

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name: Molycorp, Inc.
Facility Address: 300 Caldwell Avenue, Washington, PA 15301
Facility EPA ID #: PAD030068282

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

If yes - check here and continue with #2 below.
 If no - re-evaluate existing data, or
 if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA Corrective Action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Facility History

The Molycorp site occupies approximately 73 acres of land in Washington, PA and is comprised of three distinct areas: the North Process Area, the Southeast Low-lying Storage Area and the Southwest Hill Area. Molycorp has owned the North Process Area and a small portion of the Southwest Hill Area since the 1920s. The remainder of its current property was purchased in the 1970s. The additional land was purchased because of Molycorp's need for additional storage space for slags generated during the ferroalloy manufacturing operations in the North Process Area.

Ferroalloy manufacturing began at the facility in the 1920s. Molybdenite was processed primarily, but smaller amounts of samarium and other rare-earth elements were also processed. From 1964 through 1970, Molycorp produced a ferro-columbium alloy from a Brazilian pyrochlore ore known as araxa. This alloy was used as an additive to strengthen steel. The processing of araxa, which contained 1 - 1.5% thorium, generated a thorium-bearing slag, some of which was used as fill material over portions of the site. The thorium content of the araxa required Molycorp to obtain a Source Materials License from the Atomic Energy Commission (AEC), currently known as the Nuclear Regulatory Commission (NRC). The NRC is responsible for protection of human health and the environment related to the use of source, byproduct and special nuclear material under the Atomic Energy Act. Its responsibility also includes the safe and timely decommissioning of facilities it has licensed.

Discovery of the disposition of thorium contaminated slags in portions of the facility led the NRC to issue a Notice of Violation (NOV) and request remedial action in June 1971. In 1972, several thousand cubic yards of thorium-contaminated wastes (estimates from 2,200 cubic yards to 27,700 cubic yards) were excavated and segregated into a clay-capped pile on the southeast low-lying property area near the intersection of Caldwell Avenue and Chartiers Creek. The pile was eventually removed from the site under the supervision of the NRC in 2001.

In 1985, a radiological survey performed by an NRC contractor indicated widespread surface thorium contamination beyond the boundaries of the area designated for the survey. Elevated levels of thorium were found in the dikes separating the eight surface impoundments located along the western boundary of the North Process Area. A 1990 subsurface radiological survey indicated that thorium contaminated slags were present along the northern boundary of the plant along the adjacent Findlay Refractory property. In 1995, during the closure of the eight surface impoundments, thorium contaminated sludge from the impoundments was placed into eight 20-cubic yard roll-off containers and stored on-site. In 1996, Molycorp filled approximately one hundred eighty four (184) 20-cubic yard roll off boxes with thorium contaminated slag from the Findlay Refractory Area. These roll off containers were stored at the former location of the surface impoundments along with the roll-offs containing the impoundment sludge. The Pennsylvania Department of Environmental Protection (PADEP) approved of the closure of this Findlay Refractory slag disposal area in 1997. All of the roll-off containers were removed from the site in 2001 under NRC supervision.

In 2001, the Agency for Toxic Substances and Disease Registry (ATSDR) conducted a Public Health Assessment to evaluate the potential public health impact of thorium contamination at the facility. According to ATSDR, the site does not pose a public health threat from the exposure to ionizing radiation in the form of either gamma radiation or the incidental ingestion/inhalation of on-site soils containing thorium. Furthermore, the estimated levels of past radionuclide emissions generated while processing thorium containing ore were found to be below levels of health concern.

Based on (1) ATSDR's conclusions, (2) the NRC's jurisdiction related to radiologic contamination, and (3) the fact that none of the radioactive wastes at the site are believed to be mixed with hazardous waste, **this EI determination focuses primarily on the nonradiologic contamination present at the site.**

The Southwest Hill Area contains the former location of a manufactured gas plant (MGP) that is believed to have been owned by the Hazel Atlas Glass Company. One of the wastes typically generated by an MGP consists of coal tar. The Southeast Low-lying Storage Area contained at least two coal tar ponds (North and South) and several tar seepage areas when Molycorp purchased the property in the mid-1970s. The coal tar present on the Southeast Low-lying Storage Area is believed to have originated from the former MGP in the Southwest Hill Area. Coal tar from the various areas has been tested several times using the Toxicity Characteristic Leaching Procedure (TCLP). No constituents have ever been detected at levels above the TCLP limits contained in the Federal regulations at 40 CFR §261.24; however, the coal tar may contain constituents at concentrations that may be hazardous to human health.

