4.3.4.2 discusses potential impacts from wastewater discharged to the New Ivanpah Evaporation Pond. No public lands are adjacent to the two non-contiguous post-FLPMA parcels within the mine area (see Plate 1).

An SCE transmission line and an AT&T access road will be relocated during Phase 1 of the proposed project to allow for expansion of the Overburden Stockpile. These facilities are currently located on either an easement or right-of-way. Plate 1 shows the new locations of these facilities. Because the SCE easement and AT&T right-of-way will be replaced and no disruption of service will occur, there will be no significant impacts to these facilities.

4.5.1.3 Mitigation Measures

No significant land use impacts are expected to occur as a result of the Mountain Pass Mine expansion project. Therefore, no mitigation is necessary or proposed.

4.5.2 Utilities/Infrastructure

4.5.2.1 Significance Criteria

Impacts to utilities and infrastructure systems will be considered significant if one or more of the following is occurs:

- An increase in the demand for utilities substantially impacts current capacities for electricity supply.

- An overload of the local switching capabilities of the Pacific Bell or AT&T/Centel systems.

- An increase in sanitary sewer water substantially impacts the current septic tanks and treatment pond system.

- Public/private roads or property are damaged by new storm water drainage patterns.

- The generation and disposal of nonhazardous waste exceeds the capacity of designated landfills.

4.5.2.2 Impacts

Power Systems

The proposed expansion project will require an estimated 5 percent of additional electricity above the average 3.5 million Kwh currently used per month over the 30-year life of the project. This increase distributed over a 30-year time period is not expected to significantly impact the existing SCE delivery systems for electricity.

Communication Systems

Molycorp estimates that an additional eight to ten inside extensions and three to six outside lines for modems and alarms will be needed as a result of the proposed project. These increases are not expected to significantly impact the existing communications network.

Sewer Systems

No substantial increase in the average volume of sanitary wastewater generated at the mine is expected to occur as a result of this project. Mine operations will continue at the same rate with the same number of employees. Therefore, there will be no significant impacts to the existing septic system and wastewater treatment system from sanitary wastewater. Additionally, because Molycorp operates its own septic system, there will be no impacts to publicly operated sewer systems as a result of the project. Section 4.3.4 provides a discussion of the process wastewater impacts due to the proposed project.

Water Supply Systems

Section 4.3.4.2 provides a discussion of water supply impacts due to the proposed expansion project.

Storm Water Drainage Systems

The proposed project is not expected to substantially change the current storm water flow patterns at the facility. New facilities to be constructed for the project (i.e., East Tailings Pond) will be designed with storm water diversion systems. Therefore, no significant impacts to the storm water system are expected to occur.

Solid Waste Disposal

The proposed project will not increase the amount of solid waste generated at the mine and transported offsite for disposal. Concrete and asphalt will be disposed of in the concrete/asphalt landfill to be constructed on the Overburden Stockpile during Phase 1 of the project. As stated in Section 3.5.2.6, Molycorp currently disposes of an estimated 310 tons per year of solid waste at the Apex Landfill and sells an additional 20 tons of scrap metal, packaging material, and used pallets to recyclers. Projected closure date for the Apex Landfill is 2083. Currently, approximately 3 percent of the landfill's capacity has been used (Rogers 1996). No significant impacts to the solid waste handling systems will occur.

Approximately 500 to 700 tons per year of construction debris are currently being disposed in a selected area of the Overburden Stockpile that is currently being permitted under a separate project as an inert disposal area by the San Bernardino County Environmental Health Services Department as LEA.

4.5.2.3 Mitigation Measures

No significant impacts to utilities and infrastructure systems are expected to occur as a result of the Mountain Pass Mine expansion project. Therefore, no mitigation is necessary or proposed.

4.5.3 Transportation/Circulation

4.5.3.1 Significance Criteria

Impacts to transportation and circulation will be considered significant if the following criteria are met:

- A major roadway or railroad is closed to all through traffic and no alternate route is available.
- Average daily traffic on Interstate 15 within the expansion project area is substantially increased to the point of disrupting traffic flow.

4.5.3.2 Impacts

As a continuation of current operations at the Mountain Pass Mine, the proposed expansion project is not expected to cause a significant increase in traffic levels. No significant increase in product shipment or materials delivery over public roads is expected to occur. Over the 30-year life of the project, Molycorp expects the number of employees to increase gradually from the current 300, which would not cause a significant increase to the amount of traffic currently utilizing Interstate 15. Currently, the level of service at the intersection of Bailey Road and Interstate 15 is operating at LOS A (see Table 3.5-1). This service level will not be degraded with the minimal increase in employees expected over the life of the project.

4.5.3.3 Mitigation Measures

No significant transportation or circulation impacts are expected to occur as a result of the Mountain Pass Mine expansion project. Therefore, no mitigation is necessary or proposed.

4.5.4 Energy

4.5.4.1 Significance Criteria

Impacts to energy resources will be considered significant if the increased demand exceeds the current production and or delivery rate capacities of the local distribution facilities.

4.5.4.2 Impacts

The proposed project is a continuation of an existing operation. No increase in the amount of energy resources used is anticipated as a result of the project; therefore, no significant impacts are expected.

4.5.4.3 Mitigation Measures

No significant impacts to energy resources are expected to occur as a result of the Mountain Pass Mine expansion project. Therefore, no mitigation is necessary or proposed.

4.5.5 Housing/Demographics/Socioeconomics

4.5.5.1 Significance Criteria

Housing/demographics/socioeconomics impacts will be considered significant if the following criteria are met or exceeded:

- The expansion project produces additional population, housing, or employment inconsistent with adopted plans either in terms of overall amount or location.
- The demand for temporary or permanent housing exceeds the supply.

4.5.5.2 Impacts

As a continuation of existing operations at the Mountain Pass Mine, the proposed expansion project will not cause significant changes to population, housing, or employment in the area. It is anticipated that the workforce may increase from the current 300 over the 30-year life of the project. No housing is available in Mountain Pass, but current employees commute an average of 60 miles one way to work. Housing is available within a 60-mile radius of the mine. Therefore, no significant impacts are expected to occur.

4.5.5.3 Mitigation Measures

No significant impacts to housing/demographics/socioeconomics are expected to occur as a result of the Mountain Pass Mine expansion project. Therefore, no mitigation is necessary or proposed.

4.5.6 Public Services

4.5.6.1 Significance Criteria

Impacts to public services will be considered significant if any of the following conditions occur:

- Additional service from the law enforcement and fire departments requires an increased workforce.
- An increased demand for schools, medical services, and/or public maintenance services within the vicinity of the Mountain Pass Mine requires additional provisions to accommodate the project.

4.5.6.2 Impacts

No additional demand on public services as a result of the mine expansion project is expected to occur because the project will be a continuation of existing operations. No change in operations will occur that would increase the need for any public service. A slight increase in additional employees is anticipated to be hired over the 30-year life of the project as a result of the project. The Mountain Pass School and Baker Junior-Senior High are not currently operating at capacity and could accommodate 40 and 80 more students, respectively (Taylor 1995). Therefore, no significant impacts are expected to occur.

4.5.6.3 Mitigation Measures

No significant impacts to public services are expected to occur as a result of the Mountain Pass Mine expansion project. Therefore, no mitigation is necessary or proposed.

5.0 PROJECT ALTERNATIVES

5.1 Introduction

This Draft EIR includes a discussion of alternatives to the proposed project as required by CEQA guidelines. According to the guidelines, alternatives should include realistic measures for attaining the basic objective of the proposed project and provide a means for evaluating the comparative merits of each alternative. In addition, although the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative [CEQA Guidelines Section 15126 (d)(5)]. The selection and discussion of alternatives should foster informed decision making and public participation.

5.2 Alternatives

Three alternatives to the proposed project are discussed in this section. The first alternative is the CEQA-mandated No Project Alternative. The second and third alternatives are responsive to both the project objectives and have been developed to reduce some of the significant environmental impacts discussed in Section 4. Additionally, two other potential alternatives are described that were eliminated from further consideration due to infeasibility.

5.2.1 No Project Alternative

Under the No Project Alternative, the mine would continue to operate under its current permits and approvals. The 30-year expansion of the Open Pit to extract additional rare-earths would not occur. The North Tailings Pond will reach its maximum currently permitted capacity by the year 2000; thus, no additional tailings could be generated. Limitations in other current permits would also inhibit the continuation of mining. At that time, the Overburden Stockpile would cover approximately 83 acres, the Open Pit would cover approximately 58 acres, and the North Tailings Pond and Dam would cover approximately 90 acres. Increased disturbance that would occur under the No Project Alternative from the present time until the initiation of reclamation in approximately 2001 is as follows:

- Open Pit - 4.5 acres
- Overburden Stockpile - 44.5 acres
- North Tailings Pond and Dam - 20.4 acres

Under the No Project Alternative, it is assumed that operations at Mountain Pass Mine would cease in 2000.

5.2.2 Reduced Project Alternative

Under the Reduced Project Alternative, the expansion of the Mountain Pass Mine would be reduced to a 20-year time period, which would include a 33 percent decrease in production of rare earths from the proposed project. Table 5.2-1 shows the project components and amount of surface disturbance for the two-phased Reduced Project Alternative. Figure 5.2-1 presents a project site map of the Reduced Project Alternative. Phase 3 of the project would be eliminated in the Reduced Project Alternative. Processing rates would not change from those specified for the proposed project. Under this alternative, 5 million fewer tons of ore would be mined, and 64 million fewer tons of overburden would be generated. The Reduced Project Alternative would mine 10 million tons of ore compared to the 15 million tons to be mined under the proposed project. The Reduced Project Alternative would generate 74 million tons of overburden compared to 138 million tons expected to be generated for the proposed project. Ore, overburden, and tailings generation by year are shown on Table 2.5-3, assuming that Phase 3 would be eliminated for the Reduced Project Alternative.

The Reduced Project Alternative would result in approximately 217 acres of surface disturbance (which represents a 69 percent decrease from the 696 acres to be disturbed by the proposed project) beyond the existing disturbance at the mine. This reduction in disturbance would be as follows:

- Open Pit Expansion -- 34 acres
- Overburden Storage -- 123 acres
- Expanded Use of Borrow Site -- 10 acres
- Expansion of Tailings Storage -- 50 acres

The Reduced Project Alternative would potentially result in a shortfall of lanthanide elements in the world market.

5.2.3 Underground Mining Alternative

With the Underground Mining Alternative, a 16-foot-diameter by 1,050-foot-vertical production shaft would be developed in year 25 of the proposed project to extract the ore. Under this alternative, 2.1 million tons of ore would be developed as compared to 2.7 million tons for the proposed project, which represents a 22 percent decrease in production of rare earths.

TABLE 5.2-1

Alternatives Components by Phase

Alternative and Component	Phase 1 10 Years	Phase 2 10 Years	Phase 3 10 Years	Phase 4 5 Years
No Project Alternative	Reclamation	Closed	Closed	Closed
Reduced Project Alternative				
Mining and Expansion of Open Pit	11 acres	35 acres	—	Reclamation
Increase Area of Overburden Stockpile	79 acres	127 acres	—	Reclamation
Construct or Increase Area of East Tailings Borrow Site	20 acres (construct)	10 acres (increase)	—	Reclamation
Construct or Increase Area of East Tailings Pond	70 acres-pond 14 acres-diversion channels (construct)	60 acres (increase)	—	Reclamation
Increase Area of North Tailings Pond to 4,950 Elevation	20 acres	Reclamation	Closed	Closed
Relocation and Expansion of Mine Equipment Yard	13.8 acres	—	—	Reclamation
Surface Material Stockpile Area	15 acres	—	—	Reclamation
Realign SCE Power-Line and AT&T Access Road	1.5 acres	—	—	—
Relocate Shadow Valley Water Line	—	2.5 acres	—	—
Underground Mining Alternative				
Mining and Expansion of Open Pit	11 acres	35 acres	0 acres (Steepen pit walls)	Reclamation
Increase Area of Overburden Stockpile	79 acres	127 acres	123 acres	Reclamation
Construct or Increase Area of East Tailings Borrow Site	20 acres (construct)	10 acres (increase)	10 acres (increase)	Reclamation
Construct or Increase Area of East Tailings Pond	70 acres-pond 14 acres-diversion channels (construct)	60 acres (increase)	50 acres (increase)	Reclamation
Increase Area of North Tailings Pond to 4,950 Elevation	20 acres	Reclamation	Closed	Closed
Relocation and Expansion of Mine Equipment Yard	13.8 acres	—	—	Reclamation
Surface Material Stockpile Area	15 acres	—	—	Reclamation
Realign SCE Power Line and AT&T Access Road	1.5 acres	—	—	—
Relocate Shadow Valley Water Line	—	2.5 acres	—	—

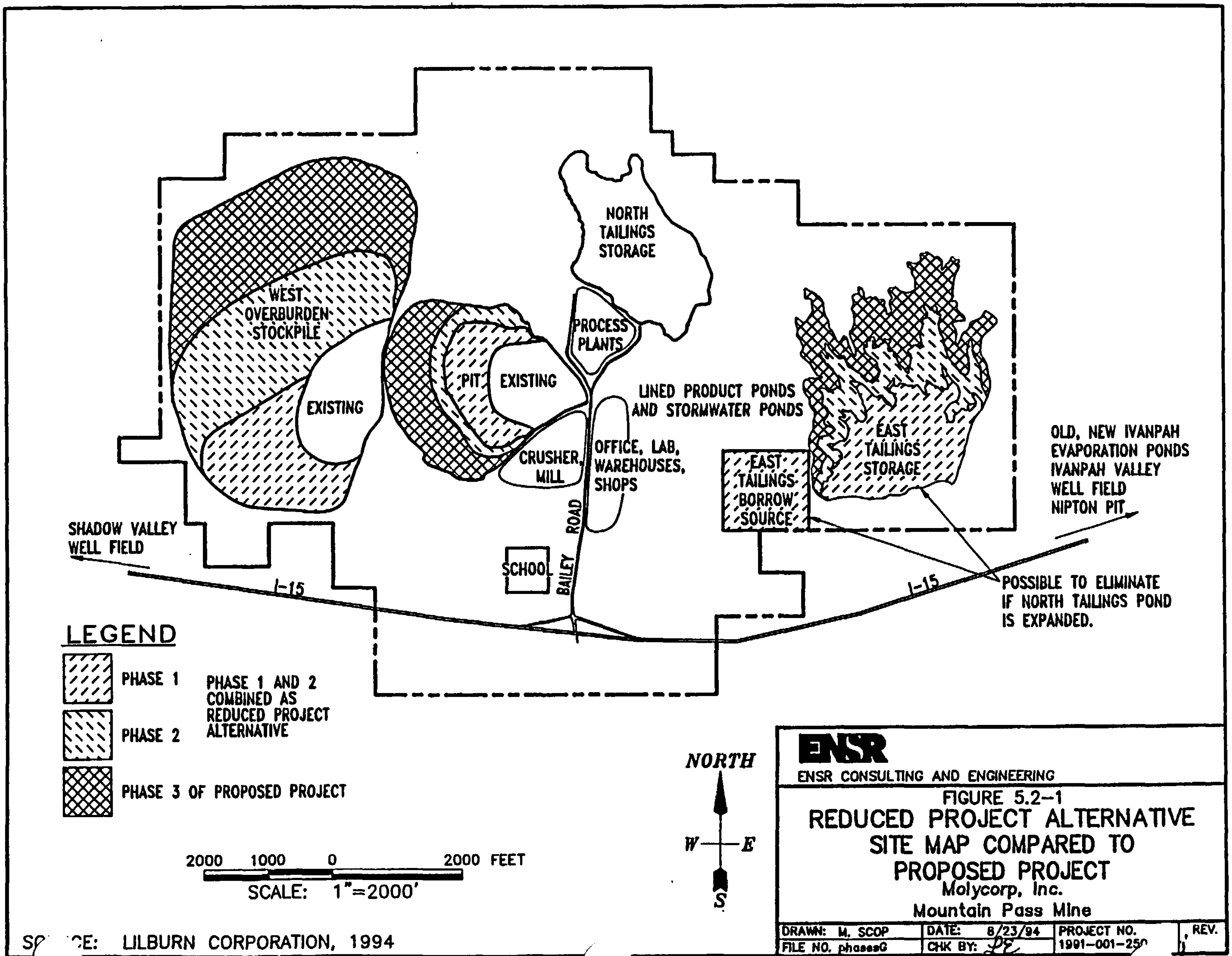


FIGURE 5.2-1
REDUCED PROJECT ALTERNATIVE SITE MAP COMPARED TO PROPOSED PROJECT
Molycorp, Inc.
Mountain Pass Mine

During the 5-year underground mining phase, approximately 625,000 tons of overburden would be created as compared to 34.3 million tons of overburden expected to be generated during those 5 years for the proposed project. Ore, overburden, and tailings generation are shown in Table 2.5-3. Table 5.2-1 also shows the project components and amount of surface disturbance for the Underground Mining Alternative. The overburden would be created at the same rate as the proposed project during Phases 1 and 2, with the final overburden stripping completed during Phase 3 when the underground mine would be developed to production.

The Underground Mining Alternative would result in disturbance of 33.5 fewer acres of open pit as compared to the proposed project. The Overburden Stockpiles would cover the same area as the proposed project (see Figure 2.5-3), although final elevations of the stockpiles would be approximately 120 feet lower than for the proposed project. The lower portion of the Overburden Stockpile would be very flat and could slope 10 feet over a 4,000-foot area to the north. The northern limit of the stockpile would be approximately 50 feet above the natural ground surface and could be contoured to blend with a diversion ditch that would be required to handle surface runoff.

The Underground Mining Alternative would consume more energy due to the use of hoists, pumps, fans, and other underground-related equipment (Molycorp 1996). The Underground Mining Alternative would require improvements to the surface water treatment system because water flow from underground mining is greater than for surface mining.

5.2.4 Alternatives Determined To Be Infeasible

The following two additional alternatives have been considered but have been determined to be infeasible and withdrawn from consideration:

- Rolling Pit Construction Option - The rolling pit method of expanding an open pit mine requires that angles of the open pit not exceed 35 to 37 degrees. A steeper angle does not provide the footwall stability necessary for rolling pit construction. In order to expose the ore to be mined, the Molycorp open pit takes advantage of the 42-degree angle of the natural dip of the ore body.

- Alternative Site - This potential alternative has been determined to be infeasible because the lanthanide ore body to be mined occurs only at the Mountain Pass site. Therefore, it would not be possible for Molycorp to conduct bastnasite (lanthanide elements) mining operations at an alternative site.

5.3 Impacts of Alternatives

5.3.1 Natural Hazards

The No Project Alternative would result in no additional impacts to the geologic environment, flood and wildfire hazards, and wind erosion beyond the impacts permitted and approved for existing operation of the Mountain Pass Mine. Under the No Project Alternative, the mine would cease operations in approximately the year 2000 due to the limitations inherent in current mine permits and approvals. The East Tailings Pond and Dam would not be constructed, the Overburden Stockpile would not be expanded beyond its currently permitted size, and the Open Pit would be expanded only to the point where storage of overburden and tailings was no longer permitted.

The Reduced Project Alternative would result in a decrease of impacts to the geologic environment in that fewer tons of ore would be mined, thus causing the eventual size of the Open Pit to be approximately 33 percent smaller than is planned for the proposed project. Substantially less overburden would be generated, requiring 123 acres less space for overburden storage and a smaller Overburden Stockpile. The pit bottom would be at the 4,250-foot elevation at the end of the Reduced Project Alternative. Up to 5 million fewer tons of ore would be mined, and 64 million fewer tons of overburden would be generated. The East Tailings Pond and Dam would be constructed under this alternative, and the eventual size of the pond and dam would be reduced by 50 acres as compared to the proposed project. The size of the East Tailings Borrow Site would be reduced by 10 acres. However, impacts associated with slope stability under the Reduced Project Alternative would be similar to the proposed project and would require mitigation as outlined for the proposed project. If it is feasible to expand the North Tailings Pond for use during the two phases of the Reduced Project Alternative, it would be possible to reduce impacts by eliminating the East Tailings Pond and the East Tailings Borrow Source. Significant, long-term, and unavoidable impacts to topography would occur under the Reduced Project Alternative.

The Underground Mining Alternative would result in a decrease of impacts to the geologic environment during the final phase of the mine expansion. At that time, mining would transition from the open pit method to the underground method, resulting in 35 million fewer tons of overburden being produced due to the decrease in stripping ratio as compared to the proposed project. Approximately 600,000 fewer tons of ore would be produced. The pit bottom would be at the 4,160-foot elevation when underground mining commences. However, impacts associated with slope stability would be similar to the proposed project under this alternative because the mine would continue to operate as an open pit mine for the first 25 years of the proposed expansion, transitioning to underground mining during the last 5 years of the project. Impacts associated with slope stability for underground mining would be significant. The mitigation outlined for the proposed project (Section 4.2.1.3) would be required. Because overburden would cover the same area as the proposed project, significant long-term and unavoidable impacts to topography would also occur under this alternative. However, requiring that the Overburden Stockpile be configured to cover a smaller area could reduce these impacts.

5.3.2 Natural Resources

5.3.2.1 Biological Resources

Vegetation

The No Project Alternative would avoid the removal of approximately 680 acres of vegetation during mine expansion. Implementation of the Reduced Project Alternative would remove approximately 460 fewer acres of vegetation than the proposed project. Implementation of the Underground Mining Alternative would have similar impacts to vegetation as the proposed project because the actual areas of vegetation to be disturbed would be the same. However, if the Overburden Stockpile was configured to cover a smaller area due to the smaller volume of overburden generated, these impacts could be reduced. Impacts to special-status plant species are not anticipated with the implementation of the No Project, Reduced Project, or Underground Mining Alternatives.

Wildlife

The No Project Alternative would avoid the removal of 696 acres of native habitat lost to the proposed mine expansion and would reduce the overall effects from the developed pit lake and tailings ponds located within the mine site. The Reduced Project Alternative would avoid the removal of 479 acres of native habitat and may aid in animal dispersal during mine expansion, since the rate of mining and processing would be reduced from that proposed for the proposed project. Otherwise, the anticipated effects from the Reduced Project Alternative would be similar to those described for the proposed project.

Under the Underground Mining Alternative, both the direct and indirect impacts to wildlife resources and sensitive species would be the same as those described for the proposed project except for the 33.5 fewer acres lost from the proposed development of the open pit and the decreased amount of overburden generated. The fewer number of acres disturbed or lost by the mine expansion would be less impact to wildlife resources; however, the overall effects to wildlife from the incremental habitat loss would be the same. The decreased amount of overburden could reduce the amount of habitat loss if the Overburden Stockpile was reconfigured to cover a smaller area. The potential impacts to wildlife from changes in water quantity and water quality from mine dewatering and pit lake development, respectively, would be the same under the Underground Mining Alternative as for the proposed project.

5.3.2.2 Cultural/Paleontological Resources

The No Project Alternative would result in expansion of disturbed areas until approximately the year 2000. Because the area of disturbance relative to the cultural and paleontological resources identified in Section 4.3.2.2, would not affect the resources, the No Project Alternative would have not effect on the identified resources. The Reduced Project and Underground Mining Alternatives would increase the area of disturbance over the existing conditions and may affect the identified resources. If either the Reduced Project or Underground Mining Alternatives is selected instead of the proposed project, a Phase II cultural resources investigation would be necessary as mitigation for potential significant impacts.

5.3.2.3 Air Quality

Under the No Project Alternative, mining is expected to continue until the year 2000; therefore, PM_{10} emissions will be generated over that time period. However, it is expected that the current stripping ratio of overburden to ore at 4 to 1 would remain relatively constant under the No Project Alternative. Presently, 172 tons per year of PM_{10} emissions are estimated for the mining, hauling, blasting, crushing, and mineral production activities at the mine (see Table 4.3-4). Since this level of PM_{10} emissions is not projected to increase with the No Project Alternative, no PM_{10} mitigation measures beyond those in current practice would be required under the No Project Alternative.

Under the Reduced Project Alternative, PM_{10} causing activities would be reduced compared to the proposed project. Phase 3 of the proposed project would be eliminated. However, as shown on Table 4.3-5, 251 tons per year of PM_{10} emissions are estimated during Phase 2 of the project, which is an increase of 110 tons per year. Since this is a significant emissions increase (see Section 4.3.3.1), Molycorp would be required to mitigate PM_{10} emissions under the Reduced Project Alternative.

The Underground Mining Alternative would have the same air quality impact for the first 25 years as the proposed project. However, PM_{10} emissions would be significantly reduced during the last five years when underground mining is implemented. This reduction in emissions would be due to the 22 percent reduction in ore production and, more significantly, the reduction in overburden from around 7 million tons per year to about 125,000 tons per year. The decrease in overburden handled means less PM_{10} emissions from blasting, hauling, loading, and crushing. The only increase in emissions from this scenario would be from the air compressors needed to ventilate the underground mine; however, this source accounts for less than 1 ton per year of PM_{10} emissions. The underground mine will require dewatering and is expected to remain damp during mining.

Therefore, maximum emissions in the last half of Phase III are expected to be 80 tons per year which is less than half the present emissions of 172 tons per year.

Application of mitigation measures as listed in Section 4.3.3.4 would be required for either the Reduced Project Alternative or the Underground Mining Alternative to reduce expected PM_{10} impacts. Although air quality impacts remain potentially significant after mitigation under these project alternatives, both would have less impact than the proposed project.

5.3.2.4 Water Supply/Quality

Water use would continue at the current rate until the year 2000 under the No Project Alternative. Due to limited recharge of aquifers in the arid desert environment, potential drawdown would be expected to continue, although it would be less than with the proposed project. The Open Pit would not be expanded to the depth proposed for the proposed project; therefore, pit dewatering would have less of an impact on drawdown under the No Project Alternative.

The East Tailings Pond would not be constructed under the No Project Alternative; therefore, no impacts from potential seepage from the East Tailings Pond would occur. Seepage from the North Tailings Pond would continue until control measures are implemented.

