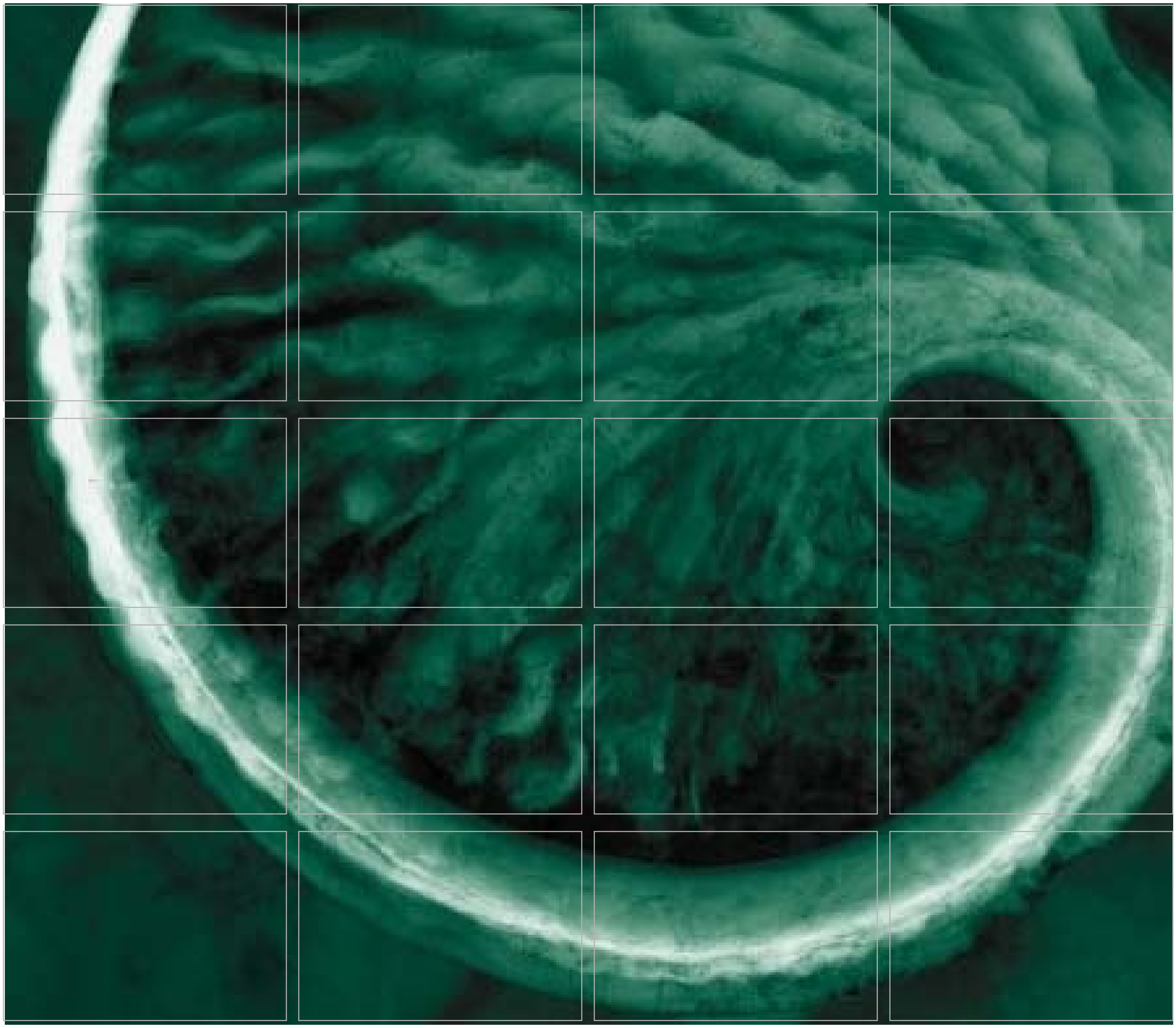

Mining-Related Materials Characterization and Remediation Work Plan

Submitted to:

Regional Water Quality Control Board –
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114

Sulphur Creek Mining District
Central Group and Wide Awake Mines
Colusa County, California

September 2010

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Homestake Mining Company of California

Mining-Related Materials Characterization and Remediation Work Plan

Sulphur Creek Mining District
Central Group and Wide Awake Mines
Colusa County, California

September 2010

Project No. 116443.03

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PROFESSIONAL GEOLOGIST CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Jim Warner

Printed Name of Registered Professional Geologist

Jim Warner

Signature

5314

Registration Number

California

State

30 September 2010

Date

Professional Geologist's Seal

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BMP	Best Management Practice
°C	degree Celsius
CalWET	California Waste Extraction Test
CEQA	California Environmental Quality Act
CNDDB	California Department of Fish and Game Natural Diversity Database
CSM	conceptual site model
CVRWQCB	Central Valley Regional Water Quality Control Board
cy	cubic yard
District	Sulphur Creek Mining District
EE/CA	Engineering Evaluation and Cost Analysis
ERM	Environmental Resources Management / ERM-West, Inc.
°F	degree Fahrenheit
GPS	global positioning system
HASP	Health and Safety Plan
Homestake	Homestake Mining Company of California
mg/kg	milligrams per kilogram
Orders	Technical and Monitoring Report Orders R5-2010-0048 and R5-2010-0049
RCRA	Resource Conservation and Recovery Act
RUSLE2	Revised Universal Soil Loss Equation
SAP	Sampling and Analysis Plan
STLC	Soluble Threshold Limit Concentration
Site	Wide Awake Mine and mines within the Central Mine Group
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
U.S.	United States
USBM	United States Bureau of Mines
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
Work Plan	Mining-Related Materials Removal Work Plan for the Wide Awake Mine and Mines within the Central Mine Group

1.0 INTRODUCTION

On 27 May 2010, the Central Valley Regional Water Quality Control Board (CVRWQCB) issued Technical and Monitoring Report Orders R5-2010-0048 and R5-2010-0049 (Orders), which require the submittal of a Mining Waste Characterization Work Plan (Characterization Plan) and a Mining Waste Characterization Report (Characterization Report) for the Wide Awake Mine and five mines within the Central Mine Group (Central, Cherry Hill, Empire, Manzanita, and West End). The Orders were issued by the CVRWQCB based on provisions of California Water Code Section 13267. The six mines addressed by the Orders are located within the Sulphur Creek Mining District (the District), and for purposes of this document, these six mines, including adjacent land, are collectively referred to as "the Site".[1]

The Orders were issued to several Potentially Responsible Parties, including Homestake Mining Company of California (Homestake), which are referred to as Dischargers in the Orders. The CVRWQCB has recognized that Homestake did not engage in any of the mining activities that resulted in the mining materials that are being addressed by the Orders.

ERM-West, Inc. (ERM) has prepared this Mining-Related Materials Characterization and Remediation Work Plan (Work Plan), on behalf of Homestake, to describe the following:

- Site background;
- Characterization of the mining-related materials to be removed;
- A proposed mining-related materials removal scope of work;
- The removal design, methods, and procedures; and
- Proposed schedule.

The CVRWQCB has acknowledged that this Work Plan meets Homestake's requirements for both the Characterization Plan and Characterization Report required under the Orders (CVRWQCB, 2010a).

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1 The Site includes a cumulative area of about 465 acres within the Sulphur Creek watershed in Colusa County, and is located in Sections 28 and 29, Township 14 North, Range 5 West, Mount Diablo Base and Meridian. The specific parcel numbers included within the Site are listed on the Orders.

Although the Orders include additional characterization and reporting requirements, the CVRWQCB agreed that Homestake's obligation is limited to the remediation of the surface mining-related materials. Additional characterization actions, if required, and other inspection and maintenance activities after Year 1 (e.g., constructed erosion control measures and revegetation plan) shall be the responsibility of other Dischargers identified by CVRWQCB. Post Year 1 inspection and maintenance activities are proposed in this Work Plan; however, final plans would be agreed upon by CVRWQCB and identified Dischargers.

1.1 PROJECT OBJECTIVES

The objective of the removal activities described in this Work Plan is to mitigate the migration of particulate material potentially containing mercury from mining-related materials (e.g., waste rock, tailings, and mining equipment) associated with the Site that are potential sources of mercury to Sulphur Creek. This would be accomplished by removing mining-related equipment where necessary and removal and/or stabilizing other mining-related materials (i.e., waste rock, tailings, stockpiled ore, and shallow mercury-enriched soils) that are present in the vicinity of former mercury processing areas (retorts, furnaces, kilns). During execution of the reclamation activities, environmental and health and safety controls would be implemented to ensure the work is completed safely and in accordance with applicable federal, state, and local regulations and permit conditions.

1.2 GENERAL PROJECT APPROACH

The project, as outlined, includes planning, design, permitting, bid specifications, contractor selection, and oversight services during the project development, construction, and post-construction phases. The following summarizes the general approach to each of the project phases and the controls that would be implemented to ensure the work is completed safely and in accordance with applicable federal, state, and local regulations and permit conditions:

- Project Development and Scoping – During this phase, the project will be defined based on the identified objectives and schedule constraints. Applicable county, state and federal approvals will be attained, bid specifications will be prepared, and the construction contractor selected so construction may be initiated in Spring 2011. The implementing parties would work closely with the CVRWQCB, and other regulatory agencies, as needed, to comply with applicable environmental requirements; and identify sustainable business practices that can be integrated into the removal design and implementation. Support from the CVRWQCB through the permitting process to ensure that applications and permits are received in a timely manner will be critical to the overall project success.

- Construction – The construction phase will include site preparation; removal and/or stabilization of mining-related waste rock, tailings, and stockpiled ore; removal of mining-related equipment (if required) and shallow mercury-enriched soils that may be present in the vicinity of former retort or furnace areas; material transportation and disposal; and grading and reclamation. During the construction phase, a record of approvals and permit conditions will be created and maintained in a single "Permit Book", including all certified and signed permissions and exemptions and a complete list of permit conditions and best management practices (BMPs) that are to be adhered to during construction. In addition, clear lines of communication and project responsibilities will be defined for each construction activity prior to the start of construction. Following completion of removal activities, compliance with permit conditions and requirements will be documented, and the Site will be restored and re-vegetated in working areas, as needed, and a final inspection by CVRWQCB will be scheduled.
- As stated in the Orders, "the issuance of the Orders is an enforcement action taken by a regulatory agency and is exempt from the provisions of the California Environmental Quality Act (CEQA) Pub. Resources Code, section 21000 et seq.), pursuant to California Code of Regulations, Title 14, section 15321(a)(2). The implementation of this Order is also an action to assure the restoration of natural resources and/or the environment and, as currently contemplated, may be exempt from the provisions of the CEQA, in accordance with California Code of Regulations, title 14 sections 15307 and 15308.

Detailed descriptions of the removal scope of work and the removal design, methods, and procedures are provided in Sections 3 and 4 of this Work Plan, including the environmental, health and safety controls to be implemented during the project. However, the plans will require input and concurrence from property owners and other named Dischargers; thus, final detailed plans and cost estimates will be provided when available.

1.3 WORK PLAN ORGANIZATION

This Work Plan is organized as follows:

- Section 2 provides background information related to the Site, including an overview of the setting, history and development, environmental conditions, and characterization of mining-related materials that provide the basis for the remediation and removal actions.
- Section 3 provides the approach and scope of work of the mining-related material remediation actions.
- Section 4 provides detailed descriptions of the remediation design, methods, and procedures.
- Section 5 discusses the proposed project schedule.
- Section 6 provides a list of the literature cited in the Work Plan.

2.0 BACKGROUND

This section summarizes Site background information relevant to the planned mining-material reclamation activities, including the Site setting, history and development, environmental conditions and characterization of mining-related materials.

2.1 SITE SETTING

This section provides an overview of the Site location and features, geology and soils, hydrogeology, hydrology, climate, vegetation and wildlife, land use and ownership, and potentially significant historical and archaeological features. A Site location map is provided as Figure 2-1.

2.1.1 Site Location and Features

The District encompasses an area of about 22 square miles in the eastern portion of the Coast Range geomorphic province of California, about 8 miles west of the western margin of California's central valley and approximately 20 miles west of Williams, California (Figure 2-1). The Coast Range geomorphic province consists of northwest trending ridges between the Pacific Ocean and California's central valley. This portion of the Coast Range is dominated by moderately steep to steep slopes and summits with steep narrow valleys.

The District includes the 6,543-acre Sulphur Creek watershed and adjoining portions of the Bear Creek watershed to the north and the Harley Gulch watershed to the south. These watersheds are components of the larger, 1,095-square-mile, Cache Creek watershed that drains into the Yolo Bypass (Figure 2-2). The Site includes a cumulative area of about 465 acres within the Sulphur Creek watershed in Colusa County, and is located in Sections 28 and 29, Township 14 North, Range 5 West, Mount Diablo Base and Meridian. The Site ranges in elevation between 1,400 to 1,640 feet above mean sea level.

Several of the individual mine areas within and outside the Site are located adjacent to Sulphur Creek. Sulphur Creek is an intermittent stream with continuous flows reported between the fall and spring months (October through June). Stretches of the stream are wet throughout the year due to inputs from geothermal springs (CVRWQCB, 2007).

A Site map, showing the approximate locations of the mines and mining-related features is provided as Figure 2-3. In general, the six mines constituting the Site include one or more of the following mining-related material types:

- Calcined tailings (the relatively fine-grained waste material remaining after the ore is processed in a furnace or retort);
- Waste rock (relatively coarse-grained rock fragments generated while excavating to gain access to ore in the subsurface);
- Mining-related mercury-enriched soils[2] located adjacent to former retorts, kilns or furnaces;
- Ore, including rock fragments or sediment containing one or more minerals in sufficient concentrations and quantities for economic recovery;
- Miscellaneous small waste piles, including materials of varied and/or uncertain origin; and
- Mining equipment and structures, including remnants of former furnaces, retorts, and other mining and milling equipment.

A detailed inventory and description of the mining-related materials present at the Site is provided in Section 2.4

2.1.2 *Geology and Soils*

The Sulphur Creek watershed is located in the northern California Coast Range near the Coast Range Thrust Fault. The Coast Range Thrust pushed a thick sheet of mostly sedimentary rocks (the Great Valley sequence) over the metamorphic rocks of the Franciscan complex. Numerous faults underlie the area surrounding Sulphur Creek. The eastern edge of the Stony Creek Thrust is slightly north of Sulphur Creek. The western end of the Resort Fault Zone is located within the Sulphur Creek watershed. Common lithologies in the area include detrital serpentines, sandstone, and mudstone. Mercury-gold mineralization is associated with splays of the Stony Creek Thrust Fault. A geological map of the Site is provided as Figure 2-4.

The Wilbur Springs Hydrothermal Area, which encompasses portions of the Sulphur Creek Watershed, is known for its thermal springs and is associated with the District hydrothermal ore deposits, most notably

[2] Adjacent to retorts or furnaces and generally up to 1 foot deep.

mercury and gold. The Wilbur Springs Hydrothermal Area is terminated west of the West End Mine and east of the Central Mine by faults. Local concentrated fractures in the Site, particularly those associated with cross-cutting structures, have focused increased hydrothermal convection and mineralization from a heat source beneath the area.

Thermal-spring-type mercury deposits are associated closely with volcanic host rocks and associated clastic sedimentary rocks and form in the near surface environment (Rytuba, 2002). The mercury was deposited as cinnabar, derived when mercury vapor from sedimentary rocks reacted with hydrogen sulfide. In areas where mercury vapor was not trapped underground, the serpentine-derived soils contain only small concentrations of mercury.

2.1.3 *Hydrogeology*

There are no water wells reported within 1 mile of the District according to the California Department of Water Resources Database (CVRWQCB, 2007); therefore, little information is available pertaining to the District hydrogeology. Groundwater beneath the District is primarily geothermal. The source of these hot springs is a deep-seated fracture system that exposes groundwater to heat sources, such as a magma chamber, which produces the natural hydrothermal, mineralizing fluids. A shallow magma chamber beneath the Geysers-Clear Lake area is the most likely source of geothermal activity and springs in the Sulphur Creek watershed. The United States (U.S.) Geological Survey (USGS) has mapped numerous mercury-bearing geothermal springs discharging to Sulphur Creek, including the Jones Fountain of Life, Blanck Springs, Elbow Springs, Elgin Spring, and the Wilbur Hot Springs. All the identified springs, except Elgin Spring, drain directly into lower Sulphur Creek. Many unnamed hydrothermal springs also emanate from the streambed of Sulphur Creek, including springs fed by base flow in stream gravels adjacent to the West End Mine (Tetra Tech, 2003). Figure 2-5 shows the locations of geothermal springs in the area.

2.1.4 *Hydrology*

The District lies within the 1,095 square mile Cache Creek watershed (Figure 2-2). Summer flows in Cache Creek are controlled by releases from the Indian Valley Reservoir and Clear Lake for irrigation. Releases from Clear Lake and Indian Valley Reservoir are curtailed during the winter months to increase storage, and winter flows in Cache Creek are controlled by runoff from precipitation. Cache Creek flows into the Sacramento River, a major tributary to the Bay-Delta.

The upper Cache Creek basin is naturally divided into three sub-basins: Main stem (Cache Creek), North Fork (Cache Creek), and Bear Creek. Intermittent creeks located within the Site periodically contribute flow to Sulphur Creek, which drains a 10-square-mile area and flows into Bear Creek (Figure 2-2). Sulphur Creek has an average base flow in the summer of about 0.3 cubic feet per second, predominantly from mercury-bearing springs. Peak flows of up to 81 cubic feet per second were recorded for Sulphur Creek in February 1963 (USGS, 2002).

Although the primary objective of the remediation effort is to control erosion and minimize the sediment load delivered to the Sulphur Creek channel, the remediation program is **not** a stream restoration effort. However, it should be noted that Sulphur Creek is subject to natural structural changes over time that is completely unrelated to the mining-related materials in the valley and the existing Sulphur Creek channel is experiencing considerable instability. A brief description of the observed instability provided by Mr. Ken Myers, P.E. of the Mines Group is included in *Sulphur Creek Instability Photo Log*, Appendix A.

2.1.5 Climate

The average temperatures within the District range from approximately 41°F (degrees Fahrenheit) / 5.1°C (degrees Celsius) to 72.4°F / 22.4°C (Tetra Tech, 2003). The District receives an average of approximately 27 inches (68.6 centimeters) of precipitation each year. Most of the precipitation is rain, but an occasional snowstorm occurs during the winter months. The majority of the rain falls between November and March (Tetra Tech, 2003).

2.1.6 Vegetation and Wildlife

As described in the *Engineering Evaluation and Cost Analysis for the Sulphur Creek Mining District* (EE/CA – Tetra Tech, 2003), vegetation in the District consists of an interior live oak plant community characterized by shrub oak, interior live oak, chaparral, manzanita, forbs, shrubs, and grasses. In general, the mining areas within the Site are sparsely vegetated with non-native, invasive plants present in disturbed areas. The District is habitat for elk, mule deer, coyotes, rodents, raptors, and mountain lion.

An inventory of plant and wildlife species of special concern has not been compiled for the District; however, the California Department of Fish and Game Natural Diversity Database (CNDDB) was reviewed for the District and surrounding areas in March 2010. The CNDDB findings for the project area and greater Sulphur Creek region are summarized in Table 2-

1. The National Wetlands Inventory map for the Site was also reviewed for potential wetlands locations. The National Wetlands Inventory and CNDDB findings map for the project area is provided as Figure 2-6.

Based on the CNDDB findings, there are no state or federally listed threatened or endangered species within the Site area. However, there are BLM, State and other sensitive species. In addition the following two state rare, endangered or threatened plant species are listed as being within the project area, but not necessarily within the actual project footprint:

- Cobb Mountain lupine, and
- Big-Scale balsamroot.

Additional information has been gathered for the Site, such as delineations of wetlands for the project area, for incorporation, where appropriate, into project planning.

2.1.7 Land Use and Ownership

Land use within the District is predominantly rangeland in undeveloped chaparral and California scrub oak (Foe and Croyle, 1998). Cattle graze in portions of the lower watershed, with some recreation and fire-wood harvesting also occurring within the District (CalFED Report). The nearest community to the District is the town of Williams, located about 24 miles to the east, with a reported population of about 5,300 (City of Williams, 2009). The Wilbur Hot Springs resort, located on the north bank of Sulphur Creek about 1 mile east of the Central Mine, is the year-round home to about seven people (CVRQCB, 2007). There are no other known year-round residences in the watershed; however, two vacation homes are known to be located within the area.

Current land ownership within the Sulphur Creek watershed is shown on Figure 2-7. As shown on Figure 2-7, portions of the lower watershed are privately held by various land-owners. The U.S. Bureau of Land Management administers the public land in the upper portions of the watershed.

2.1.8 Potentially Significant Historical and Archeological Features

Properties of the District are currently not listed on the National Register of National Historic Landmarks. However, the mines were developed beginning in the 1800s, and portions of a number of original mining structures and equipment remain at the Site. In addition, Native Americans may have resided in or used the area prior to mining (CalFED

Report). To ensure that significant historical and archeological features are not disturbed, consultation with the State Historic Preservation Officer should be initiated by current landowners prior to remediation activities.

2.2 SITE HISTORY AND DEVELOPMENT

Mining and mining-related ore processing began in the District approximately 140 years ago, with numerous mines in the District reportedly developed for mercury and/or gold between the 1860s and 1870s. The principal inactive mines within the Sulphur Creek drainage that constitute the Site include the Wide Awake Mine and five mines within the Central Mine Group (Central, Empire, Cherry Hill, West End, and Manzanita). The approximate locations of these mines are shown on Figure 2-3, and available information related to their development histories and general current conditions are summarized in the following subsections. A more detailed mining-related materials inventory is provided in Section 2.4.

2.2.1 Wide Awake Mine

The Wide Awake Mine is located above the east side of an ephemeral tributary to Sulphur Creek (Figure 2-3). Other names used historically for the Wide Awake Mine include Wide Awake Consolidated, Buckeye, Buckeye Quicksilver, and Jefferson (CalFED Report). Originally known as the Buckeye mine, operations at the mine reportedly began in the 1870s, with an estimated total production in the 1870s of 1,800 flasks of mercury.

As described in *CALFED – Cache Creek Study, Task 5C2: Final Report. Final Environmental Evaluation and Cost Analysis for the Sulphur Creek Mining District* prepared by Tetra Tech EM, Inc., September 2003 (hereafter referred to as CalFED Report); the initial production at the Wide Awake mine was from shallow surface workings and tunnels. Later, 500-foot vertical shafts were sunk, with levels at 190, 290, and 390 feet. Limited production was also reported in the late 1890s, ending in about 1901. Some production may also have occurred in 1932 and 1943 (U.S. Bureau of Mines [USBM], 1965). Total production from the mine is estimated at about 1,800 flasks, most of which was produced in the 1870s.

Ore processing facilities in the 1870s included a Knox-Osborne 10-ton furnace and two small retorts (CalFED Report). In the early 1900s, a 24-ton Scott ore furnace was reportedly installed, but scarcely used before the mine ceased to operate. Currently, remains of the Knox-Osborne furnace and the two small retorts are present at the mine.

2.2.2 *Central and Empire Mines*

The Central and Empire mines included several historical mine openings. The Central Mine is the largest of the mines in the Central Mine Group and is located in the northern part of the Site (Figure 2-3). The Empire Mine is the easternmost mine of the Central Mine Group. Because their historical development and operations are intertwined, the development history and current conditions of these two mines are described together in this section.

Other historical names for the Central and Empire mines include Dewey, Little Giant, Mercury Queen, Mercury King, Hidden Treasure, the Mercury Mine, and the Sulphur Creek Mine (CalFED Report). The Empire Mine was located in the 1870s and the Central Mine in 1891. In 1873 the Empire mine reportedly produced 63 flasks of mercury (Watts, 1893b). No significant production occurred from the Central Mine until 1926, when about 107 flasks were reportedly produced (USBM, 1965). The mines were idle until 1942 when a small production was reported (USBM, 1965). Based on this information, it is estimated that the total production of mercury from the Central and Empire Mines was approximately 170 flasks.

Mine workings are reported to include several hundred feet of underground tunnels. The workings of the Central Mine consisted of four short adits, the highest about 400 feet above Sulphur Creek (CalFED Report). The Empire Mine may have included at least three adits that were up to 150 feet long (Moisseeff, 1966).

In 1873, ore from the Empire mine was processed in a small retort at the nearby Buckeye mine, which was later called the Wide Awake mine (Watts, 1893). During the 1890s, ore from the Central and Empire Mines was likely processed at the Abbott facilities (Bradley, 1918). In 1926, a small furnace was reportedly installed on the Central Mine, but was unsuccessful and the ore was processed via pipe retorts (Ransome and Kellog, 1939).

The workings of the Central and Empire Mines are now caved. There are no visible indications of the underground workings at the Central Mine; however, the remains of a former rotary furnace and brick retort are present below the former mine workings (CalFED Report).

2.2.3 *Cherry Hill and West End Mines*

The Cherry Hill Mine is located approximately 100 yards south of Sulphur Creek (Figure 2-3). The West End Mine is the westernmost mine in the Central Mining Group, and is situated in a bedrock promontory marking the western end of the steep slopes on the north bank of Sulphur Creek (Figure 2-3). Because the West End mine was likely operated in conjunction with the Cherry Hill Mine (Tetra Tech, 2003) their development history is described together in this section.

Gold was produced at both the Cherry Hill and West End mines. As described in CalFED Report, gold production records for the Cherry Hill mine are fragmentary. Gold production records are not available for West End mine, because this mine was likely operated in conjunction with Cherry Hill mine. There is no evidence that either mine produced mercury.

The Cherry Hill mine workings reportedly consist of two short adits that have a maximum length of about 100 feet, and the West End mine workings consist of three adits, the extent of which is unknown (CalFED Report). Ore processing facilities at the Cherry Hill mine consisted of a stamp mill with coarse gold recovery tables (Watts, 1893b). There is no reported processing operation at the West End Mine. West End ore was reported to be very siliceous and similar in milling quality to Cherry Hill ore and it is inferred that processing of West End ore was done in the Cherry Hill stamp mill (CalFED Report).

The mine workings at Cherry Hill are open and accessible. However, the adits were not observed to currently extend much further than a few yards into the rock and only various pieces of iron from the mill and concrete foundations were remaining in the vicinity of the mine. Two adits remain open at the West End Mine. Access is controlled to one of the adits with a gate, and the other is currently accessible.

2.2.4 *Manzanita Mine*

The Manzanita Mine is located adjacent to the north bank of Sulphur Creek (Figure 2-3). There are several mine workings included in the area currently known as the Manzanita Mine. The mine reportedly produced both gold and mercury, beginning in about 1863 until 1891, and is reported to have produced additional mercury from 1902 to 1942, yielding over 2,500 flasks (USBM, 1965). The mine workings included numerous tunnels and shafts, and mining was performed by using glory hole and open cut methods.

Processing was performed for gold, gold and mercury, and mercury alone. Ore was typically pulverized in a stamp mill, sized by gravity, and then passed over sluices to concentrate. The dried concentrates, mixed with lime, were then retorted (CalFED Report). A mine adit is evident above the outcropping on the western side of the Manzanita Mine. However, most of the tunnels and shafts at the mine are caved-in and inaccessible, and there are no remnants of mill structures. A concrete foundation that may have been part of a crushing facility and stamp battery is present to the west of the adit.

2.3 *PREVIOUS INVESTIGATIONS AND CURRENT SITE CONDITIONS*

Findings of the key investigations and evaluations of former mining activities within the District and related mercury loading to Sulphur Creek are summarized in the following subsections:

- Mercury studies in the Cache Creek watershed conducted in 2000 to 2001 (USGS, 2004);
- An assessment of the feasibility of remediating mercury mine sources in the Cache Creek watershed (Churchill and Clinkenbeard 2003);
- An EE/CA for the District (CalFED Report);
- The Sulphur Creek Total Maximum Daily Load (TMDL) for mercury (CVRWQCB, 2007); and
- Site Reconnaissance of Mine-Related Materials (ERM, 2009 and 2010).

2.3.1 *Mercury Studies and Feasibility Assessment of Remediating Mercury Mine Sources in the Cache Creek Watershed, 2000 - 2003*

An assessment of the potential ecological and human health impacts of mercury in the Cache Creek watershed was conducted in 2000 and 2001 with funding by the CALFED Bay-Delta Program. A number of federal and state agencies, universities, and one commercial laboratory contributed to the project, including the USGS, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, the California CVRWQCB, the California Geological Survey, the University of California Davis, the San Jose State University Foundation, and Frontier Geosciences, Inc. The principal findings of the study and an assessment of the feasibility of remediating mercury mine sources in the District are presented in the *Summary of Synthesis of Mercury Studies in the Cache Creek Watershed, California, 2000-01* (USGS, 2004) and in *Task 5C1: Assessment of* *the Feasibility of Remediation of Mercury Mine Sources in the Cache Creek Watershed* (Churchill and Clinkenbeard, 2003).

The mercury studies were commissioned to:

- Evaluate and document the locations and potential remediation of mine wastes within the Cache Creek Watershed;
- To document the current loads of both total mercury and methylmercury to Cache Creek from major anthropogenic and natural sources;
- To test the potential for exporting sediment that contains mercury to transform to methylmercury in downstream environments; and
- To evaluate the factors controlling bioaccumulation of mercury in aquatic organisms within the Cache Creek watershed.

During the studies, fourteen historical mercury and gold mines in the District were evaluated to assess their potential mercury contributions to the Cache Creek watershed. During the field investigations, mining-related materials were inventoried and samples were collected for laboratory analysis. Mining-materials identified during the site evaluations included calcined tailings, waste rock, ore, miscellaneous small material piles, and processing-site soil (mercury-enriched soils located in the vicinity of former processing facilities, such as retorts). Naturally elevated mercury in soil resulting from weathering of hydrothermally mineralized bedrock was also observed at the mine sites. The mercury concentrations in these materials, including the naturally elevated mercury in soils, were reported to range from 10 to 300 milligrams per kilogram (mg/kg or parts per million). Ore piles and processing-site soils had higher mercury levels but were not observed at all the mines and were reported to be much less common and volumetrically less important than other materials that were naturally high in mercury (USGS, 2004). Occurrences of acid mine drainage were not observed at the Site during the mine-site investigations.

Previous studies found that mercury occurs principally in the form of cinnabar and metacinnabar in the ore and calcined tailings located in the District (Bradley, 1918; Rytuba, 1996). In the 2000-2001 USGS studies, leaching analyses with a reducing agent (hydroxylamine hydrochloride) were used to evaluate the mercury associated with iron and manganese oxides. The reductive leach analysis of selected samples found that only a very small percentage of the total mercury in ore, waste rock, calcined tailings, and naturally-elevated mercury soils was mobilized during leaching. These results were determined to be consistent with the occurrence of mercury as cinnabar and metacinnabar, and suggest that most anthropogenic mercury moves from mine sites to adjacent waterways in particulate form rather than as dissolved mercury (USGS, 2004).

Additional mercury-speciation studies, using sequential-selected extraction experiments, were also conducted, and concluded that the mercury within the mining-materials are approximately 20 times less bioavailable for methylation than dissolved mercury, which is the form commonly produced by the geothermal springs (Churchill and Clinkenbeard, 2003). The study therefore concluded that solid-phase cinnabar-containing minerals do not represent a major methylation source to the main stem of Cache Creek.

Contributions of regional background mercury to Sulphur Creek were estimated to be 0.45 to 9.8 kilograms per year, assuming lower and upper annual erosion rates of 0.2 and 4 metric tons per hectare for each watershed (Churchill and Clinkenbeard, 2003). Identified non-mining mercury sources included:

- Thermal spring water and related precipitates;
- Eroded naturally-elevated mercury soil from mineralized areas;
- Eroded background mercury soil;
- Deposits of mercury-containing alluvium along creeks;
- Mercury emissions to the air from local naturally-elevated mercury soils in mineralized areas; and
- Atmospheric mercury from regional or global sources.