In 1985, a berm was placed around the south coal tar pond for containment purposes. The tar within the north pond was excavated and placed into the south pond. Overexcavated areas were backfilled with slag. Tar observed to be seeping between the Brockway access road and I-70 embankment was also excavated and placed in the south pond. Tar within Chartiers Creek was excavated and placed in the south pond as well. A permanent cyclone fence was placed around the south pond. In September 1985, the presence of tar was observed at the surface at several locations. Since the south pond was still open, Molycorp excavated the seeps and placed the material into the pond. To date, closure of this pond has not been approved by PADEP and several areas of coal tar seepage can once again be observed in the Southeast Low-lying Storage Area.

In 1986, the former MGP foundation located in the Southwest Hill Area contained an estimated 10 inches of tar within the walls of the building. The walls, originally nine feet high, were cut in half and collapsed into the foundation. The resultant concrete and tar was covered by approximately four feet of clean soil. In 1987, coal tar seeps were observed emerging at the surface within and along the perimeter of the MGP foundation. The tar was apparently displaced by the weight of the fill material and migrated upward to the ground surface and laterally toward the Foundation Area perimeter. In 1992, a trench was installed around the perimeter of the foundation to control the lateral migration of the coal tar.

In the 1960s, eight surface impoundments, ranging in capacity from 29,000 gallons to 56,000 gallons were built west of the manufacturing portion of the facility (North Process Area), adjacent to Chartiers Creek. The impoundments were used to store tailings for the recovery of molybdenite generated by the facility's wet scrubbers. The wet scrubbers captured the sulfur dioxide (SO₂) emissions generated during the molybdenite ore roasting process. The use of wet scrubbers was discontinued when a baghouse was installed to capture SO₂ emissions in 1974. The surface impoundments were then used to collect runoff from various plant areas, such as the sulfuric acid plant, the acid storage areas, and the thickener unit. In 1985, PADEP denied Molycorp's application for a Part B permit for the impoundments because (1) there was no double liner or leachate collection system, (2) the bottoms of the impoundments were too close to the water table and (3) the impoundments were located within the 100-year floodplain. All liquids were removed from the surface impoundments after the acid plant was shut down and the facility was placed on standby in late 1991. In 1995, closure activities at the surface impoundments began. Molycorp removed all of the wastewater, sludges, rip rap material, sand and synthetic liners from the eight impoundments. Molycorp also relined the excavations, backfilled them with clean fill and sealed them with a geosynthetic material in anticipation of the future NRC decommissioning of the site. Wastes exceeding 5 pCi/gm Th-232 were placed in roll-off containers to be managed under NRC requirements. As stated above, the roll-off containers were removed from the site in 2001.

After the plant shutdown in late 1991, the facility operated in an extended standby mode with a small active area leased to a vendor during most of the 1990s. The principal site activities during that time frame involved the purchasing and reselling of alloys, plant maintenance and plant decommissioning per the NRC requirements. In 2002, all of the former plant buildings and structures except for the guardhouse and scales were demolished and removed from the property. The foundation of Building No. 2 was left in place since it provided a large surface to load and unload materials and because of its proximity to a rail line that could be utilized if needed.

A supplemental site characterization is currently underway at the Molycorp facility. The purpose of this investigation is to collect the additional data needed to develop a site closure plan that addresses both radiological and non-radiological issues that remain. Surface soils, subsurface soils, groundwater, surface water and sediment in the North Process Area, Southeast Low-lying Storage Area and Southwest Hill Area will be evaluated under this study. Sampling for this investigation began in September 2003 and a final report should be available in the winter of 2004. Although it is not anticipated that the results of this investigation will affect the conclusions of this Human Health Environmental Indicator Determination, the results will greatly aid in the remedy selection process at the facility.

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **“contaminated”**¹ above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	<u>X</u>	—	—	Several inorganic constituents including molybdenum, manganese, cadmium, chromium, lead, selenium and iron have been found in groundwater samples at concentrations greater than EPA’s RBCs, PADEP MSCs for used aquifers, and/or MCLs.
Air (indoors) ²	—	<u>X</u>	—	There is no history of volatile organic compound (VOC) chemical handling/usage in the North Process Area of the site. The distance between the known coal tar residue locations and nearest occupied buildings is great enough that an indoor air problem is not suspected.
Surface Soil (e.g., <2 ft)	<u>X</u>	—	—	Coal tar residue, which is suspected to contain hazardous constituents at elevated concentrations, has been observed seeping to the surface at various site locations. Slags used as fill throughout the site were found to contain molybdenum, arsenic and other inorganic constituents at significant concentrations.
Surface Water	<u>X</u>	—	—	Coal tar has been removed from Chartiers Creek, but remains visible at certain creek. locations. Molybdenum was detected in surface water downstream of the North Process Area at concentrations above EPA’s RBC for tap water.
Sediment	<u>X</u>	—	—	Coal tar has been removed from Chartiers Creek, but remains visible at certain creek. locations.
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	—	—	Same as Surface Soil.
Air (outdoors)	—	<u>X</u>	—	No evidence of a release of contaminants to air.