Erosion of the Overburden Stockpile would occur under the No Project Alternative but at a smaller rate than with the proposed project due to the smaller size of the stockpile and the institution of reclamation activities within the next 5 years.

Under the Reduced Project Alternative, water use would be less than for the proposed project but more than for the No Project Alternative. Average annual volume of water used is 407.8 million gallons. For the Reduced Project Alternative, water use would be reduced by approximately 4 billion gallons. The East Tailings Pond would be constructed for storage of tailings after the year 2000, when the North Tailings Pond is expected to reach capacity and be closed. The amount of overburden and tailings generated would be less than for the proposed project, but erosion and seepage controls would still be necessary to eliminate impacts to surface and groundwater.

Impacts of the Underground Mining Alternative would be similar to those of the proposed project because, under this alternative, water use would be essentially the same for the first 25 years as for the proposed project. It is assumed that the East Tailings Pond would be constructed upon closure of the North Tailings Pond. The amount of overburden generated would decrease substantially in the final 5 years of the project, and tailings generation would decrease slightly. During this 5-year period, substantially less water would be required for dust control. However, erosion and seepage controls would still be necessary to eliminate the potential for impacts to surface and groundwater.

Mitigation as listed in Section 4.3.4.3 would be required for water supply and water quality under the Reduced Project and Underground Mining Alternatives.

5.3.2.5 Open Space/Recreation/Scenic

The No Project Alternative would have no effect on open space/recreation resources in the project area. The No Project Alternative would result in a substantial reduction in the extent and duration of visual impacts as compared to the proposed project, assuming that reclamation of the existing site would be accomplished. This would be necessary since the existing on-site disturbances are readily visible from Interstate 15. If reclamation was not applied to the existing site, visual impacts of the No Project Alternative would be similar to those of the proposed project for the next 30 years, but on a smaller scale. After 30 years, when the Phase 4 reclamation efforts of the proposed project would be applied, impacts associated with the No Project Alternative (without reclamation) would exceed those of the proposed project .

Compared to the proposed project, the Reduced Project Alternative would have no effect on open space/recreation resources in the project area. Potential reductions in the rates of processing, the amount of ore mined, and the amount of overburden generated within a given time period would likely have a minimal influence on the significant adverse visual impacts of the project. The Overburden Stockpile would be up to one third smaller than the proposed project. However, even at this reduced size, the visual impacts would be significant. Reconfiguring the Overburden Stockpile so that it is located to the north of the pit rather than the south may minimize visual impacts. However, during the active life of the project, the rate at which landform modifications grow has less of an effect than their ultimate size and scale.

While the Underground Mining Alternative results in 35 million fewer tons of overburden, the Overburden Stockpile would cover the same area as under the proposed project. The Overburden Stockpile would be lower in total height by 120 feet as compared to the proposed project, but would be substantially the same visually as in the Reduced Project Alternative. Under the proposed project, the configuration of the west overburden stockpile features a top "layer" 120 feet high (from an elevation of 5,000 feet to a maximum elevation 5,120 feet at its southern point) that sits atop the northwest portion of the larger base of the stockpile. With the Underground Mining Alternative, this top layer would not be developed. The maximum elevation of the stockpile would be 5,000 feet at its south edge. The top surface of the stockpile would slope very gently to the north by about 10 feet over a distance of 4,000 feet.

In terms of its apparent size and scale as viewed by the public from Interstate 15, the reduction in height of the stockpile that would occur with the Underground Mining Alternative would make little difference. This is due to the position of the top layer which would be eliminated. Under the proposed project, the south edge of the stockpile's top layer is nearly 1,000 feet back from the south edge of the surface on which it rests. It is more than 1,600 feet back from the east edge. The surface on which the top layer sits has an elevation of 5,000 feet. As viewed from KOPs along Interstate 15, this is high enough to block the visibility of most of the top layer. Therefore, eliminating the top layer makes little difference in the apparent size and scale of the Overburden Stockpile for either the Reduced Project Alternative or the Underground Mining Alternative. Figure 5.3-1 is a simulated image showing the stockpile as viewed from KOP 1 without the top layer. Compared to Figure 4.3-5, which shows the stockpile as it would be developed under the proposed project, very little difference is apparent.

At KOP 2, the viewer is farther west on Interstate 15 compared to KOP 1 and closer to the south face of the stockpile. In this case, the stockpile's top layer is not in view due to its position approximately 1,000 feet back from the south edge of the surface on which it rests. Therefore, elimination of the top layer with the Underground Mining Alternative would have no change in the appearance of the Overburden Stockpile as viewed from KOP 2.

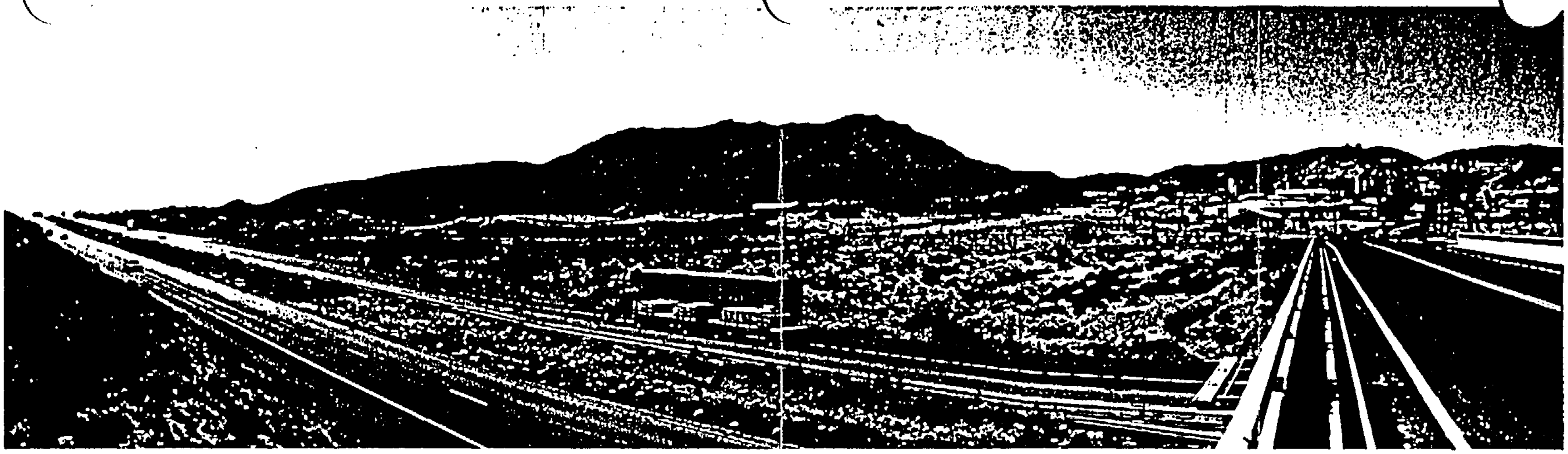
5.3.2.6 Soils/Agriculture

Potential impacts to soils were examined relative to the proposed project alternatives. The No Project, Reduced Project, and Underground Mining Alternatives would each reduce the acreage of soil affected during mine expansion. Therefore, impacts to soils for either of the project alternatives would be less than for the proposed project.

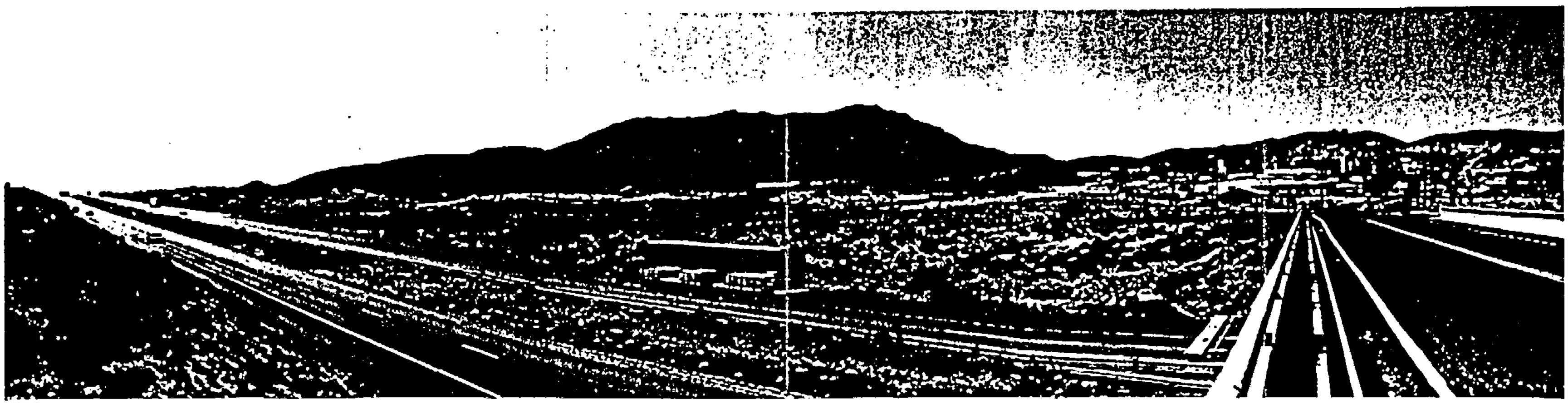
5.3.3 Manmade Hazards

Under the No Project Alternative, no impacts beyond current operating conditions at the Mountain Pass Mine would be expected for Noise or Aviation Safety. Additional hazardous waste would be generated that would require source reduction/waste minimization strategies to comply with state law. However, changes to the environment as a result of the No Project Alternative would be expected to be very similar to current conditions at the mine.

Under the Reduced Project Alternative, no impacts to Noise or Aviation Safety would be expected to occur. The amount of hazardous waste generated and hazardous materials used and stored would be less than for the proposed project. However, mitigation as listed in Section 4.4.3.3 would still be required to minimize the potential impacts from hazardous waste generation.

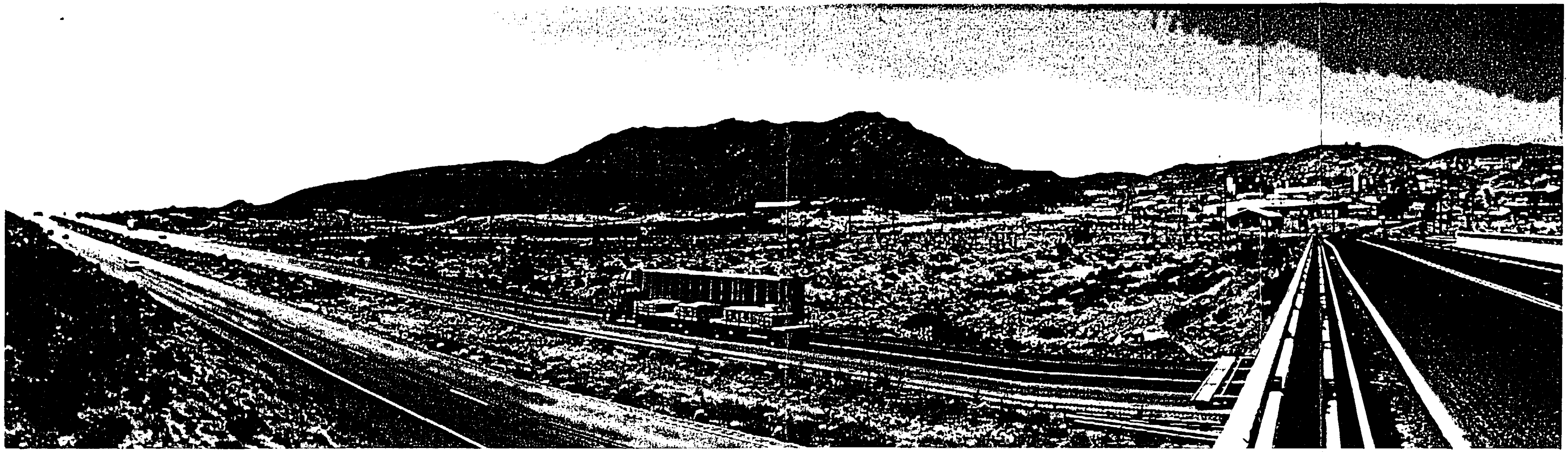


Proposed Project From KOP #1

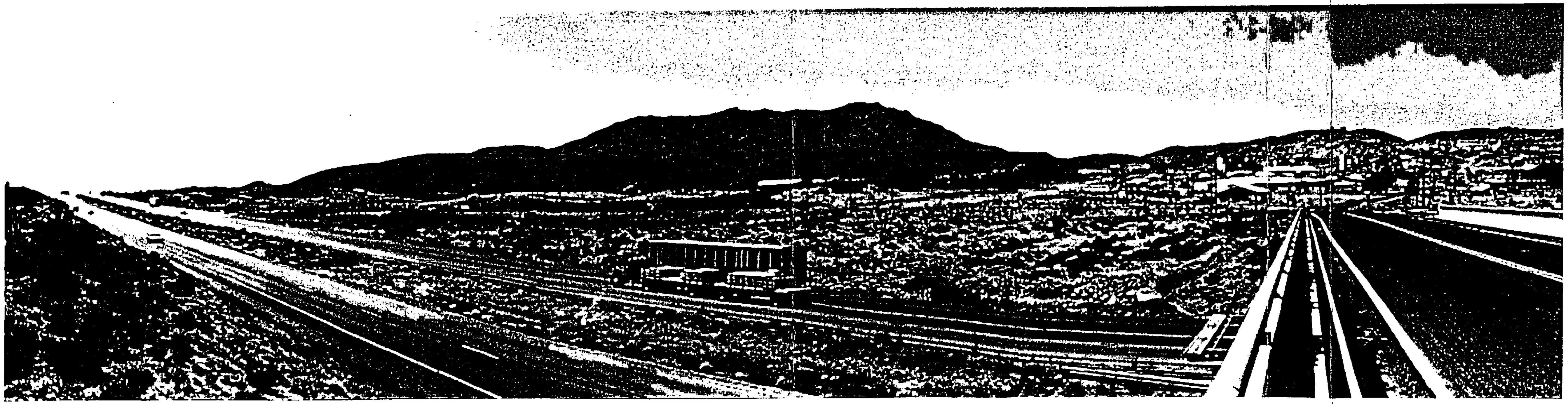


Underground Mining Alternative From KOP #1

FIGURE 5.3-1. Simulated Image of Underground Mining Alternative From KOP #1



Proposed Project From KOP #1



Underground Mining Alternative From KOP #1

FIGURE 5.3-1. Simulated Image of Underground Mining Alternative From KOP #1

Under the Underground Mining Alternative, no substantial impacts to Noise or Aviation Safety would be expected to occur. The amount of hazardous waste generated and hazardous materials used and stored would be similar to the proposed project (Section 4.4.3.2). Mitigation as listed in Section 4.4.3.3 would be required to minimize the impacts of hazardous waste generation for this alternative. Underground mine safety for workers is somewhat different from open pit mining, and Molycorp would be required to use workers who have been certified in underground work by the Mine Safety and Health Administration. Additionally, impacts to workers may arise from mine ventilation, blasting gases, and noise at the intake/exit shafts. Finally, Molycorp would be required to train its employees in mine rescue planning.

The California Department of Health Services Radiologic Health Branch is currently reviewing the processes and activities at the Mountain Pass Mine that involve the use and generation of radioactive materials/wastes to determine if a license is required for handling these materials. Depending upon the outcome of this review, such a license may be required for either the No Project, Reduced Project, or Underground Mining Alternatives.

5.3.4 Manmade Resources

Impacts from the Project Alternatives to manmade resources will be similar to or less than the impacts expected to occur as a result of the proposed project. No significant impacts to manmade resources as a result of the proposed project have been identified. The No Project Alternative will result in no impacts to the existing setting. The Reduced Project Alternative would result in fewer impacts to manmade resources, and the Underground Mining Alternative impacts would be similar to those of the proposed project.

6.0 CUMULATIVE IMPACTS

6.1 Introduction

This assessment of cumulative impacts in the Mountain Pass Mine area includes a discussion of the potential cumulative effects of past, present, and reasonably anticipated future projects in the project area that may potentially produce related impacts. The cumulative impact analyses in this section address the following:

- Do the impacts of individual projects, when considered together, compound or increase other environmental impacts?

- Will cumulative impacts result from individually minor but collectively significant projects taking place over a period of time?

The environmental disciplines evaluated in this EIR are included in this section along with proposed appropriate mitigation measures for potential cumulative impacts.

6.2 Proposed Projects In Project Vicinity

Based upon information received from the agencies and individuals contacted to compile data for this section, projects with the potential to have cumulative impacts with the Mountain Pass Mine expansion project are discussed in this section and shown on Figure 6.2-1.

A developer has received a Conditional Use Permit from the San Bernardino County Planning Department for two 18-hole golf courses, a 9-hole mini-course, and associated facilities to be located 5 miles west of the California-Nevada border and 1 mile north of Interstate 15. One of the two golf courses will open at the end of 1996, and the second will be developed after the first is opened. Aside from a caretaker's residence, no residential or commercial development will be included. San Bernardino County issued a Negative Declaration for the project (Williams 1996).

The Viceroy Castle Mountain Mine is currently in the fifth year of a 20-year permit to mine gold, and has applied to the BLM and San Bernardino County for permits to extend the project an additional 10 years. The mine is approximately 25 miles south-southeast of the Mountain Pass Mine. It is not located in the same groundwater basin as Molycorp and is located far enough away from the proposed project that it is unlikely that cumulative impacts from both projects will occur. The Colosseum Mine, which is located approximately 12 miles

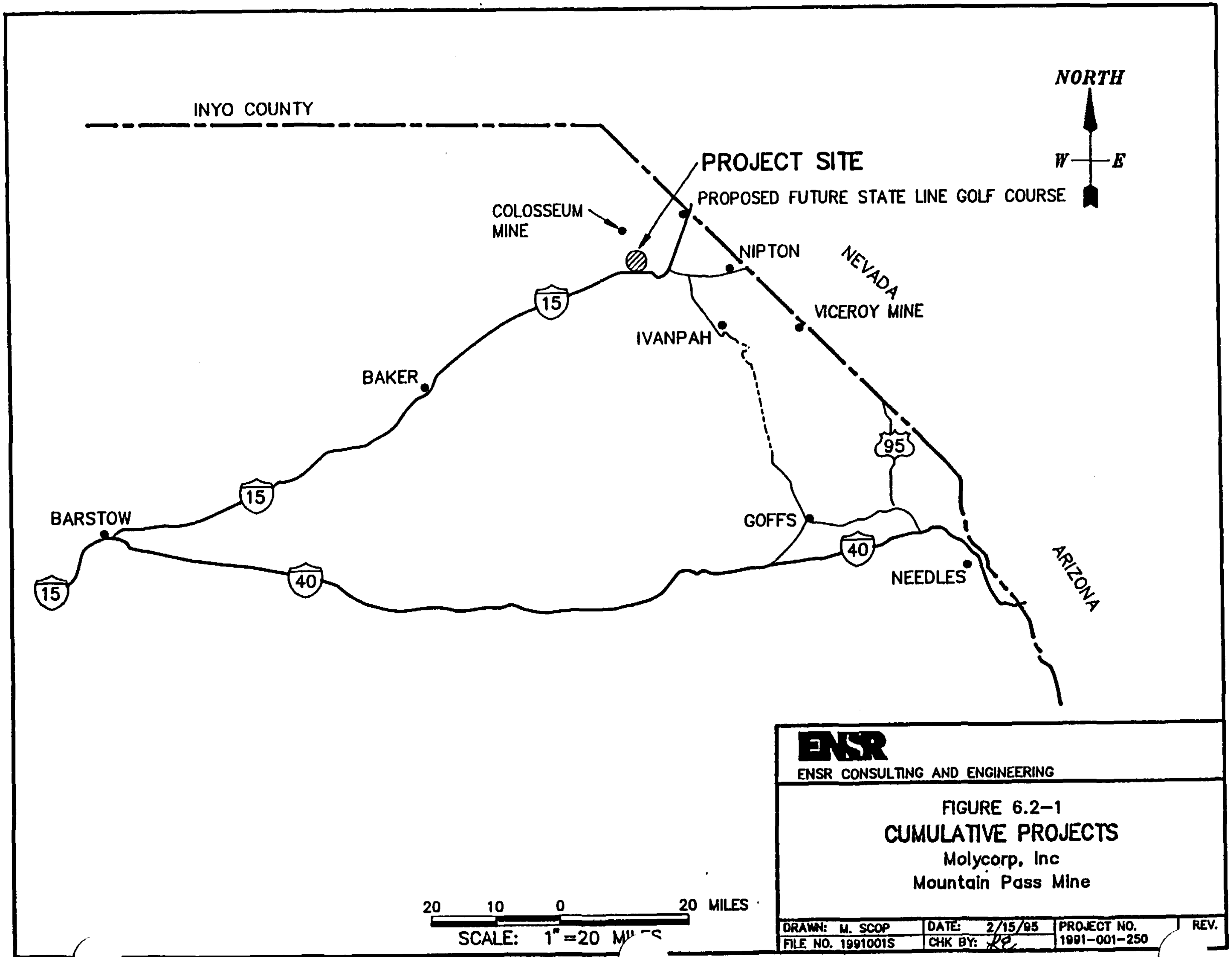


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FIGURE 6.2–1
CUMULATIVE PROJECTS
Molycorp, Inc
Mountain Pass Mine

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FILE NO. 1991001S	CHK BY:		

1991-001-850

north of the proposed project, has completed the final stage of reclamation at the present time and is in the monitoring phase.

6.3 Cumulative Effects

6.3.1 Natural Hazards

Concurrent development of the golf course in the State Line area and continued operation of the Viceroy Castle Mountain Mine during the time frame of the proposed expansion of the Mountain Pass Mine would not have cumulative effects relative to the alteration, change, or disturbance of the natural hazards of the area environment. Potential impacts to the geologic environment of each project would be site-specific and would not overlap or interact. Activities at each of the projects would not create additional geologic hazards at the other projects.

Because of the physical distance between the proposed Mountain Pass Mine expansion project, the Viceroy Castle Mountain Mine project, and the proposed golf course at State Line, activities at each would not have the potential to affect flood waters at the others. No cumulative impacts to flood hazards would occur.

Similarly, wildfire hazards and water erosion hazards from one project to another are not expected to occur due to the physical distance between the projects. Therefore, no cumulative impacts or alteration of natural hazards from the three projects will occur.

6.3.2 Natural Resources

6.3.2.1 Biological Resources

<u>Vegetation</u>

Due to the reclamation plan for the proposed project, which is designed to minimize impacts for this project and the distance between the project area and the proposed recreational golf course and the Viceroy Castle Mountain Mine, cumulative impacts to vegetation are not anticipated to occur.

Estimated habitat disturbances from the cumulative effects of mining expansion, use of the Nipton Road Borrow Site, and proposed area projects (e.g., recreational golf course) were analyzed, focusing on the issues and species discussed for general and sensitive wildlife resources. No reasonably foreseeable actions were identified in the immediate vicinity of the project area. The location of the proposed project expansion restricts additional habitat loss and fragmentation to an area already heavily disturbed by past mining activities and does not affect critical riparian habitat.

Wildlife

The primary impacts to wildlife resources from regional development would be in incremental habitat loss and fragmentation, displacement, and impacts to associated carrying capacities of native habitats. Cumulative impacts are likely to be significant in the region, but these impacts can be reduced to less than significant by implementation of mitigation as discussed in Section 4.3.1.2.

Wildlife species that would most likely be affected by cumulative development within the region would include the desert tortoise, passerine species (e.g., Bendire's thrasher), and small and medium-sized mammals (e.g., American badger), predominantly limited to resident nongame species.

Cumulative impacts on wildlife resources are related to both water use within the cumulative effects area and the effects to the desert tortoise. Water availability is a critical issue in Southern California, and further reduction in water sources for wildlife use would be considered significant to the majority of species dependent on these resources. Potential cumulative loss is not quantifiable for any foreseeable projects, with effects being related to the levels of water reduction and vegetation removal.

Cumulative effects on the desert tortoise are also critical throughout both the eastern and western Mojave Desert. However, current mitigation compensation required for these projects aids in protecting important tortoise habitat, particularly designated Class I habitat. Quantification of these potential cumulative losses is difficult, and would depend on the project locations, the extent of proposed developments, and the level of ancillary facilities planned for each project.

The implementation of the No Project Alternative would result in an overall lower amount of cumulative habitat loss and fragmentation, displacement, and effects to wetland/riparian habitats within the project region. The anticipated cumulative impacts to wildlife resources under the Reduced Project Alternative and the Underground Mining Alternative would essentially be the same as those described for the proposed project.

6.3.2.2 Cultural/Paleontological Resources

No cumulative impacts to cultural or paleontological resources are expected to occur as a result of the development of the proposed project and the projects discussed in Section 6.2. Cultural and paleontological resources are generally site-specific and are not spread over a large geographic area. The projects discussed in Section 6.2 and the proposed project are not within close geographic proximity.

6.3.2.3 Air Quality

Cumulative impacts to air quality may occur if the proposed golf course in the State Line area and the proposed project are each producing PM_{10} impacts within the same time period. PM_{10} is generally a result of earth-moving, hauling, blasting, and soils disruption, all of which would be expected to occur with a golf course project as well as with the proposed mine expansion project. Impacts from the proposed project would be significant and would require mitigation. It is likely that additional mitigation would be required if both projects were exceeding MDAQMD PM_{10} thresholds simultaneously. Continued expansion at the Viceroy Castle Mountain Mine may also have the potential to have cumulative PM_{10} impacts with the proposed project, although the Viceroy mine is located at some distance downwind from the Mountain Pass Mine. Cumulative impacts will occur, and although the mitigation measures proposed in Section 4.3.3.4 would minimize project impacts, they would not reduce impacts below a level of significance when considered together with other ongoing projects in the region.

