CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

BOARD ORDER NO. R6V-2004-(TENTATIVE)
WDID NO. 6B360009001

REVISED WASTE DISCHARGE REQUIREMENTS
FOR

MOLYCORP, INC.
MOUNTAIN PASS MINE AND MILL SITE
NORTH TAILINGS POND (P-16) CLOSURE AND POST-CLOSURE MAINTENANCE

San Bernardino County

The California Regional Water Quality Control Board, Lahontan Region (Board) finds:

1. Discharger

On May 17, 2004, Molycorp, Inc. submitted information to the Regional Board, which completed a Revised Report of Waste Discharge (RWD). The Discharger submitted the Revised RWD for closure of the North Tailings Pond (P-16), hereinafter referred to as the P-16 Waste Management Unit (P-16 WMU). The information constituting a complete Revised RWD is listed in Attachment F. For the purposes of this Regional Board Order (Order) Molycorp, Inc. is referred to as the "Discharger" and is a wholly owned subsidiary of Union Oil Company of California (UNOCAL). The Discharger's Mine Site includes a Lanthanide Open-Pit Mine (Pit), and three mineral processing plants; Mill Plant (Mill), Separations Plant and Specialty Plant and numerous active and inactive waste disposal units.

2. Facility

This Order imposes revised requirements for the P-16 WMU, including post-closure requirements for the closed P-16 WMU (Closed P-16 Landfill). The P-16 WMU received Mill Waste Streams during the period from 1967 through November 5, 2002. On November 4, 2002, the Discharger ceased operation of the Mill and discharge of mineral processing related waste streams to the P-16 WMU. Discharge of these waste streams was stopped to comply with a closure-schedule contained in the previous waste discharge requirements (WDRs) for the WMU.

3. Location of Facility

The P-16 WMU is located on the Discharger's 2,223-acre Mine Site. The Mine Site is located in the Community of Mountain Pass, which is located east of Baker, California. The Mine Site is located within Sections 11, 12, 13, 14 and 15, T16N, R13E, SBB&M, and Sections 30 and 31, T16N, R14E, SBB&M as shown on Attachment A1, A2 and A3. The P-16 WMU is located in the Ivanpah Hydrologic Unit.

4.

Order History

Waste Discharge Requirements (WDRs) for the P-16 WMU were previously prescribed under Board Order No. 6-00-101, which was adopted by the Board on November 16, 2000. Board Order No. 6-00-101 required the Discharger to submit a Revised RWD to the Board for closure of the WMU, begin construction for closure by January 1, 2004, and complete construction by October 1, 2004. As required by Board Order No. 6-00-101, the Discharger filed a Revised RWD for closure of the WMU. Finding No. 13 describes the liner system installed as required by Board Order No. 6-00-101 to reduce leakage from the WMU.

On March 25, 1998, the Board's Executive Officer issued Cleanup and Abatement Order (CAO) No. 6-98-19 after determining that the P-16 WMU was violating WDRs and causing a condition of pollution. In October 2000, the Executive Officer issued Amended CAO No. 6-98-19A1 allowing the Discharger additional time to complete its proposed improvements to the P-16 Corrective Action Systems (CASs) as described in Finding No. 24. The Discharger completed those improvements and is in compliance with the CAOs, with the exception of requirements pertaining to P-16 WMU leakage to ground water underlying lands down gradient of the Mine Site (off-site lands). Partial off-site access has been granted by the U.S. Bureau of Land Management and an interim site investigation report is expected to be complete in 2004. Further investigation of off-site areas on National Park Service-controlled land will require additional access approval. Scheduling of such approvals, which must come from the land owners, are beyond the control of the Discharger.

5. Reason for Action

The Discharger's revised RWD includes a Final Closure and Post-Closure Maintenance Plan (CPCMP) for closure of waste solids in the P-16 WMU as a landfill (Closed P-16 Landfill). The Board is issuing Revised WDRs to: (a) approve of the CPCMP, (b) update findings, (c) revise the schedule for closure, and (d) establish revised requirements for the Closed P-16 Landfill. Provision G.4 of this Order includes the revised schedule for closure.

The updated findings recognize that the 5330 Gangue and Roaster Scrubber Solids are two of the four types of waste solids that have been discharged to the P-16 WMU. Previous WDRs requirements did not document the presence of these two wastes. The other two types of waste solids discharged to the P-16 WMU and referenced in previous WDRs are the Tailings and 4010 Gangue Solids. The Tailings Solids accounts for approximately 99.5% of the total volume of waste solids in the WMU. The other waste solids account for the remaining 0.5%.

6. Climatology

The climate at the Mine Site is arid to semi-arid with rainfall varying from three to 10 inches per year. The mean annual precipitation at the Mine Site is 7.89 inches per year. Daytime temperatures during the summer frequently exceed 100^{o}F and may fall to less than 10^{o}F at night during the winter. Estimated pan evaporation is 115 inches per year.

7.

Seismic and Flood Hazards

The Mine Site area is not within an active earthquake fault zone as defined by the Alquist-Priolo statute. The Pahrump-Stateline fault, which is potentially active and located about 11 miles east of the mine, is the controlling fault for calculating the Maximum Credible Earthquake for the P-16 WMU.

The Probable Maximum Precipitation (associated with the Probable Maximum Flood) is 8.5 inches. The 100-year, 24-hour design storm is approximately 3.6 inches of precipitation.

8. Land Use

The initial post-closure land use for the Closed P-16 Landfill will be open space re-vegetated with native plants. Pursuant to Section 13260, California Water Code, the Regional Board may require the Discharger to file a Revised RWD with the Board for any proposed change to this land use.

Lands located adjacent to the Mine Site include public lands managed by the US Department of Interior, Bureau of Land Management (USDOI(BLM)) and National Park Service (USDOI(NPS)). A public elementary school is located approximately 4,000 feet southwest of the P-16 WMU. The school is located on a 10-acre parcel of land owned by the Baker Unified School District. In June 2003, the District decided not to open the school for the 2003/2004 school year, because of an insufficient number of students attending the school. The 10-acre parcel where the school is located is completely surrounded by land that is part of the Discharger's Mine Site. The nearest residences are located adjacent to the Mine Site and approximately 5500 feet southwest of the WMU. The residences are occupied by employees (and families of employees) of the California Department of Transportation (Caltrans) and California Highway Patrol. The Caltrans employees work at the Interstate 15 highway maintenance station, which is also located adjacent to the Mine Site. Interstate 15 passes through the southern portion of the Mine Site on land owned by the State of California. All but a small portion of the Mine Site is located north of Interstate 15.

9. Description of Hydrogeology

a. Waste Management Unit (WMU) Area

The P-16 WMU is: (i) at the north edge of the Mine Site in a small canyon that slopes in a southeasterly direction, and (ii) approximately 1,000 feet up gradient and northeast of the ore body, which is exposed in the bottom of the Pit. The WMU is on top of bedrock, metamorphic rock and igneous rock. The igneous rock (shonkinite) is associated with the ore body and is relatively unfractured. Fractures in the metamorphic rocks are more frequent in the upper 500 feet of rock. There are some alluvial deposits (channel deposits) between the WMU and the underlying bedrock. These deposits are limited to former drainage channels and their thicknesses do not exceed 20 feet. The Discharger estimates the depth to the ground water table at the WMU (thickness of the former vadose zone) was about 70 feet before operation of

the P-16 WMU began in 1967. Leakage from the WMU has saturated soil pores and bedrock fractures in the former vadose zone underlying the WMU.

b. Down Gradient of Waste Management Unit (WMU)

Surface and subsurface waters of the P-16 WMU area drains to Wheaton Wash, which in turn drains to the east toward the Ivanpah Dry Lakebed. Ivanpah Dry Lakebed is eight miles down gradient of the WMU. Wheaton Wash and Ivanpah Dry Lakebed appear on the U.S. Geological Survey (USGS) 15-minute quadrangle(s).

Depth to the saturated-zone surface on or down gradient of the WMU varies depending on the topography and other factors. The depth to the saturated-zone surface ranges from ground surface (at springs/wastewater seeps) to approximately 100 feet. Migration velocities in the saturated zone are highly variable due in part to the varying hydraulic conductivity. Extraction wells that are part of CASs have created local "cones of depression" in the saturated-zone surface.

Surface waters in the area include ephemeral surface water present during and following storm events. Other surface waters include springs located down gradient of the WMU, including one spring (Roseberry Spring) that appears on the USGS 15-minute quadrangle published in 1912. Roseberry Spring is an ephemeral spring that does not appear on more recent quadrangle maps. It is found in Wheaton Wash one mile down gradient of the WMU within Section 31, T16N, R14E, SBB&M on federal land administered by the USDOI, BLM. Other springs down gradient of the WMU are ephemeral and do not appear on USGS quadrangle maps. Such springs typically flow for short periods during or following wet weather.

10. Description of Wastes Within the P-16 WMU Before Closure

Before November 5, 2002, the Discharger discharged the following four types of waste solids in the form of mineral processing waste streams (mixture of waste solids and wastewaters) to the P-16 WMU: Tailings, 4010 Gangue, 5330 Gangue and Roaster Scrubber Solids. Attachment B1 provides a detailed description of P-16 formation and closure construction methods and Attachment B2 provides the dates and amounts of discharge. Attached Tables No. D1S through D9S summarize results of laboratory analyses conducted on the waste solids. In 2001, the Discharger developed a list of constituents of concern (COCs) to evaluate whether soils outside of the P-16 WMU had been contaminated by mining waste constituents (Indicator/Soil COCs). The Indicator/Soil COCs were developed as part of an investigation of soil contamination, which is described in Finding No. 24. Attached Tables No. D1S through D4S summarize results of laboratory analyses conducted on the waste solids for Indicator/Soil COCs.

The particle size for the waste solids located in the P-16 WMU ranges from sand-sized down to clay-sized particles. Some of the voids that formed among the particles contain wastewater. This wastewater is referred to in this Order as Pore Wastewater.

There is a total of approximately 67 million gallons of Pore Wastewater within the WMU. The Pore Wastewater in the lower portion of the unlined section of the P-16 WMU (Unlined-WMU Section) is seeping into ground waters causing exceedance of water quality objectives (WQOs) for constituents in Tables No. 1 and 2. These constituents are also referred to in this Order as the main constituents of concern for ground water (GW-COCs)), because their concentrations in both the Pore Wastewater and ground water exceed those values in Tables No. 1 and 2. Attached Table No. E1W provides concentrations representative of concentrations in the Pore Wastewater for additional constituents

Total dissolved solids (TDS) in the Pore Wastewater primarily originates from reagents used in mineral processing. GW-COCs originating from reagents include chloride, sodium and lignin sulfonate. Chloride and sodium originate from use of sodium carbonate and hydrochloric acid in mineral processing. Some of the GW-COCs in the Pore Wastewater also originate from dissolution of the minerals contained in the waste solids, which originate from the ore the Discharger processes.

The ore body, surrounding geologic formations, and waste solids in the P-16 WMU contain elevated concentrations of a number of naturally occurring minerals. These minerals include the following: Bastnasite (mixed lanthanide fluoride carbonate), Calcite ($CaCO_3$), Strontianite ($SrCO_3$), Barite ($BaSO_4$), Celestite ($SrSO_4$), Silica (SiO_2), Galena (PbS), Cerrusite ($PbCO_3$), Hematite (Fe_2O_3), Monazite (mixed lanthanide thorium phosphate), and radioactive elements of the Thorium-234 and Uranium-238 decay series. Bastnasite is the primary lanthanide mineral in the ore body. The lanthanide content of Bastnasite is roughly 49% cerium, 33% lanthanum, 12% neodymium, 4% praseodymium and 2% other lanthanides.

Table No. 1
California Dept. Health Services Primary Maximum Contaminant Levels
Title 22, CCR
Water Quality Objectives (WQOs)

Constituent	**WQOs**	**Units**	**Source of Constituent**
Strontium (Sr)	4.2[1]	mg/l	Dissolution of minerals in the ore
Barium	1	mg/l	"
Gross Alpha	15	pCi/L	"
Gross Beta	50	pCi/L	"
Total Uranium	20	pCi/L	"
Total Uranium	0.0253	mg/L	"

[1] US Environmental Protection Agency (USEPA) Lifetime Health Advisory [The Lifetime Health Advisory (LHA) is based on data published in the USEPA's Integrated Risk Information System (IRIS) for waters used in domestic supply systems.]

Table No. 2
California Dept. Health Services Secondary Maximum Contaminant Levels
Title 22, CCR
Water Quality Objectives (WQOs)

Constituent	WQOs	Units	Source of Constituent
Total Dissolved Solids (TDS)	500	mg/l	Primarily reagents and some dissolution of minerals in the ore
Chloride	250	mg/l	Reagent
Color	15	Color Units	Reagent (lignin sulfonate)

11. Description of Ground Water Quality

a. Background Quality

The source of recharge to the ground water at the Mine Site derives from the Clark Mountain Range. An example of the high-quality ground water is ground water in the Discharger's background monitoring well (Well No. 93-1MW), up gradient of the Mine Site. The TDS concentrations in Well No. 93-1MW average 382 mg/l. Concentrations of constituents in ground water from Well No. 93-1MW are below WQOs listed in Tables No. 1 and 2. Concentrations of constituents in Well No. 93-1MW are given in Attachment E, Table No. E2W.

b. Polluted Ground Water

Leakage of Pore Wastewater from the P-16 WMU has polluted ground water within and down gradient of the Mine Site. The saturated zone underlying the P-16 WMU is polluted because of past and ongoing wastewater leakage from the P-16 WMU. An example of the polluted ground water is the wastewater (polluted ground water), which is extracted by the East P-16 CAS and West P-16 CAS (Mine Pit extraction wells). Concentrations of constituents in wastewater extracted from well RW8, which is one of the wells included in the East P-16 CAS, are given in Attachment E, Table No. E3W. Table No. E4W, Attachment E, provides concentrations of constituents in polluted ground water from the West P-16 CAS. In terms of mass concentration, TDS is the primary pollutant in that ground water.

c. Alternate Water Supply

The Discharger owns two separate well fields that have been used to supply domestic water to the Community of Mountain Pass. One is 10 miles to the west in the Amargosa Hydrologic Unit (Shadow Valley). The other is 10 miles to the east in the Ivanpah Valley. The well fields have been used to supply water to the Mine Site and a school and residences described in Finding No. 8. There are no active domestic water supply wells within the Mine Site or within a distance of several miles down gradient of the Mine Site. Actions to cleanup polluted ground water are described in Finding No. 24.

12. Description of Closure

The Discharger's objective is to construct a final cover and close waste solids in the P-16 WMU as a landfill in conformance with Title 27, California Code of Regulations (Title 27 or 27CCR). The Discharger intends to construct a sub-base for the final cover by using on-site borrow materials and relocating 0.225 million cubic yards of materials within the P-16 WMU. Borrow materials to be used in the sub-base for the final cover are described in Finding No. 15. Findings No. 13 and 14 describes the final cover.

To facilitate closure construction, the Discharger intends to properly destroy two extraction wells (Extraction Wells No. 2000-4RW and 2000-5RW) and 19 piezometers within the area of the P-16 Dam. The facilities proposed for destruction are described in Finding No. 24 b. Attachment B3 and Table No. 5 of the attached monitoring and reporting program (MRP). The Discharger proposes to construct new extraction wells and piezometers to replace the destroyed facilities (Replacement Extraction Wells and Piezometers). Before destruction of Extraction Wells No. 2000-4RW and 2000-5RW, the Discharger proposes to construct and begin operation of the new Replacement Extraction Wells. The Discharger will construct and begin operation of the Replacement Extraction Wells and Piezometers in accordance with an approved Workplan for Replacement Extraction Wells and Piezometers, which is required under Provision G.4 of this Order.

Finding No. 17 describes reuses of wastewater on the P-16 WMU. Finding No. 19 describes the character and classification of the wastewaters. The Discharger will be required to construct the closure in accordance with an approved Final Closure Plan and a Storm Water Pollution Prevention Plan (SWPPP), which is required by Provision No. G.4 of this Order.

13. Cover Design

The Discharger has proposed to construct an Evapotranspiration (ET) Final Cover. Title 27, Section 22510, CCR, requires that new and existing Mining Units shall be closed so that they no longer pose a threat to water quality. Furthermore, Title 27, Section 21090(a) provides that the RWQCB can allow any alternative final cover design that it finds will continue to isolate the waste in the unit from precipitation and irrigation water at least as well as would the a final cover built in accordance with applicable prescriptive standards. As proposed in the cover evaluation report, the Discharger compares the predicted performance of a prescriptive cover design to several ET cover designs using many different alluvium compositions in combination with two climate scenarios. Based on the geotechnical analyses of the borrow material on-site, and the conservative evapotranspiration values, computer modeling shoes that an ET cover design performance is equal or exceeds the prescriptive cover design. The ET cover design proposed would be composed of a sub-base and an upper two feet of Older alluvium. The sub-base would be constructed with about 0.053 million cubic yards of borrow material (Assorted Borrow Material described in Finding No. 15), and the upper two feet would use about 0.30 million cubic yards of borrow material (Older Alluvium described in Finding No. 15c.). The upper layer would be vegetated to minimize erosion and increase transpiration of water. Cover design also includes other elements to isolate waste such as the surface slope, drainage channels, vegetation plan, settlement monitoring, and erosion control.

a. Post-closure Settlement

In order to maintain the designed landfill surface gradients, the Discharger's closure plan included the placement of additional borrow material onto P-16 as settlement occurs over time due to dewatering of the granular material. The material to be used will be the uncontaminated borrow material (Older Alluvium).

The Discharger's RWD includes results of mathematical modeling used to predict consolidation and settlement of waste solids in the WMU. The maximum settlement will occur where the thickness of the waste solids are the greatest. At this location, the maximum estimated settlement is six to nine feet. Under a worst case scenario, the modeling predicts a maximum settlement of 13 to 14 feet at this location. At the perimeter of the WMU, there will be no settlement. The modeling indicates cessation of settlement in 15 to 20 years.

b. Exposed Surface Areas

The areal extent of the landfill final cover (LFC) will be approximately 87 acres and will consist of the: North LFC Area (32 acres), Central LFC Area (41 acres), and South LFC Area (14 acres). It will include two drainage channels; the North and South Diversion Channels.