— If no (for all media) - skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

— If unknown (for any media) - skip to #6 and enter “IN” status code.

Footnotes:

¹ “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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Rationale and Reference(s):

Groundwater:

The site is located within the Pittsburgh Low Plateau Section of the Appalachian Plateaus Physiographic Province. This Province consists of flat-lying sedimentary units varying between sandstone, shale, limestone, claystone and conglomerate which contain rich coal seams and numerous natural gas and oil deposits. Much of the ground surface in the North Process Area of the site is covered with asphalt or concrete. The uppermost water-bearing unit at the site occurs in the fill material comprised of slags, spent refractory bricks, mixed sand, gravel, silt and clay, and miscellaneous debris. Fill thickness ranges from 2 - 12 feet and averages 7 feet. Alluvial clay, silt, sand and gravel with an average thickness of 8 to 9 feet lies directly below the fill. Below the alluvial deposits are the three members of the Waynesburg Formation. The upper member of the Waynesburg Formation is up to 25 feet thick and consists of sandstone, siltstone, mudstone, and carbonaceous shale. The Little Washington coalbed separates the upper member from the middle member of the Waynesburg Formation. The middle member is up to 90 feet thick and consists primarily of mudstone, with some interbedded limestone, sandstone, siltstone, carbonaceous shale and coal. The lower member of the Waynesburg Formation is also up to 90 feet thick and consists of sandstone, limestone, siltstone, mudstone and coal.

The average depth to water in the North Process Area is about four feet below the ground surface. At most locations, the surface of the water table occurs in the fill material; however, in some instances, the water table surface occurs in the upper portion of the clayey zone beneath the fill. This clayey zone acts as an aquitard between the water table and a deeper sand and gravel layer that rests upon the bedrock. There is evidence that the water table aquifer and this sand and gravel layer are hydraulically interconnected. Groundwater in the water table and sand and gravel units flows west across the site toward Chartiers Creek. Depth to bedrock is approximately 20 feet below the ground surface.

In the Southwest Hill Area of the site, groundwater results from precipitation that infiltrates through the permeable surface soils and saprolite that covers the hill surface. The infiltrating water perches on less permeable strata and migrates laterally along bedding planes or fractures until it intersects the saprolite along the sides of the hill or seeps out of the hillside. The water then flows in the subsurface beneath the weathered rock and soil until it discharges into Sugar Run or Chartiers Creek through the alluvium along the valley floor.

In 1982, a groundwater monitoring program was established for the surface impoundment area along the western boundary of the North Process Area. Four shallow wells (1 upgradient, 3 downgradient) were installed and continue to be monitored quarterly. Historically, the contaminant of concern that has been consistently detected at elevated concentrations in all four of the wells has been molybdenum, a constituent that is directly attributable to the operations at Molycorp since the 1920s. The molybdenum concentrations detected in the well located upgradient of the surface impoundments is roughly of the same order of magnitude (20 - 60 mg/l) as the downgradient wells. Well M-4, the northernmost of the downgradient wells, has exhibited the lowest molybdenum concentrations in recent years (10 - 20 mg/l) but even these levels are two orders of magnitude above EPA's Risk Based Concentration (RBC) for molybdenum in tap water (0.18 mg/l). PADEP currently does not have a medium specific concentration (MSC) for molybdenum in groundwater. Other contaminants routinely detected above EPA's RBCs or maximum contaminant levels (MCLs) in the groundwater monitoring program include arsenic, cadmium, chromium, lead, and selenium; however, none of these contaminants exhibit concentrations in excess of PADEP's MSCs for non-use aquifers.

A groundwater investigation in the North Process Area that included the installation of 17 monitoring wells (M-5 through M-18, M-9S, M-15S, and M-18S) was conducted in 1991. The investigation also included the installation of two staff gages, collection of six soil samples for geotechnical analyses, and collection of 30 soil samples for thorium analysis. Two rounds of groundwater sampling from the 17 newly installed wells and the four existing wells were included in the study. Elevated concentrations of molybdenum and other metals were detected in the groundwater samples.

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A 1994 Site Characterization included the installation of over 400 core borings to characterize the site surface fill and subsurface overburden units for physical extent, the presence of thorium and hydrogeologic properties. Fifteen of those borings were converted to monitoring wells and designated MW-19 through MW-29, UG-2, UG-3, UG-4 and BR-1, bringing the total number of on-site monitoring wells to 36. Two pumping wells (PW-1 and PW-2) were also installed during this investigation. Two rounds of groundwater sampling, including all 36 on-site monitoring wells, were conducted in the summer of 1994. Five wells located near the Chartiers Creek stream bank north of Caldwell Avenue were also sampled in a third round during the summer of 1994. The samples from each event were analyzed for target analyte list (TAL) metals plus molybdenum, total organic carbon (TOC), total halogenated organics (TOX), total dissolved solids (TDS), sulfate, chloride phenols, and for specific radioisotopes of radium, thorium and uranium. The groundwater sampling results agreed with the previous investigations in that elevated molybdenum concentrations were noted. The molybdenum concentrations generally increased from the southeast portion of the North Process Area to the northwest portion of that area with the highest observed molybdenum concentration occurring in MW-5 (280,000 ug/l). Molybdenum was found at concentrations as high as 126,000 ug/l in the only well screened into the bedrock aquifer at the site located in the northwest corner of the North Process Area which suggests an interconnection with the above-lying aquifers. Arsenic, iron and manganese were found in a few of the wells at elevated concentrations.

