UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MEMORANDUM

DATE: MAY 15 2014

SUBJECT: Request for a Time-Critical Removal Action including an Exemption to the $2 Million Limitation on Removal Actions at the Argonaut Mine Tailings Site, City of Jackson, Amador County, California

FROM: Daniel Shane,
Emergency Response Section (SFD-9-2)

THROUGH: Harry L. Allen, Chief
Emergency Response Section (SFD-9-2)

TO: Daniel Meer, Assistant Director
Superfund (SFD-9)

I. PURPOSE

The purpose of this Action Memorandum is to obtain approval to spend up to $2,407,200.00 in direct extramural costs to mitigate threats to human health and the environment posed by the presence of mine tailings wastes at the Argonaut Mine Tailings Site, ("Site"). The Site is located north of downtown Jackson, in Amador County, California.

This Action Memorandum, if approved, will authorize the expenditures required for U.S. EPA, as the lead technical agency, to take actions described herein to abate an imminent and substantial endangerment to neighboring residents posed by hazardous substances at the Site. The proposed removal of hazardous substances would be undertaken pursuant to Section 104(a)(1) of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9604(a)(1), and Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. § 300.415.

II. SITE CONDITIONS AND BACKGROUND

Site Status: Non-NPL
Category of Removal: Time-Critical
CERCLIS ID: CAD983650011
SITE ID: A930

A. Site Description

1. Physical Location

The Argonaut Mine Tailings Site (Site) is situated on undeveloped private land in the western portion of the City of Jackson, Amador County, California. The Site is located approximately ½ mile south of the Argonaut Mine main shaft and head frame. The Site is in the Jackson-Plymouth Gold Mining District approximately 45 miles east of Stockton and Sacramento. The District is a 20 mile long belt of gold mineralization that runs through western Amador County. The Site is in the western foothills of the Sierra Nevada Mountains near Highway 49 at an elevation between 1,200 and 1,600 feet. The Site is near other old gold mining towns including Angels Camp, Murphy's, Sonora and Sutter's Fort. There were approximately 1,500 people living and working within four miles of the Site in 1998. In 2009, Jackson had a population of 4,236.

The main area of the Site is comprised of a 64.8 acre area known as the Argonaut Lane mine waste area. This area consists of five parcels. The Assessor Parcel Numbers (APNs) are 044-010-100, 044-010-074, 044-010-082, 044-010-083 and 044-010-084. The most highly contaminated soils are located in a 5-acre area in the most northwestern portion of the 64.8 acres. There are several smaller parcels that have been impacted by mine waste disposal adjacent to or within 300 feet of the large mine waste disposal area. The 0.39 acre Pioneer Street mine waste area consists of two parcels. The APNs are 044-071-002, 044-071-003. A property adjacent to the 5-acre area along the northeast boundary has also been impacted by mine waste disposal. This property is currently occupied by a mental health clinic. The APN is 044-072-008.

The Site is bounded by Argonaut Lane to the west, Hoffman Street to the south, Argonaut Drive and Sutter Street to the east, and Argonaut Heights and Sierra View Estates Subdivisions to the north. Argonaut High School and West View Estates Subdivision are across Argonaut Lane from the Site. Jackson Junior High School is on Sutter Street and in close proximity to the eastern boundaries of the Site. The Amador County Offices and Superior Court are located south of the Site on Hoffman Road. There are large undeveloped parcels located to the northwest, south, and southeast.

The geographic coordinates of the Site are 38° 21' 26.9" N latitude and 120° 47' 23.4" W longitude. See Figure 1 for a Site Location Map.

2. Site characteristics

Argonaut Mine:

The Argonaut Mine was one of the two most important and successful hard rock gold mines in the Mother Lode region. The Argonaut Mine is located approximately 1/2 mile northeast of the Argonaut Mine Tailings Site. The Argonaut Mine and Kennedy Mine are designated as a California State Historical Landmark (No. 786). They were the deepest mines in the country and each had a vertical depth of more than 5900 feet. The total production for the Argonaut Mine was 2,750,000 dry tons of ore, resulting in production of gold worth an estimated $25,197,000.

The Argonaut Mine (initially called the Pioneer Mine and not to be confused with the Pioneer Mine that is 1 mile south of Plymouth), is a gold-bearing quartz mine that operated from 1850-1942. Specifically, portions of the mine extend through Sections 17, 20 and 21 of Township 6N, Range 11E, MDM, with the main portion of the mine and tailings in Section 20. The Argonaut adjoins the Kennedy Mine which is immediately north of the Argonaut Mine. The mine's surface features straddle what is now State Highway 49/88, with the original mill and hoist house set downhill on the northeast side of the road and the head frame on the southwest side of the road. A 40-stamp mill (later a 60-stamp mill) crushed the quartz ore, followed by mercury amalgamation and concentration to obtain the gold, with a resultant waste dump hill built up and accessed by trestle below the road (now a highway). In 1916 the mill was relocated uphill to the southwest side of the road. This new mill was located on top of a hill in an area now known as Argonaut Estates II Subdivision. Residential homes have been built on the area where the mill was located.

The Argonaut Mine and mill areas are not part of the removal action. These areas are currently being investigated for potential listing of the site on the National Priority List (NPL). The Preliminary Assessment/Site Inspection (PASI) for potential long-term remediation and the Removal Site Evaluation (RSE) for short-term mitigation of immediate hazards are being conducted concurrently.

Argonaut Mine Tailings Site (Site):

The Argonaut Mine Tailings Site is located in an alluvial valley and consists of open space characterized by soil and processed mine tailings impounded behind several earthen dams and a concrete dam. When the mine and mill were in operation, the sand and silt-sized tailings from the Argonaut mill were carried by gravity flume down the back side of the hill for approximately 3,000 feet to the thickener basin and may have been discharged to tailings pond areas (i.e., historic impound and concrete dam basin) located on the Site. The thickener basin may have been used to evaporate the excess water prior to processing in the cyanide plant located east of the thickener basin. The upper earthen tailings dam is constructed of processed mine tailings and is located south of the former cyanide plant. Approximately 1 million cubic yards of cyanide process tailings waste, also known as "grey sand tailings", were placed in the impoundment

behind the dam. This dam is estimated to be 100 feet high (at its highest point) and 900 yards long. The earthen dam is curved in an arc that points downstream. The centrally located historic impound basin is contained by an approximately 60-foot high and 900-foot long earthen dam constructed from the grey sand tailings. The lower earthen tailings dam was constructed to contain runoff from the grey sands tailings stockpile. Downgradient from the lower earthen tailings dam is the concrete dam basin. The third and final tailings dam is a multiple inverted arched concrete dam which is 46 feet high and 420 feet long. The concrete dam lies above the North Fork of Jackson Creek. Jackson Creek empties into Lake Amador (a recreation area but not a drinking water source) roughly 8 miles downstream.

In the westernmost portion of the Site near the topographical high point, there is an approximately 5-acre area of concern (AOC) designated as AOC-1. The area is characterized by surface deposits of semi-processed ore. During wet weather, AOC-1 contains localized areas of saturated sediments. A surface impoundment (SI-1) had been present in AOC-1 but the containment had been breached on the south end of the berm. A second surface impoundment (SI-2) located approximately 125 yards to the southeast was used to catch overflow from SI-1. This surface impoundment was apparently backfilled and is no longer evident. The former cyanide plant was located east and down grade from AOC-1. This 6.5-acre area is designated as AOC-2 and contains abandoned vats and tanks that had been used for cyanide leaching of processed ore. There is process waste material in several of the vats and tanks. Additionally, there is a thickening basin in AOC-2 that was associated with the cyanide plant. AOC-3 is located southeast and down grade from AOC-2 and is a 48-acre area. There are three large impoundment areas in AOC-3 including the grey sand tailings area; the historic impound area and the concrete dam basin. Based on borings advanced during a State site investigation, mine wastes are present to a maximum depth of approximately 80 feet below ground surface (bgs) in AOC-3. Although the area behind the lower earthen tailings dam does retain water, both the upper and lower earthen tailings dams are currently breached and surface water eventually flows down grade to the south and/or east of AOC-3 to a 5.3 acre area containing a reversed arched concrete dam referred to as Eastwood Multiple Arch Dam (EMAD). This area is designated AOC-4.

