

## **PREASSESSMENT SCREEN AND DETERMINATION**

Molycorp Site  
Taos County, New Mexico

### **Action**

Preassessment Screen and Determination for Molycorp, Inc. (a wholly owned subsidiary of the Unocal Corporation), Questa Division (Molycorp Site) composed of the mine, the Red River corridor, and the tailings disposal facility located in Taos County, New Mexico. The preliminary screen and determination was prepared by the New Mexico Office of Natural Resources Trustee (NMONRT), the United States Department of the Interior (DOI), and the United States Department of Agriculture (USDA) Forest Service (FS), known collectively as the Trustees.

### **Authority**

The Comprehensive Environmental Response, Compensation, and Liability Act as amended by the Superfund Amendments and Reauthorization Act, 42 U.S.C. § 9601 et seq. (CERCLA), and the Clean Water Act, 33 U.S.C. § 1251 et seq. (CWA), authorize the Federal government and the states to recover, on behalf of the public, damages for injuries to natural resources, including their supporting ecosystems, belonging to, managed by, appertaining to, or otherwise controlled by them.

The USDA FS and the DOI are natural resources trustees under CERCLA and CWA. In accordance with section 107(f)(2)(A) of CERCLA, 42 USC § 9607(f)(2)(A), section 311(f)(5) of CWA, 33 USC § 1321(f)(5), and Executive Order 12580, the President designated the Secretary of Agriculture and the Secretary of the Interior as Federal trustees for natural resources. The Secretary of Agriculture has redelegated this authority to the Chief of the FS for land under FS custody or control. This authority has, in turn, been redelegated to the Regional Foresters. The Secretary of the Interior has delegated this authority to the Director of the United States Fish and Wildlife Service. This authority has, in turn, been re-delegated to the Regional Director of the United States Fish and Wildlife Service, Region 2, who has been delegated as the DOI authorized official for this case.

Pursuant to section 107(f)(2)(B) of CERCLA, and section 311(f)(5) of the CWA, the Governor of the State of New Mexico has designated the New Mexico Natural Resources Trustee to act on behalf of the public as trustee for natural resources in the State of New Mexico.

## **PREASSESSMENT SCREEN**

### **Regulatory Guidance**

Federal regulations at 43 CFR § 11.23(a) provide for the natural resource trustees to complete a preassessment screen and make a determination as to whether there is a reasonable probability of making a successful claim for natural resource damages before assessment efforts are undertaken. This document fulfills that requirement and follows the structure of Federal regulations at 43 CFR Part 11. The regulations provide a method for the assessment of natural resource damages resulting from a release of hazardous substances under CERCLA. Adherence to the methods set forth in these regulations is not mandatory and does not preclude the Trustees' use of alternate methods of assessing damages or arriving at a negotiated settlement with potentially responsible parties.

### **Purpose**

The purpose of this preassessment screen is to provide a rapid review of readily available information on releases of hazardous substances from the Molycorp Site and potential impacts on natural resources for which the Federal or State agency may assert trusteeship under Section 107(f) of CERCLA.

### **Site Overview**

The Molycorp Site is located approximately five miles east of the town of Questa, New Mexico, in steep mountains adjacent to the Red River. Tailings from the mill are deposited in repositories on the west side of Questa, approximately nine miles from the mine. Underground mining and mine dewatering continues to the present.

The last four miles of the Red River, located upstream of the confluence of the Rio Grande, is designated a National Wild and Scenic River. The Red River drainage area covers approximately 190 square miles. Two tributaries to the Red River in the vicinity of the mine and tailings ponds are Columbine Creek and Cabresto Creek. Four to five miles down stream of the tailings ponds, the Red River enters the Rio Grande (Figure 1).