In mid-2003, a contractor for Molycorp conducted a reconnaissance to determine the condition of the existing monitoring wells. Numerous wells have been damaged or destroyed as a result of demolition activities at the site. Specifically, monitoring well nos. MW-8, MW-11, MW-13, MW-14, MW-15, MW-15S, MW-17 and MW-20 are presumed to be destroyed. Monitoring well nos. MW-7, MW-9, MW-9S, MW-12, MW-18S, MW-23 and UG-3 could not be located possibly because they were concealed by vegetative cover, soil and fill material, or stacked PVC pipes. Monitoring well UG-2 has been backfilled with bentonite and is no longer usable.

Molycorp prepared a Supplemental Site Characterization Plan for the facility in September 2003. The plan calls for the installation of 21 additional monitoring wells (13 wells in the North Process Area, and 8 wells in the Southeast Low-lying Storage Area). Three of the wells in the North Process Area will be screened into bedrock with the remaining ten screened into the overburden. Four of the thirteen wells will replace wells that were damaged or destroyed. Three of the wells in the Southeast Low-lying Storage Area will be screened into the bedrock with the remaining five wells screened into the overburden. The plan calls for the sampling of all new and existing monitoring wells at the site.

Surface and Subsurface Soil:

In 1980, a contractor for Molycorp installed 8 soil borings in the vicinity of the North and South Tar Ponds. The borings indicated that the North Tar Pond contained a distinct tar layer about two feet thick at boring SRW-7 and tar was mixed with soil at depths from 2 to 16 feet below the surface. In the South Tar Pond area, coal tar was observed in a distinct two foot layer in borings SRW-6 and SRW-8. Soils in the South Tar Pond area were observed to be impacted by coal tar at depths up to 14 feet in SRW-6. Coal tar was not observed in the two borings installed adjacent to Chartiers Creek.

In 1985, a berm was placed around the south coal tar pond for containment purposes. The tar within the north pond was excavated and placed in the south pond. Overexcavated areas were backfilled with slag. Some tar observed to be seeping between the Brockway access road and I-70 embankment was also excavated and placed in the south pond. The tar beneath the Brockway access road was left in place with a fine-grained soil barrier to contain it. Tar within Chartiers Creek was excavated and placed in the south pond as well. A permanent cyclone fence was placed around the south pond. In September 1985, the presence of tar was observed at the surface at several locations. Since the south pond was still open, Molycorp excavated the seeps and placed the material into the pond. The South Tar Pond was covered with an impermeable geomembrane and clean soil. Over time, soil settling has caused the geomembrane to tear in several locations which has allowed the coal tar to percolate to the surface.

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In 1986, the former MGP foundation contained an estimated 10 inches of tar within the walls of the building. The walls, originally nine feet high, were cut in half and collapsed into the foundation. The resultant concrete and tar was covered by approximately four feet of clean soil. In 1987, coal tar seeps were observed emerging at the surface within and along the perimeter of the foundation. The tar was apparently being displaced by the weight of the fill material and migrated upward to the ground surface and laterally toward the Foundation Area Perimeter. In 1992, a trench was installed around the perimeter of the foundation to control the lateral migration of the coal tar.

In 1996, a contractor for Molycorp installed seven soil borings and four test pits along or adjacent to the diked area surrounding the South Tar Pond. These borings and test pits were installed to assist in the development of a design that would raise the height of the dike wall to a level that would accommodate the coal tar material that was contained in the former foundation area. Evidence of coal tar impacts were noted in both of the borings installed adjacent to the dike at depths from 1.5 ft. to 8 ft. Coal tar was observed at depths up to 15 feet in the borings and test pits installed along the dike. The coal tar material from the foundation area was never moved to the South Tar Pond.

There is not a great deal of analytical data associated with the coal tar. The tar ponds and foundation areas have been sampled and analyzed for toxicity equivalent procedure (TEP) and TCLP organics and inorganics on at least three different occasions (May 1981, November 1993, and December 1996). No constituent has ever been detected at a level greater than the TCLP limit contained in the Federal regulations at 40 CFR §261.24. On March 13, 2002, EPA revised its Phase IV Land Disposal Restriction regulations by no longer allowing the use of the TCLP test to determine whether MGP waste is hazardous from toxicity characteristic regulation. Therefore, the material is not considered to be a hazardous waste. The material is believed to contain hazardous constituents and will be further analyzed per the Supplemental Site Characterization Plan.