The slopes and direction of slopes are: North Diversion Channel (0.65 to 0.90% primarily toward the east), North LFC Area (1% to the north and east), Central LFC Area (2% to the south), South Diversion Channel (2% primarily toward to the west), and South LFC Area (50% to the south). The North Diversion Channel will be 12-feet wide, 2.5 feet deep, and will have sides, which are sloped at 33% (one-vertical: three-horizontal).

The North LFC Area will include: (i) a stormwater outlet located at the northeast corner of the Area and (ii) the North Diversion Channel located along the northern perimeter of the Area. The North Diversion Channel and North LFC Area will be sloped to the stormwater outlet, which will discharge to Farmer's Wash during storm events. The boundary between the North and Central LFC Areas will be a drainage divide (Drainage Divide). The Central LFC Area will include the South Diversion Channel located at the boundary between the Central and South LFC Areas and overlying the vicinity of the Crest of the Dam. The Central LFC Area will be sloped to the South Diversion Channel, which will discharge to the stormwater system for the mineral processing plants (Plant Stormwater System). This system ultimately discharges to Wheaton Wash. The South LFC Area will be underlain by the Apron for the P-16 Dam. This Area will be sloped to the Plant Stormwater System, which ultimately discharges to Wheaton Wash. The Crest of the Dam at the completion of closure will be located two feet below the top surface of the final cover.

c. Storm/Flood Protection

The design for the Closed P-16 Landfill will prevent failure of the P-16 Dam as a result of a 100-year, 24-hour design storm or Probable Maximum Flood (PMF) associated with the Probable Maximum Precipitation. Drainage channels and the final cover for the Closed P-16 Landfill will be constructed to be free draining during a 100-year, 24-hour design storm or PMF.

The North Diversion Channel will be of sufficient capacity to convey runoff from major up-gradient watersheds as a result of a 100-year, 24-hour design storm. The Diversion Channel will convey the flow to the stormwater outlet, which will discharge to Farmer's Wash. In the event of a PMF, the North LFC Area will act as an emergency basin to temporarily store stormwater. Stormwater will overtop the North Diversion Channel, flow onto the North LFC Area and backup to form ponded stormwater. Ponded stormwater in the Area will continue to discharge from the stormwater outlet to Farmer's Wash until all ponded water drains from the Area. The peak volume and surface elevation of stored (ponded) stormwater will be five acre-feet and 4,944 feet above mean sea level (amsl), respectively. This will leave a minimum freeboard in the North LFC Area of five feet during a PMF. The effective minimum containment elevation around the perimeter of the North LFC Area will be 4,950 feet amsl, except at the southern perimeter (Drainage Divide) and the Stormwater Outlet. The range of elevations along the Drainage Divide is 4,949 to 4,952 feet amsl. The elevation of the Stormwater Outlet at the northeast corner of the Area will be 4,936 feet amsl.

d. Erosion Control

The initial post-closure land use for the Closed P-16 Landfill will be open space re-vegetated with native plants. The Discharger will construct final cover and erosion control measures for the South LFC Area (Face of the Dam) in accordance with an approved Final Cover Design Report, and the Quality Assurance Plan, which are required by Provision G.4 of this Order.

e. Lined-WMU Portion

Approximately 2% of the waste solids in the Closed P-16 Landfill will be located above the lined-portion of the WMU. The 31-acre, north portion of the WMU is lined with a 40-mil polyvinyl chloride liner. This includes a 30-acre compartment containing Fine Tailings Solids, and a 1-acre compartment containing 4010 Gangue Solids. The depth of waste solids in the two compartments ranges from zero to 8 feet and zero to several feet, respectively. The depth of the liner below the final cover will range from approximately one to eight feet. The 4010 Gangue Solids located in the 1-acre compartment are dry.

The Fine Tailings Solids in the 31-acre compartment contain Pore Wastewater. The volume of Pore Wastewater is roughly seven million gallons. There is a drainage system on top of the liner for removal of Pore Wastewater during the post-closure

period (Drainage System). The System consists of a network of plastic drain pipes. Provision G.4 of this Order requires that the Discharger submit a **Pore Wastewater Removal Plan** that would describe modifications needed to make the Drainage System operable. Post-Closure Requirement No. C.8 requires that the Discharger operate and maintain the Drainage System until the Pore Wastewater is completely drained from the Fine Tailings Compartment.

f. Unlined-WMU Section

Approximately 98% of the waste solids that will be in the WMU will be in the unlined portion of the P-16 WMU. The unlined portion of the P-16 WMU consists of the waste solids in the central area, and waste solids underlying the Liner System and the up-gradient surface of the apron of the dam. Mill Waste Streams (waste solids and wastewater) were discharged to the Unlined Section between 1967 and April 1, 2000. The maximum depth of waste solids in the P-16 WMU occurs in the Unlined-WMU portion up gradient of where the height of the Dam is the greatest. The Unlined-WMU portion contains approximately 60 million gallons of Pore Wastewater. Following closure, the volume of material located in the Unlined-WMU Section will remain approximately the same. The Discharger's RWD indicates leakage from the Unlined-WMU Section is expected to continue for 15 to 20 years. (*MC, 2003d*)

14. Engineered Alternative for Final Cover

The Discharger plans to construct an ET Final Cover as described in the RWD, provided that the **Final Cover Feasibility Report** required in Provision G.4 of this Order confirms the results of preliminary evaluation in the RWD. That evaluation shows that an ET Final Cover can achieve the Title 27 performance goal (an infiltration rate equal to (or less than) the rate for the final cover prescribed in Title 27). In the unlikely event the Report can not make this demonstration, the Discharger intends to construct a Geomembrane Final Cover described in the RWD. The RWD provides full demonstration that the Geomembrane Final Cover will meet or exceed the Title 27 performance goal.

Both final covers are engineered alternatives to the cover prescribed in Title 27. The ET Final Cover would consist of clean fill (Older Alluvium) with a minimum thickness of two feet. The design for the Geomembrane Final Cover is the same as the ET Final Cover, except it would include a 60-mil geomembrane under the layer of Older Alluvium.

Title 27, Section 21090 prescribes that the final cover for landfills consist of a minimum of a two-foot thick foundation layer, which may contain waste materials, overlain by a one-foot thick clay soil layer and finally by a one-foot thick vegetative soil layer. The clay soil layer shall be compacted to attain a maximum hydraulic conductivity of 1×10^{-6} centimeters/second.

Due to the arid climate setting, maintaining the performance criteria of the prescribed cover is not feasible. Studies have shown that without adequate protection, arid conditions can

eventually cause the clay to desiccate and crack. These cracks can extend to 3 feet in depth allowing infiltration into the waste.

Title 27 allows for approval of engineered alternatives for closure requirements when the Discharger demonstrates the following criteria are met: the prescriptive standard is not feasible, and there is a specific engineered alternative that is consistent with the performance goal of the prescriptive standard, and it provides equivalent protection against water quality impairment. The Discharger has demonstrated in the RWD that the engineered alternative selected for the final cover will meet these Title 27 criteria, including the Title 27 performance goal.

15. Assorted Borrow Materials

The Discharger proposes to use borrow materials, which contain mining waste constituents, in the sub-base for the final cover for the P-16 WMU (Assorted Contaminated Borrow Material). Title 27 allows the use of material containing waste in the sub-base for the final cover (27CCR§21090(a)(1)). Approximately 0.053 million cubic yards of Assorted Contaminated Borrow Material will be excavated from the following areas located outside of the P-16 WMU: Dune Area of the Windblown Waste Solids Area, and Channel/Pond Areas. Additional description of the Channel/Pond Areas and the Dune Area are provided below and in Attachment C. The upper-most cover will consist of a minimum of 2 feet of uncontaminated borrow materials consisting of Older Alluvium derived from areas on-site.

a. Windblown Waste Solids

Windblown waste solids were eroded from the P-16 WMU and primarily deposited over a 43-acre area northeast of the P-16 WMU and ranges in thickness from several feet to less than an inch (Windblown Waste Solids Area). The thickest accumulation of these deposits form the dune area, which is less than 20 acres, adjacent to the northeast and southeast side of the WMU. At this time, the Discharger proposed to excavate only the Dune Area for incorporation into the sub-base portion of the cover. There will be no attempt to excavate soils located under the Dune Area.

b. Channel/Pond Waste Solids

The Channel/Pond Areas consist of natural drainage channel areas and artificial pond areas located down gradient of the P-16 WMU, and the Mill, Separations and Specialty Plants. These facilities are the sources of Mining Waste constituents located in these Areas. In the Channel/Pond Areas, the Discharger is proposing to remove material to background soil concentrations. Borrow materials excavated will consist of Mining Waste solids, soils contaminated by Mining Waste constituents and uncontaminated soils. The Discharger intends to overexcavate in order to remove waste from the areas and obtain sufficient borrow material. Over-excavation and mixing due to borrow handling will significantly reduce higher concentrations in samples collected from the Channel/Pond Areas.

c. Uncontaminated Borrow Material (Older Alluvium)

The Older Alluvium consists of debris flow and has a lower permeability than younger shallow alluvium found in drainage channels located at the Mine Site. The hydraulic conductivity (saturated) for the Older Alluvium ranges from 3.1×10^{-7} to 1.1×10^{-5} centimeters/second. (*MC, 2003d*)

d. Quality of Borrow Waste

As discussed in more detail in Finding No. 24, the Discharger completed investigations in 1998/1999, 2001, 2003, and 2004 to characterize the Channel/Pond Areas and Windblown Waste Solids Area (including the associated Dune Area). Concentrations of lead (one of the indicator/soil COCs) that were found to be higher than those in waste that have been discharged to P-16 are from sites, Channel/Pond Area (Pond P-3), Channel/Pond Area (Pond P-15), and former Lead Pond P-11. Barium (primarily in the form of barium sulfate and so is excluded from hazardous classification) concentrations that were found to be higher than material discharged to P-16 derives from the Dune area soils. **Attached Tables No. D10S through D13S** summarize results of laboratory analyses, for Indicator/Soil COCs for these specified sites.

e. Closure of Borrow Areas

Approval granted by this Order to remove contaminated borrow material from the Channel/Pond Areas and Dune Area for use in the sub-base for the final cover does not constitute approval of closure of these areas. Determination of final cleanup levels and confirmation that closure is complete will be administered separately from this Order.

16. Character of Wastewaters Authorized for Reuse

Wastewaters authorized for reuse within the P-16 WMU consist of the East P-16 CAS, West P-16 CAS and High-Quality Hyperfiltration Water. Concentrations of constituents in these wastewaters are given in attached Tables No. E3S, E4S and E5S, respectively. Concentrations of constituents in Tables No. E3S are for wastewater derived from the extraction well RW-8, which is one of the wells included in the East P-16 CAS.

The High-Quality Hyperfiltration Water is produced by the Hyperfiltration (Reverse Osmosis) Wastewater Treatment Facility (WTF), which is part of the Advanced Wastewater Treatment, Disposal/Reuse System (AWT System). Waste Discharge Requirements for the AWT System is contained in a separate Order.

17. Authorized Disposal/Reuse Site

The P-16 WMU is the only authorized disposal/reuse site for the waste solids present in the WMU. These waste solids consist of the Tailings, 4010 Gangue, 5330 Gangue and Roaster Scrubber Solids. These WDRs authorize use of Assorted Borrow Waste Materials for

construction of the sub-base for the final cover. Once the Assorted Borrow Materials are placed in the sub-base, the WMU shall become the only authorized disposal/reuse site for these materials.

These WDRs authorize continued disposal of the East P-16 CAS Wastewater to the 31-Acre Lined Compartment up until construction for closure starts. At startup of construction for closure, the Discharger intends to remove any ponded wastewater on top of the 31-Acre Lined Compartment and dispose of it to the Onsite Evaporation Ponds (OSEPs). The OSEPs are regulated by WDRs contained in a separate Order established for the AWT System.

The Discharger is authorized to reuse the East and West P16 CAS Wastewaters for dust control/compaction on the WMU until construction of the sub-base for the final cover is complete. Once construction for the sub-base is complete, the Discharger intends to:

(i) Resume discharge of the West P-16 CAS Wastewater to the AWT System .
(ii) Initiate a proposed discharge of the East P-16 CAS Wastewater to the AWT System.

As mentioned above, the AWT System is regulated by separate WDRs.

These WDRs authorize the proposed reuse of the High-Quality Hyperfiltration Water on the final cover for the WMU provided it meets effluents limits prescribed in the WDR for the AWT System. This reuse is limited to: (i) use for dust control and/or compaction during construction of the final cover and (ii) use following closure construction for dust control, or repair and supplemental irrigation for native vegetative.

18. Waste Classification

For the purposes of this Order, "wastes generated by beneficiation of ore" are referred to as either Mining Waste or Group B Mining Waste. The definitions of "waste generated by beneficiation of ore" and "Group B Mining Waste" are contained in 22CCR§66261.4 and 27CCR§22480, respectively. According to 22CCR§66261.4, "waste generated by beneficiation of ore," include wastes generated by crushing, grinding, flotation, leaching, roasting, precipitation, solvent extraction, washing, dissolution and filtration. These are the processes located at the Discharger's mineral processing plants (Mill, Separations and Specialty Plants).

a. Waste Solids and Mineral Processing Wastewater

In accordance with 22CCR§66261.4 and 27CCR§22480, the following are classified Group B Mining Waste and are not classified as Hazardous Waste: Pore Wastewater, Tailings Solids, 4010 Gangue Solids, 5330 Gangue Solids, Roaster Scrubber Solids and waste constituents present in the Assorted Borrow Materials for the sub-base portion of the final cover. These wastes originate from the Discharger's mineral processing plants (Mill, Separations and Specialty Plants). The Board established

the Group B Mining Waste classification for Pore Wastewater, Tailings Solids and 4010 Gangue Solids in previous WDRs (Board Order No. 6-00-101).

The above-described solids will represent a low risk to water quality if contained and managed within the P-16 WMU in accordance with requirements in this Order. Corrective actions to address leakage of Pore Wastewater from the P-16 WMU are described in Finding No. 24.

The California Department of Toxic Substance Control (DTSC) regulates hazardous waste under Division 4.5, Title 22, CCR (Division 4.5). Division 4.5 includes threshold criteria and exemptions used to identify hazardous waste. Result of laboratory analyses in attached Tables No. D1S, D2S, D4S, D9S and D10S show that the concentrations of lead in the following waste solids do exceed criteria used to identify characteristics of hazardous waste: Tailings Solids, 4010 Gangue Solids, Roaster Scrubber Solids, and waste solids in the Assorted Borrow Material. These materials, however, are Mining Waste and therefore not classified hazardous waste.

b. Wastewaters Authorized for Reuse

The High-Quality Hyperfiltration Water is regulated by WDRs contained in a separate Order. Those WDRs specify that the water meet discharge limits that implement water quality objectives contained in the Basin Plan for potential receiving waters. Pursuant to 27CCR§20200, this wastewater is not classified under Title 27.

The East P-16 CAS and West P-16 CAS Wastewaters contain constituents at concentrations that exceed WQOs in the Basin Plan for receiving water. These wastewaters, however, will represent a low risk to water quality if used in accordance with requirements contained in this Order. Pursuant to 27CCR§20200, these wastewaters are not classified under Title 27.

19. Waste Management Unit (WMU) Classification

Previous WDRs classified the P-16 WMU as an Existing Group B Mining Waste Tailings Pond as defined in 27CCR§22480 and 27CCR§22490. A tailings pond is a type of surface impoundment. The Existing Group B Mining Waste Tailings Pond classification will remain in effect up until time the Discharger completes:

a. Removal and disposal of remaining wastewater on the Liner System as described in Finding No. 18, and
b. Completion of the sub-base for the final cover.

At that time, the classification will change to an Existing Group B Mining Waste Landfill.

20. Detection Monitoring Program (DMP)

The Discharger has implemented an Evaluation Monitoring Program and Corrective Action Program as required under separate Orders described below (6-98-19 and amendments). Detection Monitoring shall be required to detect any new releases from the WMU. Evidence of a new release includes both statistical and nonstatistical (physical) evidence of a release as specified in Title 27. The attached MRP includes requirements for Detection Monitoring as defined in Title 27 for the following media: unsaturated and saturated zones.

The attached MRP describes the Water Quality Protection Standards (WQPSs) for the Detection Monitoring Program. The WQPSs consist of GW-COCs (including Monitoring Parameters), Concentration Limits, Monitoring Points, and the Point of Compliance.

21. Evaluation Monitoring Program

The Discharger shall establish an Evaluation Monitoring Program whenever there is statistically significant evidence of a new release from the Facility as required in Section 20385(a)(2) or (3) of Title 27.

22. Corrective Action Program

The Discharger shall institute a CAP when required pursuant to Section 20385(a)(4) of Title 27.

23. Statistical Methods

Title 27 requires statistical analyses of the monitoring data. Statistical analyses of monitoring data are necessary for the earliest possible detection of any new release of waste from the WMU.

24. Cleanup and Abatement Orders (CAOs)

a. CAO No. 6-98-19

On March 25, 1998, the Board's Executive Officer issued CAO No. 6-98-19 after determining that the P-16 WMU was violating WDRs and causing a condition of pollution. On April 1, 2000, to comply with CAO No. 6-98-19, the Discharger temporarily stopped the discharge of the Mill Waste Streams to the P-16 WMU.

b. CAO No. 6-98-19A1 (Ground Water)

In October 2000, the Executive Officer issued amended CAO No. 6-98-19A1 allowing the Discharger additional time to complete its proposed improvements to the P-16 CASs, which consists of extraction wells installed to extract polluted ground water down gradient of P-16. The improvements consisted of construction of two additional extraction wells (Extraction Wells 2000-4RW and 2000-5RW), which were completed in 2000. (These same extraction wells will be destroyed to facilitate

closure of the P-16 WMU). Flows generated by extraction wells 2000-4RW and 2000-5RW are discussed below.