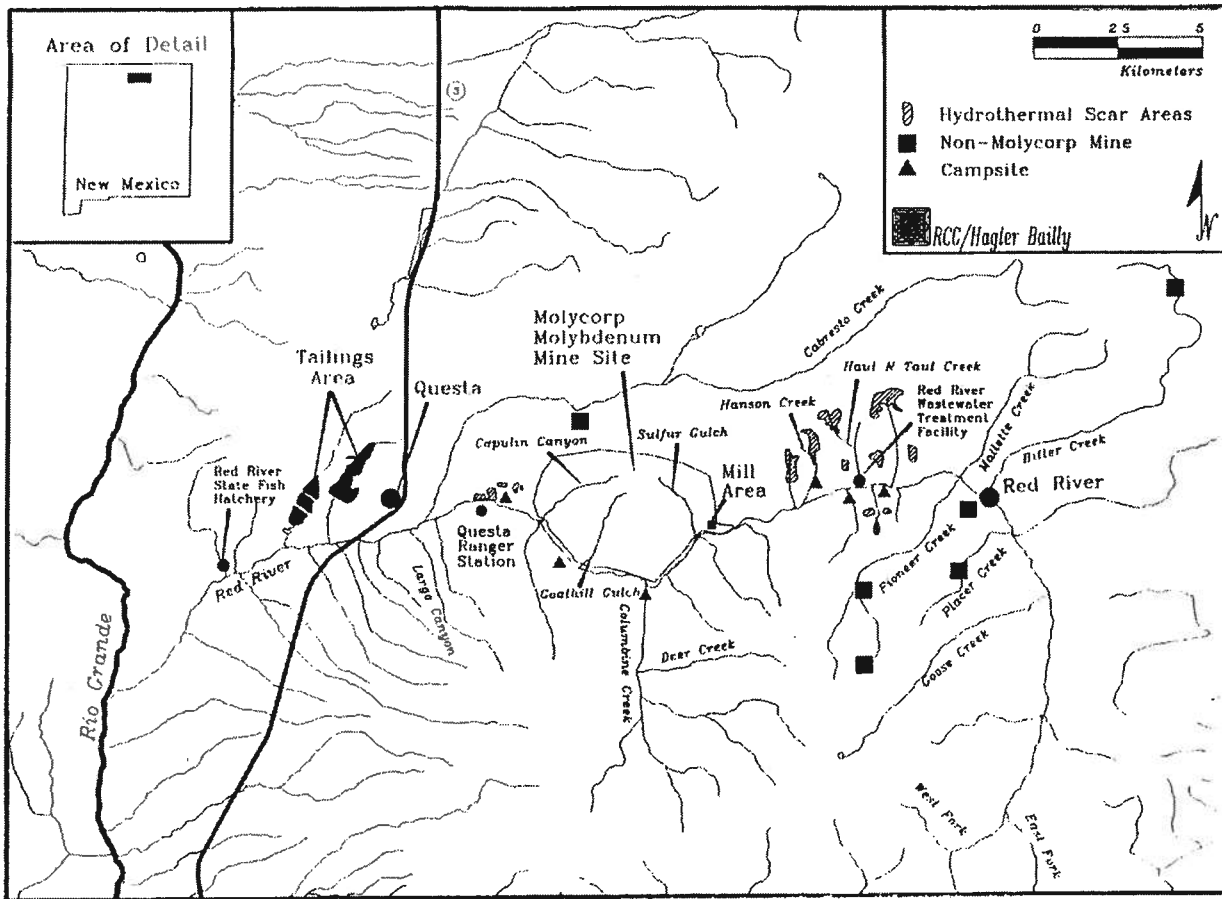
The surface areas potentially affected by Molycorp Site operations include the mine, mill and tailings areas, the historical open pit mine and associated waste rock, and the Red River and its floodplain from the upper boundary of the Molycorp Site to the confluence of the Red River with the Rio Grande. Mining at the Molycorp Site was primarily for molybdenum (Mo), but, arsenic (As), cadmium (Cd), copper (Cu), and lead (Pb), were also present in unmarketable quantities.

The site ranks among the largest in the world for Mo production. Oils and other organic compounds have also been used in the milling process. Since 1923, waste rock from extensive underground and open-pit mining operations has covered over 500 acres.

Tailings, deposited approximately nine miles west of the mine via a slurry pipeline, cover approximately an additional 640 acres, and numerous tailings line breaks over the years have been released to portions of the Red River and its floodplain.

Tailings slurry line breaks, erosion and runoff, and groundwater seepage from surrounding waste rock and tailings piles, released hazardous substances to Red River sediments and riparian areas. Several wetlands have formed on top of the tailings piles (USFWS, 1989). These wetlands are within the feeding range of several nesting pairs of peregrine falcons and attract a variety of other wildlife (Kennedy and Stahlecker, 1986).

**Figure 1.** Map of Molycorp Site and Red River Watershed  
 Note: five kilometers equals approximately three miles.



Molycorp has installed some acid-rock drainage interception structures, and a part of the tailings piles has been covered with nine or more inches of topsoil and revegetated. Based on the continued presence of acid seeps into the Red River, groundwater interception systems installed by Molycorp appear to be insufficient (USEPA, 2000). Additional remedial and restoration work is necessary. For example, even with the existing tailings

soil cover, plants growing on this cover contain Mo concentrations known to be toxic to certain wildlife (e.g., Dreesen, 1989; Eisler, 1989; Dreesen and Henson, 1996; Sample et al., 1996). Small burrowing mammals and insects have also exposed covered tailings.

Vegetation has been planted directly on waste rock piles without any recontouring or soil cover. Revegetation success has been marginal, plant-metal uptake from waste rock has not been evaluated, waste rock appears to be contaminating underlying groundwater (NMED, 2000), and direct contact of waste rock and biota has not been evaluated.