In early 2000, Molycorp hired a contractor to sample and analyze representative soil/slag samples for TCLP, chemical and radiologic constituents. Numerous archived samples that had been collected from five areas were composited into one sample for each of the areas. The archived samples used in this effort were among the several thousand split-spoon samples collected at six-inch increments from boreholes drilled during the 1994 site characterization study. Each of the composited samples was comprised of at least six individual samples. Sample C1 was composited from samples ranging in depth from 0.5 to 6 feet collected in the northwest portion of the North Process Area west of Building 33. Sample C2 was composited from samples ranging in depth from 0.5 to 6 feet collected in the surface impoundment area west of Building 36/42. Sample C3 was composited from samples ranging in depth from 0 to 3 feet collected in soils near the Thorium Pile on the south side of Caldwell Ave. Sample C4 was composited from samples ranging in depth from 0 to 9.5 feet collected in soils near Building 39 on the south side of Caldwell Ave. Sample C5 was composited from samples ranging in depth from 0 to 24 feet collected from the Thorium Pile located on the south side of Caldwell Ave. No constituents were detected above the TCLP limits. A handful of polycyclic aromatic hydrocarbons (PAHs) including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(a,h)anthracene were found at concentrations above EPA's RBCs for residential soils. Benzo(a)pyrene (4,500 ug/kg) in Sample C1 was the only constituent found above PADEP's medium specific concentration (MSC) for direct contact with residential soils (2,500 ug/kg). PADEP's MSC for direct contact for non-residential surface soils is more than double the concentration of benzo(a)pyrene in Sample C1.

In 2001, Molycorp hired a contractor to conduct an investigation of the non-radiologic slags located in the western portion of the North Process Area and the area south of Caldwell Avenue near the former thorium pile. Twenty soil borings were installed as part of this investigation. Soil samples from these borings were screened in the field for radioactivity and VOC contamination. Arsenic, iron, manganese, molybdenum and selenium were found at more than one slag sample location at concentrations greater than EPA's RBC for residential soil. Only arsenic and molybdenum were found at concentrations above EPA's RBC for industrial soils. Arsenic also exceeded PADEP's surface soil statewide health standards (SHS) at some of the surface sample locations (PADEP does not have a

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health standard for molybdenum). Arsenic, boron, lead, selenium and vanadium exceeded the soil to groundwater SHS in several of the samples. No VOCs or SVOCs were detected at levels exceeding the PADEP SHS although benzo(a)pyrene was detected in four samples above EPA's RBC for residential soils. One of those four samples (SB-09 at 400 J ug/kg) exceeded EPA's RBC for benzo(a)pyrene in industrial soils (390 ug/kg). TCLP results indicated that none of the samples tested were above the regulatory limit for a characteristic hazardous waste. The investigation report concluded that the materials overlying the radiological contaminated slag could remain on-site provided that exposure pathways are eliminated and that PADEP's Act 2 procedures are followed.

The September 2003 Supplemental Site Characterization Plan identifies 230 sampling locations throughout the site for soil, slag and sediment sampling for both radiologic and nonradiologic parameters. Since the NRC has jurisdiction over the radiological investigation of the site, only the nonradiological sampling efforts will be discussed. Samples from selected borings in the North Process Area and areas south of Caldwell Avenue believed to be impacted by thorium contaminated slag/soil will be analyzed for PADEP Act 2 metals plus molybdenum and tungsten in addition to the radiological parameters. Several samples from these areas will also be analyzed for the presence of VOCs. Samples from potential coal-tar impacted soils in selected borings installed in the Southeast Low-lying Storage Area and Southwest Hill Area will be analyzed for BTEX compounds, PAHs, acid extractable phenolics, and total cyanide, as well as the PADEP Act 2 metals plus molybdenum and tungsten. Limited off-site sampling is also included in the sampling plan to determine whether any contamination from the facility has migrated to off-site properties.

Surface Water:

Chartiers Creek enters onto the Southeast Low-lying Storage portion of Molycorp's property at a point along Interstate 70 between the Brockway Access Road and the South Tar Pond. Sugar Run, which runs east through the northern portion of Molycorp's Southwest Hill Area joins Chartiers Creek in the Southeast Low-lying Area. The direction of flow in Chartiers Creek in the vicinity of the site is generally to the north. Beyond the site, Chartiers Creek drains to the northeast for approximately 30 miles and enters the Ohio River at McKees Rocks, PA.