6.3.2.4 Water Supply/Quality

Development of a golf course in the State Line area together with the proposed expansion of the Mountain Pass Mine would likely have a significant cumulative impact on the water supply available in the Ivanpah Valley. As stated in Section 4.3.4.2, groundwater elevations in the vicinity of the Molycorp Ivanpah Valley well field have declined an average of 2 feet per year since the early 1950s (Leroy Crandall 1979), which suggests that water is currently being extracted at a rate greater than the natural recharge to the aquifer. Molycorp does not plan to use additional water in its processing of rare-earth ore, but it does plan to use water at the current rate for a longer period of time. Golf courses are traditionally heavy water users, which would create an additional demand on the Ivanpah Valley aquifer. The Viceroy Castle Mountain Mine would not be included in cumulative effects to water supply because the Castle Mountain Mine uses water from its own separate aquifer.

The cumulative impact on water supply would be minimized by development of a water conservation program at Molycorp, continued use of reclaimed tailings water in manufacturing processes and the development of new uses for the reclaimed water, and the use of reclaimed water for irrigation during the mine's reclamation phase.

Water quality in the Ivanpah Valley aquifer may not be cumulatively affected by continued seepage from the New Ivanpah Evaporation Pond (which is permitted under Waste Discharge Order 6-90-41) combined with potential seepage from the golf course, because presently all groundwater flows toward the playa, which is the lowest point in the basin. At this time, however, the TDS constituents of the wastewater discharged to the New Ivanpah Evaporation Pond from the Mountain Pass Mine are similar to or less than the background TDS levels in the first (non-potable) aquifer.

Molycorp has been beneficially utilizing water pumped from the Ivanpah Basin since the early 1950s. Senior water rights are protected by state law. If the golf course wells are located near the Ivanpah Playa, a change in groundwater gradient away from the playa could result, causing groundwater under the New Ivanpah Evaporation Pond to migrate toward the golf course wells. It is assumed that percolation from a golf course would include fertilizer and pesticides, contaminants which are not generated at the Mountain Pass Mine.

6.3.2.5 Open Space/Recreation/Scenic

Currently a golf course complex is being developed at State Line. State Line presently has two themed casino-resort complexes, including gas stations and a convenience grocery. One of the casino-resorts, the Prima Donna, features an amusement park-like development on the grounds in front of the casino, facing the highway. The development at State Line is approximately 17 highway miles northeast of the Mountain Pass Mine site. Between State Line and Mountain Pass, the landscape is relatively undeveloped and appears undisturbed, except for some transmission lines and the Biogen Power 1 facility and the imported trees and vegetation associated with the first phase of the golf course development seen west of Interstate 15 about 5 miles south of State Line. Therefore, motorists travel south then west from State Line for approximately 15 minutes at maximum highway speeds and climb a long mountain grade before reaching Mountain Pass, creating a distinct separation between the two areas. While the development of a golf course raises the issue of cumulative impacts to visual resources with respect to the existing development at State Line, no cumulative visual impacts with those identified for the Mountain Pass Mine expansion project are expected to occur due to the distance between the sites.

Significant cumulative impacts to open space/recreation resources will occur with the expansion of the mine due to the combination with existing and planned projects in the east Mojave Desert region with projects in the west Mojave Desert region. Continued development of mines and waste disposal projects adds to regionally significant impacts to open space resources.

6.3.2.6 Soils/Agriculture

Cumulative impacts to soils in the region would include the impacts to be expected from the proposed golf course. However, the golf course is nearly completed and adds an additional 456 acres of soil disturbance in the region (Williams 1996). Due to the reclamation activities to be conducted as part of the proposed project, the distance between projects, and the differing soil types, it is unlikely that the proposed project would contribute significantly to cumulative adverse impacts to soils in the region.

6.3.3 Manmade Hazards

The proposed project is a continuation of existing mining operations at the Mountain Pass Mine. Noise that will be generated will be similar to what is currently generated at the facility and will occur within the boundaries of the mine. Noise from Mountain Pass will not be discernible at other projects in the area and will not cause a cumulative impact to receptors when considered with noise generated from other projects in the area. Similarly, no cumulative contributions to aviation hazards will occur.

Hazardous wastes generated at the Mountain Pass Mine will continue to be generated in roughly the same volumes as are presently generated (see Table 2.3-4). Generation of this volume of hazardous waste over an additional 30 years, particularly when combined with hazardous wastes that may be generated by the projects discussed in Section 6.2, may have an impact on the capacity of the approved disposal facility that receives the wastes. Future new landfill development is uncertain. Mitigation measures, such as waste minimization and source reduction, will be required of all projects.

6.3.4 Manmade Resources

The proposed project is not expected to create significant impacts to manmade resources because it is a continuation of an existing mining operation. Although additional land will be utilized, it will be located within the immediate project vicinity and would therefore not impact potential other land uses in the region. No significant additional use of utilities, transportation systems, energy resources, public services, or housing and employment will occur as the result of the proposed project; thus, the project will not contribute to cumulative impacts in the area.

6.4 Mitigation Measures

Cumulative impacts from individual projects considered together may affect geological resources, wildlife resources, water supply and water quality, air quality, open space, and hazardous waste disposal. Mitigation measures for these disciplines are provided in their respective sections of Section 4. Cumulative impacts from individual projects considered together will have significant impacts on geological resources, water supply, open space, and air quality in the East Mojave Desert region that cannot be mitigated to less than significant.

Implementation of the mitigation measures listed in Section 4.2.1.3 will reduce impacts to geological resources. However, permanent, irreversible changes to topography in the region will occur from the proposed project together with other projects in the region.

Implementation of the mitigation measures proposed for potential impacts to wildlife resources in Section 4.3.1.2 will assist in mitigation of potential cumulative wildlife impacts.

Mitigation measures discussed in Section 4.3.3.4 for reducing or eliminating PM_{10} increased emissions will assist in mitigating cumulative air quality impacts, although they would not reduce impacts below a level of significance when considered with other projects in the area.

Implementation of mitigation measures for water supply and water quality impacts as discussed in Section 4.3.4.3 will assist in the mitigation of cumulative impacts to this discipline. Emphasis on the use of reclaimed or recycled water for irrigation and manufacturing operations will reduce impacts to the aquifer. However, impacts to water supply will continue to be significant after application of mitigation measures.

Mitigation that may reduce Molycorp's contribution to the irreversible impacts on open space in the East Mojave Desert area includes implementing the mitigation discussed in Section 4.3.5.3 for visual resources and Section 4.2.1.3 for geologic resources.

The volumes of hazardous waste to be disposed over the life of the project can be minimized by source reduction and waste minimization projects, as discussed in Section 4.4.3.3.

7.0 OTHER CEQA TOPICS

7.1 Significant Irreversible Environmental Changes

An EIR must also consider the potential for significant irreversible environmental changes and irretrievable commitments of resources [CEQA Statutes and Guidelines, Article 9, Section 15126 (f)]. Irreversible alterations to topography at the Mountain Pass Mine will occur with the proposed project or either project alternative. The reclamation proposed throughout the project and in Phase 4 is designed to reduce these permanent effects.

The proposed project and each alternative will continue to utilize significant amounts of water which can be considered an irretrievable commitment of a resource. Water to be used will be treated and recycled and will eventually reenter the water cycle. Groundwater quality in the area will continue to be impacted until seepage controls are in place and functional. However, this impact is not expected to be irreversible when mitigation and controls are applied.

An increase in PM_{10} emissions will occur as a result of the proposed project or either alternative. This increase is not expected to be an irreversible environmental change because it will end when mining at Mountain Pass ends.

Impacts to the existing visual environment will be irreversible in that the visual environment will be permanently changed in the area of the Overburden Stockpile and the East Tailings Pond Dam. Mitigation measures will reduce the significance of this impact. Cumulative impacts to open space resources will be irreversible from the proposed project and other projects proposed for the East Mojave Desert region. Implementation of mitigation measures for visual resources may lessen the impacts of Molycorp's contribution.

7.2 Growth-Inducing Impacts of the Proposed Project

CEQA defines growth-inducing impacts as those impacts of a proposed project that "could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth ... discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively" [CEQA Statutes and Guidelines, Article 9, Section 15126 (g)].

The Molycorp Mountain Pass Mine expansion project is not expected to foster population growth in the area, nor will additional housing or infrastructure be required. The project involves the physical expansion of an existing mining operation without the addition of a significant number of new workers or requirement for new services; therefore, no infrastructure development or improvement will be required, and no population growth will be encouraged as a result of the project.

8.0 ORGANIZATIONS AND PERSONS CONSULTED

CEQA Statutes and Guidelines Article 9 Section 15129 requires that identification of organizations and persons consulted be provided in the EIR document.

In the course of preparation of the Draft EIR for the Molycorp Mountain Pass mine expansion project, various federal, state, and local agencies; industries; special interest organizations; and individuals have been consulted. The following organizations and individuals have provided input to the document. A list of persons and organizations responsible for the preparation of this document is also provided in this section.

8.1 Organizations Consulted

- Baker Unified School District
- Bureau of Land Management
- California Environmental Protection Agency, Department of Toxic Substances Control
- California Department of Conservation; Division of Mines and Geology
- California Department of Fish and Game
- California Department of Transportation
- California Highway Patrol
- California Office of Historic Preservation
- California Regional Water Quality Control Board - Lahontan Region
- San Bernardino County Environmental Health Department
- San Bernardino County Public Works Department
- U.S. Army Engineer District
- U.S. Environmental Protection Agency

8.2 Individuals Consulted

Edgar Bailey. Chief, Department of Health Services Radiologic Health Branch, Sacramento, California.

R. Bittman. 1994. Data Manager-California Natural Diversity Data Base.

Irene Coyazo. State of California Department of Transportation District 8 Public Affairs Office.

Christian Ihenacho. Mojave Desert Air Quality Management District.

Marvin Jensen. Superintendent, Mojave National Preserve. U.S. Department of the Interior National Park Service.

A. Lapp. California Department of Fish and Game.

K. Madsen. U.S. Department of the Interior Bureau of Land Management.

M. McGill. Wildlife Biologist, Bureau of Land Management.

Russ Miller. California Department of Conservation Division of Mines and Geology.

Dominick Nigro. San Bernardino County Environmental Health Services Department.

Andy Pauli. Wildlife Biologist, California Department of Fish and Game.

George Rogers. Silver State Disposal, Inc. (Apex Landfill).

B. Stinnett. State of California Department of Transportation District 8 Superintendent.

Antoine Szijj. Regulatory Officer with U.S. Army Corps of Engineers-Redlands Field Office.

Linda Taylor. Baker Valley Unified School District.

Rich Touslee. County of San Bernardino Planning Department, North Desert Region.

Mike Williams. County of San Bernardino Planning Department, North Desert Region.

Willow Yumiko. Wildlife Biologist, Bureau of Land Management, Needles, CA.

8.3 List of Preparers

- San Bernardino County Planning Department
  San Bernardino, California

- ENSR Consulting and Engineering
  Camarillo, California

- Greenwood and Associates
  Pacific Palisades, California

- EDAW, Inc.
  San Francisco, California

- Paleo Environmental Associates, Inc.
  Altadena, California

9.0 REFERENCES

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APPENDIX A

NOTICE OF PREPARATION
AND
WRITTEN COMMENTS

PLANNING DEPARTMENT
th Arrowhead Avenue • San Bernardino, CA 92415-0180 • (714) 387-4091
Fax No. • (714) 387-3223

COUNTY OF SAN BERNARDINO
ENVIRONMENTAL MANAGEMENT GROUP
SHARON W. HIGHTOWER
Director of Planning

Date: September 3, 1992

To: Responsible and Trustee Agencies
Interested Citizens and Groups

Subject: **NOTICE OF PREPARATION OF A JOINT ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL IMPACT STUDY FOR THE EXPANSION OF MOLYCORP INC.'S MOUNTAIN PASS MINE IN THE COMMUNITY OF MOUNTAIN PASS.**

The San Bernardino County Planning Department will be coordinating the preparation of a joint Environmental Impact Report (EIR) and Environmental Impact Statement (EIS) for the expansion of Molycorp Inc.'s Mountain Pass mine in the Community of Mountain Pass.

The Environmental Initial Study, completed July 1, 1991 identified the following areas of potentially significant impact: 1) Geologic Hazards, 2) Flood Hazards, 3) Erosion, 4) Hazardous Materials, 5) Biological Resources, 6) Cultural and Paleontologic Resources, 7) Air Quality, 8) Water Supply/Quality, 9) Open Space, Recreation, Scenic Resources. Copies of the initial Study are available at the following location:

Planning Department
385 N. Arrowhead Ave.
San Bernardino CA 92415-0182
Attn: Ray Johnson
(714) 387-4099

This letter is a request for environmental information that you or your organization feels should be addressed in the Environmental Impact Report / Environmental Impact Study. Due to time limits, as defined by the California Environmental Quality Act, your response should be sent at the earliest possible date, but no later than 30 days after receipt of this notice. Comments and questions can be directed to Ray Johnson at the address above.

Sincerely,
PLANNING DEPARTMENT

RAYMOND W. JOHNSON, AICP
ENVIRONMENTAL TEAM

Attachment: Initial Study and Location Map

Notice of Completion

Appendix F

See NOTE below

SCH #

Mail to: State Clearinghouse, 1400 Tenth Street, Sacramento, CA 95814 916/445-0613

Project Title: Molycorp Mine Expansion

Lead Agency: San Bernardino County

Contact Person: Ray Johnson

Street Address: 385 N. Arrowhead Ave.

Phone: 387-4099

City: San Bernardino CA

Zip: 92415-0182

County: San Bernardino

Project Location

County: San Bernardino

City/Nearest Community: Lucerne Valley

Cross Streets: I-15 & Bailey Rd.

Total Acres:

Assessor's Parcel No. Various

Section: Various

Twp. Various

Range: Various

Base:

Within 2 Miles: State Hwy #: I-15

Waterways:

Airports:

Railways:

Schools: Baker

Document Type

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent ☐ EIR (Prior SCH No.) ☐ Other

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☒ Joint Document ☐ Final Document ☐ Other

Local Action Type

☐ General Plan Update
☐ General Plan Amendment
☐ General Plan Element
☐ Community Plan
☐ Specific Plan
☐ Master Plan
☐ Planned Unit Development
☐ Site Plan
☐ Rezone
☐ Prezone
☒ Use Permit
☐ Land Division (Subdivision, Parcel Map, Tract Map, etc.)
☐ Annexation
☐ Redevelopment
☐ Coastal Permit
☒ Other Rec. Plan

Development Type

☐ Residential: Units ___ Acres ___
☐ Office: Sq.ft. ___ Acres ___ Employees ___
☐ Commercial: Sq.ft. ___ Acres ___ Employees ___
☐ Industrial: Sq.ft. ___ Acres ___ Employees ___
☐ Educational
☐ Recreational
☐ Water Facilities: Type ___ MGD ___
☐ Transportation: Type
☒ Mining: Mineral Lanthanides
☐ Power: Type ___ Watts ___
☐ Waste Treatment: Type
☐ Hazardous Waste: Type
☐ Other:

Project Issues Discussed in Document

☒ Aesthetic/Visual
☐ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☐ Coastal Zone
☒ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☐ Flood Plain/Flooding
☐ Forest Land/Fire Hazard
☒ Geologic/Seismic
☐ Minerals
☐ Noise
☐ Population/Housing Balance
☐ Public Services/Facilities
☐ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☐ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☐ Solid Waste
☐ Toxic/Hazardous
☐ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☐ Wetland/Riparian
☒ Wildlife
☐ Growth Inducing
☐ Landuse
☒ Cumulative Effects
☐ Other

Present Land Use/Zoning/General Plan Use

Planned Development & Resource Conservation

Project Description

Expansion of Molycorp Inc. Mountain Pass Mine in the Community of Mountain Pass.

NOTE: Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. from a Notice of Prepa... or previous draft document) please fill it in.

Revised October

SAN BERNARDINO COUNTY
INITIAL STUDY ENVIRONMENTAL CHECKLIST FORM

This form and the descriptive information in the application package constitute the contents of Initial Study pursuant to County Guidelines under Ordinance 3040 and Section 15063 of the State CEQA Guidelines.

I.

DATES ID :745DSN91007533SAMR01/07533SM1
COMMUNITY :MOUNTAIN PASS
FILE/INDX :SAMR/90-0328/DN953-681N

APPLICANT :MOLYCORP INC
PROPOSAL :MINING/RECLAMATION PLAN FOR EXISTING LANTHANIDES OPERATION ON 2058 AC

LOCATION :I-15 BOTH SIDES; BAILEY RD BOTH SIDES

REP('S) :LILBURN CORP

USGS Quad: Mescal Range

T,R,Section: T16N, R13E, Sec 11-14; T16N, R14E, Sec 30-31; T15 1/2N, R15E, Sec 20; and T16N, R15E, Sec 5 and 8

Thomas Bros: Pg 703 / C - 6

Planning Area: Baker Region (BK)

OLUD: Resource Conservation (RC) Planned Development (PD 2.5), and General Commercial (CG)

Improvement Level: 5

PROJECT CHARACTERISTICS: Molycorp, Incorporated has submitted this Mining Conditional Use Permit and Reclamation Plan requesting the expansion of their existing mining operation at the Mountain Pass Mine and to extend the expiration date of their Reclamation Plan 77M-0027. The mine is located approximately 35 miles northeast of Baker, California, north of and adjacent to Interstate 15 (I-15) at Mountain Pass. Molycorp has continuously mined this site for the last 40 years. Molycorp's extent of holdings total 12,516 acres (10,544 acres of mining and millsite claims administered by the Bureau of Land Management (BLM) and 1,972 acres of patented land). The entire operational mine area occupies some 2,058 acres (829 acres of millsite claims and 1,229 acres of patented land) of which approximately 373 acres are currently disturbed. Outside of the mine area, Molycorp has several wells and booster stations, a borrow pit (Nipton Road Borrow Pit) and wastewater evaporation ponds all of which cover approximately 1,178 acres. The majority of Molycorp's remaining land holdings are held in reserve for further exploration and future development.

Expansion of the mine site will consist of enlarging the surface area and depth of the main pit, expanding existing overburden stockpiles, expanding an existing tailings storage area through the year 2000 before constructing a new tailings storage impoundment, and constructing a new borrow pit for material for the new tailings storage impoundment dam. The additional area to be disturbed by these activities is 523 acres so that at mine buildout a total of 896 acres will have been disturbed and reclaimed. The mine expansion will occur over 35 years in three phases of ten years each with a final monitoring phase of five years. Molycorp will also be expanding the Nipton Road Borrow Pit from 3.2 acres to approximately 50 acres during its efforts to close and reclaim its abandoned evaporation ponds. No major changes in the processing facilities, water usage, and the wastewater stream are proposed.

ENVIRONMENTAL/EXISTING SITE CONDITIONS: As the project site has been mined for almost 40 years significant disturbance has occurred over large areas of the site. Existing facilities consist of an open pit, several overburden stockpiles, a tailings storage area, a landfill, miscellaneous water storage ponds, numerous access and haul roads, and several processing and support buildings. The Mountain Pass Mine is surrounded by the Clark Mountain Range to the north and northwest, the Mineral Hills to the southeast, the Mescal Range to the southwest, and the Mohawk Hills to the northwest. The project site ranges in elevation from 4,500 to 6,000 feet above sea level (ASL), with most of the site in the 4,600 to 4,900 foot range. Annual temperatures range from well below freezing to 110°F with average yearly precipitation equalling 6.8 inches. Undisturbed areas of the site are covered by Joshua Tree Woodland with an understory of Blackbrush Scrub in the upper elevations and Mojave Mixed Woody Scrub in the lower portions. Surrounding land uses consist of BLM open space to the north and east, Interstate 15 (I-15) and Mountain Pass Elementary School to the south, and a Caltrans maintenance station, a California Highway Patrol office and BLM open space to the west.

	EXISTING LAND USE	OFFICIAL LAND USE DISTRICT	IL
North	BLM Open Space	Resource Conservation	5
South	Elementary School & I-15	Resource Conservation	5
East	BLM Open Space	Resource Conservation	5
West	Caltrans Station, CHP Office & BLM Open Space	Resource Conservation	5

II. Identification of maximum potential environmental effects of the proposed project. The purpose is to identify any potentially significant impacts and discuss mitigation measures for identified impacts. Please substantiate your responses by summarizing your assessment of significant impacts and referencing documents used as research (e.g., Norton Air Force Base AICUZ study re: Noise). Include quantification of changes caused by the project's development at maximum potential buildout from existing status.

Circle or underline specific item of concern for "yes" or "maybe" answers if one item applies and others do not. If an impact that would be significant can be mitigated below a level of significance, indicate by checking "yes" or "maybe" with an "—>" to "no" and discuss mitigative measure(s) under substantiation. Substantiation is also necessary for "no" answers.

NATURAL HAZARDS

	Yes	Maybe	No
1. Geologic Hazards. Will the proposal result in significant impacts related to:			
a. Unstable earth conditions or changes in geologic substructures?		X	
b. Change in topography or ground surface relief features?	X		
c. The destruction, covering or modification of any unique geologic or physical features?			X
d. Exposure of people or property to geologic hazards, such as earthquakes, landslides, mudslides, ground failure, or similar hazards?		X —>	X
e. Exposure of people or property to water-related seismic hazards such as seiche?			X

SUBSTANTIATION (check ____ if project is located in the Geologic Hazards Overlay District): While the project site is not within an identified Alquist-Priolo Special Study Zone, several complex faults are known to pass through or nearby the mining area. The applicant proposes to mine the pit to an ultimate depth of approximately 760 feet and stockpile overburden up to 200 feet which will change the site's ground surface relief features. Earthquakes could pose hazards to people and property which will be mitigated by the applicant complying with the Uniform Building Code. An Environmental Impact Report (EIR) is necessary to analyze the project's geologic impacts, including the stability of overburden stockpile slopes and open pit highwalls and benches, and develop appropriate mitigation measures as necessary.

	Yes	Maybe	No
2. Flood Hazards. Will the proposed project result in significant impacts related to:			
a. Changes in currents, or the course of direction of water movements?			X
b. Changes in deposition, erosion, or siltation that may modify the channel of a river, stream, bay, inlet, or lake?			X
c. Alterations to the course or flow of flood waters?		X —>	X
d. Change in the amount of surface water in any water body?			X

e. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff? ___ _X_—>_X_

f. Exposure of people or property to water-related hazards such as flooding or dam inundation? ___ _X_—>_X_

SUBSTANTIATION (check if project is located in the Flood Plain Safety Overlay District ____ or Dam Inundation Overlay ____): Several natural drainage courses indicated as blue line streams on the USGS Mescal Range Quadrangle 7.5 Minute Series Topographic map pass around or through the mine operations area. Molycorp has established a system of drainage channels that direct sheet flows on-site into the drainage courses. In instances of heavy precipitation, stormwaters are channeled into the Jack Meyers Pond for retention and desedimentation. Molycorp has also constructed a small dam for its liquid tailings pond and is proposing to construct an additional tailings dam and pond when the existing one has reached its capacity. Molycorp will be required to comply with the requirements of the State Division of Dams at the time it constructs the new tailings dam. Reclamation of the site will include insuring that the natural drainage courses are not blocked or diverted, all ponds have been backfilled and regraded, and that appropriate erosion control measures are in place. No significant impacts are expected.

	Yes	Maybe	No
3. Fire Hazards. Will the proposed project result in significant impacts related to:			
a. Exposure of people or property to wildland fires?	___	___	_X_

SUBSTANTIATION (check ____ if project is located in the Fire Safety Overlay District): The project site is not within a Fire Safety Overlay District. Molycorp maintains a fire protection system as required by the County Fire Warden who inspects the operation at regular intervals. No significant impacts are expected.

	Yes	Maybe	No
4. Wind/Erosion. Will the proposed project result in significant impacts related to:			
a. Any increase in wind or water erosion of soils, either on or off the site?	___	_X_—>	_X_

SUBSTANTIATION: The proposed project may cause minor increases in the amount of wind and water erosion during mining and reclamation activities. To mitigate these potential impacts, Molycorp will be required to wet sweep areas being mined or reclaimed. Molycorp will also use dust suppressants such as magnesium chloride ($MgCl^2$) on unsurfaced haul and access roads. Additional erosion control measures will include covering temporary topsoil stockpiles with gravel and/or vegetating them with local plant species, grading the site to ensure proper drainage, and revegetating the mine site at the end of operations. No significant impacts are expected.

MANMADE HAZARDS

5. Noise. Will the proposed project result in significant impacts related to:

	Yes	Maybe	No
a. Increases in existing noise levels?	___	___	X
b. Exposure of people to severe noise levels?	___	___	X

SUBSTANTIATION (check if the project is located in the Noise Hazard Overlay District ___ or is subject to severe noise levels according to the General Plan Noise Element ____): The proposed project will not increase noise levels beyond existing levels and poses no significant threat to people. Blasting does occur during operations however all occupational safety standards protecting employees from noise hazards will continue to be implemented. No significant impacts are expected.

6. Aviation Safety. Will the proposed project result in significant impacts related to:

	Yes	Maybe	No
a. Exposure of people to risk from aircraft operations?	___	___	X

SUBSTANTIATION (check _____ if project is located in the Airport Safety Overlay District): The project is not within an Airport Safety Overlay District and does not pose any risk of exposing people to aircraft operations. No significant impacts are expected.

7. Hazardous/Radioactive Materials. Will the proposed project result in significant impacts related to:

	Yes	Maybe	No
a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals, or radiation) in the event of an accident or upset conditions?	___	X -->	X
b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	X
c. Creation of any health hazard or potential health hazard?	___	X -->	X
d. Exposure of people to potential health hazards?	___	X -->	X

SUBSTANTIATION: The proposed project will require the use of explosives as well as fuel, lubricants, and solvents. Ongoing ore processing also produces both solid and liquid waste materials. Molycorp will be required to keep its Business Plan and Hazardous Materials Handlers/Generators Permits valid with the Department of Environmental Health Services (DEHS). Molycorp will also continue to be subject to California RWQCB Order No. 6-90-41 in treating and disposing of its liquid wastes into the Ivanpah Dry Lake Pond. Additional on-going review and monitoring by other federal and state agencies will continue as well.