## **Information on the Molycorp Site and Discharges**

### 1) Time, Quantity, Duration and Frequency of the Release

Contaminants found at the Molycorp Site are consistent with the mining operations that have taken place at that location since the early 1900's. Waste rock, contaminated soils and sediments, and tailings are a continuing source of contaminants of concern (COCs) to ground and surface waters, air, and biota. There is evidence that releases have occurred since the late 1960's and continue today. For example, the November 2000 New Mexico Environment Department groundwater discharge permit for the Molycorp Questa Mine states that the waste rock, open pit, and subsidence zones continue to generate sulfuric acid that may leach COCs directly or indirectly into groundwater (NMED, 2000). Subsequently, groundwater may then leach into surface water, soils, and sediments. Numerous historical tailings pipeline breaks deposited large quantities of metal-rich mill tailings into the Red River corridor.

### 2) Identification of Hazardous Substances

Contaminants found in the Red River basin include, but are not limited to, the following hazardous substances identified under CERCLA § 102 as hazardous substances (40 CFR 302, Table 302.4): aluminum sulfate, As and As compounds, beryllium (Be) and Be compounds, Cd and Cd compounds, chromium (Cr) and Cr compounds, cobalt (Co) compounds, Cu and Cu compounds, ferric sulfate, Pb and Pb compounds, manganese (Mn) and Mn compounds, nickel (Ni) and Ni compounds, silver (Ag) and Ag compounds, sulfuric acid, zinc (Zn) and Zn compounds.

### 3) History of the site

The Molycorp Site includes a molybdenum mine and milling operation located approximately five miles east of Questa, New Mexico. The mine site is owned and operated by Molycorp, Inc. Mining at the site began in the early 1900s, primarily for molybdenum. Before 1965, the mine principally consisted of underground workings, with approximately 35 miles of tunnels. Mining activities expanded in 1965 to include an open pit operation. Waste rock was dumped on ridgelines at the

heads of Goathill Gulch and Capulin Canyon and adjacent to the mill. From 1983 to 1992, new underground workings were added beneath Goathill Gulch. Ore removal resulted in a subsidence area in the bottom of Goathill Gulch. In 1992, mining and milling operations were discontinued, and surface drainage at the site was intercepted and directed into the underground workings. In 1994, underground mining and mine dewatering began again and continues to the present.

Mill tailings are deposited in dammed arroyos just west of the town of Questa via an approximately nine-mile long, aboveground slurry pipeline from the mine. From 1964 to 1982, the pipeline followed the Red River on the south side of Highway 38. Because of numerous pipeline breaks and release of tailings slurry to the Red River floodplain, the upper sections of the pipeline were relocated to the north of Highway 38 and refitted with double-walled, rubber-lined piping. The lower section of the pipeline was upgraded between 1991 and late 1996. When operating, tailings delivery flow-rates are up to 2,800 gallons per minute.

4) Relevant operations occurring at or near the site

Hazardous substances discharged or released from the Molycorp Site have potentially contaminated groundwater, surface water, sediments, and soil. The primary contaminants detected are used in, or are byproducts of, the mine processes.

5) Potentially Responsible Parties

The following potentially responsible party has been identified: Molycorp, Inc. Molycorp Inc. is the current and only known historical operator, and is presently a wholly owned subsidiary of the Unocal Corporation.

6) No Statutory Exclusions from Liability Under CERCLA

Injuries resulting from the discharge or release of the hazardous substances from the Molycorp Site were not identified in any environmental impact statement, pursuant to the National Environmental Policy Act, as amended, 42 USC § 4321 et seq., or any similar review or document.

The releases of the hazardous substances at the Molycorp Site are ongoing and did not occur wholly before enactment of CERCLA, nor before the 1977 amendments to CWA.

The hazardous substances at the Molycorp Site are not pesticide products registered under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 USC § 135-135k). Injuries resulting from the discharge or release of the hazardous substances at the Molycorp Site did not result from the application of a FIFRA registered pesticide product.

Injuries resulting from the discharge or release of the hazardous substances at the Molycorp Site did not result from any federally permitted release as defined in CERCLA § 101(10).

The hazardous substances are not recycled oil products as described in CERCLA § 07(a)(3) or (4). Injuries resulting from the discharge or release of the hazardous substances at the Molycorp Site did not result from release of a recycled oil product.

### **Preliminary Identification of Resources Potentially at Risk**

#### 1) Discharge or release

Information reviewed by the Trustees indicate that hazardous substances have been released directly or indirectly to groundwater, surface water, soil, and sediments in the vicinity of and downstream from the Molycorp Site. Numerous samples of groundwater, surface water, soil, and sediments contain elevated concentrations of COCs including hazardous substances identified in 40 CFR 302, Table 302.4, e.g., aluminum sulfate, As and As compounds, Be and Be compounds, Cd and Cd compounds, Cr and Cr compounds, Co compounds, Cu and Cu compounds, ferric sulfate, Pb and Pb compounds, Mn and Mn compounds, Ni and Ni compounds, Ag and Ag compounds, sulfuric acid, and Zn and other contaminants including Al, Co, iron (Fe), Mo, and sulfate. These COCs are consistent with the mine operations at this location. All intercepted waste rock and tailings facility seepage waters, mill process waters, and tailings slurry are deposited in the tailings facility west of Questa via an approximately nine-mile pipeline located along the Red River.