In March and April 1985, a contractor removed coal tar from Chartiers Creek on the Southeast Low-lying Storage property. The tar was located both upstream and downstream of the intersection of Chartiers Creek with Sugar Run, as well as in Chartiers Creek downstream of the east end of the North Tar Pond. The materials removed from the creek in 1985 were placed into the South Tar Pond. Coal tar presently is visible in portions of the Chartiers Creek in the Southeast Low-lying Storage Area.

In August 1994, two rounds of surface water samples were collected from Chartiers Creek as part of the Site Characterization completed for the NRC License Termination of the facility. For each round, two samples were collected upstream, one was collected downstream, and one was collected adjacent to the industrial portion of the site. The samples were analyzed for TAL metals, molybdenum, chloride, phenols, sulfate, total dissolved solids (TDS), total organic carbon (TOC) and total halogenated hydrocarbons (TOX). Molybdenum, selenium, cadmium and TOX are indicator compounds of impact from ore refining activities.

Cadmium and Selenium were not detected in any of the stream samples collected during the two rounds of sampling. TOX was detected at 20 ug/l in both the furthest upstream and furthest downstream sampling locations. Manganese concentrations ranged from 313 ug/l in the upstream sample to 426 ug/l in the downstream sample. There is no evidence that the presence of any of these contaminants is attributable to activities conducted at the Molycorp facility. The only contaminant found in the surface water that can be attributed to the facility is molybdenum. The molybdenum concentration at the furthest upstream location during the first round of sampling was 15 ug/l compared to 1,320 ug/l in the furthest downstream sample. EPA's RBC for molybdenum in tap water is 180 ug/l

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In addition to the surface water samples collected, the 1994 Site Characterization included the sampling of plant sewer water from both the North and South Storm Sewers outfalls. The South Outfall is located along Chartiers Creek just north of the Caldwell Ave. bridge. The North Outfall is located along Chartiers Creek at the northwest corner of the North Process Area. The storm sewers and outfalls were sampled during a period that precipitation did not contribute to surface runoff. Much like the surface water samples, the only contaminant of concern that was detected at elevated concentrations in the sewer and outfall samples was molybdenum, which ranged from 410 mg/l to 4,900 mg/l.

To better define the surface water quality at the site, the Supplemental Characterization Plan includes the collection and analysis of surface water samples from 13 locations in Chartiers Creek and Sugar Run for VOCs, SVOCs, and Act 2 metals plus molybdenum and tungsten. Radiological parameters will also be measured and analyzed.

Sediment:

In March and April 1985, a contractor removed coal tar from Chartiers Creek on the Southeast Low-lying Storage property. The tar was located both upstream and downstream of the intersection of Chartiers Creek with Sugar Run, as well as in Chartiers Creek downstream of the east end of the North Tar Pond. The materials removed from the creek in 1985 were placed into the South Tar Pond. No analytical data associated with the coal tar removed from the creek is available. Coal tar presently is visible in portions of the Chartiers Creek in the Southeast Low-lying Storage Area.

The sediment of Chartiers Creek has been sampled only once as part of the site characterization activities performed in 1994. Samples were collected from seven stream locations (SS-1 through SS-7) along the creek in the north process and Southeast Low-lying Storage Areas. The samples were only analyzed for thorium-232. The results indicated thorium concentrations from 0.23 to 0.89 pCi/g, which indicated no significant thorium-related impact to the sediment.

To better define the sediment quality at the site, the Supplemental Characterization Plan includes the collection and analysis of sediment samples from 13 locations in Chartiers Creek and Sugar Run for VOCs, SVOCs, and Act 2 metals plus molybdenum and tungsten. Eight of the samples will also be analyzed for PCBs. Radiological parameters will also be measured and analyzed.

Air (indoor)

There is no evidence to support that any VOC-contaminated groundwater has migrated off-site or has impacted the indoor air quality of nearby residences or other off-site structures. All on-site structures have been demolished and removed from the site. TCLP testing of the coal tar found on the southeast low-lying and Southwest Hill Areas has indicated the presence of benzene, which suggests that there are chemicals present in the tar material that have the potential to negatively impact indoor air quality. However, there are no inhabited buildings within 100 feet of known areas of coal tar disposition and the groundwater flow direction from areas of known disposition is toward Chartiers Creek or Sugar Run. No residences or other buildings are located between the coal tar and the above water bodies.

Air (Outdoor)

A release of contaminants from source areas to the air above a risk-based level is not suspected. Molycorp collected 22 air samples as part of the 1994 Site Characterization and analyzed the samples for ⁽²³²⁾Thorium. The concentrations detected were found to be negligible compared to the NRC effluent concentrations of 0.004 pCi/ft³. The concentrations of VOCs observed at the site do not warrant a concern for a release to the atmosphere.