Based on the available information regarding the abundance and characteristics of mercury in mine site materials and estimates of mine site mercury contributions to waterways in the Sulphur Creek drainage, the USGS and CalFED reports concluded that effective mine site remediation should be based on general site erosion control and mining-related material isolation measures.

2.3.2 *Engineering Evaluation and Cost Analysis for the Sulphur Creek Mining District, 2003*

An EE/CA for the District was conducted in 2003 under contract to the San Jose State University Foundation, with technical direction from the California Department of Conservation, California Geologic Survey. The findings of the EE/CA are presented in the *Final Engineering Evaluation* *and Cost Analysis for the Sulphur Creek Mining District, Colusa and Lake Counties, California* (CalFED Report). The purpose of the EE/CA was to present a detailed analysis of potential mine-site mitigation alternatives that could be used for decision making, and the document includes the following information:

- Background information on the District;
- Summary of prior investigations;
- Summary of mining impacts to the watershed;
- Description of applicable or relevant and appropriate requirements;
- Preliminary mitigation objectives and goals;
- Identification and screening of response actions, technology types, and process options for the District;
- Detailed analysis of potential alternatives to mitigate mercury loading to surface water in the District;
- Comparative analysis of mitigation alternatives; and
- Recommended mine-specific mitigation activities.

The EE/CA presented recommended interim and final mitigation activities for each mine site, with a focus on reducing particulate mercury loading to surface water within the district. In general, the EE/CA recommended that mining-related wastes with elevated mercury levels be excavated and removed off-site and/or consolidated and stabilized on site, with the implementation of institutional and surface water run-on/runoff controls to reduce the potential for erosion into nearby surface water.

2.3.3 Sulphur Creek TMDL Report for Mercury, 2007

In 2007, the CVRWQCB prepared a TMDL water quality management strategy for Sulphur Creek (CVRWQCB, 2007). The Sulphur Creek TMDL Report includes water quality numeric targets, assessment of mercury sources, estimated contributions and loads from different mercury sources, allocation of acceptable loads, a margin of safety, and an implementation plan. The report established TMDL targets for mercury and methylmercury in Sulphur Creek at the point of discharge to Bear Creek.

In December 2009, ERM conducted a preliminary evaluation of the data used to develop the mercury loading estimates in the Sulphur Creek basin and the TMDL for mercury and methylmercury in Sulphur Creek as presented by the CVRWQCB in the 2007 report. That data review identified concerns that the conclusions drawn from the data presented in the TMDL Report are based on insufficient data, and poorly defined factors affecting data correlation (e.g. mercury loading from thermal springs and mercury contribution attributable to background). The findings of the ERM data evaluation indicate that the TMDL data are insufficient to:

(a) Quantify current mercury loadings to Sulphur Creek with the resolution necessary to confirm the 2007 TMDL Report conclusions based on the mean loading values;

(b) Adequately quantify total mercury contributions from thermal springs and seeps; and

(c) Reasonably predict the effect of remediation of mining-related mercury sources in the basin on the annual mercury load or the instantaneous mercury concentrations in Sulphur Creek.

This uncertainty in the understanding of mercury loading in Sulphur Creek (as exhibited by the available data) presents a very real possibility that there could be a failure to reach the numeric TMDL goal, while fully achieving the stated objective of the remediation effort (i.e., to return mercury discharge conditions from Sulphur Creek to pre-mining conditions).

2.3.4 *Recent Reconnaissance of Mining-Related Material*

Teams of geologists and scientists from ERM, Homestake, and others conducted two field reconnaissance visits to the Central Mine Group and Wide Awake Mine in December 2009 and March 2010. Objectives of the reconnaissances included:

- Identify potential sources of mercury to Sulphur Creek from mine tailings, waste rock and other features;
- Identify potential anthropogenic sources of mercury to Sulphur Creek; and
- Identify natural features in and around Sulphur Creek that could be contributing mercury to the creek.

Additional Site data collected by the field teams included waste rock samples, and photographs, observations, and global positioning system (GPS) locations of features of interest. General observations from the Site reconnaissance are provided below. Site features are shown on Figure 2-3, and the additional sampling data, along with estimated quantities and locations of the mining-materials to be addressed as part of this Work Plan are provided in Section 2.5.

Wide Awake Mine

At the Wide Awake Mine, a waste rock pile is located on the northern end of a deeply incised section of an ephemeral tributary to Sulphur Creek, just upstream of where the tributary enters the bottom of the Sulphur Creek valley. The tributary was observed to be dry, and the sediment in the stream bottom appeared to be cemented by carbonates. A faint hydrogen sulfide odor was noted in the drainage, indicating that the carbonate cementation is likely related to periodic geothermal water discharge. Very little fine sediment was observed in the stream bed.

Retorts, tailings piles and waste rock piles were also observed over the area comprising the main mine workings and milling area. The largest of the retorts was located at the west side of the mine, adjacent to the tributary. The largest of the tailings piles was observed to the south of the largest retort. The tailings pile exhibited signs of erosion as the slopes were not vegetated and erosion channels into the ephemeral tributary were evident.

Central Mine

Benched tailings and waste rock were observed at the Central Mine beneath a small open pit and exposed high wall approximately ¼ mile from Sulphur Creek. A deeply incised drainage channel was observed high on the hillside to the west of the Central Mine. This drainage channel traversed what appeared to be the westernmost extent of the Central Mine past the west side of a retort. During the site reconnaissance, this incised channel was dry and is assumed to only carry water during and immediately following heavy rain. A spring was observed further down the drainage channel to the south of the retort area, and water was evident in the channel, which discharged to Sulphur Creek east of the Jones Fountain of Life. Metacinnabar was identified as a precipitate in the spring flow channel.

Empire Mine

The Empire Mine includes a mine portal located adjacent to the Wilbur Springs access road and a waste rock pile that is located on a hillside approximately 300 feet from Sulphur Creek. Much of the area in the vicinity of the Empire Mine is overgrown with native vegetation (digger pine and manzanita shrubs). The condition of the Empire Mine area was evaluated during the site reconnaissance in March 2010. A part-time residence was observed within the former mine area, likely on the Empire Mine dump. The waste rock pile appeared to be capped with topsoil, and there was no evidence of erosion (or a threat of erosion) of mining-related material into Sulphur Creek at this location. Additionally, a small retort that had been reported by others to be present at the mine had apparently been removed.

Cherry Hill Mine

The waste rock piles present at the Cherry Hill mine were observed to be relatively small compared to other sites in the District, and consist mainly of cobbles and boulders. A waste rock pile was observed on the Sulphur Creek floodplain about 500 feet northeast of the Cherry Hill workings. The source of the rock in the pile is not known, but the rock appears to be of local origin. Based on the presence of a borehole marker, it is likely that this pile was placed to form a drilling platform during exploration in the area in the 1970s.

West End Mine

Two adits were observed at the West End Mine, near the top of a relatively large waste rock pile. One of the adits was blocked off with a gate, and the other was open. At the time of the site reconnaissance, the observed adits were dry with no evidence of discharge. The waste rock pile at the West End Mine is cone-shaped with steep side-slopes, and consists primarily of coarse rock fragments with very little fine material. No gullies or signs of erosion were observed on the waste rock pile during the Site reconnaissance, and the potential for significant erosion of sediments from the waste rock pile to Sulphur Creek is considered low due to the relatively coarse nature of the waste rock fragments; however, it is located adjacent to Sulphur Creek.

Manzanita

The Manzanita Mine area was observed to include several cuts and at least one adit surrounded by thin deposits of rock material from road grading activities and rockfall from the steep slopes (scree). No defined areas of waste rock were observed. During the field reconnaissance, it was noted that minor erosion channels exist below the mine and the north bank of Sulphur Creek is episodically eroding toward mineralized rock and scree associated with the Manzanita Mine area.

2.4 CONCEPTUAL SITE MODEL OVERVIEW

The conceptual site model (CSM) summarizes available information about potential sources, release mechanisms, contaminant fate and transport, exposure pathways, and potential receptors at the Site. An initial CSM for mercury was developed for the District and presented in the CalFED Report. The CSM overview presented in this section is focused on mining-related materials at the Site, and is based on ERM's current understanding of Site conditions.

The CSM incorporates the following components:

- Naturally-occurring mercury-enriched Site soil (i.e., soil in naturally-mineralized areas and background soils);
- Mining-related sources [e.g., exploration, mining, waste rock/overburden, tailings, construction (roads/impoundments), other mine-related material]; and
- Exposure pathways and receptors of concern.

2.4.1 Naturally-Occurring Mercury-Enriched Site Soil

Mercury-enriched soil naturally occurs at the Site in localized mineralized zones and in general background areas. Mercury levels associated with mineralized zone, background soils and natural rock outcrop are discussed below.

Mineralized Area Soils

Mercury concentrations ranged from 0.07 to 520 mg/kg in forty-eight samples collected by Churchill and Clinkenbeard (2004) from mineralized area soils in proximity to mining activities in the District, and from 34 to 290 mg/kg in mineralized area soil samples collected in 2005-2006 by Holloway et al (2009). In addition to the mineralized zones around the former mines, mineralized soils may also be exposed on several road cuts in the Sulphur Creek watershed or at other small unnamed prospects.

Background Area Soils

As part of their assessment of mercury mine sources in the Cache Creek Watershed, Churchill and Clinkenbeard (2003) and Holloway et al (2009) collected over 50 samples of background soil in the District. In the Churchill and Clinkenbeard study (2003), mercury concentrations from soil samples derived from barren serpentinite and detrital serpentinite soils ranged from 0.07 to 0.31 mg/kg, and background mercury concentrations reported for soils near mine sites ranged from 0.12 to 390 mg/kg.

Mercury concentrations ranged from 0.07 to greater than 10 mg/kg in a small set of naturally derived (background) soil samples collected outside and within areas of the District as part of the Holloway et al study (2009).

Natural Outcrop (Homestake Data)

Historically, the District was identified and evaluated by Homestake as an exploration target for economic gold mineralization. As part of that evaluation, a grid-sampling program was undertaken to obtain geochemical data for the project area, and ninety-four representative rock-chip samples were collected from rock outcrops and sub-crops on an approximate 400-foot grid spacing over the entire District. The rock-chip samples were analyzed for total mercury by atomic absorption techniques and the results are shown on Figure 2-8. A tabular representation of the data is provided in Appendix B (R.W. Hatch, 1983).

As shown on Figure 2-8, available background mercury data show a significant degree of natural variation across the District. Background mercury concentrations range from 0.128 mg/kg to 6,000 mg/kg, likely as a result of natural hot springs activity over the past 500,000 years.

The hydrothermal hot springs activity has produced widely variable naturally elevated mercury concentration in the areas where mining-related materials (i.e., waste rock, ore, and tailings) were placed during mining operations. Examination of the geochemical data shows that two distinct mercury concentration population ranges are present: one that occurs in rocks altered by hydrothermal fluids, and a second that occurs in rocks that were not exposed to hydrothermal fluids and are therefore unaltered. Mercury concentrations in both altered and non-altered rocks represent background conditions at the Site.

Figures B-1 and B-2, in Appendix B provide charts showing the frequency distribution for mercury values in altered and unaltered rock. Inspection of the figure shows that as expected the highest mercury values are associated with hydrothermally altered rock, which is generally within areas where mining took place. Background mercury concentrations ranged from 0.128 mg/kg to 6,000 mg/kg in altered rocks versus 0.241 mg/kg to 15.9 mg/kg in unaltered rocks.

2.4.2 *Mining-Related Sources*

As described above in Section 2.3.1, an assessment of mining-related sources of mercury to Sulphur Creek was conducted in 2000 and 2001 with funding by the CALFED Bay-Delta Program. The principal findings of the study are presented in USGS (2004) and in Churchill and Clinkenbeard (2003).

Fourteen historical mercury and gold mines in the District were evaluated in the CALFED study to assess their potential mercury contributions to the Cache Creek watershed. During the field investigations, mining-related materials were inventoried and samples were collected for laboratory analysis. In situations where mining-related materials appeared to be eroding into waterways, estimates of erosion rates were made using the RUSLE2 (Revised Universal Soil Loss Equation) model. The mercury concentrations and estimated erosion rates were used to estimate average annual mercury contributions from the mining-materials to local waterways.

The resulting estimate of annual mercury contributions from mining-materials in the Sulphur Creek watershed was 4 to 19 kilograms per year (Churchill and Clinkenbeard, 2003). However, the data suggest that most mercury moves from mine sites to adjacent waterways in particulate form rather than as dissolved mercury (USGS, 2004), and it is uncertain how much, if any, of the mining-related material sediment is actually transported from tributaries of Sulphur Creek and Sulphur Creek to Bear Creek, as much of the material is reportedly being deposited in dry ravines, several miles from Bear Creek.

2.4.3 *Potential Future Land and Resources Uses*

As described in Section 2.1.7, current land use in the District is predominantly rangeland in undeveloped chaparral and California scrub oak (Foe and Croyle, 1998). Wilbur Hot Springs Spa and Resort is located downstream of the Site. Most of the surrounding land is managed by the BLM. A smaller part of the Sulphur Creek watershed is privately owned and cattle graze on some private property in the lower watershed. Additional land uses include firewood harvesting and recreation. Future land us is expected to remain similar to current conditions.

2.4.4 *Potential Exposure Pathways and Receptors of Concern*

The term "exposure" is used to describe contact with a substance (e.g., mercury) by swallowing, breathing, or touching the skin or eyes.

Exposure may be short-term (acute exposure), of intermediate duration, or long-term (chronic exposure). An exposure pathway is the route a substance takes from its source to its end point, and how the human and/or ecological receptor comes into contact with the substance.

Human exposure to mining-related materials is possible at the Site for potential future on-site residents, subsistence farmers, health spa users,[3] and outdoor workers. The primary potential routes of exposure to mercury in mining-related materials are direct contact and incidental ingestion.

Ecological concerns with mercury/methyl mercury are predominantly associated with aquatic systems, thus the ecological receptors and potential exposure pathways focus on freshwater aquatic habitat and associated biota observed and/or anticipated in the Sulphur Creek drainage. However, Sulphur Creek and tributaries at the Site do not support fish and portions are dry during the summer. In the Amendment to the Basin Plan, the CVRWQCB concluded that municipal and domestic supply (MUN) beneficial use and the human consumption of aquatic organisms use do not exist and these beneficial uses cannot be attained in Sulphur Creek[4] due to natural sources of dissolved solids and mercury (CVRWQCB Resolution No. R5-2007-0021). As such, there are no fish and limited aquatic receptors at the Site. Further, the USGS (2004) concluded that most mercury moves from mine sites to adjacent waterways in particulate form rather than as dissolved mercury, and it is uncertain how much, if any of the mining-related material sediment is actually transported to Bear Creek, as much of the material is reportedly being deposited in dry ravines, several miles from Bear Creek.

Wildlife within the area may come into direct contact with the mining-related materials. The primary exposure route would be ingestion of mercury-containing materials while foraging.

2.4.5 *Summary of Potential Site Risks*

A brief overview of the potential risks to human health and ecological receptors resulting from the potential exposure to mining-related materials at the Site is provided in the following subsections. Removal

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[3] Though potential receptors, exposures via drinking water are likely to be insignificant given that the Wilbur Hot Springs resort obtains drinking water from shallow groundwater wells on a ridge above Sulphur Creek (CVRWQCB, 2007). Water from these wells have a different source than the Wilbur Hot Springs Geothermal area.

[4] Sulphur Creek from Schoolhouse Canyon to the mouth.

and/or proper disposal of the mining-related materials will mitigate potential exposure pathways.

2.4.5.1 *Summary of Potential Human Health Risks*

As described above, potential exposure to mercury in mining-materials is possible through direct contact of skin with mercury-containing material, inhalation of volatile elemental mercury (if present) or particulates containing mercury, and/or incidental ingestion of mercury containing particles. Mining-related material present at the Site contain mercury that may potentially pose a threat to human health due to exposures through recreation or work at the mine sites (e.g., recreational exposure can occur during hiking, camping, hunting, or rock collecting at or near the mine areas).

2.4.5.2 *Summary of Potential Ecological Risks*

As discussed above, animals can ingest or directly contact mercury-bearing mining-related material. In addition to potential toxicity effects on organisms caused by exposure to mercury, mercury has the potential to accumulate in biota. Natural hydrothermal altered areas and the mine sites contain mercury concentrations that potentially pose a threat to ecological receptors.

2.5 *MINING-RELATED MATERIAL WASTE CHARACTERIZATION*

This section describes the approach used to classify Site mining-related materials for disposal, previous mining-related material characterization sampling, the March 2010 mining-related materials characterization sampling, and the estimation of mining-related material volumes and areal extent.

2.5.1 *Approach to Mining-Related Material Classification*

The mining-related material characterization approach was intended to determine appropriate waste designations, and therefore disposal options, for mining-related materials at the Site in accordance with Resource Conservation and Recovery Act (RCRA) and State of California regulations. RCRA was amended in 1980 by the Bevill Exclusion, to exclude "solid waste from the extraction, beneficiation, and processing of ores and minerals" from regulation as hazardous waste under Subtitle C of RCRA. The mining-related materials to be removed from the Site meet the criteria under the Bevill Exclusion.

The State of California waste regulations acknowledge the Federal exclusion, but include the following waste classifications for mining-related solid waste:

- Group A – Mining-related waste determined to be a significant threat to groundwater quality and that the CVRWQCB determines must be managed as hazardous waste.
- Group B – Mining-related waste that consists of or contains materials that pose a significant risk to water quality, but that qualify for a variance, provided that the CVRWQCB finds such mining wastes pose a low risk to water quality.
- Group C – Mining-related waste from which any discharge would be in compliance with the applicable water quality control plan, including water quality objectives other than turbidity.

Based on the available data collected to date and regulatory definitions, Group A wastes have not been identified at the Site.

2.5.2 *Previous Mining-Related Material Waste Characterization Sampling*

Mining-related material characterization sampling was conducted at the Central Mine Group and Wide Awake Mine as part of the CALFED – Cache Creek Study, and the results are provided in the CalFED Report. Total mercury concentrations are also available for selected materials from assays that were completed by Homestake during exploration activities, as well as from more recent Homestake sampling events that were completed to provide preliminary material characterization information. Table 2-2 summarizes the available analytical results for mercury from these previous sampling events.

In the CALFED study, samples were collected from several waste piles located within the Central Mine Group and Wide Awake mines. The samples were analyzed for leachable antimony, arsenic, chromium, mercury, and nickel using the CalWET. Of the metals analyzed, only mercury was detected in the leachate at a concentration greater than the soluble threshold limit concentration (STLC). Mercury concentrations in the other samples collected were one to two orders of magnitude less than the STLC, and results for each of the other metals were one to four orders of magnitude less than the STLC.

Based on the general knowledge of the geologic formation and the previous material characterization test results provided in Table 2-2, the

March 2010 material characterization sampling focused on total and leachable mercury for waste group determination.

2.5.3 *March 2010 Mining-Related Materials Waste Characterization Sampling*

ERM conducted a field program in March 2010, to collect additional data to characterize and estimate the quantities of mining-related material, including waste rock, tailings, mercury-enriched soils, ore, and mining equipment remaining at the Site, in preparation for removal activities. A secondary objective of the field program was to gather additional data to evaluate whether portions of the waste rock and tailings piles meet criteria for processing for gold reclamation. Waste rock and tailings containing greater than 2 mg/kg (0.06 ounces/ton) of recoverable gold could be considered for processing as ore rather than disposal as a waste.

The Empire Mine was not included in the mining-related material inventory. The only known waste rock pile at the Empire Mine is far from Sulphur Creek, has been built upon, covered with soil and vegetated, and there is no evidence of a threat of erosion of mining-related material into Sulphur Creek at this location. Further, the EE/CA concluded that erosion was not occurring from mining-related materials and complete pathways from mine-related sources to Sulphur Creek did not appear to be present, which was also confirmed during 2010 site reconnaissance. Therefore, and as concluded in the EE/CA, no removal action will be conducted at the Empire Mine by Homestake.

2.5.3.1 *Sampling and Analysis*

During the March 2010 field program, ERM collected samples of mining-related material at the Site for the purposes of material characterization. Details related to sampling procedures, and laboratory analytical methods are provided in the *Sampling and Analysis Plan for Mining-Related Waste Characterization* (ERM, 2010) and are included as Appendix C. A summary of the materials sampled and analytical methods used are described below.

Structures and Equipment

Samples of brick, ceramic, and/or dimension stone were collected from each ore processing structure remaining at the Site. Samples were analyzed for total mercury and STLC mercury (leachable mercury) using U.S. Environmental Protection Agency (USEPA) Method 7471A and the CalWET Method, respectively.

Metal equipment, such as pipes and retort remnants, were not sampled, but will be visually inspected for the presence of elemental mercury during removal activities.

Waste Rock, Tailings and Ore

Visual observations were recorded for each pile encountered, including the color and grain size distribution for the material, and the type and density of vegetation growing on the material. The number of samples collected at each mine was dependent on existing data and the total volume of waste rock, tailings and/or ore present, as follows:

- Mines with greater than 5,000 cubic yards (cy) of waste rock, tailings, and/or ore – Four or more composite samples consisting of three point samples with each composited in the field.
- Mines with less than 5,000 cy of waste rock, tailings, and/or ore – One or more composite samples consisting of a three point composite sample that was composited in the field.

Additional samples were collected from miscellaneous small deposits as needed. For example, an additional discrete sample was collected from a small calcine and ash pile at the Wide Awake Mine. Because no distinct piles or areas of mining-related materials are present at the Manzanita Mine, the samples were collected from scree adjacent to the mine workings.

Composite samples collected from waste rock and tailings deposits were analyzed for STLC mercury using CalWET. Composite samples from the Wide Awake, West End, and Cherry Hill Mines were also analyzed for gold content and suitability for ore processing using the following methods:

- Total gold by fire assay;
- pH by USEPA Method 9045C; and
- Total sulfide by USEPA Method 9034.

Material with a gold content of 0.06 ounces per ton or greater may be suitable for ore processing depending on its sulphur or sulfide content.

2.5.3.2 *Waste Characterization Results*

A summary of sample results from past characterization efforts and the March 2010 field activities are provided in Table 2-3. Materials handling and disposal conclusions based on the sample results are summarized in

Table 2-3. The basis for the conclusions summarized in Table 2-3 is described in the Section 2.5.1 above. The laboratory reports for the waste characterization samples are provided in Appendix D.

Table 2-3 provides a summary of the CalWET solubility for each of the mine material piles/areas shown on Figure 2-8. Solubility data is available for waste rock, calcine tailings, scree, retort soil and ash. The table shows the results of 23 total samples comprised of 18 three-point composites collected by ERM in 2010 and 5 individual grab samples collected in 2003 as part of the CalFED Report.

The results show that the average mercury solubility value for each mine material pile is well below the STLC limit concentration of 200 ug/L. In fact, the results for most of the discrete mine material piles/areas identified on Figure 2-9 (9 of 13) are non-detect for dissolved mercury. These results show that the mercury contained in the material is stable and not prone to dissolution or leaching for all material types: waste rock, calcine tailings, scree, retort soil and ash. These results support the conclusion that all the material identified and sampled is Group C mining-related waste and the focus of remediation should be to remove the connection between the mine-related material and Sulphur Creek.

2.5.4 *Estimation of Mining-Related Material Volumes and Areal Extent of Material*

The locations and extent of mining-related wastes at the Site are shown in Figure 2-9. An inventory of the mining-related materials, including volume estimates, is included in Table 2-4.

Volumes of waste rock and tailings piles were estimated using the following procedure:

- The locations of points at the margins of the piles and on the piles were established using a GPS unit;
- The pre-accumulation ground surface topography was estimated by interpolation of surrounding topography based on the available geolocated base map;
- Using three-dimensional rendering software, the original land surface and current pile configuration were matched, and the volume of the resulting figure was calculated; and
- The calculated volumes were confirmed and adjusted based on site observations and photographs.

Volumes of materials contained in structures at the Site were estimated based on dimensions measured in the field and estimated from field observations and photographs.

The preliminary total volume of mining-related materials to be managed is approximately 58,800 cy. Of the total managed volume, 9,600 cy may be reclaimed for gold processing (West End and Manzanita materials) and 49,200 to 58,800 cy of mining-related material is expected to be removed for disposal off-site or recontoured (managed in place). Approximately 30,800 cy of material is present at the Wide Awake Mine, and 28,000 cy of material are present in the Central Mine group area. Of the Central Mine group material, approximately 17,800 cy of material are present in the Central Mine waste rock dump.

3.0 REMEDY APPROACH AND SCOPE OF WORK

This section describes the planned remediation activities of mining-related material to be performed by Homestake at the Site, including material characterization, permitting, Site preparation and control, mining–related material removal and in-place management, waste management, removal confirmation, and Site restoration.

The proposed plan for mine-related material remediation is consistent with previous federal and state recommendations for the District. The USGS (2004) and Churchill and Clinkenbeard (2003) reports concluded that effective mine site remediation should be based on general site erosion control and mining-related material isolation measures. Similarly, the CalFED Report recommended that mining-related wastes with elevated mercury levels be excavated and removed off-site and/or consolidated and stabilized on site, with the implementation of institutional and surface water run-on/runoff controls to reduce the potential for erosion into nearby surface water.

Detailed descriptions of the remediation design, methods, and procedures are provided in Section 4.

3.1 MINING-RELATED MATERIAL WASTE CHARACTERIZATION

ERM conducted a field program in March 2010 to characterize mining-related material, including waste rock, tailings, ore, mercury-enriched soils, and mining equipment present at the Site. This information was used in conjunction with existing data to classify the material for disposal during remedy implementation. A secondary objective of the field program was to gather additional data to determine if portions of the remaining ore piles meet the criteria to be processed for gold reclamation. Waste rock and tailings characterized with greater than 2 mg/kg (0.06 ounces/ton) of recoverable gold will be considered for processing as ore rather than disposal as a waste.

The March 2010 material characterization and classification activities are summarized in Section 2.4 and available material inventory and characterization data are provided on Tables 2-3 and 2-4. Analytical results used to determine material handling and disposal requirements are summarized in Tables 2-2 and 2-3. If previously unidentified structures, equipment, waste rock, tailings, or ore are observed during remedy implementation, these materials will be sampled and classified for disposal as described in Section 2.3.2, following the procedures outlined in the Sampling and Analysis Plan (SAP) provided as Appendix B to this Work Plan.

Mine-related equipment, such as pipes and retort remnants, will be further evaluated to determine if removal is necessary. Factors to be considered include historical significance, proximity to creeks, and evidence of elemental mercury. The equipment will be visually inspected for the presence of elemental mercury during removal activities. If mercury is observed in metal equipment, those pieces of equipment will be appropriately isolated and the mercury removed. Metal structures that were in contact with the mercury, if present, will be characterized appropriately and may be disposed accordingly.

3.2 *PERMITTING*

All necessary approvals will be obtained prior to initiating the remediation activities described in this Work Plan to ensure the project is completed in compliance with applicable regulatory requirements. The general approach to the permitting process will be to:

- Identify potentially applicable approvals required from regulatory agencies and private parties;
- Meet with key regulatory agencies for pre-application meetings to confirm the potential requirements, and establish early communication with agencies and adjust data needs as required; and
- Facilitate the approval process from pre-application to submittal and approval.

Tracking of the approval status and compliance with the potential requirements will be conducted including:

- Use of a permit tracking matrix to manage submittal of materials and status of approvals. (See Table 3-1 for a simplified matrix of the key approvals that are anticipated for the project.) A master permit list with more detailed information on permit requirements and planned dates has been prepared and will be updated throughout the project for use as a tracking and management tool.
- Development of specific oversight plans and documentation as required for permit compliance.
- Implementation of field monitoring requirements, as needed. Work monitoring and inspection activities (e.g., monitoring of BMPs) required

by applicable permits during field work/construction will be implemented into the bid specifications.

3.3 SITE PREPARATION AND CONTROL

This section describes the Site preparation and control activities that will be completed prior to and during remediation and restoration work at the Site, including Site access agreements, mobilization and demobilization, material and equipment staging, road construction and improvements, and transportation.

3.3.1 Site Access Agreements

Access agreements will need to be negotiated with the current landowners at the Site. Other agreements with landowners would be required if mining-related material is consolidated and stored on Site.

3.3.2 Mobilization and Demobilization

Mobilization and demobilization will include all work necessary to manage operations for the duration of the project. Mobilization will be an ongoing task as new resources are needed for specific operations. The project-specific Health and Safety Plan (HASP) will be completed as part of the mobilization phase. A Draft HASP will be finalized prior to beginning field activities, with input from the selected contractor during the pre-mobilization phase of work. Equipment will be cleaned to limit noxious weed transport to the Site. A Storm Water Pollution Prevention Plan (SWPPP) will be prepared prior to the initiation of any soil disturbing activities at the Site.

Demobilization will include the removal of all equipment and personnel mobilized to the site and waste generated during the duration of the project. Final demobilization will include cleanup and restoration of all staging areas to pre-existing conditions. At the conclusion of the 2011 construction season, areas will be secured and appropriate storm water BMPs will be implemented to reduce the potential for site activities to impact storm water run-off. Final demobilization will occur at the completion of work in 2011.

3.3.3 Erosion Control

Remediation of the mining-related materials will require establishing equipment access (including three stream crossings) and the excavation, loading, and haulage of the materials . The disturbance associated with these activities will need to be mitigated to prevent erosion. This mitigation will involve the regrading and reclamation of the natural ground surface and the temporary placement of erosion control BMPs.

BMPs will be selected based on the planned reclamation activities and include categories related to erosion control, sediment control, tracking control, wind erosion, non-storm water controls, and waste management and materials control. These BMPs can include, but are not limited to:

- Grading;
- Silt Fences;
- Straw Bales;
- Fiber Rolls;
- Loose Straw Ground Cover;
- Grass filters;
- Sand/Gravel Bags;
- Dust Control Moderation;
- Good House Keeping Practices;
- Site Entrances and Exit Maintenance; and
- Management of Construction-Related Wastes.

The combination of the above-listed BMPs will protect the storm water quality during reclamation activities. Procedures to ensure proper implementation of erosion control BMPs during remediation will be identified and described in the SWPPP. The SWPPP will be established prior to starting any soil disturbing activities associated with construction work at the Site, and will be included as necessary in permitting documentation. Specific construction activities likely to require erosion control measures are addressed in the task descriptions in the following sections. Erosion control materials will be on standby for use if rainfall events occur during construction activities.

3.3.4 Material and Equipment Staging

All materials and equipment will be staged to the northeast of the Cherry Hill Mine. The approximate location of the materials and equipment staging area is shown on Figure 3-1. Field offices, temporary facilities, and storage containers will be located in this area. Final determination of the staging area location will be approved by the Field Engineer prior to mobilization. Each work area will have a temporary staging area for equipment and personnel while working remotely at each mine. These areas will be determined and approved by the Site engineer.

An emergency helipad landing area will also be delineated to the west of the West End Mine (Figure 3-1). This area will be kept clear at all times during removal and restoration activities. The final location of the helipad will be determined with CAL-Fire during the pre-mobilization phase of the work.

3.3.5 Road Improvements and Construction

Site access and mine access road construction and improvement will be required throughout the project. Preliminary plans for road construction and improvement are shown in Figure 3-1. Proposed locations of access routes and stream crossings are preliminary and will be revised as necessary pending additional information from wetlands delineation and other site conditions. Access improvements will be located to minimize disturbance.

The existing Site access road directly from Highway 20 will require improvements and upgrades to handle daily traffic to the Site including light trucks, equipment delivery, and material export trucks. Improvements include general grading to remove ruts, application of crushed rock for traction and to prevent wear, and the repair of three locations where the road has washed out. The road repair will include the placement or replacement of existing culverts for proper run-off, armoring the banks of the road in those areas with rock to prevent future erosion, and compaction to prevent sinkholes. No change to the width or current location of the existing road is planned. These improvements have been tentatively approved by the Ukiah BLM staff and will be completed during the pre-mobilization stage of the project.