The P-16 CASs (consisting of the West P-16 CAS [located in the Mine Pit area] and the East P-16 CAS, located immediately down gradient of P-16 WMU) are now the primary CASs that intercept leakage from the P-16 WMU. This extraction system provides cleanup and containment of wastes in the saturated zone. Currently the extraction wells are either within the boundary of the P-16 WMU or outside, but within a distance of 1000 feet from the WMU. Hydrogeologic modeling results indicate that the P-16 leakage rate was 75 gallons per minute (gpm) in 2001. The current leakage rate has decreased (*MC, 2002a*). The P-16 CASs generate an average of approximately 102 gallons per minute (gpm) of wastewater. Approximately; 59 gpm is generated by the West CAS (Pit Wells) and 43 gpm is generated by the East P-16 CAS. The East P-16 CAS consists of extraction wells 2000-4RW, 2000-5RW, 95-RW1 and 98-RW1, and infiltration trench RW-8. The average wastewater flow generated by Extraction Wells 2000-4RW and 2000-5RW is 21 gallons per minute (gpm), which is 21% of total flowrate (102 gpm). Wastewaters generated by the East and West P-16 CASs are a mixture of varying amounts of the P-16 WMU leakage and high-quality groundwater that enters the Mine Site from the north. The fractions of the WMU leakage in these wastewaters are roughly 80% and 35%, respectively.

CAO No. 6-98-19A1 includes a performance standard, which requires the Discharger capture a minimum of 85 percent of the WMU leakage. Mathematical modeling shows that the P-16 CASs are meeting this performance standard (*MC, 2002a*).

c. <u>CAO No. 6-98-19A1 (Channel/Pond Areas)</u>

In 1998/1999, the Discharger conducted an investigation of the Channel/Pond areas in accordance with CAO No. 6-98-19A1. The investigation utilized gamma-radiation survey meters to identify potential areas of contamination by the Discharger's mining wastes. Several thousand survey readings where completed along 30,000 linear feet in seven drainage channels. The screening was followed up by collection of soil samples for fixed laboratory analyses. Approximately 95 samples (64 surface samples and 31 soil boring samples) were collected and analyzed by laboratories. The Discharger collected surface samples at a depth of zero to six inched below ground surface (bgs). Deeper samples were typically collected at depths of four and 10 feet bgs (*MC, 1998a, MC, 2001 and MC, 2003e*).

d. <u>Cleanup and Abatement Order No. 6-98-19A1 (Windblown Waste Solids Area)</u>

In 2001, the Discharger conducted an investigation of the Windblown Waste Solids Area in response to CAO No. 6-98-19A1 and a February 28, 2000 letter from Board staff. The investigation included remote sensing using Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) overflight data. The remote sensing was focused on the neodymium, because it has a very distinct spectral signature and is present in

Windblown Waste Solids. Remote sensing was followed up by investigation with gamma-radiation survey meters and collection of soil samples for fixed laboratory analyses. Approximately 51 samples (28 surface samples and 23 soil boring samples) were collected and analyzed by laboratories. Surface samples are representative of soils at a depth of zero to one inch below ground surface (bgs). Deeper samples are representative of soil one to 12 inches bgs. The 43-acre Windblown Waste Solids Area extends approximately 4,000 feet northeastward (downwind) from the P-16 WMU. The maximum width of the Area is approximately 1500 feet.

25. Closure and Post-Closure Maintenance Plan (CPCMP)

The Discharger's RWD includes a Final CPCMP. Provision G.4 of this Order includes a schedule that the Discharger must follow for completing closure of the P-16 WMU.

26. Financial Assurances for Closure and Post-Closure Maintenance

The Discharger has established financial guarantee bonds for the P-16 WMU and other Mine Site facilities regulated by the Board. The amounts of the bonds, which are based on 2001 cost estimates, are: $22,954,494 for closure, $693,418 for post closure maintenance, and $7,301,644 for known or reasonably foreseeable releases. These amounts of financial assurance are sufficient to cover current estimates of cost for closure, post closure maintenance, and known or reasonably foreseeable releases. Provision G.8 requires that the Discharger maintain adequate financial assurances for the Closed P-16 Landfill. The attached MRP requires that the Discharger submit a report annually demonstrating whether the amount of financial assurance is still adequate. If it is not adequate, the MRP requires that the Discharger increase the financial assurances by the appropriate amount.

27. Receiving Waters

The receiving waters are ground waters and surface waters (ephemeral springs) of the Ivanpah Hydrologic Unit.

28. Lahontan Basin Plan

The Board adopted a Water Quality Control Plan for the Lahontan Basin (Basin Plan), which became effective on March 31, 1995. This Order implements the Basin Plan.

29. Beneficial Uses

The historic, present and potential beneficial uses of the ground waters of the Ivanpah Hydrologic Unit as set forth and defined in the Basin Plan are:

a. Municipal and Domestic Supply (MUN);
b. Agricultural Supply (AGR);
c. Industrial Service Supply (IND); and
d. Freshwater Replenishment (FRSH).

The present and potential beneficial uses of surface waters (ephemeral springs) of the Ivanpah Hydrologic Unit are set forth and defined in the Basin Plan under Minor Surface Waters. Those beneficial uses include the above beneficial uses and the following beneficial uses:

e. Water Contact Recreation (REC-1);
f. Non-contact Water Recreation (REC-2);
g. Commercial and Sport Fishing (COMM);
h. Warm Freshwater Habitat (WARM);
i. Cold Freshwater Habitat (COLD);
j. Wildlife Habitat (WILD);
k. Water Quality Enhancement (WQE); and
l. Flood Peak Attenuation/Flood Water Storage (FLD).

30. California Environmental Quality Act (CEQA)

a. Negative Declaration

On November 20, 1997, the County of San Bernardino (Planning Commission) completed an Initial Study and adopted a Negative Declaration for the Project in accordance with the CEQA (Public Resources Code, Section 21000 et seq.). On September 26, 2000, the County of San Bernardino completed an Amended Initial Study and re-adopted the November 20, 1997 Negative Declaration for the Project. The Project includes:

i. Excavation of borrow materials from the Mine Site for use in closure of the WMU as a landfill that includes a final cover,
ii. Construction for closure of the WMU, and
iii. Continued operation of the Corrective Action Systems and Monitoring Facilities before and during the post-closure period.

The Project also included the following items that were completed between 1997 and 2002:

iv. Increasing the disposal capacity of the WMU through raising the height of the Crest of the Dam to 4,950 feet amsl,
v. Installation of a liner, and
vi. Continued operation of the Mill, generation of Mill Waste Streams and disposal of those Waste Streams to the P-16 WMU.

The September 26, 2000 action was in accordance with Section 15164, Title 14, CCR (CEQA Guidelines).

b. Mitigation Measures

The intended closure of the P-16 WMU is a mitigation measure for protection of water quality. The final cover and drainage controls, which will be part of the closed P-16 Landfill, will minimize percolation of precipitation through wastes to the underlying saturated zone. The final cover will also eliminate wind erosion and transport of waste solids from the WMU to natural ephemeral channels. Continued operation of the CASs for the P-16 WMU is an ongoing mitigation of water quality impacts. The Project described in the CEQA documents and this Order includes the following additional actions to mitigate degradation to water quality:

i. Removal of non-native salt cedar in the channel/pond areas (this will help to lower evapotranspiration-caused, high TDS concentrations accumulating in the saturated zone),
ii. Removal of mining waste from the channel/pond areas (eliminate/reduce degradation to the ephemeral surface water and the underlying saturated zone from stormwater runoff),
iii. Removal of Windblown Waste Solids from the Dune Area (reduce the potential for degradation to ephemeral surface waters).

31. Notification of Interested Parties

The Board has notified the Discharger and all known interested parties of its intent to adopt Revised WDRs for the P-16 WMU.

32. Consideration of Public Comments

The Board, in a public meeting, heard and considered all comments pertaining to the P-16 WMU.

IT IS HEREBY ORDERED that the Discharger shall comply with the following:

A. Receiving Water Limits

1. This discharge shall not cause a violation of any applicable water quality standards adopted by the Regional Board or the State Water Resources Control Board.

2. The discharge shall not cause ground waters of the Ivanpah Hydrologic Unit to contain:

a. Bacteria: A median concentration of coliform organisms over any seven-day period that is in excess of (or equal to) 1.1MPN/100 milliliters;

b. Chemical Constituents: Concentrations of chemical constituents in excess of the MCL or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions of Title 22 of the CCR which are incorporated by reference into this Order: Table No. 64431-A of Section 64431 (Inorganic Chemicals), Table No. 64433.2-A of Section 64433.2 (Fluoride), Table No. 64444-A of Section 64444 (Organic

Chemicals), Table No. 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table No. 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges). (This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.);

Concentrations of chemical constituents that adversely affect the water for beneficial uses, including the beneficial use AGR;

c. Radioactivity: Concentrations of radionuclides in excess of the limits specified in Table No. 4 of Section 64443 (Radioactivity) of Title 22 of the CCR, which is incorporated by reference into this Order. (This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.); and

d. Taste and Odors: Taste or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses.

B. Prohibitions

1. The discharge of waste to the Closed P-16 Landfill is prohibited, except for the following:

   a. borrow material proposed for use in the sub-base portion of the final cover,
   b. the CAS wastewaters as described for use as dust-control during cover construction, and
   c. High-Quality Hyperfiltration Water for use on the final cover as described in Finding No. 18.

2. The discharge of waste from the P-16 WMU to adjacent land areas, or ground or surface waters is prohibited.

C. Post-Closure Requirements

1. Closed Landfill surface drainage (and surface drainage from surrounding tributary areas) shall not contact or percolate through wastes contained in the Landfill

2. The exterior surfaces of the Closed P-16 Landfill shall be sloped to promote lateral runoff of precipitation and to prevent ponding.

3. In accordance with State Water Resources Control Board Order No. 97-03-DWQ, the Discharger shall maintain a Storm Water Pollution Prevention Plan (SWPPP) and Monitoring Program. Stormwater runoff from the Closed P-16 Landfill shall be regulated under the SWPPP and Monitoring Program.

4. The Discharger shall promptly repair any breach in the final cover or other final cover problem discovered by periodic monitoring.

5. Annually, prior to October 1 of each year, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding and to prevent surface drainage from contacting or percolating through wastes.

6. The Discharger shall maintain the native vegetative cover, including seeding, fertilization, replanting, and controlling vehicle access to prevent damage to vegetation.

7. The Discharger shall, in a timely manner, remove and relocate any waste which has been discharged at the Closed P-16 Landfill in violation of this Order.

8. The Discharger shall operate and maintain the Pore Wastewater Removal System until drainage of Pore Wastewater from the Fine Tailings Compartment is complete.

D. General Requirements

1. The P-16 WMU shall be adequately protected against washout, inundation, erosion of wastes, or erosion of cover materials from a storm or flood having a recurrence interval of once in 100 years.

2. The P-16 WMU (including the Dam) shall be adequately protected against washout, erosion, structural damage or slope failure resulting from a Probable Maximum Flood (PMF).

3. The P-16 WMU shall not cause a pollution, or threatened pollution, as defined in Section 13050 of the California Water Code.

4. The P-16 WMU shall not cause a nuisance as defined in Section 13050 of the California Water Code.

5. Wastewater or freshwater used for compaction, control of dust or establishing native vegetation on the final cover shall be limited to a minimal amount. A "minimal amount" is defined as that amount which will not result in ponding or runoff, or percolation into waste solids located within the P-16 WMU.

6. The Discharger shall maintain in good working order any facility, control system, or monitoring device installed to achieve compliance with this Order.

7. At all times, the P-16 WMU shall be in compliance with applicable requirements contained in Title 27, California Code of Regulations (27CCR), including requirements for closure and post-closure maintenance contained in 27CCR§21090.

8. The Discharger shall maintain a Detection Monitoring Program for the P-16 WMU as required in 27CCR§20385(a)(1) and as outlined in the attached MRP.

9. The Discharger shall construct the final cover as specified in the approved Final Closure Plan, an approved Construction Quality Assurance/Quality Control Plan, and the final Design Construction Report.

E. Provisions

1. Board Order No. 6-00-101 is hereby rescinded.

2. The Discharger shall comply with the "Standard Provisions for Waste Discharge Requirements," dated September 1, 1994, which is attached and is made a part of this Order.

3. Pursuant to California Water Code Section 13267(b), the Discharger shall comply with the attached Monitoring and Reporting Program No. R6V-2003-(**TENTATIVE**) and "General Provisions for Monitoring and Reporting," dated September 1, 1994.

4. Closure Schedule: The Discharger shall complete closure of the P-16 WMU and comply with applicable closure requirements of Title 27 in accordance with the following schedule:

   a. By **December 30, 2004**, submit to the Board a:

      i. **Pore Wastewater Removal Plan** that describes modifications needed to the Pore Wastewater Removal System (The System is described in Finding No. 13.e.)

      ii. **Final Sub-Base Construction Report**, including but not limited to the following:

         (A) A detailed schedule for completing all tasks associated with construction of the sub-base for the final cover;
         (B) Sub-Base Construction Design Plans; and
         (C) Sub-Base Construction specifications and construction quality assurance plan.

      iii. A **Workplan for Replacement Extraction Wells and Piezometers**, including:

         (A) A detailed schedule for completing all tasks associated with construction of replacement facilities;
         (B) A map showing proposed locations for replacement facilities;
         (C) Justification for the proposed locations and number of replacement facilities; and
         (D) Construction design plans and specifications for the proposed replacement facilities.

(E) Results of evaluation showing that the Replacement Extraction Wells will meet the performance standard contained in CAO No. 6-98-19A1.

(F) Plans that describe destruction for those extraction wells and piezometers to facilitate closure construction.

iv. **Health and Safety Plan**, that describes activities to insure the health and safety of workers during construction of the final cover and

v. Revised copy of the **Storm Water Pollution Prevention Plan (SWPPP)** for the Mine Site. (The revised **SWPPP** shall address stormwater runoff from borrow areas during and following removal of borrow material, and from the P-16 WMU during and following construction for closure. The **SWPPP** shall include a description of potential pollutants, points of storm water release, best management practices, and all other items required by State Water Resources Control Board (SWRCB) Water Quality Order No. 97-03-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 and SWRCB Water Quality Order No. 99-08-DWQ, NPDES General Permit No. CAS000002. The **SWPPP** shall include a description of how the Discharger will manage stormwater to ensure protection of the P-16 Dam during construction for closure, including management of stormwater run-on and runoff during an unlikely large storm event (e.g., Probable Maximum Precipitation).

b. By **December 30, 2004**, submit to the Board a **Final Cover Feasibility Report** for closure of the P-16 WMU, including but not limited to the following:

i. A detailed schedule for completing all remaining tasks associated with construction for closure of the WMU;
ii. Vegetation Plan including the names of the native plants proposed for vegetating the final cover;
iii. Final Construction Design Plans; and
iv. Final Construction specifications and construction quality assurance plan.

The **Reports** required under Provision G.4.a and G.4.b, above, shall be prepared by or under the supervision of either a California Registered Civil Engineer or a California Certified Engineering Geologist.

c. By **January 28, 2005**, begin construction for closure of the P-16 WMU, including construction of proposed Replacement Extraction Wells to replace Extraction Wells No. 2000-4RW and 2000-5RW.

d. By **February 25, 2005**, startup Replacement Extraction Wells.

e. By **March 23, 2005**, complete destruction of Extraction Wells No. 2000-4RW and 2000-5RW.

f. By **November 1, 2005**, complete construction for closure of P-16 WMU.

5. The operator shall submit to the Regional Board a certification, under penalty of perjury, that the solid waste landfill has been closed in accordance with the final CPCMP. The certification shall be completed by a California registered civil engineer or a California certified engineering geologist and include a report with supporting documentation. The report shall include a Final Construction Quality Assurance (**CQA**) report and any other documentation as necessary to support the certification.

6. Post-Closure Repairs: Before any proposed major repairs to the Closed P-16 Landfill structures are to take place, the Discharger shall submit design plans and specifications, and a construction quality assurance plan to the Board for review and consideration of approval. Repairs shall include all necessary cover construction due to settling.

7. Documentation of Repairs/Construction: Following the completion of any landfill repairs or construction, the final documentation required in 27CCR§20324(d)(1)(C) shall be submitted to the Board for review and approval. The Report shall be prepared by or under the supervision of either a California Registered Civil Engineer or a California Certified Engineering Geologist. It shall contain sufficient information and test results to verify that construction was in accordance with the design plans and specifications, and with the performance goals of Title 27.

8. Adverse Conditions: The Discharger shall immediately notify the Board of any adverse condition in accordance with the notification procedures in Item 2.a of the attached "Standard Provisions for Waste Discharge Requirements." Adverse conditions include but are not limited to:

   a. Slope failure,
   b. Erosion of final cover material, which results in exposure of waste, or
   c. Evidence of any new release from the P-16 WMU (i.e., a release other than the ongoing wastewater leakage)from the P-16 WMU).

9. Financial Assurances: The Discharger shall maintain adequate financial assurance to cover the costs for post-closure monitoring and maintenance, and completing corrective action for all known and reasonably foreseeable releases from the Closed P-16 Landfill.

10. Recording: Upon completion of closure, the Discharger shall file a detailed description of the Closed P-16 Landfill, including a map, with the San Bernardino County Recorder, and the Board. The description of the Closed P-16 Landfill shall include but not be limited to the following:

a. The date that closure was completed;
b. The boundaries including height and depths of the filled area;
c. The location where the closure and post-closure plans can be obtained; and
d. A statement that the future Closed P-16 Landfill use is restricted in accordance with the Closure and Post-Closure Maintenance Plan.

11. Claim of Copyright or other Protection: Any and all reports and other documents submitted to the Regional Board pursuant to this Order will need to be copied for some or all of the following reasons: 1) normal internal use of the document, including staff copies, record copies, copies for Board members and agenda packets; 2) any further proceedings of the Regional Board and the State Water Resources Control Board; 3) any court proceedings that may involve the document; and 4) any copies requested by members of the public pursuant to the Public Records Act or other legal proceedings.