Numerous studies show that the Molycorp mine has contributed to the degradation of the Red River corridor (e.g., Allen et al., 1999; Abshire, 1998; Slifer, 1996; Kent, 1995).

It has also been suggested that natural hydrothermal scar areas and other natural background conditions contribute a portion of the metals loading to the Red River. While these scar areas undoubtedly contribute a portion of the metal and sediment load, various studies indicate that Molycorp operations have markedly degraded the Red River beyond baseline conditions. For example, Cu, Mn, Ni, Pb, and Zn concentrations in mine waste rock are 1.3 to 3.6 times higher than concentrations in natural scar areas, and Mo concentrations are 5.1 times higher in waste rock than in scar areas (Kent, 1995). Further, by analyzing sediment cores from ponds up stream and down stream of the Molycorp mine area, Allen et al. (1999) determined that metal loading to the Red River corridor increased dramatically following the beginning of waste rock dumping.

Kent (1995) also found that mine leachate had 44 times more Cd, 29 times more Cr, 15 times more Zn, 12 times Ni, 5 times more Cu, 3 times more Pb, and 2 times

more Mo than scar area leachate. Similarly, Robertson GeoConsultants (2000) determined that Al, Co, Cu, Mo, Ni, and Zn would readily leach from waste rock washed with artificial rainwater. These waste rock leachate tests also suggest that water passing through the upper five to ten feet of waste rock may be more hazardous than water leached from scar areas. Ongoing studies by the U.S. Geological Survey are addressing these issues in more detail.

In addition to metals associated with MolyCorp Site mining operations, other inorganic and organic compounds currently and/or historically used in the milling process may be present in water and/or tailings sediments. Compounds include cyanide, polycyclic aromatic hydrocarbons (from diesel and pine oils), methyl-isobutyl carbinol and its breakdown products, and any chemicals associated with the sulfide "Nokes" reagent.

## 2) Preliminary Pathway Identification

A key part of the damage assessment process involves identification and confirmation of the pathway by which the hazardous substance was transported from the source of the discharge to the injured resource. The DOI natural resource damage assessment regulations define pathway as the route or medium through which a hazardous substance is transported from the source of the discharge or release to the injured resource (43 CFR § 11.14 [dd]). Available data suggest that hazardous substances were released, and in some cases continue to be released, to groundwater, surface water, sediments, and soil, resulting in the contamination of these resources and biological receptors.

Pathways for transport of hazardous substances and other contaminants from sources to **groundwater** may include: leaching of tailings, underground workings, waste piles, surface deposits, and contaminated soil via precipitation infiltration, runoff, and snowmelt. Leachate from waste rock piles (e.g., Capulin Canyon, Sugar Shack South and Sugar Shack West, Goathill Gulch, Spring Gulch, Blind Gulch, Old Sulphur Gulch, and Middle), the open pit, and metal contaminated surface soils moves directly or indirectly into groundwater. Leachate from tailings impoundments moves directly or indirectly into groundwater (NMED, 1998). The Capulin Canyon waste rock dump currently discharges between 25 and 75 gallons per minute of leachate continuously. The Sugar Shack South and Sugar Shack West waste rock piles may discharge leachate in a quantity sufficient to cause groundwater to exceed standards for COCs. The open pit collects precipitation and storm water runoff and directs it to groundwater in the underground mine (NMED, 2000).

Pathways for transport of hazardous substances to **surface water** may include: leaching and runoff from sources described above to surface water, expression of contaminated groundwater, exposure of surface water to contaminated stream sediment, and leaching of spilled tailings deposited from numerous historical tailings pipeline breaks. The section of the Red River between the MolyCorp mill

and the Questa Ranger Station gains flow from groundwater. In the tailings area, hazardous substances are likely transported from groundwater in the tailings area to the Red River through aquifers and alluvium. In the Red River, hazardous substances settle out of surface water and aggregate on the stream bottom and floodplain. Discharges from the mine not covered under NMED DP-1055 are currently limited under the U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Permit No. NM0022306.

Hazardous substances may be transported from the Molycorp Site to **soil** by leaching, runoff, pipeline breaks and spills, and direct contact with contaminated surface water and groundwater.

Pathways to **aquatic biota** may involve exposure to contaminated surface water and sediments. Aquatic biota may also be exposed to hazardous contaminants by ingestion of contaminated food.