Site soils are predominantly ore and/or waste rock in AOC-1. These soils are rocky and acidic (pH 2 to 5) and generally do not support vegetation. Mineralized salts have formed on the surface of the ground. Soils in AOC-2 and AOC-3 are predominantly grey sand tailings. In most portions of AOC-3, vegetation has been re-established and a thin layer of organic material is present over the tailings. In these areas, the soils are generally stable. This area has abundant wildlife habitat used by a variety of bird species, deer, mountain lion, black bear and other wildlife. However, large portions of AOC-2 and AOC-3 contained exposed mine tailings that are devoid of vegetation. These soils were easily eroded during large magnitude rain events and large gullies and erosion channels have formed. Some of the erosion channels in AOC-2 and AOC-3 exceeded 20 feet in depth and top-width. Several large sinkholes were present behind the lower earthen tailings dam.

The surface waters and sediment in the intermittent stream that flows through the Site and discharge from the EMAD are designated as AOC-4. Sediment and tailings have filled the basin behind the concrete dam to within a few feet of its top. The sediment becomes saturated during wet periods and impounded water flows over the top of the dam and through cracks in the dam. A large hole was cut by an unknown party near the south end of the dam to provide a drainage outlet for impounded water. Water released from the dam flows to a small ravine and then into a culvert that runs under Argonaut Drive. Surface water from the culvert flows to an intermittent stream for approximately 1,200 feet to its confluence with Jackson Creek. The intermittent stream is an open channel for approximately 600 feet before it enters a second culvert under Highway 49 and it becomes a closed channel for 600 feet until it outfalls into the North Fork of Jackson Creek near the City of Jackson Library Building.

Roughly 300 feet north of AOC-1 are two residential lots owned by a single property owner. Combined, the two lots are approximately 0.39 acres. These lots appear to have been used for storage or disposal of ore or mine tailings. These residential lots, designated as AOC-5, have yellow and orange-colored stained ground and are largely devoid of plant life. In addition, mine wastes from AOC-1 have apparently spread over to the adjacent property near the northeast corner. The property impacted by this movement of mine wastes is occupied by a Sierra Wellness and Recovery Center and is designated AOC-6.

The locations of AOC-1 through AOC-6, the approximate parcel boundaries, and other site features are shown on Figure 2 in the attachments.

3. Removal site evaluation

During the period from July 9 through July 12, 2013, EPA, START and the U. S. Coast Guard's Pacific Strike Team mobilized to Jackson, California to perform site assessment activities (i.e., soil, water, waste and sediment sampling). The weather conditions were hot and dry and no surface water was flowing in the intermittent streams. Surface water was encountered in a small pond on site and a small volume of water, possibly fed by a spring, was flowing through a culvert on the downstream side of the concrete dam. The purpose of the assessment was to evaluate the nature and extent of contaminants of concern (COCs) which included arsenic, lead, mercury, cyanides, and polycyclic aromatic hydrocarbons (PAHs) in surface and shallow subsurface soils at the Site and in sediment and surface water potentially discharging from the Site. The selection of COCs was based on previous investigations by the State and historical mining records. Generally, the highest levels of contaminants were found in AOC-1, and decreased with distance downgradient. The principle driver for the removal action is arsenic. The areas with the highest levels of lead and mercury were co-located with the areas that had the highest levels of arsenic in soil.

A total of 95 soil, sediment and waste samples were collected and analyzed using XRF technology for arsenic, lead, mercury and other toxic heavy metals. Thirty-one samples were submitted to a commercial laboratory. Twenty-one soil samples were

collected from AOC-1, five samples from AOC-2, and five samples from AOC-4. There was a very high correlation between the XRF and laboratory concentrations for toxic heavy metals. Fourteen soil, sediment and waste samples from AOC-2 and five sediment samples from AOC-4 were analyzed for total cyanides and cyanides amenable to chlorination. Ten soil, sediment and waste samples from AOC-2 and five sediment samples from AOC-4 were analyzed for PAHs due to the presence of coal tar. Three surface water samples were collected from the Site. Two surface water samples were collected downstream from the EMAD at the inlet to the culvert beneath Argonaut Drive. One surface water sample was collected from a small pond located west of lower earthen tailings dam. These samples were analyzed for heavy metals, total and amenable cyanides and PAHs. The water sampling results indicated the concentrations of arsenic, lead, mercury, total and amendable cyanides and PAHs were below the project-specific environmental screening levels.

AOC-1: The primary "area of concern" (AOC-1), a 5-acre section located on the east side of Argonaut Lane, had the highest concentrations of arsenic, lead and mercury. According to historic literature the semi-processed ore was known as "middlings." The mechanical concentrating process at the mine resulted in three product streams: mineral concentrate, "middlings" (a material of low gold value, but consisting of a high concentration of sulfide minerals), and the waste sand and slime tailings. "Middlings" were captured as a middle product, heavier than tailing sands but lighter than the gold. The "middlings" contained sulfide minerals consisting primarily of pyrite and arsenopyrite, but with the gold locked up within the sulfide crystalline structure. Both mercury amalgamation and cyanidation captured only the "free' gold so the materials were set aside until an alternative process was developed to release the gold at an economic cost. "Middlings" were also called a recalcitrant ore because the gold was caught in a matrix of pyrite or arsenopyrite and could not be effectively recovered by cyanidation. It was not until 1980's the potential for extraction of gold from recalcitrant ores was appreciated such as the use of roasting and pressure leaching and bioleaching.

The primary contaminant of concern is arsenic. The maximum concentration of arsenic in soil was 48,000 mg/kg at 12"-18" below ground surface (bgs). The average concentrations of arsenic in surface soils within the 1.30 acre and 3.22 acre "hotspots" were 7,557 mg/kg and 4,613 mg/kg, respectively. The Regional Screening Level (RSL) and the EPA action level for arsenic in residential soils at this Site is 61 mg/kg. The maximum concentration of lead in soils was 4,000 mg/kg and the RSL was 400 mg/kg. The maximum concentration of mercury in soils was 360 mg/kg and the RSL was 10 mg/kg. The estimated background levels of arsenic, lead and mercury ranged from 8 mg/kg to 21 mg/kg, 14 mg/kg to <28 mg/kg, and 0.1 mg/kg to <8.1 mg/kg, respectively.

Based on soil sampling conducted by EPA and the California Department of Toxic Substances Control (DTSC), the concentrations of arsenic in soils in AOC-1 are at least an order of magnitude, and in some samples were several orders of magnitude, greater than the concentrations in soils in AOC-2 and AOC-3. There is an estimated 120,000 cubic yards of unprocessed or semi-processed ore in the AOC-1 area.

The soil pH in 9 samples collected in AOC-1 ranged from 3.07 to 7.76. Most of the soils are acidic and corrosive to metal. DTSC had installed a security fence around the perimeter of AOC-1 and the corrosion of the metal posts caused the fence to fall down. DTSC erected a second cyclone fence.

AOC -2: AOC-2 is a 6.5 acre section that was the former location of the cyanide plant. In approximately 1917 a cyanide plant was installed to work the tailings by cyanide vat leaching. In 1922, the Amador Metals Reduction Company (AMRC) took over the operation and was treating tailings in the 250-ton cyanidation and flotation plant. The sands and slimes from Argonaut mill were pre-coated with coal tar to prevent premature precipitation of the dissolved gold within the cyanide solution and then the sand was treated in a leaching vat while the slimes were first agitated and then filtered. Sand and slime residues were discarded (the "grey sand tailings") and the gold-bearing solution was precipitated, roasted, and the gold melted down into bullion. In 1938, operations at AMRC plant were halted and much of the equipment was dismantled and removed to storage. In 1941, a (new) cyanide plant was constructed to treat concentrates from the Argonaut mill and flotation concentrates from the Plymouth Mine tailings plant and tailings from the company's Empire Mine in Plymouth. All production ceased on March 28, 1942 due to wartime limitations, however the AMRC cyanide plant continued to operate at a capacity of 500 tons. Historical records indicated the cyanide plant was dismantled in 1952.