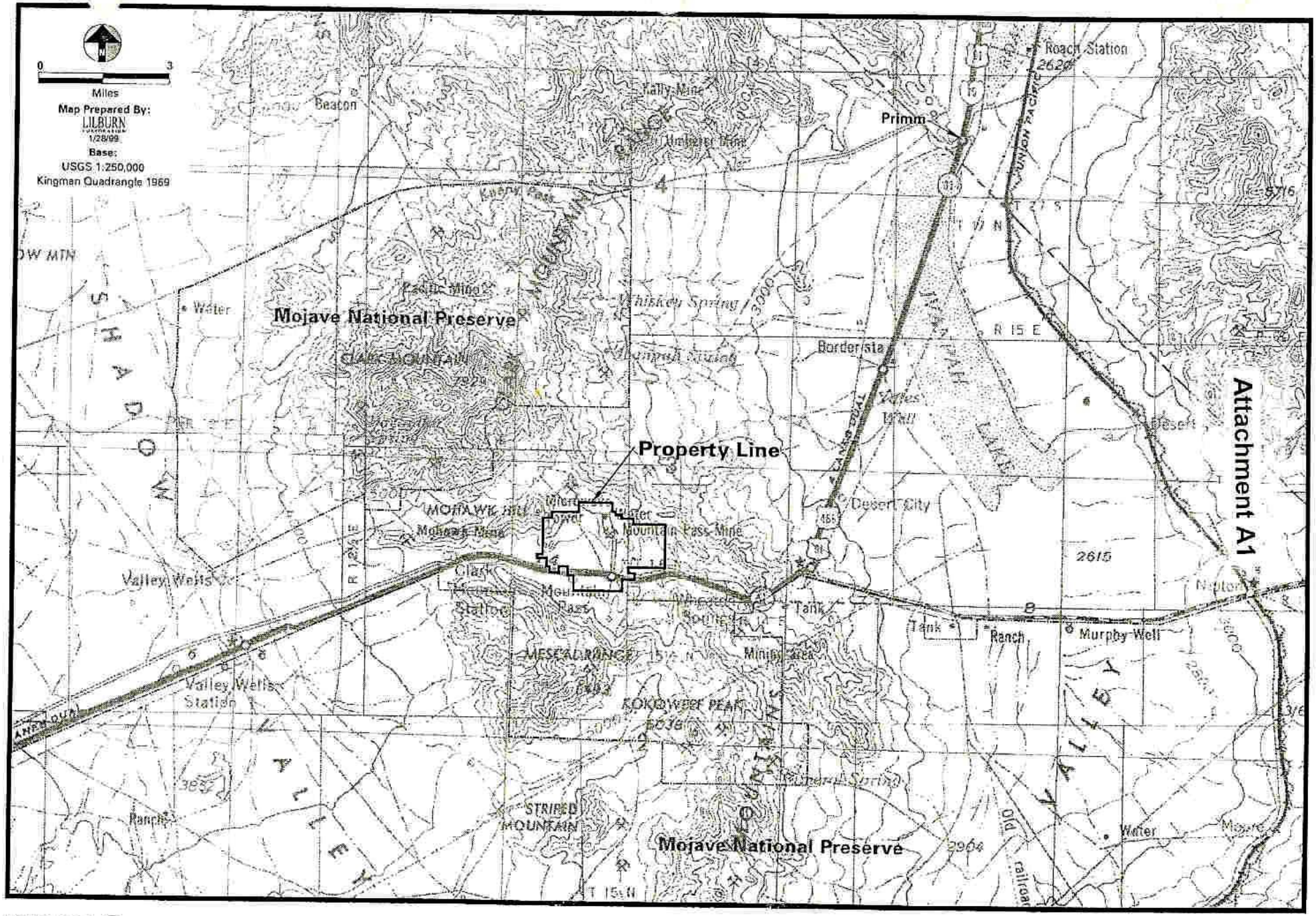
If the Discharger or its contractor claims any copyright or other protection, the submittal must include a notice, and the notice will accompany all documents copied for the reasons stated above. If copyright protection for a submitted document is claimed, failure to expressly grant permission for the copying stated above will render the document unusable for the Regional Board's purposes, and will result in the document being returned to the Discharger as if the task had not been completed.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by California Regional Water Quality Control Board, Lahontan Region, on October 13, 2004.

_____

HAROLD J. SINGER
EXECUTIVE OFFICER

Attachments:
A1. Map - Mine Site Location
A2. Map - P-16 Waste Management Unit (WMU) Location within Mine Site
A3. Map - P-16 WMU
B1. Description of the P-16 WMU (Pre-Closure) and Description of Closure Construction
B2. Waste Solids Discharged to P-16 WMU before November 2, 2002
B3. Description of the P-16 WMU Stability (Pre and Post-Closure)
C. Sources of Assorted Borrow Materials
D. Character of Solids (S) – Tables No. D1S through D12S
E. Character of Wastewater/Ground Water (W) – Tables No. E1W through E5W
F. References
D. Standard Provisions for Waste Discharge Requirements

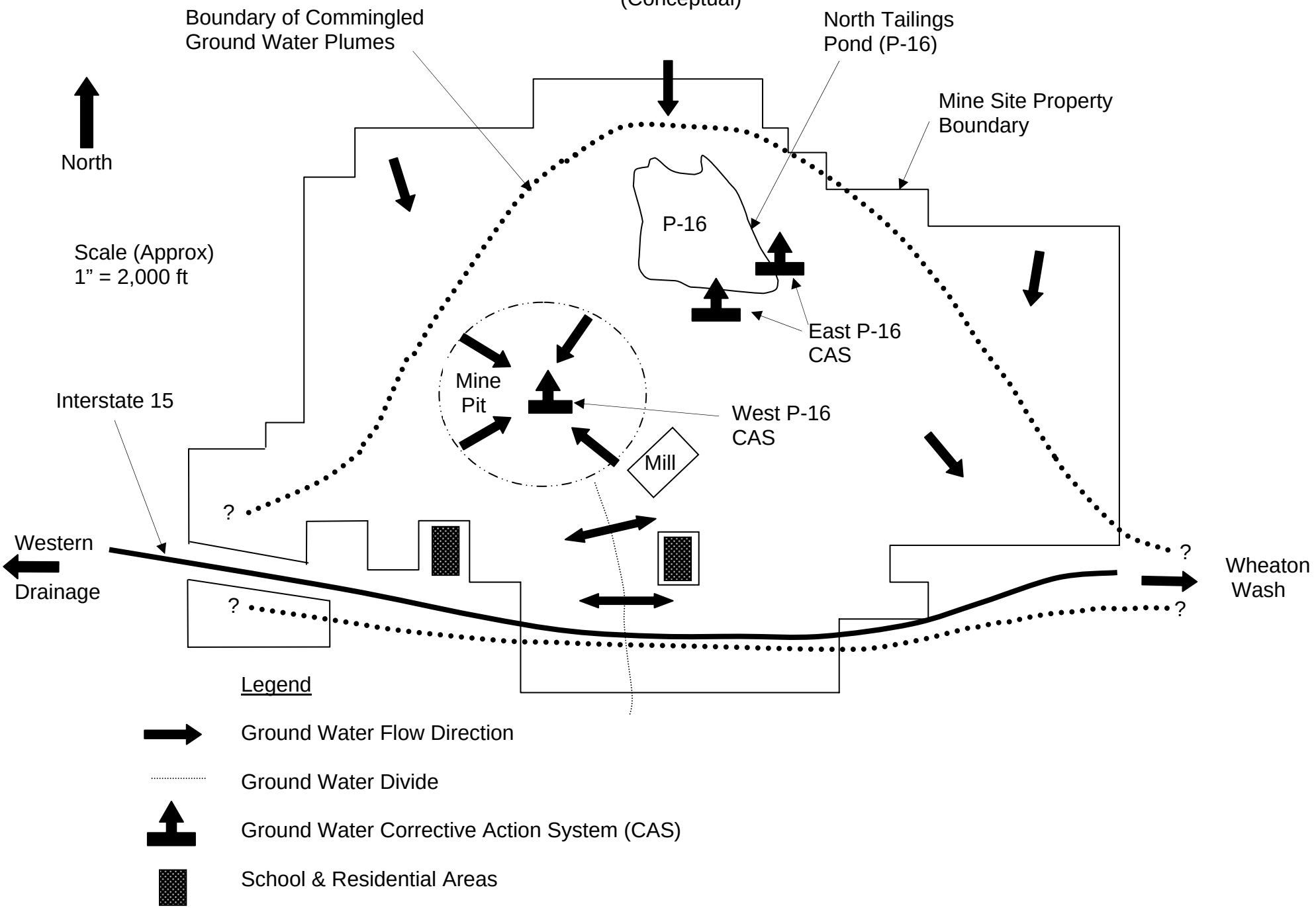


UNOCAL MOLYCORP

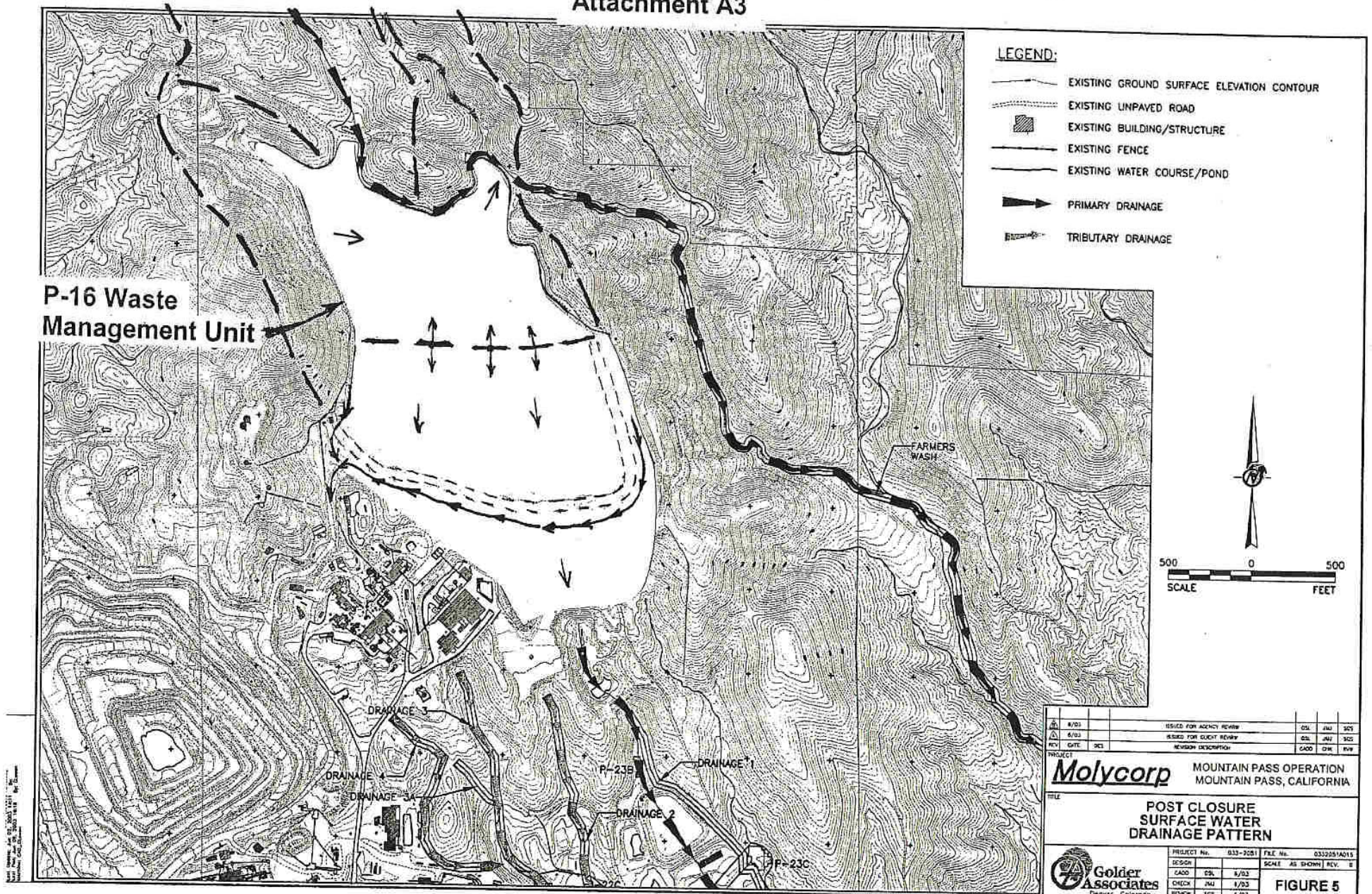
Project Site Location Map

Mountain Pass Mine
San Bernardino County, California

Attachment A2
Mine Site Map
(Conceptual)



Attachment A3



Attachment B1
Description of the P-16 WMU (Pre-Closure) and
Description of Closure Construction

1. Disposal Capacity (Pre-Closure)

To form the P-16 WMU, the Discharger has established a dam (P-16 Dam) across a small canyon (Canyon) through a series of separate construction projects. The Canyon includes a primary drainage channel (Canyon Drainage Channel) sloping in a southeasterly direction. Through Negative Declarations dated November 20, 1997 and September 26, 2000, the County of San Bernardino (County) approved of a P-16 dam elevation of 4950 feet amsl and disposal capacity of approximately 7.0 million cubic yards (or 9.6 million dry tons). The P-16 WMU never reached its disposal capacity.

2. Exposed Surface Areas (Pre-Closure)

The areal extent of the P-16 WMU is approximately 87 acres. Proceeding from north to south, the exposed surfaces of the WMU include the: Lined-WMU Section (32 acres), central area (34 acres), and exposed surfaces of the P-16 Dam (21 acres). The Lined-WMU Section includes an emergency spillway (Emergency Spillway) to Farmer's Wash. The boundary between the Lined-WMU Section and central area consists of a berm (Internal Berm), which has a height of several feet. The central area is unlined and serves as an emergency stormwater storage basin in the event of a MPF.

3. Portions of WMU Affected by Closure

Closure will affect the upper portions of the WMU. In the Lined-WMU Section, the Discharger proposes: (a) to leave the liner in-place, (b) no relocation of 4010 Gangue Solids, and (c) minimal relocation of Fine Tailings Solids. The pre-Closure locations of wastes in the Lined-WMU are essentially the same as the location described for post-closure in Finding No. 14. In the P-16 Dam Area, material will be removed and relocated to other portions of the WMU. In August 2003, the piezometric elevations in the Dam area ranged from 37 to 77 feet below the Crest of the Dam. A maximum of 22-feet will be removed from the upper portion of the P-16 Dam where the height of the Dam is the greatest (180 feet), which is near the intersection of the Dam with underlying Canyon Drainage Channel. A maximum of 11 feet will be removed at the west end of the Dam and two feet at the east end of the Dam. The Internal Spillway will be eliminated. The Emergency Spillway to Farmer's Wash will be eliminated and replaced with a stormwater outlet (Stormwater Outlet) to Farmer's Wash. The Stormwater Outlet will be located 10 feet lower in elevation than the Emergency Spillway. Any ponded wastewater on the Liner System will be removed and disposed of as described in Finding No. 18.

To facilitate closure of the P-16 WMU, the Discharger intends to shutdown and destroy two extraction wells and 19 piezometers, which are described in Attachment B1. Before shutdown of the two extraction wells, the Discharger intends to construct and startup operation of replacement extractions wells. Replacement piezometers will be installed before construction for closure is complete.

4. Storm/Flood Protection (Pre-Closure)

The 1997 Stability Investigation evaluated failure due to dam overtopping. In accordance with recommendations in the report, spillways were constructed to prevent failure as a result of a 100-year, 24-hour design storm or Probable Maximum Flood associated with the Probable Maximum Precipitation (PMF). The elevation of the Crest of the P-16 Dam is 4950 feet above mean sea level (amsl). The effective-containment elevation of the Canyon Surfaces exceeds 4950 feet amsl. The North-Area Surface Impoundment includes an emergency spillway (Existing Emergency Spillway) to Farmer's Wash with overflow elevation of 4946 feet amsl. It also includes an internal spillway (Existing Internal Spillway) located on the Existing Internal Berm, which is the boundary between the North-Area and Central-Area. The elevation of the top of the Existing Internal Berm is 4947 feet amsl. The overflow elevation of the Internal Spillway is 4945 feet amsl.

The run-on from a 100-year, 24-hour design storm would be contained in the North-Area Surface Impoundment below the invert of both the Existing Internal Spillway and Existing Emergency Spillway. In the event of a PMF, the entire P-16 WMU footprint would be used to contain the floodwater. The Internal Spillway would allow flood flows into the Central-Area. Stormwater would be allowed to flow out the Emergency Spillway into Farmer's Wash.

Attachment B2
Waste Solids Discharged to P-16 WMU Before November 5, 2002
(Tailings, 4010 Gangue, 5330 Gangue and Roaster Scrubber Solids)

1. Methods and Dates of Discharges

The discharge of mineral processing related wastes to P-16 WMU stopped in November 5, 2002. Table B1, below, describes the wastes discharged to the P-16 WMU before November 5, 2002. The P-16 WMU was unlined until May 2001, when the Discharger placed a liner on top of the waste solids, creating two lined compartments; 31-Acre and One-Acre Lined Compartments. Between 1967 and April 1, 2000, the Tailings and 4010 Gangue Solids waste streams were commingled and released to the unlined P-16 WMU as a single discharge.[1] During the subsequent Interim Mill Operations (which began in May 2001 and ended on November 5, 2002), the Discharger discharged Fine Tailings Solids and 4010 Gangue Solids as separate waste streams to the 31-Acre and One-Acre Lined Compartments, respectively. During the Interim Mill Operation, the Discharger disposed of Dewatered Coarse Tailings to the unlined central area.

Between November 21, 1988 and January 1997, the 5330 Gangue Waste Stream was released to the P-16 WMU as a single discharge separate from the commingled discharge of the Tailings and 4010 Gangue Waste Streams . During this period, the 5330 Gangue Waste Stream discharge point was routinely moved to different locations within the WMU.

Between 1997 and 1983, the Roaster Scrubber waste stream was discharged to an unlined pond (Pond P-17) located adjacent to the north side of the P-16 WMU. As the P-16 WMU expanded over time, Pond P-17 and its contents became part of the P-16 WMU. This occurred in the late 1980s.

2. Amounts of Discharges

Approximately, 98% of the waste solids located within the P-16 WMU are located in the Unlined-WMU Section. The remaining 2% are located in the Lined-WMU Section. The Unlined-WMU Section contains all four of the above-referenced waste solids. The Lined-WMU Section, which includes the 31-Acre Lined Compartment and One-Acre Lined Compartment contains approximately 0.12 million cubic yards of Fine Tailings Solids and 0.002 million cubic yards of 4010 Gangue Solids, respectively.

[1] During this period, the discharge point was routinely moved to different locations within the WMU.