Pathways to **terrestrial biota** may include direct contact with hazardous contaminants, inhalation of dusts, and consumption of contaminated food and water.

### 3) Exposed areas

Areas exposed to hazardous substances include the waters, soils, sediments, and biota in the vicinity and downstream of the Molycorp Site. The mine area encompasses a total of 3,966 acres. Since 1923, waste rock from extensive underground and open-pit mining operations has covered over 500 acres. Tailings deposited nine miles west of the mine via a slurry pipeline corridor cover approximately 640 acres. The slurry pipeline corridor covers an estimated 20 acres. Numerous tailings line breaks over the years have contaminated areas of the Red River and its floodplain.

Potentially affected USDA lands include 9.7 miles of the Red River and portions of the riparian zones, six acres around and including Eagle Rock Lake, two administrative water supply wells (Questa Ranger Station and Columbine Campground), and 7.5 miles of upland areas adjacent to Molycorp properties. Potentially affected DOI Bureau of Land Management (BLM) lands include the riparian zone of the Red River west of Questa to the Rio Grande. State affected areas include areas impacted by the mine, as described above.

### 4) Exposed water estimates

Approximately 15 miles of the Red River, from the upper boundaries of the mine to the confluence of the Red River and the Rio Grande, have potentially been exposed to mine-derived contaminants. An approximate 25 acres of additional wetlands, Eagle Rock Lake, and other water impoundments along the Red River corridor may also have been exposed. Naturally formed wetlands on top of historical tailings



deposits totals approximately 50 acres. Groundwater beneath and directly adjacent to the mine and tailings facility may also have been impacted, although the volume of groundwater has not been determined. Groundwater under approximately 6,341 acres could potentially be impacted. This is based on estimates of the area of the mine property boundary, the area of the tailings property plus the area from the south property boundary of the tailings facility to the Red River and the length of the pipeline multiplied by a width of 20 feet.

5) Potentially affected resources

Natural resources that have been, or potentially have been, affected by the discharge or release of the hazardous substances, include but are not limited to groundwater, surface water, sediments, soils and biological resources on and surrounding the Molycorp Site, and Red River corridor. The Red River and adjacent ponds, which border the southern side of the mine, contain contaminated sediments (Table 3). Extensive riparian areas, wetlands, and ponds that support a variety of aquatic and semi-aquatic organisms, migratory birds, and other wildlife, are also contaminated (Table 5), but further study is needed to determine the extent and magnitude. Priority resource management needs that have been identified for this area include conserving and enhancing fishery habitat, nesting and rearing habitat for birds, and wetland habitat.

Fish census data of 1960 indicate that approximately 572 fish per mile were estimated in the river (NMGF, 1960). During the late 1960s and early 1970s the New Mexico Department of Game and Fish discovered in the course of routine population studies that fish were conspicuously absent in the middle reach of the Red River where thriving populations had once existed (EPA, 2001). In 1971, EPA conducted a study of the Red River that concluded that the chemical quality and biological conditions of the Red River were very good but that occasional breaks in the tailings pipeline resulted in some degradation of stream quality and biota (EPA, 1971). The 1988 fish census found no fish in this same reach (NMGF, 1988).

The 1988 census results may indicate fish spawning and movement from the Rio Grande up the Red River may be impaired due to behavioral avoidance of metals. Numerous raptors, including the State of New Mexico endangered peregrine falcon, nest in and visit the area regularly, and feed on small birds, waterfowl, rodents, amphibians, and reptiles that may contain elevated metal concentrations. Lower portions of the Red River contain potentially suitable habitat for the federally endangered southwestern willow flycatcher, although surveys have not been conducted. Wildlife is at risk of molybdenosis (Mo toxicity). Molybdenum concentrations in vegetation exceed risk-based criteria for Mo toxicity to ruminants (e.g., Sample et al., 1996; Eisler, 1989).

Injuries and potential injuries to natural resources may have resulted in lost use of associated services provided by these resources, such as recreational and

commercial fishing, wildlife viewing and existence values. The Red River is, and has historically been, a popular fishing and recreational destination.

6) Quantity and concentration of released hazardous substances are sufficient to cause injury

The quantity and concentration of the released hazardous substances at the Molycorp Site are sufficient to cause injury to the above natural resources. Discussions specific to resources follow.

*Surface Water Resources (43 CFR § 11.62 (b)(1)(i-iii))*

COC concentrations, such as Mo, exceed or have exceeded State of New Mexico and/or Federal water quality standards (Table 1). Concentrations of other contaminants, such as sulfate, are also highly elevated at times, although not regulated under New Mexico's water quality standards, and could cause injury to State and Federal trust resources. These exceedences are most severe and frequent at sites down stream of the Molycorp mine and tailings facility.

**Table 1. Surface Water.** Maximum dissolved concentrations of selected COCs in ponded tailings water and surface waters down stream of the Molycorp mine and tailings facility. Values in *blue italics* exceed regulatory standards and/or other remedial guidelines.