There are several structures remaining on site including various sized concrete tanks, concrete vats and a steel framed and redwood tumbling box that was used to pre-coat tailings with coal tar (4 lbs of coal tar per ton of ore). Coal tar is similar to creosote and contains PAHs and phenols. Several of the tanks and vats contain waste materials. Arsenic concentrations in waste materials in the tanks and surface soils near the tanks were well above the action level. Base on laboratory results, the waste material in one old steel drum is likely coal tar. There are eight partially buried round concrete tanks measuring approximately 25 feet in diameter and 10 feet deep. Two of the tanks were completely filled with cyanide processing wastes. The arsenic concentrations in these tanks ranged from 200 mg/kg to 480 mg/kg. The mercury concentrations in these tanks ranged from ND to 11 mg/kg. Immediately to the west, there are four concrete vats measuring approximately 10 feet by 10 feet and an estimated 10 feet in depth. These vats contained various quantities of cyanide processing wastes. The arsenic concentrations in the two vats that were sampled were 4,900 mg/kg and 12,000 mg/kg. Two samples from the vats had mercury concentrations of 13 mg/kg and 14 mg/kg. The lead concentrations were 480 mg/kg and 750 mg/kg.

Cyanide concentrations in some samples collected from surface soils between the tanks and near the drum were above the EPA action level. The highest cyanide level in soils was 75 mg/kg located near a drum containing coal tar. The RSL for cyanide is 22 mg/kg. A waste sample collected from process piping on what appeared to be a decanting tank was tested for pH. The measured pH of the sample was 2.14. The arsenic and mercury concentrations in the waste sample were 300 mg/kg and 41 mg/kg,

respectively. These levels were significantly above the RSLs of 61 mg/kg and 10 mg/kg, respectively.

AOC-3: AOC-3 comprises approximately 48 acres. This area contains approximately 5-7 acres of grey sand tailings. This area also includes the upper earthen tailings dam, the lower earthen tailings dam, historic impound basin, and concrete dam basin. In 2008, soil sampling was conducted by URS, a contractor for DTSC. The arsenic concentrations in surface soils ranged from non-detect to 420 mg/kg. The sampling results for 34 surface soil samples indicated an average concentration of arsenic in surface soils of 131 mg/kg. The maximum arsenic concentration was 670 mg/kg at a depth of 20 feet. The lead concentrations in surface soils ranged from 6.4 mg/kg to 47 mg/kg. The maximum lead concentration was 160 mg/kg at a depth of 15 feet. URS did not analyze the soil samples for mercury. URS estimated one million cubic yards of grey sand tailings in AOC-3.

Groundwater sampling was also conducted by URS in 2008. HydroPunch groundwater samples from sonic borings were collected in four locations in AOC-3. Arsenic concentrations in groundwater from three borings ranged from 120 ug/l to 220 ug/l. The MCL for arsenic is 10 ug/l. Chromium was reported in one boring at 130 ug/l. The MCL for chromium is 50 ug/l. Nickel was reported in three borings and ranged from 150 ug/l to 400 ug/l. The MCL for nickel is 100 ug/l. Zinc was reported in all four borings and ranged from 74 to 1,200 ug/l. The MCL for zinc is 67 ug/l. The water table depths vary in response to local conditions. During wet weather, the depth to ground water is between 45 feet and 65 feet and 70 feet to below 100 feet in the dry seasons. There are no reliable large underground storage basins in the area. Pardee Reservoir on the Mokolumne River supplies water to the City of Jackson. It is about 10 miles upstream of the Site.

EPA may conduct additional soil and water sampling in this area in order to help determine whether the Site may be appropriate for listing on the National Priorities List ("NPL"). EPA does not plan to conduct removal activities in this area; however, this area may be addressed in a future response action if the Site is listed on the NPL.

Two large sink holes have developed in grey sand tailings on the near upstream side of the lower earthen tailings dam in AOC-3. The sink holes are approximately 15-20 feet deep and very unstable. Both sink holes appear to be eroding the west facing slope of the dam. Additionally, these sink holes pose a hazard to children who may play on the site. As part of the dam safety investigation, USACE is assessing the impact of these sink holes on the stability of the earthen dam.

AOC-4: The intermittent stream that flows through the 64.8 acres, the concrete multiple arched dam and the intermittent stream below the dam have been designated as AOC-4. Sediment samples collected in the intermittent stream indicate that contamination has been carried in the runoff emanating from AOC-1. In a sediment sample collected from the drainage in AOC-3, the arsenic, lead, mercury and cyanide concentrations exceeded the RSL. The arsenic, lead, mercury and cyanide concentrations

were 7,300 mg/kg, 750 mg/kg, 14 mg/kg and 23 mg/kg, respectively. The concentrations of arsenic in sediment samples collected on the downstream side of the dam were 1,400 mg/kg, 2,900 mg/kg and 4,700 mg/kg. This indicated a potential release of hazardous substances from the Site. These concentrations are well above the RSL for arsenic in soil and the California Hazardous Waste Criteria Level which is 500 mg/kg.

In a water sample collected downstream from the concrete dam at the inlet to the culvert under Argonaut Drive, the concentration of arsenic was detected at a level of 50 µg/l. This concentration was below the project-specific screening level of 150 µg/l. It should be noted that the arsenic level of 50 ug/l was five times the California MCL for drinking water of 10 µg/l. The sediment and water results suggest that impacts to groundwater or downstream surface waters are possible. It is unclear whether these contaminants have already migrated downstream to Jackson Creek. Additional assessment is planned. The water sample collected below the dam may not have been representative of water that is flushed through the tailings and released to Jackson Creek during periods of heavy rainfall and runoff. EPA is planning to return to the Site after a period of precipitation and collect water samples to characterize the release and runoff into Jackson Creek.

AOC-5: This area is located approximately 300 feet north of AOC-1. The property is comprised of two adjacent parcels owned by the same individual. The 0.39 acre is located at the corner of Pioneer Street and Argonaut Lane. Based on the sampling results there may be greater than 2,000 cubic yards of mine waste contaminated with high levels of arsenic, lead and mercury. This area is vacant land and the soils do not support vegetative growth. Argonaut High School is located approximately 1,000 feet south of AOC-5 and residential homes adjoin the property fence line on the north and east sides of the property. The property is not fenced and is an attractive nuisance to children living in the subdivision and walking to school.

The source of the surface deposits is unknown but there is a high probability the materials are ore or waste rock from the Argonaut Mine. It was common practice to use mine waste as fill for residential development in the area. The surface deposits are similar to the "middlings" material in AOC-1. The soils are generally rocky and acidic. In September 2013, EPA collected four 5-point composite surface (0"-2" bgs) and subsurface (12"-18" bgs) soil samples from two adjacent parcels. Additionally, discrete samples were collected at five locations along the fence line and drainage leading to the storm sewer to assess potential contamination of developed properties adjacent to AOC-5 and to surface waters.

The average arsenic concentration in eight surface and nine subsurface soil samples was 3,413 mg/kg and 10,040 mg/kg, respectively. The maximum arsenic concentration in surface and subsurface soil samples was 8,200 mg/kg and 25,000 mg/kg. The average lead concentration in surface and subsurface soils samples was 595 mg/kg and 1,079 mg/kg, respectively. The mercury concentration in six of nineteen soil samples was above the screening level of 10 mg/kg. The maximum mercury concentration is soil was 22 mg/kg. Two soil samples were analyzed for pH and the results were 1.3 and 2.7.

Following a period of precipitation, EPA pH-tested a pool of water with a reddish hue on the surface of the mine waste pile and it had a pH of 2. There was evidence of metal corrosion (i.e., pitting and discoloration) on sewer manhole covers and grates from contact with acidic soils and surface runoff. The high levels of arsenic, lead and mercury in samples collected along the fence line indicated contamination is likely to extend under adjacent properties to the north and east. A subsurface soil sample (12"-18" bgs) collected on an adjacent property (APN 044-071-004) had an arsenic concentration of 480 mg/kg. The surface soil sample had an arsenic concentration of 27 mg/kg. Both lead and mercury concentrations levels were below the screening levels.

AOC-6: This area borders the northeast side of AOC-1. Soil samples were collected within 25 feet of the fence line and the unpaved parking area between the fence line and the mental health clinic building. The only samples that exceeded the arsenic screening levels were surface soil samples collected approximately 10 feet and 25 feet from the fence line. The arsenic concentrations were 130 mg/kg and 150 mg/kg.