NATURAL RESOURCES

	Yes	Maybe	No
8. Biological Resources. Will the proposed project result in significant impacts related to:			
a. Loss, reduction, or deterioration of habitat and/or change in diversity of species of plants or animals?	___	X	___
b. Reduction of the numbers of any unique, rare, threatened, or endangered species of plants or animals?	___	___	X
c. Introduction of exotic species of plants or animals into an area, or in a barrier to the normal replenishment or migration of existing species?	___	X	___

SUBSTANTIATION (check if project is located in the Biological Resources Overlay ____ or contains habitat for any species listed in the California Natural Diversity Database ____): Biological surveys of the operational mine area were conducted by John Wear of Lilburn Corporation in July 1990, and April and May of 1991. A desert tortoise survey was also completed for the Nipton Road Borrow Pit by Shirl R. Naegle in November 1990. Surveys of the mine area found one rare plant species, the Clark Mountain buckwheat (Eriogonum heermannii var. floccosum), and one vertebrate species, the State and Federally listed threatened desert tortoise (Gopherus agassizii), within the mine expansion area. No other sensitive wildlife species were detected. The Clark Mountain buckwheat is on the California Native Plant Society (CNPS) list and is considered rare but not endangered. It is Federally rated (C3c) too widespread and not endangered. No additional rare or sensitive plant species as determined by the CNPS were observed, however 31 other sensitive plant species are known to occur in similar habitats or have been recorded near the project site and continuing drought conditions may be affecting their normal growth patterns. In addition, the proposed expansion will result in the removal of most if not all the existing Joshua Tree Woodland occurring in the areas of the overburden stockpiles, the pond site, and pit expansion.

The survey completed for the Nipton Road Borrow Pit did not observe any sign of tortoise on site, however two tortoise burrows were found in the zone of influence adjacent to the borrow pit. According to Ms Naegle, it is possible that tortoise could migrate onto the borrow site because it is within suitable habitat. Molycorp will be required to complete a Section 7 consultation, pursuant to the Endangered Species Act, with the U.S. Fish and

Wildlife Service and the California Department of Fish and Game. An EIR is necessary to determine the project's full impacts on biological resources of the site and to develop appropriate mitigation measures as necessary. The EIR should include the development of a detailed revegetation/habitat conservation program, including the development of appropriate revegetation performance and success criteria, and a site-specific monitoring plan.

	Yes	Maybe	No
9. Cultural/Paleontological Resources. Will the proposed project result in significant impacts related to:			
a. The alteration or destruction of a prehistoric/historic archaeological site?	___	X	___
b. Physical or aesthetic effects to a prehistoric or historic building, structure, or object?	___	X	___
c. A physical change that would affect unique ethnic cultural values?	___	X	___
d. Restricting existing religious or sacred uses within the potential impact area?	___	X	___
e. Any alteration or destruction of fossil remains?	___	X	___

SUBSTANTIATION (check if the project is located in the Cultural ___ or Paleontologic ___ Resources overlays or cite results of cultural resource review): According to comments received from the Archaeological Information Center, cultural resources have been found on the site in the past (Agave Roasting Pit) and there is a moderate potential that additional resources occur within the project area. Additionally, Dr. Allan D. Griesemer, Director of San Bernardino County Museum, has indicated that the project may impact paleontologic resources known to occur within the open pit and in the surrounding area. An EIR is required to determine the project's full impacts to both cultural and paleontological resources and to develop appropriate mitigation measures if needed.

	Yes	Maybe	No
10. Air Quality. Will the proposal result in:			
a. Substantial air emissions or deterioration of ambient air quality?	___	X	___
b. The creation of objectionable odors?	___	___	X
c. Alteration of air movement, moisture or temperature, or any change in climate, either locally or regionally?	___	___	X

SUBSTANTIATION (discuss conformity with the South Coast Air Quality Management Plan, if applicable): The San Bernardino County Air Pollution Control District (APCD) is responsible for enforcing air quality regulations in the San Bernardino County portion of the Southeast Desert Air Basin (District). The District has been designated nonattainment for the State Ozone and PM10 standards and any new and/or increased emissions of ozone precursors and particulates in the District can affect APCD attainment demonstration as outlined the 1991 Air Quality Attainment Plan (AQAP). The proposed project includes the use of blasting areas, stockpiles, unpaved roads and parking areas which have the potential to create PM10 emissions from wind erosion. Additionally, the blasting operation could create criteria and toxic emissions from the plume. An EIR is required to determine the project's impacts to air quality and to develop appropriate mitigation measures if needed. At a minimum, this analysis should include an air quality assessment and emissions inventory.

	Yes	Maybe	No
11. Water Supply/Water Quality. Will the proposed project result in significant impacts related to:			
a. Changes in the quantity of groundwaters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations (onsite)?	___	X	___
b. Substantial reduction in the amount of water otherwise available for public water supplies?	___	___	X
c. Alteration of the direction or rate of flow of groundwaters?	___	X -->	X
d. Pollution, contamination, or any change in the quality of groundwater (toxics, nitrates, fluorides, salts, etc.)?	___	X	___
e. Discharge into surface waters, or any alteration of surface water quality, including but not limited to, temperature, dissolved oxygen or turbidity?	___	___	X

SUBSTANTIATION: The proposed expansion would excavate the open pit to a depth of approximately 760 feet which may impact local groundwater movement. Molycorp's ore processing method produces liquid tailings and wastewater which may impact groundwater quality. Molycorp is currently disposing of its wastewater via a pipeline to the Ivanpah Dry Lake Wastewater Evaporation Pond which operates under CRWQCB Order No. 6-90-41. The CRWQCB has requested that the reclamation plan identify the discrete tasks that are required to close and reclaim the tailings ponds, wastewater evaporation ponds and all other water retention ponds used in the operation as CRWQCB will require that Molycorp provide financial assurance for water quality related aspects of the reclamation plan. An EIR is needed to determine the project's impacts to local groundwater quality and to develop appropriate mitigation measures if needed. The EIR should also include cost estimates for pond closure activities.

	Yes	Maybe	No
12. Open Space/Recreation/Scenic. Will the proposed project result in significant impacts related to:			
a. The quality or quantity of existing recreational opportunities?	___	X	___
b. The obstruction of any scenic vista or view open to the public?	___	X	___
c. The creation of an aesthetically offensive site open to public view?	___	X	___
d. New light or glare?	___	___	X

SUBSTANTIATION (check X if project is located within the viewshed of any Scenic Route listed in the General Plan): The project site is north of and adjacent to I-15 which is designated a scenic highway in the General Plan (pg. II-CS-92). The Mountain Pass Mine is visible along a 1.5 mile stretch of this highway. The proposed expansion of the mining operation could also produce visual impacts that may affect recreational opportunities from the adjacent Clark Mountain WSA and East Mojave Scenic area. An EIR is required to assess the project's visual impacts to the scenic quality of the area and to develop appropriate mitigation as necessary.

	Yes	Maybe	No
13. Soils/Agriculture. Will the proposed project result in significant impacts related to:			
a. Disruptions, displacements, compaction, or overcovering of the soil?	___	___	X
b. Loss of agricultural soils?	___	___	X
c. Reduction in acreage of any agricultural crop?	___	___	X

SUBSTANTIATION (check ___ if project is located in the Important Farmlands Overlay): The site consists of gravelly alluvium with no agricultural potential or croplands. No significant impacts are expected.

	Yes	Maybe	No
14. Mineral Resources. Will the proposed project result in significant impacts related to:			
a. Prohibit or restrict the development of any mineral resource rated as Classified or Designated by the State Mining and Geology Board?	___	___	X

SUBSTANTIATION (check ___ if project is located within the Mineral Resource Zone Overlay): The project will enable the continued development of a unique mineral resource. The site is a major supplier of rare earth products throughout the world. The tailings ponds may be recycled in the future if new refining processes are developed and implemented. No significant impacts are expected.

MANMADE RESOURCES

	Yes	Maybe	No
15/16. Utilities/Infrastructure. Will the proposal result in significant impacts related to a need for new systems, or substantial alterations to the following utilities:			
a. Power or natural gas?	___	___	X
b. Communications systems?	___	___	X
c. Water?	___	___	X
d. Sewer?	___	___	X
e. Storm water drainage?	___	___	X
f. Solid waste and disposal?	___	___	X

SUBSTANTIATION: The project is a continuation of an existing operation and will not require significant expansion or alterations to utility/ infrastructure facilities existing onsite or serving the site. Reclamation of the site will include leaving it in a natural state of open space and wildlife habitat which should help to preclude future impacts. No significant impacts are expected.

	Yes	Maybe	No
17. Transportation/Circulation. Will the proposed project result in significant impacts related to:			
a. Generation of substantial additional vehicular movement?	___	___	X
b. Effects on existing parking facilities, or demand for new parking?	___	___	X
c. Substantial impact upon existing transportation systems?	___	___	X
d. Alterations to present patterns of circulation or movement of people and/or goods?	___	___	X
e. Alterations to waterborne, rail or air traffic?	___	___	X
f. Increase in traffic hazards to motor vehicles, bicyclists, equestrians, or pedestrians?	___	___	X

SUBSTANTIATION: The project is a continuation of an existing operation and will not significantly increase production. No increase in offsite traffic is proposed and no significant impacts to transportation/circulation are expected.

	Yes	Maybe	No
18. Energy. Will the proposed project result in significant impacts related to:			
a. An increase in the rate of consumption of any natural resources?	___	___	X
b. Use of substantial amounts of fuel or energy?	___	___	X
c. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?	___	___	X

SUBSTANTIATION: The project is a continuation of an existing operation and will not require significant increases in energy consumption. No significant impacts are expected.

	Yes	Maybe	No
19. Housing/Demographics/Socioeconomics. Will the proposed project result in significant impacts related to:			
a. An effect on existing housing, or creation of a demand for additional housing?	___	___	X
b. Alteration of the location, distribution, density, or growth rate of the human population of the area?	___	___	X

SUBSTANTIATION: The project is a continuation of an existing mine operation and will not require an increase in housing or produce changes to demographics. No significant number of new employees are required.

	Yes	Maybe	No
20. Public Services. Will the proposed project result in significant impacts related to a need for new or altered governmental services in:			
a. Fire protection?	___	___	X
b. Police protection?	___	___	X
c. Schools?	___	___	X
d. Parks or other recreational facilities?	___	___	X

	Yes	Maybe	No
e. Maintenance of public facilities, including roads?	___	___	X
f. Other governmental services?	___	___	X

SUBSTANTIATION: The project is a continuation of an existing mine operation and will not require any significant increase or need for additional public services.

LAND USE

	Yes	Maybe	No
21. Will the proposed project result in significant impacts related to:			
a. A substantial alteration of the present or planned land use of an area? (Consider the Official Land Use Designation of the project site and surrounding property, as well as their Improvement Level designations on the General Plan Infrastructure Overlay and any relevant Resource Overlays.)	___	___	X

SUBSTANTIATION: The project is an expansion of the operational area of the Mountain Pass Mine. This mine is a vested mining operation with active mining since 1951. The mine is located within three different Land Use Districts: Resource Conservation (RC), Planned Development (PD 2.5), and General Commercial (CG). All three districts are within an Improvement Level Overlay of 5 (IL-5). Mining is allowed in all three districts and necessary improvements required by IL-5 already exist or will be provided by * the applicant. The mine/reclamation plan proposes reclamation to open space and potential continued operation of the plant facility. The reclaimed land uses would be appropriate uses for the area and no significant impacts are expected. Portions of the proposed mine expansion will also occur on BLM designated Multiple-Use Class M (moderate use) land, which provides for a variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. The proposed action conforms with the general guidelines of the California Desert Conservation Area Plan (1980).

	Yes	Maybe	No
22. MANDATORY FINDINGS OF SIGNIFICANCE			
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below selfsustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	___	X	___

b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.) ___ ___ X

c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.) ___ X ___

d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? ___ ___ X

SUBSTANTIATION: The expansion and ultimate reclamation of the Mountain Pass Mine is not expected to cause any adverse environmental effects on humans and should aide the County in achieving both its long-term and short-term goals by providing needed mineral resources while at the same time ensuring that environmental concerns are addressed through proper mine site reclamation. The project may impact the threatened desert tortoise and might potentially impact archaeological and paleontological resources. Several other potential impacts are also discussed in this initial study which, when taken individually are limited in their impacts, but could be considered cumulatively considerable.

III. Discussion of Environmental Evaluation:

The project has the potential to reduce the number of desert tortoise. Though not commonly found at the mine site's altitude, one desert tortoise was observed in the extreme southwest corner of the site, in an area which is not proposed for disturbance. Evidence of tortoise was also found in the area of influence of the Nipton Road Borrow Pit. Consultation with USFWS and CDFG will be required and mitigation implemented that should reduce impacts to nonsignificance. Cultural and paleontolgical resources may potentially be impacted. Geologic impacts may occur and groundwater quality may be impacted by the pit excavation and tailings pond water quality issues. The project also has the potential to impact both visual resources on BLM land and a County scenic highway and air quality in the Southeast Desert Air Basin.

IV. Mitigation Measures to be included in project Conditions of Approval/ Mitigation Monitoring Program:

Appropriate mitigation measures will be developed during the preparation of the Environmental Impact Report.

Initial Environmental Evaluation Prepared By:

July 1, 1991	
Date	Signature Andrew J. Rush

Revised February 27, 1992

On the basis of this initial evaluation:

The proposed project WOULD NOT have a significant effect on the environment, (and Mitigation Measures are included within the project's Conditions of Approval) and a NEGATIVE DECLARATION should be prepared. [ ]

The proposed project MAY have a significant adverse effect on the environment, and an ENVIRONMENTAL IMPACT REPORT should be required. [X]

July 1, 1991	
Date	Signature Randy Scott
Revised February 27, 1992	For The Planning Agency

REFERENCES

"Biological and Desert Tortoise Survey and Revegetation Plan", Lilburn Corporation, February, 1991.

California Regional Water Quality Control Board, Lahanton Region, Board Order No. 6-90-41, Harold Singer, Executive Officer, June 14, 1990.

"Desert Tortoise Survey for Niption Road Barrow Pit", Shirl R. Naegle, November, 1990.

"Evaluation of Pit Slope Stability, Mountain Pass Operations, CA.", C.O. Brawner Engineering LTD., October 21, 1985.

"Mine and Land Reclamation Plan for the Expansion of the Existing Mountain Pass Mine", Lilburn Corporation, February, 1991.

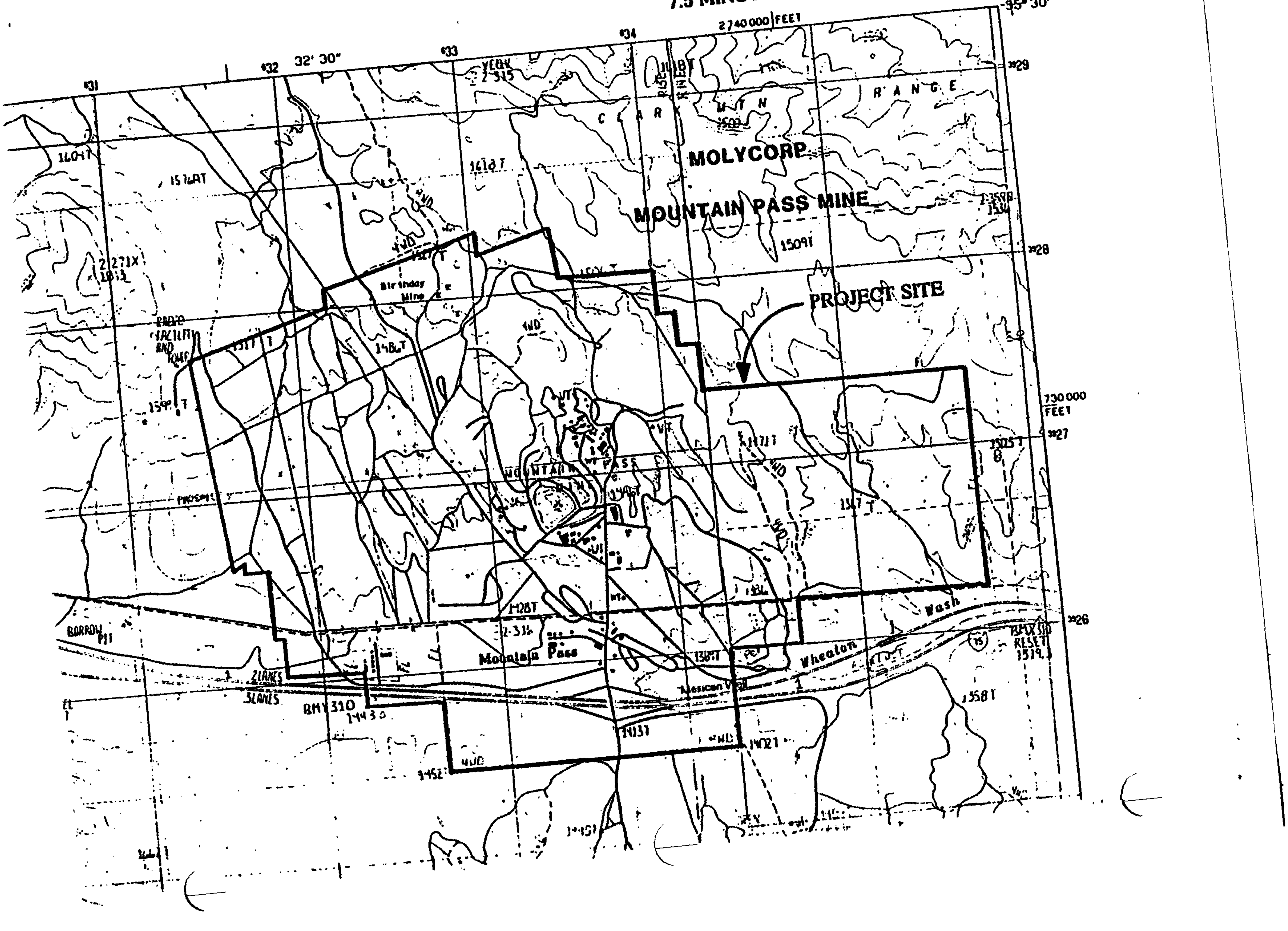
San Bernardino County General Plan (Revised August 1991).

San Bernardino County, Title Eight, Development Code (Printing B).

"Spring Biological Survey", Lilburn Corporation, May, 1991.

Surface Mining and Reclamation Act of 1975, State of California.

MESCAL RANGE QUADRANGLE
CALIFORNIA—SAN BERNARDINO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



STATE OF CALIFORNIA PETE WILSON, Governor

STATE LANDS COMMISSION
L[illegible] McCARTHY, Lieutenant Governor
GRAY DAVIS, Controller
THOMAS W. HAYES, Director of Finance

EXECUTIVE OFFICE
1807 - 13th Street
Sacramento, CA 95814-7187

CHARLES WARREN
Executive Officer

October 14, 1992

OCT 1992
RECEIVED
BY________

File Ref.: SD 92-09-21.6
W 40646

Mr. Ray Johnson
San Bernardino County
385 N. Arrowhead Avenue
San Bernardino, CA 92415-0182

Dear Mr. Johnson:

Staff of the State Lands Commission (SLC) has reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Molycorp Mine Expansion (SCH #92092040). Based on this review, we offer the following comments.

Shortly after becoming a State, California was granted Sections 16 and 36, or lands in lieu thereof, out of each township then held by the federal government. The lands, classified as "School Lands," were given to the State to help support public education. While many of the School Lands were sold off over the years, the State retains an interest in approximately 1.3 million acres of mostly desert and forest lands. State legislation has mandated that revenues from these school lands accrue to the State Teachers Retirement System. The SLC has jurisdiction and authority over School Lands and Lieu Lands.

The proposed project area includes lands the State acquired and patented, reserving a 100% minerals interest. This interest, which is under the jurisdiction of the SLC, includes, but may not be limited to, the following lands within the project area: Approximately 400 acres within the S 1/2, SE 1/4 of NE 1/4 and SW 1/4 of NW 1/4 Section 13, T16N, R13E, SBM. Such interests should be addressed in the draft document.

It appears from the information provided that essentially all of Molycorp's mine expansion will be on State interest lands. However, staff will need a more precise map which shows Molycorp's current mine operation, as well as its' planned expansion area, to determine the exact extent of State ownership within the project area. This information should be on a 7.5 minute quadrangle map.

Staff of the SLC will also need to acquire any information Molycorp has regarding current or past mineral prospecting and exploration drilling on State property. This information, as well as the above mentioned maps should be sent to Eric Kruger, State Lands Commission, Long Beach Office, 245 W. Broadway, Suite 425, Long Beach, CA 90802-4471. Eric can be reached at (310) 590-5237.

Thank you for the opportunity to comment.

Sincerely,

MARY GRIGGS
Environmental Review Section
Division of Environmental
Planning and Management

cc: Dwight E. Sanders
Eric Kruger
OPR

IN.EROFFICE MEMC

DATE October 5, 1992 PHONE 387-4677

FROM RAY JOHNSON, AICP
PLANNING DEPARTMENT

TO SCOTT ROSE, REHS ~~(C/O~~ PAT GALLAGHER)
DEPARTMENT ENVIRONMENTAL HEALTH SERVICES

SUBJECT MOLYCORP. INC. EIR/EIS SCOPING COMMENTS

The Department of Environmental Health Services (DEHS) has reviewed the Initial Study for the Molycorp expansion and have the following issues that should be addressed in an Environmental Report.

1) Under the existing conditions: are the tailings from this mine hazardous or not?

2) The existing landfill is currently not legally permitted by our Local Enforcement Agency section and must be!

3) Who is the owner of the elementary school and how many feet is it going to be from the proposed expansion or disturbed area?

4) The ponds on site will be a direct infiltration or recharge to a regional aquifer (Ivanpah Basin-6-30) that is the potable source to all the water systems in Ivanpah.

5) Is the expansion moving closer to any existing or proposed residential development? If so, noise will be a significant issue.

6) Do they use explosives to mine the ore? If so, the impact will be significant for the risk of explosion.

7) If two new ponds will be added to the expansion, there will be an impact to the existing water supply.

SRR:bp

STATE OF CALIFORNIA—THE RESOURCES AGENCY

PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
330 GOLDEN SHORE, SUITE 50
LONG BEACH, CA 90802
(310) 590-5113

RECEIVED OCT 1992 BY

October 14, 1992

Mr. Ray Johnson
San Bernardino County
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0182

Dear Mr. Johnson:

Notice of Preparation for
Molycorp Mine Expansion
San Bernardino County - SCH 92092040

To enable our staff to adequately review and comment on subject project, we recommend the following information be included in the Draft Environmental Impact Report:

1. A complete assessment of flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened and locally unique species and sensitive and critical habitats.

2. A discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts.

3. A discussion of potential adverse impacts from any increased runoff, sedimentation, soil erosion, and/or urban pollutants on streams and watercourses on or near the project site, with mitigation measures proposed to alleviate such impacts. Stream buffer areas and maintenance in their natural condition through non-structural flood control methods should also be considered in order to continue their high value as wildlife corridors.

   More generally, there should be discussion of alternatives to not only minimize adverse impacts to wildlife, but to include direct benefit to wildlife and wildlife habitat. Those discussions should consider the Department of Fish and Game's policy that there should be no net loss of wetland acreage or habitat values. We oppose projects which do not provide adequate mitigation for such losses.

Diversion, obstruction of the natural flow, or changes in the bed, channel, or bank of any river, stream, or lake will require notification to the Department of Fish and Game as called for in the Fish and Game Code. Notification should be made after the project is approved by the lead agency.

Thank you for the opportunity to review and comment on this project. If you have any questions, please contact Mr. Curt Taucher at (310) 590-5137.

Sincerely,

K. Nal for

Fred Worthley
Regional Manager
Region 5

cc: Office of Planning & Research

South Coast
AIR QUALITY MANAGEMENT DISTRICT
21865 E. Copley Drive, Diamond Bar, CA 91765-4182 (714) 396-2000

OCT 1992
RECEIVED
BY

October 13, 1992

Mr. Ray Johnson
San Bernardino County
385 N. Arrowhead Avenue
San Bernardino, CA 92415-0182

Dear Mr. Johnson:

Subject: Notice of Preparation of an Environmental Impact Report for Molycorp Mine Expansion

SCAQMD# SBC920922-01

The South Coast Air Quality Management District (SCAQMD) appreciates the opportunity to comment on the Notice of Preparation of a Draft Environmental Impact Report (Draft EIR) for the Molycorp Mine Expansion. SCAQMD is responsible for adopting, implementing, and enforcing air quality regulations in the South Coast Air Quality Management District, which includes the project location. As a responsible agency, SCAQMD reviews and analyzes environmental documents for projects that may generate significant adverse air quality impacts. In this capacity, SCAQMD advises lead agencies in addressing and mitigating the potential adverse air quality impacts caused by the project.

To assist the Lead Agency in the preparation of the air quality analysis for the Draft EIR, the following is a summarization for evaluating air quality impacts.

Baseline Information: Describe the existing climate and air quality of the region and project site location.

Identify and quantify all project **Sources of Emissions.**

Compare and assess anticipated project emissions with the District's **Thresholds of Significance** and the existing air quality of the region and project location.

Assess **Cumulative Air Quality Emissions** from related projects.

Demonstrate that the operation does not pose any **Health Risks.** Procedures for Preparing Risk Assessments to Comply with Air Toxics Rules of the South Coast Air Quality Management District should be used for this assessment.

Assess the potential Toxic Air Contaminants from the operation. Include chemical dusts and volatile organic compounds (VOCs), where applicable.

Assess the Health and Safety Risks associated with the use, storage or transportation of chemicals such as ammonia and chlorine.

Identify and quantify Project Alternatives that may attain the goals of the project with substantially fewer or less significant impacts.