	<i>Tailings</i> <sup>1</sup>	<i>Red River</i> <sup>2</sup>	<i>Red River</i> <sup>3</sup>	<i>Red River</i> <sup>4</sup>	<i>Red River</i> <sup>5</sup>	<i>Red River</i> <sup>6</sup>	<i>Red River</i> <sup>7</sup>	<i>NM SWQS</i> <sup>8</sup>
	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>
<i>Al</i>	BD	ND	ND	~ 4,500	< 500	127	149	87
<i>Cu</i>	BD	ND	56.0	36.0	122	4.2	4.0	12.0
<i>Mo</i>	3,600	ND	21.0	BD	BD	7.8	57	1,000
<i>Zn</i>	BD	10.0	130	250	355	142	105	110

BD= below analytical detection limit; ND= no data available

1 NMED, 1998

2 EPA, 1971. Values are totals.

3 USGS-STORET, 1982

4 Vail Engineering, 1993

5 South Pass Resources, 1994

6 Woodward Clyde, 1996

7 Taylor, 2000

8 New Mexico Surface Water Quality Standards. 20.6.4 NMAC, 2000. [Assumes 100 ppm hardness.]

### *Groundwater Resources (43 CFR § 11.62)*

COC concentrations exceed or have exceeded State of New Mexico and/or Federal groundwater standards (Table 2). Injuries to groundwater resources have resulted in conversion of some residents to alternative drinking water supplies by Molycorp.

The New Mexico Environmental Department groundwater discharge permit (NMED, 2000) for the mine area states that leachate from the waste rock piles exceeds health-based groundwater quality standards under the Water Quality Control Commission (WQCC) Regulations at 20.6.2.3103.A NMAC for the contaminants Cd, Cr, fluoride (F), and Pb. Some of the leachate exceeds other domestic water supply standards under 20.6.2.3103.B NMAC for the contaminants Cu, Fe, Mn, sulfate, and Zn. Additionally, some of the leachate exceeds the maximum contaminant level for Be, a primary drinking water standard set by the U.S. EPA under the Safe Drinking Water Act, 42 USC 6901 (NMED, 2000). Since leachate discharged from the Molycorp Site may move into groundwater, leachate from the mine may be causing water quality standards to be exceeded in groundwater.

### *Sediment Resources (43 CFR § 11.62(b)(1)(iv))*

In the Red River corridor, hazardous substances settle out of surface water and aggregate on the stream bottom, in wetlands, and in other water impoundments, such as Eagle Rock Lake. COC concentrations in sediments are likely sufficient to cause injury to surface water, groundwater, geologic, and/or biological resources. Some metal concentrations exceed guidelines for the protection of aquatic life and/or certain ecological risk-based thresholds (Table 3).

### *Geologic Resources (43 CFR § 11.62(e))*

Soil COC concentrations are elevated and exceed certain ecological risk-based guidelines (Table 4) and paste-pH is less than 4.0 in several areas (e.g., Robertson Geoconsultants, 2000). This may have resulted in one or more of the following injuries:

- salt saturation >2 mmhos/cm and/or sodium absorption ratio >0.176
- insufficient water holding capacity to support plant, microbial, or invertebrate populations
- impairment of microbial respiration and plant and/or microbial growth
- impaired carbon mineralization due to reduction in microbial populations
- invertebrate toxic response; phytotoxicity and/or impaired plant growth
- act as a source resulting in exceedences of State of New Mexico and/or Federal groundwater quality standards.

**Table 2. Groundwater.** Maximum concentrations of selected COCs in groundwater and groundwater seeps at and downgradient of the Molycorp Site. Values in *blue italics* exceed regulatory standards and/or other remedial guidelines.

	<i>Tailings Wells<sup>1</sup></i>	<i>Waste rock Wells<sup>2</sup></i>	<i>Waste rock Wells<sup>3</sup></i>	<i>Waste rock Seeps &amp; Springs<sup>4</sup></i>	<i>NM GWQS<sup>5</sup></i>
	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>	<i>µg/L</i>
<i>Al</i>	BD	961,000	64,000	979,000	5,000
<i>Cu</i>	BD	5,040	7,600	13,300	1,000
<i>Mn</i>	2,600	73,000	26,000	554,400	200
<i>Mo</i>	2,800	50	10	ND	1,000
<i>SO<sub>4</sub></i>	1,113,000	10,400,000	1,800,000	13,043,000	600,000
<i>Zn</i>	200	11,900	6,200	142,600	10,000

BD= below analytical detection limit; ND= no data available

1 South Pass Resources, 1994

4 South Pass Resources, 1993

2 South Pass Resources, 1995

5 New Mexico Groundwater Quality Standards, 20.6.2 NMAC, 1996.

3 Vail Engineering, 2000

**Table 3. Sediments.** Maximum concentrations of selected COCs in sediments at and down stream of the Molycorp mine and tailings facility. Values in *blue italics* exceed regulatory standards and/or other remedial guidelines.