Table No. B1
Wastes

Wastes	Source	Period Discharged to P-16	Solids Mass Rate (dry tons/day)	Cubic Yards of Solids in P-16 WMU (Millions)	Dry Tons of Solids in P-16 WMU (Millions)[2]	Percent of Total Solids located in the P-16 WMU
Tailings	Mill (Flotation Process)	1967 to 11/5/2002	1,850	5.7[3]	7.9	99.5
4010 Gangue	Mill (Acid Leach Plant)	"	5	0.017	0.024[4]	0.3
5330 Gangue	Specialty Plant (Cerium 96 Process)	11/21/1988 to 01/1997	1.8	0.0039	0.0053[5]	0.1
Roaster Scrubber	Separations Plant (Roaster Scrubber)	1977 to 1983	1.8	0.0039	0.0053[6]	0.1
			Totals	5.7587	7.8994	**100**

[2] A conversion factor of 0.729 was used to convert between cubic yards and dry tons.
[3] (*SBCo, 2000*), (*MC, 2000*)
[4] (*MC, 2000*)
[5] (*MC, 1987*)
[6] (*CRWQCB, 1989*), (*MC, 1986*), (*MC, 1989*), (*MC, 2004*).

Attachment B3
Description of WMU Stability

1. Description of P-16 WMU Stability

a. Summary

Lateral and upward support to prevent catastrophic release of waste from the P-16 WMU is provided the underlying Canyon Surfaces and the design and construction for the P-16 WMU, which includes the Dam. Waste solids underlying and upgradient of the Apron assist the primary components of the Dam (Apron and Starter Dam) in providing lateral support to contain waste within the WMU.

Evaluation shows that the Existing P-16 WMU has an adequate margin of safety against failure (*MC, 1997*). In accordance with Section 6355, Division 3, California Water Code, the California Department of Water Resources, Division of Safety of Dams (DOSD) issued its Certification of Approval for the Existing P-16 WMU on September 17, 1998. This approval is based on the 1997 evaluation described in Item No. 1.c of this attachment. The 1997 evaluation included mathematical modeling.

Further evaluation in the Discharger's RWD shows that the P-16 WMU will continue to have an adequate margin of safety against failure during the period that includes construction for closure and the post-closure phase. During this period, Discharger will add borrow material to the WMU upgradient of the Dam. The top surface of the P-16 WMU, however, will remain below the surface elevations modeled during the 1997 Stability Investigation. The factor of safety will therefore remain higher than that determined by the 1997 modeling. The piezometric elevations in the WMU will also remain below the values modeled. The margin of safety will therefore continue to remain higher than that determined by the modeling.

Since April 2000, there has been an overall steady decrease in piezometric elevations in all nine piezometers, which have designated Maximum Permissible Piezometric Elevations (MPPEs) as described in Item No. 1.c of this attachment. This trend will continue as the amount of Pore Wastewater in the WMU continues to decrease. As piezometeric elevations decrease, there will be corresponding increases in the factor of safety for protection from catastrophic failure. (*MC, 2003a*) (*MC, 2003d*) Since the elevations for the piezometric surface and the upper surfaces of the WMU will remain below the values modeled during the 1997 Stability Investigation, the margin of safety will be higher than that determined by the modeling. (*MC, 1997*) (*MC, 2003d*)

b. Description of Dam and Canyon

The Canyon Surfaces consist of the surface of Massive Bedrock Formations. Evaluation shows that the stability of these Formations exceeds applicable factors of safety against failure by a very large amount. These Formations have been fully characterized through borehole logging and other geologic investigation methods.

The exposed surfaces of the P-16 Dam consist of portions of the apron of the P-16 Dam (Apron). The top of Apron is also the crest of the Dam (Crest). The downgradient face of the Apron is also the face for the Dam (Face). The P-16 dam also includes a Starter Dam. Both the Apron and Starter Dam are constructed of compacted rock-fill. The rock fill was obtained from the Discharger's Open Pit Mine. The in-place, compacted rockfill Apron and Starter Dam consist of broken rock ranging in size from approximately three inches to two feet, with gravel-size and smaller-sized particles located in void spaces among the rocks. The Apron is 40-feet wide along the Crest. The Discharger has established an unpaved access roadway along the Crest (Crest Access Road). The slope of the Face (downgradient surface of the Apron) of the P-16 Dam is one-foot vertical:two-foot horizontal (50% slope). The Starter Dam is buried by waste solids on its top and upgradient side, and by the Apron on its downgradient side. The maximum width of the Apron (200 feet) and Starter Dam (250 feet) occurs at the base of the P-16 Dam along the underlying Canyon Drainage Channel. The maximum height of the P-16 Dam (180 feet) and Starter Dam (50 feet) also occur above the underlying Canyon Drainage Channel (*MC, 1997*), (*MC, 2003d*).

c. 1997 Evaluation of WMU Stability

In 1997, a consultant to the Discharger re-investigated the stability of the P-16 WMU (1997 Stability Investigation) and developed design plans and specifications for the final Dam raising from elevation 4940 to 4950 feet above mean sea level (amsl). The design plans and specification, and results of the investigation are included in a report prepared by the consultant (1997 Stability Report). The Report includes updated Maximum Permissible Piezometric Elevations (MPPEs) for nine existing piezometers in the Dam area[1] and recommends routine monitoring of the piezometers. The report also recommends modification to the WMU in the Emergency Spillway area. In 1998, the Discharger implemented the recommendations in the report and completed the final Dam rising from elevation 4940 to 4950 feet amsl. The 1997 Stability Investigation included use of mathematical modeling to evaluate the P-16 WMU. The modeling evaluated slope stability, liquefaction and the affects of a MCE. The modeling assumed that within the WMU boundaries: (1) the piezometric surface would be at the MPPEs, (2) the top surface (Crest) of the Dam would be at an elevation of 4950 feet amsl, and (3) the elevations for the surface of solids in the WMU would be equal to elevations that would occur if the WMU had reached its capacity for disposal of solids. Under these conditions, the modeling showed that the P-16 WMU (including the Dam) would have an adequate margin of safety against failure. Since the piezometric elevations and amount of solids in the WMU are currently below the values modeled, the margin of safety is currently higher than that determined by the modeling. (*MC, 1997*) (*MC, 2003d*)

d. Monitoring

The DSOD Certificate of Approval for the Existing P-16 WMU (including the Dam) incorporates the above-described MPPEs (*DOSD, 1998)*. The Discharger has been

[1] Piezometers P-1, P-2, P-3D, P-3M, P-4, P-5, P-6, P-7 and P-9

monitoring these piezometers routinely and submitting results with self monitoring reports to the Regional Board Victorville Office and the DOSD. Measurements completed on August 21, 2003 for the nine piezometers indicate piezometric elevations range from 23 to 83 feet below the MPPEs. (*MC, 2003a*) (*MC, 2003d*)

Attachment C
Description of Sources of Assorted Borrow Material

Borrow Areas	Type of Area	Number of Facilities	Location	Approximate Size of Area (acres)	Approximate Borrow Volume (cubic yards)
Channel/Pond Areas[1]	Former Asphalt Lined Product Storage Pond	One Pond: P-12	Adjacent to ephemeral wash	< 1	1,000
"	Former Wastewater Disposal Pond Areas[2]	Eleven Ponds: P-13, P-14, P-20B, P-20C, P-20D, P-20E, P-22B, P-22C, P-22D, P-23C	Ephemeral washes	< 1 each	4,000
"	Inactive Mill Operations Ponds[3]	Three Ponds: P-3, P-4, P-15	South side of Mill	< 1 each	1,000
"	"	Seven Ponds: P-23A and P-23B Five Ephemeral Wash Areas: U-2, U-3, U-5, and the portions of U-1 and U-4 located on land owned and controlled by the Discharger	Ephemeral washes	< 1 each	20,000
"	Active Wastewater Disposal Ponds	Two Ponds: P-20A[4] and P-19[5]	Ephemeral washes	< 4 each	9,000
"	Drainage Channels	Two Ephemeral Washes	Ephemeral washes (Immediately downgradient of Separations and Specialty Plants)	2	2,000
"	Former Asphalt Lined Product Storage Pond	One Pond: P-7B containing Bastnasite (approx. 25K cubic feet)	Just north of Main Office Building	<1	1,000
"	Former Lead Ponds	Three Ponds: P-8, P-11, & P-24 (approx. 16K total cubic feet)	Ephemeral washes	<1 each	600
Bunker	Former Cerium Bunker	One bunker area containing cerium concentrate like material (approx. 800 ft3)	Cerium #1 area at the Separation's Plant	<1	30

Borrow Areas	Type of Area	Number of Facilities	Location	Approximate Size of Area (acres)	Approximate Borrow Volume (cubic yards)
Dune Area	Dunes	One area located in and adjacent to ephemeral wash	Adjacent to and in upper Farmer's Wash (Adjacent to northeast and southeast edge of P-16 WMU)	20	16,000
Thickeners	Former Beneficiation Areas at the Separation's Plant	Five Thickeners (1 through 5) at the Separation's Plant containing Cerium Concentrate-like residue. (Approx. 11.8K cubic feet)	Separation's Plant	12	450
Thickeners	Former Beneficiation Area at the Cerium 96 Plant	One Leach Thickener containing Cerium 96 Plant Residue (approx. 600 ft3)	Cerium 96 Plant	<1	20
Filter Press	Beneficiation Area at the Cerium 96 Plant	Lanthanide Carbonate from future Separation's and Cerium 96 Plants operations (approx. 8K ft3).	Cerium 96 Plant	<1	300
Roasters	Herreshoff and Skinner Roasters and Feed Bins	Two Roasters and two feed bins containing Bastnasite (approx. 1400 ft3)	Separation's Plant	< 1 each	50
Mics.materials from Sumps, Pipes, and Tanks	Former Beneficiation Areas at the Separation's and Cerium 96 Plants	One Tank containing tailings at the Separation's Plant and various sumps & pipes at the Cerium 96 Plant. One Filter Press at the Cerium 96 Plant (approx. 500 ft3)	Separation's and Cerium 96 Plants	<1 total	20
Totals		**---**	**---**	**---**	**55,470 (sum of above)**

[1] The Channel/Pond Areas consist of natural drainage channel areas and artificial pond areas located down gradient of the P-16 WMU, and the Mill, Separations and Specialty Plants.

[2] During the mid-1980s to the mid-1990s, the Discharger excavated pond materials (embankments, waste residues and contaminated soils) and placed them into the West Tailings Pond (P-1) for closure as a landfill. Some contaminated soils, however, still remain at these Former Pond Areas.

[3] Ponds received process streams from Mill when there was a spill or upset in a Mill process. Pond Embankments still exist; however, ponds have not received wastewater since sometime before 1991.

[4] The Discharger currently uses P-20A for containment of stormwater runoff. The Discharger proposes to remove borrow material from P-20A when it is dry and does not contain stormwater. The Discharger plans to continue to use Pond P-20A for stormwater containment.

[5] The Discharger currently discharges less than 3,800 gallons per day of septic tank effluent to the southern half of Pond P-19. The effluent covers a fraction of the area for the southern half of the pond. The Discharger proposes the following sequence for removing borrow material from Pond P-19. The Discharger plans to excavate borrow material from the northern half of the pond where ponded effluent is not present. Following excavation of the northern half, the Discharger will divert the discharge to that half of the pond. The Discharger will allow the soils in the southern half to dry. Once the soils in the southern half are dry, the Discharger will remove borrow material from that half. The Discharger plans to continue to use Pond P-19 for septic tank effluent disposal..

Table No. D1S
Tailings Solids
Indicator COCs

Constituent	Units	Min	Mean	Max	Std Dev	N	Footnotes
Barium (Ba)	mg/kg	138827	153874	168384	6963	95	1
Lanthanides (total)	mg/kg	23775	38416	50281	5475	95	1
Lead	mg/kg	1392	2018	2785	319	95	1
Strontium	mg/kg	18603	35515	35515	4284	95	1
Radium (226+228) (Sum of Below)	pCi/g	13.9	32.6	57.5	---	7	---
Thorium	mg/kg	70.3	122.8	158.2	17	95	1
Uranium	mg/kg	18.0	21.8	26.0	---	4	3
Radium-226	pCi/g	4.4	9.2	21.4	5.89	7	2
Radium-228	pCi/g	9.5	23.4	36.1	6.03	7	2
Cerium (Ce)	mg/kg	13391	18050	23543	---	95	1, 4
Lanthanum (La)	mg/kg	9484	12791	16674	---	95	1, 4
Neodymium (Nd)	mg/kg	3447	4646	6060	---	95	1, 4

Footnotes:

1. Sampling location: Discharge to the P-16 WMU. Sampling dates: 9/4/98 to 12/21/98. Laboratory: Discharger's laboratory at Mountain Pass, CA. Sample preparation: Samples were dewatered and dried to remove wastewater. Laboratory Method: XRF(fused disk, lithium flux). Reference: The Discharger maintains a summary of the laboratory results for the solids in a database. Laboratory reports are on file at the Mine Site. The database is the same one used for tailings solids in the following reference: Alternate Source Investigation Report for Mountain Pass Mine , Prepared by CH2MHILL, August 28, 2002.

2. Sampling location: Tailings solids in Ponds P-23A and P-23B, which are located downgradient of the P-16 WMU. Sampling dates: During the 1998/1999 Onsite Investigation. Laboratory: FGL Environmental Laboratories and Paragon Environmental Laboratories. Laboratory Method: EPA 901.1M. Reference: P-16 Closure Activities, Prepared by Molycorp, April 10, 2003. Individual laboratory reports are contained in three-ring binders received by the Regional Board office on July 31, 2003.

3. Sampling location: Solids in the P-16 WMU. Sampling date: The Discharger's staff collected samples on February 4, 2003. Laboratory: NEL Laboratories located in Las Vegas, Nevada. Laboratory Method: USEPA 3050 (Extraction) & USEPA 6020 (ICP/MS). Reference: Laboratory reports were faxed to CRWQCB's Victorville Office on December 11, 2003.

4. The Discharger calculated the concentration for each lanthanide (Ce, La, Nd) by multiplying the laboratory result for the concentration of all lanthanides by a constant (fraction). The lanthanides in the tailings solids are present in the mineral Bastnasite. The fraction (percent) of each lanthanide in Bastnasite remains constant. Therefore, the fraction (percent) of each lanthanide to the concentration of all lanthanides in the Tailings Solids also remains constant.

Table No. D2S
4010 Gangue Solids
Indicator COCs

Constituent	Units	Min	Mean	Max	N	Footnotes
Barium (Ba)	mg/kg	1100	2500	3400	3	1,2
Lanthanides (total)	mg/kg	7010	33867	76300	3	1,2,3
Lead	mg/kg	2600	5067	7000	3	1,2
Strontium	mg/kg	48000	74667	88000	3	1,2
Radium (226+228) (Sum of Below)	pCi/g	26.8	32.3	36.7	3	---
Thorium	mg/kg	19.0	56.7	76.0	3	1,2
Uranium	mg/kg	23.0	54.3	71.0	3	1,2
Radium-226	pCi/g	10.2	12.5	14.5	3	1,4
Radium-228	pCi/g	16.6	19.8	22.2	3	1,4
Cerium (Ce)	mg/kg	9100	25700	35000	3	1,2
Lanthanum (La)	mg/kg	6200	20067	28000	3	1,2
Neodymium (Nd)	mg/kg	2200	6767	9800	3	1,2

Footnotes:

1. Sampling location: Solids in Ponds P-4, which is located near the Mill. Sampling dates: During the 1998/1999 Onsite Investigation. Laboratory: FGL Environmental Laboratories and Paragon Environmental Laboratories. Reference: P-16 Closure Activities, Prepared by Molycorp, April 10, 2003. Individual laboratory reports are contained in three-ring binders received by the Regional Board office on July 31, 2003.

2. Laboratory Method: USEPA 3050 (Extraction) & USEPA 6020 (ICP/MS).

3. The Discharger calculated the concentration for all lanthanides (total lanthanides) by multiplying the sum of the laboratory results for Ce, La, Nd, and Pr by a constant (fraction). The lanthanides in the 4010 Gangue are present in the mineral Bastnasite. The fraction (percent) of each lanthanide in Bastnasite remains constant. Therefore, the fraction (percent) of each lanthanide to the concentration of all lanthanides in the 4010 Gangue Solids also remains constant.

4. Laboratory Method: EPA 901.1M.

Table No. D3S
5330 Gangue Solids
Indicator COCs

Constituent	Units	Conc	Min	Max	N	Footnotes
Barium (Ba)	mg/kg	85065	---	---	1	1
Lanthanides (total)	mg/kg	281795	---	---	1	1
Lead	mg/kg	371	---	---	1	1
Strontium	mg/kg	17769	---	---	1	1
Radium (226+228) (Sum of Below)	pCi/g	493	---	---	1	2
Thorium	mg/kg	---	1582	5090	2	1,2
Uranium	mg/kg	241	---	---	---	---
Radium-226	pCi/g	95	---	---	1	2
Radium-228	pCi/g	398	---	---	1	2
Cerium (Ce)	mg/kg	---	---	---	---	---
Lanthanum (La)	mg/kg	---	---	---	---	---
Neodymium (Nd)	mg/kg	---	---	---	---	---

Footnotes:

1. Laboratory: Discharger's laboratory at Mountain Pass, CA. The Discharger sent (cc'd) the Regional Board office a July, 1987 cover letter transmitting a summary of the laboratory results. The letter was addressed to the Calfornia Department of Health Services, Alternative Technology and Policy Development Section.

2. Date Sampled: 1997. Sampler: Molycorp staff. Laboratory: Accu Laboratory in Golden, Colorado.

Table No. D4S
Roaster Scrubber Solids
Indicator COCs

Constituent	Units	Min	Mean	Max	N	Std Dev	Foot-notes
Barium (Ba)	mg/kg	8061	17104	33139	93	4796	1
Lanthanides (total)	mg/kg	462259	551751	585613	93	14756	1
Lead	mg/kg	464	1144	1671	93	248	1
Strontium	mg/kg	10993	20822	32978	93	4346	1
Radium (226+228) (Sum of Below)	pCi/g	121.0	124.5	128.0			
Thorium	mg/kg	694.3	1095.8	1327.0	93	89	1
Uranium	mg/kg	92.0	93.5	95.0	2	---	2
Radium-226	pCi/g	27.0	28.0	29.0	2	---	3
Radium-228	pCi/g	94.0	96.5	99.0	2	---	3
			124.5				
Cerium (Ce)	mg/kg	216447	258351	274206	93	---	1,4
Lanthanum (La)	mg/kg	153294	182971	194201	93	---	1,4
Neodymium (Nd)	mg/kg	55711	66496	70577	93	---	1,4

Footnotes:

1. Sampling location: Mill Flotation Plant Concentrate (Product No. 4000). Sampling dates: 9/4/98 to 12/21/98. Laboratory: Discharger's laboratory at Mountain Pass, CA. Laboratory Method: XRF(fused disk, lithium flux). Reference: The Discharger maintains a summary of the laboratory results for the solids in a database. Laboratory reports are on file at the Mine Site. The database is the same one used for tailings solids in the following reference: Alternate Source Investigation Report for Mountain Pass Mine, Prepared by CH2MHILL, August 28, 2002.