Temporary access routes to each of the Central Mine Group and Wide Awake mines will be required. These routes will consist of a combination of improved existing roads and new roads. The mine access roads will be used for access by construction equipment and off-road dump trucks. Existing roads will be graded as needed to facilitate the movement of trucks. New roads will be constructed on an as needed basis to access the mines.

Two of the mine access roads will include temporary bridges; one crossing at Sulphur Creek, and one at an existing at-grade vehicle crossing near the

Wide Awake Mine (Figure 3-1). Impact to surrounding areas will be minimized to the extent practical, and existing roads will be used when possible. When temporary bridge placement is required, the contractor will place steel "I" beams parallel to the stream bank and lay the bridge across the beams. The "I" beams will help distribute the weight and minimize damage to the bank. If needed, concrete support columns will be set under the bridge in the stream bed. Existing rock in the bed will be removed prior to the placement of the column for replacement when done. The deck of the bridge will be rated to handle the weight of loaded equipment.

In the event that any roads cross a drainage channel, existing culvert, or small tributary, a replacement culvert will be installed or temporary steel plating will be placed across to keep drainage areas open.

Mine access roads will be removed and reclaimed upon completion of work, as described in Section 3.7.

3.3.6 Transportation Plan

A Site Transportation Plan will be prepared during pre-mobilization activities and will cover both on- and off-site transport of mining-related material and other material generated during Site removal and restoration activities. The transportation plan establishes procedures to minimize the environmental and health and safety risks associated with materials transportation conducted for the project.

3.3.7 Dust Control

Reclamation activities anticipated to generate dust during the project include construction vehicle traffic and ground disturbance activities associated with material removal and re-contouring. Routine dust control measures will consist of water spray to moisten disturbed areas, on-site haul roads and other areas, as needed (e.g., unpaved construction roads are commonly watered three or more times per day during the dry season). If dust emissions are visible, dust control practices will be modified or other corrective measures will be implemented immediately.

3.4 MINING-RELATED MATERIAL REMEDIATION

This section describes the remediation (e.g., removal and management-in-place) of mining-related materials, including structures and equipment, waste rock, and tailings. A summary of the planned removal and cleanup activities is included in Table 3-2.

Based on preliminary evaluation, which would be subject to Regional Board approval, it is anticipated that there will be three groups of materials addressed in remediation at the Site:

- Group C mining-related materials at the Central, Manzanita, and Wide Awake Mines;
- Group B and C mining-related materials from the remaining mines (except West End Mine); and
- Gold-bearing ore from the West End Mine and Manzanita Mine.

The Group C mining-related materials from Central Mine will be managed in place by re-grading and capping. Other Group C mining-related materials from the other mines will be managed in place or on-site in a location such as the Central Mine. Options for disposal of Group B materials, if identified, include the following:

- Off-site disposal at the Homestake McLaughlin Mine Pit;
- Off-site disposal at an alternative licensed Class B facility; and
- On-site disposal in a constructed Class B containment unit.

Homestake's McLaughlin Mine is a permitted Group B facility and is located approximately 40 miles from the Site. If an on-site Class B unit is selected as an option, construction plans in accordance with Class B unit rules will be prepared.

3.4.1 Structures and Equipment

The following mining-related structures and debris will be evaluated as described in Section 3.1 for potential off-site disposal:

- Central Mine brick retort/furnace;
- Wide Awake Mine retorts/furnaces; and
- General scrap wood and steel.

An inventory of the mining-related equipment to be evaluated is provided in Table 2-4 and shown on Figure 2-9. The mining-related material management plan is provided in Section 3.5.

3.4.2 *Waste Rock, Tailings, Stockpiled Ore and Soil*

Waste rock, calcined tailings, stockpiled ore, and mercury-enriched soils related to mining activities will be removed from the individual mine area using excavators and/or back hoes. A complete inventory of the mining-related materials to be removed is provided in Table 2-4 and shown on Figure 2-9. A mining-related material management plan is provided in Section 3.5.

The material will be segregated based on its final disposal location (i.e., off-site disposal/landfilling, off-site transport for recycling, or on-site stabilization) based on available material characterization data. Materials to be taken off-site will be loaded directly into bulk transporters or into on-site trucks for stockpiling at the staging area. Materials for on-site stabilization will be re-graded in the immediate area. The materials will be excavated or dozed such that material from the mining impacted areas does not enter surrounding creeks.

3.4.3 *Mine Adits and Shafts*

Many of the mine sites include the presence of open adits and shafts. Shafts are to be either backfilled or plugged to effectively remove the safety hazard associated with the openings. Since each site is unique, the successful contractor is to submit a detailed proposal for the closure of each shaft to the Owner and Engineer for review and approval. Adits are similarly associated with a safety hazard requiring mitigation; however they are also commonly associated with habitat for wildlife, in particular for communities of bats. It is expected that all open adits will be closed using a locking steel grate that will prohibit human access while continuing to provide access for bats. Again, since each Site is unique, the successful contractor will submit a detailed proposal for the closure of each adit to the Owner and Engineer for review and approval.

3.5 *MATERIAL MANAGEMENT PLAN*

This section describes the material management plan for Site mining-related material, including structures and equipment, waste rock, calcined tailings, stockpiled ore, and mercury-enriched soils.

3.5.1 *Recycling and Disposal of Structures and Equipment*

Mine-related equipment, such as pipes and retort remnants, will be further evaluated to determine if removal is necessary. Factors to be considered include historical significance, proximity to creeks, and evidence of elemental mercury. If equipment or structures require disposal, then the procedures that would be followed are described below.

Where possible, based on the available material characterization data, remnants of former mining-related structures and equipment will be recycled. Only those materials demonstrated to contain concentrations of mercury below applicable regulatory limits will be considered for recycling. Materials will be sorted by type (i.e., brick/concrete, dimension stone, wood, and metal) in the staging area as they are removed from each mine. Brick, dimension stone, and concrete debris will be transferred to a recycling facility or disposed as construction waste, depending on condition; wood will either be recycled or disposed of as construction waste depending on condition; and steel will be transferred to a recycling facility as general scrap metal.

3.5.2 On-Site Stabilization

Mining-related materials that are characterized for on-site stabilization will be graded as described in Section 3.7.2 to prevent erosion of mercury-containing mining related material to Sulphur Creek.

On-site or in-place stabilization will be completed for materials that are distant from Sulphur Creek and major creek tributaries, so that they will not be actively eroding material directly to the creek or major tributaries. Materials that are moved will be placed in lifts, keyed into existing slopes and compacted between lifts. Water trucks will provide water that will be used for dust control as well as to enhance soil compactability. Lifts will be keyed in for stability and erosion control. Once final grading is complete, the materials will be capped with soil. The source of the borrow soil will be determined prior to contractor selection for reclamation activities. The cap material will be keyed into the surrounding native material and proof rolled for compaction.

As discussed with CVRWQCB during the Site visit in August 2010, removal or re-contouring the scree on cliffs and steep slopes at Manzanita Mine will not be conducted. However, existing gullying/erosion areas will be stabilized during reclamation and restoration activities. The approach for regrading and stabilization is described in Section 4.4.3.

Due to steep slopes and close contact with creek bank, there is the potential that minimal material from the Wide Awake mine area may best managed in place. The approach to address this situation, if it occurs, is described in Section 4.4.4.

3.5.3 *Disposal at Off-Site Facility*

If encountered, waste rock, tailings, and soils that do not meet on-site stabilization requirements, are not recycled, and are classified as Group B waste will be placed in an on-site Class B facility, transported to a permitted Group B facility, or transported and placed within the northern end of the McLaughlin Mine.

3.5.4 *Ore Processing*

Waste rock, tailings, or stockpiled ore that can be processed, on economically acceptable terms to Homestake may be sent to a Nevada processing facility in compliance with the Site Transportation Plan.

3.5.5 *Hazardous Waste*

Although not anticipated, hazardous wastes generated during the project will be transported to an appropriate hazardous waste landfill facility for disposal. The Transportation Plan will include, if required, trucking routes and manifest required for the hazardous waste facility. The final hazardous waste disposal facility will be determined based on the waste characteristics, waste profile, and the acceptance criteria for the available disposal facilities.

Bevill wastes, transported off site for disposal, will be manifested as hazardous materials to meet Department of Transportation regulations.

3.6 *REMOVAL CONFIRMATION*

Because of the natural variation in background mercury concentrations at the Site (Section 2.4.1), the extent of excavation of mining-related waste rock, ore, and tailings at the Site will be determined in the field using qualitative (visual) techniques before and during excavation activities. Samples for laboratory analysis will not be collected to confirm removal and/or stabilization limits or boundaries.

The horizontal and vertical limits of the waste rock, ore, and tailings piles will be identified and confirmed using the following guidelines:

- Topographical expression (many material piles have well-defined topographic profiles);
- Color change (calcine tailings have a distinctive reddish color);

- Presence of buried soil horizons, as evidenced by the presence of organic material, roots, and developed soil horizons;
- Presence of in-place bedrock;
- Presence of laminated or bedded fine-grained material indicative of natural overbank deposits; and
- Presence of an abundance of rounded gravel and cobbles indicative of former stream bed or stream terrace deposits.

Delineation of the horizontal and vertical limits of the waste rock, ore, and tailings piles will be conducted by or under the direction of registered Professional Geologists with relevant expertise in accordance with California Business and Professions Code sections 6735, 7835, and 7835.1. The delineation tasks will also be documented and reported to the CVRWQCB.

Examples of the contact between native material and mining derived material are provided in Photos E-1 through E-3 in Appendix E. In order to distinguish mining-related materials from natural soils and rock materials, the following guides will be used; the soil classification guidelines published in American Society for Testing and Materials Standard D-2487, The Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). The available guidelines will be applied in a manner that allows for the removal or stabilization of all targeted mining-related materials while minimizing the removal or disruption of in-place naturally-occurring materials.

Surficial soil removal is planned in the vicinity of the retorts and furnaces identified in Table 2-4 and shown on Figure 2-9. At each of these locations, up to the upper 1 foot of native soil (if present) will be removed and disposed within a radius of up to 25 feet around each retort or furnace. Note that additional soil excavation will not be completed in areas within that radius where waste rock or tailings have been removed.

3.7 SITE RESTORATION APPROACH

This section describes the site restoration approach, including temporary road removal; regrading, slope stabilization and bank stabilization; and re-vegetation.

3.7.1 Temporary Road Removal

All mine access roads or constructed temporary roads, bridges, or steel plates used during construction will be removed and the area restored upon the completion of work in that area as described in Sections 3.7.2 and 3.7.3. Unless required for future access or requested by the landowner, culverts placed or repaired during the construction of the roads will be removed and disposed of in accordance the recycling plan described in Section 3.5.1.

3.7.2 Regrading, Slope Stabilization, and Bank Stabilization

Disturbed areas and temporary roads will be restored upon completion of all removal and/or on-site stabilization activities. Slopes and roads will be graded to a natural line that limits run-off and drainage. Fill material will be borrowed from on-site as need for grading and stabilization. Positive drainage will be achieved to minimize ponding of water. Slopes will be stabilized by eliminating run-off from the top of the slope or cutting the slope back to slow storm water run-off. Grading around on-site stabilized materials will be used to divert storm water away from the stabilized material. Grading near creeks will be completed to limit stream bed disturbance and maintain the natural flow. The grading of site areas will remain above the creek elevation to minimize the potential for undercutting.

Creek banks will be stabilized on an as needed basis. Temporary bank stabilization measures may be necessary at the two planned temporary bridge crossings over Sulphur Creek (Figure 3-1). Also, the north bank of Sulphur Creek adjacent to the Manzanita Mine area will be stabilized to minimize lateral creek migration. The Manzanita Mine area bank/stream stabilization plan is described in more detail in Section 4.4.5.

3.7.3 Re-vegetation and Monitoring

The preliminary Vegetation Restoration Plan (Revegetation Plan) is attached as Appendix F of this Work Plan. As agreed between Homestake and the CVRWQCB, Homestake will be responsible only for the initial broadcast seeding of early succession stage native herbaceous grasses and/or forbs. Accordingly, this Revegetation Plan focuses on Year 1, *Seeding of Early Succession Herbaceous Grasses and/or Forbs*.

Disturbed Site areas will be revegetated following the completion of the construction season during the project, just prior to the first rain events. This is anticipated to occur during the Fall of 2011. Revegetation will include hydro seeding, or other techniques where more appropriate, with an appropriate soil stabilization seed mix. Upon completion of re-vegetation activities initiated by Homestake, a Site inspection with the CVRWQCB will be scheduled. See Section 4.4.6 for additional details of the Revegetation Plan.

4.0 REMOVAL DESIGN, METHODS AND PROCEDURES

This section describes the removal design, methods and procedures, including sample collection and analysis, Site preparation and control, mining-related material removal, site restoration design, equipment decontamination, geolocation, and recordkeeping.

4.1 SAMPLE COLLECTION AND ANALYSIS

Although not anticipated, samples of previously uncharacterized structures, equipment, waste rock, tailings, or ore, if encountered during remedy implementation, will be collected and analyzed following the procedures outlined in the project SAP (Appendix C). Metal equipment, such as pipes and retort remnants will be visually inspected for the presence of elemental mercury during removal activities. If mercury containing metal equipment is observed, containment, profiling, and disposal procedures described in Section 3.1 will be implemented.

4.2 SITE PREPARATION AND CONTROL

This section outlines the site preparation and control methods and procedures to be implemented during site removal and restoration activities, including mobilization and demobilization, materials and equipment staging, and road construction and improvements.

4.2.1 Mobilization and Demobilization

Mobilization and demobilization includes all work necessary to manage operations for the duration of the project. Mobilization tasks will include, but are not limited to:

- Project management of all construction operations;
- Completion and maintenance of the HASP;
- Delivery of all equipment and materials to support work and health and safety requirements;
- General site preparation, including fencing, helipad and signage, to support operations for the duration of the project; and
- Installation and maintenance of all storm water BMPs.

Demobilization tasks will include, but are not limited to:

- Temporary site controls and facilities established by the subcontractor are removed from the Site;
- Any damage caused by temporary site controls and/or removal work is repaired by the subcontractor;
- Verify that post-construction Storm Water Protection Plan BMPs are in place at the conclusion of the project;
- Decontamination of all equipment leaving the site; and
- Final inspection by CVRWQCB at the conclusion of the project.

4.2.2 Materials and Equipment Staging

The material and equipment staging area will be located on the valley floor as shown on Figure 3-1. The staging area will house field offices, equipment and material storage, and heavy equipment staging areas. Stockpile staging for mining-related materials and debris to be hauled off-site will also be conducted in this area.

The staging area will be located in an area that is not impacted by past mining operations. Only minor or emergency equipment repair or maintenance will be completed in the staging area. Activities will be conducted within the staging area in a safe manner that is protective of the environment. All generators used for power will have secondary containment for fueling and a spill response kit available at all times. The equipment maintenance area will also have secondary containment as well as storm water BMPs in place to protect the surrounding area. Note non-emergency maintenance will be conducted off site.

Storm water BMPs will be in place anytime material is being stored in the stockpile portion of staging area. Stockpiles will be covered if substantial rain is in the forecast and run-off is possible. At a minimum, BMPs will consist of straw wattles around the base of the pile and silt fence around the perimeter of the stockpile area.

Both the materials and equipment staging area will be restored as described in Section 4.4 upon completion of the project.

4.2.3 Road Construction and Improvement

Road construction and improvement will be an ongoing task during the project. Portions of the main Site access road and mine access roads will need to be repaired, upgraded, and/or constructed during removal activities. The following improvements will be made to the existing main Site access road prior to mobilization to the Site:

- Grading – The road will be graded and cleared along its entire length. The road will be improved and maintained so that equipment deliveries as well as off-site trucks can utilize the road without failure for the construction season.
- Signage – The road will be marked at both ends with appropriate signage to warn drivers that the road is single-lane and not open to the general public. Potentially hazardous sections of road, e.g., drop offs, will be marked with orange snow fence. Blind corners will have signage to instruct drivers to sound horn before approaching. Speed limits will be posted at both ends of the road.
- Road Covering – Material from the off-site borrow pit along the access road will be used as a gravel surfacing. The material will minimize dust and provide traction for the trucks. The borrow material will be selected so that it will not be a significant source of mercury.
- Culvert Repair – Three locations along the road will require existing culverts to be removed or a culvert to be put in place for natural drainage crossing. The replacement will include repair of the adjacent slope if necessary with soil and rock. Repaired area will be sloped to minimize the potential for washouts.
- Sink Hole Repair – Areas along the road that have sinkholes will be repaired. Material from the surrounding area will be placed into the hole and compacted in lifts to minimize the potential for road failure in the area.

Mine access roads will be constructed or existing roads repaired on an as needed basis. Tasks that will be performed for mine access road construction include the following:

- Grading of existing road for use by off road trucks and equipment will be kept to a minimum. Roads will only be scraped to remove ruts, large rocks, or widened for safe passage of the largest piece of equipment using the road. These roads will be constructed by using a dozer to create a road and berm the spoils along the outer edge of the road for use later. The maximum road width will be 14’ except in turn out areas. Roads will be re-contoured to minimize the disturbance of existing slopes.
- Replacing or extending drainage culverts will be required to accommodate larger vehicles.

- Temporary bridges will be placed to access the Wide Awake and Central Mine Group areas - New culverts, steel trench plates, or a combination of the two will be used at locations where existing culverts or drainage channels require additional support. The three planned locations are depicted on Figure 3-1. Example diagram for a typical crossing is provided in Figure 3-2; however, the selected contractor/Engineer will make decisions on the crossing based on the size of equipment.
- Constructing new roads into mine areas where no current access exists. New access roads will be constructed only when needed. Each road will be constructed with a dozer just deep enough to removed vegetation and wide enough for the largest piece of equipment to access. Any material removed from the road will be bermed on the side for revegation use when the work is complete. Depending on the length of the road, turnouts for passing may be placed every 1,000 yards. Roads will be constructed along contour as much as possible while providing safe passage of trucks and equipment. Turns will be kept wide so that additional rutting and damage to the area does not occur.

Tree removal and/or trimming to facilitate road placement may be required, but will be minimized to the extent practicable, and impacts to surrounding areas will be minimized.

Temporary bridges will be set on the creek banks at two locations (Figure 3-1). Steel I-beams will be set back from the bank and placed parallel to the creek to distribute the weight of the bridge and load while minimizing the damage to the creek bank. Concrete anchor blocks and cables will be used to minimize movement of the bridge on both sides. A support block may be placed in the creek bed to support the center of the bridge span. The deck itself will consist of a portable bridge deck, a flat rail car, or equivalent, rated for the expected weight. Both reaches where temporary bridges are planned are expected to be dry during Site operations.

4.3 MINING-RELATED MATERIAL REMEDIATION

This section describes the mining-related material remediation methods (i.e., removal and managed-in-place) and procedures to be implemented during Site removal and restoration activities, including required equipment; structures and equipment removal and staging; waste rock and tailings removal, segregation, and staging; and transportation.

4.3.1 *Required Equipment*

The removal of mining-related materials (e.g., rock, tailings, and debris) will require the use of heavy equipment, including:

- Excavator with thumb;
- Excavator with straight edge bucket;
- Multiple 10-wheel truck or off-road trucks;
- Water truck, all wheel drive;
- Drop tank for water;
- Loader;
- Dozer, D-6; and
- Dozer, D-6 LGP.

4.3.2 *Structures and Equipment Removal and Staging*

Mining-related structures, equipment, soil, and debris will be removed, if required, from the work area during the project. As structures are removed from each mine area the material will be transported to the staging area, stockpiled, and consolidated for disposal. Mining-related debris encountered between the staging area and the target mine areas will also be evaluated for removal, as described in Section 3.1. This includes man-made wood products and steel.

If required, the removal of former mining structures is anticipated to be completed with an excavator with thumb with minor cutting. If hot work is need to dismantle steel structures a separate Job Hazard Analysis form will be completed and included in the project HASP.

Debris will be sorted by type (i.e., brick/concrete, wood, and metal). Based on available characterization data, brick and concrete debris will be disposed off at a recycling facility, wood either recycled or disposed of as construction material, and steel will be recycled. If processing equipment is determined to be Group A waste, then a separate containment area in the staging area will be created specifically for those wastes. This waste will be transported to an appropriate facility within 90 days of accumulation, or prior to the end of the construction season, whichever comes first. Debris and materials to be recycled will be sent off site as a full load is generated or the end of the project to minimize expenses.

4.3.3 *Waste Rock, Tailings, Ore, and Soil Removal, Segregation, and Staging*

Waste rock, tailings, ore, and soil will be removed from the Site using a systematic approach. Excavators will be used to segregate the material based on material characterization data and field observations as the material is placed into haul trucks. The material will be removed using a straight edge bucket working from the outside edges of dumps and piles inward. The process will minimize the mixing of native material with the tailings, the over excavation of material, and the spreading of material into adjacent creeks and clean areas. To the extent possible, work will proceed from the furthest location of the mine back toward the staging area.

Material will be loaded directly into bulk transporters or into on-Site trucks where access is limited. Materials that are loaded onto on-Site trucks will be stockpiled in the staging area for loading into bulk carriers for transport to the final disposal or processing destination.

4.3.4 *On-Site Management of Mining-Related Materials*

As mentioned previously, not all of the mining-related material will require removal and disposal off Site. Mining-related materials meeting Group C requirements will be managed in accordance with Group C requirements and may be reclaimed in place. The existing waste rock at the Central Mine site has been sampled, tested, and is classified as a Group C mining waste. This material will not be removed, but will be reclaimed in place.

Inspection has revealed that the surface of the existing waste rock pile contains a pocket against the existing highwall that is capable of accepting additional (Group C) mining-related materials. The capacity of this "pocket" is estimated to be on the order of 9,000 cy. Any additional Group C material encountered at other locations on-Site can be transported to the Central Mine area and placed on the existing waste rock pile to be reclaimed on-Site, up to the estimated total capacity.

The mining-related material will be spread in thin lifts and compacted using equipment traffic. The final surface shall be graded to match surrounding surface, have positive drainage, and then seeded with the approved upland seed mix to revegetate the finished surface.

4.3.5 *Transportation Plan*

A Preliminary Site Transportation Plan was prepared to identify potential health and safety risks resulting from on- and off-site movement of materials, equipment, and debris. The preliminary transportation plan outlines appropriate procedures and precautions that will be taken to minimize potential risks, and will be modified during the project to reflect changing conditions, improved procedures, and expanded scope, as needed, including additional off-site disposal locations.

4.4 SITE RESTORATION DESIGN

This section describes the Site restoration design, including required equipment, temporary road removal, regrading and slope stabilization, and revegetation.

4.4.1 Required Equipment

Equipment required for Year 1 Site restoration may include the following:

- Water truck, all wheel drive;
- Dozer, D-6, with rippers; and
- Hydro seeder.

4.4.2 Restoration of Temporary Roads

All temporary roads used or constructed as part of this project will be removed when a construction is completed. Using excavating equipment and starting at the furthest extent of the access road, the roadway shall be graded to match existing grade and contour as the equipment "backs out" of the access road alignment. Area shall be graded such that no ponding of storm water will occur and seeded with the approved seed mix to re-establish the vegetative cover (see Figures 4-1 and 4-2 for steep slopes and flat terrain, respectively). Restoration activities will include:

- Removal of culverts installed for creek crossings;
- Removal of signs or markers installed during mobilization;
- Removal of new temporary bridges, anchor blocks, and support blocks in creek;
- Replacement of stone where bridge support blocks were removed;
- Rip the soil compacted during road construction to facilitate re-vegetation;
- Re-grade the road location to minimize visual evidence of the road;
- Re-grade to minimize run-off and erosion, per Sections 4.4.3 and 4.4.4; and

- Re-vegetate area per Section 4.4.5.

At locations where the roadway prism crosses a drainage, existing structures will be removed and the channel bed re-established, if necessary. The new channel should match the existing channel grade and the new channel armored with D50 = 4 inch graded riprap.

4.4.3 *Regrading and Slope Stabilization*

The restoration of disturbed areas and temporary roads will be completed by grading the area to blend with the surrounding grades and natural slopes to the extent practicable. Areas that have been compacted and abandoned will be graded and/or ripped to facilitate vegetation growth. All slopes and graded areas will minimize channeled storm water run-off and erosion. Stream bed slope and path will be protected during re-grading.

Slopes will be stabilized by track rolling with the dozer, will comply with storm water BMPs, and will be finished with hydro seeding per the re-vegetation plan. For areas requiring fill along slopes, the material will be keyed in and compacted.

Where appropriate, grass filters may be employed to facilitate stabilization and mitigate sediment runoff to the creek. A grass filter is essentially a vegetated buffer zone lying on the flat to gently sloping terrace surface between the toe of the slope and the top of the main channel bank. The vegetation slows the velocity of sediment laden runoff causing the sediment to deposit on the surface within the limits of the vegetation coverage before reaching the edge of the stream bank. It relies on a high cover density of grass or grass-like vegetation (a dense cover of weeds will also be effective). The grass filter can be formed either by preserving an existing stand of dense vegetative cover (i.e., leaving a buffer zone) or by re-establishing a dense vegetative cover on a newly disturbed surface.

4.4.4 *Potential Channel Sediment Controls at Wide Awake*

As discussed with the CVRWQCB, removal of the mining-related waste rock in the very bottom of the existing channel in the Wide Awake Mine area may be difficult and result in greater potential impacts to the creek from the removal activities. As such, some material may remain trapped in inaccessible areas of the channel floor (among boulders and in pools and pockets along the channel floor). If the estimated volume trapped is sufficiently small, then no additional measures to mitigate potential downstream sedimentation shall be deemed necessary. However, if the trapped volume is of sufficient quantity[5], then a temporary rockfill sediment dam structure may be constructed as a temporary collection measure.

It is proposed that the sediment dam would be operated in the channel downstream of the Wide Awake area to detain and facilitate the removal of the trapped materials over a period of up to five (5) years. A proposed design plan for the rockfill sediment dam is provided in Appendix G.

If the construction of the rockfill sediment dam is warranted, Homestake will include this activity as part of the restoration activities. However, any inspections, maintenance and final removal will be the responsibility of other Dischargers, identified by CVRWQCB.

4.4.5 *Stream Stabilization near Manzanita*

Expected disturbance on a portion of the Manzanita Mine lies directly above a section of the main channel of Sulphur Creek that is an outside meander bend and is actively migrating toward the base of the slope. Should the erosion associated with the meander bend reach the toe of the slope, it could result in significant instability in the slope above the channel delivering sediment, (potentially from mining-related material) directly to the creek channel. As a mitigation measure, the installation of a self-deploying riprap barrier is proposed. The purpose of the self deploying riprap barrier is to arrest the lateral migration of the channel before it reaches the toe of the slope without constructing a hard structure within the active channel.

Once erosion of the channel bank reaches the edge of the barrier, it will undermine and expose the riprap filled trench causing the rock to fall into the edge of the channel forming an angle of repose slope of coarse rock that inhibits any further migration toward the toe of the slope. A typical detail diagram of a self-deploying riprap barrier is provided as Figure 4-3.

[5] Based on the limited topographic information and the Site inspection performed, the preliminary trigger amount is estimated to be 20 CY of in place material. This estimate considers the space available in which to construct a sediment pond in the drainage, as well as the effective amount of sediment that could be collected and removed from the pond. This estimate will be re-evaluated during the remediation activities at the Wide Awake area.

4.4.6 *Revegetation*

The preliminary Revegetation Plan is attached as Appendix F of this Work Plan. A summary of the Revegetation Plan is provided here; however for complete details refer to Appendix F.

As agreed between the CVRWQCB and Homestake, Homestake will be responsible for the initial broadcast seeding of early succession stage native herbaceous grasses and/or forbs. Accordingly, this Work Plan focuses on Year 1, *Seeding of Early Succession Herbaceous Grasses and/or Forbs*. Other Dischargers identified by CVRWQCB will be responsible for the Post Year 1 revegetation monitoring and activities.

Key features of the Revegetation Plan include:

- Phased approach;
- Location and areal extent;
- Seed mixes;
- Seeding schedule;
- Evaluate the effectiveness of the restoration; and
- Monitor to verify the effectiveness of the restoration.

The location and areal extent of Year 1 vegetation restoration efforts are specified on a mine-by-mine basis in Section 3 of the Revegetation Plan. An overview of the restoration plan is provided in **Table 4-1**. The Year 1 decision framework is shown in **Figure 4-4**.

Based on Year 1 verification monitoring data for a particular area, if the Year 1 performance-based triggers are:

- Achieved—then Year 1 restoration actions are complete and no further Year 1 restoration actions are necessary.
- Not achieved—then additional seeding effort using native herbaceous grasses and/or forbs will be conducted.

Re-vegetation of the restored areas will be completed prior to the beginning of the wet season (Fall 2011). Appropriate seed mixes will be applied as described in the Revegetation Plan. As requested by the CVRWQCB, the Revegetation Plan also describes the proposed monitoring and performance criteria for Post Year 1 activities that will be the responsibility of other Dischargers as identified by CVRWQCB.

4.5 EQUIPMENT DECONTAMINATION

Equipment decontamination will occur anytime a piece of equipment or truck that was in contact with contaminated material leaves a specific mine area (boundaries to be determined in the field) or the Site. Mine area and staging area decontamination will be conducted in accordance with the following procedures:

- Contaminated material with be knocked off all equipment tracks and or tires prior to leaving work area;
- Bulk transporters or on-site trucks will load in a single area outside of the contaminated zone to prevent material from being tracked out;
- Bulk transporters and in-site trucks will keep loads below the rail and will clean rails prior to proceeding on haul road; and
- Support vehicles will not enter contaminated zones.

Equipment and or trucks leaving the project Site will adhere to the following procedures:

- Equipment will be decontaminated in the staging area prior to leaving the Site. The bid specifications will include specific demobilization decontamination procedures.
- Bulk transport trucks will verify that rails and fenders of trucks are clear of soil and that tires are clean prior to leaving staging area. Knock off pads will be constructed if necessary.
- Pickup trucks leaving the site will have clean tires prior to leaving the site on the access road.
- All vehicles leaving the property will have clean tires prior to entering Highway 20. Knock off pads will be constructed if needed.

4.6 GEOLOCATION

The limits of removal actions at each mine site will be photo-documented in the field and will be geolocated using a portable GPS unit. The GPS data will be used to develop as-build maps of the construction effort using the existing project base map, and will be augmented by a series of before-and-after photographs of each work area.

4.7 RECORDKEEPING

This section describes recordkeeping procedures that will be followed during the removal and restoration activities at the Site, including daily field notes, the project permit book, and field and laboratory material characterization activities.

4.7.1 Daily Field Notes

Daily field notes, consisting of the following forms, will be produced during Site removal and restoration activities:

- Daily tailgate form – The daily tailgate form will document the days planned activities, safety discussions, and all site visitors signed in and out of the site (form included in project HASP).
- Field log – The field log will document site activities, work completed, volumes excavated, materials leaving the site, phone log, and decisions made in the field.
- Air monitoring log – Real time air monitoring and dust monitoring will be recorded daily (log included in the project HASP).
- Off-site truck log – Off-site truck logs will contain the date, time, truck, material leaving the site and the manifest for the load. It will be paired with a receiving log for any landfilled materials at the McLaughlin Mine or a manifest receipt for materials disposed off-site.
- Photo log – Photo logs will be digital images of the progress of work through out the day. Overall Site photos as well as detailed photos will be organized chronologically and maintained electronically.

All of the site daily field notes will be kept by the Construction Manager during Site construction activities, and will be provided to the Project Manager following completion of construction, for placement into the project file.