	<i>Eagle Rock Lake<sup>1</sup></i>	<i>Red River (RR)<sup>2</sup></i>	<i>Sediment CB-TEC<sup>3</sup></i>	<i>NOAA Sed. SQUIRTs<sup>4</sup></i>
	<i>mg/kg<sup>5</sup></i>	<i>mg/kg</i>	<i>mg/kg</i>	<i>mg/kg</i>
<i>Al</i>	10.7 %	4.08 %	ND	2.55 %
<i>Cu</i>	370	390	31.6	28.0
<i>Mn</i>	2,850	2,770	ND	630
<i>Zn</i>	1,700	1,630	121	98.0

ND= no data available

1 Allen et al., 1999.

2 Taylor, 2000.

3 Consensus-based Threshold Effects Concentrations, (MacDonald et al., 2000).

4 Sediment Screening Quick Reference Tables (NOAA, 1999)

5 milligrams per kilogram (Al in percent)

**Table 4. Soils.** Maximum concentrations of selected COCs in soils at and down stream of the Molycorp mine and tailings facility. Values in *blue italics* exceed no observable adverse effect level (NOAEL) ecological risk-based guidelines. NOAEL dietary guidelines from Sample et al. (1996).

	<i>Tailings</i> <sup>1</sup>	<i>Waste rock</i> <sup>3</sup>	<i>Chino Lowest NOAEL SoilSC</i> <sup>4</sup>
	<i>mg/kg</i>	<i>mg/kg</i>	<i>mg/kg</i>
<i>Al</i>	<i>16,300</i>	<i>18,900</i>	164/mammal
<i>Cu</i>	<i>324</i>	<i>222</i>	111/bird
<i>Mn</i>	<i>692</i>	<i>1,080</i>	894/mammal
<i>Mo</i>	<i>2572</i>	<i>207</i>	0.2/mammal
<i>Zn</i>	<i>158</i>	<i>569</i>	41/bird

1 Kent, 1995

2 ACZ, 1998

3 Kent, 1995

4 Schafer and Associates, 1999

#### *Biological Resources (43 CFR § 11.62 (f))*

Elevated COC concentrations in various media at the site (Table 5) suggest that the following resource injuries are possible: impaired fish health, behavioral abnormalities, physiological malfunctions/reproductive impairment and histopathological lesions.

In 1982, EPA evaluated the Red River for potential impairment from metal loading. Bioassay results from tests with Red River water suggested biological toxic response may be occurring in the Red River. Concentrations of ambient total As, Cd, and silver exceeded EPA-recommended acute criteria for the protection of aquatic biota, and bioassay results from tests with Red River water suggested some biological toxic response may be occurring in the Red River (Allen et al., 1999).

Based on data in Chadwick Ecological Consultants (2001), mean brown trout numbers, weight, and length decrease down stream of the Molycorp Site, suggesting impaired health. Impaired health could be related to a parallel decrease in benthic invertebrate density (food) and/or sub-lethal contaminant stressors. Brown trout density also decreases farther downstream at the Questa Ranger Station site. This could be related to the cumulative impacts of several low-pH, metal-rich seeps (such as from Capulin Canyon) on water quality beyond the downstream border of Molycorp's property. More contaminant-sensitive rainbow trout do not return until near the fish hatchery, despite consistent stocking for the past 25+ years.

Research has shown substantial negative impact of site mining activities on diversity, abundance and composition of hyporheic invertebrates. Hyporheic invertebrate communities are sensitive indicators of stream health and stream ecosystem integrity (Allen et al., 1999). Studies by Failing (1993) and Lynch et al. (1988) also noted that invertebrate tissue metal concentrations were greater down stream of Molycorp Site operations. Concentrations of Cu, manganese, and Mo were approximately 2 times, 15 times, and 6 times, respectively, greater in invertebrates collected down stream of Molycorp Site operations. Concentrations of Cu and zinc in invertebrates exceed lowest observable adverse effect level (LOAEL) based benchmarks for food items of insectivorous birds (Sample et al. 1996).

**Table 5.** Biota: Maximum concentrations (mg/kg [ppm]) of selected COCs in biota at and down stream of the Molycorp Site. Values in *blue italics* exceed either LOAEL or NOAEL ecological risk-based guidelines. NOAEL and LOAEL dietary guidelines from Sample et al. (1996).