Identify Mitigation Measures necessary to reduce air quality impacts.

For additional information please refer to SCAQMD's Air Quality Handbook for Preparing Environmental Impact Reports to assess and mitigate adverse air quality impacts.

Upon completion of the Draft Environmental Impact Report, please forward two copies to:

Office of Planning & Rules
South Coast Air Quality Management District
21865 Copley Drive
P O Box 4939
Diamond Bar CA 91765-0939

Attn: Local Government - CEQA

If you have any questions regarding the environmental analysis, please call me at (714) 396-3055.

Sincerely,

Connie Day

Connie Day
Program Supervisor
Local Government-CEQA

CAD:PF
(mining/landfillnop)

ATTACHMENT 2
RECOMMENDED MITIGATION MEASURES

A. *Minimize Construction Activity and Dust Emissions*

- o Operate street-sweepers on paved roads adjacent to site.
- o Cover dirt in trucks during on-road hauling.
- o Cease construction during periods when winds exceed 25 miles per hour, or during Stage 2 episodes.
- o Spread soil binders on site, unpaved roads, and parking areas.
- o Reestablish ground cover on construction site through seeding and watering.
- o Wash off trucks and their wheels when leaving site. A minimum of 2-feet of freeboard height should be kept by all loaded trucks.
- o Construction equipment should be properly tuned.
- o Use low-sulfur fuel for construction equipment.
- o Use power from the main power source. Avoid the use of internal combustion engines.
- o Provide rideshare incentives for construction personnel.
- o Provide transit incentives for construction personnel.
- o Provide a flagperson as needed at construction sites.
- o Provide paved parking areas for the construction personnel.

B. *Reduce Operational Emissions*

- o Install automated traffic signals as appropriate.
- o Ensure traffic flow management.
- o Implement a Transportation Demand Management Plan.
- o Mitigate traffic related impacts. Assess the impacts from the vehicle miles traveled and traffic congestion.
- o Implement a truck transportation schedule.
- o Landscape with native drought-resistant plant species to reduce water consumption.
- o Reduce health risks to acceptable levels.
- o Implement safety requirements when chemicals (ammonia and chlorine) are used, stored or transported.
- o Reduce or eliminate fugitive dusts and odors from rock crushing or mining operations.

CAD:PF

C A L I F O R N I A

MINING ASSOCIATION

"The California Mining Association is dedicated to the advancement of responsible mining and the education of the public to the vital role of minerals and mining in our society."

September 24, 1992

RECEIVED OCT 1992 BY

Planning Department
385 N. Arrowhead Avenue
San Bernardino, CA 92415-0182
Attn: Ray Johnson

Dear Mr. Johnson:

This letter is in response to your notice of preparation of a joint EIR/EIS for the expansion of Molycorp Inc.'s Mountain Pass Mine. The California Mining Association (CMA) respectfully encourages your favorable consideration of the expansion.

This year Molycorp was the recipient of CMA's Excellence in Reclamation award. Molycorp has been a CMA member since the association's inception in 1977. The company has demonstrated concern for the mining industry and the general public through its operations. Most recently, the company made a strong committment of support for CMA's education foundation, an organization which educates students and the public on minerals and mining.

CMA feels Molycorp is a responsible mining operation, and therefore strongly supports the company's expansion efforts. Thank you for your consideration.

Sincerely,

Mary Lou Smith

Mary-Lou Smith
Executive Director

cc: Robert Sega

(916) 447-1977 • FAX (916) 447-0348 • 1121 L STREET, SUITE 909 • SACRAMENTO, CA 95814

STATE OF CALIFORNIA

PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION
VICTORVILLE BRANCH OFFICE
15428 CIVIC DRIVE, SUITE 100
VICTORVILLE, CA 92392-2383
(619) 241-6583
FAX No. (619) 241-7308

OCT 1992
BY________

September 30, 1992

Randy Scott
San Bernardino Co. Planning Dept.
385 North Arrowhead Avenue
San Bernardino, CA 92415-01280

Dear Mr. Scott:

COMMENTS ON NOTICE OF PREPARATION (NOP) OF A JOINT ENVIRONMENTAL IMPACT REPORT/STUDY (EIR/EIS) FOR MOLYCORP MOUNTAIN PASS MINE, MOUNTAIN PASS, SAN BERNARDINO COUNTY

We have received the above referenced NOP and have the following issues that should be addressed in the EIR/EIS:

1. The EIR/EIS should address the items listed in § 2574(c), Title 23, Cal. Code of Regs (CCR) in order that the waste discharge requirements issued by the Regional Board be consistent with the prepared reclamation plans. The EIR/EIS should include what actions are necessary to prevent water quality degradation.

2. The EIR/EIS should address the items listed in § 2574, Title 23, CCR for closure and post-closure maintenance. Special emphasis should be made to consider § 2574(g) for financial responsibility. Both the reclamation requirements of the Surface Mining and Reclamation Act, administered by San Bernardino County, and closure requirements administered by the Regional Board require financial assurance. Because there are instances where the reclamation plans and closure plans overlap, we strongly urge that the reclamation plans and closure plans be referenced together. They should specify in line-item detail the closure/reclamation activity and estimated cost, the expected lead agency, and where differences or overlaps occur.

3. Any proposed future action that could adversely affect water quality or constitute a material change in the waste, manner, or method of disposal shall be reported to the Regional Board at least 120 days before implementation. For such actions, a revised Report of Waste Discharge under § 13260 of the Water Code must be submitted.

If you have any questions, please call me at the above number.

Sincerely,

Jehiel W. Cass

Jehiel W. Cass
WRC Engineer

jc11/moly1/wp51

cc: Grover Eaton, Molycorp
Richard Fagan, BLM Needles
Rick Humphreys, SWRCB
Jim Pompey, Division of Mines and Geology
Ken Carter, Regulation Enforcement Section

COUNTY OF SAN BERNARDINO
ENVIRONMENTAL
MANAGEMENT GROUP

AIR POLLUTION CONTROL DISTRICT

15428 Civic Drive, Suite 200 • Victorville, CA 92392 • (619) 243-8920
Fax No. (619) 243-8925

CHARLES L. FRYXELL
Air Pollution Control Officer

September 30, 1992

Ray Johnson
San Bernardino County Planning
Environmental Team
385 N. Arrowhead Ave, 3rd floor
San Bernardino, CA 92415-0812

RE: NOTICE OF PREPARATION FOR THE EXPANSION OF THE MOUNTAIN PASS MINE

Dear Mr. Johnson:

The San Bernardino County Air Pollution Control District (APCD) appreciates the opportunity to provide the following comments regarding the Notice of Preparation (NOP) for the Mountain Pass Mine project. The APCD is responsible for adopting and implementing air quality regulations for the San Bernardino County portion of the Southeast Desert Air Basin (District), as mandated by the federal Clean Air Act Amendments of 1990 (CAAA) and the California Clean Air Act of 1988 (CCAA). Pursuant to the California Environmental Quality Act (CEQA), Article 7, Section 15082 (b), the APCD reviews and analyzes projects that may generate significant adverse air quality impacts. The APCD then advises the Lead Agency on air quality issues that may affect the APCD's efforts in attaining required State and National Ambient Air Quality Standards in the District.

Staff has reviewed the NOP and the initial study prepared for the Mountain Pass Mine and concurs with the requirement for an EIR as the project does have the potential to significantly impact regional air quality. However, along with the issues addressed in the air quality section of the initial study, staff feels that the potential air quality impacts associated with the storage and use of the various hazardous materials should be evaluated.

The APCD would like to take an active role in the development and selection of the mitigation measures for the project. Staff would appreciate the opportunity to review the mitigation monitoring program as part of the Draft EIR.

The APCD appreciates the opportunity to comment on the NOP for the Mountain Pass Mine and looks forward to continued participation in the environmental review process. If you have any questions regarding our comments, please contact me at (619) 243-8921.

Sincerely,

RENEE MOSHER
Air Quality Planner

cc: Kayode Kadara, Deputy APCO

OCT 1 1992

United States Department of the Interior

FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
SOUTHERN CALIFORNIA FIELD STATION
Ventura Office
2140 Eastman Avenue, Suite 100
Ventura, California 93003

TAKE PRIDE IN AMERICA

September 24, 1992

Ray Johnson
Planning Department
385 N. Arrowhead Ave
San Bernardino, CA 92415-0182

Subject: Notice of Preparation for an Environmental Impact Report/Environmental Impact Study for the Expansion of Molycorp, Inc.'s Mountain Pass Mine in the Community of Mountain Pass, San Bernardino County, California

Dear Mr. Johnson:

The Fish and Wildlife Service (Service) has reviewed the referenced notice of preparation. The proposed project, located approximately 35 miles northeast of Baker, California, would consist of expanding the existing mining operation, including enlarging the main pit, overburden stockpiles, and tailings storage areas, as well as construction of new features and additional modification of existing features needed to accommodate the expansion. These activities would disturb about 570 acres.

The proposed project could cause significant environmental impacts to biological resources. The primary concern and mandate of the Service is the protection of public fish and wildlife resources and their habitats. The Service is responsible for administering significant portions of the Endangered Species Act of 1973, as amended (Act). Section 7 of the Act requires Federal agencies to consult with the Service should it be determined that their discretionary acts may affect a threatened or endangered species. The notice of preparation states that the desert tortoise, (Gopherus agassizii), a federally listed threatened species, is present in the area. As a Federal nexus in this project, the Bureau of Land Management (Bureau) will need to determine if activities it authorizes may affect the desert tortoise. If such authorization may affect the desert tortoise, the Bureau is required to consult with the Service.

The notice of preparation also stated that Clark Mountain buckwheat (Eriogonum heermanii var. floccosum) was present in the project area. Although this plant is currently considered category 3C (taxa which, at this time, are not being considered for listing), we recommend you consider it in the draft environmental impact report/environmental impact study (DEIS/DEIR), in case its status changes prior to or during project construction.

Section 9 of the Act prohibits the "take" (e.g., harm, harassment, pursue, injure, kill) of Federally listed species. "'Harm' in the definition of 'take' in the Act means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3)." Anyone who engages in take would be subject to prosecution under section 9 of the Act. Since desert tortoises are present in the area, implementation of the Molycorp Mine expansion could result in take. Note that the Service considers unauthorized handling of desert tortoises or moving them out of harm's way a taking under section 9 of the Act. Take, however, can be authorized by the Service through the section 7 process, as long as that taking is incidental and results from, but is not the purpose of carrying out otherwise lawful activity (50 CFR 402.02). Incidental take can also be authorized for projects without a Federal nexus under the provisions of section 10(a)(1)(B) of the Act.

Our mandates also require that we provide comments on any public notice issued for a Federal permit or license affecting the nation's waters, in particular, U.S. Army Corps of Engineers (Corps) permits pursuant to Section 404 of the Clean Water Act and Section 10 of the River and Harbors Act.

The Service believes the following items should be thoroughly addressed in the draft report:

1. The DEIR/DEIS should fully describe the potential impacts of the proposed project on the desert tortoise. These impacts could include, but are not limited to, direct loss of habitat through project construction, including new roads to project features, fragmentation of habitat by project features, and indirect loss of habitat and take of individual desert tortoises. The draft report should also include measures designed to mitigate these impacts and reduce the potential take of desert tortoises. The Service believes it would be in the best interest of the project applicant to undertake appropriate measures to ensure that desert tortoises are not taken illegally at any point during the development process. Such measures could include surveys by qualified biologists to ascertain the presence or absence of desert tortoises.

2. The DEIR/DEIS should also fully document the wildlife resources of the proposed project area. This information should include the results of any field work and a review of appropriate literature to develop lists of species which could potentially occupy the area, but were not observed in the field.

3. The DEIR/DEIS should discuss the potential impacts of the proposed action on the biological resources of the area and describe the means by which these impacts can be mitigated.

4. The notice of preparation states that there may be impacts to the quantity, quality, and the direction or rate of groundwater flow. The DEIR/DEIS should address how these impacts may affect flow rates and water quality of local springs and seeps, which, in an arid environment, are crucial to many wildlife species and may support unusual plant assemblages.

4. Preparers of the DEIR/DEIS should be aware of the requirements of the Clean Water Act with regard to the placement of fill material in washes and special aquatic sites. For further information, please contact:

U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053
Attn: Regulatory Branch
(213) 894-5606

Additionally, the Environmental Protection Agency has responsibility to review the proposed project for compliance with 404(b)(1) guidelines, which were established to determine the water-dependency of projects. For further information, please contact:

Environmental Protection Agency
75 Hawthorne Street, Wetlands W-7-2
San Francisco, California 94105
(415) 744-1976

5. The DEIR/DEIS should rigorously explore and evaluate all reasonable project alternatives (40 CFR 1502.14). These alternatives should include alternate locations of project features, alternate technologies, and elimination of specific, unmitigatable aspects of the currently proposed project.

The Service appreciates the opportunity to participate in your planning process. If you have any questions, please contact Jim Rorabaugh of my staff at (805) 644-1766.

Sincerely,

Steven M. Chambers

Steven M. Chambers
Office Supervisor

STATE OF CALIFORNIA—THE RESOURCES AGENCY.

PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
330 GOLDEN SHORE, SUITE 50
LONG BEACH, CA 90802
(310) 590-5113

September 18, 1992

Mr. Ray Johnson
San Bernardino County
Planning Department
385 North Arrowhead Avenue
San Bernardino, California 92415-0182

Dear Mr. Johnson:

Notice of Preparation for the Expansion of Molycorp Inc.'s Mountain Pass Mine, San Bernardino County

To enable our staff to adequately review and comment on subject project, we recommend the following information be included in the Draft Environmental Impact Report:

1. A complete assessment of flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened and locally unique species and sensitive and critical habitats.

2. A discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts.

3. A discussion of potential adverse impacts from any increased runoff, sedimentation, soil erosion, and/or urban pollutants on streams and watercourses on or near the project site, with mitigation measures proposed to alleviate such impacts. Stream buffer areas and maintenance in their natural condition through non-structural flood control methods should also be considered in order to continue their high value as wildlife corridors.

   More generally, there should be discussion of alternatives to not only minimize adverse impacts to wildlife, but to include direct benefit to wildlife and wildlife habitat. Those discussions should consider the Department of Fish and Game's policy that there should be no net loss of wetland acreage or habitat values. We oppose projects which do not provide adequate mitigation for such losses.

Diversion, obstruction of the natural flow, or changes in the bed, channel, or bank of any river, stream, or lake will require notification to the Department of Fish and Game as called for in the Fish and Game Code. Notification should be made after the project is approved by the lead agency.

Thank you for the opportunity to review and comment on this project. If you have any questions, please contact Mr. Curt Taucher at (310) 590-5137.

Sincerely,

R. E. Mull

Fred Worthley for
Regional Manager
Region 5

cc: Office of Planning & Research

SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
818 West Seventh Street,12th Floor • Los Angeles, California 90017-3435 □ (213) 236-1800 • FAX (213) 236-1825

September 16, 1992

Mr. Raymond Johnson
385 North Arrowhead Ave.
San Bernardino, CA 92415-0180

RE: SCAG Clearinghouse #: I9200130
Project Title: Joint Environmental Impact Report and Environmental Impact Study for the Expansion of Molycorp Inc.'s Mountain Pass Mine in the Community of Mountain Pass.

Dear Mr. Johnson:

We have reviewed the above referenced Notice of Preparation and determined that it is not regionally significant per Areawide Clearinghouse criteria. Therefore, the project does not warrant clearinghouse comments at this time. Should there be a change in the scope of the project, we would appreciate the opportunity to review and comment at that time.

A description of the project was published in the September 15, 1992 Intergovernmental Review Report for public review and comment.

The project title and SCAG number should be used in all correspondence with SCAG concerning this project. Correspondence should be sent to the attention of the Clearinghouse Coordinator. If you have any questions, please contact Maureen Farley at (213) 236-1886.

Sincerely,

Eric H. Roth

ERIC H. ROTH
Manager, Intergovernmental Review

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
ict 8, P.O. Box 231
Bernardino, CA 92402
TDD (714) 383-4609

September 28, 1992

08-SBd-15-171.4

Mr. Ray Johnson
Planning Department
San Bernardino County
385 North Arrowhead Avenue
San Bernardino, CA 92415-0182

Dear Mr. Johnson:

Notice of Preparation for
Expansion of Malycorp Inc.'s Mountain Pass Mine

We have reviewed the above-referenced document and request consideration of the following comments:

- If there is work on any stream which falls in the 100-year flood plain and is within one mile of any State highway structure it is required that the lead agency notify the Department of Transportation, Division of Structures, allowing 45 days to receive and comment on the proposed surface mining operations with respect to hydrological changes and their impact on the State highway and bridge structures prior to approval of the project. Please send the hydrology analysis and all other pertinent documentation to:

  Bill Lindsey
  Division of Structures
  California Department of Transportation
  P.O. Box 1499
  Sacramento, CA 95807

When available, please send the DEIR to:

  La Keda Johnson
  Transportation Planning, CEQA/IGR
  California Department of Transportation
  P.O. Box 231
  San Bernardino, CA 92402

If you have any questions, please contact La Keda Johnson at (714) 383-5929 or FAX (714) 383-5936.

Sincerely,

HARVEY J. SAWYER, Chief
Transportation Planning
San Bernardino Coordination
Branch

APPENDIX B

SUMMARY OF HAZARDOUS MATERIALS

Source: Molycorp Mountain Pass Mine
Hazardous Materials Business Plan
April 1994

			SPECIALITY PLANT			CERIUM 96 PLANT			CHEMICAL PLANT			FLOTATION PLANT			ALL OTHER FACILITY AREAS		
INVENTORY ITEM No.	HAZARDOUS MATERIAL	CONTAINER TYPE	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)
83	402 Molybdate Polymer & Azole	Drums							155	Pounds	(W,25)				155	Pounds	(DD,21)
12	Acetic Acid, Glacial	Polyethylene drums	11,000	Gallons	(DD,24)												
89	Activated Alumina	Metal drums													350	Pounds	(Z,38)
14	Ammonium Bi-Carbonate	Bags	25,000	Pounds	(CC,25)				18,000	Pounds	(V,25); (V,24)						
15	Ammonium Bi-Carbonate	Cardboard drums							1,500	Pounds	(V,25)						
16	Ammonium Bi-Fluoride	Bags	25,000	Pounds	(CC,25)												
13	Ammonium Hydroxide (19%)	6,500 gal aboveground tank	5,000	Gallons	(CC,23)												
49	Ammonium Hydroxide (28%)	Polyethelene drums							2,500	Gallons	(V,26); (X,25); (Y,27)						
131	Anhydrous Ammonia	7,700 gal tank truck trailer													7,700	Gallons	(BB,28)
132	Aqueous Ammonia	100,000 gal aboveground tank													65,000	Gallons	(BB,29)
28	Barium Chloride	Bags				30,000	Pounds	(U,22); (AA,21)									
86	Betz ENTEC 240	Plastic buckets							1,880	Pounds	(W,29)						
82	Betz ENTEC 349 Bromocide	Buckets													40	Pounds	(DD,21)
78	Betz ENTEC 720 Phosphate Powder	Fiber drums							220	Pounds	(W, 25)				105	Pounds	(DD,21)
79	Betz ENTEC 733 Catalyzed Sulfide	Drums							300	Pounds	(W,25); (W,24)	200	Pounds	(R,40)	400	Pounds	(DD,21)
80	Betz ENTEC 750	Buckets							20	Pounds	(W,25)				20	Pounds	(DD,21)
81	Betz ENTEC Opti Sperse 10	Drums							280	Pounds	(W,25)				280	Pounds	(DD,21)
76	Beller Chemicals 804 Chemicals	One 200 gal tank inside bldg										200	Gallons	(R,40)			
27	Borax	Bags				40,000	Pounds	(U,22); (AA,21)									
113	Calcium Hydroxide	Bags							25,000	Pounds	(V,26); (V,24)						
130	Carbonic Dioxide Anhydride	5,000 gal tank truck trailer													5,000	Gallons	(CC,23)
135	Cerium Nitrate	55 gal plastic drums				14,000	Gallons	(BB,26); (CC,25); (DD,26)							1,750	Gallons	(Y,50); (Y,51)
107	Cleaning Solvent	55 gal drums													180	Gallons	(W,24);(T,41);(BB,38)
17	Cyclosol 53 Solvent	7,520 gal aboveground tank	800	Gallons	(BB,24)												
114	De-Icer Tanner Gas	Metal drums										275	Gallons	(Q,40)			
9	Di(2-ethylhexyl) Phosphoric Acid	Plastic drums	295	Gallons	(CC,25)				4,000	Gallons	(W,21); (Y,24)						
10	Di(2-ethylhexyl) Phosphoric Acid	130 gal tank inside bldg	95	Gallons	(DD,23)												
20	Diesel #2	190 gal aboveground tank	180	Gallons	(DD,21)												
53	Diesel #2	22,000 gal aboveground tank				11,000	Gallons	(W,18)									
54	Diesel #2	Two 10,000 gal aboveground tanks				10,000	Gallons	(W,18)									
64	Diesel #2	20,000 gal aboveground tank										15,000	Gallons	(R,38)			
119	Diesel #2	Two 5,000 gal underground tanks													5,000	Gallons	(AA,37)
65	Diesel #6	24,000 gal aboveground tank										16,000	Gallons	(R,38)			
66	Diesel #6	11,000 gal aboveground tank										7,500	Gallons	(R,38)			
88	Econofloat 131	Metal drums										440	Gallons	(P,40); (Q,40)			
127	Ethylene Glycol	55 gal drums													475	Gallons	(W,24);(T,41);(BB,38)
120	Gasoline, Unleaded	5,000 gal underground tank													2,500	Gallons	(AA,37)
103	Grease	25 pound buckets													100	Pounds	(W,24)
104	Grease	14.4 ounce cartridges													300	Cartridges	(W,24)
116	Grease, Gearlie HD 4800	55 gal drums													390	Gallons	(BB,38); (P,40)
99	Hydraulic Oil Improver	55 gal drums													30	Gallons	(Z,36)
36	Hydrochloric Acid (0.2%)	FRP cells (in process)							11,000	Gallons	(Y,29)						
59	Hydrochloric Acid (30%-36%)	22,500 gal aboveground tank										11,000	Gallons	(W,29)			
34	Hydrochloric Acid (33% - 40%)	Polyethylene drums															
35	Hydrochloric Acid (34%-35%)	Two 33,000 gal aboveground tanks				40,000	Gallons	(W,19)									
37	Hydrochloric Acid (less than 0.1%)	FRP cells (in process)							4,500	Gallons	(Y,29); (X,29)						
18	Hydrogen Peroxide (35%)	Polyethylene drums	110	Gallons	(DD,23)				470	Gallons	(V,25); (X,26)						
23	Hydrogen Peroxide (35%)	10,000 gal aboveground tank				1,500	Gallons	(X,20)									
25	Hydroxylamine Hydrochloride	Fiber drums				24,000	Gallons	(U,22); (X,25); (X,29)									
134	Ionquest 801	55 gal drums				800	Gallons	(DD,23); (DD,24)									
2	ITEM DELETED FROM INVENTORY IN NOVEMBER 1995 (Item No. reserved for future use)																
19	ITEM DELETED FROM INVENTORY IN OCTOBER 1994 (Item No. reserved for future use)																
57	ITEM DELETED FROM INVENTORY IN OCTOBER 1994 (Item No. reserved for future use)																
60	Kerosene	11,000 gal aboveground tank				5,500	Gallons	(W,18)									
111	Kerosene	55 gal drums													85	Gallons	(T,41)
58	Liquid Nitrogen	9,800 gal pressurized tank							9,800	Gallons	(X,26)						
105	Methanol	55 gal drums													225	Gallons	(W,24); (BB,38)
56	Nalco 7871 Flocculent (0.12%)	10,000 gal concrete tank				5,000	Gallons	(Y,23)									
55	Nalco 7871 Flocculent (conc.)	2,300 gal tank inside bldg				2,300	Gallons	(Y,23)									
128	Nalco 7871 Flocculent (conc.)	Plastic drums							825	Gallons	(U,22)						
30	Nalco 8817 (0.01% Solution)	500 gallon tank inside bldg				300	Gallons	(Z,22)									