2. Sampler: Molycorp staff. Sampling date: June 25, 2001. Sampling locations: Two samples. One of Mill Flotation Plant Concentrate (Product No. 4000) and the other of Mill Acid Leach Plant Concentrate (Product No. 4010). Laboratory: FGL Laboratory. Laboratory Method: USEPA 3050 (Extraction) & USEPA 6020 (ICP/MS).

3. Sampling locations: Two samples. One of Mill Flotation Plant Concentrate (Product No. 4000) and the other of Mill Acid Leach Plant Concentrate (Product No. 4010). Laboratory: Paragon Analytical.

4. The Discharger calculated the concentration for each lanthanide (Ce, La, Nd) by multiplying the laboratory result for the concentration of all lanthanides by a constant (fraction). The lanthanides in the Roaster Scrubber Solids originate from the mineral Bastnasite. The fraction (percent) of each lanthanide in Bastnasite remains constant. Therefore, the fraction (percent) of each lanthanide to the concentration of all lanthanides in the Roaster Scrubber Solids also remains constant.

Table No. D5S
Tailings Solids
Metals and
Gross Alpha and Beta

Constituent	Units	Concen-tration	---	---	N	Footnotes
Antimony (Sb)	mg/kg	54	---	---	1	1
Arsenic (As)	mg/kg	9.4	---	---	1	1
Beryllium (Be)	mg/kg	4	---	---	1	1
Cadmium (Cd)	mg/kg	2	---	---	1	1
Total Chromium (Cr)	mg/kg	37	---	---	1	1
Cobalt (Co)	mg/kg	16	---	---	1	1
Copper (Cu)	mg/kg	48	---	---	1	1
Mercury (Hg)	mg/kg	0.2	---	---	1	1
Molybdenum (Mo)	mg/kg	60	---	---	1	1
Nickel (Ni)	mg/kg	27	---	---	1	1
Selenium (Se)	mg/kg	1.3	---	---	1	1
Silver (Ag)	mg/kg	1	---	---	1	1
Thallium (Tl)	mg/kg	1.3	---	---	1	1
Vanadium (V)	mg/kg	28	---	---	1	1
Zinc (Zn)	mg/kg	48	---	---	1	1
Fluoride (F)	mg/kg	153	---	---	1	1

Constituent	Units	Minimum	Average	Maximum	N	Footnotes
Gross Alpha	pCi/g	119	201	392	7	2
Gross Beta	pCi/g	59	90	151	7	2

Footnotes:

1. Sampling location: Tailings solids. Sampling date: 1983. Results reported in Table No. 2.1 of report titled: P-16 Closure Plan (Including Interim Operations), Prepared by Molycorp and TRC, June 2000.

2. Sampling location: Tailings solids in Ponds P-23A and P-23B, which are located downgradient of the P-16 WMU. Sampling dates: During the 1998/1999 Onsite Investigation. Laboratory: FGL Environmental Laboratories and Paragon Environmental Laboratories. Reference: P-16 Closure Activities, Prepared by Molycorp, April 10, 2003. Individual laboratory reports are contained in three-ring binders received by the Regional Board office on July 31, 2003.

Table No. D6S
4010 Gangue Solids
Metals and
Gross Alpha and Beta

Constituent	Units	Minimum	Average	Maximum	N	Footnotes
Antimony (Sb)	mg/kg	<5.0	---	<5.0	3	1
Arsenic (As)	mg/kg	4	12	18	3	1
Beryllium (Be)	mg/kg	<1.0	---	3.0	3	1
Cadmium (Cd)	mg/kg	<1.0	---	<1.0	3	1
Total Chromium (Cr)	mg/kg	<5.0	---	12.0	3	1
Cobalt (Co)	mg/kg	<1.0	---	6	3	1
Copper (Cu)	mg/kg	<5.0	---	22	3	1
Mercury (Hg)	mg/kg	0.5	0.8	1.4	3	1
Molybdenum (Mo)	mg/kg	<5.0	---	10	3	1
Nickel (Ni)	mg/kg	<5.0	---	14	3	1
Selenium (Se)	mg/kg	<2.0	---	<2.0	3	1
Silver (Ag)	mg/kg	<5.0	---	<5.0	3	1
Thallium (Tl)	mg/kg	<1.0	---	<1.0	3	1
Vanadium (V)	mg/kg	10	23	30	3	1
Zinc (Zn)	mg/kg	<20.0	---	50.0	3	1
Fluoride (F)	mg/kg				3	1
Gross Alpha	pCi/g	117	154	214	3	1
Gross Beta	pCi/g	60	77	108	3	1

Footnotes:

1. Sampling location: 4010 Gangue solids in Pond P-4. Sampling date: During the 1998/1999 Onsite Investigation. Laboratory: FGL Environmental Laboratories and Paragon Environmental Laboratories.

Table No. D7S
5330 Gangue Solids
Metals

Constituent	Units	Concen-tration	Footnotes
Antimony (Sb)	mg/kg	9.7	1
Arsenic (As)	mg/kg	9.2	1
Beryllium (Be)	mg/kg	8.1	1
Cadmium (Cd)	mg/kg	1.2	1
Total Chromium (Cr)	mg/kg	<10.0	1
Cobalt (Co)	mg/kg	<10.0	1
Copper (Cu)	mg/kg	<5.0	1
Mercury (Hg)	mg/kg	<0.4	1
Molybdenum (Mo)	mg/kg	<50.0	1
Nickel (Ni)	mg/kg	<10.0	1
Selenium (Se)	mg/kg	<0.5	1
Silver (Ag)	mg/kg	<2.0	1
Thallium (Tl)	mg/kg	<50.0	1
Vanadium (V)	mg/kg	1.6	1
Zinc (Zn)	mg/kg	<8.0	1
Fluoride (F)	mg/kg	0.6	1

Footnotes:

1. Sample collected by: Discharger's staff. Date analyzed: February 25, 1988. Laboratory: Brown and Caldwell Laboratories. Laboratory reports were transmitted by the Discharger to Regional Board's office under a cover letter dated April 7, 1988.

Table No. D8S
Roaster Scrubber Solids
Metals

Constituent	Units	Minimum	Maximum	N	Footnotes
Antimony (Sb)	mg/kg	<5	<5	2	1
Arsenic (As)	mg/kg	5.1	5.9	2	1
Beryllium (Be)	mg/kg	7	9	2	1
Cadmium (Cd)	mg/kg	<1	<1	2	1
Total Chromium (Cr)	mg/kg	<5	<5	2	1
Cobalt (Co)	mg/kg	<1	<1	2	1
Copper (Cu)	mg/kg	7	9	2	1
Mercury (Hg)	mg/kg	0.27	0.34	2	1
Molybdenum (Mo)	mg/kg	<5	<5	2	1
Nickel (Ni)	mg/kg	<5	<5	2	1
Selenium (Se)	mg/kg	<0.5	<0.5	2	1
Silver (Ag)	mg/kg	<5	<5	2	1
Thallium (Tl)	mg/kg	<1	<1	2	1
Vanadium (V)	mg/kg	<10	<10	2	1
Zinc (Zn)	mg/kg	<20	<20	2	1

Footnotes:

1. Sampler: Molycorp staff. Sampling date: June 25, 2001. Sampling locations: Two samples. One of Mill Flotation Plant Concentrate (Product No. 4000) and the other of Mill Acid Leach Plant Concentrate (Product No. 4010). Laboratory: FGL Laboratory. Laboratory Method: USEPA 3050 (Extraction) & USEPA 6020 (ICP/MS).

Table No. D9S
Tailings Solids
Lead Concentrations in Laboratory Leachates

Laboratory Test Procedure	Description of Limit	Limit (mg/L)	Laboratory Results		N
			Minimum (mg/L)	Maximum (mg/L)	
Toxicity Characteristic Leaching Procedure (TCLP)	TCLP Limit	5	0.8	13	7
Waste Extraction Test (WET)	Soluble Threshold Limit Concentration (STLC)	5	6.5	38	14

Footnotes:

1. Laboratory results are from: Factors Controlling Wastecake Stabilization, Prepared by PTI Environmental Services, October 1992; Special Waste Application Request, Prepared by Molycorp for California Department of Toxic Substances Control (DTSC), March 1993; and Lead Stabilization in Filtercake/Tailings Mixtures, Prepared by PTI Environmental Services, June 1993

2. Results of IT Corporation laboratory analyses sent to DTSC for classification of mine tailings, January 24, 1986.

Table No. D10S
Windblown Waste Solids
Indicator COCs

Constituent	Units	Min	Mean	Max	Std Dev	N	Foot-notes
Barium (Ba)	mg/kg	132841	196386	273656	53650	8	1,2
Lanthanides (total)	mg/kg	---	---	---	---	---	---
Lead	mg/kg	1363	1650	2044	256	8	1,2
Strontium	mg/kg	28263	36987	45100	6179	8	1,2
Radium (226+228) (Sum of Below)	pCi/g	25.5	29.1	35.0	---	---	---
Thorium	mg/kg	69	227	323	69	8	1,2
Uranium	mg/kg	15	25	40	8	8	1,2
Radium-226	pCi/g	7.70	8.20	8.90	0.50	8	1,3
Radium-228	pCi/g	17.80	20.93	26.10	3.32	8	1,3
Cerium (Ce)	mg/kg	25389	35814	48678	9038	8	1,2
Lanthanum (La)	mg/kg	17546	24286	32666	5948	8	1,2
Neodymium (Nd)	mg/kg	6192	8644	11645	2139	8	1,2

Footnotes:

1. Sampling Location: Dune Area of the Windblown Waste Solids Area. Sampling dates: August 2001. Reference: Evaluation of data and laboratory reports are contained in the following reference: Alternate Source Investigation Report for Mountain Pass Mine, Prepared by CH2MHILL, August 28, 2002.

2. Laboratory: Discharger's laboratory at Mountain Pass, CA. Laboratory Method: XRF(fused disk, lithium flux).

3. Laboratory: Paragon Environmental Laboratories.

Attachment D

Table No. D11S
Pond P-3 Waste Sediments
Indicator COCs

Constituent	Units	Min	Mean	Max	N	Foot-notes
Barium (Ba)	mg/kg	2,600		3600	3	*
Lanthanides (total)	mg/kg	28,600		67300	3	*
Lead	mg/kg	1,700		17000	3	*
Strontium	mg/kg	9,600		18000	3	*
Radium (226+228) (Sum of Below)	pCi/g	13.3		26.7	3	*
Thorium (total)	mg/kg	95		330	3	*
Uranium (total)	mg/kg	8		15	3	*
						*
Radium-226	pCi/g					*
Radium-228	pCi/g					*
						*
Cerium (Ce)	mg/kg	15,000		36000	3	*
Lanthanum (La)	mg/kg	9,100		21000	3	*
Neodymium (Nd)	mg/kg	3,300		7600	3	*

* Footnote: taken from the report: P-16 Closure Activities dated April 10,2003.

Attachment D

Table No. D12S
Pond P-15 Waste Sediments
Indicator COCs

Constituent	Units	Min	Mean	Max	N	Foot-notes
Barium (Ba)	mg/kg	1,600		3100	3	*
Lanthanides (total)	mg/kg	27,000		67300	3	*
Lead	mg/kg	3,600		7900	3	*
Strontium	mg/kg	8,200		13000	3	*
Radium (226+228)	pCi/g	11.8		29.5	3	*
Thorium (total)	mg/kg	76		150	3	*
Uranium (total)	mg/kg	12		19	3	*
Radium-226	pCi/g	4		10.60	3	*
Radium-228	pCi/g	8		21.80	3	*
Cerium (Ce)	mg/kg	13,000		36000	3	*
Lanthanum (La)	mg/kg	9,400		26000	3	*
Neodymium (Nd)	mg/kg	3,400		8400	3	*

* Footnote: taken from the report: P-16 Closure Activities dated April 10,2003.

Table No. D13S
Pond P-11 Waste Sediments
Indicator COCs

Constituent	Units	Min	Mean	Max	N	Foot-notes
Barium (Ba)	mg/kg	755		5090	4	*
Lanthanides (total)	mg/kg					*
Lead	mg/kg	5,960	7763	9930	4	*
Strontium	mg/kg	2,110		9500	4	*
Radium (226+228)	pCi/g	2.4	4.5	5.6	4	**
Thorium (total)	mg/kg	50	93	115	4	**
Uranium (total)	mg/kg	101	136	193	4	**
Radium-226	pCi/g					*
Radium-228	pCi/g					*
Cerium (Ce)	mg/kg	6,000		19000	4	*
Lanthanum (La)	mg/kg	10,100		19700		*
Neodymium (Nd)	mg/kg	5,780		10900	4	*

* sampled March, 2004, sample preparation method 3050B, sample Analysis method 6020 by FGL Enviornmental

** sampled March, 2004, sample preparation method E903.0, E907.0 by Molycorp Laboratory.

Table No. E1W
Pore Wastewater

Constituent	Units	Minimum	Average	Maximum	Detection Level/ Maximum Total Propagated Uncertainty	Footnotes
Anitimony	mg/L	0.01	0.025	0.04		1
Arsenic	mg/L	0.014	0.03	0.041		1
Barium	mg/L	0.068	1.100	4.700		1
Beryllium	mg/L	<0.005	<0.005	<0.005		1
Boron	mg/L	3	12	34		1
Cadmium	mg/L	<0.005	<0.005	<0.005		1
Carbonate	mg/L	<25	<25	<25		1
Chromium	mg/L	<0.01	0.0105	0.011		1
Calcium	mg/L	67	598	1240		1
Chloride	mg/L	2600	5160	8600		1
Cerium	mg/L	0.024	0.935	1.700		1
Cobalt	mg/L	0.010	0.016	0.031		1
Copper	mg/L	0.028	0.034	0.048		1
Fluoride	mg/L	35	66.8	110		1
Iron	mg/L	0.560	1.230	3.000		1
Lead	mg/L	0.011	0.850	3.490		1
Lanthanum	mg/L	0.011	0.480	1.30		1
Magnesium	mg/L	<50	114.7	230		1
Manganese	mg/L	2.900	5.6	8.0		1
Mercury	mg/L	<0.0002	0.00067	0.0017		1
Molybdenum	mg/L	0.840	1.47	2.1		1
Nickel	mg/L	<0.04	0.059	0.092		1
Nitrate as N	mg/L	<1	3.790	17.0		1
pH	pH Units	7.580	7.640	7.7		1,2
Potassium	mg/L	43	118	300		1
Silicon	mg/L	16	18	20		1
Selenium	mg/L	0.008	0.008	0.008		1
Silver	mg/L	<0.005	<0.005	<0.005		1
Sodium	mg/L	2000	2923	3800		1
Strontium	mg/L	1.5	435	1600		1
Sulfate	mg/L	83	460	1000		1
TDS	mg/L	7800	11887	17000		1
Thallium	mg/L	<0.002	0.017	0.033		1
Vanadium	mg/L	<0.005	0.017	0.025		1
Yttrium	mg/L	<0.01	<0.01	<0.01		1
Zinc	mg/L	0.017	0.022	0.027		1
Gross Alpha	pCi/L	41.4	369	531		1
Gross Beta	pCi/L	21.3	269	445		1
Radium-226	pCi/L	0	0.300	0.600		1
Radium-228	pCi/L	0	1.150	2.300		1
Radium Total	pCi/L	0.000	1.450	2.900		1
Thorium-228	pCi/L	0	0.075	0.150		1
Thorium-230	pCi/L	0.1	0.300	0.500		1
Thorium-232	pCi/L	Non-Detect	Non-Detect	Non-Detect	+/-0.49	1,3
Thorium Total	pCi/L	0.1	0.375	0.650		1
Thorium Total	mg/L	Non-Detect	Non-Detect	Non-Detect	<0.004	1,3
Uranium-234	pCi/L	40	90	192		1
Uranium-235	pCi/L	2.7	4.100	8.850		1
Uranium-238	pCi/L	33	67	141		1
Uranium Total	pCi/L	6.00	71.40	149.85		1
Uranium Total	mg/L	0.008	0.090	0.190		1

Footnotes:

1. Source of Table No. E1W: Molycorp, 2000, P-16 Closure Plan (Including Interim Operations), Prepared by Molycorp and TRC, June. This table provides a summary of analysed conducted on samples collected from the 1990s through June 2000. The samples were collected from the wastewater pool (ponded wastewater), which existed during that period. The quality of the ponded wastewater is considered to be approximately the same the quality of the Pore Wastewater.

2. Concentrations in samples collected from 4/19/01 - 5/1/03 from flow at downgradient toe of P-16 Dam, which is also referred to as the East P-16 CAS (RW-8) Wastewater. Molycorp collected the samples & reported laboratory results in quarterly self monitoring reports.

Table No. E1W
Pore Wastewater

3. Includes laboratory result for sample collected during fourth quarter 2001. Molycorp collected the samples & reported laboratory results in quarterly self monitoring reports.