Eastwood Multiple Arch Concrete Dam (EMAD): The U.S. Army Corps of Engineers (USACE) is assisting the OSC in assessing the stability of the tailings storage dams under an Interagency Agreement. These include EMAD in AOC-4 and the lower earthen tailings dam in AOC-3. These dams were built and operated in the early 1900's. The EMAD was known to have been built in 1916. The concrete dam is approximately 46 feet high and 420 feet long. The earthen tailings dam is constructed of grey sand tailings and is approximately 60 feet high and 900 feet long. Several large, deep sink holes have developed on the upstream side of the earthen dam. These sink holes may be impacting the integrity of the dam and these holes pose a significant safety hazard to people. The USACE conducted visual inspections of the dams in July and November 2013. Based on their observations of the concrete dam, the arches appeared to be deteriorated and cracks were noticed in four of the thirteen arches and did pose structural concerns. Additionally, the concrete buttresses showed signs of concrete cracking and spalling around locations of the embedded wire ropes. The buttress braces extending between the buttress walls showed signs of significant concrete cracking, delaminating and/or spalling. Failure of a single buttress would most likely lead to failure of the dam and pose a life safety risk to businesses and people downstream and spread thousands of tons of tailings, mud and water contaminated with high levels of arsenic into populated areas below the dam.

The USACE has not completed their evaluation of the stability of the two dams. The USACE dam safety investigation will be conducted concurrently with the removal site evaluation and removal action. The final report which is due in June 2014 will provide recommendations on the repair and future analysis of the dam in the event that stability and/or seismic deficiencies are found. This removal action will not address repairs, reinforcement or replacement of existing tailings storage dams. There may be other more appropriate Federal or State agencies with responsibility for making improvements to the safety of the dams.

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

The mine wastes, including semi-processed ores, mine tailings and cyanide leaching process wastes, were observed at or near the ground surface in the waste piles, impound basin tailings dams, drainages and downstream of the concrete dam which is the lowermost containment for runoff emanating from the waste disposal areas. The mine wastes contain high levels of arsenic, lead, mercury and cyanide exceeding health-based benchmarks (*i.e.*, EPA RSLs). The mine wastes are highly acidic and corrosive to metal. High levels of arsenic, lead and mercury have been observed on adjacent properties and properties in close proximity to the Argonaut Lane mine waste area.

During mining operations, pyrite ore and waste rock from deep within the earth are deposited on the surface of the ground. These materials become exposed to air and water. The reactions of air, water and bacteria can oxidize the pyrites and produce acid mine drainage. The chemistry of oxidation of pyrites is very complex. Basically, the pyrites (iron sulfides) are oxidized to sulfates and hydrogen ions and a reaction, catalyzed by microorganisms, can contribute to the formation of sulfuric acid also known as acid mine drainage. Acid mine drainage increases the mobility of toxic heavy metals in the environment.

Rain events have cause erosion, mobilization, and migration of exposed waste materials. Storm water flows from the westernmost portion of the Site and conveys contaminants via an intermittent stream through the Site and is eventually impounded behind the EMAD. Runoff contaminated with heavy metals is released through holes and cracks in the concrete dam or overflow the top of the dam during rain events. Sediments downstream of the concrete dam are contaminated with high levels of arsenic. Due to drought conditions, EPA has been unable to collect water samples from the runoff but will do so during the next rain event. Additionally, the Pioneer Street mine waste area is exposed and unfenced. The soils are California regulated hazardous waste due to toxicity (Arsenic > 500 mg/kg) and corrosivity (ph $\leq$ 2), respectively. Five measurements of surface water runoff from this area by Amador County Environmental Health Department (ACEHD) and one measurement by EPA revealed a pH of between 1 and 2. The most highly contaminated soil surface areas are in AOC-1 and AOC-5 which are comprised of exposed fine grained materials which can easily become airborne during windy conditions and migrate off-site.

5. NPL status

This Site is not on the National Priorities List (NPL). In 2013, the EPA Brownfields and Site Assessment Section commenced a PASI at the Argonaut Mine Site for the purpose of scoring the site for potential listing on the NPL. The Argonaut Lane and Pioneer Street mine waste areas (known collectively as the Argonaut Mine Tailings Site) may be considered operational units of the larger Argonaut Mine Site. The Argonaut Mine Site also includes the mine shaft and head frame, stamp mill and buildings that housed the ore separators, concentrators, and mercury amalgamation

processing and retort areas. Additionally, the Argonaut Mine Site includes waste rock and tailings piles on both east and west sides Highway 49 and drainages on the east side of the highway. The boundaries of the Site have not been fully delineated.

B. Other Actions to Date

On November 13, 2013, the OSC exercised his Warrant authority to erect a fence to restrict access to the top of the concrete dam from Argonaut Drive. A fence was needed to prevent children from walking on top of the dam and being exposed to contaminated soils and water in the basin behind the dam. The ERRS contractor subcontracted ERRG to construct a 3-strand barbed wire fence with metal t-posts and post a warning sign. The work was completed on November 14, 2013. The Action Memo to document the decision to initiate the emergency action was dated December 5, 2013 and signed by OSC Shane on December 30, 2013

C. State and Local Authorities' Roles

1. State and local actions to date

The Cal-EPA, Department of Toxics Substances Control (DTSC) was the lead agency for the Site since 1992. Sampling conducted by DTSC in 1993 and 2006 revealed extensive arsenic contamination. In some locations, the soil was so corrosive it had eaten through metal fence posts causing a portion of the fence to fall over. DTSC fenced the Site after the PRP failed to comply with a fence and post order. In 1998, DTSC submitted a Preliminary Assessment (PA) report to EPA. The PA report recommended that a Site Investigation (SI) be completed and a HRS scoring package be prepared for the Site.

In 2002, a consultant for the owner of the property in AOC-5 collected soil samples for the Amador County Health Department (ACHD) for the purpose of obtaining a permit for residential development. The maximum concentration of arsenic was 1,300 mg/kg. In 2003, ACHD, in response to a citizen complaint, measured the pH of drainage emanating from the property and bodies of standing water. All five pH readings were between pH 1 and 2. In 2007, DTSC notified the PRP of an Imminent and/or Substantial Endangerment Determination. In 2008, DTSC's contractor, URS Corporation (URS), performed site investigation activities which consisted of drilling, soil sampling, and ground water sampling. A total of 80 borings and 151 soil samples were collected from AOC-1 through AOC-3. The maximum concentration of arsenic was 39,000 mg/kg from a surface soil sample in AOC-1. The maximum concentration of arsenic in the other areas of concern was 670 mg/kg from a boring at a depth of 20 feet in AOC-3. The maximum arsenic concentration detected in the groundwater was 220 ug/l. The depth to groundwater on the site is unknown, but is estimated to range from 45 feet to 100 feet bgs.

In March 2009, URS submitted to DTSC the "Argonaut Mine Tailings Site, Site Investigation Report". The report summarized the results of the SI conducted in 1993. In

May 2011, URS developed a draft Removal Action Work Plan (RAW). The plan proposed to consolidate the tailings on site, neutralize the acidic soils with lime, install a cover of clean fill, and plant with native grasses to hold the fill in place. DTSC did not have sufficient funding to implement the RAW. In December 2011, DTSC requested EPA take the lead agency role for the site during an interagency mine group meeting. On August 26, 2013, the California Department of Toxic Substances Control officially requested assistance from EPA to conduct a removal action at the Site, including the Argonaut Lane mine waste area (parcel numbers: 44-010-074-00, 44-010-082-00, 44-010-083-00, 44-010-084-00 and 44-010-100-00) and the Pioneer Street mine waste area (parcel numbers: 044-071-002, 044-071-003).

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Current Site conditions pose the threat of potential future releases of hazardous substances. These substances include arsenic, lead, mercury and cyanide present within mine waste, contaminated soils and sediments. In addition, the migration of contaminated mine waste into the surrounding community poses threats to human health or welfare or the environment. The likelihood of direct human exposure, via ingestion and/or inhalation of hazardous substances, and the threat of potential future releases and migration of those substances, may pose an imminent and substantial endangerment to public health, and/or welfare, or the environment based on the factors set forth in the NCP, 40 C.F.R. § 300.415(b)(2). These factors include:

1. Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations or the food chain

High concentrations of heavy metals, including but not limited to arsenic, lead and mercury have been detected in samples of semi-processed ore, mine tailings, cyanide processing waste, soil and sediments. Analytical results indicate that concentrations of heavy metals identified in these media exceed background, EPA RSLs and California's hazardous waste criteria. Much of the contaminated material is very fine-grained and therefore likely to result in human exposure via inhalation or ingestion. Mine wastes containing documented hazardous substances may be entrained in naturally and mechanically generated dust and transported by water, by wind or on the shoes and/or clothing of persons passing over the Site.