4.7.2 Permit Book

A record of all project approvals and permit conditions will be created as they are obtained and a "Permit Book" will be developed that contains all certified and signed permissions and exemptions, and a complete list of conditions and BMPs that are to be adhered to during construction. A hard copy of the Permit Book will remain on Site during construction, and copies will be distributed to appropriate Homestake and contractor leads.

Following completion of removal and restoration activities, the Permit Book will be incorporated into the project file by the Project Manager.

4.7.3 *Field and Laboratory Material Characterization Data Management*

Although not anticipated, if additional mining-related materials are identified during the removal action, additional field and laboratory characterization data may be collected. All additional characterization data will be reviewed for acceptability and entered into the project database. Procedures related to field and laboratory data management are provided in the SAP (Appendix C).

Data generated in the field may include field log book entries, sample dates, field parameter measurements, observations, and additional information (such as field duplicate number). These data will be manually entered into an electronic format, and then checked by a second person, before final inclusion in the database. Following review and acceptance, analytical data generated by the subcontract laboratories will be obtained as an electronic data deliverable for import into the project database.

5.0 *PROJECT SCHEDULE*

The project schedule is dependent upon timely approval by CVRWQCB of this Work Plan. It is anticipated that Homestake will receive approval of this plan within 45 calendar days of submittal. The project schedule also requires landowner agreements.

Permitting and planning activities for the remediation project will begin during the fall of 2010. Site mobilization and construction tasks are planned to be completed during the dry season of 2011 (1 April through 15 October 2011) with revegetation/restoration activities continuing through the fall season. It is anticipated that a Mining-Related Materials Remediation Completion Report will be submitted within 3 months after the completion of all field efforts at the Site.

The above schedule assumes that all Site activities will satisfy requirements for categorical exemption from CEQA review. If certain activities require CEQA action, the above schedule will need to be revised to include CEQA review and reporting.

6.0 REFERENCES

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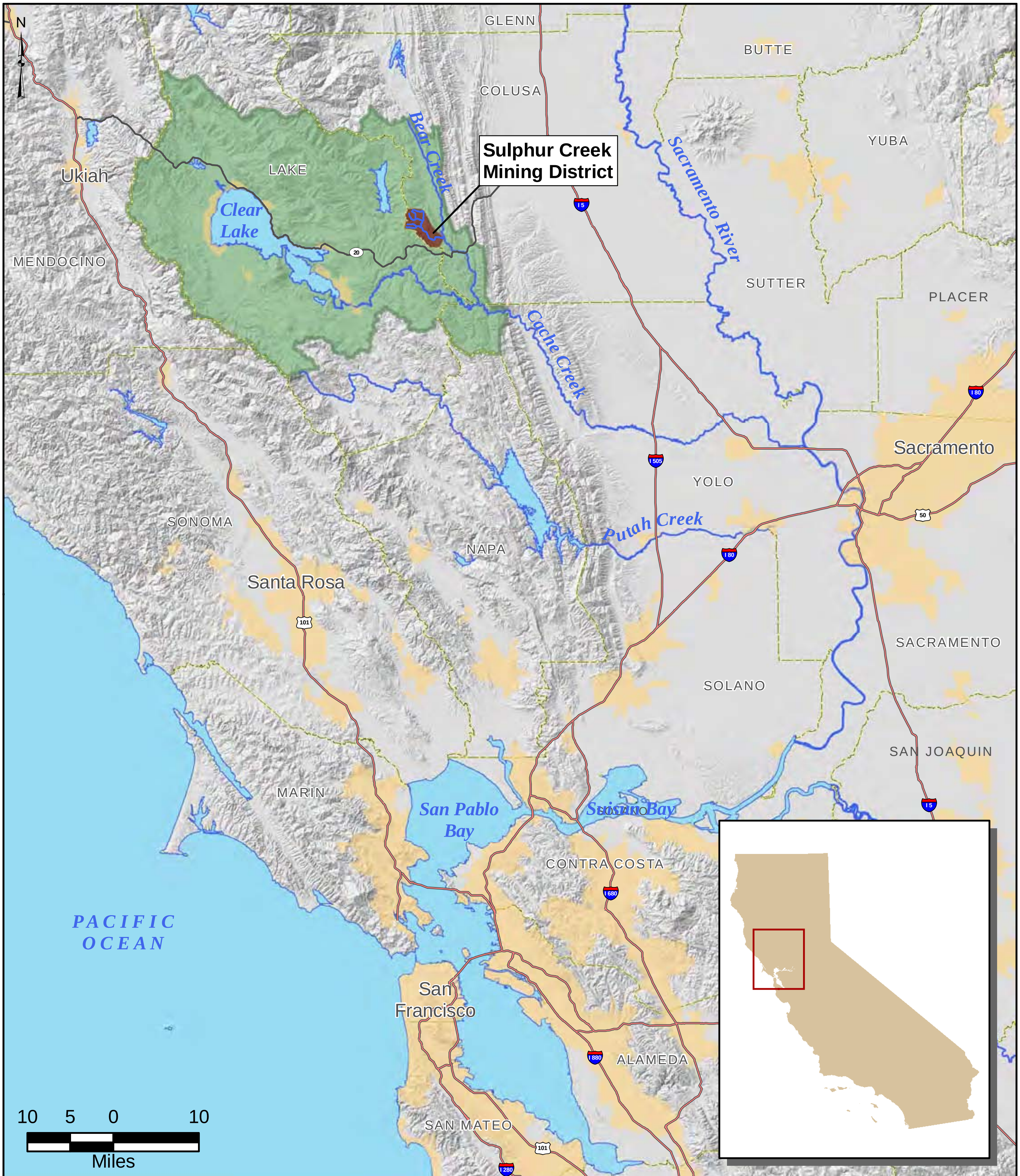
Figures



Cache Creek Watershed

Urban Areas (e.g., Santa Rosa)

Counties (e.g., COLUSA)

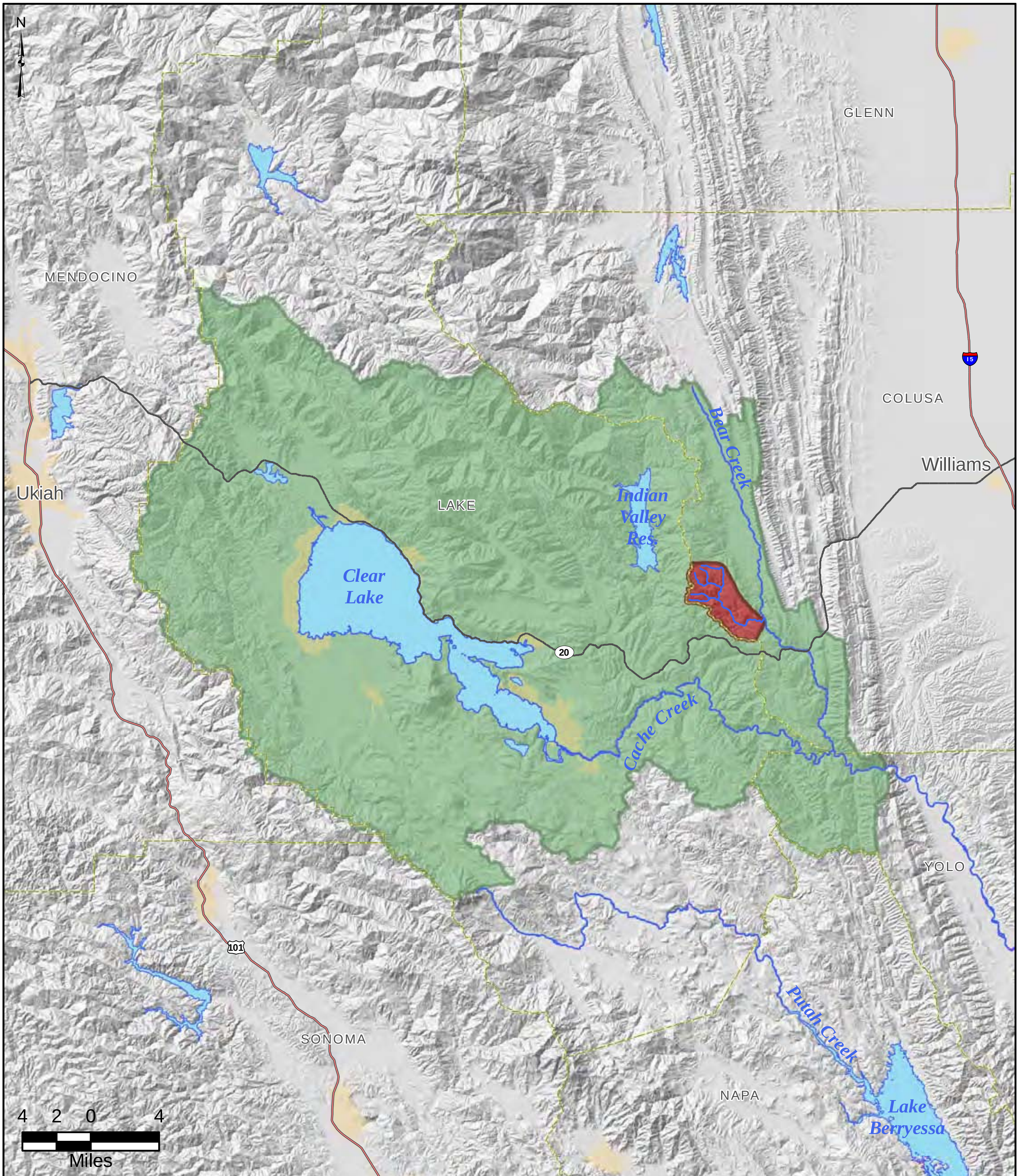
Sulphur Creek Mining District
Colusa County, California

FIGURE 2-1

SITE LOCATION MAP

ERM

Prepared by MKJ (ERM)	Date 03/30/10	JOB No. 0103878 FILE: GIS/BARRICK/SCMD/FIGURE 1.MXD



Cache Creek Watershed

Sulphur Creek Watershed

Urban Areas (e.g., Ukiah)

Counties (e.g., COLUSA)

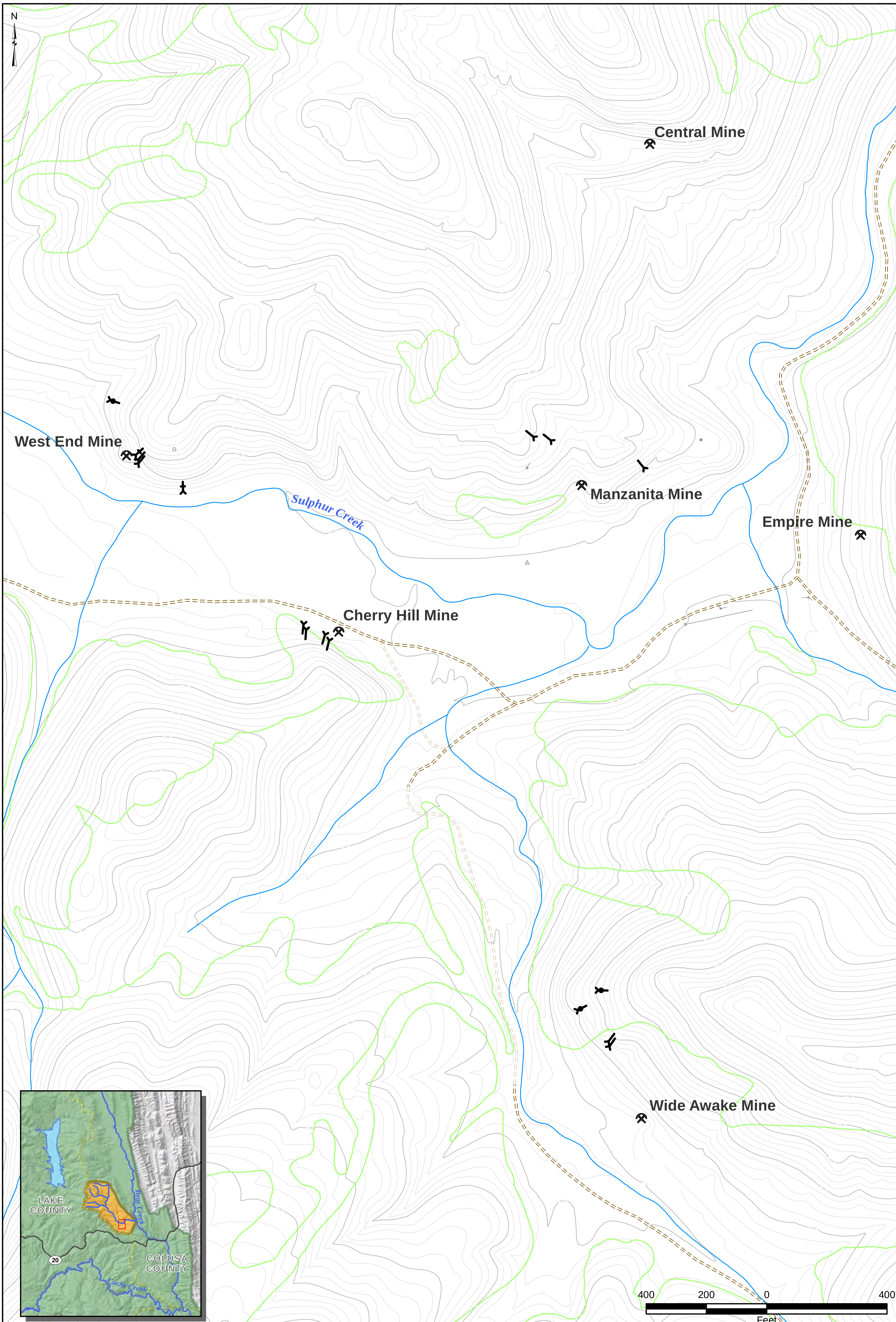
Sulphur Creek Mining District
Colusa County, California

FIGURE 2-2

CACHE CREEK WATERSHED

ERM

Prepared by MKJ (ERM)	Date 03/30/10	JOB No. 0103878 FILE: GIS/BARRICK/SCMD/FIGURE 2-1.MXD



Existing Road
Waterbody
Vegetation
Major Contour
Minor Contour
Utilities

Mine Site
Adit and Shaft Locations
Open
Open-Gated
Filled In

Cache Creek Watershed
Sulphur Creek Watershed

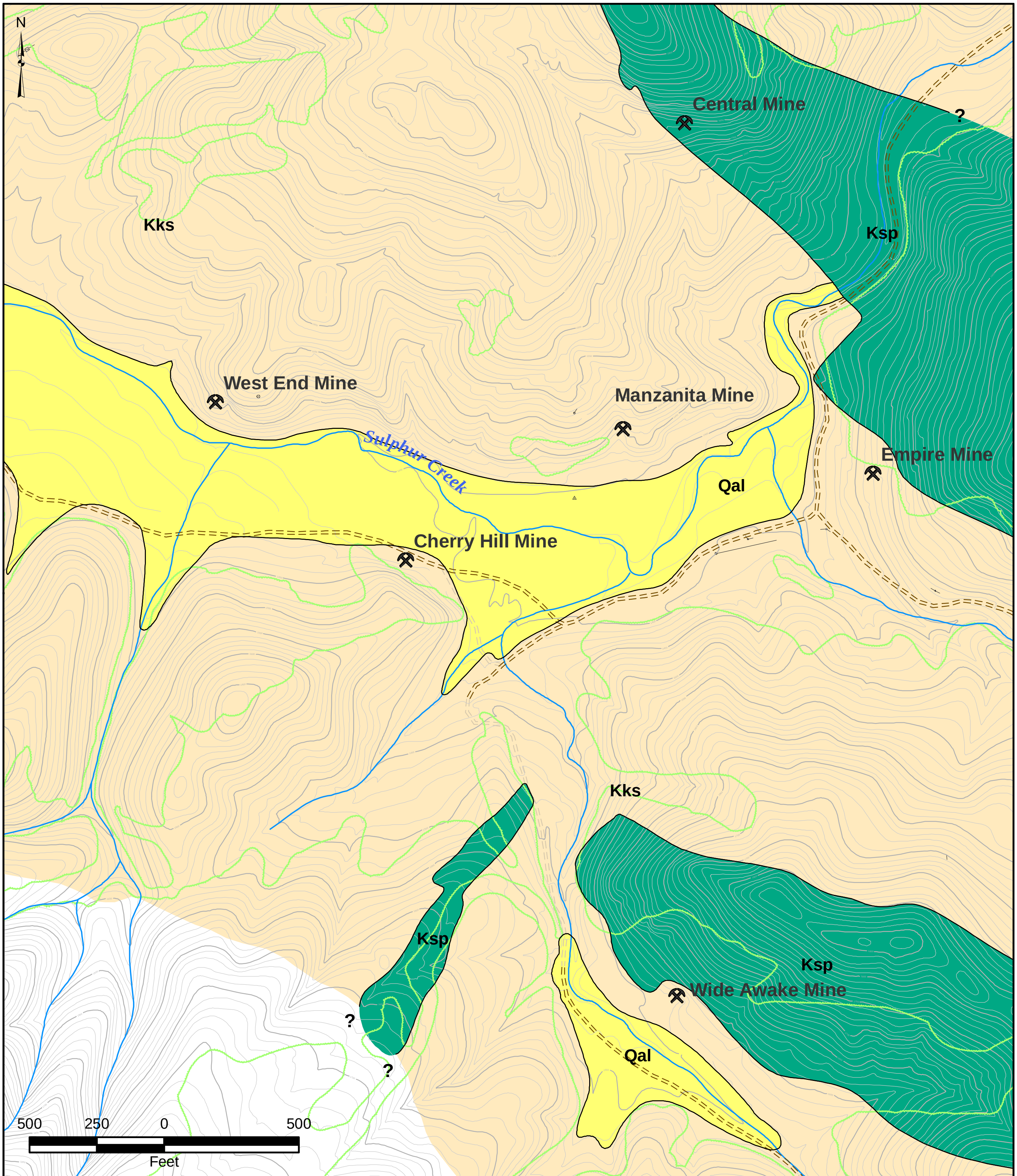
Sulphur Creek Mining District
Colusa County, California

FIGURE 2-3

SITE MAP

ERM

Prepared by MKJ (ERM) | Date 04/23/10 | JOB No. 0108205 FILE: GIS/BARRICK/SCMD/FIGURE _.MXD



Existing Road
Waterbody
Vegetation
Major Contour
Minor Contour
Utilities

Mine Site
Qal = Quarternary Alluvium
Kks = Knoxville Formation Sedmentary Rocks
Ksp = Serpentinite

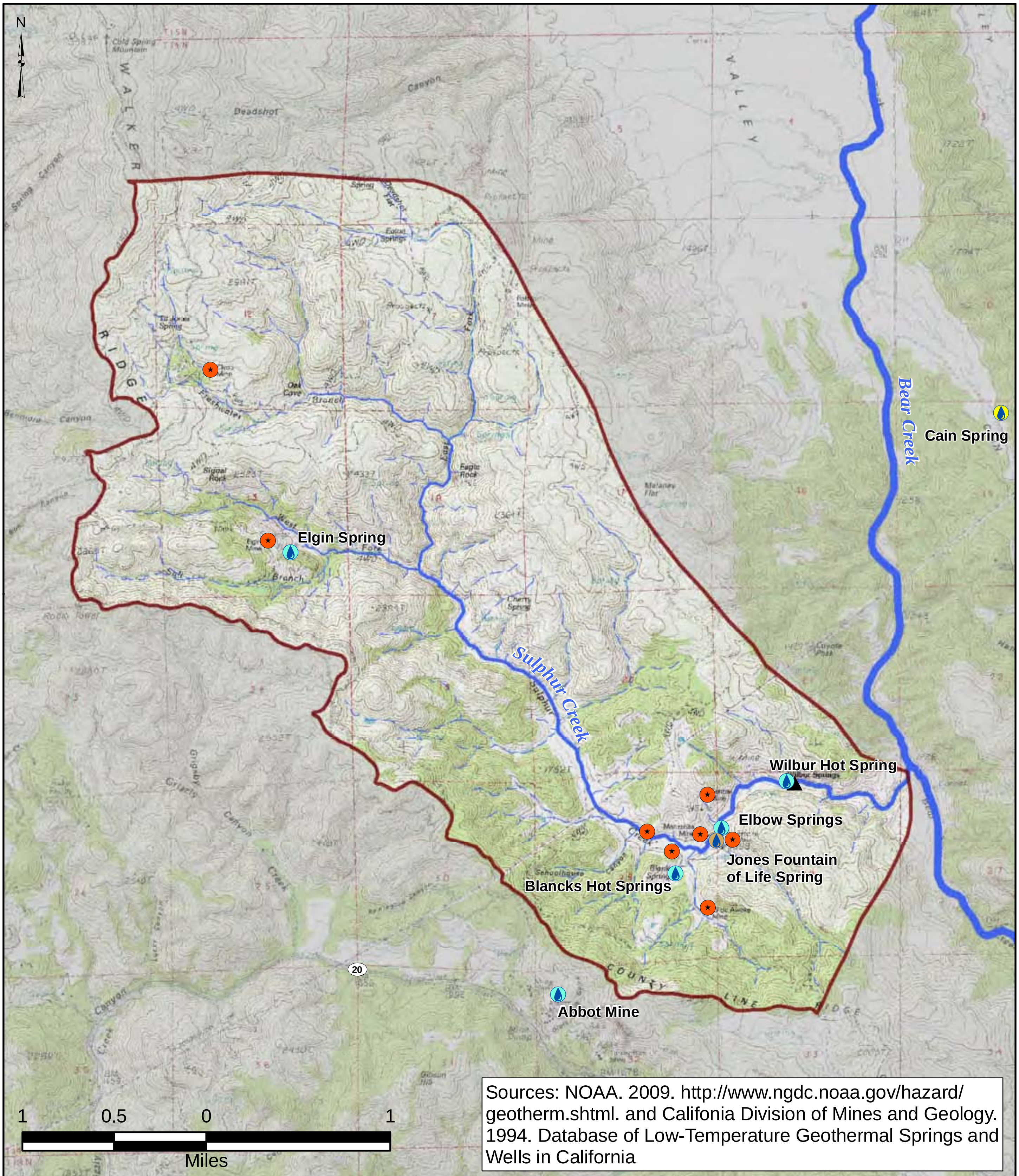
Sulphur Creek Mining District
Colusa County, California

FIGURE 2-4

GEOLOGIC MAP

ERM

Prepared by MKJ (ERM)	Date 04/15/10	JOB No. 0108205 FILE: GIS/BARRICK/SCMD/FIGURE 2-4.MXD



Inactive Mine

USGS Stream-Gaging Station

Wells and Springs

Thermal Spring

Geysering Well

Saline Spring

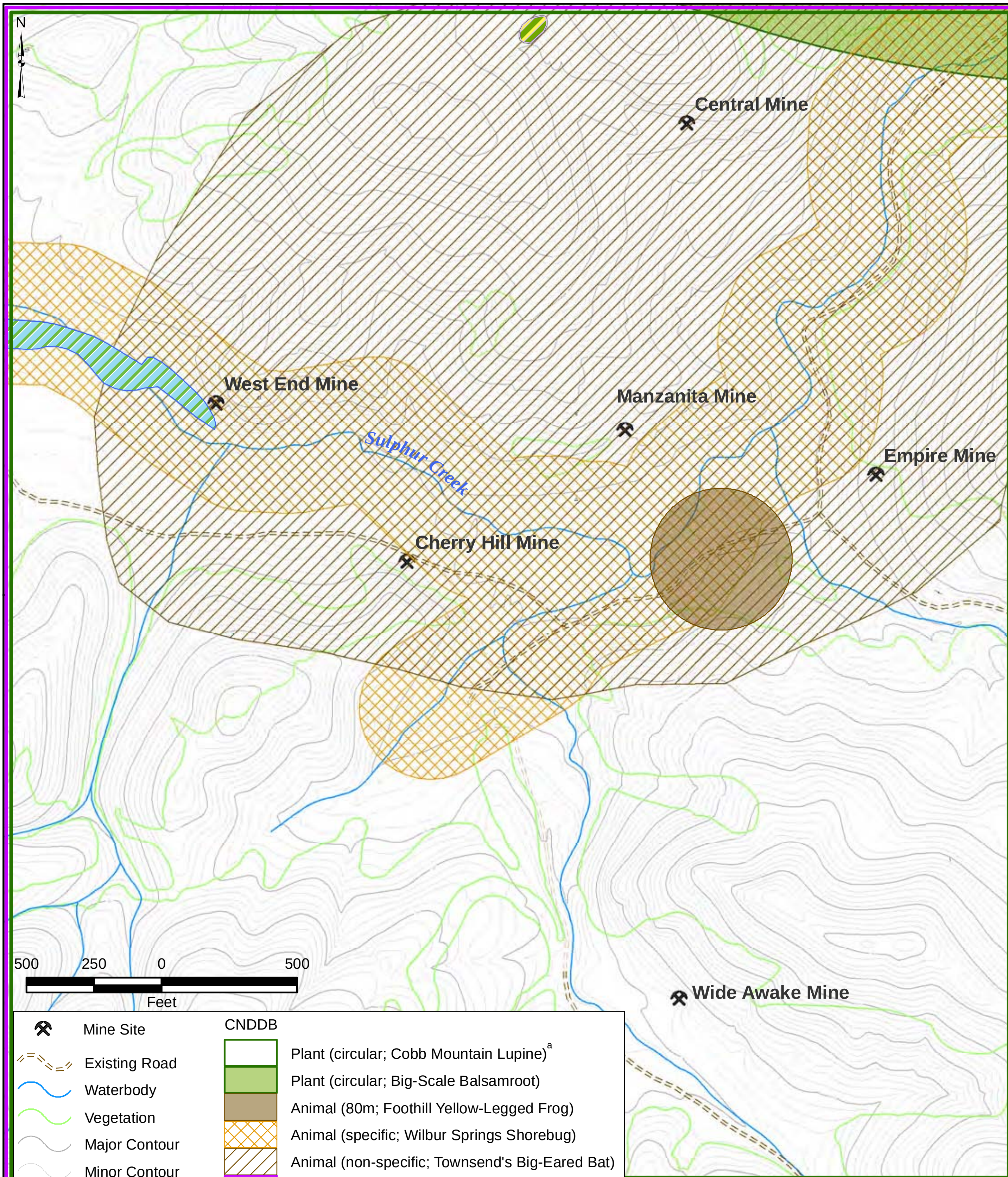
Sulphur Creek Mining District
Colusa County, California

FIGURE 2-5

GEOTHERMAL WELLS AND SPRINGS IN THE AREA

ERM

Prepared by MKJ (ERM) | Date 09/21/10 | JOB No. 0103878 FILE: GIS/BARRICK/SCMD/FIGURE 2-5.MXD



Mine Site
Existing Road
Waterbody
Vegetation
Major Contour
Minor Contour
Utilities

CNDDB
- Plant (circular; Cobb Mountain Lupine)[a]
- Plant (circular; Big-Scale Balsamroot)
- Animal (80m; Foothill Yellow-Legged Frog)
- Animal (specific; Wilbur Springs Shorebug)
- Animal (non-specific; Townsend's Big-Eared Bat)
- Sensitive EO's (Commercial only; Prairie Falcon)[a]

National Wetlands Inventory (NWI)[b]
- Freshwater Emergent Wetland (PEMA)
- Diked/Impounded Wetland

[a]Extent Covers Entire Map
[b]NWI Wetland Codes: http://www.fws.gov/wetlands/Data/wetlandcodes.html

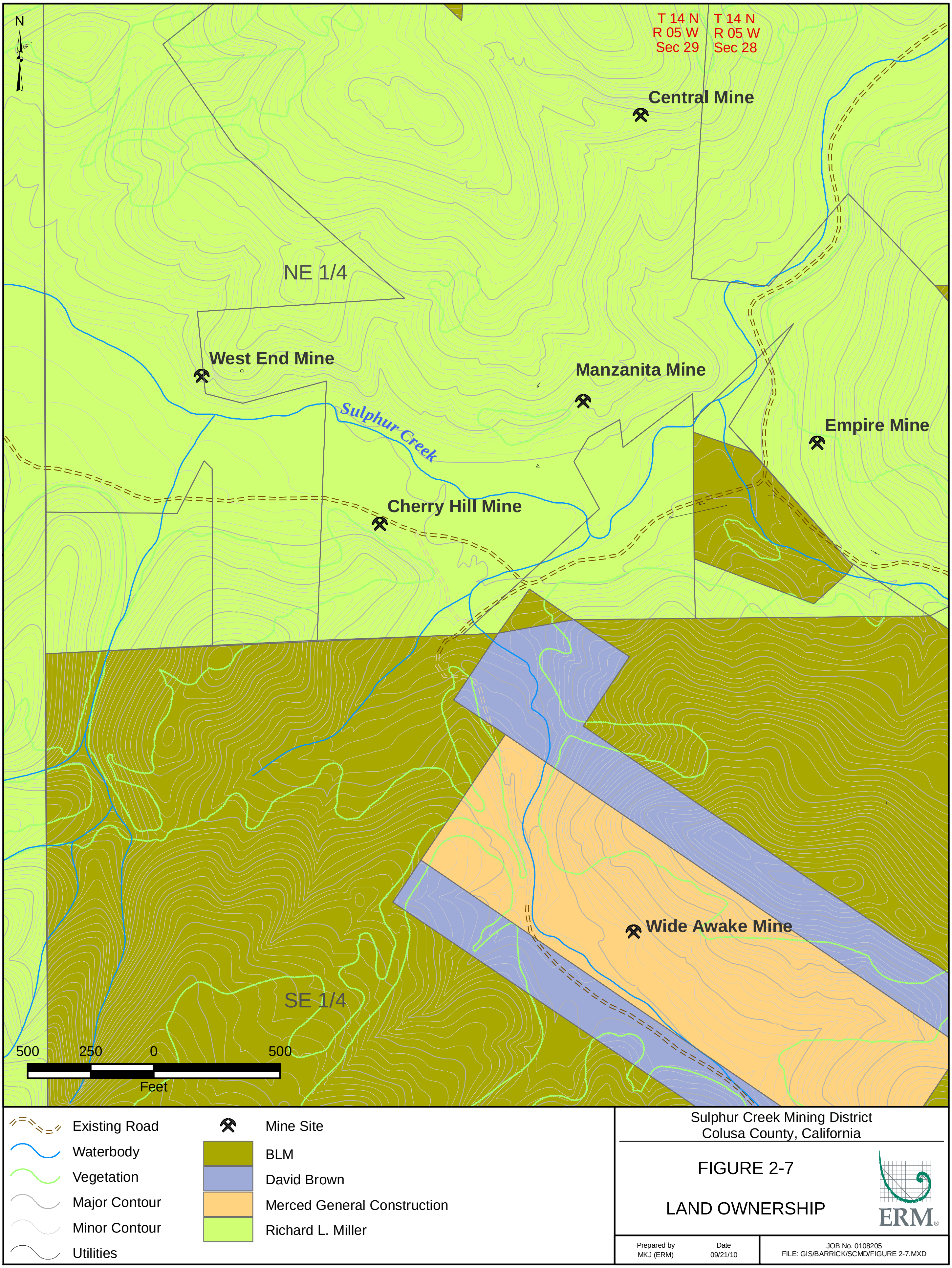
Sulphur Creek Mining District
Colusa County, California

FIGURE 2-6

NWI WETLANDS
AND CNDDB MAP

ERM

Prepared by MKJ (ERM)	Date 09/21/10	JOB No. 0108205 FILE: GIS/BARRICK/SCMD/FIGURE 2-6.MXD



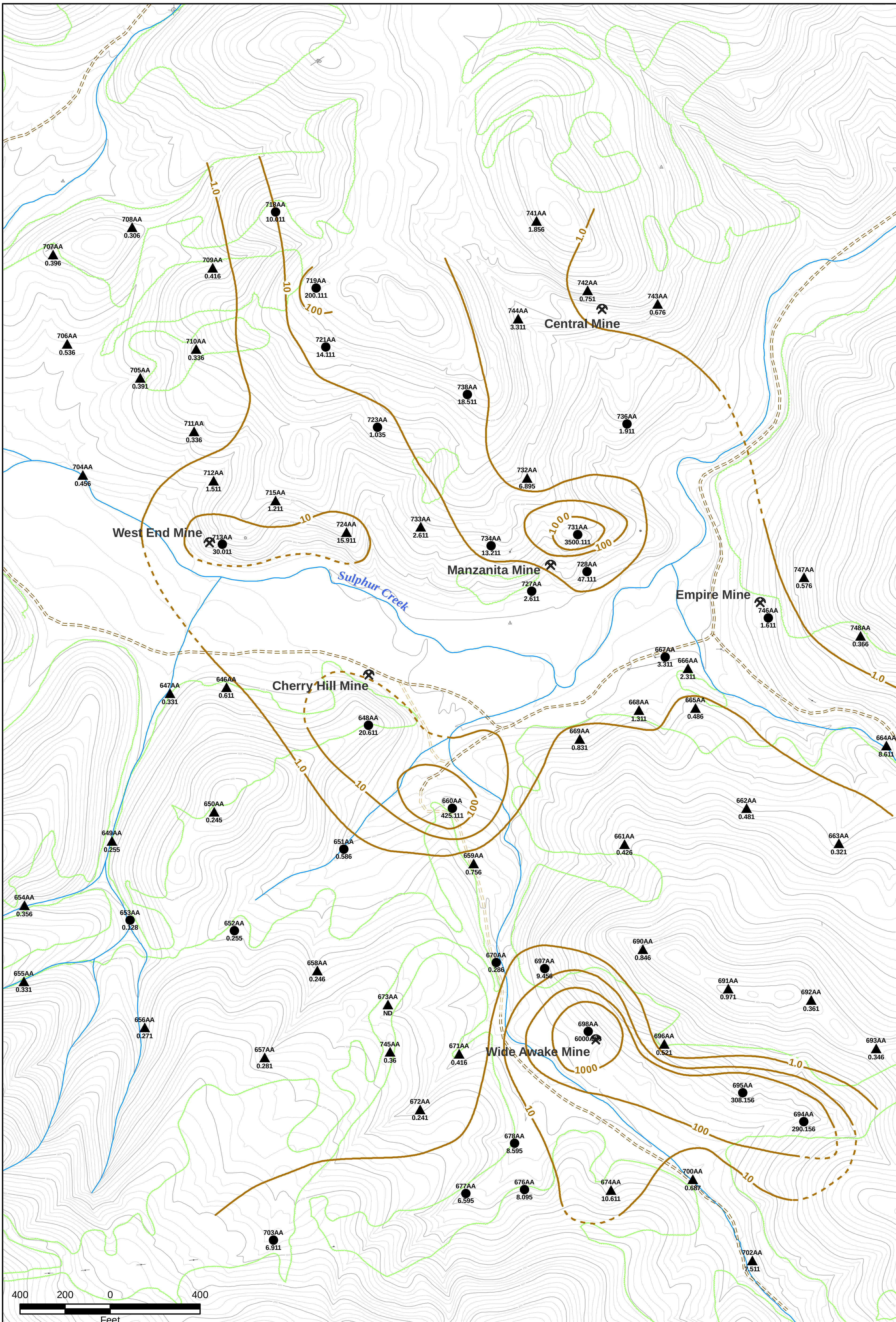
Sulphur Creek Mining District
Colusa County, California

FIGURE 2-7

LAND OWNERSHIP

ERM

Prepared by	Date	JOB No. 0108205
MKJ (ERM)	09/21/10	FILE: GIS/BARRICK/SCMD/FIGURE 2-7.MXD



Existing Road
Waterbody
Major Contour
Minor Contour
Vegetation
Utilities

Mine Site
Altered Rock Samples
Unaltered Rock Samples

647AA = Sample ID
0.331 = Concentration in Total Hg, ppm

Mercury Isoconcentration Contour, dashed where inferred (ppm), surficial bedrock

Data obtained from R.W. Hatch, 1983, Cherry Creek Re-evaluation, Preliminary Report, Homestake Mining Company of California, File\Report, October 1983.