Table No. E2W
Ground Water Monitoring Well No. 93-1MW (Background)

Constituent	Units	Minimum	Average	Maximum	N	Maximum Total Propagated Uncertainty
Alkalinity	mg/L	230.0000	233.3333	240.0000	3	
Alkalinity	mg/L	<5		<25	3	
Alkalinity	mg/L	<5		<25	3	
Alkalinity Total	mg/L	230.0000	233.3333	240.0000	3	
Barium	mg/L	0.110	0.146	0.330	9	
Calcium	mg/L	57	60	61	3	
Chloride	mg/L	22	28	37	9	
Color	mg/L	5		5	3	
Lead	mg/L	<0.005		<0.005	2	
Lignin Sulfonate	mg/L	<5		<5	3	
Magnesium	mg/L	15.0	15.0	15.0	3	
Nitrate as N	mg/L	1.9	3.4	4.3	9	
pH	pH Units	7.4	7.6	7.7	3	
Potassium	mg/L	3.3	6.9	14.0	3	
Sodium	mg/L	53	57	64	3	
Strontium	mg/L	0.23	0.32	0.45	9	
Sulfate	mg/L	40	43	46	3	
TDS	mg/L	274	377	492	9	
Gross Alpha	pCi/L	<mdc	1.32	3.00	9	
Gross Beta	pCi/L	<mdc	2.90	5.10	9	
Radium-226	pCi/L	<mdc	0.02	0.18	9	
Radium-228	pCi/L	<mdc	0.11	1.00	9	
Radium Total	pCi/L	<mdc	0.13	1.18	sum of above	
Thorium-228	pCi/L	<mdc	0.02	0.08	5	
Thorium-230	pCi/L	<mdc	0.12	0.22	5	
Thorium-232	pCi/L	<mdc	0.01	0.05	5	
Thorium-234	pCi/L	<mdc	<mdc	<mdc	5	+/- 120.0000
Thorium Total	pCi/L	<mdc	0.14	0.35	sum of above	
Thorium Total	mg/L		0.0001	0.0004		
Uranium-234	pCi/L	1.14	1.37	1.54	9	
Uranium-235	pCi/L	<mdc	0.06	0.26	9	
Uranium-238	pCi/L	0.71	0.90	1.17	9	
Uranium Total	pCi/L	1.85	2.33	2.97	sum of above	
Uranium Total	mg/L	0.0023	0.0029	0.0038		

Footnotes:

1. Concentrations in samples collected from 4/16/01 - 4/16/03. Molycorp collected the samples & reported laboratory results in quarterly self monitoring reports.

2. The concentrations in Columns No. 3 through 5 are all set at four decimal places to facilitate comparison of magnitudes and not to indicate precision.

3. "<mdc" means the concentration of the radiological constituent was less than the minimum detectable concentration. The maximum Total Propagated Uncertainty (TPU) is given for radiological constituents, which were "<mdc" in all samples. The Maximum TPU is the highest TPU of all samples for that constituent. Each sample has a different TPU. Samples results that are "<mdc" were set at zero to calculate averages in this table.

Table No. E3W
East P-16 CAS Wastewater (RW-8)

Constituent	Units	Minimum	Average	Maximum	N	Maximum Total Propagated Uncertainty (pCi/L)
Alkalinity	mg/L	320	343	370	3	
Alkalinity	mg/L	<5		<25	3	
Alkalinity	mg/L	<5		<25	3	
Alkalinity Total	mg/L	320	343	370	3	
Barium	mg/L	0.034	0.077	0.110	3	
Calcium	mg/L	180	257	340	3	
Chloride	mg/L	4000	4000	4000	3	
Color	mg/L	1200	1633	2200	3	
Lead	mg/L	0.0690	0.0945	0.1200	2	
Lignin Sulfonate	mg/L	52	106	160	2	
Magnesium	mg/L	65	99	140	3	
Nitrate as N	mg/L	1.10	2.47	4.20	3	
pH	pH Units	7.58	7.64	7.67	3	
Potassium	mg/L	23	36	55	3	
Sodium	mg/L	1400	2067	2400	3	
Strontium	mg/L	100	137	180	3	
Sulfate	mg/L	730	980	1300	3	
TDS	mg/L	7510	8038	8410	4	
Gross Alpha	pCi/L	16	35	57	3	
Gross Beta	pCi/L	28	33	42	3	
Radium-226	pCi/L	1.42	2.91	5.18	3	
Radium-228	pCi/L	0.00	0.00	0.00	3	+/- 4.6000
Radium Total	pCi/L	1.42	2.91	5.18	sum of	
Thorium-228	pCi/L	1.31	2.92	4.53	2	
Thorium-230	pCi/L	0.24	0.24	0.24	1	
Thorium-232	pCi/L	0.15	0.18	0.21	2	
Thorium-234	pCi/L	0.00	0.00	0.00	2	+/- 92.0000
Thorium Total	pCi/L	1.46	3.22	4.98	sum of	
Thorium Total	mg/L	0.0014	0.0016	0.0019		
Uranium-234	pCi/L	3.96	4.87	6.21	3	
Uranium-235	pCi/L	0.23	0.25	0.29	3	
Uranium-238	pCi/L	3.30	4.24	5.62	3	
Uranium Total	pCi/L	7.49	9.36	12.06	sum of	
Uranium Total	mg/L	0.009	0.012	0.015		

Footnotes:

1. Concentrations in samples collected from 4/19/01 - 5/1/03. Molycorp collected the samples & reported laboratory results in quarterly self monitoring reports.
2. The concentrations in Columns No. 3 through 5 are all set at four decimal places to facilitate comparison of magnitudes and not to indicate precision.
3. "<mdc" means the concentration of the radiological constituent was less than the minimum detectable concentration. The maximum Total Propagated Uncertainty (TPU) is given for radiological constituents, which were "<mdc" in all samples. The Maximum TPU is the highest TPU of all samples for that constituent. Each sample has a different TPU. Samples results that are "<mdc" were set at zero to calculate averages in this table.

Table No. E4W
West P-16 CAS Wastewater (Pit Wells)

Constituent	Units	Minimum	Average	Maximum	N
Alk - Bicarbonate	mg/L	130	140	160	10
Alk - Carbonate	mg/L			<25	1
Alk - Hydroxide	mg/L			<25	1
Alkalinity - Total	mg/L	130	140	160	7
Antimony	mg/L	0.001	0.004	0.005	6
Arsenic	mg/L	0.001	0.004	0.005	6
Barium	mg/L	0.003	0.091	0.190	10
Beryllium	mg/L	0.001	0.004	0.005	6
Boron	mg/L	0.440	0.513	0.610	8
Cadmium	mg/L	0.002	0.009	0.010	6
Calcium	mg/L	430	548	1200	10
Chloride	mg/L	1400	1780	2100	10
Chromium	mg/L	0.005	0.009	0.010	6
Cobalt	mg/L	0.005	0.009	0.010	6
Copper	mg/L	0.001	0.005	0.010	6
Lead	mg/L	0.001	0.005	0.006	6
Magnesium	mg/L	270	301	340	10
Manganese	mg/L	0.012	0.042	0.120	8
Mercury	mg/L	0.001	0.002	0.004	8
Molybdenum	mg/L	0.005	0.009	0.010	6
Nickel	mg/L	0.020	0.037	0.040	6
Nitrate (as N)	mg/L (N)	22	27	34	10
Potassium	mg/L	14	16	18	9
Selenium	mg/L	0.005	0.007	0.010	6
Silver	mg/L	0.005	0.018	0.020	6
Sodium	mg/L	230	267	290	10
Strontium	mg/L	66	79	110	10
Sulfate	mg/L	200.000	431.000	2100.000	10
Thallium	mg/L	-3.600	0.027	3.800	8
TDS	mg/L	2220.000	3658.000	4930.000	10
Vanadium	mg/L	0.003	0.005	0.005	6
Zinc	mg/L	0.020	0.093	0.160	7
Gross Alpha	pCi/L	44	73	94	11
Gross Beta	pCi/L	25	41	55	11
Radium-226	pCi/L	0.320	0.984	1.820	11
Radium-228	pCi/L	0.920	4.236	6.416	12
Radium - Total	pCi/L	1.240	5.219	8.236	
Thorium-228	pCi/L	0.010	0.130	0.230	11
Thorium-230	pCi/L	0.048	0.109	0.186	11
Thorium-232	pCi/L	-0.010	0.015	0.052	11
Thorium - Total	pCi/L	0.048	0.254	0.468	
Thorium Total	mg/L	0.000	0.001	0.002	
Uranium-234	pCi/L	32.600	54.373	76.100	15
Uranium-235	pCi/L	-17.000	-0.097	3.830	19
Uranium-238	pCi/L	16.500	28.647	45.000	15
Uranium - Total	mg/L	32.100	82.923	124.930	
Uranium - Total	mg/L	0.041	0.105	0.158	
pH	pH units	7.460	7.530	7.600	2

Concentrations in samples collected from 1/21/99 - 4/16/02. Molycorp collected the samples & reported results in quarterly self monitoring reports.

Table No. E5W
High-Quality Hyperfiltration Water

Constituent	Units	Minimum	Average	Maximum	N
Alkalinity - Bicarbonate	mg/L	0	0	0	4
Alkalinity - Carbonate	mg/L	0	0	0	4
Alkalinity - Hydroxide	mg/L	0	0	0	4
Alkalinity - Total	mg/L	0	0	0	4
Arsenic	mg/L	0.000	0.000	0.000	4
Barium	mg/L	0.007	0.008	0.008	4
Boron	mg/L	0.080	1.293	4.800	4
Calcium	mg/L	4.400	4.900	5.400	4
Chloride	mg/L	21	25	30	4
Chromium	mg/L	0.000	0.000	0.000	4
Cobalt	mg/L	0.000	0.000	0.000	4
Copper	mg/L	0.003	0.008	0.013	3
Lead	mg/L	0.000	0.000	0.000	4
Magnesium	mg/L	2.700	2.975	3.200	4
Manganese	mg/L	0.006	0.006	0.006	4
Molybdenum	mg/L	0.005	0.005	0.005	4
Nitrate (as N)	mg/L	0.260	0.310	0.330	4
Potassium	mg/L	0.000	0.000	0.000	4
Sodium	mg/L	4.000	4.350	4.800	4
Strontium	mg/L	0.400	0.420	0.440	2
Sulfate	mg/L	0.800	0.953	1.100	4
TDS	mg/L	29	42	47	4
Zinc	mg/L	0.000	0.000	0.000	4
Gross Alpha	pCi/L	0.000	0.000	0.000	4
Gross Beta	pCi/L	0.000	0.000	0.000	4
Radium-226	pCi/L	0.000	0.000	0.000	4
Radium-228	pCi/L	0.000	0.000	0.000	4
Radium - Total	pCi/L	0.000	0.000	0.000	4
Thorium-228	pCi/L	0.000	0.000	0.000	4
Thorium-230	pCi/L	0.092	0.106	0.124	4
Thorium-232	pCi/L	0.000	0.000	0.000	4
Thorium-234	pCi/L	0.000	0.000	0.000	2
Thorium - Total	pCi/L	0.090	0.105	0.120	4
Thorium Total	mg/L	0.000	0.000	0.000	
Uranium-234	pCi/L	0.143	0.159	0.179	4
Uranium-235	pCi/L	0.037	0.062	0.087	4
Uranium-238	pCi/L	0.081	0.089	0.105	4
Uranium - Total	pCi/L	0.200	0.258	0.370	4
Uranium - Total	mg/L	0.318	0.409	0.562	
pH	pH units	5.68	6.12	6.55	4

Concentrations in samples collected from 10/30/01 - 4/16/02. Molycorp collected the samples & reported results in quarterly self monitoring reports.

Attachment F
References
P-16 Waste Management Unit

1. California Department of Health Services, Division of Drinking Water and Environmental Management (CDHS-DDW), 2002, July 22 telephone conversation between staff of CRWQCB (Curt Shifrer) and CDHS-DDW (K. Baliga) (*CDHS-DDW, 2002*)

2. California Department of Water Resources, Division of Safety of Dams, 1998, Certification of Approval for Molycorp Tailings Dam and Reservoir, September 17 (*DOSD, 1998).*

3. California Regional Water Quality Control Board (CRWQCB), 1995, Water Quality Control Plan for the Lahontan Basin (Basin Plan), March 31 (*CRWQCB, 1995*)

4. CRWQCB, 1989, Letter transmitting Tentative WDRs for the Molycorp Mountain Pass Operation, March 16 (*CRWQCB, 1989*)

5. Dragun, 1998, The Soil Chemistry of Hazardous Materials, Amherst Scientific Publishers (*Dragun, 1998*)

6. Molycorp, 2004, E-mail to Regional Board staff January 14 (*MC, 2004*)

7. Molycorp, 2003, Third Quarterly Self Monitoring Report for 2003, October 30 (*MC, 2003a*)[1]

8. Molycorp, 2003, Letter from Molycorp to CRWQCB#6 transmitting copy of Molycorp's September 10, 2003 report to California Department of Water Resources, Division of Safety of Dams, October 16, (*MC, 2003b)*

9. Molycorp, 2003, Letter from Molycorp to CRWQCB#6 commenting on Tentative WDRs, October 16, (*MC, 2003c)*

10. Molycorp, 2003, Final Closure and Post-Closure Maintenance Plan for the P-16 Tailings Impoundment, Prepared by Golder Associates, June 9. (*MC, 2003d*)

11. Molycorp, 2003, P-16 Closure Activities, Prepared by Molycorp, April 10. (*MC, 2003e*)[2]

12. Molycorp, 2002, Alternate Source Investigation Report for Mountain Pass Mine, Prepared by **CH2M**HILL, August 28 (*MC, 2002a*)

13. Molycorp, 2002, P-16 Interim Remedial Measures Final Modeling Review March 2001 to February 2002 Operations, Prepared by Geomega, April 25 (*MC, 2002b*)

14. Molycorp, 2002, Annual Self Monitoring Report for 2001, March 28, (*MC, 2002c*)[3]

15. Molycorp, 2001, Site Investigation Report Onsite Groundwater, Prepared by Molycorp and TRC, March (*MC, 2001*)

16. Molycorp, 2000, P-16 Closure Plan (Including Interim Operations), Prepared by Molycorp and TRC, June (*MC, 2000*)

17. Molycorp, 1998, Technical Information Memorandum, Facilities Characterization Surveys, Molycorp Mountain Pass, Prepared by Rogers and Associates Engineering Corporation, November 30. (*MC, 1998a*)

18. Molycorp, 1998, Site Investigation Workplan Mountain Pass Mine and Mill, Prepared by Molycorp and TRC, September (*MC, 1998b*)

19. Molycorp, 1997, Phase 2 Construction, Dam Raising to Elevation 4950 Feet, Detail Design Report, Molycorp Inc, Prepared by Kilborn Inc, Geocon Dept, August. (*MC, 1997a*)

20. Molycorp, 1997, Letter regarding Maximum Permissible Piezometric Levels from Molycorp consultant (Kilborn Inc, Geocon Dept) to California Department of Water Resources, Division of Safety of Dams, March 11. (*MC, 1997b*)

21. Molycorp, 1989, Letter commenting on March 16, 1989 Tentative WDRs prepared by CRWQCB staff, April 14. (*MC, 1989*)

22. Molycorp, 1987, Letter to Alternative Technology & Policy Development Section, California Dept of Health Services, July 30 (*MC, 1987*)

23. Molycorp, 1986, Report of Waste Discharge, Molycorp, Inc, Mountain Pass Operations, Prepared by Molycorp, April 15 (*MC, 1986*)

24. Molycorp, 1977, Revised Reclamation Plan (77M-0027), Prepared by Molycorp. November 20 (*MC, 1977*)[4]

25. San Bernardino, County of, 2001, Human Health and Ecological Risk Assessment (HHERA), Prepared by Tetra Tech for SBCo, June. (*SBCo, 2001*)

26. San Bernardino, County of, 2000, Amended Initial Study and Re-Adopted Negative Declaration, September 26 (*SBCo, 2000*)

27. San Bernardino, County of, 1997, Initial Study and Negative Declaration, Prepared by SB Co, November 20 (*SBCo, 1997*)

28. Wong, C. T. et al, 1999, Isotopic Uranium Activity Ratios in California Ground Water, Journal of American Water Works Association, Volume 91, Issue 4, April.(*Wong, 1999*).

29. Molycorp, 2004, Letter attachment: Technical Memorandum – Groundwater monitoring for radionuclides at the Molycorp Mountain Pass site, Jan Johnson MFG, Inc., March 2, 2004.

30. Molycorp, 2004, Proposal to place materials into P-16 during Closure - Waste Analyses Report, May 17, 2004.
31. Molycorp, 2004, Final cover Performance evaluation for the P-16 tailings impoundment closure, prepared by Golder and Assoc. Inc., May 17, 2004.

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[1] The report describes the rationale for the changes requested in the April 16, 2002 letter.

[2] This report summarizes laborartory results for 1998/1999 soil sampling conducted during the Onsite Investigation. Laboratory reports for the soil sampling were received by the Regional Board office on July 31, 2003. Reports are contained in five three-ring binders. References (*MC, 1998a, MC, 2001 and MC, 2003e*) contains maps that show sampling locations.

[3] The report describes the rationale for the changes requested in the April 16, 2002 letter.

[4] On September 26, 2000, when the County of San Bernardino re-adopted the November 20, 1997 Negative Declaration, it also extended the Revised Reclamation Plan (77M-0027) until either November 20, 2005 or the 1999 Draft Reclamation Plan for the 30-year mining project becomes final (which ever occurs first). A copy of Revised Reclamation Plan (77M-0027) is included in Appendix A of the 1999 Reclamation Plan (Draft).

Attachment G

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

STANDARD PROVISIONS
FOR WASTE DISCHARGE REQUIREMENTS

1. Inspection and Entry

The Discharger shall permit Regional Board staff:

a. to enter upon premises in which an effluent source is located or in which any required records are kept;

b. to copy any records relating to the discharge or relating to compliance with the Waste Discharge Requirements (WDRs);

c. to inspect monitoring equipment or records; and

d. to sample any discharge.

2. Reporting Requirements

a. Pursuant to California Water Code 13267(b), the Discharger shall immediately notify the Regional Board by telephone whenever an adverse condition occurred as a result of this discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, spills of petroleum products or toxic chemicals, or damage to control facilities that could affect compliance.

b. Pursuant to California Water Code Section 13260 (c), any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge, shall be reported to the Regional Board at least 120 days in advance of implementation of any such proposal. This shall include, but not be limited to, all significant soil disturbances.

c. The Owners/Discharger of property subject to WDRs shall be considered to have a continuing responsibility for ensuring compliance with applicable WDRs in the operations or use of the owned property. Pursuant to California Water Code Section 13260(c), any change in the ownership and/or operation of property subject to the WDRs shall be reported to the Regional Board. Notification of applicable WDRs shall be furnished in writing to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board.

d. If a Discharger becomes aware that any information submitted to the Regional Board is incorrect, the Discharger shall immediately notify the Regional Board, in writing, and correct that information.

e. Reports required by the WDRs, and other information requested by the Regional Board, must be signed by a duly authorized representative of the Discharger. Under Section 13268 of the California Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1,000) for each day of violation.

f. If the Discharger becomes aware that their WDRs (or permit) are no longer needed (because the project will not be built or the discharge will cease) the Discharger shall notify the Regional Board in writing and request that their WDRs (or permit) be rescinded.