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Ref.: Site Characterization Report for License Termination of the Washington, PA Facility, prepared by Foster Wheeler Environmental Corp., January 1995; Final Closure Report for Eight Surface Impoundments at the Washington, PA Facility, prepared by Foster Wheeler Environmental Corp., Revised May 1996; Washington Facility Environmental Report, prepared by ICF Kaiser, April 1997; TCLP and Radioanalytical Analyses of Representative Soil/Slag Samples from the Molycorp Washington, PA Site, prepared by Radiological Services, Inc., March 2000; Petitioned Public Health Assessment for Molycorp, Inc., Washington, PA, prepared by Agency for Toxic Substances and Disease Registry, June 2001; Environmental Indicator Inspection Report for Molycorp, Inc., prepared by U.S. Army Corps of Engineers, December 2001; Overburden Slag Investigation Report, prepared by MFG, Inc., February 2002; Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, USEPA, November 2002; Supplemental Site Characterization Plan for the Washington, PA Site, prepared by Malcolm Pirnie, September 2003; Quarterly Groundwater Monitoring Reports, prepared by Molycorp, Inc., 1985 to 2003.

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3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

<u>“Contaminated” Media</u>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>			<u>No</u>
<u>Air (indoors)</u>	—	—	—				
Soil (surface, e.g., <2 ft)	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>
Surface Water	<u>No</u>	<u>No</u>			<u>No</u>	<u>No</u>	<u>No</u>
Sediment	<u>No</u>	<u>No</u>			<u>No</u>	<u>No</u>	<u>No</u>
Soil (subsurface e.g., >2 ft)				<u>No</u>			<u>No</u>
<u>Air (outdoors)</u>	—	—	—	—	—		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated” as identified in #2 above.
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“___”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- X If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter ”YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- _____ If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- _____ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code.

Rationale and Reference(s):

See the following pages

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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Groundwater

Groundwater has been monitored at the site, especially in the North Process Area since the early 1980s. The data associated with the monitoring has indicated that the groundwater beneath the site contains inorganic contaminants including molybdenum, arsenic, cadmium, chromium, lead and selenium at concentrations above EPA's RBC or MCL limits. None of these contaminants are generally found at concentrations above PADEP's MSCs for non-use aquifers, although PADEP does not currently have a standard for molybdenum.

Although the data indicates that some of the inorganic contamination in the groundwater may be migrating off-site to the northwest toward Chartiers Creek, groundwater is not used as a source of drinking water, for agricultural purposes, or for any other purpose in the site vicinity. No registered wells are located within two kilometers of the facility. The Pennsylvania American Water Company provides drinking water to the surrounding community. Both of the Pennsylvania American Water Company intakes are located on the Monongahela River, a water body that is not downstream of the facility.

There is no evidence of site-related VOC contamination migrating in groundwater from the site to beneath nearby residences or other structures. All of the on-site structures have been removed and there is no worker population at the facility, except for the Facility Superintendent, who occupies a trailer on West Green Street across the street and upgradient from the North Process Area and a guard located in a guard shack on the North Process Area near Caldwell Avenue. There are no plans for construction on the property that could potentially expose workers to contaminated groundwater on-site.

Surface and Subsurface Soil:

Most of the soil/slag sampling at the site to date has focused on the radiological contamination present at the site; however, many of the studies have also included analyses for non-radiologic parameters. The available data (summarized in the answer to Question 2 above) suggests that both the non-radiologic slags used as fill throughout the site and the coal tar residues located on the Southeast Low-lying Storage and Southwest Hill Areas contain hazardous constituents at concentrations that may impact human health if the exposure pathway is complete.

There is no evidence that any site-related contamination is currently impacting the surface and subsurface soils of properties adjacent to the site. The only known area where site-related contamination was found off-site was the Findlay Refractory property located adjacent to the northern boundary of the North Process Area. The radiologically contaminated slag found on the Findlay Refractory property was excavated from that area in 1996 and removed from the site in 2001 under NRC supervision.

Molycorp has purchased all of the former residential properties located across Green Street from the North Process Area. Although site-attributable contamination is not suspected to be present on the east side of Green Street, Molycorp has ensured that there is no exposure to residents by purchasing those properties. Molycorp currently has no plans for construction on the former residential properties or on any of the land that it owns at this facility.

The on-site guard's duties require him to remain inside the guardhouse for the vast majority of his time. When the guard is outside the guardhouse, he does not have any responsibilities that would cause the disturbance of any of the on-site surface and subsurface soils. Therefore, the human health risk associated with incidental exposure to contaminants in the surface soils is negligible. It should be noted that any remaining areas of radiological concern have been clearly marked on-site so that the guard or other site visitors are aware of potential radiological hazards.

To discourage trespassing, the entire North Process Area is fenced. There is also a fence installed along the south side of Caldwell Avenue, preventing access to the Southeast Low-lying Storage and Southwest Hill Areas. There are no known recreational uses for the land in any of the three distinct facility areas and none of the property owned by Molycorp is used for agricultural purposes.