			SPECIALITY PLANT			CERIUM 96 PLANT			CHEMICAL PLANT			FLOTATION PLANT			ALL OTHER FACILITY AREAS		
INVENTORY ITEM No	HAZARDOUS MATERIAL	CONTAINER TYPE	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)
29	Nalco 8817 Defoamer (conc.)	Two 2,300 gal aboveground tanks				1,150	Gallons	(Z,22)	1,150	Gallons	(X,22)						
88	Nalco 8817 Defoamer (conc.)	Metal drums															
8	Nitric Acid (0.01%)	SX-5 cells (in process)	2,020	Gallons	(CC,24);(DD,23)												
7	Nitric Acid (1%)	SX-6 cells (in process)	15,750	Gallons	(CC,24);(DD,24)												
6	Nitric Acid (2%)	SX-7 cells (in process)	1,475	Gallons	(CC,25);(DD,24)												
4	Nitric Acid (23%)	5,000 gal aboveground tank	2,500	Gallons	(CC,23)												
5	Nitric Acid (5%)	SX-4 cells (in process)	7,528	Gallons	(CC,24);(DD,23)												
1	Nitric Acid (64%)	10,000 gal aboveground tank	7,000	Gallons	(CC,23)												
3	Nitric Acid (64%)	10,000 gal aboveground tank	7,000	Gallons	(DD,23)												
11	Oxalic Acid	Bags	40,000	Pounds	(CC,25);(EE,23);(DD,24)	500	Pounds	(Z,21)	80,000	Pounds	(V,25); (U,22); (X,25)						
75	PAMAK 25 Additive	80,000 pound tank inside bldg										40,000	Pounds	(O,38)			
67	Pamolyn Fatty Acid 125	Metal drums										1,700	Gallons	(R,41)			
89	Pentolite	Numbers													250	Numbers	(B,21)
95	Petroleum Oil, 10 Wt Motor Oil	275 gal tank inside bldg													150	Gallons	(Z,36)
96	Petroleum Oil, 10 Wt Motor Oil	55 gal drums													305	Gallons	(Z,36); (BB,38)
93	Petroleum Oil, 30 Wt Motor Oil	275 gal tank inside bldg													150	Gallons	(Z,36)
94	Petroleum Oil, 30 Wt Motor Oil	55 gal drums													330	Gallons	(Z,36),(T,41),(BB,38)
91	Petroleum Oil, 40 Wt Motor Oil	275 gal tank inside bldg													150	Gallons	(Z,36)
92	Petroleum Oil, 40 Wt Motor Oil	55 gal drums													330	Gallons	(Z,36),(W,24),(BB,38)
101	Petroleum Oil, 4EPNL	55 gal drums													55	Gallons	(W,24);(T,41)
108	Petroleum Oil, 4EPNL	55 gal drums													80	Gallons	(W,24),(BB,38)
115	Petroleum Oil, 50 Wt Motor Oil	55 gal drums													275	Gallons	(BB,38)
97	Petroleum Oil, 80/90 Wt Gear Lube	275 gal tank inside bldg													150	Gallons	(Z,36)
99	Petroleum Oil, 80/90 Wt Gear Lube	55 gal drums													140	Gallons	(Z,36);(W,24);(T,41),(BB,38)
118	Petroleum Oil, 85/140Wt Gear Lube	55 gal drums													55	Gallons	(BB,38)
109	Petroleum Oil, AW 46 UNAX	55 gal drums													345	Gallons	(W,24);(BB,38)
112	Petroleum Oil, High Temp Grease	55 gal drums													120	Gallons	(W,25)
102	Petroleum Oil, Pure Lube 710	55 gal drums													25	Gallons	(T,41)
117	Petroleum Oil, Turbine Oil VG 220	55 gal drums													55	Gallons	(BB,38)
100	Petroleum Oil, VG 68	55 gal drums													110	Gallons	(W,24);(T,41);(BB,38)
110	Petroleum Oil-ATF Dextron II	55 gal drums													330	Gallons	(W,24);(BB,38)
106	Petroleum Oil	55 gal drums													25	Gallons	(W,24)
26	Potassium Chloride	Bags				38,000	Pounds	(U,22)									
90	PRIMADET Non Electric Detonators	Numbers													5,000	Numbers	(B,21)
121	Propane	20,000 gal aboveground tank													15,000	Gallons	(Z,52)
122	Propane	1,144 gal aboveground tank													572	Gallons	(Y,37)
123	Propane	Two 1,000 gal aboveground tanks													1,000	Gallons	(Y,37)
124	Propane	Five 400 gal aboveground tanks													1,248	Gallons	(T,63);(V,61);(Y,59);(N,42);(Y,37)
125	Propane	350 gal aboveground tank													175	Gallons	(W,57)
126	Propane	325 gal aboveground tank													163	Gallons	(U,47)
43	Purification Feed	10,200 gal aboveground tank							10,200	Gallons	(X,26)						
44	Purification Feed	1,000 gal tank inside bldg							1,000	Gallons	(X,25)						
74	Rhodopan EC 111	Cardboard drums										1,750	Pounds	(P,40)			
87	Shiny Side	Plastic containers													15	Gallons	(Z,36)
21	Sodium Carbonate	Two 126,000 pound aboveground bins				100,000	Pounds	(Y,20)	100,000	Pounds	(X,25); (Y,21); (Y,20)						
60	Sodium Carbonate	152,400 pound aboveground bin										76,200	Pounds	(Q,40)			
22	Sodium Carbonate (15%)	Two 6,300 gal aboveground tanks				9,000	Gallons	(Y,20)									
46	Sodium Carbonate (15%)	8,000 gal aboveground tank							4,000	Gallons	(X,24)						
61	Sodium Carbonate (21%)	8,000 gal tank inside bldg										4,000	Gallons	(Q,40)			
62	Sodium Carbonate (21%)	1,000 gal tank inside bldg										1,000	Gallons	(Q,40)			
77	Sodium Carbonate (Ash)	Bags							30,000	Pounds	(V,24); (X,25); (U,25)						
48	Sodium Hydrosulfide (20%)	16,000 gal aboveground tank							8,000	Gallons	(V,22)						
32	Sodium Hydroxide (20%)	4,000 gal aboveground tank				2,000	Gallons	(Z,22)									
31	Sodium Hydroxide (50%)	8,000 gal aboveground tank				4,000	Gallons	(Y,21)									
85	Sodium Hydroxide (50%)	Drums													110	Gallons	(DD,21)
47	Sodium Hydroxide (beads)	Steel drums							20,000	Pounds	(V,26),(X,26)						
84	Sodium Hydroxide (beads)	Steel drums													1,650	Pounds	(DD,21)
63	Sodium Silicofluoride	Bags										20,000	Pounds	(R,41), (P,40)			
33	Sodium Sulfide	Steel drums				1,600	Pounds	(V,25)									
135	Strontium Carbonate	Cardboard drums							3,900	Pounds	(V,22); (V,23)						
38	Sulfuric Acid (93.2%)	polyethelene drums							1,100	Gallons	(U,25); (X,25)						
52	Superfloc 107 Flocculent (0.23%)	55 gal drums															

SUMMARY LISTING OF HAZARDOUS MATERIALS (SORTED ALPHABETICALLY)

			SPECIALITY PLANT			CERIUM 96 PLANT			CHEMICAL PLANT			FLOTATION PLANT			ALL OTHER FACILITY AREAS		
INVENTORY ITEM No.	HAZARDOUS MATERIAL	CONTAINER TYPE	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)
51	Superfloc 107 Flocculent (conc.)	Bags							3,000	Pounds	(U,22)						
70	Superfloc 127 Flocculant	Bags										1,100	Pounds	(S,41)			
71	Superfloc 127 Flocculant	500 gal tank inside bldg										250	Gallons	(Q,40)			
39	SX-1 Feed Mixture	Three aboveground tanks (various capacities)							16,000	Gallons	(Y,24)						
41	SX-1 Organic Feed Mixture	Four aboveground tanks (various capacities)							14,000	Gallons	(Y,24)						
40	SX-2 Feed Mixture	aboveground tank							20,000	Gallons	(Y,24)						
42	SX-2 Organic Feed Mixture	5,000 gal aboveground tank							2,500	Gallons	(X,24)						
142	Unocal Anti-freeze & Coolant	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
139	Unocal Extra Duty NL Gear Lube 4EP	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
140	Unocal Extra Duty NL Gear Lube 7EP	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
143	Unocal Guardol Motoroil 30	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
138	Unocal MP Gear Lube LS 80W90	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
146	Unocal Multipurpose ATF	55 gallon drums													55	Gallons	(T, 41)
144	Unocal Steaval A	55 gallon drums							55	Gallons	(W, 25)						
145	Unocal Turbine Oil 220	55 gallon drums													55	Gallons	(T, 41)
137	Unocal Turbine Oil 68	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
141	Unocal UNAX AW 32	55 gallon drums							55	Gallons	(W, 25)						
136	Unocal UNAX AW 46	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
24	Urea, Carbamide	Bags				25,000	Pounds	(U,22); (Z,22)									
72	Westig 120CP-1500	9,000 gal aboveground tank										4,000	Gallons	(Q,39)			
73	Westig 120CP-1500 (30%)	1,000 gal tank inside bldg										1,000	Gallons	(Q,40)			
129	Westig120CP-1500 (30%)	6,000 gal tank inside bldg													3,000	Gallons	(Q,40)
40	Zinc Powder	5 gal steel drums							10,000	Pounds	(U,22); (X,25)						

SUMMARY LISTING OF HAZARDOUS MATERIALS (SORTED ALPHABETICALLY)

			SPECIALITY PLANT			CERIUM 96 PLANT			CHEMICAL PLANT			FLOTATION PLANT			ALL OTHER FACILITY AREAS		
INVENTORY ITEM No.	HAZARDOUS MATERIAL	CONTAINER TYPE	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)
83	402 Molybdate Polymer & Azole	Drums							155	Pounds	(W,25)				155	Pounds	(DD,21)
12	Acetic Acid, Glacial	Polyethylene drums	11,000	Gallons	(DD,24)												
88	Activated Alumina	Metal drums													350	Pounds	(Z,38)
14	Ammonium Bi-Carbonate	Bags	25,000	Pounds	(CC,25)				18,000	Pounds	(V,25); (V,24)						
15	Ammonium Bi-Carbonate	Cardboard drums							1,500	Pounds	(V,25)						
16	Ammonium Bi-Fluoride	Bags	25,000	Pounds	(CC,25)												
13	Ammonium Hydroxide (15%)	6,500 gal aboveground tank	5,000	Gallons	(CC,23)												
45	Ammonium Hydroxide (28%)	Polyethelene drums							2,500	Gallons	(V,26); (X,25); (Y,27)						
131	Anhydrous Ammonia	7,700 gal tank truck trailer													7,700	Gallons	(BB,28)
132	Aqueous Ammonia	100,000 gal aboveground tank													85,000	Gallons	(BB,28)
26	Barium Chloride	Bags				30,000	Pounds	(U,22); (AA,21)									
86	Betz ENTEC 240	Plastic buckets							1,680	Pounds	(W,25)						
82	Betz ENTEC 349 Bromocide	Buckets													40	Pounds	(DD,21)
78	Betz ENTEC 720 Phosphate Powder	Fiber drums							220	Pounds	(W, 25)				105	Pounds	(DD,21)
79	Betz ENTEC 733 Catalyzed Sulfide	Drums							300	Pounds	(W,25); (W,24)	200	Pounds	(R,40)	400	Pounds	(DD,21)
80	Betz ENTEC 750	Buckets							20	Pounds	(W,25)				20	Pounds	(DD,21)
81	Betz ENTEC Opti Sperse 10	Drums							280	Pounds	(W,25)				280	Pounds	(DD,21)
76	Boiler Chemicals 504 Chemicals	One 200 gal tank inside bldg										200	Gallons	(R,40)			
27	Borax	Bags				40,000	Pounds	(U,22); (AA,21)									
113	Calcium Hydroxide	Bags							25,000	Pounds	(V,26); (V,24)						
130	Carbonic Dioxide Anhydride	5,000 gal tank truck trailer													5,000	Gallons	(CC,23)
133	Cerium Nitrate	55 gal plastic drums				14,000	Gallons	(BB,26); (CC,25); (DD,26)							1,750	Gallons	(Y,50); (Y,51)
107	Cleaning Solvent	55 gal drums													160	Gallons	(W,24);(T,41);(BB,38)
17	Cyclosol 53 Solvent	7,520 gal aboveground tank	800	Gallons	(BB,24)												
114	De-Icer Tanner Gas	Metal drums										275	Gallons	(Q,40)			
9	Di(2-ethylhexyl) Phosphoric Acid	Plastic drums	295	Gallons	(CC,25)				4,000	Gallons	(W,21); (Y,24)						
10	Di(2-ethylhexyl) Phosphoric Acid	130 gal tank inside bldg	65	Gallons	(DD,23)												
20	Diesel #2	150 gal aboveground tank	150	Gallons	(DD,21)												
53	Diesel #2	22,000 gal aboveground tank				11,000	Gallons	(W,18)									
54	Diesel #2	Two 10,000 gal aboveground tanks				10,000	Gallons	(W,18)									
64	Diesel #2	20,000 gal aboveground tank										15,000	Gallons	(R,38)			
119	Diesel #2	Two 5,000 gal underground tanks													5,000	Gallons	(AA,37)
65	Diesel #6	24,000 gal aboveground tank										16,000	Gallons	(R,38)			
66	Diesel #6	11,000 gal aboveground tank										7,500	Gallons	(R,38)			
68	Econofloat 131	Metal drums										440	Gallons	(P,40); (Q,40)			
127	Ethylene Glycol	55 gal drums													475	Gallons	(W,24);(T,41);(BB,38)
120	Gasoline, Unleaded	5,000 gal underground tank													2,500	Gallons	(AA,37)
103	Grease	25 pound buckets													100	Pounds	(W,24)
104	Grease	14.4 ounce cartridges													200	Cartridges	(W,24)
116	Grease, Gearite HD 4800	55 gal drums													360	Gallons	(BB,38); (P,40)
99	Hydraulic Oil Improver	55 gal drums													30	Gallons	(Z,36)
36	Hydrochloric Acid (0.3%)	FRP cells (in process)							11,600	Gallons	(Y,25)						
59	Hydrochloric Acid (30%-35%)	22,500 gal aboveground tank										11,000	Gallons	(W,29)			
34	Hydrochloric Acid (33% - 40%)	Polyethylene drums															
35	Hydrochloric Acid (34%-35%)	Two 33,000 gal aboveground tanks				40,000	Gallons	(W,19)									
37	Hydrochloric Acid (less than 0.1%)	FRP cells (in process)							4,500	Gallons	(Y,25); (X,25)						
18	Hydrogen Peroxide (35%)	Polyethylene drums	110	Gallons	(DD,23)				470	Gallons	(V,25); (X,26)						
23	Hydrogen Peroxide (35%)	10,000 gal aboveground tank				1,500	Gallons	(X,20)									
25	Hydroxylamine Hydrochloride	Fiber drums				24,000	Gallons	(U,22); (X,25); (X,26)									
134	Ionquest 801	55 gal drums				600	Gallons	(DD,23); (DD,24)									
2	ITEM DELETED FROM INVENTORY IN NOVEMBER 1995 (Item No. reserved for future use)																
19	ITEM DELETED FROM INVENTORY IN OCTOBER 1994 (Item No. reserved for future use)																
57	ITEM DELETED FROM INVENTORY IN OCTOBER 1994 (Item No. reserved for future use)																
50	Kerosene	11,000 gal aboveground tank				5,500	Gallons	(W,18)									
111	Kerosene	55 gal drums													55	Gallons	(T,41)
58	Liquid Nitrogen	9,800 gal pressurized tank							9,800	Gallons	(X,26)						
105	Methanol	55 gal drums													225	Gallons	(W,24); (BB,38)
56	Nalco 7871 Flocculent (0.12%)	10,000 gal concrete tank				5,000	Gallons	(Y,23)									
55	Nalco 7871 Flocculent (conc.)	2,300 gal tank inside bldg				2,300	Gallons	(Y,23)									
128	Nalco 7871 Flocculent (conc.)	Plastic drums							825	Gallons	(U,22)						
30	Nalco 8817 (0.01% Solution)	500 gallon tank inside bldg				300	Gallons	(Z,22)									

SUMMARY LISTING OF HAZARDOUS MATERIALS (SORTED ALPHABETICALLY)

			SPECIALITY PLANT			CERIUM 96 PLANT			CHEMICAL PLANT			FLOTATION PLANT			ALL OTHER FACILITY AREAS		
INVENTORY ITEM No.	HAZARDOUS MATERIAL	CONTAINER TYPE	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)
29	Nalco 8817 Defoamer (conc.)	Two 2,300 gal aboveground tanks				1,150	Gallons	(Z,22)	1,150	Gallons	(X,22)						
69	Nalco 8817 Defoamer (conc.)	Metal drums															
8	Nitric Acid (0.01%)	SX-5 cells (in process)	2,020	Gallons	(CC,24);(DD,23)												
7	Nitric Acid (1%)	SX-6 cells (in process)	15,750	Gallons	(CC,24);(DD,24)												
6	Nitric Acid (2%)	SX-7 cells (in process)	1,475	Gallons	(CC,25);(DD,24)												
4	Nitric Acid (23%)	5,000 gal aboveground tank	2,500	Gallons	(CC,23)												
5	Nitric Acid (5%)	SX-4 cells (in process)	7,528	Gallons	(CC,24);(DD,23)												
1	Nitric Acid (64%)	10,000 gal aboveground tank	7,000	Gallons	(CC,23)												
3	Nitric Acid (64%)	10,000 gal aboveground tank	7,000	Gallons	(DD,23)												
11	Oxalic Acid	Bags	40,000	Pounds	(CC,25);(EE,23);(DD,24)	500	Pounds	(Z,21)	60,000	Pounds	(V,25); (U,22); (X,25)						
75	PAMAK 25 Additive	80,000 pound tank inside bldg										40,000	Pounds	(O,39)			
67	Pamolyn Fatty Acid 125	Metal drums										1,700	Gallons	(R,41)			
89	Pentolite	Numbers													250	Numbers	(B,21)
95	Petroleum Oil, 10 Wt Motor Oil	275 gal tank inside bldg													150	Gallons	(Z,36)
96	Petroleum Oil, 10 Wt Motor Oil	55 gal drums													305	Gallons	(Z,36); (BB,38)
93	Petroleum Oil, 30 Wt Motor Oil	275 gal tank inside bldg													150	Gallons	(Z,36)
94	Petroleum Oil, 30 Wt Motor Oil	55 gal drums													330	Gallons	(Z,36);(T,41);(BB,38)
91	Petroleum Oil, 40 Wt Motor Oil	275 gal tank inside bldg													150	Gallons	(Z,36)
92	Petroleum Oil, 40 Wt Motor Oil	55 gal drums													330	Gallons	(Z,36);(W,24);(BB,38)
101	Petroleum Oil, 4EPNL	55 gal drums													55	Gallons	(W,24);(T,41)
108	Petroleum Oil, 4EPNL	55 gal drums													80	Gallons	(W,24);(BB,38)
115	Petroleum Oil, 50 Wt Motor Oil	55 gal drums													275	Gallons	(BB,38)
97	Petroleum Oil, 80/90 Wt Gear Lube	275 gal tank inside bldg													150	Gallons	(Z,36)
98	Petroleum Oil, 80/90 Wt Gear Lube	55 gal drums													140	Gallons	(Z,36);(W,24);(T,41);(BB,38)
118	Petroleum Oil, 85/140Wt Gear Lube	55 gal drums													55	Gallons	(BB,38)
109	Petroleum Oil, AW 46 UNAX	55 gal drums													245	Gallons	(W,24);(BB,38)
112	Petroleum Oil, High Temp Grease	55 gal drums													120	Gallons	(W,25)
102	Petroleum Oil, Pure Lube 718	55 gal drums													25	Gallons	(T,41)
117	Petroleum Oil, Turbine Oil VG 220	55 gal drums													55	Gallons	(BB,38)
100	Petroleum Oil, VG 68	55 gal drums													110	Gallons	(W,24);(T,41);(BB,38)
110	Petroleum Oil-ATF Dextron II	55 gal drums													330	Gallons	(W,24);(BB,38)
106	Petroluem Oil	55 gal drums													25	Gallons	(W,24)
26	Potassium Chloride	Bags				35,000	Pounds	(U,22)									
90	PRIMADET Non Electric Detonators	Numbers													5,000	Numbers	(B,21)
121	Propane	20,000 gal aboveground tank													15,000	Gallons	(Z,52)
122	Propane	1,144 gal aboveground tank													572	Gallons	(Y,37)
123	Propane	Two 1,000 gal aboveground tanks													1,000	Gallons	(Y,37)
124	Propane	Five 499 gal aboveground tanks													1,248	Gallons	(T,63);(V,61);(Y,59);(N,42);(Y,37)
125	Propane	350 gal aboveground tank													175	Gallons	(W,57)
126	Propane	325 gal aboveground tank													163	Gallons	(U,47)
43	Purification Feed	10,200 gal aboveground tank							10,200	Gallons	(X,26)						
44	Purification Feed	1,000 gal tank inside bldg							1,000	Gallons	(X,25)						
74	Rhodopan EC 111	Cardboard drums										1,750	Pounds	(P,40)			
87	Shiny Side	Plastic containers													15	Gallons	(Z,38)
21	Sodium Carbonate	Two 128,000 pound aboveground bins				100,000	Pounds	(Y,20)	100,000	Pounds	(X,25); (Y,21); (Y,20)						
60	Sodium Carbonate	152,400 pound aboveground bin										76,200	Pounds	(Q,40)			
22	Sodium Carbonate (15%)	Two 6,500 gal aboveground tanks				9,000	Gallons	(Y,20)									
46	Sodium Carbonate (15%)	8,000 gal aboveground tank							4,000	Gallons	(X,24)						
61	Sodium Carbonate (21%)	8,000 gal tank inside bldg										4,000	Gallons	(Q,40)			
62	Sodium Carbonate (21%)	1,000 gal tank inside bldg										1,000	Gallons	(Q,40)			
77	Sodium Carbonate (Ash)	Bags							30,000	Pounds	(V,24); (X,25); (U,25)						
48	Sodium Hydrosulfide (20%)	16,000 gal aboveground tank							8,000	Gallons	(V,22)						
32	Sodium Hydroxide (20%)	4,000 gal aboveground tank				2,000	Gallons	(Z,22)									
31	Sodium Hydroxide (50%)	8,000 gal aboveground tank				4,000	Gallons	(Y,21)									
85	Sodium Hydroxide (50%)	Drums													110	Gallons	(DD,21)
47	Sodium Hydroxide (beads)	Steel drums							20,000	Pounds	(V,26);(X,26)						
84	Sodium Hydroxide (beads)	Steel drums													1,650	Pounds	(DD,21)
63	Sodium Silicofluoride	Bags										20,000	Pounds	(R,41); (P,40)			
33	Sodium Sulfide	Steel drums				1,600	Pounds	(V,25)									
135	Strontium Carbonate	Cardboard drums							3,600	Pounds	(V,22); (V,23)						
38	Sulfuric Acid (93.2%)	polyethelene drums							1,100	Gallons	(U,25); (X,25)						
52	Superfloc 107 Flocculent (0.23%)	55 gal drums															

SUMMARY LISTING OF HAZARDOUS MATERIALS (SORTED ALPHABETICALLY)

INVENTORY ITEM No.	HAZARDOUS MATERIAL	CONTAINER TYPE	SPECIALITY PLANT			CERIUM 96 PLANT			CHEMICAL PLANT			FLOTATION PLANT			ALL OTHER FACILITY AREAS		
			MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)	MAXIMUM QUANTITY	QUANTITY UNITS	STORAGE LOCATION (Map Coordinates)
51	Superfloc 107 Flocculent (conc.)	Bags							3,000	Pounds	(U,22)						
70	Superfloc 127 Flocculent	Bags										1,100	Pounds	(S,41)			
71	Superfloc 127 Flocculent	500 gal tank inside bldg										250	Gallons	(Q,40)			
39	SX-1 Feed Mixture	Three aboveground tanks (various capacities)							16,000	Gallons	(Y,24)						
41	SX-1 Organic Feed Mixture	Four aboveground tanks (various capacities)							14,000	Gallons	(Y,24)						
40	SX-2 Feed Mixture	aboveground tank							20,000	Gallons	(Y,24)						
42	SX-2 Organic Feed Mixture	5,000 gal aboveground tank							2,500	Gallons	(X,24)						
142	Unocal Anti-freeze & Coolant	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
139	Unocal Extra Duty NL Gear Lube 4EP	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
140	Unocal Extra Duty NL Gear Lube 7EP	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
143	Unocal Guardol Motoroil 30	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
136	Unocal MP Gear Lube LS 80W90	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
146	Unocal Multipurpose ATF	55 gallon drums													55	Gallons	(T, 41)
144	Unocal Steaval A	55 gallon drums							55	Gallons	(W, 25)						
145	Unocal Turbine Oil 220	55 gallon drums													55	Gallons	(T, 41)
137	Unocal Turbine Oil 68	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
141	Unocal UNAX AW 32	55 gallon drums							55	Gallons	(W, 25)						
138	Unocal UNAX AW 46	55 gallon drums							55	Gallons	(W, 25)				55	Gallons	(T, 41)
24	Urea, Carbamide	Bags				25,000	Pounds	(U,22); (Z,22)									
72	Wesfig 120CP-1500	8,000 gal aboveground tank										4,000	Gallons	(O,39)			
73	Wesfig 120CP-1500 (30%)	1,000 gal tank inside bldg										1,000	Gallons	(Q,40)			
129	Wesfig120CP-1500 (30%)	6,000 gal tank inside bldg													3,000	Gallons	(Q,40)
49	Zinc Powder	5 gal steel drums							10,000	Pounds	(U,22); (X,25)						

APPENDIX C

MAGNITUDES OF EMISSIONS FOR EACH MINING PHASE

APPENDIX C
EMISSION INVENTORY ASSUMPTIONS

The emission inventory for the various phases of mining was developed using information in emission inventories compiled by Molycorp for the 1991 and 1993 operating years. The Molycorp inventories were used to identify the emission sources at the mine and other source-specific information such as combustion equipment fuel use, silt content of the materials, PM_{10} adjustment factors, and efficiencies of emissions control equipment. This source-specific information was applied to the ore and overburden production rates for each phase given in Table 2.5-3 and the emission factors used. Emissions factors from the most recent version (fifth edition, January 1995) of EPA's Compilation of Air Pollutant Emission Factors (AP-42) were used unless source-specific data were available from Molycorp.

Data were preferentially taken from the 1991 inventory, since the ore production of 468,687 tons in 1991 was considered more representative of the 500,000 tons assumed as the base case than the 439,876 tons of ore mined in 1993. However, the 1993 inventory had several additional sources not listed in 1991. Some variation in activities is expected year to year, e.g., the solvent extraction systems were used in 1991 but not 1993, and there was relatively more overburden removal in 1991 than 1993. However, for this analysis, a constant ore production level and associated processing were assumed. In general, data were chosen to represent a conservative or realistic worst-case scenario. The assumptions used for each of the source types are provided below. The emission inventory for criteria pollutant emissions from combustion equipment (boilers, dryers, and roaster) and combustion emissions from vehicles is contained in Table C-1. The emission inventory for PM_{10} emission sources (including the combustion emissions) is given in Table C-2. Reactive organic gases (ROG) emission sources, i.e., the solvent extraction system and fuel storage tanks, are listed in Table C-3. Emissions from the combustion equipment/vehicles and ROG sources were assumed to stay constant in future years.