3. Right to Revise WDRs

The Regional Board reserves the privilege of changing all or any portion of the WDRs upon legal notice to and after opportunity to be heard is given to all concerned parties.

4. Duty to Comply

Failure to comply with the WDRs may constitute a violation of the California Water Code and is grounds for enforcement action or for permit termination, revocation and re-issuance, or modification.

5. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of the WDRs which has a reasonable likelihood of adversely affecting human health or the environment.

6. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the WDRs. Proper operation and maintenance includes adequate laboratory control, where appropriate, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by the Discharger, when necessary to achieve compliance with the conditions of the WDRs.

7. Waste Discharge Requirement Actions

The WDRs may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for waste discharge requirement modification, revocation and re-issuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any of the WDRs conditions.

8. Property Rights

The WDRs do not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

9. Enforcement

The California Water Code provides for civil liability and criminal penalties for violations or threatened violations of the WDRs including imposition of civil liability or referral to the Attorney General.

10. Availability

A copy of the WDRs shall be kept and maintained by the Discharger and be available at all times to operating personnel.

11. Severability

Provisions of the WDRs are severable. If any provision of the requirements is found invalid, the remainder of the requirements shall not be affected.

12. Public Access

General public access shall be effectively excluded from treatment and disposal facilities.

13. Transfers

Providing there is no material change in the operation of the facility, this Order may be transferred to a new owner or operation. The owner/operator must request the transfer in writing and receive written approval from the Regional Board's Executive Officer.

14. Definitions

a. "Surface waters" as used in this Order, include, but are not limited to, live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of waters. "Surface waters" does not include artificial water courses or impoundments used exclusively for wastewater disposal.

b. "Ground waters" as used in this Order, include, but are not limited to, all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.

15. Storm Protection

All facilities used for collection, transport, treatment, storage, or disposal of waste shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

REVISED MONITORING AND REPORTING
PROGRAM NO. R6V-2004 (TENTATIVE)
WDID NO. 6B360009001
FOR
MOLYCORP, INC.
MOUNTAIN PASS MINE AND MILL SITE
NORTH TAILINGS POND (P-16) CLOSURE AND POST CLOSURE MAINTENANCE

_____San Bernardino County _____

I. MONITORING

A. Monitoring of Final Cover and Drainage Controls

1. Landfill Settlement

The Discharger shall monitor settlement monitoring devices described in Table No. 1 in accordance with the frequencies contained in that table. Measurements shall be recorded and reported in annual monitoring reports. Annually, the Discharger shall submit a topographic map (as described in Part II, below) showing the gradients of the slopes for the final cover. In the annual monitoring reports, the Discharger shall describe actions completed to correct the slope of the final cover in areas that do not conform to the design gradients described in the findings of the attached Order.

2. Minimization of Infiltration

The Discharger shall record and report in quarterly monitoring reports: the readings for electronic moisture monitoring devices described and the amount of water (if any) present in the lysimeter also described in Table No. 1. If water is present in the lysimeter, the Discharger shall include the following in the quarterly report: the calculated infiltration rate through the final cover, calculations used to determine the rate, and a comparison of the rate to the performance standard (i.e., calculated rate for the final cover prescribed in Title 27, California Code of Regulations.)

Table 1
Monitoring Devices and Frequency of Monitoring

No. and Description of Stations:	**Purpose**	**Monitoring Frequency**
Two settlement monitoring benchmarks located adjacent to P-16	Detect Ground Surface settlement	Annually
Eight settlement monitoring stations located on the Closed P-16 Landfill[1]	Detect Ground Surface settlement	Annually
One soil moisture monitoring station located under the P-16 final cover (One pan lysimeter and two electronic soil moisture monitoring devices located above the lysimeter.)	Infiltration of Final Cover	Quarterly

3. Inspection of Final Cover and Drainage Controls

The Discharger shall perform periodic inspections to identify and address cover problems including:

a. Areas requiring replanting of vegetation;
b. Eroded or damaged portions of the final cover;
c. Areas lacking free drainage; and
d. Areas damaged by equipment operation.

The Discharger shall record and report the results of the inspections in the annual monitoring reports.

B. Flow Monitoring

The Discharger shall measure and record:

1. The volume of flow, in million gallons, that occurred each month at each of the stations listed in Table No. 2;

2. The average flowrate, in gallons per minute, that occurred each quarter at each of the stations listed in Table No. 2;

[1] At locations shown in Drawing 4 and described on Page 49 of (*MC, 2003b*)

Table 2
Wastewaters

WASTEWATER	SOURCE
EAST P-16 CAS	INFILTRATION TRENCH 4 (RW-8) EXTRACTION WELLS 95-1RW, 98-1RW, 2000-4RW AND 2000-5RW
WEST P-16 CAS	PIT WELLS
HIGH-QUALITY HYPERFILTRATION WATER	HYPERFILTRATION WASTEWATER TREATMENT FACILITY

C. Detection Monitoring

1. Saturated Zone Monitoring

The upgradient and downgradient saturated zone monitoring stations consist of the monitoring wells and extraction wells listed in Table No. 3. Samples shall be collected quarterly at these stations and analyzed to determine the concentration of the parameters listed in the tables 4, and 5. Corrective Action Monitoring frequencies are indicated in CAO No. 6-98-19A1.

Table 3
Monitoring Stations
Ground Water Monitoring Wells (Gwmws), Extraction Wells And Piezometers

WELL NO.	USE	PROPOSED FOR DESTRUCTION
93-1MW	Background Gwmw	NO
98-6MWU	Background Gwmw	NO
98-18MW	Downgradient Mw	NO
SRK-15	Downgradient Mw	NO
94-4MW	Downgradient Mw	NO
94-7MWL	Downgradient Mw	NO
94-9MW	Downgradient Mw	NO
94-10MW	Downgradient Mw	NO
SRK-16 M & L	Downgradient Mw	NO
95-1RW	Extraction Well	NO
94-6P	Piezometer For 95-1rw	YES
94-7P	Piezometer For 95-1rw	YES
95-3P	Piezometer For 95-1rw	YES
94-5P	Piezometer For 95-1rw	YES
95-1P, ,	Piezometer For 95-1rw	NO
95-2P	Piezometer For 95-1rw	NO
95-3P	Piezometer For 95-1rw	NO
98-1RW	Extraction Wells	NO
98-1P	Piezometer For 98-1rw	NO
98-2P	Piezometer For 98-1rw	NO
2000-4rw	Extraction Wells	YES
2000-5rw	Extraction Wells	YES
P-1S	Piezometer For 2000-4rw, 2000-5rw & Surface Of Saturated Zone At Dam	YES
P-1D	“	YES
P-2S	“	YES
P-2D	“	YES
P-3M	“	YES
P-3D	“	YES
P-4S	“	YES
P-4D	“	YES
P-5	“	YES
P-6S	“	YES
P-6D	“	YES
P-7S	“	YES
P-7D	“	YES
P-8	“	YES
P-9	“	YES

Table 4
FIELD PARAMETERS
MONITORED QUARTERLY

PARAMETER	UNITS
ELECTRICAL CONDUCTIVITY (E_C)	µMHOS/CM
PH	PH UNITS
TEMPERATURE	In degrees Fahrenheit (°F) or Celsius (°C)

Table 5
Parameters for Laboratory Analyses
Quarterly Monitoring

PARAMETER	UNITS (WASTEWATER WASTE SOLID)
Total Dissolved Solids (TDS)	Mg/L
CALCIUM (Ca)	Mg/L
MAGNESIUM (Mg)	Mg/L
SODIUM (Na)	Mg/L
POTASSIUM (K)	Mg/L
CHLORIDE (Cl)	Mg/L
CARBONATE + BICARBONATE (CO_3 + HCO_3)	Mg/L
SULFATE (SO_4)	Mg/L
COLOR	Color Units
NITRATE AS NO_3	Mg/L
Strontium (Sr)	Mg/L
TOTAL LANTHANIDES	Mg/L
YTTRIUM	Mg/L - Mg/Kg
BARIUM (Ba)	Mg/L - Mg/Kg
CADMIUM (Cd)	Mg/L - Mg/Kg
TOTAL CHROMIUM (Cr)	Mg/L - Mg/Kg
LEAD (Pb)	Mg/L - Mg/Kg
MERCURY (Hg)	Mg/L - Mg/Kg

PARAMETER	**UNITS (WASTEWATER WASTE SOLID)**
Gross Alpha	pCi/L
Gross Beta	pCi/L
Total Thorium	Mg/L[2]- Mg/Kg
Total Uranium	Mg/L[3] - Mg/Kg
Radium-226 (^{226}Ra)	pCi/L - pCi/Gm
Radium-228 (^{228}Ra)	pCi/L - pCi/Gm
Total Radium Calculation (^{226}Ra + ^{228}Ra)	pCi/L - pCi/Gm

2. Well Purging Method

The Discharger shall sufficiently purge each monitoring well before sampling. Purging shall be in accordance with generally accepted sampling practice, to obtain a "representative" sample. If a non-purging method is used, the method proposed must be approved, in advance, by Regional Board staff. The self-monitoring reports shall describe methods used.

3. Quarterly, the Discharger shall:

a) Measure and record the depth below the ground surface and the elevation above mean sea level of the saturated zone surface in the monitoring wells and piezometers listed in Table No. 5;

b) Plot the above-described elevations and elevation isopleths on a 11" x 17" copy of a site plan, which shows the locations of the site and monitoring wells; and

c) Calculate and record the saturated zone gradient, the direction of the gradient, and velocity of saturated zone flow.

4. Unsaturated Zone Monitoring

Much of the former vadose zone underlying the P-16 WMU is currently saturated by wastewater leakage from the WMU. Monitoring described above under Saturated Zone Monitoring includes detection monitoring of the former vadose zone. Additional Detection Monitoring in the former vadose

[2] For mass analysis use laboratory method with detection level of 0.001 mg/l for wastewater and ground water samples. Higher detection levels are acceptable if the Discharger can demonstrate there is matrix interference due to high total dissolved solids.

[3] The Discharger has conducted a statistical evaluation of laboratory results that demonstrates there is a correlation between results for isotopic analysis and mass analysis for uranium. For mass analysis use laboratory method with detection level of 0.001 mg/l for wastewater and ground water samples. Higher detection levels are acceptable if the Discharger can demonstrate there is matrix interference due to high TDS.

zone is not required at this time.

D. General Operation and Maintenance

A brief summary of any operational problems and maintenance activities shall be submitted to the Regional Board with each monitoring report for Mountain Pass Operations. This summary shall discuss:

1. Any modifications, additions, or major maintenance to the facilities regulated under the attached WDRs;

2. Any major problems occurring in the facilities; and

3. The calibration of any wastewater flow measuring devices or moisture sensing devices.

II. DATA EVALUATION AND PRESENTATION

A. Graphs (Saturated-Zone Surface Elevations)

Annually, the Discharger shall prepare a graph of the saturated-zone surface elevation versus time for each piezometer and saturated zone monitoring well listed in Table 5. The graphs shall:

1. Start from the first time the Discharger measured the saturated-zone surface elevation at the monitoring station, and

2. Include all measurements collected during each year in order to show any seasonal changes.

B. Graphs (Saturated Zone Quality)

Annually, the Discharger shall prepare graphs of constituent concentrations versus time for each saturated zone monitoring well, extraction well, spring and wastewater seep listed in Table 5. For each of these monitoring stations, the Discharger shall prepare a series of graphs (one for each constituent listed in Tables No. 6 and 7). The graphs shall:

1. Start from the first time the Discharger sampled the monitoring station for the constituent, and

2. Include all data collected during each year in order to show any seasonal changes.

C. Ground water Concentration Limits

1. Statistical Analysis

The concentration limits for the detected parameters listed in Table 5 shall be the prediction limits calculated by intrawell comparison for each

ground water detection monitoring well listed in the Table 3. Tentative exceedences shall be determined by comparing the detected parameter to its calculated prediction limit. The Discharger shall provide calculated numerical values for the predicted limits and a detailed description of how the numerical limits were developed.

2. Non-statistical Analysis

The concentration limits for parameters listed in Table 3 with greater than 90 percent non-numerical results shall be laboratory specific and specific to the analytical method being used and shall be the Estimated Quantitation Limit (EQL) as described in the most recent edition of Manual SW-846 published by US EPA. Concentrations that lie between the EQL and the Method Detection Limit (MDL) shall be reported as traces. Tentatives exceedences shall be determined using the non-statistical procedure described below.

Each qualifying parameter at a Monitoring Point shall be determined based on either:

i. the data from a single sample for that constituent, taken during that Reporting Period from that Monitoring Point, or
ii. (where several independent samples have been analyzed for that constituent at a given Monitoring Point) the data from the sample which contains the largest number of qualifying constituents.
iii. The Discharger shall conclude that a release is tentatively indicated if the data for any Monitoring Point contain either two or more qualifying parameters that equal or exceed their respective MDLs, or one qualifying constituent which exceeds its PQL.

D. Topographic Map of P-16 WMU and Vicinity Area

Annually, the Discharger shall prepare topographic maps of the P-16 WMU and vicinity (Scale: 1 inch = 300 feet). The maps shall include:

1. The boundaries of P-16;

2. Faults and areas of different geologic material;

3. Tailings settlement monitoring stations;

4. Piezometers, monitoring wells, and extraction wells;

5. Locations of infiltration trenches, which are part of the P-16 Shallow Leakage Intercept System;

6. Lines of equal elevations in feet above mean sea level for the final cover, ground surface and saturated-zone surface. (The maps shall cover the P-16 area and capture zone areas for both the shallow and deep zones.)

E. Geohydrologic Cross-Sectional Maps

Once each year (annually), the Discharger shall prepare cross-section maps (Horizontal Scale: 1 inch = 300 feet), which show:

1. The P-16 WMU

2. Ground surface, saturated-zone surface and contacts separating different geologic material;

F. P-16 WMU Slope Stability

Once each quarter, the Discharger shall prepare a table that lists each piezometer used for monitoring the factor of safety for the slope stability of the P-16 WMU. The table shall include the quarterly piezometric elevation measured in the piezometer, and the Maximum Permissible Piezometric Elevation (MPPE) for the piezometer.

III. REPORTING

A. General Provisions

In accordance with the attached General Provisions 3.a., the Discharger shall make a compliance statement in each submitted monitoring report, noting each violation that occurred during the reporting period and actions taken and/or proposed to return into compliance.

B. Failure to Furnish Reports

Any person failing or refusing to furnish technical or monitoring reports or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1,000) for each day of violation under Section 13268 of the California Water Code.

C. Quarterly Reports

Monitoring reports including the preceding information shall be submitted to the Regional Board the **month following each quarter**.

D. Annual Report

By **March 30** of each year, the Discharger shall submit an annual report to the Regional Board with the following information:

1. Evidence that adequate financial assurance for closure is still in effect (Evidence may include a copy of the renewed financial instrument or a copy of the receipt for payment of the financial instrument.);

2. Evidence that the amount is still adequate or increase the amount of financial assurance by the appropriate amount if necessary, due to inflation, a change in the approved closure plan, or other unforeseen events;

3. Graphical and tabular data for the monitoring data obtained for the previous year and early years if appropriate.

Ordered by: _____ Dated: _____

HAROLD J. SINGER
EXECUTIVE OFFICER

Attachments: General Provisions for Monitoring and Reporting Program

CS/rp 7/9/04 MolyP16MRPdraftJune04.doc

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

GENERAL PROVISIONS
FOR MONITORING AND REPORTING

1. SAMPLING AND ANALYSIS

a. All analyses shall be performed in accordance with the current edition(s) of the following documents:

   i. Standard Methods for the Examination of Water and Wastewater

   ii. Methods for Chemical Analysis of Water and Wastes, EPA

b. All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Regional Board Executive Officer. Specific methods of analysis must be identified on each laboratory report.

c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The methods used shall also be reported. If methods other than EPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Regional Board prior to use.

d. The Discharger shall establish chain-of-custody procedures to insure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage, and analysis shall be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The most recent version of the approved SAP shall be kept at the facility.

e. The Discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall insure that both activities will be conducted. The calibration of any wastewater flow measuring device shall be recorded and maintained in the permanent log book described in 2.b, below.

f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.

g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

2. OPERATIONAL REQUIREMENTS

a. Sample Results

Pursuant to California Water Code Section 13267(b), the Discharger shall maintain all sampling and analytical results including: strip charts; date, exact place, and time of sampling; date analyses were performed; sample collector's name; analyst's name; analytical techniques used; and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

b. Operational Log

Pursuant to California Water Code Section 13267(b), an operation and maintenance log shall be maintained at the facility. All monitoring and reporting data shall be recorded in a permanent log book.

3. REPORTING

a. For every item where the requirements are not met, the Discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time, and shall submit a timetable for correction.

b. Pursuant to California Water Code Section 13267(b), all sampling and analytical results shall be made available to the Regional Board upon request. Results shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

c. The Discharger shall provide a brief summary of any operational problems and maintenance activities to the Board with each monitoring report. Any modifications or additions to, or any major maintenance conducted on, or any major problems occurring to the wastewater conveyance system, treatment facilities, or disposal facilities shall be included in this summary.

d. Monitoring reports shall be signed by:

i. In the case of a corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates;

ii. In the case of a partnership, by a general partner;

iii. In the case of a sole proprietorship,by the proprietor; or

iv. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

e. Monitoring reports are to include the following:

i. Name and telephone number of individual who can answer questions about the report.

ii. The Monitoring and Reporting Program Number.

iii. WDID Number.

f. Modifications

This Monitoring and Reporting Program may be modified at the discretion of the Regional Board Executive Officer.

4. NONCOMPLIANCE

Under Section 13268 of the Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1,000) for each day of violation under Section 13268 of the Water Code.