Inorganic arsenic toxic effects of concern are related to heart and blood vessels (cardio vascular) stomach and intestines (gastrointestinal) kidney effects, liver, nerves and nervous system, lungs, reproductive, respiratory, blood and blood forming organs, and skin (dermal). Arsenic exposure also increases a person's risk to develop lung, skin, bladder, breast, prostate, kidney and liver cancer. In December 2013, for the first time, findings by the University of California (UC) Berkeley Superfund Research Program (SRP) provided strong evidence in humans that ingested arsenic in drinking water causes cancer in specific kidney and ureter cells, called transitional cells. Other recent findings

from the group suggest that people exposed to both arsenic and other known or suspected carcinogens have very high risks of lung or bladder cancer.

Lead has its predominate effects on the central nervous system in adults and children. Once absorbed by the body, lead can be stored for some time in teeth and bones. Lead can be released from these storage sites and enter the blood stream particularity when there is a lack of calcium in the body (e.g. pregnancy and osteoporosis). Generally, lead can cause problems in bones, blood kidney and the brain. High lead concentrations can have an effect on children's normal growth and mental development causing learning difficulties and mental impairment. In adults, lead exposure can increase blood pressure, digestive problems, anemia, weakness in fingers, wrists and ankles, nervous system problems and impaired memory/concentration.

Inorganic mercury salts are toxic to many organs, primarily the kidneys. Both metallic mercury vapor and methyl- and dimethyl-mercury affect the central nervous system. Pregnant women, the developing fetus, and children are the most vulnerable to mercury neurologic effects.

The mine waste areas are readily accessible to nearby part-time and/or full-time residents and other persons that live or visit in the area. The Site is in the center of burgeoning residential area and is directly adjacent to a well-traveled road (Argonaut Lane). At least 50 residences are located within 200 feet of the Site. Persons living in close proximity to the mine waste areas are likely to come into contact with uncontrolled hazardous substances, especially the Pioneer Street mine waste area which is unfenced. The Argonaut Lane mine waste area is mostly fenced but there are areas that are unfenced in the eastern boundaries parts of the Site. EPA and DTSC have observed evidence of children and others playing on the Site, including dirt bike tracks, motorized vehicles, footprints, soda bottles and golf balls.

According to a DTSC report, two children playing on Site years ago reportedly suffocated while tunneling into the grey sand tailings or in a sink hole that caved in on them. The exact location is unknown but it is believed to be in the area of the lower earthen tailings dam.

2. Actual or potential contamination of drinking water supplies or sensitive ecosystems

In 2008, URS collected groundwater samples from several borings. Arsenic, chromium, nickel and zinc exceeded the MCL in several of the ground water samples. There are no reported municipal wells or private wells in the area being used as a drinking water supply. The City of Jackson's purchases treated water from the Amador Water Agency. The water comes directly from the Mokelumne River. Contaminated runoff from the mine waste areas flows to Jackson Creek, which eventually flows to Lake Amador. Lake Amador is not currently used as a drinking water source; however, it is a popular recreational fishing resort and is stocked with fish from its own hatchery.

Two wetlands, identified by the FWS National Wetlands Inventory, are located in the area behind the lower earthen tailings dam and the concrete dam. Habitats for threatened or endangered species are present in Jackson Creek, which is located approximately 400 yards downstream of EMAD. The species include the Foothill Yellow Legged Frog (California Rare and Endangered, observed), Western Pond Turtle (same as previous), and the California Red-Legged Frog (Federally Threatened and Endangered, habitat). The removal action should not adversely affect the habitats of these species. The removal action may improve the water quality within the habitats of these animals by significantly reducing the contaminant levels in the runoff from the Site.

3. Hazardous substances or pollutants or contaminants in drums, barrels, tanks or other bulk storage containers that may pose a threat of release

The former cyanide plant area has numerous concrete tanks and vats of various sizes and construction. The arsenic concentrations in the two of the four vats that were sampled ranged from 4,900 mg/kg to 12,000 mg/kg. Two samples from the vats had mercury concentrations of 13 mg/kg and 14 mg/kg. The lead concentrations ranged from 480 mg/kg to 750 mg/kg. There are also several very old steel drums in this area. One drum was sampled for the presence of coal tar and the lab results indicated the material inside the drum was contaminated with polycyclic aromatic hydrocarbons (PAHs) which verified the presence of coal tar (which was routinely used in the gold purification process) in the drum. Several of the PAHs are harmful to human health from inhalation of fumes, ingestion, and long periods of skin contact and are known animal carcinogens.

4. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released

Analytical results from sediment analysis in the drainage suggest that mine wastes are being transported by runoff from the semi-processed ore pile to the concrete dam located in AOC-4. Analytical results from sediment downstream of the concrete dam suggest that contaminants are being released from the basin behind the dam. During periods of heavy rainfall, water flows through cracks and openings in the dam structure and washes into an intermittent tributary to Jackson Creek approximately 400 yards downstream. DTSC has observed water cascading over the top of the dam during a strong storm event. The culvert under Argonaut Drive is under-sized and water ponds in a large and deep ravine. Residents have observed water overtopping the ravine and flowing onto Argonaut Drive.

Wind erosion also may result in migration of hazardous substances. The mine waste areas are fully exposed to wind. Fine-grained materials containing arsenic, lead and mercury may be transported from the site and deposited on roads and on residential properties.

5. Threat of fire or explosion

There is no threat of explosion at the Site; however, wildfires are a common occurrence in the region. A nearby fire might exacerbate conditions at the Site. Wildfires may destroy nearby vegetation leading to increased runoff impacts. Higher erosion rates would increase the likelihood of tailings deposition into surface water bodies or onto surfaces where persons may more easily come into contact with metals contamination. Furthermore, vegetative loss in the area may also increase the likelihood of wind erosion and off-site deposition, thereby increasing the likelihood of exposure.

6. Availability of other appropriate federal or State response mechanisms to respond to the release

The State of California is unable to respond to the release due to insufficient funds to carry out a removal action. In August 2013, DTSC officially requested EPA assistance in conducting a removal action at the Argonaut Lane mine waste area and the Pioneer Street mine waste area.

IV. ENDANGERMENT DETERMINATION

Actual and threatened releases of hazardous substances from this Site, if not addressed by implementing a Time-Critical Removal Action may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. EXEMPTION FROM STATUTORY LIMITS

Section 104(c) of CERCLA generally restricts Federal lead removal actions to a total direct cost of $2 million and 12-month duration per 42 U.S.C. § 9604(c)(1). Pursuant to Section 104(c) (1) (A) of CERCLA and 40 C.F.R. § 300.415(b) (5) (i), application of the emergency exemption is appropriate when: 1) there is an immediate risk to public health or welfare or the environment; 2) the response action is immediately required to prevent, limit, or mitigate an emergency; and 3) such assistance will not otherwise be provided on a timely basis. These criterions have been adequately addressed in this Action Memo to support an exemption from the statutory spending limit of $2 million. Criterions 1 and 2 are addressed in Section II.A. (4), and Section III. (1-5). The Criterion 3 is addressed in Section III. (6). The project may be completed in several phases with each requiring a separate mobilization based on available funds at the time.

VI. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

EPA proposes to mitigate threats to human health, welfare, or the environment by taking steps to reduce potential or actual risks to human and ecological receptors from

contamination in semi-processed ores, mine tailings, soils, sediment, process waste, and mine influenced water (MIW). The primary objectives of the removal action will be to consolidate highly contaminated mine waste from several areas of the Site, including the Pioneer Street mine waste area, and construct a repository and evapo-transpiration cover on 5-acres of land (AOC-1) which is a portion of the 64.8 acre Argonaut Lane mine waste area. The repository will prevent direct human exposure to contaminants and eliminate contaminated runoff from the most highly contaminated area. Groundwater protection will be enhanced because rainwater that infiltrates through the cover during the winter will be stored in the sand and mulch layer until it is transpired by plants during the summer.

Construction of the repository will involve grading the mine waste in AOC-1 to conform to the natural topography. The following waste materials will be excavated, transported and consolidated with existing mine waste materials in AOC-1 and used to fill in low spots:

1) Process waste from the cyanide plant (AOC-2) – Approx. 60 cubic yards;
2) Contaminated sediments below the concrete dam (AOC-4) - Approx. 330 cubic yards;
3) Mine tailings from the Pioneer Street mine waste area (AOC-5) – Approx. 2,000 cubic yards;
4) Contaminated soils from an adjacent property (AOC-6) – Approx 300 cubic yards.