	<i>Plants Tailings<sup>1</sup></i>	<i>Diet LOAEL Mammal (e.g., pocket gopher)</i>	<i>Invertebrates Red River<sup>2</sup></i>	<i>Diet LOAEL Bird (e.g., American dipper)</i>	<i>Fish Red River<sup>3</sup></i>	<i>Diet LOAEL Bird (e.g., belted kingfisher)</i>
<i>Al</i>	831	38.2	183	36.8	660	87.8
<i>Cu</i>	23.0	73.3	159	51.1	16.10	121.8
<i>Mo</i>	287	5.15	26.4	29.2	0.62	69.7
<i>Zn</i>	80.0	1,172	356	108	267	258

1 Dreesen, 1989, Dreesen and Henson, 1996

2 Failing, 1993

3 Andreasen, 1981, Roy et al., 1992

There is an ongoing potential for adverse effects to migratory birds and other biota from the waters impounded on top of the current tailings piles. Some of these ponds have developed extensive wetland-like characteristics, and as such will likely attract a variety of wildlife. Similarly, small wetlands and ponds (e.g., Eagle Rock Lake) along the Red River contaminated with COCs have likely impaired migratory bird supporting habitat and injured other biota.

7) Availability of data for a reasonable cost damage assessment

Currently available data document contamination and degradation of environmental quality at the Molycorp Site. Among other studies, the Allen et al. (1999) report prepared for the NMONRT documents impacts to surface water, sediment and biota

in the Red River. Molycorp Site investigations that have documented impacts to surface water and sediments of the Red River meet regulatory definitions of injury.

There are few if any metals data available for wetland and pond sediments along the Red River corridor (USGS 7.5" quadrangle maps indicate there are approximately eight small ponds, and possibly additional wetlands, that could be affected by Molycorp operations), tailings repository wetlands, New Mexico Department of Game and Fish hatchery ponds and raceways, surface soils in and around the mine site and tailings area, waste rock seepage interception collection ponds/sumps, biota, and soils and/or spilled tailings deposits along the Red River corridor. These data are necessary to determine proper compensation for damages due to injuries to State and Federal trust resources. In addition to detailed evaluations of possible injuries to individual organisms, population status, habitat suitability, and reproductive success in the area needs to be evaluated.

Data further documenting the extent and magnitude of groundwater, surface water, soil, sediment, and biota contamination will be collected as part of the remedial investigation/feasibility study currently being conducted under CERCLA. Additional supporting data could be collected, at a reasonable cost, to complete assessment of injury and scale restoration necessary to compensate the public.

8) Response Actions, carried out or planned, do not or will not sufficiently remedy the injury to natural resources without further action

Response Actions have been initiated under the State of New Mexico Mining Act, the State of New Mexico Water Quality Act, and the CWA. Further response actions are expected following an ongoing CERCLA Superfund Remedial Investigation. Most Response Actions carried out under the New Mexico Mining Act will not begin until mine closure, estimated for 2020. This schedule does not fully address ongoing injuries to natural resources. Response Actions under the New Mexico and Federal Clean Water Acts will partially address impacts to some trust resources, but will not fully remedy injuries to natural resources. Response actions under CERCLA Superfund will not sufficiently restore, replace, or provide equivalent compensation for injuries to natural resources.

9) Trustees and Trust Resources

The Trustees have trusteeship over one or more of the natural resources associated with the subject of this PAS. These natural resources include: surface water; groundwater; biological resources such as wildlife, endangered species, migratory birds, and wetland, terrestrial, riparian and aquatic habitats; and soils and sediments.

## **PREASSESSMENT SCREEN DETERMINATION**

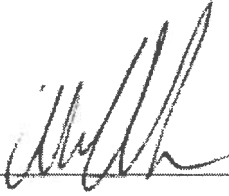
Based on review of readily available data and an evaluation of the preassessment determination criteria, summarized in this document, the Trustees have reached the following conclusions with regard to the Molycorp Site:

1. Releases of hazardous substances have occurred;
2. Natural resources for which the Trustees may assert trusteeship under CERCLA and CWA have likely been adversely affected by the discharge or release of hazardous substances;
3. The quantity and concentration of the released hazardous substances are sufficient to potentially cause injury to natural resources;
4. Data sufficient to pursue an assessment are readily available or likely to be obtained at a reasonable cost; and,
5. Current and planned response actions will not sufficiently remedy the injury to natural resources without further action.

The Trustees have determined that further investigation and assessment is warranted, in accordance with the Federal Regulations at 43 CFR Part 11. The Trustees further determine that there is a reasonable probability of making a successful Natural Resource Damage claim pursuant to Section 107 of CERCLA and Section 311 of the CWA.




**SIGNATURES**



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Trustee, State of New Mexico  
Office of Natural Resources Trustee



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Date

*for* Gregory J. Haskett  
H. Dale Hall  
Authorized Official  
U.S. Department of Interior  
U.S. Fish and Wildlife Service

11/15/02  
Date

*Lucia M. Turner*

11/04/2002

*for*

Regional Forester  
U.S. Department of Agriculture/Forest Service

Date

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