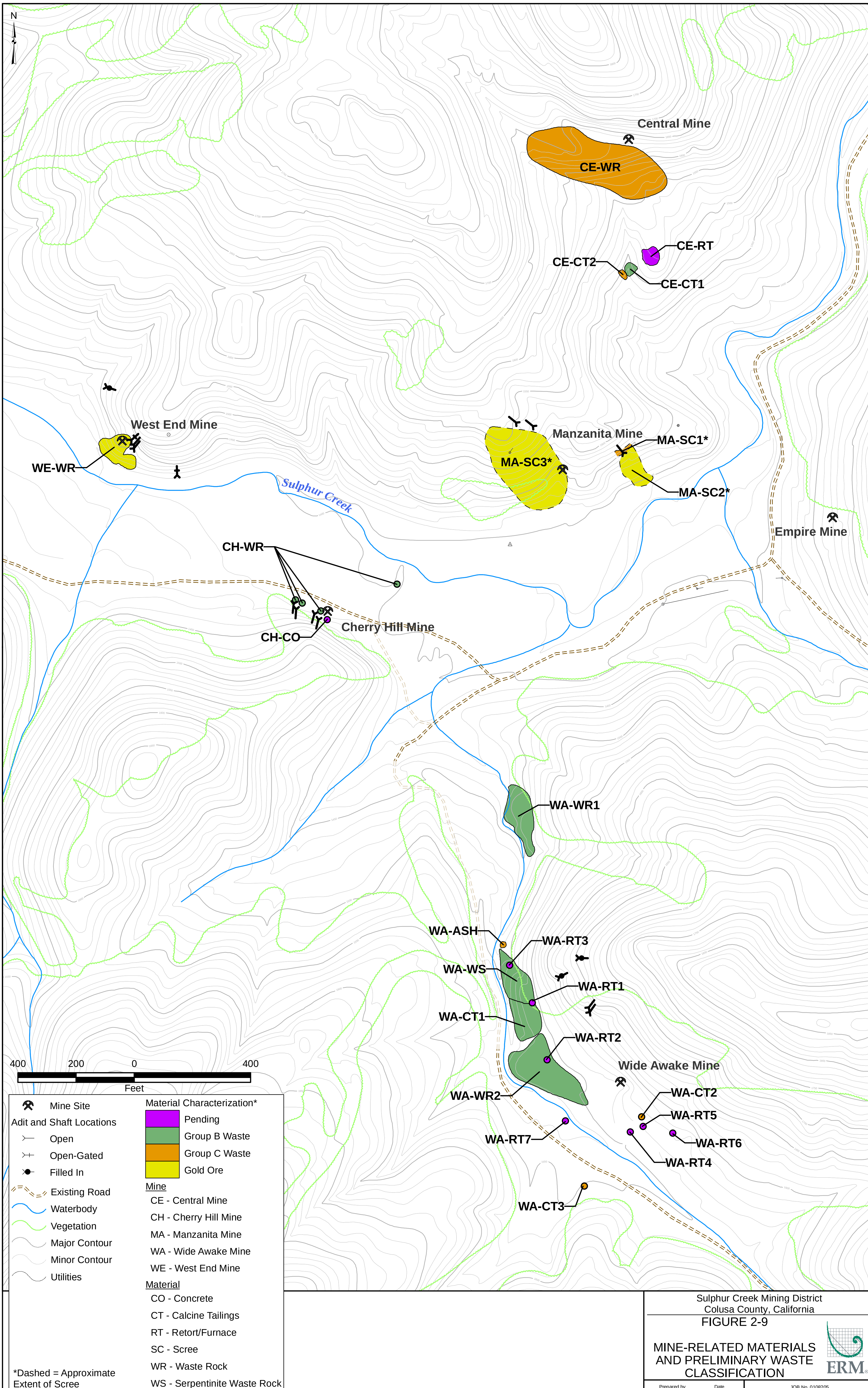
Sulphur Creek Mining District
Colusa County, California

FIGURE 2-8

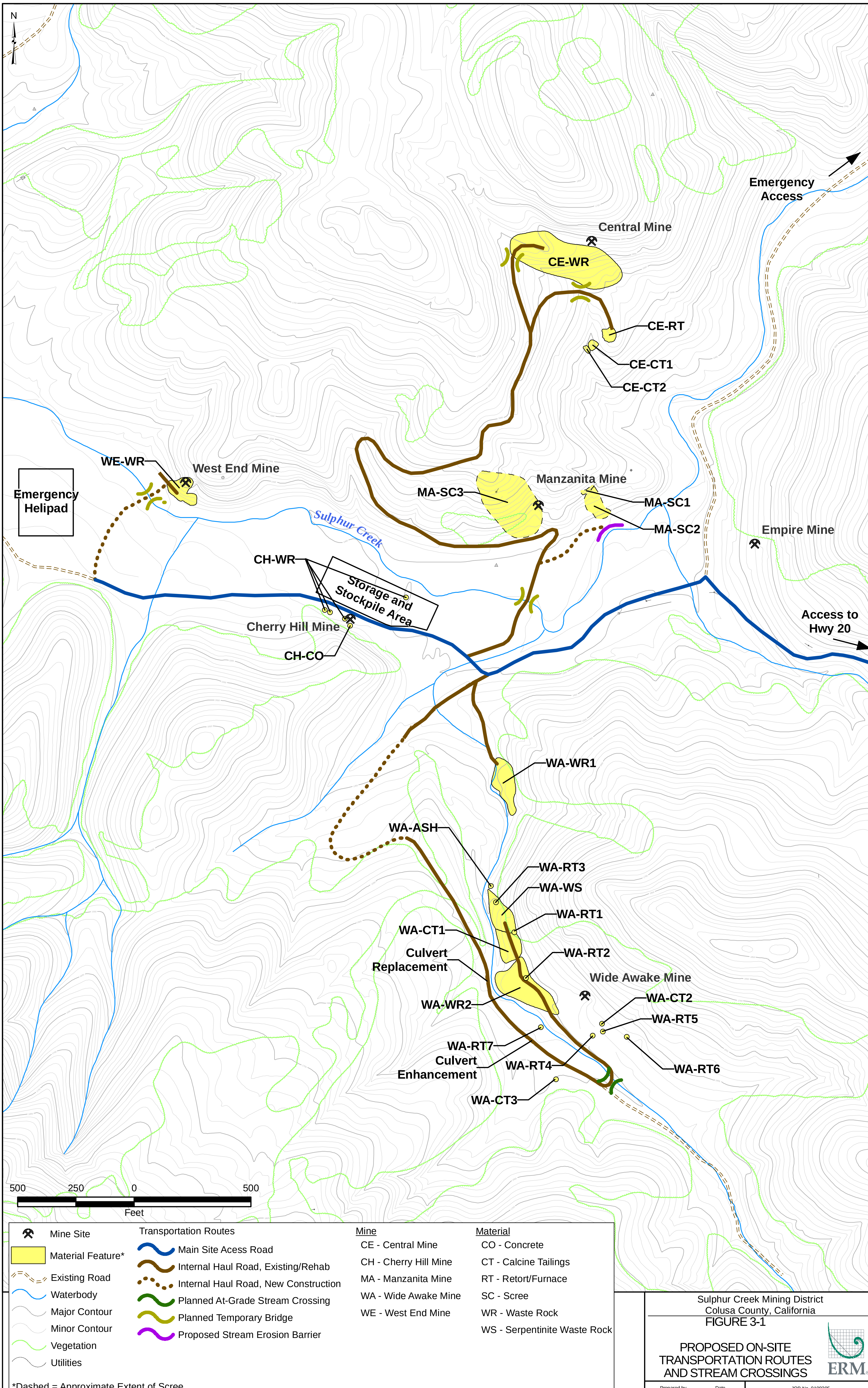
BACKGROUND
MERCURY RESULTS

ERM

Prepared by	Date	JOB No. 0108205
MKJ (ERM)	09/21/10	FILE: GIS/BARRICK/SCMD/FIGURE 2-8.MXD



N
Central Mine
CE-WR
CE-RT
CE-CT2
CE-CT1
West End Mine
WE-WR
Manzanita Mine
MA-SC1*
MA-SC3*
MA-SC2*
Sulphur Creek
Empire Mine
CH-WR
Cherry Hill Mine
CH-CO
WA-WR1
WA-ASH
WA-RT3
WA-WS
WA-RT1
WA-CT1
WA-RT2
Wide Awake Mine
WA-WR2
WA-CT2
WA-RT5
WA-RT6
WA-RT7
WA-RT4
WA-CT3
400 200 0 400
Feet
Mine Site
Adit and Shaft Locations
Open
Open-Gated
Filled In
Existing Road
Waterbody
Vegetation
Major Contour
Minor Contour
Utilities
*Dashed = Approximate Extent of Scree
Material Characterization*
Pending
Group B Waste
Group C Waste
Gold Ore
Mine
CE - Central Mine
CH - Cherry Hill Mine
MA - Manzanita Mine
WA - Wide Awake Mine
WE - West End Mine
Material
CO - Concrete
CT - Calcine Tailings
RT - Retort/Furnace
SC - Scree
WR - Waste Rock
WS - Serpentinite Waste Rock
Sulphur Creek Mining District
Colusa County, California
FIGURE 2-9
MINE-RELATED MATERIALS AND PRELIMINARY WASTE CLASSIFICATION
ERM
Prepared by MKJ (ERM)
Date 09/21/10
JOB No. 0108205
FILE: GIS/BARRICK/SCMD/FIGURE 2-9.MXD



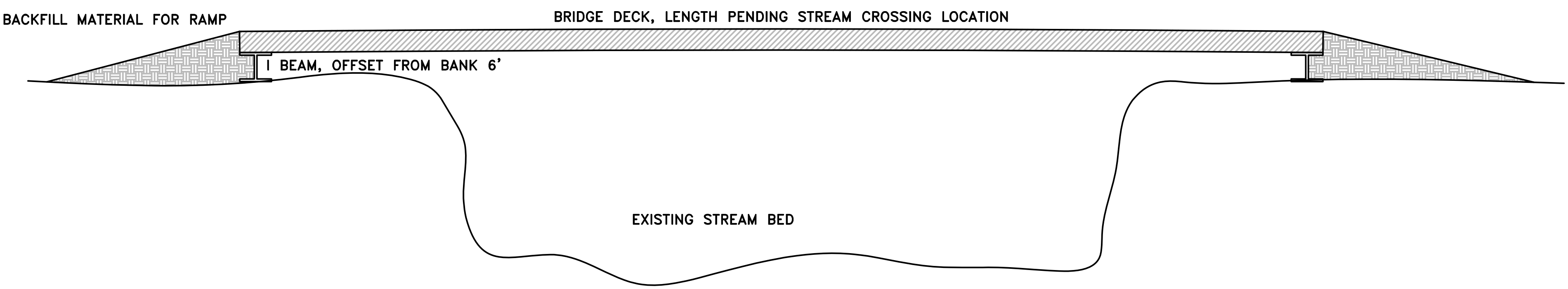
Sulphur Creek Mining District
Colusa County, California

FIGURE 3-1

PROPOSED ON-SITE TRANSPORTATION ROUTES AND STREAM CROSSINGS

Prepared by MKJ (ERM) | Date 04/28/10 | JOB No. 0108205 | FILE: GIS/BARRICK/SCMD/FIGURE 3-1.MXD

CAD File:	Drawn By: D. Ludlam	Date: 09/29/10	Project No.



*NOTE: DIMENSIONS OF BRIDGE AND WIDTH OF CREEK WILL VARY AND BE FINALIZED DURING BID PROCESS.

0 5
Approx. Scale (feet)

Figure 3-2
Railroad Flatcar Bridge
(Typical Detail)
Sulphur Creek Mine Related Remediation Project
Homestake Mining Company of California
Colusa County, California

ERM *09/10*

Figure 4-1: Access Road Reclamation – Steep Slope Locations

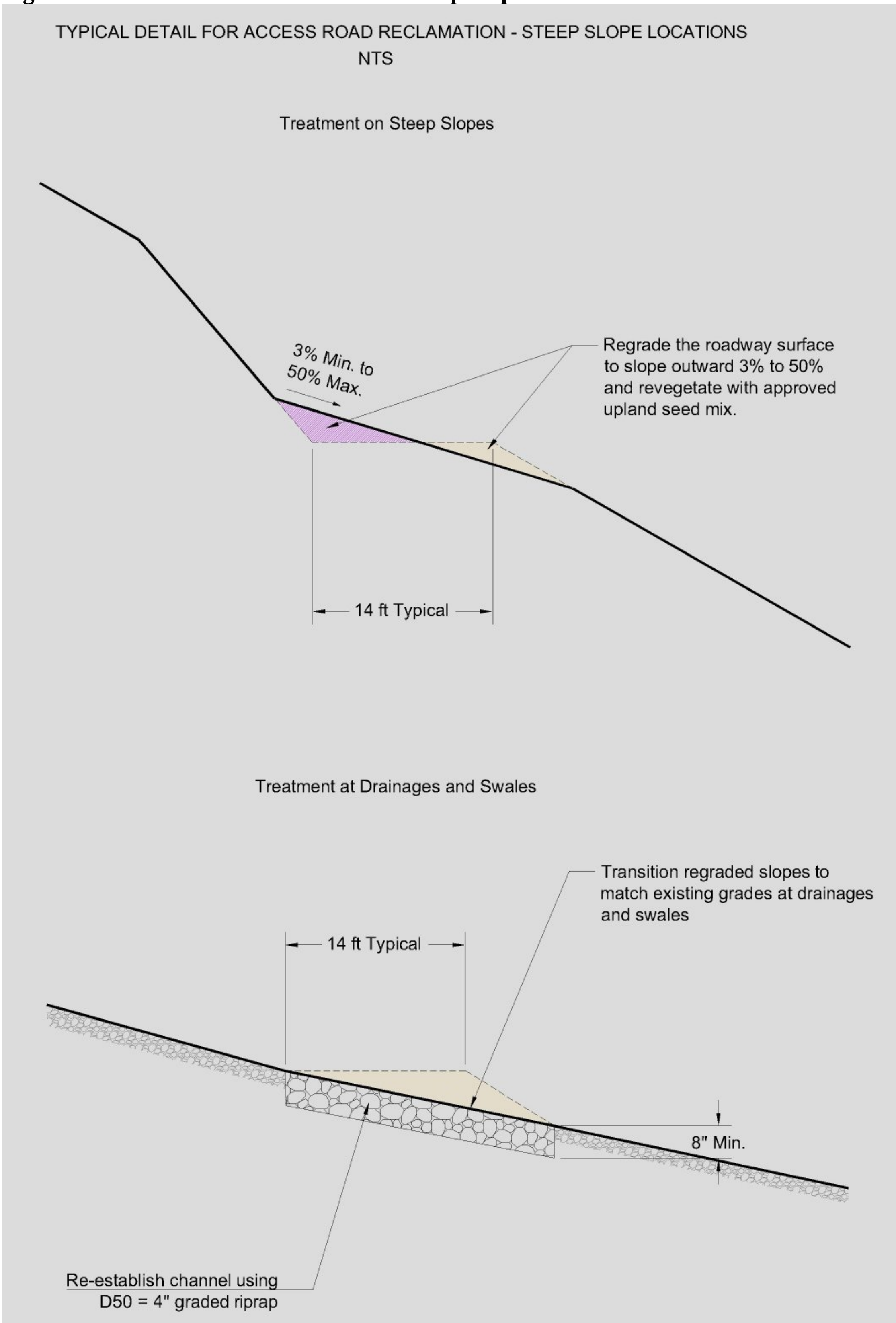


Figure 4-2: Access Road Reclamation – Flat Ground Locations

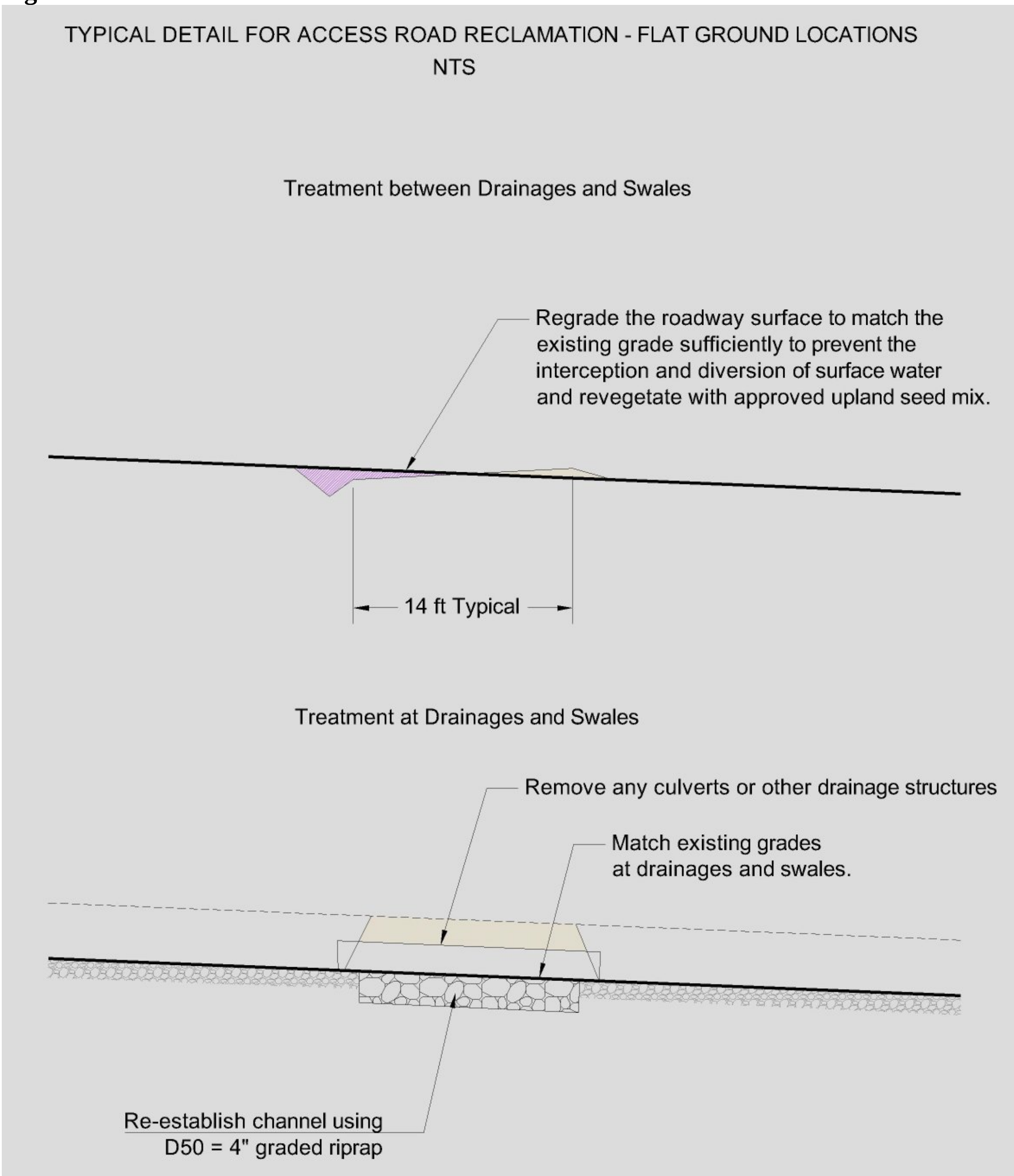


Figure 4-3: Self Deploying Riprap Barrier

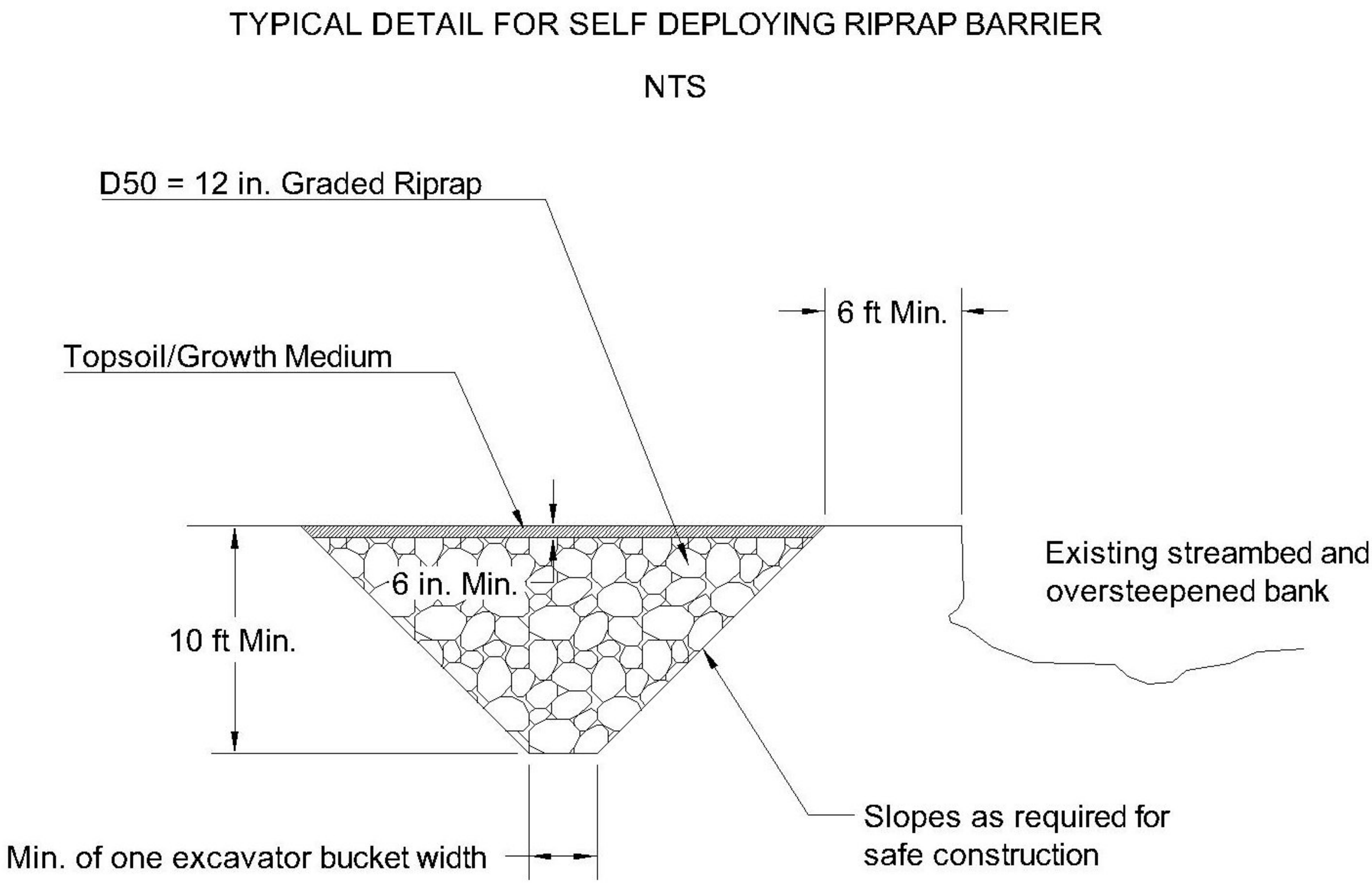
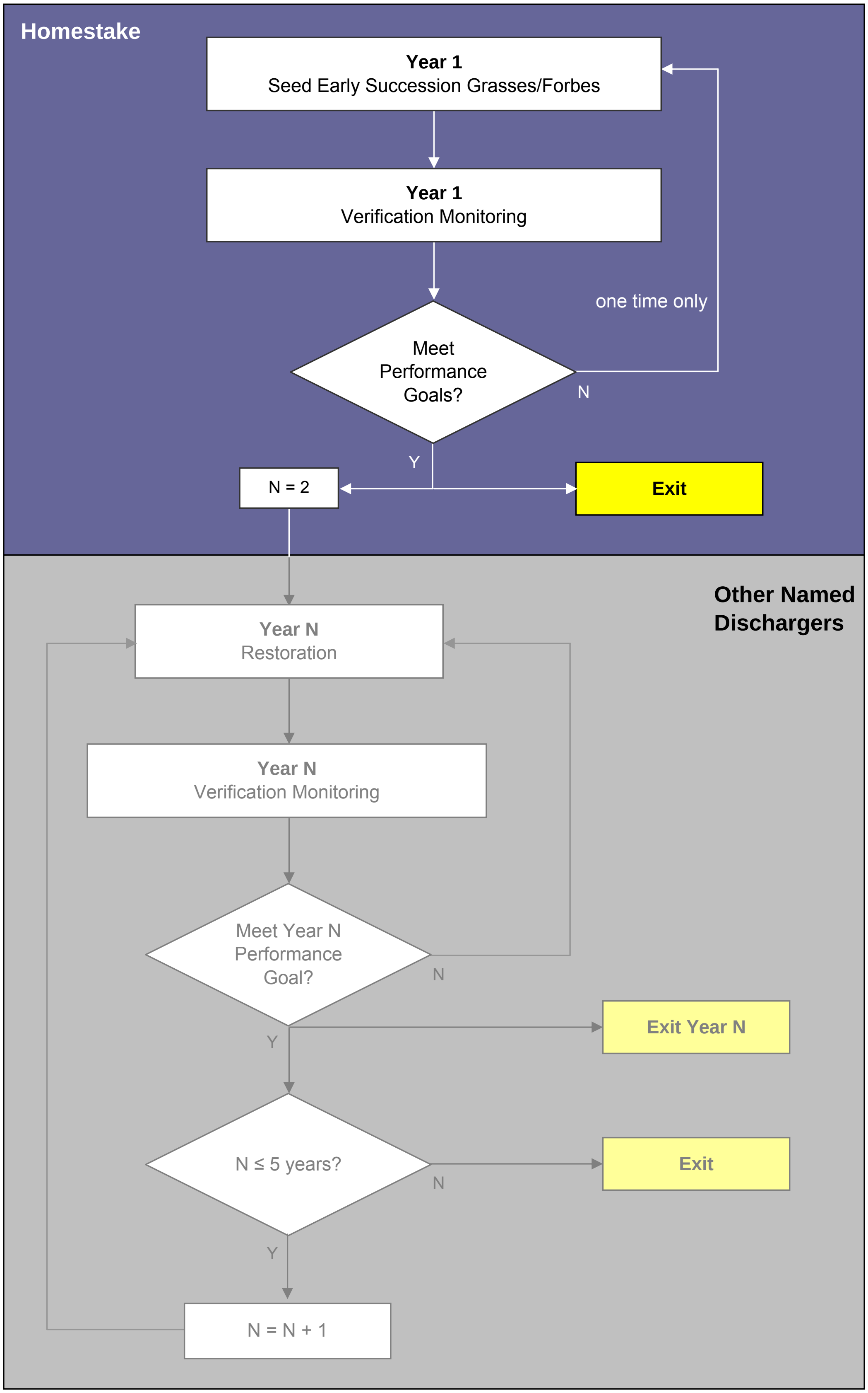