The excavations will be backfilled with clean soil, graded for proper drainage, and hydro-seeded. Once the final grade in AOC-1 is completed, the cover will be constructed in a series of lifts on top of the mine waste cell and will include the following:

1) Imported gravel – Approx. 4,000 cubic yards
2) On-site grey sand tailings – 8,100 cubic yards
3) Imported clean soil (12 "compacted) – 8,000 cubic yards
4) Imported clean soil (12 " non-compacted) – 8,000 cubic yards

The following additional actions will be taken to meet the project objectives:

1) Prior to the construction of the cover, a drainage swale will be constructed that will be approximately 600 feet long and 12 feet wide to divert surface water runoff away from the engineered cell. Concrete cloth and rock rip rap will be used in the construction of the drainage swale;
2) The grey sand tailings and imported clean fill will be amended with 10% by weight Class A, Exceptional Quality (EQ), Composted Biosolids (Approx. 1,500 cubic yards);
3) Erosion control measures (i.e., fiber rolls) will be installed and the final surface will be hydro-seeded with blown fertilizer mixture containing straw, mulch, seed, and tackifier;

4) Process wastes with high levels of arsenic, lead and mercury will be excavated from four large concrete vats in AOC-2 and transported to AOC-1;
5) Soils contaminated with high levels of arsenic, lead, mercury and cyanide in the vicinity of the cyanide tank structures in AOC-2 will be excavated and transported to AOC-1. A fence and locking gate will be installed around the structures to prevent exposure to wastes in the tanks. Because of the risk of damaging potentially historic structures, no attempt will be made to decontaminate the tanks. The levels of arsenic, lead and mercury in process wastes inside the tanks are similar to the levels found in AOC-3;
6) The large sink holes on the upstream side of the lower earthen tailings dam will be backfilled with surrounding tailings and soil in the historic impound area. The wetlands will be roped off to prevent heavy equipment from entering the area.

2. Contribution to remedial performance

The long-term cleanup plan for the Site:

There is currently no long-term cleanup plan for this Site. There is currently an on-going PASI.

Threats that will require attention prior to the start of a long-term cleanup:

In November 2013, the OSC used his delegated warrant authority to install a fence and post a danger sign to prevent public access to the top of the 46 foot high dam and contaminated tailings in the basin behind the dam.

The extent to which the removal will ensure that threats are adequately abated:

It is expected that this removal action will substantially reduce any threat of direct or indirect contact with or inhalation of hazardous substances at the Site. Additionally, the removal action should decrease loading of contaminants into the Jackson Creek watershed.

Consistency with the long-term remedy:

Concurrently with this removal action, the Site Assessment Manager (SAM), Brownfields and Site Assessment (B&SA) Section, is conducting a PASI to score the site for potential listing on the NPL. The OSC is closely coordinating the removal site evaluation and proposed removal action to mitigate the most immediate threats with the SAM. The proposed removal action should not affect the long term remediation of the Site. This removal action would mitigate the most immediate threats which exist in several areas within the 64.8 acre, the Argonaut Lane mine waste area and the Pioneer Street mine waste area. Additionally, the hazards posed by soil contamination on the mental health clinic property that was impacted by mine waste, and contaminated sediments from past releases below the concrete dam will be mitigated. The public has easy access to both of these areas. The removal action will not address other areas of the

site including the grey sand tailings pile area, historic impound area and concrete dam basin. These areas will be investigated as part of the PASI.

3. Description of alternative technologies

The use of Class A EQ Biosolids is considered to be an alternative technology. Biosolids consist of composted municipal sewage sludge and green waste. Biosolids may be used as an amendment to condition the soil and add nutrients for plant growth. Biosolids can be used to capture and bind metals within the soil structure, thereby decreasing human and eco-toxicity. Research conducted by the EPA, the USDA and others have shown that this technology is feasible and cost-effective and can significantly reduce high concentrations of bio-available metals in soil. Class A EQ Biosolids meet strict standards for chemicals and pathogens and is marketed to the public for use as soil amendment and fertilizer.

4. Applicable or relevant and appropriate requirements (ARARs)

Section 300.415(j) of the NCP provides that removal actions must attain ARARs to the extent practicable, considering the exigencies of the situation.

Section 300.5 of the NCP defines applicable requirements as cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site.

Federal cleanup standards will be based upon the EPA RSL's (May 2013) for arsenic, lead, mercury and cyanide in residential soil, or may be based upon a comparison to background concentrations in the immediate vicinity of the Site. For arsenic, EPA has tentatively calculated a risk screening level of 61 mg/kg in residential soil at this Site. This level is based on an arsenic bioavailability of 60%. EPA considers this level to be protective of health for persons exposed to soils for many decades. Additionally, groundwater contaminant concentrations were compared with the Maximum Contaminant Levels (MCLs) under the National Primary Drinking Water Regulations, May 2009.

Section 300.5 of the NCP defines relevant and appropriate requirements as cleanup standards, standards of control and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular site.

Because CERCLA on-site response actions do not require permitting, only substantive requirements are considered as possible ARARs. Administrative

requirements such as approval of, or consultation with administrative bodies, issuance of permits, documentation, reporting, record-keeping, and enforcement are not ARARs for the CERCLA actions confined to the site.

The following ARARs have been identified for the proposed response action. All can be attained.

Federal ARARs:

Clean Water Act: Controls the discharge of pollutants to surface waters of the United States. EPA will protect against discharge of pollutants to Jackson Creek during excavation and removal of contaminated mine waste and soils by implementing standard storm water controls. Excavation will occur only during dry weather conditions where there is little risk of free flowing water escaping the excavation.

National Historic Preservation Action: Provisions under the NHPA Section 106 are meant to protect historic properties from damage during removal actions. The OSC has a qualified Historic Specialist under contract from the Anthropological Services Center at Sonoma State University (ASC) to assist EPA in the notification process, cultural resources inventory, and preparing a report on potential eligibility of the property for inclusion in the National Register of Historic Places. Consultation with the State Historic Preservation Officer (SHPO) has been initiated and the proposed removal action includes elements suggested by the SHPO. Consultation with tribes and other interested parties has also been initiated. Should EPA determine that any adverse effects might occur as a result of, or during, the removal action, EPA, with assistance from ASC, will prepare the appropriate agreement document outlining steps to mitigate the impacts and submit it to the SHPO and the Advisory Council on Historic Preservation for concurrence.

Endangered Species Act: Provisions under the ESA are meant to protect rare and endangered species and their habitat from harm during the removal actions. The OSC is coordinating this effort with the EPA Regional Ecologist. See Section III, (2) for a description of threatened and endangered species.

State ARARs:

Environmental Screening Levels: EPA may consider the following screening levels to determine if further actions are needed to mitigate threats to public health, welfare or the environment:

- California Human Health Screening Levels (CHHSLs) for residential soil, January 2005
- Central Valley Regional Water Quality Control Board, Water Quality Objectives, Jackson Creek, Freshwater Aquatic Life, May 31, 2013
- California Toxics Rule, State Water Quality Standards, May 18, 2000

5. Project schedule

The project is scheduled to begin on August 18, 2014. The start-up date is estimated pending available funding. It is estimated that removal activities will take approximately 8 weeks to complete. All or part of the hydro-seeding may be delayed until the spring of 2015 to take advantage of optimum conditions for seed germination. Additional work may be required if re-vegetation and/or other erosion controls are not immediately successful or are compromised due to extreme weather.

B. Estimated Costs

Regional Removal Allowance Costs:

Total Cleanup Contractor Costs	$ 1,806,000.00

Other Extramural Costs Not Funded from the Regional Allowance:

START Contractor Costs	$ 150,000.00
USCG PST Costs	30,000.00
ERT Costs	20,000.00
Subtotal Extramural Costs	$ 2,006,000.00
Extramural Costs Contingency (20%)	401,200.00
TOTAL, Removal Action Project Ceiling	$ 2,407,200.00

In addition to the extramural costs estimated for the proposed action, a cost recovery enforcement action also may recover the following intramural costs:

Intramural Costs

U.S. EPA Direct Costs	$ 50,000.00
U.S. EPA Indirect Costs (45.79%)	$ 1,152,256.00

(45.79% of 2,407,200 + 50,000)

TOTAL Intramural Costs	$ 1,202,256.00

The total U.S. EPA extramural and intramural costs for this removal action, based on full-cost accounting practices that will be eligible for cost recovery, are estimated to be $3,609,456.00.