Boilers

Fuel use from 1991 was used for the 1,000 horsepower (hp) boiler in the Mill and the 300 hp Chemical Plant boiler. Fuel use from 1993 was used for the 300 hp Specialty Plant boiler. The new 500 hp boiler was estimated to have half the fuel use of the Mill boiler.

Emission rates for all the boilers were based on a 1990 source test of the Mill boiler. Emission rates in lbs/1000 gal are: total organic gases (TOG) - 2.5, ROG - 1.67, NO_x - 69.5, SO_x - 72.0 for two large boilers and 2.18 for two smaller boilers, CO - 10.0, and PM_{10} -17.3.

Dryers, Furnaces, and Roasters

Fuel use from 1991 was used. Emission rates are based on Molycorp source test data as follows:

Dryers (in lbs/1000 gal): TOG - 49.1, ROG - 0.17, NO_x - 60.0, SO_x - 2.18, CO - 101.0, and PM_{10} -17.3.

Table C-1 Combustion Equipment Emissions

Equipment	Fuel Use	Units	Organic Gases	Reactive Organic Gases	Nitrogen Oxides	Sulfur Oxides	Carbon Monoxide	Part. Matter-10	units
Boilers									
Mill Boiler	966380	gal/yr	2416	1614	67163	69579	9664	16718	lbs/yr
Chem/Sep	272619	gal/yr	682	455	18947	594	2726	4716	lbs/yr
Boiler 300hp	56300	gal/yr	141	94	3913	123	563	974	lbs/yr
Boiler 500hp	483190	gal/yr	1208	807	33582	34790	4832	8359	lbs/yr
Total	1778489	gal/yr	4446	2970	123605	105086	17785	30768	lbs/yr
Dryers & furnaces									
Conc Dryer	150856	gal/yr							
#1 LA Dryer	9008	gal/yr							
#2 LA Dryer	73596	gal/yr							
#1 CE Dryer	19904	gal/yr							
#2 CE Dryer	161225	gal/yr							
Total	414589	gal/yr	20356	70	24875	904	41873	9274	lbs/yr
Herr. Roaster									
Throughput	56690595	lbs/yr							
Hours	5495	hours/yr							
	381456	gal/yr	1629	65	4509	1125	8423	1156	lbs/yr
Misc. Vehicles	105070	gal-gas/yr	19018	19018	10087	525	416077	630	lbs/yr
	269877	gal-deis/yr	5398	5398	77185	8366	33195	4858	lbs/yr
TOTAL			50847	27521	240261	116007	517353	46686	lbs/yr

Table C-2 PM10 Emission Sources

Process	amount	units	Mining and Process Levels Present (1995)	Phase I (2005)	Phase II (2015)	Phase III (2025)	Particulate Emissions (PM10) (lbs/yr) Present (1995)	Phase I (2000)	Phase II (2015)	Phase III (2025)
Drilling	64	holes/blast								
Emission Factor =	0.618	lbs/hole					2294	3718	5102	6447
Blasting										
Waste	2000000	tons/yr	2000000	3620000	5420000	7220000				
Ore	500000	tons/yr	500000	500000	500000	500000				
Total	2500000	tons/yr	2500000	4120000	5920000	7720000				
No of Blasts per year	58		58	94	129	163	61770	100110	137385	173595
Emission Factor =	1065	lb/blast								
Loading Trucks										
Overburden	2000000	tons/yr	2000000	3620000	5420000	7220000				
Ore	500000	tons/yr	500000	500000	500000	500000				
Total	2500000		2500000	4120000	5920000	7720000	3116	5134	7378	9621
Emission Factor =	0.001246213	lb/ton								
Haulage										
Ore and Waste	29412	trips/yr	29412	48471	69647	90824	100861	166219	238839	311459
Emission Factor =	3.43	lb/trip	80% control							
Tailings Storage	3	cuyd/yr	3	3	3	3				
Wind Erosion										
Emission Factor E =	2835.00	lb/cuyd	80% control				8505	1701	1701	1701
Overburden Storage		acres	39	79	127	123				
Wind Erosion										
Emission Factor E =	23.80	lbs/yr/acre					928	1880	3023	2927

TABLE C-2 (Cont'd)

Unloading										
Ore	500000	tons/yr	500000	500000	500000	500000				
Overburden	2000000	tons/yr	2000000	3620000	5420000	7220000				
	2500000	tons/yr	2500000	4120000	5920000	7720000	3116	5134	7378	9621
Emission Factor =	0.00124621	lb/ton								
Crusher										
Ore Crushed	500000	tons/yr					42560	42560	42560	42560
Misc Baghouses and Sources							12100	12100	12100	12100
Combustion Sources							41198	41198	41198	41198
Misc. Vehicles							5488	5488	5488	5488
						TOTAL (lbs/yr)	281936	385243	502151	616717
						TOTAL (tons/yr)	141	193	251	308
						TOTAL (lbs/hr)	32.18	43.98	57.32	70.40
						Increase		11.79	13.35	13.08

Table C-3 Misc. ROG Emission Sources (lb/yr)

Process	Amount	Units	Reactive Organic Gases
SX-4	1.83	lbs/hr	
Hours Operated	3365	hours/yr	6158
SX-5	1.14	lbs/hr	
Hours Operated	2293	hours/yr	2614
SX-6	1.52	lbs/hr	
Hours Operated	2293	hours/yr	3485
SX-7	1.19	lbs/hr	
Hours Operated	2327	hours/yr	2769
SX-1 Vap Rcy	13.2	lbs/hr	
Hours Operated	5376	hours/yr	70963
SX-2 Vap Rcy	13.2	lbs/hr	
Hours Operated	4584	hours/yr	60509
Gasoline UST	105070	gal/yr	
	3.1	lb/mgal	326
Diesel UST	269877	gal/yr	
	0.036	lb/mgal	10
Total			**146834**

Herreshoff Roaster (in lbs/1000 gal): TOG - 4.3, ROG - 0.17, NO_x - 11.8, SO_x - 2.95, CO - 22.1, and PM_{10} - 3.03.

Baghouse and Scrubber Emissions

Baghouse throughputs and hours of operation from 1991 were used with the following source test data:

Mill, bastnasite packaging, #2 CE, #1&2 LA, and CE 96 baghouse - 0.82 lbs/hr PM_{10}; Herreshoff Roaster baghouse - 0.252 lbs/hr PM_{10}; Skinner Roaster baghouse and #1 CE Scrubber - 1.45 lbs/hr PM_{10}.

Total PM_{10} emissions from these sources based on the 1991 data were about 5 tons per year. PM_{10} emissions from these sources in the 1993 Molycorp inventory contributed less than 0.1 ton per year. The reason for the large disparity between the two Molycorp inventories is unknown. The higher 1991 emissions were used for this analysis as representing worst case.

Crushing Plant

The following sources and factors from the 1993 Molycorp inventory scaled up to 500,000 tons of ore were assumed for the Crushing Plant:

Device	Control	Eff.	PM_{10} Factor	Thruput (Tons)	PM_{10} Emissions
Jaw crusher	baghouse	70	0.017	500,000	2550
Primary crusher	baghouse	90	0.009	500,000	450
Product screening	baghouse	70	0.120	500,000	18000
Product screening	baghouse	70	0.120	500,000	18000
Tertiary crusher	baghouse	90	0.009	150,000	135
Screen oversize	baghouse	90	0.009	150,000	135
Secondary crusher	baghouse	90	0.009	200,000	180
Secondary crusher	baghouse	80	0.017	200,000	680
Secondary crusher	baghouse	90	0.009	200,000	180
Tertiary crusher	baghouse	70	0.017	150,000	765
Belt feeder	baghouse	90	0.009	150,000	135
Product conveyor	baghouse	90	0.009	500,000	450
Stacker conveyor	water	80	0.009	500,000	900

Note: emissions were scaled to a 420,000-ton throughput for the Underground Mining Alternative.

Drilling and Blasting

The ore and overburden are mined by drilling holes (8 inches in diameter and 6 feet deep) and blasting the rock into smaller pieces. The amount of drilling was derived based on the following Molycorp data:

	Ore	Overburden
Drill spacing/hole	16' x 16'	20' x 20'
Tons cuttings/hole	1.3	1.1
Tons blasted/hole	768	668
Holes/blast	64	64

Emission factors from AP-42 Section 11.9 Western Surface Coal Mines ($0.0005A^{1.5}$ lb/blast, where A is the horizontal surface area (25,600 square feet), from Table 11.9-2 for blasting and 1.3 lb/hole from Table 11.9-4 for drilling) were used. Blasting emissions were converted to PM_{10} using a 0.52 factor from AP-42 Table 11.9-2 and drilling emissions were converted to PM_{10} using Molycorp's 47.5 percent adjustment factor.

Haulage

Haul trucks are used to move the ore and overburden material to the storage and processing areas. Number of trips was estimated based on the trucks carrying an 85-ton load each trip. The trucks were assumed to be loaded coming out of the pit and unloaded returning to the pit. According to Molycorp, the trucks can only go about 6-7 miles per hour (mph) fully loaded and are limited by governors on the engine to 20 mph on the return trip to ensure control. Trips were assumed to be 2.11 miles round trip based on the 1993 inventory. The emission factors were taken from AP-42 Section 13.2.2 Unpaved Roads, where the following data were assumed:

Parameter	Description	Loaded	Unloaded
k	PM_{10} particulate size factor	.36	.36
s	Silt content	8%	8%
S	Speed	7 mph	20 mph
W	Weight in tons of the truck	160	75
w	Number of wheels	6	6
p	Number of days with ≥.01" rain	27	27
E	PM_{10} emission factor in lb/VMT	6.06	10.19

Molycorp keeps the roads watered 80 percent of the time, so an 80 percent control efficiency was assumed. In 1995, Molycorp used 4,381,000 gallons of water for road dust control, with 75 percent of the water coming from the pit and 25 percent fresh water.

Loading and Unloading

PM_{10} emissions occur when loading the ore and overburden material in the mine into the haul trucks using a front end loader, unloading the material out of the trucks onto the storage piles or bins, and dropping ore into the dump hopper. Emissions from these processes were estimated using AP-42 Section 13.2.4 Aggregate Handling and Storage Piles. Assumptions for batch drop operations, i.e., both loading and unloading, included:

Parameter	Description	Value
k	PM_{10} particulate size factor	.35
s	Silt content	8%
U	Mean wind speed	8.4 mph

M Moisture content 3%

Tailings Storage

After processing, the tailings are released as a slurry into the tailings area. The current tailings area was formed by blocking a canyon and filling it in. The emissions from this source are difficult to estimate since only part of this area remains wet. The dry portion is subject to wind erosion, but is somewhat protected since the top of the area is below the ridges of the canyon.

PM_{10} emissions from the tailings storage area were estimated based on calculations found in *Molycorp Mountain Pass Mine Tailings Pond Dust Control Plan* (Environmental Solutions 1994b). This plan estimated the amount of annual emissions based on the amount of accumulation in areas downwind of the tailings storage areas. Although Molycorp estimated that only about 3 percent of this material will be less that 10 microns (PM_{10}), it is likely that a fair portion of the fine particulate would remain airborne and not accumulate. Therefore, the PM_{10} emissions were estimated to be on the order of three cubic yards per year, or 4.25 tons per year. These emissions were not adjusted to account for the addition of a new tailings area in Phase I or reclamation of the current tailings area during subsequent phases. However, Molycorp has begun implementing the dust control measures identified in the above plan (wind fences and sprinkler system), and so it is expected that emissions will be much less from this source in the future. No data on the expected efficiencies of the control measures were provided in the plan, so 80 percent control was assumed.

Overburden Storage

According to Molycorp, dust emissions from the overburden storage pile are minimal since most of the fine particulate is emitted during loading and unloading operations. However, to be conservative, some PM_{10} emissions from wind erosion of the pile were assumed. Insufficient data were obtained to calculate emissions using AP-42 Section 13.2.5 Industrial Wind Erosion. Therefore, Table A9-9-E, Estimating Emissions From Wind Erosion of Storage Piles, from the South Coast Air Quality Management District California Environmental Quality Act Handbook was used. The assumptions used for this equation were:

$E = (1.7 \times (G/1.5) \times [(365\text{-}H)/235] \times (I/15) \times J)$, where
E = PM_{10} emissions in lb/day/acre
G = 0.08: silt content
H = 27: number of days with $\geq 0.01"$ of rain
I = 15: percent of time that unobstructed wind speed > 12 mph at mean pile height
J = 0.5: PM_{10} portion

Information of the percentage of time that unobstructed wind speed was greater than 12 mph was estimated from wind speed data collected at the mine in 1990 and contained in *Molycorp Mountain Pass Mine Tailings Pond Dust Control Plan* (Environmental Solutions 1994b). These data were assumed to be measured at a height of about 30 feet (10 meters) above ground level. The overburden pile is currently about 100 feet high and is estimated to increase to about 200 feet high. Using the wind power law and assuming a neutral stability, it was calculated that a 9 to 10 mph wind at the reference height would be roughly equivalent to 12 mph at the pile height. The wind speed data provided in the dust control plan gave frequency of occurrence by wind speed groups, where wind speeds greater than 10 mph occurred 15 percent of the time.

The size of the overburden pile in acres was taken from Table 2.5-1.

Vehicle Exhaust

In addition to dust generation as vehicles drive over roads, pollutants are emitted from the exhaust of the vehicle due to combustion of the fuel. Molycorp purchases and stores gasoline and diesel fuel for the vehicles used at the mine and for transportation of product and wastes off-site. Exhaust emissions were calculated based on fuel records in 1993. Molycorp estimates that about 40 percent of the gasoline is used on site and 60 percent for trips made to Las Vegas. Since all of these emissions, even those off-site, are considered project-related, emissions were calculated for the entire fuel amount used. Emission factors from AP-42 Volume II Table II-7.1 for Off-Highway Trucks were used for the diesel engines and Table II-7.2 for Miscellaneous Gasoline-Powered Equipment were used for the gasoline engines.

ROG emissions from storage of these fuels in underground storage tanks were also estimated. Emission factors were based on AP-42 Section 5.2 Transportation and Marketing of Petroleum Liquids, Table 5.2-7 for the gasoline tank, assuming balanced submerged filling and controlled displacement losses. This emission factor was ratioed based on vapor weight fractions for the diesel tank, but assuming uncontrolled displacement losses.

Molycorp recently replaced the underground tanks with aboveground tanks. Insufficient data were obtained to calculate emissions from this configuration. It is likely that emissions would be higher due to breathing losses in an aboveground tank. However, since these emissions are projected not to change significantly in future years, they do not contribute to additional impacts associated with the proposed project.

Solvent Extraction Systems

The solvent extraction systems operated in 1991 but not 1993. ROG emissions were based on source test data as follows:

SX-1	13.2 lbs/hr of organic gases
SX-2	13.2 lbs/hr of organic gases
SX-4	1.83 lbs/hr of organic gases
SX-5	1.14 lbs/hr of organic gases
SX-1	1.52 lbs/hr of organic gases
SX-1	1.19 lbs/hr of organic gases

Miscellaneous Sources

There are other PM_{10} sources related to the manufacture of specific rare earth products. These include Yttrium furnaces, Cerium Carbonate precipitation system, Lanthanum flaker, Neodymium calciner, Leach circuit, Cement Plant, product packaging systems, etc. However, most of these are wet processes or controlled by baghouses. Therefore, PM_{10} emissions are estimated to be minor, and are shown as contributing a total of about one ton per year.

Air Compressors

For the Underground Mining Alternative, three 125 to 150 hp air compressors will be used to provide ventilation for the underground mine. These compressors were assumed to be dieselpowered, since electricity is limited at the site. Emissions were estimated for these engines based on AP-42 Section 3.3 Gasoline and Diesel Industrial Engines, Table 3.3-2. Note that the PM_{10} emissions from the ventilation system were assumed to be negligible, since it is expected that the underground mine surfaces will be wet due to seepage, so dust generation will be minimal, and most PM_{10} will be deposited within the mine. The hoists associated with this scenario are projected to be electric, and hence will not contribute to the project emissions.

AIR TOXIC EMISSIONS

As shown in Table C-2, the project is expected to produce a net increase in fugitive dust emissions over the levels produced by current operations. These emissions are a result of removal, hauling and storage of additional overburden from the pit. Comparing the Phase III emissions to Present emissions, this increase could be as large as 334,851 pounds per year (i.e., 616,717 minus 281,936). Since chemical analyses (Core Laboratories, 1990) conducted on samples from the Mountain Pass Mine have shown that the overburden contains trace amounts of heavy metals, the fugitive dust emissions are also a source of air toxic emissions. As shown in Table C-3 these emissions were calculated by multiplying the mass fraction of each metal in the overburden by the mass increase in dust emissions.

TABLE C-3
Air Toxics from Particulate Emission Increases

PM10 Emissions Increase = 334,781.00 lbs/yr

Toxic Compound	Concentration mg/kg	Detect/ Non-Detect	Emissions lb/yr
Arsenic	1	ND	0.33
Beryllium	5	ND	1.67
Cadmium	0.5	ND	0.17
Copper	32		10.71
Lead	44		14.73
Managanese	430		143.96
Mercury	0.1	ND	0.03
Nickel	25		8.37
Selenium	10	ND	3.35
Silica	853		285.57
Zinc	55		18.41

Mine Waste Rock Average August 1990 Data

PM 10 emission rate does not include combustion and misc. sources.

APPENDIX D

AIR TOXICS HEALTH RISK CALCULATION

SCREENING HEALTH RISK ASSESSMENT

The potential increase in air toxic emissions from the mine expansion project is presented in Appendix C. A conservative, screening-level risk assessment was performed to determine the potential long-term health effects of these emissions. Table D-1 shows a calculation of the toxic source strength of these emissions for carcinogenic and noncarcinogenic health effects. The toxic source strength for the carcinogenic effects is the sum of the products of the emission rates and the unit risk values for the chemicals considered. For the noncarcinogenic effects, it is the sum of the ratios of the emission rates to the Reference Exposure Levels (RELs) for the chemicals. When multiplied by a dispersion factor, an estimate of increased cancer risk or chronic hazard index is produced. In calculating the toxic source strength, note that conservative factors were used to account for noninhalation health effects. Also, the treatment of noncarcinogenic effects is conservative because this simplified treatment assumes that all chemicals affect the same human toxic endpoint (i.e., physiological system or organ).

The required dispersion factor was determined by applying the EPA ISCST3 dispersion model. In this modeling, the project emissions were represented by an "area" source centered on the pit area. The dimensions of the source were set to be 600 meters (1,968 feet) in the horizontal, which encompasses most of the expanded pit, and 10 meters (33 feet) in the vertical. The model was executed using a set of 54 separate meteorological conditions (combinations of wind speed and atmospheric stability class) similar to that used by the EPA SCREEN3 model. Receptors were placed at distances of 715 meters (2,345 feet) and 1,000 meters (3,280 feet) from the center of the expanded pit, which represents the distance to the Mountain Pass School and the nearby California Highway Patrol (CHP) living quarters, respectively.

TABLE D-1
Toxic Source Strength

Compound	Net Change in Annual Emissions (lb/yr)	Net Change in Average Emission Rate (g/s)	AB 2588 Unit Risk 1/(ug/m3)	Inhalation Cancer Source Strength (g/s)/(ug/m3)	Multipathway Cancer Source Strength (g/s)/(ug/m3)	AB 2588 Chronic REL (ug/m3)	Inhalation Non-Cancer Source Strength (g/s)/(ug/m3)	Multipathway Non-Cancer Source Strength (g/s)/(ug/m3)
Arsenic	3.30E-01	4.75E-06	3.3E-03	0.0157	0.042	5.0E-01	9.50E-06	9.50E-05
Beryllium	1.67E+00	2.40E-05	2.4E-03	0.0577	0.398	4.8E-03	5.01E-03	5.01E-02
Cadmium	1.70E-01	2.45E-06	4.2E-03	0.0103	0.010	3.5E+00	6.99E-07	6.99E-06
Copper	1.07E+01	1.54E-04				2.4E+00	6.42E-05	6.42E-05
Lead	1.47E+01	2.12E-04				1.5E+00	1.41E-04	1.41E-03
Manganese	1.44E+02	2.07E-03				4.0E-01	5.18E-03	5.18E-03
Mercury	3.00E-02	4.32E-07				3.0E-01	1.44E-06	1.44E-05
Nickel	8.37E+00	1.20E-04	2.6E-04	0.0313	0.031	2.4E-01	5.02E-04	5.02E-04
Selenium	3.35E+00	4.82E-05				5.0E-01	9.65E-05	9.65E-05
Zinc	1.84E+01	2.65E-04				3.5E+01	7.57E-06	7.57E-06
Total Toxic Source Strength:				1.15E-01	4.82E-01		1.10E-02	5.75E-02

Notes:
1) Cancer Source Strength values have been multiplied by 1.E6.
2) Carcinogenic multipathway factors taken from SCAQMD (1995).
3) Noncarcinogenic multipathway exposure adjustment factors set to 10.0.

Table D-2 summarizes the results of the modeling and calculates the corresponding increased cancer risk and chronic hazard index. Note that the risks inherently assume that an individual remains at the same receptor location continuously (24 hours per day, 365 days per year) for a period of 70 years. Moreover, the individual is assumed to consume produce grown at the receptor location, which is unlikely for a school and CHP living quarters. Because of these and other conservative assumptions in this analysis, actual risks would be much less than the risks presented.

TABLE D-2

Calculation of Health Risks

Receptor Name	Downwind Distance (meters)	Dispersion Factor[1] $(\mu g/m^3)/(g/s)$	Increased Cancer Risk[2] (per million)	Chronic Hazard Index[3]
School	715	9.03	4.35	0.52
Housing	1,000	7.82	3.77	0.45

[1] *From ISCST3 model, with 1 m/sec wind speed and F stability class; 1-hour average concentration multiplied by 0.1 to provide conservative estimate of annual average concentration.*

[2] Product of multipathway Cancer Source Strength from Table D-1 and the Dispersion Factor.

[3] Product of multipathway Non-Cancer Source Strength from Table D-1 and the Dispersion Factor.

APPENDIX E

CALCULATIONS - EFFECTS OF MINE PIT DEWATERING

Title	Date	Dwg.	Project		BY:
MOLYCORP EIS	1/30/95		1991-001-940		WPVL

EFFECTS OF MINE-PIT DE-WATERING

SEE: ENSR FIG 3-3 (WSW-ENE CROSS SECTIONAL DIAGRAM OF PROPOSED MINE PIT)

AND

ENSR PLATE 1 (PLAN VIEW OF PROPOSED MINE PIT)

GIVEN:

FOR FRACTURED BEDROCK:

$$\left.\begin{array}{l} 10^{-5}\ \text{cm/sec} < K < 10^{-3}\ \text{cm/sec} \\ S_y \cong 0.05 \end{array}\right\}$$ ENVIRONMENTAL SOLUTIONS, 1994

$S_y \cong 0.01$ (SRK, 1985)

CURRENT (1994) POTENTIOMETRIC-SURFACE ELEVATION ≅ 4600 FT.
(ENV. SOLUTIONS, 1994, FIG. 2-5)

ASSUME:

RADIAL FLOW TO PIT
UNCONFINED CONDITIONS
$K = 10^{-4}$ cm/sec $= 10^{2}$ ft/yr

PUMPING RATE:

USING THE THIEM (1906) EQUATION FOR STEADY-STATE RADIAL FLOW (DERIVED FROM DARCY'S LAW):

$$K = \frac{Q \ln(r_2/r_1)}{\pi\,(h_2^2 - h_1^2)}$$

THEREFORE:

$$Q = \frac{K\pi\,(h_2^2 - h_1^2)}{\ln(r_2/r_1)}$$

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Title	Date	Dwg.	Project	Proposal BY:
MOLYCORP EIS	1/30/95		1991 – 001 – 940	WPYL

SETS head, $h_1 = 0$ AT BOTTOM OF PROPOSED PIT (ELEV $\cong$ 4000')

THEREFORE: AT LIMIT OF CONE OF INFLUENCE,
head, $h_2 = 4600 - 4000 = 600$ FT

TO DE-WATER PIT, r_1 ($@ h_1 = 0$) $\cong$ 200 FT (RADIUS OF BASE OF PIT)

r_2 ($@ h_2 = 600$ FT) $\cong$ 1000 FT (FROM PLATE 1)

$$\therefore \quad Q = \frac{(10^2 \text{ ft/yr})\, \pi\, (600 \text{ ft})^2}{\ln(1000/200)} = 7.03 \times 10^7 \text{ ft}^3/\text{yr}.$$

$$= 1.93 \times 10^5 \text{ ft}^3/\text{day} \cong 1000 \text{ gal/min}$$

$$\boxed{Q \cong 1000 \text{ gal/min}}$$

CONCLUSION: TO DEWATER THE PROPOSED PIT TO ELEV. = 4000 FT, IT WILL HAVE TO BE PUMPED AT APPROXIMATELY 1000 gal/min (AN ORDER-OF-MAGNITUDE ESTIMATE).