Figure 4-4. Vegetation Restoration Plan Decision Framework



Tables

Scientific Name	Common Name	Federal Listing Status [1]	State Listing Status [2]	Global Rank [3]	State Rank [4]	CNPS List [5]	Other Status	Habitat
Project Area Results								
Corynorhinus townsendii	Townsend's big-eared bat	None	None	G4	S2,S3	- -	BLM_S-Sensitive | DFG_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive | WBWG_H-High Priority	Broadleaved upland forest | Chaparral | Chenopod scrub | Great Basin grassland | Great Basin scrub | Joshua tree woodland | Lower montane coniferous forest | Meadow and seep | Mojavean desert scrub | Riparian forest | Riparian woodland | Sonoran desert sc
Falco mexicanus	Prairie falcon	None	None	G5	S3	- -	DFG_WL-Watch List | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley and foothill grassland
Lupinus sericatus	Cobb Mountain lupine	None	None	G2	S2.2	1B.2	BLM_S-Sensitive	Chaparral | Cismontane woodland | Lower montane coniferous forest | Ultramafic
Paracoenia calida	Wilber Springs shore fly	None	None	G1	S1		- -	Aquatic | Sacramento/San Joaquin flowing waters
Rana boylii	Foothill yellow-legged frog	None	None	G3	S2,S3	- -	BLM_S-Sensitive | DFG_SSC-Species of Special Concern | IUCN_NT-Near Threatened | USFS_S-Sensitive	Aquatic | Chaparral | Cismontane woodland | Coastal scrub | Klamath/North coast flowing waters | Lower montane coniferous forest | Meadow and seep | Riparian forest | Riparian woodland | Sacramento/San Joaquin flowing waters
Balsamorhiza macrolepis var. macrolepis	Big-scale balsamroot	None	None	G3,G4,T2	S2.2	1B.2	BLM_S-Sensitive | USFS_S-Sensitive	Cismontane woodland | Ultramafic | Valley and foothill grassland
Greater Sulphur Creek Region Results								
Accipiter cooperii	Cooper's hawk	None	None	G5	S3	- -	DFG_WL-Watch List | IUCN_LC-Least Concern	Cismontane woodland | Riparian forest | Riparian woodland | Upper montane coniferous forest
Actinemys marmorata	Western pond turtle	None	None	G3,G4	S3	- -	BLM_S-Sensitive | DFG_SSC-Species of Special Concern | IUCN_VU-Vulnerable | USFS_S-Sensitive	Aquatic | Artificial flowing waters | Klamath/North coast flowing waters | Klamath/North coast standing waters | Marsh and swamp | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast st
Amsinckia lunaris	Bent-flowered fiddleneck	None	None	G2	S2.2	1B.2	BLM_S-Sensitive	Cismontane woodland | Valley and foothill grassland
Castilleja rubicundula ssp. rubicundula	Pink creamsacs	None	None	G5,T2	S2.2	1B.2	BLM_S-Sensitive	Chaparral | Meadow and seep | Ultramafic | Valley and foothill grassland
Cryptantha excavata	Deep-scarred cryptantha	None	None	G2	S2.3	1B.3	BLM_S-Sensitive	Cismontane woodland
Didymodon norrisii	Norris' beard moss	None	None	G2,G3	S2.2	2.2	- -	Cismontane woodland | Lower montane coniferous forest

Scientific Name	Common Name	Federal Listing Status [1]	State Listing Status [2]	Global Rank [3]	State Rank [4]	CNPS List [5]	Other Status	Habitat
Fritillaria pluriflora	Adobe-lily	None	None	G3	S3	1B.2	BLM_S-Sensitive	Chaparral | Cismontane woodland | Ultramafic | Valley and foothill grassland
Hesperolinon bicarpellatum	Two-carpellate western flax	None	None	G2	S2.2	1B.2	- -	Chaparral | Ultramafic
Ochthebius recticulus	moss beetle	None	None	G1	S1	- -	- -	Aquatic | Sacramento/San Joaquin flowing waters

Notes:
Source = California Natural Diversity Database (CNDDB) located at http://imaps.dfg.ca.gov
Project Area = Sulphur Creek Mining District – Wide Awake Mine and Central Mine Group (see Figure 2-5)
Greater Sulphur Creek Region = Within an approximate 2 mile radius outside of the Project Area
[1] Federal Listing Status: United States legal status under the Federal Endangered Species Act (ESA)
[2] California State listing status: State of California legal status
[3] Global Rank reflects overall condition (rarity and endangerment) of an element throughout its range. Ranks are assigned by the CNDDB biology staff following review of all available information.
G1 = Less than 6 Element Occurrences (EO) OR less than 1,000 individuals OR less than 2000 acres:
G2 = 6 - 20 EOs OR 1,000 - 3,000 individuals OR 2,000 - 10,000 acres
G3 = 21 - 100 EOs OR 3,000 - 10,000 individuals OR 10,000 - 50,000 acres
G4 = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e. there is some threat, or somewhat narrow habitat.
G5 = Population or stand demonstrably secure to ineradicable due to being commonly found in the world.
GnTn = Subspecies ranks. The G-rank reflects the condition of the entire species, while the T-rank reflects the global situation of just the subspecies (n = 1,2,3,4,5 as described above).
[4] The State Rank reflects condition (rarity and endangerment) of an element within the State of California. Ranks may be combined to indicate a range, e.g. S1S2.
S1 = Less than 6 Element Occurrences (EO) OR less than 1,000 individuals OR less than 2000 acres:
S1.1 = Very threatened
S1.2 = Threatened
S1.3 = No current threats known
S2 = 6 - 20 EOs OR 1,000 - 3,000 individuals OR 2,000 - 10,000 acres
S2.1 = Very threatened
S2.2 = Threatened
S2.3 = No current threats known
S3 = 21 - 100 EOs OR 3,000 - 10,000 individuals OR 10,000 - 50,000 acres
S3.1 = Very threatened
S3.2 = Threatened
S3.3 = No current threats known
S4 = Apparently secure within California; this rank is clearly lower than S3 but factors exist to cause some concern; i.e. there is some threat, or somewhat narrow habitat. No Threat Rank.
S5 = Demonstrably secure to ineradicable in California. NO THREAT RANK.
[5] California Native Plant Society (CNPS) List. This field applies to plants only.
1A = Plants presumed extinct in California
1B = Plants rare, threatened, or endangered in California and elsewhere
2 = Plants rare, threatened, or endangered in California, but more common elsewhere
3 = Plants about which we need more information - a review list
4 = Plants of limited distribution - a watch list
BLM = Bureau of Land Management
DFG = California Department of Fish and Game (CDFG)
IUCN = International Union for Conservation of Nature
USFS = United States Forest Service
WBWG = Western Bat Working Group

Table 2-2

Summary of Previous Mercury and Material Characterization Test Results (2003)
Central Mine Group and Wide Awake Mines
Sulphur Creek Mining District
Colusa County, California

Location	Sample Number	Data Source	Description	Total Metals	Leachable Metals by CalWET Analysis				
				Mercury (mg/kg)	Mercury (µg/L)	Nickel (µg/L)	Arsenic (µg/L)	Antimony (µg/L)	Chromium (µg/L)
Central Mine	CEN-1	TetraTech 2003	Soil near retort site	420	NA	NA	NA	NA	NA
	CEN-2	TetraTech 2003	Calcine tailings near retort	30	NA	NA	NA	NA	NA
	CEN-3	TetraTech 2003	Field duplicate of CEN-2	30	NA	NA	NA	NA	NA
	CEN-4	TetraTech 2003	Upper dump	2.42	NA	NA	NA	NA	NA
	CEN-4	TetraTech 2003	Lab duplicate	4.15	NA	NA	NA	NA	NA
	CEN-19A	TetraTech 2003	Dump material	60	NA	NA	NA	NA	NA
	CEN-19D	TetraTech 2003	Settling pond sediment	5.49	NA	NA	NA	NA	NA
	CEN-19F	TetraTech 2003	Dump material	10	NA	NA	NA	NA	NA
Cherry Hill Mine	CH-1	TetraTech 2003	Small pile on west side of mine area	220	NA	NA	NA	NA	NA
	CH-2	TetraTech 2003	Small pile between concrete structures	47.2	NA	NA	NA	NA	NA
Manzanita Mine	MANZ	TetraTech 2003	Waste rock below adit	NA	2.7	664	3.6J	3.3J	21.8
	MAN-3	TetraTech 2003	Soil from retort site	86	NA	NA	NA	NA	NA
	MAN-7	TetraTech 2003	Soil near old equipment	560	NA	NA	NA	NA	NA
	MAN-8	TetraTech 2003	Soil near retort site	290	NA	NA	NA	NA	NA
	MAN-9	TetraTech 2003	Soil east of retort area, possibly near concentration tables	62.6	NA	NA	NA	NA	NA
	MAN-12	TetraTech 2003	Soil near possible former building location	260	NA	NA	NA	NA	NA
Wide Awake Mine	WAT-1	TetraTech 2003	Tailings below brick retort	NA	0.17J	9.1	5.1	107	6.1
	WAWR	TetraTech 2003	Waste rock from vicinity of 1940s rotary furnace	NA	0.85	9.8	24.6	79.2	9.2
	WAWR-3	TetraTech 2003	Waste rock downstream of mine	NA	21	102	7.4	79.8	33.3
	WA-2	TetraTech 2003	Small dump east of large brick furnace	5.03	NA	NA	NA	NA	NA
	WA-3	TetraTech 2003	Large waste rock pile	60	NA	NA	NA	NA	NA
	WA-4	TetraTech 2003	Large mixed waste pile	30	NA	NA	NA	NA	NA
	WA-5	TetraTech 2003	Soil near small rotary furnace	120	NA	NA	NA	NA	NA
	WA-6	TetraTech 2003	Small gray-pink pile near furnace	<10	NA	NA	NA	NA	NA
	WA-7	TetraTech 2003	Calcine tailings	10	NA	NA	NA	NA	NA
	WA-8	TetraTech 2003	Duplicate of WA-7	20	NA	NA	NA	NA	NA
	WA-9	TetraTech 2003	Calcine tailings	40	NA	NA	NA	NA	NA
	WA-10	TetraTech 2003	Small waste rock pile	90	NA	NA	NA	NA	NA
	WA-11	TetraTech 2003	Small pile - may be waste or local background	90	NA	NA	NA	NA	NA
	WA-12	TetraTech 2003	Limonitic soil on slope - may be waste or local background	220	NA	NA	NA	NA	NA
	WA-13	TetraTech 2003	Soil and brick from furnace site	30	NA	NA	NA	NA	NA
	WA-14	TetraTech 2003	Soil and brick from furnace site	440	NA	NA	NA	NA	NA
	WA-15	TetraTech 2003	Soil from under condenser building	1,040	NA	NA	NA	NA	NA
West End Mine	WE	TetraTech 2003	Waste rock near Sulfur Creek	NA	**204**	433	813	728	437
	WE-1	TetraTech 2003	Waste rock	300	NA	NA	NA	NA	NA
	WE-2	TetraTech 2003	Waste rock	>100	NA	NA	NA	NA	NA
	5568	TetraTech 2003	Toe of east dump	2.7	NA	NA	NA	NA	NA
Total Threshold Limit Concentration/ Soluble Threshold Limit Concentration		California Hazardous Waste Criteria, CCR Title 22, section 66261.24		20	200	20,000	5,000	15,000	5,000

Notes:
Shaded cells indicate concentrations greater than the TTLC (solid) and STLC (leachate) regulatory limits
µg/L = Microgram per liter
mg/kg = Milligrams per kilogram
NA = Not analyzed
CalWET - California Waste Extraction Test
CCR = California Code of Regulations

Figure Location	Sample Location	Sample Number	Data Source	Sample Description	Waste Source	Bevill Exempt?	Location/ Material Designation (see Figure 2-8)	Total Sulfides (mg/kg)	pH Std Units	Total Metals Gold (oz/ton)	Total Metals Mercury (mg/kg)	Leachable Metals by CalWET Analysis Mercury (ug/L)	Mine Waste Group Classification/ Ore (see text Section 2.4.1)
Central Mine Group Area	Central Mine	CEN-1	C and C, 2003	**Soil** near retort site	beneficiation	Yes	CE-RT (soil)	NA	NA	NA	420	NA	Group B
		CE-RT1-BR-01	ERM Sampling March 2010	Brick from retort CE-RT	beneficiation	Pending	CE-RT	NA	NA	NA	0.33	ND	**Group C**
		CE-RT1-CE-01	ERM Sampling March 2010	Ceramic from retort CE-RT	beneficiation	Pending		NA	NA	NA	34	ND	**Group B**
		CEN-2	C and C, 2003	Calcine tailings near retort	beneficiation	Yes	CE-CT1	NA	NA	0.0006	30	NA	Group B
		CEN-3	C and C, 2003	Field duplicate of CEN-2	beneficiation			NA	NA	NA	30	NA	
		CE-CT-C1	ERM Sampling March 2010	Calcine tailings at CE-CT1	beneficiation			NA	NA	NA	NA	ND	
		CE-CT-C2	ERM Sampling March 2010	Calcine tailings at CE-CT2	beneficiation	Yes	CE-CT2	NA	NA	NA	NA	ND	Group C
		CEN-4	C and C, 2003	Upper dump	extraction	Yes	CE-WR	NA	NA	NA	2.42	NA	Group C
		CEN-4	C and C, 2003	Lab duplicate	extraction			NA	NA	NA	4.15	NA	
		CEN-19F	C and C, 2003	Dump material	extraction			NA	NA	NA	10	NA	
		CE-WR-C3	ERM Sampling March 2010	Waste rock at CE-WR	extraction			NA	NA	NA	NA	ND	
		CE-WR-C4	ERM Sampling March 2010	Waste rock at CE-WR	extraction			NA	NA	NA	NA	ND	
	Cherry Hill Mine	CH-1	C and C, 2003	Small pile on west side of mine area	extraction	Yes	CH-WR	NA	NA	NA	220	NA	Group B
		CH-2	C and C, 2003	Small pile between concrete structures	extraction			NA	NA	NA	47.2	NA	
		CH-4	C and C, 2003	Soil sample geothermal exploration well area	extraction			NA	NA	NA	57	NA	
		CH-WR-C1	ERM Sampling March 2010	Composite of piles at CH-WR	extraction			ND	7.39	0.0236	NA	ND	
		CH-CO-C1	ERM Sampling March 2010	Composite of concrete	beneficiation	Pending	CU-CO	NA	NA	NA	1.1	ND	**Group C**
	Manzanita Mine	MANZ	TetraTech 2003	Waste rock below adit	extraction	Yes	MA-SC1	NA	NA	NA	NA	2.7	Group C
		MA-WR-C1	ERM Sampling March 2010	Scree from "bleached" zone MA-SC1	extraction			ND	2.68	0.021	NA	ND	
		MAN-10	C and C, 2003	Sediment at cut face of first bench	beneficiation	Yes	MA-SC2	NA	NA	NA	130	NA	Ore
		MAN-11	C and C, 2003	Duplicate of MAN-10	beneficiation			NA	NA	NA	130	NA	
		MA-WR-C2	ERM Sampling March 2010	Scree from darker rock at MA-SC2	beneficiation			ND	3.78	**0.187**	NA	ND	
		MA-WR-C3	ERM Sampling March 2010	Scree from MA-SC3	beneficiation	Yes	MA-SC3	ND	4.08	**0.158**	NA	ND	Ore
	West End Mine	WE	TetraTech 2003	Waste rock near Sulfur Creek	extraction	Yes	WE-WR	NA	NA	NA	NA	**204**	Ore
		WE-1	C and C, 2003	Waste rock	extraction			NA	NA	**0.731**	290	NA	
		WE-2	C and C, 2003	Waste rock	extraction			NA	NA	NA	300	NA	
		WS-WE001-1120309	Homestake Sampling 2009	Toe of east dump	extraction			NA	NA	NA	84.4	NA	
		WE-WR-C1	ERM Sampling March 2010	Waste rock below east adit at WE-WR	extraction			ND	4.96	**0.174**	NA	ND	
		WE-WR-C1D	ERM Sampling March 2010	Waste rock below east adit at WE-WR	extraction			ND	5.69	**0.142**	NA	ND	
		WE-WR-C2	ERM Sampling March 2010	Waste rock below west adit at WE-WR	extraction			ND	4.93	**> 0.292**	NA	ND	
Wide Awake Area	Wide Awake Mine	WAT-1	TetraTech 2003	Tailings below brick retort	beneficiation	Yes	WA-CT1	NA	NA	NA	NA	0.17J	Group B
		WA-4	C and C, 2003	Calcined tailings	beneficiation			NA	NA	**0.06**	30	NA	
		WA-7	C and C, 2003	Calcine tailings	beneficiation			NA	NA	0.028	10	NA	
		WA-8	C and C, 2003	Duplicate of WA-7	beneficiation			NA	NA	0.033	20	NA	
		WA-9	C and C, 2003	Calcine tailings	beneficiation			NA	NA	**0.061**	40	NA	
		WA-CT-C3	ERM Sampling March 2010	Calcine tailings from WA-CT1	beneficiation			ND	9.25	0.046	NA	ND	
		WA-15	C and C, 2003	**Soil** from under condenser building	beneficiation	Yes	WA-CT2 (soil)	NA	NA	NA	1,040	NA	Group B
		WA-RT5-ASH-02	ERM Sampling March 2010	Calcine tailings at WA-CT2	beneficiation		WA-CT2	NA	NA	NA	NA	110	Group C
		WA-CT-C4	ERM Sampling March 2010	Calcine tailings at WA-CT3	beneficiation	Yes	WA-CT3	NA	NA	NA	NA	ND	Group C
		WAWR	TetraTech 2003	Waste rock from vicinity of 1940s rotary furnace	beneficiation	Yes	WA-WS	NA	NA	NA	NA	0.85	Group B
		WA-3	C and C, 2003	Green waste rock pile	extraction			NA	NA	NA	60	NA	
		WA-WS-C2	ERM Sampling March 2010	Serpentinitic waste rock at WA-WS	extraction			ND	8.70	0.01	NA	ND	

Figure Location	Sample Location	Sample Number	Data Source	Sample Description	Waste Source	Bevill Exempt?	Location/ Material Designation (see Figure 2-8)	Total Sulfides (mg/kg)	pH Std Units	Total Metals	Total Metals	Leachable Metals by CalWET Analysis	Mine Waste Group Classification/ Ore
										Gold (oz/ton)	Mercury (mg/kg)	Mercury (ug/L)	(see text Section 2.4.1)
Wide Awake Area	Wide Awake Mine	WAWR-3	TetraTech 2003	Waste rock downstream of mine	extraction	Yes	WA-WR1	NA	NA	NA	NA	21	
		WS-WA002-1120309	Homestake Sampling 2009	Downstream dump	beneficiation			NA	NA	NA	587	NA	Group B
		WS-WA003-1120309	Homestake Sampling 2009	Downstream dump	beneficiation			NA	NA	NA	94.1	NA	
		WS-WA004-1120309	Homestake Sampling 2009	Downstream dump	beneficiation			NA	NA	NA	257	NA	
		WS-WA005-1120309	Homestake Sampling 2009	Downstream dump	beneficiation			NA	NA	NA	260	NA	
		WA-WR-C1	ERM Sampling March 2010	Waste rock at WA-WR1	extraction			ND	8.65	0.019	NA	ND	
		WA-10	C and C, 2003	Waste rock-bank material along creek	extraction	Yes	WA-WR2	NA	NA	NA	90	NA	Group B
		WA-11	C and C, 2003	Waste rock-flat grass covered pile	extraction			NA	NA	NA	90	NA	
		WA-WR-C4	ERM Sampling March 2010	Waste rock from WA-WR2	extraction			ND	8.39	0.016	NA	ND	
		WA-RT1-BR-01	ERM Sampling March 2010	Brick from WA-RT1	beneficiation	Pending	WA-RT1	NA	NA	NA	2	ND	**Group C**
		WA-RT2-BR-2	ERM Sampling March 2010	Brick from WA-RT2	beneficiation	Pending	WA-RT2	NA	NA	NA	0.15	ND	**Group C**
		WA-RT3-BR-3	ERM Sampling March 2010	Brick from WA-RT3	beneficiation	Pending	WA-RT3	NA	NA	NA	0.65	ND	**Group C**
		WA-RT3-CO-1	ERM Sampling March 2010	Concrete from WA-RT3	beneficiation	Pending	WA-RT3	NA	NA	NA	50	ND	**Group B**
		WA-5	C and C, 2003	**Soil** near small rotary furnace	beneficiation	Yes	WA-RT3 (soil)	NA	NA	NA	120	NA	Group B
		WA-14	C and C, 2003	**Soil** and brick near Scott furnace	beneficiation	Yes	WA-RT4 (soil)	NA	NA	NA	440	NA	Group B
		WA-RT4-BR-04	ERM Sampling March 2010	Brick from WA-RT4 Scott Furnace	beneficiation	Pending	WA-RT4	NA	NA	NA	2.3	ND	**Group C**
		WA-RT5-BR-05	ERM Sampling March 2010	Brick from WA-RT5	beneficiation	Pending	WA-RT5	NA	NA	NA	13	ND	**Group C**
		WA-RT6-BR-07	ERM Sampling March 2010	Brick from WA-RT6	beneficiation	Pending	WA-RT6	NA	NA	NA	0.21	ND	**Group C**
		WA-RT6-BR-08	ERM Sampling March 2010	Sandstone from WA-RT6	beneficiation	Pending	WA-RT6	NA	NA	NA	ND	ND	**Group C**
		WA-13	C and C, 2003	**Soil** and brick from furnace site	beneficiation	Yes	WA-RT7 (soil)	NA	NA	NA	30	NA	Group B
		WA-RT7-BR-09	ERM Sampling March 2010	Bricks from WA-RT7	beneficiation	Pending	WA-RT7	NA	NA	NA	ND	ND	**Group C**
		WA-6	C and C, 2003	Small gray-pink pile near furnace	beneficiation	Yes	WA-ASH	NA	NA	NA	<10	NA	Group C
		WA-ASH-01	ERM Sampling March 2010	Calcines and ash at WA-ASH	beneficiation			NA	NA	NA	ND	ND	
Total Threshold Limit Concentration/ Soluble Threshold Limit Concentration		California Hazardous Waste Criteria, CCR Title 22, section 66261.24						--	--	--	20	200	
Gold Reclamation Processing Facility Minimum Gold Ore Grade								NA	NA	0.06	NA	NA	

Notes:

Gray-shaded cells indicate concentrations greater than the TTLC (solid) or STLC (leachate) regulatory limits
Yellow-shaded cells indicate samples with gold content above minimum grade for ore
Materials pending waste classification/Bevill exemption interpretation

μg/L = Microgram per liter
mg/kg = Milligrams per kilogram
oz = ounce
NA = Not analyzed or not applicable

CalWET - California Waste Extraction Test
CCR = California Code of Regulations
STLC = Soluble Threshold Limit Concentration
TTLC = Total Threshold Limit Concentration

CE = Central
CH = Cherry Hill
MA = Manzanita
WA = Wide Awake

CT = Calcine tailings
CO = Concrete
BR = Brick
RT = Retort

SC = Scree
WS = Waste Serpentine
WR = Waste Rock

Bibliography:

C & C, 2003 Churchill, R. and J. Clinkenbeard, 2003, Assessment of the feasibility of remediation of mercury mine sources in the Cache Creek watershed. CALFED final report (Task 5C1). Final Report, California Department of Conservation and California Geological Survey. September 2003. Available at: http://mercury.mlml.calstate.edu/wp-content/uploads/2008/12/finalrpttask5c1-0915031.pdf

TetraTech 2003 TetraTech 2003, Colusa and Lake Counties, California. Subtask 5C2 Draft Report., Prepared for the CALFED Bay-Delta Program, Directed Action #99-B06. Available at: http://loer.tamug.tamu.edu/calfed/DraftReports.htm.

Table 2-4

Mining-Related Materials Inventory
Central Mine Group and Wide Awake Mines
Sulphur Creek Mining District
Colusa County, California

Mine Area	Mine Waste Description	Approx. Volume for Management (cubic yards)	Location/Material Designation (see Figure 2-8)	Material Designation	Comments
Central	Rotary furnace/brick retort	100	CE-RT	**Group B Waste**	Steel, wood, brick, and ceramic construction.
	Calcine pile - east	100	CE-CT1	**Group B Waste**	Calcine tailings pile near former retort/furnace.
	Calcine pile - west		CE-CT2	Group C Waste	Calcine tailings pile west of drainage near former retort/furnace.
	Waste rock pile	17,800	CE-WR	Group C Waste	Bench of waste rock adjacent to highwall mining area.
	West retort site		Near CE-CT2	Uncontaminated Material[1]	Steel & wood debris, rails, hopper car, drums
Cherry Hill	Small pile Small pile Medium pile Waste pile along creek	400	CH-WR	**Group B Waste**	Three small waste rock piles near adit portals and a possible geothermal exploration drill pad along bank of Sulphur Creek.
	Concrete footings		CH-CO	Group C Waste	
Manzanita	Scree (bleached) - east area	1,600	MA-SC1	Group C Waste	Surficial rock debris (scree) on cliff face near mine workings.
	Scree (unbleached) - east area		MA-SC2	Gold Ore	Surficial rock debris (scree) on cliff face near mine workings.
	Scree - west area	3,800	MA-SC3	Gold Ore	Surficial rock debris (scree) on hillside near mine workings.
West End	Waste rock pile	4,200	WE-WR	Gold Ore	Cone-shaped pile adjacent highwall and three adits.
Wide Awake	Brick retort	50	WA-RT1	Group C Waste	Brick furnace on top/back side of WA-CT1
	Brick retort	10	WA-RT2	Group C Waste	Brick furnace on back side of WA-WR2 (overburden pile)
	Rotary furnace	40	WA-RT3	**Group B Waste**	Main retort north of WA-WS, Steel, concrete, brick, and wood construction
	Scott furnace	430	WA-RT4	Group C Waste	Scotts Furnace, Brick construction
	Brick retort	120	WA-RT5	Group C Waste	Small brick furnace on top of Scotts Furnace
	Brick and stone retort	30	WA-RT6	Group C Waste	Brick and dimension sandstone construction
	Brick retort	110	WA-RT7	Group C Waste	Brick Furnace across stream from Wide Awake mine sties
	Steel pipes and metal debris		Scattered in WA area	Uncontaminated Material[1]	
	Waste rock pile - north	11,600	WA-WR1	**Group B Waste**	Northern pile of waste rock on edge of stream
	Nonserpentinitic waste rock in south pile	7,500	WA-WR2	**Group B Waste**	Bench of waste rock adjacent to WA-CT1 and stream
	Calcine portion of south pile	2,900	WA-CT1	**Group B Waste**	Calcine tailings pile adjacent to WA-WS and stream
	Small pile of calcine	10	WA-CT2	Group C Waste	Calcine tailings on top of Scotts Furnace next to retort WA-RT5
	Small pile of calcine	20	WA-CT3	Group C Waste	Calcine used as fill southwest of WA-RT4, across creek
	Serpentinitic waste rock in south pile	7,900	WA-WS	**Group B Waste**	Serpentinitic waste rock under and behind mine workings and along edge of stream
	Small pile of calcine and ash	60	WA-ASH	Group C Waste	Pink-gray colored ash in front of WA-RT3
Summary:	Volume for Removal/Disposal =	30,540		Assumes all Group B	**Estimated volumes for removal and management (rounded up)**
	Volume for Removal/Disposal =	840		Assumes all Group C	
	Volume Gold Ore =	9,600		West End & Manzanita	
	Volume Managed in place =	17,800		Group C	

Notes:

[1]Material to be removed for aesthetic reasons

(green) = Assumes material will be recycled
(purple) = pending waste classification/Bevill exemption interpretation
(light blue) = To be managed in place as Group C material

Mine Sites:
CE - Central Mine
CH - Cherry Hill Mine
MA - Manzanita Mine
WA - Wide Awake Mine
WE - West End Mine

Materials:
CT - Calcine Tailings
CO = Concrete
RT - Retort/Furnace
SC - Scree
WR - Waste Rock
WS - Serpentinite Waste Rock

Table 3-1
List of Anticipated Permits and Approvals
Sulphur Creek Mining District
Colusa County, California

Agency	Permit Name	Comment
U.S. Army Corps of Engineers (USACE) – Sacramento District	Section 404/10 Nationwide Permit	If Nationwide will apply, most likely permit is NWP #38 - Cleanup of Hazardous and Toxic Waste. Desktop file review and delineation of affected special aquatic sites, including wetlands to be conducted.
U.S. Department of Interior, Bureau of Land Management (BLM)	Land Use Permit; Right-of-Way	Related to temporary roads needed across BLM land.
Advisory Council for Historic Preservation/ California State Department of Parks and Recreation	National Historic Preservation Act (NHPA) Section 106, Consultation	Will depend on results from Cultural/Archeological file review and/or pedestrian survey.
US Fish and Wildlife Services (USFWS)	Endangered Species Act Section 7, Consultation.	CNDDB File & Map Review indicates that there are no Federal or State listed species in project area. Desktop file review of "sensitive" species to be conducted.
Central Valley Water Quality Regional Control Board (CVRWQCB)	Section 401 Water Quality Certification	Potentially exempt from 401 Water Quality Certification if project is covered by NWP #38 for Cleanup of Hazardous and Toxic Wastes.
Central Valley Water Quality Regional Control Board (CVRWQCB)	General Stormwater Construction Permit/ Notice of Intent	Advised to submit NOI at least (10) days prior to July 1, 2010 to be covered under existing GCP and grandfathered under new Permit effective July 1, 2010. A SWPPP will be developed prior to the start of soil-disturbing activity and shall be implemented concurrently with commencement of soil-disturbing activities.
California Department of Fish and Game	Streambed Alteration Agreement/Notification	Submit a complete notification package and fee to appropriate CDFG regional office. If CDFG determines that the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared.
Central Valley Water Quality Regional Control Board (CVRWQCB)	Chapter 15/ Title 27 - Waste Containment (Waste Piles and Mining Wastes)	Evaluate as necessary.
Colusa County - Public Works Department	Land Grading Permit	Will need to obtain permit for disturbance of 5 or more acres. Total grading and/or leveling estimated at over 5 acres.
Colusa County Air Pollution Control District	Authority of Construct	Check air district for dust suppression and other BMPs. BMPs may suffice in lieu of permit.
Colusa County - Planning and Building Department	Land Use Permit	Will verify requirements with County.
Colusa County - Public Works Department	Encroachment Permit Chapter 29	Will depend on whether project activity will encroach upon County roads. Need to determine if internal haul road rehabilitation work is on a County road, mapped as "Sulphur Creek" road.

Table 3-2

Summary of Planned Removal and Cleanup Activities
Central Mine Group and Wide Awake Mines
Sulphur Creek Mining District
Colusa County, California

Mine Area	Mining-Related Solids	Structures
Central Mine	Group C material: Re-grade, cover and vegetate waste rock and east calcine pile, implement surface controls to prevent erosion of upper mine cuts, waste rock, tailings piles, haul roads.	Based on further evaluation: Remove metal debris for disposal or recycling, if applicable; Demolition of and excavation of waste from around the perimeter of the furnace and furnace/retort, dispose off site at appropriate repository, and implement surface controls.
	Group B material: Remove waste (west calcine pile) to an appropriate repository.	
Cherry Hill Mine	Excavate waste rock and transport to Group B mine waste repository; implement surface controls to control erosion of disturbed surfaces; grate adits.	Removal of the former mill foundation not required; implement surface controls.
Empire Mine	No Action	No Action
Manzanita Mine	Group C material: Regrade, cover, and vegetate; implement surface controls to mitigate erosion of waste material to floodplain; grate shafts and adits.	None present
	Ore: Excavate and transport to gold reclamation facility, or transport to appropriate disposal facility; implement surface controls to control erosion of disturbed surfaces.	
West End Mine	Excavate ore and transport to gold reclamation facility or appropriate disposal facility; implement surface controls to control erosion of disturbed surfaces. Grate shafts and adits.	None present
Wide Awake	Excavate waste rock and tailings and transport to Group B mine waste repository. Remove metal debris for recycling, if required. Grate shafts and adits.	Excavate waste from around the perimeter of the processing facilities, haul and dispose off site, leave historic facilities and features intact, and implement surface controls.