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the site conditions, the nature of the hazardous substances documented on site, and the potential exposure pathways to nearby populations described in Sections III and IV above, actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response actions selected in this memorandum, may continue to present an imminent and substantial endangerment to public health, or welfare, or the environment.

VIII. OUTSTANDING POLICY ISSUES

There is no outstanding policy issues with the Site identified at this time.

IX. ENFORCEMENT

Please see the Confidential Enforcement Addendum for a discussion regarding enforcement against potentially responsible parties (provided as a separate document).

X. RECOMMENDATION

This decision document represents the proposed removal action for the Argonaut Mine Tailings Site, in the City of Jackson, Amador County, California, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the Site.

Because conditions at the Site meet the NCP criteria for a time-critical removal Action, EPA enforcement staff recommends that you approve selection of the removal action proposed in this memorandum.

The total project ceiling if approved will be $2,407,200.00, of which an estimated $1,806,000 comes from the Regional Removal Allowance. Your approval or disapproval may be indicated by signing on the appropriate line below.

Approve: _____ for DM Date: 5/15/14
Daniel Meer, Assistant Director
Superfund

Disapprove: _____ Date: _____
Daniel Meer, Assistant Director
Superfund

The Enforcement Addendum is provided as a separate document.

Attachments:

1. Index to the Administrative Record
2. Photograph Log

Sherry Fielding, USEPA, OERR, HQ
Pat Port, OEPC, U.S. Department of Interior
Charles Ridenour, Chief, Brownfields & Environmental Restoration Protection Branch, California Department of Toxics Substances Control
H. Allen, Chief, Emergency Response Section, SFD-9-2
L. Williams, Office of Regional Counsel, ORC-3
K. Muratore, Civil Investigator, SFD-7-5
C. Temple, SFD-9-2
Site File

ATTACHMENT I
INDEX TO THE ADMINISTRATIVE RECORD

1) Hazardous Waste Surveillance and Enforcement Report, Argonaut Lane Tailings, Argonaut Heights, California Department of Health Services, August 28, 1987
2) Cleanup and Abatement Order No. 90-722, Argonaut Heights Tailings, California Regional Water Quality Control Board, September 27, 1990
3) Site Visit Report, Argonaut Mine Tailings Site, Daniel Ziarkowski, April 14, 1993
4) Preliminary Assessment Report, Argonaut Mine Tailings (Pioneer Mine), Prepared by DTSC for EPA, October 15,1998
5) Proposed Grading and Development, Lots 30 and 31, Argonaut Heights, Jackson (APN 044-071-002, 044-071-003), Letter from Robert Fourt, Registered Environmental Health Specialist, Environmental Health Department, Land Use Agency, Amador County to Larry White, Chief Building Official, City of Jackson, January 28, 2003
6) Argonaut Mine Tailings Site, Site Investigation Report (draft), Prepared by URS Corporation for DTSC, March 1, 2009
7) Interim Soil Removal Action Work Plan, Argonaut Mine Tailings Site, Jackson, Prepared by URS Corporation for DTSC, 2011
8) Memo: Argonaut Multiple Arch Dam (7/9/13 inspection), U.S. Army Corps of Engineers, July 23, 2013
9) Sampling and Analysis Plan, Argonaut Mine Tailings Pile Assessment, Jackson, CA, Prepared by START Contractor for EPA, July, 2013
10) Memo: Argonaut Mine Tailings Storage Dam – Initial Inspection on 7/9/13, U.S. Army Corps of Engineers, July 30, 2013
11) Letter from DTSC to EPA requesting a Federal removal action at the Argonaut Lane and Pioneer Street mine waste areas, August 26, 2013
12) Memo: Argonaut Tailings Storage Dam – 2nd inspection on 11/15/13, U.S. Army Corps of Engineers, November 19, 2013
13) Sampling and Analysis Plan (draft), Prepared by Weston, Inc. for EPA's Preliminary Assessment/Site Inspection (PASI), November, 2013
14) Tailings Pile Removal Assessment Report, Prepared by START Contractor for EPA, December 1, 2013
15) Action Memo: Documents decision to initiate emergency response action to fence off access to top of dam and basin, Dan Shane, On-Scene Coordinator, December 30, 2013, for actions taken on 11/13-11/14
16) Argonaut Mine Releasable Chronology, Kim Muratore, EPA, January 28, 2014
17) Tailings Pile Removal Assessment Report (AOC-5), Prepared by START Contractor for EPA, January, 2014
18) Pollution Report One & Final, Prepared by Dan Shane, On-Scene Coordinator, U.S. EPA, dated February 2, 2014, for emergency response actions taken on 11/13-11/14
19) Removal Assessment Addendum Report; Argonaut Mine Tailings Pile AOCs 1,2,4 and 6; Jackson, Amador county, CA, prepared by START Contractor for EPA, February 13, 2014

Note: Records 6, 8, 10, 12, 14, and 18 are in the Administrative Record for the previous emergency response actions taken on 11/13-11/14 (see records 15 and 18).

ATTACHMENT II
PHOTOGRAPH LOG

Runoff from 64.8 acre mine waste area was observed cascading over the Eastwood Multiple Arch Concrete Dam following a large Storm Event. The ravine below the dam became a large lake (photo taken by DTSC).

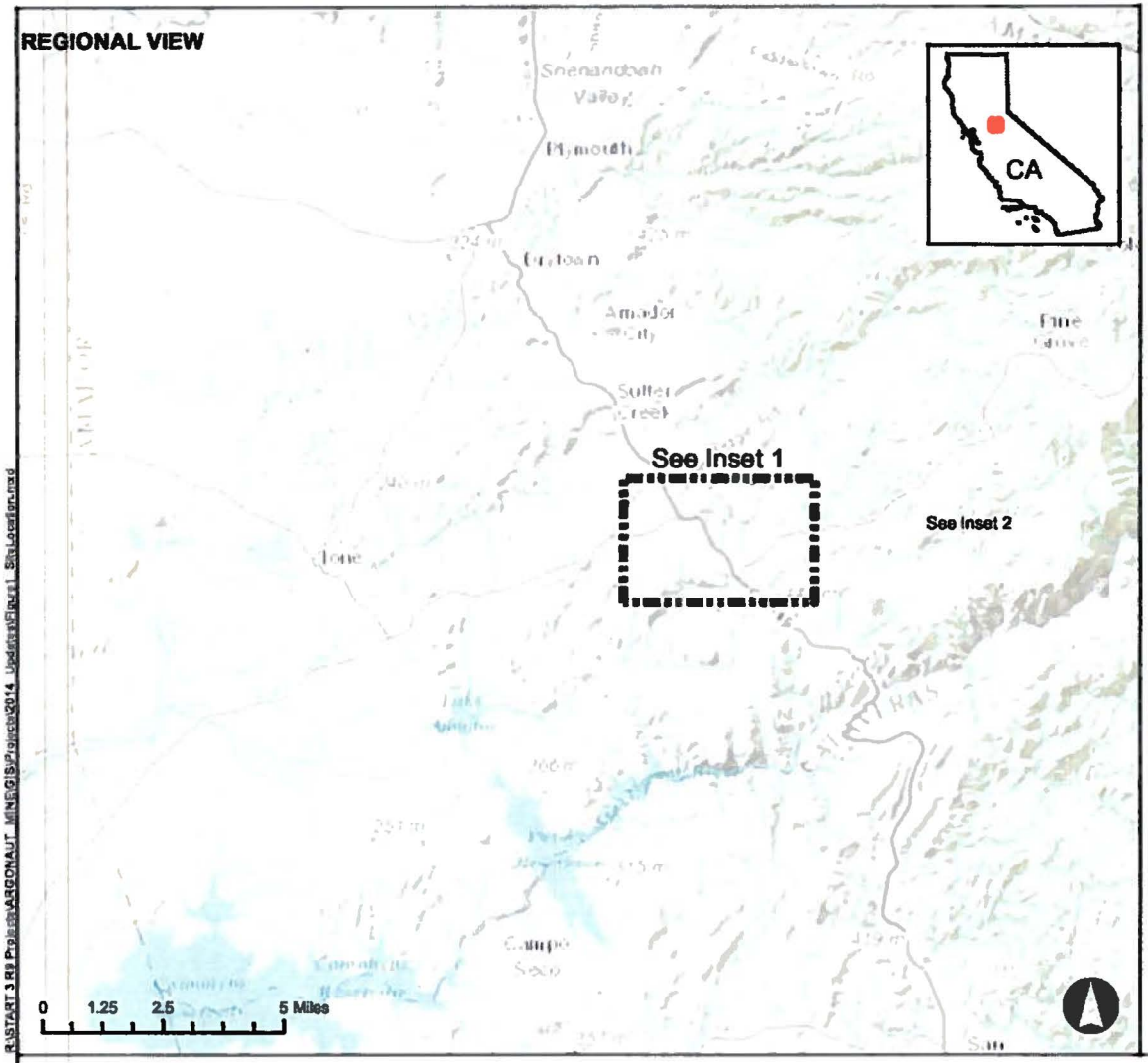
View of 5-acre area used to stockpile semi-processed ore or "middlings". The fenced area is mostly barren and nearly devoid of vegetation.