Title	Date	Dwg.	Project	BY:
MOLYCORP EIS	1/30/95		1991-001-940	WPVL

LATERAL SPREAD OF CONE OF INFLUENCE:

PARAMETERS USED:

$$K \cong 1\times10^{-4} \text{ cm/sec} = 1\times10^{2} \text{ ft/yr}$$

SATURATED THICKNESS, $b = 650$ ft

$$S = 0.01$$

$$\therefore \ T = Kb = 6\times10^{4} \text{ ft}^2/\text{yr}$$

TIME, $t = 30$ yrs OF PUMPING

$$Q \cong 1000 \text{ gal/min} = 7.03\times10^{7} \text{ ft}^3/\text{yr}$$

TWO APPROACHES (REPRESENTING OPPOSITE END-POINTS OF ASSUMPTIONS)

APPROACH #1:

ASSUME:

1) AQUIFER IS INFINITE IN AREAL EXTENT (PRACTICALLY: AS THE CONE OF INFLUENCE SPREADS OUT, NO AQUIFER BOUNDARIES [POSITIVE OR NEGATIVE] ARE ENCOUNTERED; THIS MEANS THAT STEADY-STATE CONDITIONS ARE NEVER REACHED)
2) HORIZONTAL, RADIAL FLOW TO THE PIT (i.e. NO VERTICAL INFILTRATION)
3) PUMPING IS CONTINUOUS FOR 30 YEARS

USING THE THEIS (1935) EQUATION FOR TRANSIENT-STATE RADIAL FLOW:

$$T = \frac{Q}{4\pi s} W(u) \qquad S = \frac{4Ttu}{r^2}$$

WHERE: s = DRAWDOWN
$W(u)$ = THE WELL FUNCTION OF u

REARRANGING YIELDS:

$$W(u) = \frac{4\pi s T}{Q}$$

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MOLYCORP EIS	1/30/95		1991-001-940	WPVL

AT THE EDGE OF THE CONE OF INFLUENCE:

$s \cong 0.01$ FT (APPROXIMATELY THE SMALLEST DRAWDOWN THAT WE CAN MEASURE)

$$W(u) = \frac{4\pi\,(0.01\ \text{FT})\,(6\times10^{4}\ \text{FT}^2/\text{YR})}{7.03\times10^{7}\ \text{FT}^3/\text{YR}}$$

$$W(u) = 1.07\times10^{-4}$$

FROM TABLES OF $W(u)$ vs. u (USGS PP #708 by LOHMAN, 1979):

$$u = 7.07$$

NEXT:

$$S = \frac{4Ttu}{r^2}$$

SOLVING FOR r YIELDS:

$$r = \left[\frac{4Ttu}{S}\right]^{1/2}$$

AND

$$r = \left[\frac{4\,(6\times10^{4}\ \text{ft}^2/\text{yr})\,(30\ \text{yrs})\,(7.07)}{0.01}\right]^{1/2} = 7.13\times10^{4}\ \text{ft}$$

$$\boxed{r_1 \cong 13.5\ \text{miles}}$$

CONCLUSION: IF NO VERTICAL INFILTRATION (e.g. FROM RAINFALL) OCCURS, AND THE CONE OF INFLUENCE CONTINUES TO SPREAD OUT UNABATED, IT WILL HAVE SPREAD 13.5 miles AFTER 30 years.

APPROACH #2:

ASSUME:

1) AS PUMPING CONTINUES, THE "AREA OF INFLUENCE" EXPANDS. THE LOWERING OF HYDRAULIC HEAD WITHIN THE AREA OF INFLUENCE INDUCES VERTICAL INFILTRATION FROM RAINFALL.

2) THE INFILTRATION OF RAINFALL IS EVENLY DISTRIBUTED OVER THE LAND SURFACE AT APPROXIMATELY 10% OF ANNUAL RAINFALL. (RAINFALL $\cong$ 10 in/yr. $\therefore$ INFILTRATION, $i \cong 1$ in/yr).

3) ONCE THE AREA OF INFLUENCE HAS SPREAD OUT ENOUGH, TOTAL INFILTRATION EQUALS PUMPING RATE. AT THIS POINT, THE CONE OF INFLUENCE STOPS EXPANDING RADIALLY OUTWARD, AND STEADY-STATE CONDITIONS ARE REACHED.

THAT IS:

$$A = \frac{Q}{i} = \frac{7.03 \times 10^7 \ ft^3/yr}{1/12 \ ft/yr}$$

$$A = 8.44 \times 10^8 \ ft^2$$

AND:

$$A = \pi r^2$$

THUS:

$$r = \left[\frac{A}{\pi}\right]^{1/2}$$

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MOLYCORP EIS	1/30/95		1991-001-940	WPVL

$$r = \left[\frac{8.44 \times 10^8 \ ft^2}{\pi} \right]^{1/2} = 1.64 \times 10^4 \ ft$$

$$\boxed{r_2 \cong 3.1 \ \text{miles}}$$

CONCLUSION: AFTER THE CONE OF INFLUENCE HAS SPREAD APPROXIMATELY 3.1 miles, TOTAL INFILTRATION FROM RAINFALL $\left(= 1 \text{ inch}/yr = 1 \ \frac{\text{inch}^3/yr}{in^2} \right)$ WILL

EQUAL 1000 gal/min OVER THE AREA OF INFLUENCE. THEN, STEADY-STATE CONDITIONS WILL BE REACHED, AND THE CONE OF DEPRESSION WILL STOP SPREADING.

FINAL CONCLUSION:

THE SCENARIO IN APPROACH #2 WILL OCCUR IN LESS THAN 30 YEARS (BECAUSE IF NO INFILTRATION HAD OCCURRED, THE CONE OF INFLUENCE WOULD HAVE SPREAD 13.5 MILES BY THEN). THUS, APPROACH #2 PROVIDES THE LIMITING SITUATION, AND:

$$\boxed{r = 3.1 \ \text{miles}}$$

AFTER 30 years OF PUMPING AT Q = 1000 gal/min

ENSR FORM 1052

Post-it® Fax Note 7671	Date 9/11/96	# of pages ▶ 11
To Mr. Geoff Nason	From [illegible]	
Co./Dept. Molycorp	Co. GSi/water	
Phone # 619 856 2201	Phone # 818 4410039	
Fax # 619 856 2253	Fax # 4410750	

520 MISSION ST
SOUTH PASADENA
CALIFORNIA 91030

GSi/water

(818) 441-0039
(213) 255-4511

May 26, 1995

Mr. Geoff Nason
MOLYCORP, INC.
67750 Bailey Road
P.O. Box 124
Mountain Pass, CA 92366

Dear Mr. Nason:

As you requested, we have reviewed a portion of ENSR's draft report, specifically pages 4-50 and 4-51, and attached calculations of effects of mine pit dewatering using Thiem and Theis equations. They used the Thiem equation to calculate the pumping rate needed to dewater the expanded pit. They then used the Theis nonequilibrium equation to calculate how far the cone of depression due to dewatering would expand.

Both equations are standard in the profession, and the values that they selected for hydraulic conductivity and storage coefficient are defensible. Beyond that, however, the results that they derive cannot be considered applicable to the Mountain Pass Site.

CONCEPTUAL DISCUSSION

Dewatering. Given our understanding of the geology and the hydrology, it is highly unlikely that a well or a group of wells in or in the vicinity of the mine pit could produce 1000 gallons per minute from the fractured bedrock. The hydraulic conductivity value that they use (10^{-4} cm/sec) may be locally representative of the near-surface fractured bedrock, but from field observations and test drilling, the bedrock fractures tighten with depth. Hydraulic conductivity values in the area range from 10^{-3} cm/sec to 10^{-6} cm/sec, and we believe that the hydraulic conductivity values in the deeper bedrock will more closely resemble the tighter end of the range.

Were Molycorp able to produce even 500 gallons per minute from the mine site area, it would not have been necessary to build two well fields, one in Shadow Valley and the other in Ivanpah Valley, requiring about 15 miles of pipeline, and from Ivanpah a lift of as much as two thousand feet. Molycorp would have been producing all of the water it needed from the mine pit immediately adjacent to its facilities.

Spread of the cone. The calculations on spread of the cone of depression cannot be representative of the Mountain Pass Site. The mine pit, within a three mile radius, is surrounded by a very complex topography consisting of ridges and mountains rising hundreds of feet to more than two thousand feet above the elevation of the mine pit. Within a thirteen mile radius, the topographic/geologic complexity is even greater. Included are the Shadow Valley and Ivanpah ground water basins, beginning within five miles of the pit. A thirteen-mile spread of the cone of depression would in fact reach well into the State of Nevada. This is inconceivable.

The calculations appear to have been made using some or all of the Theis assumptions. For this application, the most important of the assumptions are that the aquifer is isotropic and homogeneous, and that there is no recharge. With recharge, the cone supposedly spreads three miles. Without recharge, the cone supposedly spreads thirteen miles.

The Mountain Pass Site is extremely complex. It contains several types of alluvium, several types of bedrock, several types of joint systems, and many faults. Hydraulic conductivity values cover a very large range from that of highly permeable alluvium to extremely tight bedrock. Clearly, the most basic of the Theis assumptions, that the "aquifer" is isotropic and homogeneous, prohibits a simple application of the Theis equations at Mountain Pass.

Regarding recharge, it seems that the calculations assume something like a level plain beneath which no rainfall occurs to recharge the expanding cone (thirteen miles), or on which rainfall occurs and recharges the expanding cone by downward infiltration (three miles). Obviously, this does not describe Mountain Pass.

At Mountain Pass, the expanding cone will not need to depend on recharge by downward-infiltrating rainfall. As it expands it will encounter ground water mounded beneath the surrounding ridges, with increased hydraulic gradients; and farther away, the huge ground water bodies in highly permeable alluvium. With or without rainfall, and even if the pit is dewatered at 1,000 gallons per minute, by no stretch of imagination could the cone extend across the Ivanpah Alluvial Basin into Nevada.

Springs. On page 4-50, the statement is made "Any springs within the cone of depression would decrease in flow rate or go dry". On page 4-51, the writer refers to five springs within 3 miles of the mine pit and four to six springs a little over 4 miles north of the mine.

It is not necessarily true that any springs over the expanding cone of depression will decrease or go dry. In this highly complex topography, springs may be fed from shallow up-slope sources that are not in hydraulic continuity with the ground water. That is a type of through-flow whose sources cannot be diverted by what happens to the underlying ground water.

....

For the reasons stated above, we are by no means persuaded that the dewatering cone will extend three to thirteen miles, and any statement that the springs will decrease or dry up (regardless of the extent of the cone) must be supported by evidence related to this area.

TECHNICAL ANALYSIS

ENSR used both the Thiem equation and the Theis nonequilibrium equations. These equations were derived for porous media aquifers -- not for fractured bedrock. This approximation may be applicable for the alluvial and upper bedrock zones. However, we know from our work, that the open fractures in the bedrock are not prevalent at depth. We can expect, prior to the pit achieving a total depth of 700 ft, the hydraulic conductivity of the bedrock will be on the order of 10^{-6} cm/s, *not* 10^{-4} cm/s.

We re-worked the ENSR equations (see attached pages) using the hydraulic conductivity of 10^{-6} cm/s. The results show the pit inflows to be on the order of 100 gpm. Very similar to what is currently being extracted.

We calculated the potential annual recharge to the entire Mine Site. Using a catchment area of 12 square miles, an annual rainfall of 6 inches, and an infiltration of 5%, the amount of recharge per year is $6.3 * 10^7$ gallons per year. This is equivalent to approximately 120 gallons per minute.

It is possible that the inflows to the pit may increase to several hundred gallons per minute due to the increased radius of the pit. As the pumping within the pit continues, the upper portion of the bedrock may become dewatered and some of the fractures may close. This will result in a reduction of ground water flowing into the pit. In the Mountain Pass area, there is very little chance of ever achieving 1000 gpm of flow from the bedrock into the pit.

We have also continued the revisions to the cone of influence equations using the hydraulic conductivity value of 10^{-6} cm/s. Using ENSR's Approach #1, the result is a cone of influence of 1.4 miles not 13.5 miles. With the revised Approach #2, the result is approximately 1 mile. Both of these revised approaches yield very similar results. The purpose of using the two approaches was to "represent the opposite end-points of assumptions." If these represent the two end-points, there is now a very narrow range for the extent of the cone of influence.

Sincerely,
GSi/water

J. H. Birman

J. H. Birman, R.G. 994
President

Ronald A. Sorensen

R. A. Sorensen, R.G.P. 957
Manager of Projects

cc: Mr. W. Almas

OLYCORP EIS	Date 1/30/95	Dwg.	Project 1991-001-940		BY: WPVL

APPENDIX D

EFFECTS OF MINE-PIT DE-WATERING

SEE: ENSR FIG 3-3 (WSW-ENE CROSS SECTIONAL DIAGRAM OF PROPOSED MINE PIT)

AND

ENSR PLATE 1 (PLAN VIEW OF PROPOSED MINE PIT)

GIVEN:

FOR FRACTURED BEDROCK:

10^{-5} cm/sec $< K <$ 10^{-3} cm/sec
$S_y \cong 0.05$
} ENVIRONMENTAL SOLUTIONS, 1994

$S_y \cong 0.01$ (SRK, 1985)

CURRENT (1994) POTENTIOMETRIC-SURFACE ELEVATION $\cong$ 4600 FT.
(ENV. SOLUTIONS, 1994, FIG. 2-5)

ASSUME:

RADIAL FLOW TO PIT
UNCONFINED CONDITIONS
$K = 10^{-4}$ cm/sec $= 10^2$ ft/yr
10^{-6} cm/s $= 10^{0}$ ft/YR

+ SURROUNDED ON SOUTH BY DEBRIS FLOWS 10^{-5} - 10^{-6} cm/s

PUMPING RATE:

USING THE THIEM (1906) EQUATION FOR STEADY-STATE RADIAL FLOW (DERIVED FROM DARCY'S LAW):

$$K = \frac{Q \ln(r_2/r_1)}{\pi(h_2^2 - h_1^2)}$$

THEREFORE:

$$Q = \frac{K\pi(h_2^2 - h_1^2)}{\ln(r_2/r_1)}$$

Title MOLYCORP EIS	Date 1/30/95	Dwg.	Project 1991-001-940	Approved BY:

SET: head, $h_1 = 0$ AT BOTTOM OF PROPOSED PIT (ELEV ≅ 4000)

THEREFORE: AT LIMIT OF CONE OF INFLUENCE,
head, $h_2 = 4600 - 4000 = 600$ FT

TO DE-WATER PIT, r_1 ($@ h_1 = 0$) ≅ 200 FT (RADIUS OF BASE OF PIT)

r_2 ($@ h_2 = 600$ FT) ≅ 1000 FT (FROM PLATE 1)

$$\therefore \quad Q = \frac{(\cancel{10^{-2}}\,10\ \text{ft/yr})\,\pi\,(600\ \text{ft})^2}{\ln(1000/200)} = \cancel{7.03 \times 10^{7}}\ 7.03 \times 10^{6}\ \text{ft}^3/\text{yr}$$

$$= \cancel{1.93 \times 10^{5}}\ 1.93 \times 10^{4}\ \text{ft}^3/\text{day} \cong \cancel{1000}\ 100\ \text{gal/min}$$

$$\boxed{Q \cong 100\cancel{0}\ \text{gal/min}}$$

CONCLUSION: TO DEWATER THE PROPOSED PIT TO ELEV. ≈ 4000 FT IT WILL HAVE TO BE PUMPED AT APPROXIMATELY 100~~0~~ gal/min (AN ORDER-OF-MAGNITUDE ESTIMATE).

LYCORP EIS | Date 1/30/95 | Dwg. | Project 1991-001-940 | BY: WPYL

5/1

LATERAL SPREAD OF CONE OF INFLUENCE:

PARAMETERS USED:

$$K \cong 1\times10^{-\cancel{4}\,6} \text{ cm/sec} = \cancel{1\times10^{2}}\ 10 \text{ ft/yr}$$

SATURATED THICKNESS, $b = 600$ ft

$$S = 0.01$$

$$\therefore\ T = Kb = \cancel{6\times10^{4}}\ 6\times10^{3} \text{ ft}^2/\text{yr}$$

TIME, $t = 30$ yrs OF PUMPING

$$Q \cong 100X \text{ gal/min} = 7.03\times10^{6} \text{ ft}^3/\text{yr}$$

TWO APPROACHES (REPRESENTING OPPOSITE END-POINTS OF ASSUMPTIONS)

APPROACH #1:

ASSUME:

1) AQUIFER IS INFINITE IN AREAL EXTENT (PRACTICALLY: AS THE CONE OF INFLUENCE SPREADS OUT, NO AQUIFER BOUNDARIES [POSITIVE OR NEGATIVE] ARE ENCOUNTERED; THIS MEANS THAT STEADY-STATE CONDITIONS ARE NEVER REACHED)
2) HORIZONTAL, RADIAL FLOW TO THE PIT (i.e. NO VERTICAL INFILTRATION)
3) PUMPING IS CONTINUOUS FOR 30 YEARS

USING THE THEIS (1935) EQUATION FOR TRANSIENT-STATE RADIAL FLOW:

$$T = \frac{Q}{4\pi s} W(u) \qquad S = \frac{4Ttu}{r^2}$$

WHERE: s = DRAWDOWN
$W(u)$ = THE WELL FUNCTION OF u

ARRANGING YIELDS:

$$W(u) = \frac{4\pi s T}{Q}$$

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MOLYCORP EIS	1/30/95		1991-001-940	

AT THE EDGE OF THE CONE OF INFLUENCE:

$\Delta \cong 0.01$ FT (APPROXIMATELY THE SMALLEST DRAWDOWN THAT WE CAN MEASURE)

$$W(u) = \frac{4\pi\,(0.01\ \text{FT})\,(6\times10^{\cancel{4}\,3}\ \text{FT}^2/\text{YR})}{7.03\times10^{6}\ \text{FT}^3/\text{YR}}$$

$$W(u) = 1.07\times10^{-4} \quad \text{OK}$$

FROM TABLES OF $W(u)$ VS. u (USGS PP #708 by LOHMAN, 1979):

$$u = 7.07 \quad \text{OK}$$

NEXT:

$$S = \frac{4Ttu}{r^2}$$

SOLVING FOR r YIELDS:

$$r = \left[\frac{4Ttu}{S}\right]^{1/2}$$

AND

$$r = \left[\frac{4\,(\cancel{6\times10^4}\ 6\times10^3\ \text{ft}^2/\text{yr})(30\ \text{yrs})(7.07)}{0.01}\right]^{1/2} = \cancel{7.13\times10^4}\ 7.13\times10^3\ \text{ft}$$

$$\boxed{r_1 \cong \cancel{13.5}\ 1.35\ \text{miles}}$$

1.35 MILES

CONCLUSION: IF NO VERTICAL INFILTRATION (e.g. FROM RAINFALL) OCCURS, AND THE CONE OF INFLUENCE CONTINUES TO SPREAD OUT UNABATED, IT WILL HAVE SPREAD ~~13.5~~ 1.35 miles AFTER 30 years.

MOLYCORP EIS	Date 1/30/95	Dwg.	Project 1991-001-940	Prepared BY: WPVL

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APPROACH #2:

ASSUME:

1) AS PUMPING CONTINUES, THE "AREA OF INFLUENCE" EXPANDS. THE LOWERING OF HYDRAULIC HEAD WITHIN THE AREA OF INFLUENCE INDUCES VERTICAL INFILTRATION. FROM RAINFALL.

2) THE INFILTRATION OF RAINFALL IS EVENLY DISTRIBUTED OVER THE LAND SURFACE AT APPROXIMATELY 10% OF ANNUAL RAINFALL. (RAINFALL ≅ 10 in/yr. ∴ INFILTRATION, i ≅ 1 in/yr).

10% PROBABLY HIGH.

3) ONCE THE AREA OF INFLUENCE HAS SPREAD OUT ENOUGH, TOTAL INFILTRATION EQUALS PUMPING RATE. AT THIS POINT, THE CONE OF INFLUENCE STOPS EXPANDING RADIALLY OUTWARD, AND STEADY-STATE CONDITIONS ARE REACHED.

THAT IS:

$$A = \frac{Q}{i} = \frac{\cancel{7.03 \times 10^{7}}\ 7.03 \times 10^{6}\ ft^3/yr}{1/12\ ft/yr}$$

$$A = \cancel{8.44 \times 10^{8}}\ 8.44 \times 10^{7}\ ft^2$$

AND:

$$A = \pi r^2$$

THUS:

$$r = \left[\frac{A}{\pi}\right]^{1/2}$$

MOLYCORP EIS	Date 1/30/95	Dwg.	Project 1991-001-940	Reviewed BY: WPVL

$$r = \left[\frac{8.44 \times 10^{8}\ ft^2}{\pi} \right]^{1/2} = \cancel{1.64 \times 10^4}\ 5181.9\ ft$$

$$\boxed{r_2 \cong \cancel{3.1}\ \text{miles} \quad \cancel{0.98}\ \text{MILES}}$$

1 MILE

CONCLUSION: AFTER THE CONE OF INFLUENCE HAS SPREAD APPROXIMATELY ~~3.1~~ 1 miles, TOTAL INFILTRATION FROM RAINFALL $\left(= 1\ inch/yr = 1\ \frac{inch^3/yr}{in^2} \right)$ WILL

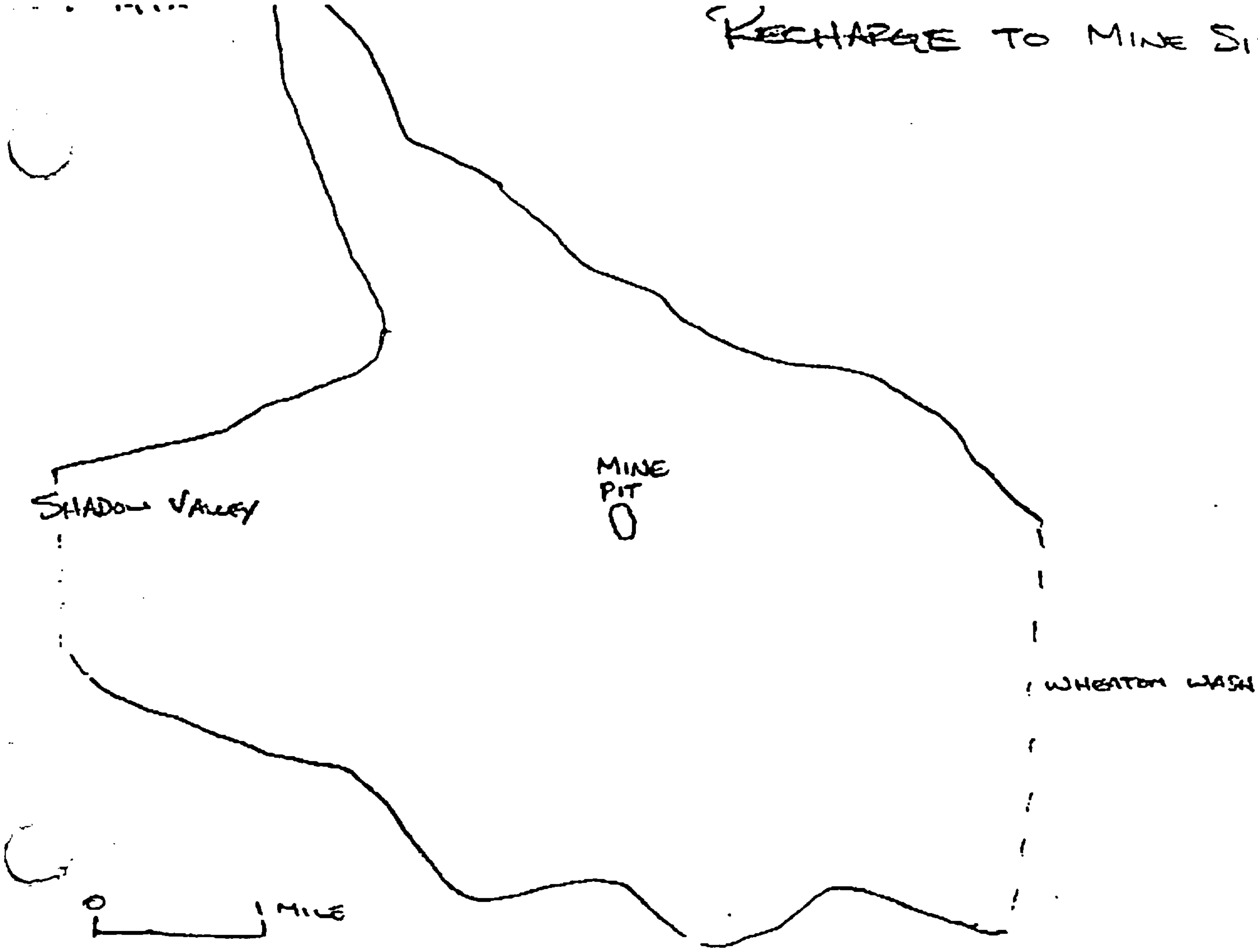
EQUAL 1000 gal/min OVER THE AREA OF INFLUENCE. THEN, STEADY-STATE CONDITIONS WILL BE REACHED, AND THE CONE OF DEPRESSION WILL STOP SPREADING.

FINAL CONCLUSION:

THE SCENARIO IN APPROACH #2 WILL OCCUR IN LESS THAN 30 YEARS (BECAUSE IF NO INFILTRATION HAD OCCURRED, THE CONE OF INFLUENCE WOULD HAVE SPREAD ~~1.3~~ 1.3 MILES BY THEN). THUS, APPROACH #2 PROVIDES THE LIMITING SITUATION, AND:

$$\boxed{\begin{array}{c} r = 3.1\ \text{miles} \\ \text{AFTER 30 years} \\ \text{OF PUMPING} \\ \text{AT } Q = 1000\ gal/min \end{array}}$$

RECHARGE TO MINE SITE



CATCHMENT AREA $\approx$ 12 MI^2 * 5280 ft^2/mi = $3.3*10^8$ ft^2

RAINFALL = 6 in/YR = 0.5 ft/YR

RAINFALL WITHIN CATCHMENT AREA = $3.3*10^8$ ft^2 * 0.5 ft/YR = $1.7*10^8$ ft^3/YR

INFILTRATION = 5%

POTENTIAL ANNUAL RECHARGE TO AQUIFER = $1.7*10^8$ ft^3/YR * 0.05 = $8.5*10^6$ ft^3/YR

= $6.3*10^7$ GAL/YR

= $1.7*10^5$ GAL/DAY

= 120 GAL/MIN

GSi/WATER

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED:
DRAWING NO. PLATE 1,
"MOLYCORP MOUNTAIN PASS MINE EXISTING OPERATIONS AND PROPOSED EXPANSION ACTIVITIES"

WITHIN THIS PACKAGE... OR BY SEARCHING USING THE DOCUMENT/REPORT NO. PLATE 1

NOTE: Because of these page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-01