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Surface Water

Chartiers Creek and Sugar Run are the two streams that can be potentially impacted by on-site contamination. Coal tar has historically been removed from Chartiers Creek and has also been recently observed in the creek sediments, although the impact of this material to the water quality has not been adequately measured. As part of the 1994 Site Characterization, molybdenum was found in a downstream sample in Chartiers Creek at a concentration above EPA's RBC for tap water. The same contaminant was found at elevated concentrations in the sewer systems found in Molycorp's North Process Area. The samples to be collected as part of the Supplemental Site Characterization Plan will be analyzed for constituents believed to comprise the coal tar as well as TAL metals and molybdenum. This will provide a much clearer picture of the water quality of the streams in the immediate site vicinity.

The contaminants potentially present in the streams in the site vicinity do not pose an unacceptable risk to human health due to the infrequency of contact with on-site surface water. It should be noted that Molycorp owns the land on both banks of the two streams as they traverse the company's property. Therefore, access to the streams by local residents and trespassers is minimized.

Although molybdenum was detected in Chartiers Creek at concentrations above EPA's RBC for tap water, the screening level assume that 100% of one's drinking water is from surface water, which is overly conservative for this site. Chartiers Creek and Sugar Run are not used as a drinking water supply and there are no known recreational uses of these streams in the vicinity of the site. The Pennsylvania American Water Company, which services Canton Township, North Franklin Township and the City of Washington gets its water supply from two intakes on the Monongahela River, which is not impacted by any site activities.

Chartiers Creek becomes more impacted by acid mine drainage and industry the further the water body flows downstream (to the north) from the site. Chartiers Creek may be used for recreational purposes (boating, fishing, etc.) from Canonsburg (located >10 miles downstream of Molycorp) to the mouth of the stream in the Ohio River. There is a fish advisory in effect for Chartiers Creek over this stretch of the creek, but the advisory is due to PCB and chlordane contamination, which is not attributable to the historical activities at Molycorp.

Sediment

The only sediment sampling effort to date occurred as part of the 1995 Site Characterization and focused only on radiologic contaminants. Since coal tar has historically been removed from Chartiers Creek and it once again has been observed in the creek, it is reasonable to infer that hazardous constituents may be present in the stream sediments. Molybdenum and other metals associated with the North Process Area former operations may also be present in the sediments of Chartiers Creek and Sugar Run. The samples identified in the Supplemental Site Characterization Plan will define the quality of the on-site stream sediments. Similar to the surface water exposure pathway, whether these samples reveal impacted sediment quality or not, an unacceptable risk to human health is not anticipated due to the infrequency of contact with the on-site sediments.

Ref.: Site Characterization Report for License Termination of the Washington, PA Facility, prepared by Foster Wheeler Environmental Corp., January 1995; Final Closure Report for Eight Surface Impoundments at the Washington, PA Facility, prepared by Foster Wheeler Environmental Corp., Revised May 1996; Washington Facility Environmental Report, prepared by ICF Kaiser, April 1997; TCLP and Radioanalytical Analyses of Representative Soil/Slag Samples from the Molycorp Washington, PA Site, prepared by Radiological Services, Inc., March 2000; Petitioned Public Health Assessment for Molycorp, Inc., Washington, PA, prepared by Agency for Toxic Substances and Disease Registry, June 2001; Environmental Indicator Inspection Report for Molycorp, Inc., prepared by U.S. Army Corps of Engineers, December 2001; Overburden Slag Investigation Report, prepared by MFG, Inc., February 2002; Supplemental Site Characterization Plan for the Washington, PA Site, prepared by Malcolm Pirnie, September 2003; Quarterly Groundwater Monitoring Reports, prepared by Molycorp, Inc., 1985 to 2003.

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4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **“significant”**⁴ (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable” for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

_____ If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

_____ If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

Ref:

⁴ If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

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5. Can the “significant” **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be “unacceptable”)- continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.

_____ If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code

Rationale and Reference(s):

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

 X YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Molycorp, Inc. facility, EPA ID # PAD 030 068 282, located at 300 Caldwell Avenue, Washington, PA 15301 under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

 NO - "Current Human Exposures" are NOT "Under Control."

 IN - More information is needed to make a determination.

Completed by (signature) _____ /s/ _____ Date 11/4/03
 (print) Andrew Clibanoff
 (title) RCRA Project Manager

Supervisor (signature) _____ /s/ _____ Date 11/04/03
 (print) Paul Gotthold
 (title) Chief, PA operations Branch
 (EPA Region or State) EPA Region III

Locations where References may be found:

EPA Region III
Waste and Chemicals Management Division
1650 Arch Street
Philadelphia, PA 19103-2029

Contact telephone and e-mail numbers:

(name) Andrew Clibanoff
(phone #) 215-814-3391
(e-mail) clibanoff.andrew@epa.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.