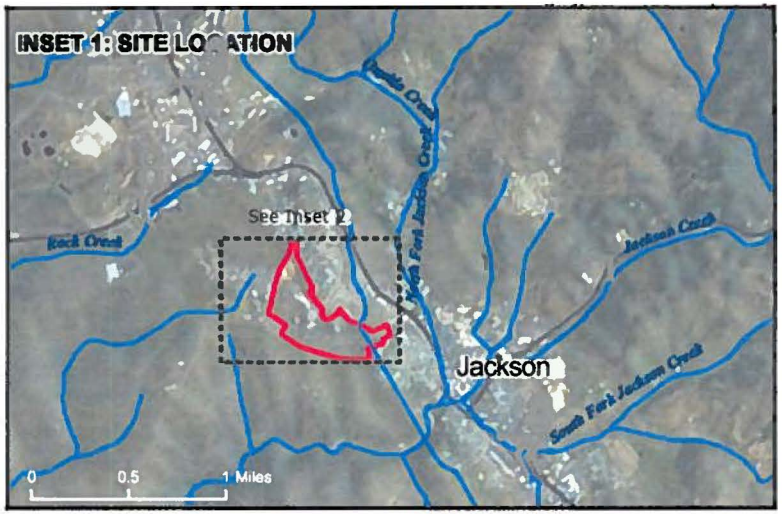
View of coal tar tumbling box located at the former Amador Metals Reduction (Cyanide) Plant used to coat the ore prior to cyanidation

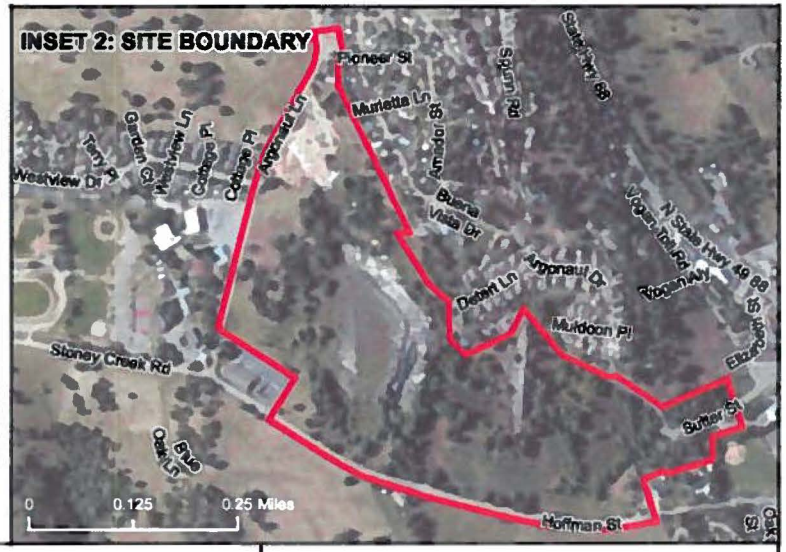
View of cyanide leaching, mixing and flotation tanks at the former cyanide plant

View of Pioneer Street Mine Waste Area at the corner of Argonaut Lane and Pioneer Street. The area is unfenced, near homes and Argonaut High School. .

View of the Eastwood Multiple Arch Dam facing south. The dam was built in 1916 and is approximately 46 feet high and 420 feet long with 13 inverted arches.







LEGEND

- Topographical Survey Boundary
- Rivers
- Major Roads

Figure 1

Site Location Map
Argonaut Mine Tailings Pile

Jackson, California

TDD #: TO-02-09-13-01-0004, PAN #: EE-002693-2213

Source: ESRI World Imagery, World Street Map

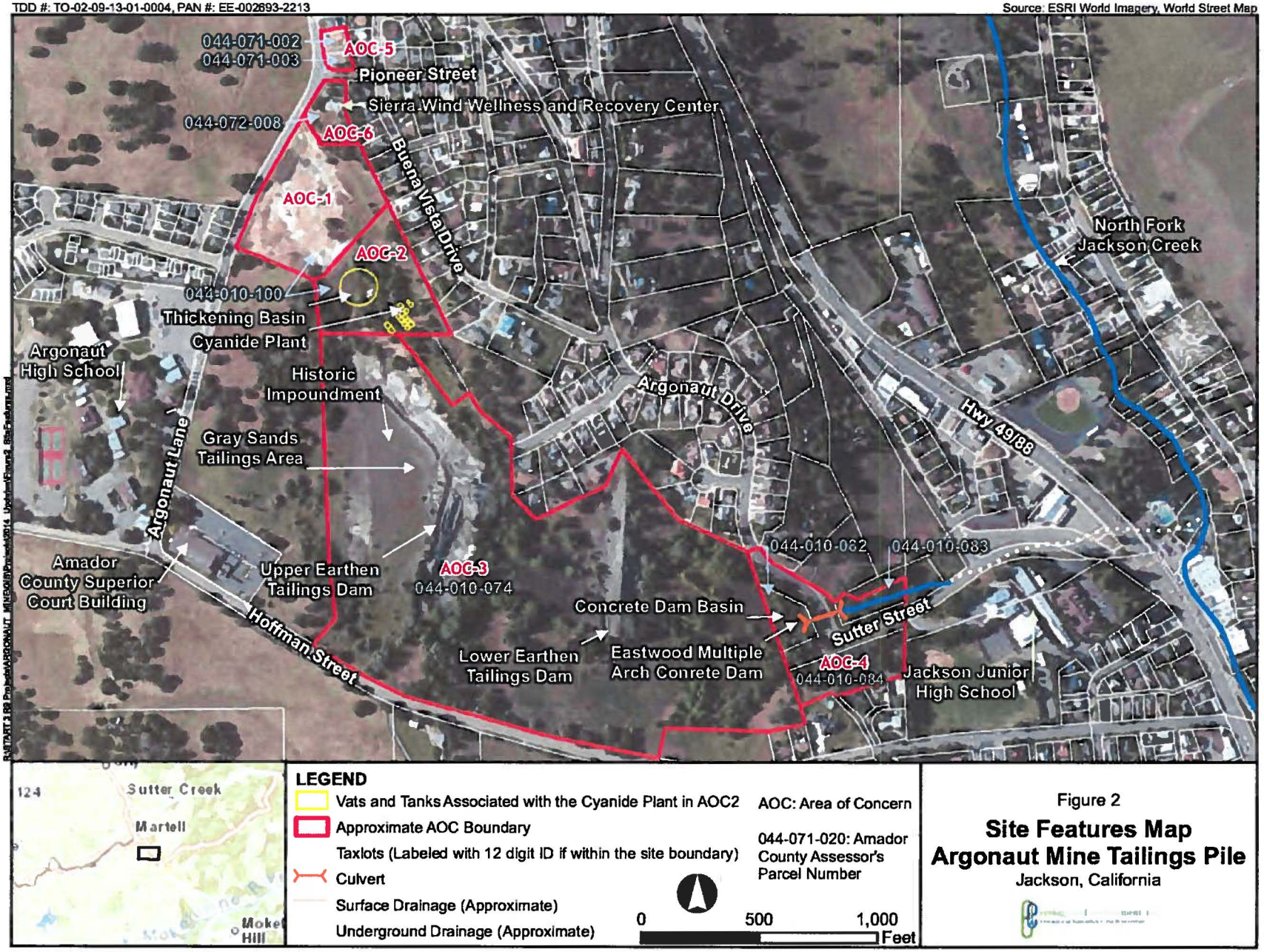


Figure 2

Site Features Map
Argonaut Mine Tailings Pile
Jackson, California