Table 4-1
Overview of the Vegetation Restoration Plan: Year 1
Sulphur Creek Mining District
Colusa County, California

	Areas of Interest									
	Wide Awake Mine		Central Mine		West End Mine		Cherry Hill Mine		Manzanita Mine	
	tailings/waste	access	tailings/waste	access	tailings/waste	access	tailings/waste	access	tailings/waste	access
Program Objective	Introduce/seed herbaceous grasses/forbs to control soil erosion and promote future succession of plant communities.									
Restoration Habitat Type[1]	AG, MC, VOW, VFR,	AG, VOW, VFR, W	AG, MC, VOW	MC, AG, VOW	MC, W	AG, W	MC	None	MC	MC, AG, VFR, W
Substrate										
bedrock / topsoil	TBD		TBD		TBD		TBD		TBD	
Slope										
steep (≥ 5% grade)	✓	✓	✓	✓	✓	✓	✓	None	✓	✓
flat (< 5% grade)	✓	✓	✓	✓	✓	✓	✓	None	✓	✓
Seed Mix	TBD	TBD	TBD	TBD	TBD	TBD	TBD	None	TBD	TBD
Performance-Based Goal[2]	40% cover	40% cover	40% cover	40% cover	40% cover	40% cover	40% cover	None	40% cover	40% cover

Notes:

1 Restoration Habitat Types = desired future habitat types

2 Progress/achievement of Year 1 performance-based triggers may be qualified to account for factors observed in the field, such as unanticipated climate (e.g., precipitation), grazing pressure (e.g., wildlife, cattle), competing invasive plants, and/or disease.

Legend:

AG = Annual Grassland
MC = Mixed Chaparral
VFR = Valley Foothill Riparian
VOW = Valley Oak Woodland
W = Wetland

Appendix A
Sulphur Creek Instability Photo Log – Existing Conditions in the Main Channel of Sulphur Creek
(source: Kenneth Myers, P.E.)

Active incision in the channel well upstream of the West End Mine

The incision gives way to aggradation, avulsion, and a poorly defined braided channel, still well upstream of the West End Mine

The poorly defined braided channel

Aggradation and the accumulation of fine sediment within the channel

An active headcut and a return to channel incision, still upstream of the West End Mine

Incision exposes a clay hardpan in the floor of the channel

Lateral migration and severe bank erosion, near the West End Mine

A relatively stable reach created by a limestone ledge forming grade control within the channel located about midway between the West End Mine and the Manzanita Mine

Immediately downstream of the limestone ledge, a return to incision and instability

Appendix B
Sulphur Creek District Background Mercury Information

APPENDIX B
BACKGROUND MERCURY DATA

Grid Sampling Data Total Mercury
By Atomic Adsorption
(Homestake Report, R.W. Hatch, 1983)

Sample No.	Alteration	Background Concentration - Altered Rocks Total Hg (ppm)	Sample No.	Alteration	Background Concentration - Unaltered Rocks Total Hg (ppm)
653 AA	argillized	0.128	672 AA	unaltered	0.241
652 AA	argillized	0.255	650 AA	unaltered	0.245
670 AA	altered	0.286	658 AA	unaltered	0.246
651 AA	argillized	0.586	649 AA	unaltered	0.255
723 AA	minor local calcite flooding	1.035	656 AA	unaltered	0.271
746 AA	solfaterized	1.611	657 AA	unaltered	0.281
736 AA	limonitic	1.911	708 AA	unaltered	0.306
727 AA	strongly bleached	2.611	663 AA	unaltered	0.321
667 AA	argillized to strongly silicified	3.311	655 AA	unaltered	0.331
677 AA	argillized	6.595	647 AA	unaltered	0.331
703 AA	moderate to strongly solfaterized	6.911	710 AA	unaltered	0.336
676 AA	argillized	8.095	711 AA	unaltered	0.336
678 AA	argillized	8.595	693 AA	unaltered	0.346
697 AA	strongly argillized	9.456	654 AA	unaltered	0.356
718 AA	moderately solfaterized	10.011	745 AA	unaltered	0.36
734 AA	silicified	13.211	692 AA	unaltered	0.361
721 AA	sheared and solfaterized	14.111	748 AA	unaltered	0.366
738 AA	strongly solfaterized	18.511	705 AA	unaltered	0.391
648 AA	strongly silicified	20.611	707 AA	unaltered	0.396
713 AA	intensely silicified	30.011	671 AA	unaltered	0.416

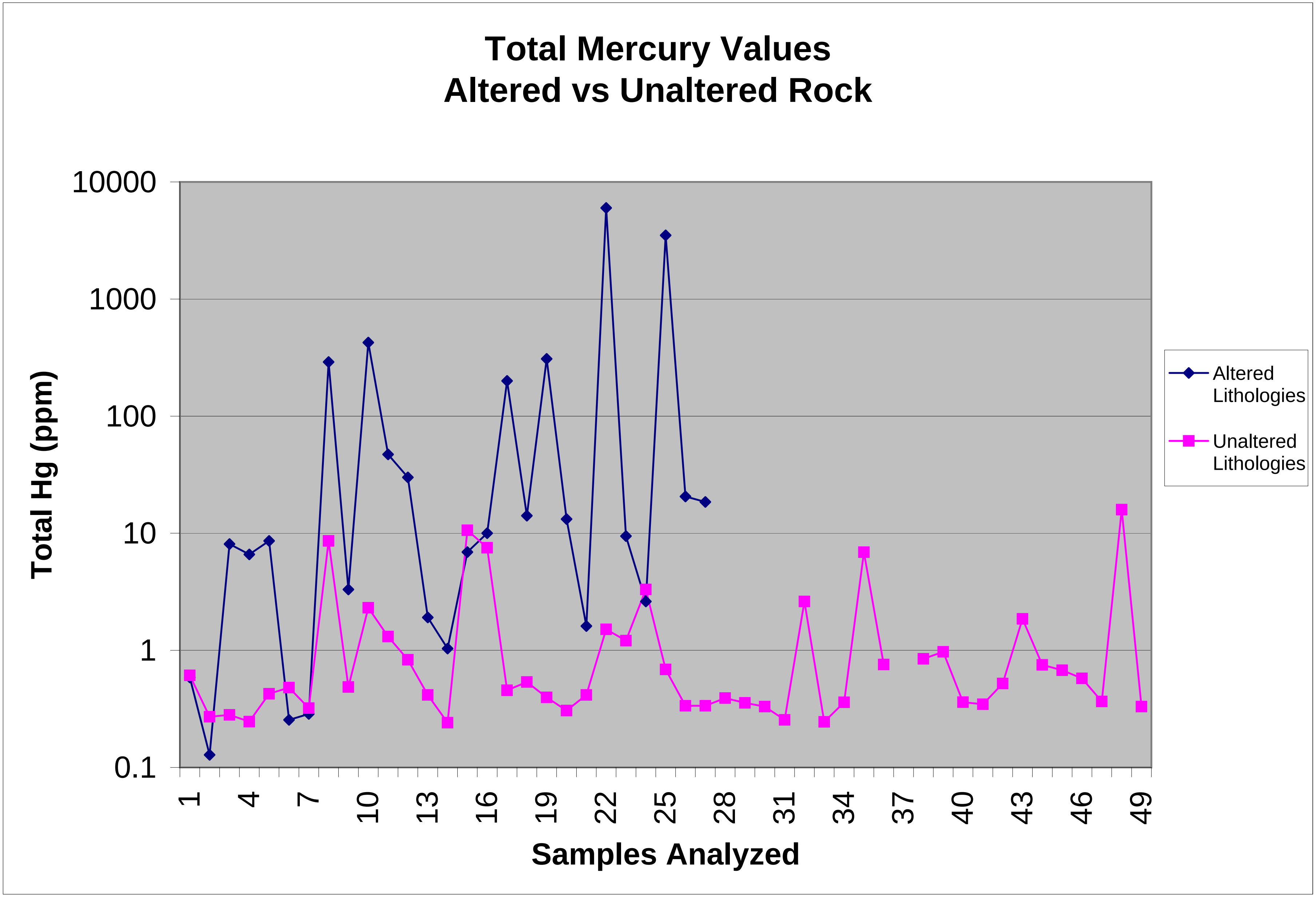
Sample No.	Alteration	Background Concentration - Altered Rocks Total Hg (ppm)	Sample No.	Alteration	Background Concentration - Unaltered Rocks Total Hg (ppm)
728 AA	bleached and weakly solfaterized	47.111	709 AA	unaltered	0.416
719 AA	moderately solfaterized	200.111	661 AA	unaltered	0.426
694 AA	argillized and silica-carbonate	290.156	704 AA	unaltered	0.456
695 AA	silica-carbonate	308.156	662 AA	unaltered	0.481
660 AA	argillized	425.111	665 AA	unaltered	0.486
731 AA	strongly bleached	3500.111	696 AA	unaltered	0.521
698 AA	strong silica-carbonate	6000.156	706 AA	unaltered	0.536
			747 AA	unaltered	0.576
			646 AA	unaltered	0.611
			743 AA	unaltered	0.676
			700 AA	unaltered	0.687
			742 AA	unaltered	0.751
			659 AA	unaltered	0.756
			669 AA	unaltered	0.831
			690 AA	unaltered	0.846
			691 AA	unaltered	0.971
			715 AA	unaltered	1.211
			668 AA	unaltered	1.311
			712 AA	unaltered	1.511
			741 AA	unaltered	1.856
			666 AA	unaltered	2.311
			733 AA	unaltered	2.611
			744 AA	unaltered	3.311
			732 AA	unaltered	6.895
			702 AA	unaltered	7.511
			664 AA	unaltered	8.611
			674 AA	unaltered	10.611
			724 AA	unaltered	15.911
			673 AA	unaltered	ND

Notes:

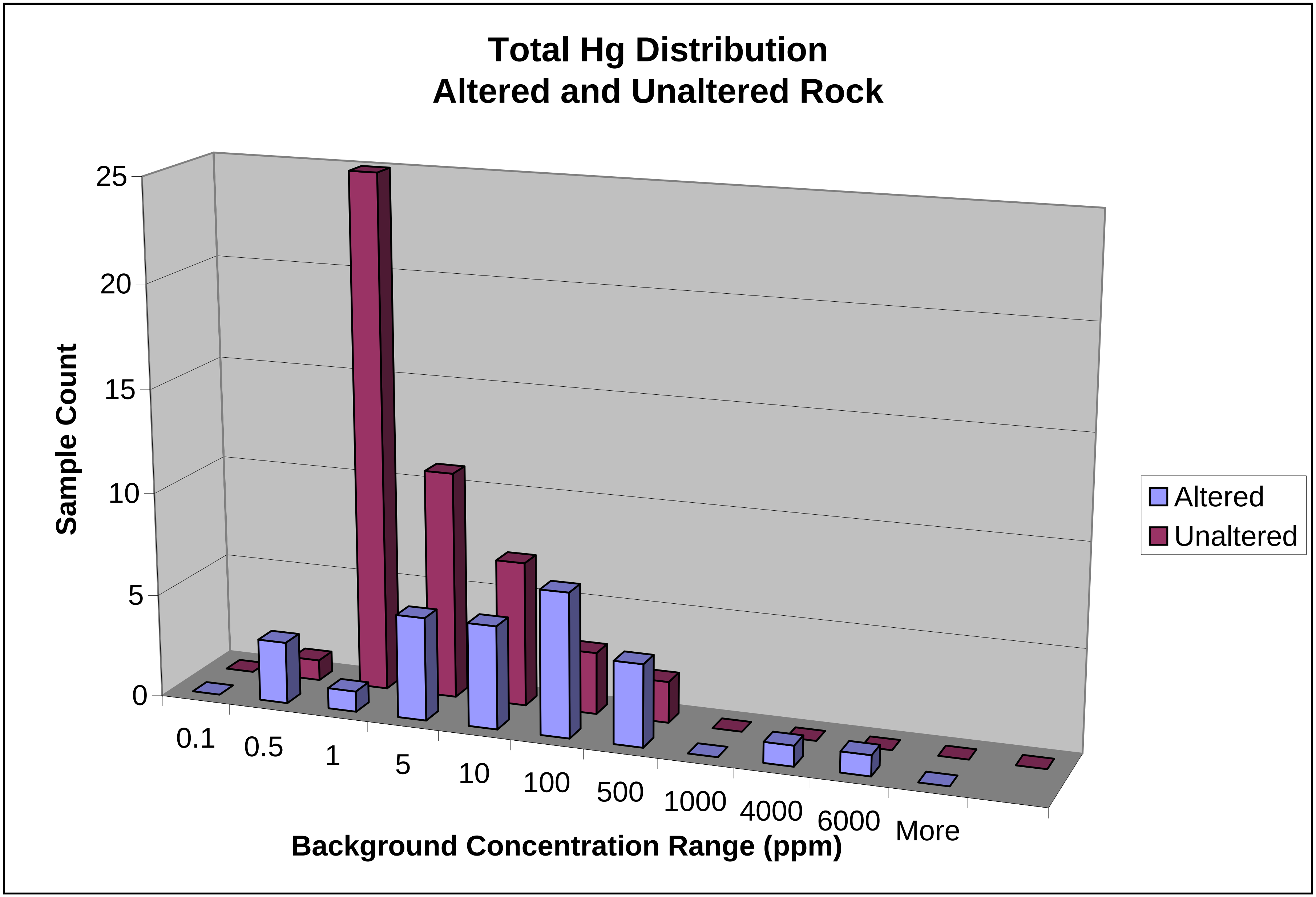
ppm = parts per million or milligrams pre kilogram

ND = not detect

solfaterized = Vapor phase alteration above the water table

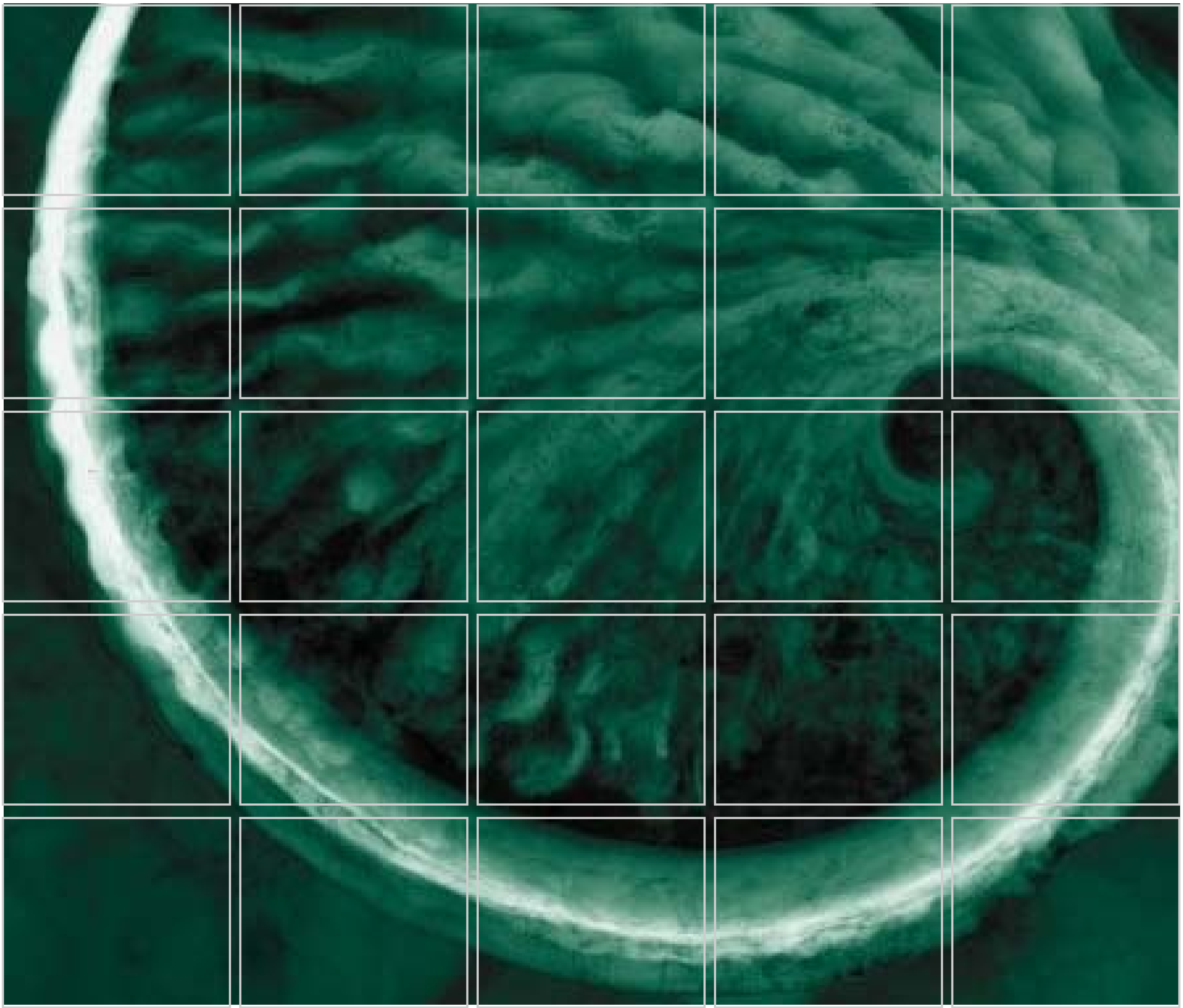


Total Mercury Values
Altered vs Unaltered Rock
Total Hg (ppm)
10000
1000
100
10
1
0.1
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
Samples Analyzed
Altered Lithologies
Unaltered Lithologies



Total Hg Distribution
Altered and Unaltered Rock
Sample Count
25
20
15
10
5
0
0.1
0.5
1
5
10
100
500
1000
4000
6000
More
Background Concentration Range (ppm)
Altered
Unaltered

Appendix C
Sampling and Analysis Plan



APPENDIX C
Sampling and Analysis Plan for Mining-Related Materials

Prepared for:
Homestake Mining Company of California

Sulphur Creek Mining District
Central Group and Wide Awake Mines
Colusa County, California

April 2010

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Homestake Mining Company of California

APPENDIX C
Sampling and Analysis Plan for Mining-Related Materials

Sulphur Creek Mining District
Central Group and Wide Awake Mines
Colusa County, California

April 2010

Project No. 108205.04

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LIST OF ATTACHMENTS

ATTACHMENT A – QUALITY ASSURANCE PROJECT PLAN

LIST OF FIGURES (Figures immediately follow the text)

LIST OF ACRONYMS

CAO	Cleanup and Abatement Order
Central District	Central portion of the Sulphur Creek Mining District
CVRWQCB	Central Valley Regional Water Quality Control Board
ERM	ERM-West, Inc.
HASP	Health and Safety Plan
Homestake	Homestake Mining Company of California
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
STLC	Soluble Threshold Limit Concentration
The sites	Wide Awake Mine and Central Mine Group
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

In 2009, the Central Valley Region Water Quality Control Board (CVRWQCB) issued Draft Cleanup and Abatement Orders (CAOs) to Homestake Mining Company of California (Homestake) and others for past mining activities associated with the following mines within the Sulphur Creek Mining District:

- Central Mine Group,
    - Central Mine,
    - Cherry Hill Mine,
    - Empire Mine,
    - Manzanita Mine,
    - West End Mine; and
- Wide Awake Mine.

The status of the CAOs is pending; they are subject to change as negotiations continue. Homestake's involvement in the Central Mine Group and Wide Awake Mine areas was limited to exploration activities from 1978 to 1992 in the vicinity of these mines. Under an agreement with the CVRWQCB, Homestake will mitigate mercury source contribution from former mine areas by removal of mining-related equipment, waste rock, and tailings.

ERM-West, Inc. (ERM) has prepared this Sampling and Analysis Plan (SAP) to describe the scope and methods for materials characterization activities that may be conducted during material removal and stabilization activities at the Central Mine Group and Wide Awake Mine (the "sites"). A Site Location Map is provided as Figure 1.

1.1 PROJECT OBJECTIVES

The primary objective of the field sampling effort is to characterize mining-related materials, including waste rock, tailings, and mining equipment located at the mine sites as necessary during remediation activities. This information will be used to determine appropriate disposal of these materials and to estimate the cost of disposal.

1.2 REPORT ORGANIZATION

This SAP is organized into five sections and two appendices as follows:

- Section 1.0 provides general introductory information;
- Section 2.0 provides background information on the mines;
- Section 3.0 describes the scope of work;
- Section 4.0 outlines the project schedule and deliverables; and
- Section 5.0 lists references.

Attachment A contains the Quality Assurance Project Plan. The Health and Safety Plan for sampling activities is included as part of the remediation work plan, of which this SAP is an appendix.

2.0 BACKGROUND

This section presents background information related to the planned material characterization activities. Information provided in this section includes mine locations and geologic settings, and historical activities at each mine.

2.1 SITE LOCATIONS AND FEATURES

The Sulphur Creek watershed is located within the eastern side of the Coast Range geomorphic province of California, about 8 miles west of the western margin of California's central valley and approximately 24 miles west of Williams, California.

The Sulphur Creek watershed is located in the northern California Coast Range near the Coast Range Thrust Fault. The Coast Range Thrust pushed a thick sheet of mostly sedimentary rocks (the Great Valley Sequence) over the metamorphic rocks of the Franciscan Complex. Numerous faults underlie the Sulphur Creek watershed, including the Stony Creek Thrust and the Resort Fault Zone. Common lithologies in the area include detrital serpentines, sandstone, and mudstone.

Sulphur Creek is an intermittent stream with continuous flows between the fall and spring months (October through June). Stretches of the stream are wet throughout the year because of inputs from geothermal springs (CVRWQCB 2007).

2.2 LAND USE AND DEVELOPMENT

2.2.1 Current Surrounding Land Use

Land use within the Sulphur Creek watershed is predominantly rangeland consisting of undeveloped chaparral and California scrub oak. Part of the Sulphur Creek watershed is privately owned and cattle graze on some private property in the lower watershed. The U.S. Bureau of Land Management administers public land in the upper portion of the watershed. The Wilbur Hot Springs resort is located on Sulphur Creek about 1 mile upstream of the confluence with Bear Creek. There are no year-round residences in the watershed, except those associated with the

Wilbur Hot Springs resort (CVRWQCB 2007). The nearest community to the District is the town of Williams about 24 miles to the east.

2.2.2 *Mining Development and History*

This subsection describes the historical activity at the mines within the site area (Figure 2). An expanded description of the site is available in the *Preliminary Conceptual Site Model for Sulphur Creek Mining District* (ERM 2009).

Wide Awake Mine: Other names for the Wide Awake Mine are Wide Awake Consolidated, Buckeye, Buckeye Quicksilver Mine, and Jefferson Mine. Originally known as the Buckeye Mine, it began operations in the 1870s, and was worked extensively for several years, with an output of 1,800 flasks of mercury. The initial production was from shallow surface workings and tunnels. Later, 500-foot vertical shafts were sunk, with levels at 190, 290, and 390 feet. In the late 1890s, a small production began with the operations ending in about 1901. Some work was done in 1932 and 1943 with a moderate production. Total production from the mine was about 1,800 flasks, most of which was produced in the 1870s. Processing facilities included large rotary furnaces and retorts.

Central and Empire Mines: The Central and Empire mine area was part of the Central group, included several mines: Central, Empire, Little Giant, Mercury Queen, Mercury King, Hidden Treasure and the Sulfur Creek Mine. The Empire Mine was located in the 1870s and the Central in 1891. In 1873 the Empire Mine produced 63 flasks of mercury. No significant production occurred from the Central Mine until 1926 when about 107 flasks were produced. The mines were idle until 1942 when a small production was reported. Total production from the Central and Empire Mines was approximately 170 flasks.

Mine workings included several hundred feet of tunnels. In 1873, ore from the Empire Mine was processing in the nearby Buckeye Mine (later called the Wide Awake Mine) in a small retort. During the 1890s, ore from the Central and Empire group was likely processed at the Abbot facilities. In 1926 a small furnace was installed on the Central Mine, but was unsuccessful so ore was processed via pipe retorts.

Manzanita Mine, Cherry Hill, and West End Mine Areas: This part of the Central Group included the Manzanita, West End, North Star, Monticello, Oak Tree, Cerise, and Cherry Hill Mines, and the Hughes mill site. The Manzanita Mine was initially operated for both gold and mercury, beginning in about 1863 until 1891. The Cherry Hill and West

End were also gold mines. The Manzanita area mines produced mercury from 1902 to 1942, yielding over 2,500 flasks. The mine workings included numerous tunnels and shafts, most of which are caved-in and inaccessible. Much work was also done by glory hole and open cut mining methods.

The Manzanita Mine was initially opened as a quicksilver mine, subsequently worked entirely for gold, and in later years worked for both gold and quicksilver. Processing was performed for gold, gold and mercury, and mercury alone, with ores concentrated by mechanical means prior to recovery. Ore was typically pulverized in a stamp mill, sized by gravity, and then passed over sluices to concentrate. The dried concentrates were mixed with lime and then retorted.

3.0 SCOPE OF WORK

This section describes the approach and methods for collection and analysis of waste characterization samples.

Data quality objectives (DQO) were developed for this investigation. DQOs are qualitative and quantitative statements developed through the seven-step DQO process that clarify study objectives, define the appropriate types of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions (EPA 2000a, 2000b). DQOs are used to develop a scientific and resource-effective design for data collection. Specific DQOs for the sampling and analysis program are summarized in the Quality Assurance Project Plan (QAPP) in Attachment A.

3.1 APPROACH TO WASTE CLASSIFICAITON

The material characterization approach is intended to determine appropriate waste designations, and therefore disposal options, for mining-related materials at the sites in accordance with Resource Conservation and Recovery Act (RCRA) and State of California regulations.

RCRA has been modified to allow exceptions to waste designation requirements for mining-related wastes. RCRA was amended in 1980 by the Bevill Exclusion, to exclude "solid waste from the extraction, beneficiation, and processing of ores and minerals" from regulation as hazardous waste under Subtitle C of RCRA. The State of California waste regulations acknowledge the Federal exclusion, but include the following waste classification related to mining solid waste:

- Group A – Mining-related waste determined to be a significant threat to groundwater quality that the CVRWQCB determines must be managed as hazardous waste.
- Group B – Mining-related waste that consist of or contain materials that pose a significant risk to water quality that qualify for a variance, provided that the CVRWQCB finds that such mining wastes pose a low risk to water quality.
- Group C – Mining-related waste from which any discharge would be in compliance with the applicable water quality control plan, include water quality objectives other than turbidity.

A waste designation process and disposal flow chart for mining wastes in California is included in Figure 3.

3.2 PREVIOUS WASTE CHARACTERIZATION SAMPLING

Materials characterization sampling was conducted at the sites to date is summarized in the remediation work plan, of which this SAP is an appendix.

Based on the general knowledge of the geologic formation and the specific materials characterization test results to date, the additional waste characterization sampling is anticipated to focus solely on mercury.

3.3 MATERIALS CHARACTERIZATION SAMPLING

3.3.1 Structure and Equipment Sampling

Structure and equipment materials located at the SCMD mines include metal pipes, metal retorts, ceramic materials, and brick furnaces. Metal equipment will not be sampled, but will be visually inspected for the presence of elemental mercury during removal activities. Ceramic, brick, and concrete materials will be sampled for waste characterization purposes, as these materials may have absorbed mercury during ore processing. Procedures for each material are provided below.

At each former structure of ceramic, brick, or concrete, at least two samples will be collected from each structure. One sample will be collected from an area with visual signs of use for mining-related activities, such as dark staining or an area that mercury would have commonly contacted, such as the inside of a furnace. The second sample will be collected from an area showing little to no visual indications of use.

Ceramic, brick, and concrete samples will be collected by field personnel using the following procedures:

1. Wear clean, nitrile gloves while conducting all sampling activities.
2. If possible, select ceramic, brick, and concrete from loose piles. To prevent injury, avoid collection of samples from standing structures if possible. Mechanically remove soil and dust from the outside of the sample using a decontaminated nylon brush.
3. Remove complete and/or broken fragments of ceramic, brick, and concrete materials, as available to remove in a safe manner. Collect

enough sample volume to meet laboratory requirements for each analytical method (described below).

4. Place samples in clean, laboratory-provided glass jars or other laboratory-approved containers and label using indelible ink and then place the samples in a cooler with ice.
5. Record date, time, and location where sample was collected.

Each sample will be analyzed for total and leachable mercury. Laboratory methods are described further in Section 3.3.

3.3.2 Waste Rock and Tailings Samples

General Approach

Waste rock and tailings from each mine site will be sampled for purposes of waste characterization. Mining waste will be identified in the field based on visual observations, including color and grain size distribution of material, vegetation type, and vegetation density. The number of samples collected, and the type of sample (discrete or composite) will be determined in the field based on the type and volume of material to be sampled.

Sample Collection/Composite Methods

Waste rock and tailings samples will be collected from each location using decontaminated hand tools.

Prior to collecting the sample at each sample location, a minimum of 3 to 6 inches of the topmost material will be moved aside to expose unweathered waste material. Samples will be handled and transported under chain-of-custody procedures. Composite samples will be prepared in the laboratory using equal aliquots of the designated discrete samples.

3.4 QUALITY ASSURANCE/ QUALITY CONTROL SAMPLES

Quality Assurance/ Quality Control (QA/QC) samples will include the following:

- At least one duplicate sample will be collected for every 20 primary samples;
- A project-specific matrix spike/matrix spike duplicate will be collected for every 20 waste rock/mine tailings samples;

- One rinsate blank will be collected from tools used for collecting waste rock/tailings samples for each 20 primary samples collected; and
- Any additional QA/QC samples recommended by the laboratory for specific analyses.

3.5 *ANALYTICAL METHODS*

This subsection describes the analytical methods to be performed on each sample. All analyses will be performed by a California-certified environmental laboratory.

3.5.1 *Equipment and Building Material Samples*

Ceramic, brick, and concrete samples will be analyzed for one or both of total mercury by United States Environmental Protection Agency (USEPA) Method 7471A and STLC mercury using the CalWET Method.

3.5.2 *Waste Rock and Tailings Samples*

Composite samples collected from waste rock and tailings deposits will be analyzed for one or both of total mercury by USEPA Method 7471A and STLC mercury using the CalWET Method.

3.6 *DECONTAMINATION PROCEDURES*

All non-dedicated sampling equipment will be decontaminated prior to use and between sample collection points. Standard decontamination procedures call for scrubbing sampling equipment with a laboratory-grade detergent (such as LiquiNox or Alconox), followed by a rinse with potable water and a rinse by ASTM Type II reagent water. After completing the decontamination process, the equipment will be positioned to preclude inadvertent contamination prior to reuse.

All decontamination fluids will be placed in a waste container that meets Department of Transportation specifications for removal to a waste collection facility.

4.0 SCHEDULE

Sampling will be completed as necessary to characterize materials as part of the remediation effort scheduled to be completed from July 2010 through October 2011.

5.0 REFERENCES

Central Valley Regional Water Quality Control Board (CVRWQCB). 2007. *Sulphur Creek TMDL for Mercury - Final Staff Report. Sacramento, CA.*

Churchill, R.K. and Clinkenbeard, J.P. 2003. *Assessment of the Feasibility of Remediation of Mercury Mine Sources in the Cache Creek Watershed, Final Report*, September 2003.

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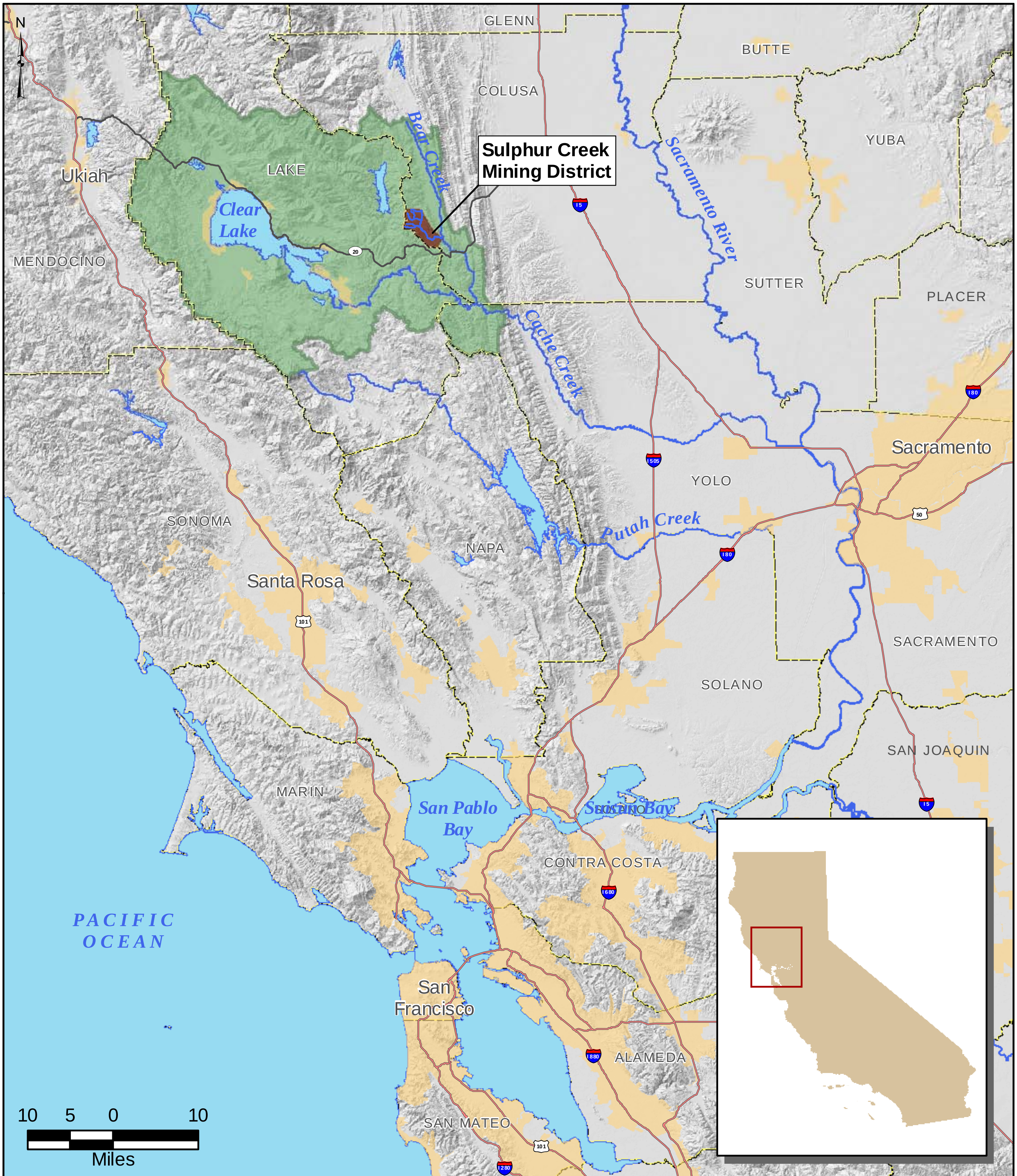
TetraTech EM Inc. 2003. *Final Engineering and Cost Analysis for the Sulphur Creek Mining District, Colusa and Lake Counties, California*. September 2003.

United States Environmental Protection Agency (USEPA). 2000a. *"Data Quality Objectives Process for Hazardous Waste Site Investigations (EPA QA/G-4HW)." Office of Environmental Information. EPA/600/R-00/007.* January 2000.

USEPA. 2000b. *"Guidance for the Data Quality Objective Process (EPA QA/G-4)." Office of Environmental Information. EPA/600/R-96/055.* August 2000.

Figures



Cache Creek Watershed

Urban Areas (e.g., Santa Rosa)

Counties (e.g., COLUSA)

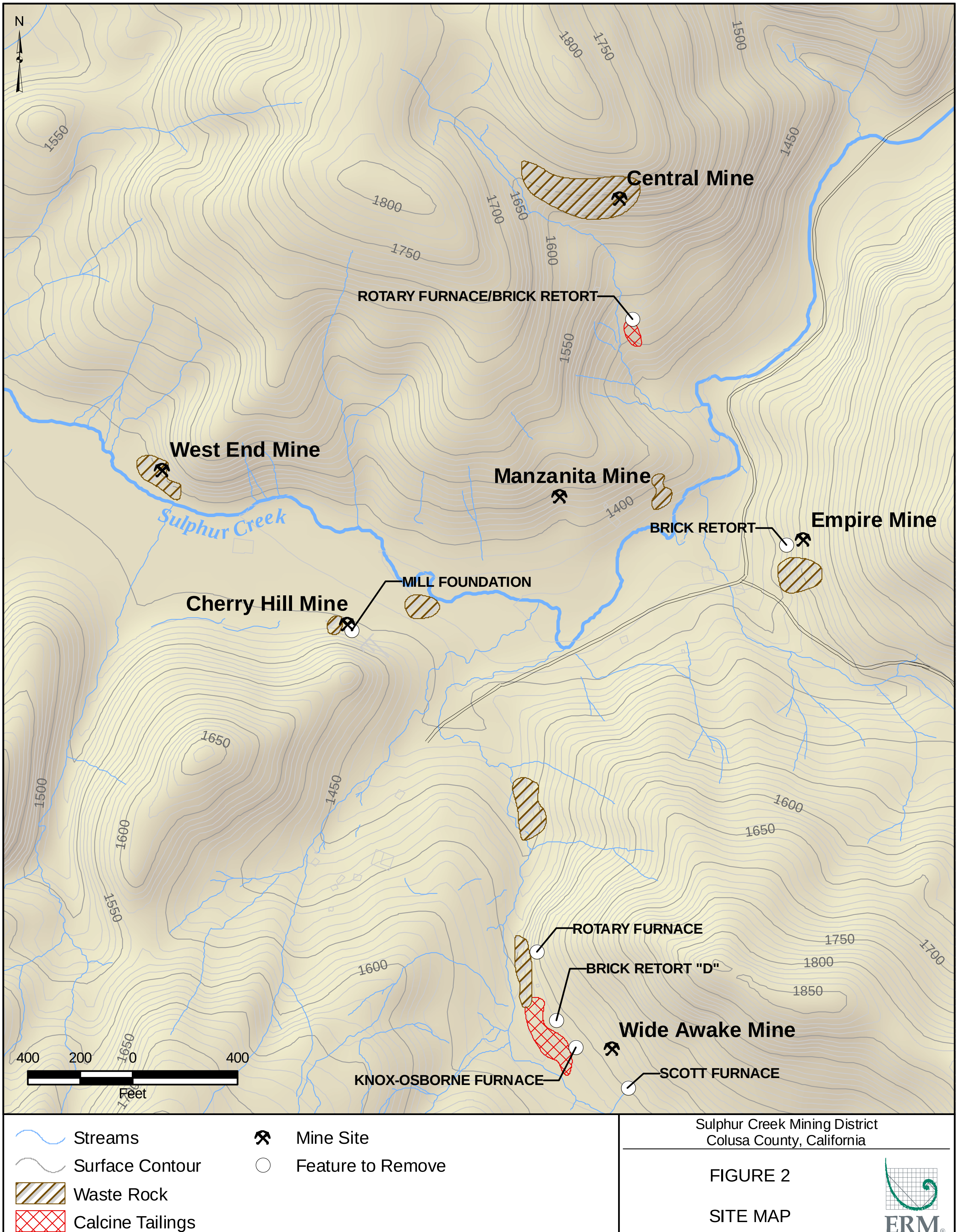
Sulphur Creek Mining District
Colusa County, California

FIGURE 1

SITE LOCATION MAP

ERM

Prepared by	Date	
MKJ (ERM)	03/15/10	JOB No. 0103878 FILE: GIS/BARRICK/SCMD/FIGURE 1.MXD



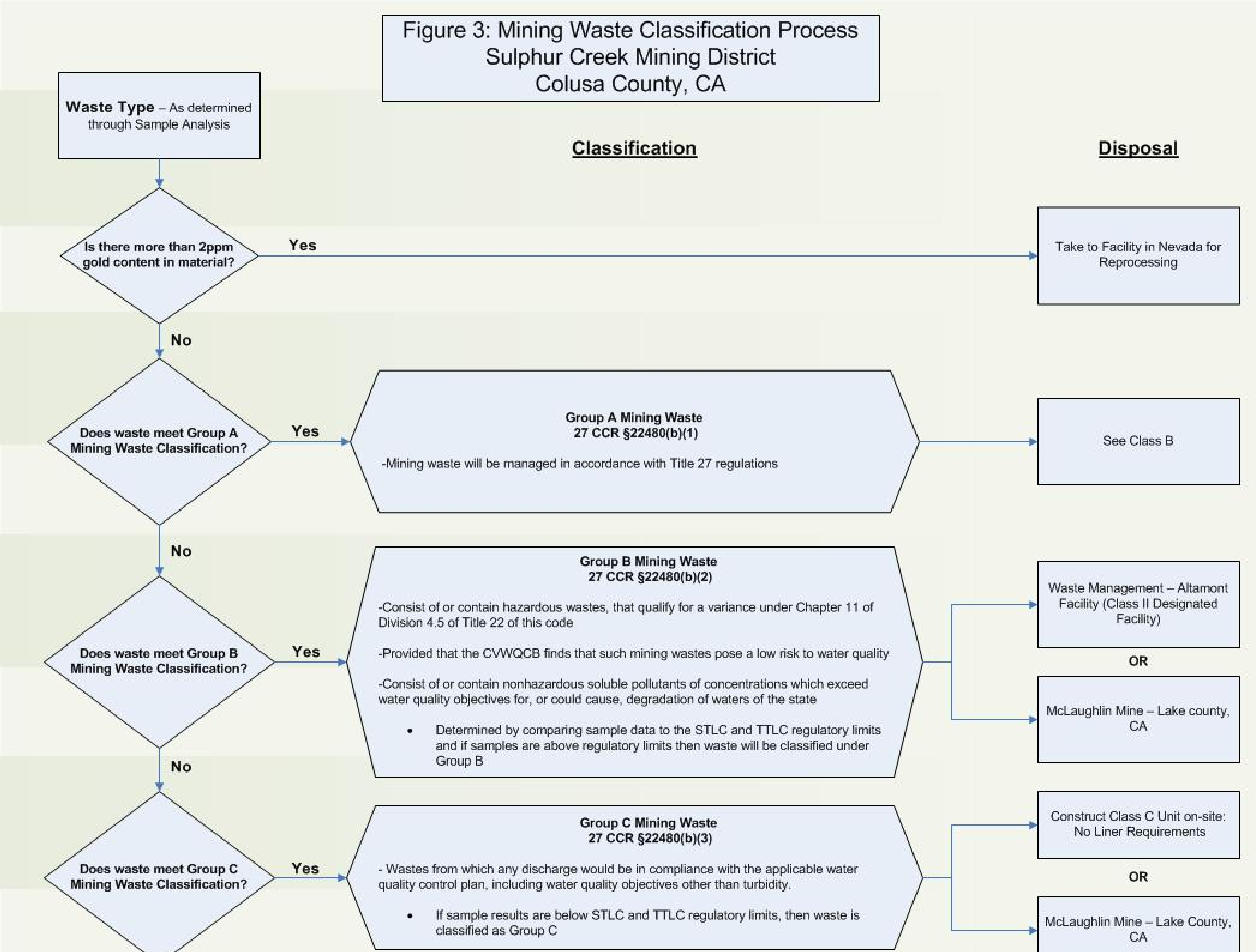
Sulphur Creek Mining District
Colusa County, California

FIGURE 2

SITE MAP

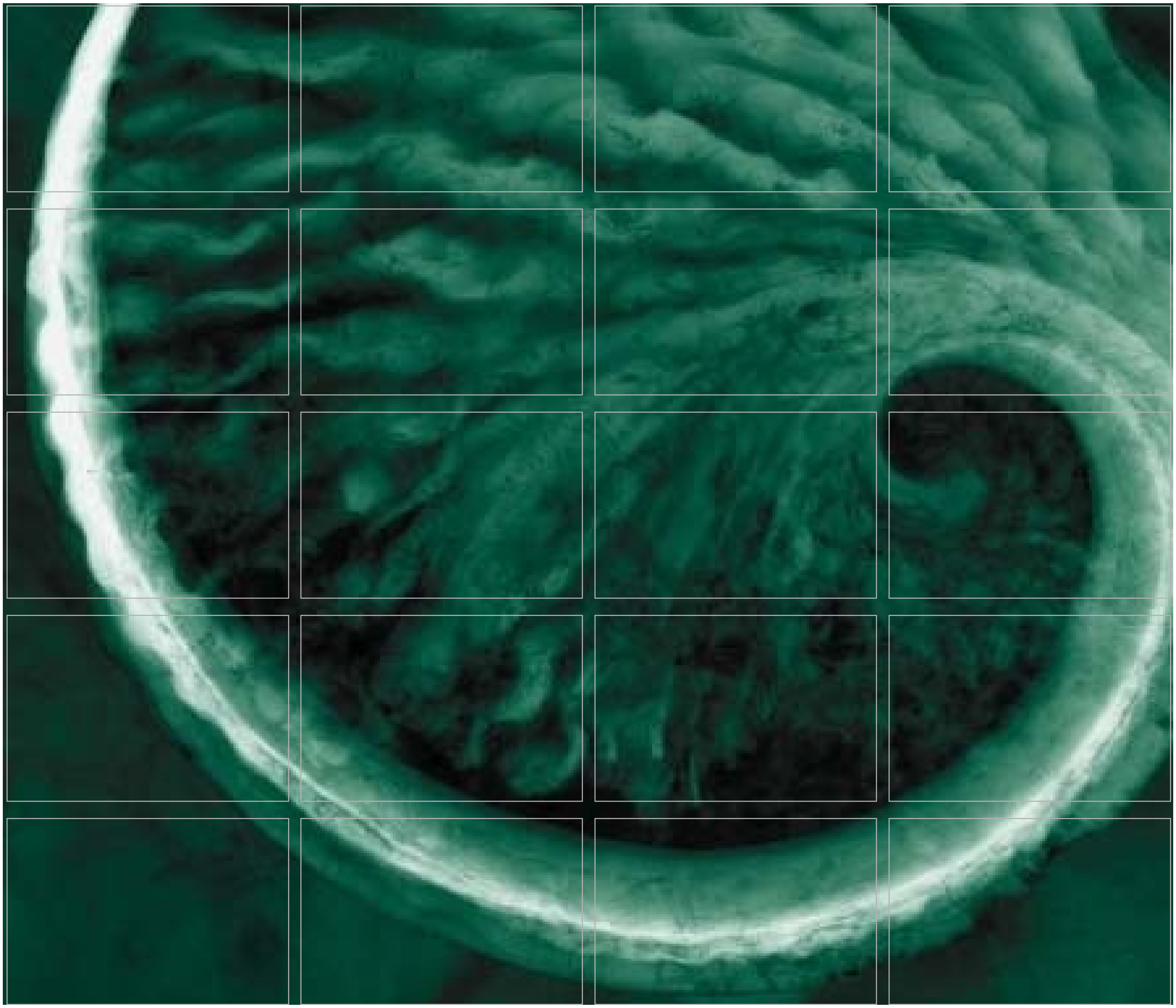
ERM

Prepared by MKJ (ERM)	Date 03/15/10	JOB No. 0108205 FILE: GIS/BARRICK/SCMD/FIGURE 2.MXD



Footnotes: STLC = Soluble Threshold Limit Concentration & TTLC = Total Threshold Limit Concentration (CCR Chapter 11, Article 3)

Attachment A
Quality Assurance Project Plan



ATTACHMENT A
Quality Assurance Project Plan for Mine-Related Materials Sampling

Sulphur Creek Mining District
Central Group and Wide Awake Mines
Colusa County, California

Prepared for:
Homestake Mining Company of California

April 2010

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ATTACHMENT A
Quality Assurance Project Plan for Mine-Related Materials Sampling

Sulphur Creek Mining District
Central Group and Wide Awake Mines
Colusa County, California

April 2010

Project No. 108205.04

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LIST OF ATTACHMENTS

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1.0 INTRODUCTION

Homestake Mining Company of California (Homestake), as well as numerous other Potential Responsible Parties, was issued Draft Cleanup and Abatement Orders (CAOs) for past mining activities associated with the central portion of the Sulphur Creek Mining District (Central District). The status of these orders is pending, and subject to change as negotiations continue for an alternative regulatory approach to site remediation. Under an agreement with the Central Valley Region Water Quality Control Board (CVRWQCB), Homestake will remediate mine workings within the Central District by removal of mining-related equipment, waste rock, and tailings. Homestake involvement in the Central District was limited to exploration activities from 1978 to 1992 in the central portion of the district.

This Quality Assurance Project Plan (QAPP) presents the quality assurance (QA) and quality control (QC) objectives, organization, and functional activities associated with the sampling and analyses of samples obtained during the mining-related waste characterization. This QAPP is prepared in general accordance with the guidelines for preparing QAPPs as provided by the United States Environmental Protection Agency (USEPA 2002).

The objective of the mine waste characterization field investigation is to provide data that characterizes the mine waste for selection of appropriate disposal options. A detailed discussion of the purpose and objectives of the sampling are described in the associated Mining-Related Waste Characterization Sampling and Analysis Plan (SAP).

Types of data to be collected under the SAP include characteristics of mine-related materials (waste rock, tailings, brick, ceramic, and concrete) to include total mercury by United States Environmental Protection Agency Method Method 7471A and Soluble Threshold Limit Concentration (STLC) mercury by the California Waste Extraction Test (CalWET) Method.

1.1 PROJECT ORGANIZATION

As part of this project, ERM-West, Inc. (ERM) will perform the sample collection, data analysis, and reporting under contract with Homestake. TestAmerica in Pleasanton, California is performing the laboratory analysis of the samples under subcontract to ERM. TestAmerica is a California-certified environmental laboratory.

The key project team members, roles and contact information are provided below.

Company	Name	Project Role	Phone	Email
Homestake	Karl Burke	Homestake Closure Manager	(707) 995-6072	KBurke@barrick.com
Homestake	Scott Moore	Homestake Project Coordinator	(707) 995-6072	Scott.moore@barrick.com
ERM	John Kinsella	Principal	(425) 647-6519	john.kinsella@erm.com
ERM	Laura Tesch	Project Director	(206) 418-8893 (cell)	laura.tesch@erm.com
ERM	Mike Arnold	Project Manager	(425) 214-0454	mike.arnold@erm.com
ERM	Sarah Piper	Field Work Task Lead	(916) 924-9378	sarah.piper@erm.com
ERM	Shira DeGrood	Project QA Coordinator and Database Manager	(503) 488-5282	shira.degrood@erm.com
TestAmerica	Surinder Sidhu	Project Manager	(925) 484-1919	surinder.sidhu@ testamericainc.com

1.2 *TASKS DESCRIPTION*

The tasks to be completed for this project include field work, laboratory analysis, data quality evaluation, data management, data analysis, and reporting.

The tasks to be completed in the field are detailed in the SAP, which includes procedures for:

- Field activity documentation;
- Sampling equipment;
- Sample collection and handling;

- Sample identification and chain-of-custody; and
- Equipment decontamination.

A summary of samples, analyses to be performed by the laboratory, the analytical methods that will be used, and the laboratory-provided analytical method control limits is presented in Table 1. Sample locations and analyses to be performed at each of the former mine areas are described in the SAP. Table 2 summarizes the sample and laboratory analyses for water quality control samples and Table 3 details the sample container, preservation and holding times.

The laboratory will report the results in hardcopy and as an electronic data deliverable in a format suitable for importing into a project database. ERM will perform the data validation and data quality assessment.

2.0 DATA QUALITY OBJECTIVES

The purpose of this QAPP is to describe the requirements and/or criteria necessary to produce data of sufficient technical quality to support the mine-related waste characterization for the Central District. This is achieved through the assessment of data quality measures, including precision, accuracy (bias), representativeness, completeness, comparability, and data reporting limits against the quality control criteria.

Data Quality Objectives (DQOs) are qualitative and/or quantitative statements to ensure that data of known and appropriate quality are collected to support specific decisions or answer specific regulatory requirements. The DQOs describe what data are needed, why the data are needed, and how the data will be used to address the problem being investigated. DQOs also establish numeric limits for the data to allow the data user (or reviewers) to determine whether data collected are of sufficient quality for their intended use.

The project DQOs for the project relate to the characterization of mining-related wastes. Specific DQOs include:

- Characterization of waste rock and tailings chemistry / physical properties to determine mercury concentrations for disposal; and
- Characterization of former mine-related equipment to determine the mercury concentration for disposal.

2.1 DATA QUALITY CONTROL

Data generated during the project will provide the basis for completing a removal action at the sites. To support this use, and to fulfill project objectives, usable data are required.

The usability of the data collected during this project depends on its quality established through a QC review. Multiple factors relate to the quality of data, including sample collection methods and analytical methods. Following standard operating procedures (SOPs) for both sample collection and analysis will reduce sampling and analytical error. Complete chain-of-custody documentation, adherence to required sample preservation techniques, holding times, and proper shipment methods ensure sample integrity.

Quantification limit objectives are based on the extent to which the laboratory or field equipment, or analytical process, can provide accurate data measurements of reliable quality for specific constituents in field samples. The actual quantification limit for a given analysis will vary depending on instrument sensitivity and matrix effects.

2.2 DATA QUALITY INDICATORS AND METHOD QUALITY OBJECTIVES

The data quality indicators presented in this section are: precision, accuracy, representativeness, comparability, completeness, and sensitivity. Data quality indicators can be applied to both field and laboratory analytical measurements to ensure that data of known and appropriate quality are obtained to support specific decisions or regulatory actions.

Method quality objectives are project specific requirements for the data quality indicators. The method quality objectives are selected to support any statistical requirements of the analytical data. Standard laboratory control limits will be used to evaluate data quality indicators for analytical data. Laboratory control limits for the method quality objective criteria are presented in Tables 1 and 2, and definitions and discussion of the data quality indicators follow below.

Precision. Precision is defined as the degree of agreement between or among independent, similar, or repeated measures. Precision is expressed in terms of analytical variability and will be calculated intra-laboratory. For this project, analytical variability will be measured as the relative percent difference (RPD) or coefficient of variation between analytical replicates/duplicates (i.e., field or laboratory) and between the matrix spike (MS) and matrix spike duplicate (MSD) analytical results. Short-term precision will be measured since the duplicates will be analyzed at the same time the primary samples are analyzed.

Precision will be calculated as the RPD of analytes as follows:

$$\% \, RPD = \frac{|O - D|}{\left(\frac{O + D}{2}\right)} \times 100$$

where:

$\% \, RPD$ = Relative percent difference

O	=	Value in original sample or MS
D	=	Value in duplicate sample or MSD

The resultant RPD will be compared to acceptance criteria and deviations from specified limits reported. If the acceptance criteria are not met, the laboratory or laboratories will supply a justification of why the acceptability limits were exceeded and implement the appropriate corrective actions.

Accuracy. Accuracy is the amount of agreement between a measured value and the true value. It will be measured as the percent recovery (%R) of the MS/MSD and laboratory control samples. It also will be measured using the analytical results of instrument calibration and other laboratory internal standards.

Accuracy will be calculated as the percent recovery (%R) of analytes as follows:

$$\% R = \frac{SS - S}{SA} \times 100$$

where:

$\% R$	=	percent recovery
SS	=	measured analyte concentration in spiked sample
S	=	measured concentration in unspiked (native) sample
SA	=	concentration of spike added

The resultant percent recoveries will be compared to acceptance criteria and deviations from specified limits will be reported. If the objective criteria are not met, the laboratory will supply a justification of why the acceptability limits were exceeded and implement the appropriate corrective actions.

Representativeness. Representativeness is the degree to which data accurately and precisely represent a parameter variation at a sampling point or an environmental condition. The results of all analyses will be used to evaluate the data to determine if the samples were collected in a manner such that the results appropriately describe the area investigated.

Comparability. Comparability is the degree to which data from one study can be compared with data from other similar studies, reference values (such as background), reference materials, and screening values. This goal will be achieved by: 1) using standard techniques to collect and analyze representative samples and by reporting analytical results in appropriate units; and 2) comparing current results with previous results, where possible.

Completeness. Measurement of completeness (C) can be defined as the ratio of acceptable (non-rejected) measurements obtained to the total number of measurements for an activity expressed as a percent. Percent completeness can be defined as:

% C = (Number of acceptable data points) / (Total number of data points) X 100

Sensitivity. As used in this context, sensitivity refers to the ability of project analytical procedures to identify and quantify target analytes at concentrations low enough to meet project data needs. Specific indicators of sensitivity in analytical measurements include the method detection limit (MDL), method reporting limit (MRL), and the sample-reporting limit (SRL).

The MDL is a purely statistical value, which is defined by the USEPA as the concentration at which an analytical system has a 99 percent probability of avoiding false positive results, and is determined by preparation and analysis of a minimum of seven replicate portions of a low level standard. The MDL lies in a region of high quantitative uncertainty, and results near the MDL must be considered as estimates.

The MRL is normally set at a factor of 5 to 10 times the MDL. The exact number depends on the lowest concentration that a laboratory can successfully use as a low calibration standard. The MRL is considered the lowest concentration that a lab can report with reasonable quantitative accuracy, although results less than 5 times the MRL can still be highly variable.

The sensitivity of the analytical methods (i.e., MRLs) identified for this project are sufficient to allow comparison of project results to the values used to determine disposal options. Analytical MRLs for all analytes are listed in Table 2. The SRL represents the lowest concentration of an analyte that can be reported with reasonable quantitative accuracy in a particular sample. The SRL is typically represented as the MRL multiplied by a dilution factor. Complicating factors such as limited sample volume, matrix effects and high concentrations of target and non-target analytes may necessitate sample dilutions and consequently elevating the SRL above the MRL. It is possible that the high concentrations of mercury in samples collected from waste rock and tailings piles may require dilution.

2.3 *DOCUMENTS AND RECORDS*

Records will be maintained to document the activities and data related to the field sampling, laboratory analysis, and the results of the data verification and validation. These records will be archived in the ERM project file and the administrative record for the project. Following data validation, the sampling results will also be uploaded to the project database.

2.3.1 *Field Documentation*

Field logbooks will be the main source of field documentation for all field activities. Notes will be taken in indelible, blue or black ink. The front and inside of each field logbook will be marked with the project name, number, and logbook number. The field logbooks or copies of the field notes will be stored in the project files when not in use and upon completion of the sampling event.

The first entry at the beginning of each day will state the date and time, project number, names of all field personnel on-Site (including subcontractors and the company for which they work), weather conditions, and the purpose of fieldwork. Each subsequent page will be started with the project number and the date. The bottom of each page will have the date and the initials of all personnel entering information onto that page. Any remaining unused lines will be crossed through. Errors will not be erased. All errors will have a single strikethrough with an initial and date next to the strikethrough and the subsequent change made. At the end of each day the field staff note taker will sign the field logbook.

Information specific to each mine will be recorded during sampling in the dedicated field logbook. Information recorded in the logbook may include, but will not be limited to:

- Mine identification;
- Weather conditions;

- Surrounding site activities;
- Date and time of sampling for each field sample and QA/QC sample;
- Sample identification or naming system, including each unique sample name/number;
- Sample location information and sample description;
- Volume of sample collected by number and type of sample containers;
- Sample preservation techniques and analyses requested; and
- Information relevant to quality control (e.g., sampling discrepancies or difficulties, unexpected conditions, abnormal sampling procedures).

Once the sample has been collected, the sample will be entered onto the chain of custody (COC) forms. These forms are used to document the custody of the samples from the field until receipt at the laboratory. Upon receipt at the laboratory the samples will be checked for physical integrity and logged into the laboratory sample tracking system. The COC forms and the sample receipt forms will be included in the laboratory data report package. Any discrepancies in the physical conditions of the samples or breaks in the chain of custody will be reported to the ERM Laboratory Coordinator within 24 hours of sample receipt.

2.3.2 Sampling Number System

The sample numbers will be designated in the field based on the location and type of material being sampled.

2.3.3 Laboratory Documentation

It is anticipated that full validation of raw data will be not be required for samples collected in support of this project, as these represent typical analyses that have been performed previously for samples collected at the Central Mine Group and Wide Awake Mine (Tetra Tech EM, Inc. 2003). Laboratory documentation and data deliverables for samples will therefore not include raw data, but will be provided as summary data packages including sufficient detail to assess data quality. Specific documentation to be included in the laboratory summary data packages includes:

- A case narrative that describes any problems encountered by the lab during analysis of project samples and results limitations in data usability;

- A cross-reference between laboratory sample IDs and project sample names;
- Summaries of analytical results for project samples, including method detection limits, method reporting limits or sample quantification limits, preparation and analytical method used, identification of any dilution performed, and footnotes to indicate any data usability limitations;
- Summaries of quality control results associated with the project samples including laboratory blank results, blank and matrix spike recoveries, duplicate analysis results, and surrogate recoveries where applicable; and
- Copies of the COC forms and laboratory sample receipt forms.

Though not included with the summary data packages, raw data will be maintained and archived by the laboratories and will be made available upon request.

2.3.4 *Quality Documentation*

Data verification and validation will be performed as a summary data quality review or a full data validation as described in Section 5 of this QAPP. Data Quality Review Reports will be prepared by ERM and submitted to the Task Manager and Project Director.

3.0 DATA ACQUISITION

The SAP describes the rationale and approach that will be used to collect data to support the mine-related waste characterization for the Central District.

3.1 SAMPLING PROCESS DESIGN

Sampling will be performed at the mines included in the Central Mine Group (Central, Manzanita, West End, and Cherry Hill mines) and the Wide Awake Mine. The number and types of samples to be collected varies according to total volume of material to be removed at each former mine area, as well as known characteristics of the material at each mine site. The rationale for specific sampling locations and types of samples to be collected at each former mine area is described in the SAP.

3.1.1 Sampling Objectives

The objective of the sampling is to collect a sufficient number of samples from each mine area to supplement existing data and provide results of adequate quality to characterize the mine-related waste for disposal.

Waste rock, tailings, and building/equipment material samples will be analyzed for one or both of the following:

- Total mercury; and
- STLC (Cal-Wet) mercury.

3.1.2 Sampling Methods and Handling

The methods used to waste rock, tailings, and building/equipment material samples are detailed in the SAP. USEPA Method 1669 will be modified for collecting the waste rock, tailings, and building/equipment material samples. The equipment and techniques used depend on the type of sample being collected and the sampling location. SOPs are explained the SAP.

The analytical sample container requirements, preservation, and holding times are summarized in Table 3. The sample jars used for samples will be laboratory-provided, pre-cleaned jars with Teflon-lined screw type lids. Equipment blank (water) samples will be collected into laboratory-provided bottles with appropriate preservative. The laboratory will maintain shipping and certification records from the supplier to trace the bottles back to the respective bottle rinse blank results.

3.2 ANALYTICAL METHOD REQUIREMENTS

Analytical methods used will be appropriate for the intended use of the data as described in this QAPP. Where possible, analytical methods will include USEPA-approved methods (USEPA 1994, USEPA 2007). For analyses for which USEPA-approved are not available, standardized methods have been identified (Plumb 1981, APHA 1998). Adherence to the relevant preparation and extraction, analytical and reporting methods will be evaluated during the data review. The analytical methods for individual analytes are summarized in Tables 1 and 2 for waste rock, tailings, building/equipment materials, and water analyses.

3.3 QUALITY CONTROL

QC samples will be prepared in the field and in the laboratory to assess the bias and precision of the field and laboratory methods.

3.3.1 Field Quality Control

Field QC samples will consist of field duplicate samples and equipment rinsate blanks. Field duplicates will be collected at a frequency of 5 percent of the total number of samples for the matrix (1 per 20 field samples), with a minimum of one field duplicate per sample type. If non-dedicated sampling equipment is used, equipment blanks will be collected at a frequency of one per day for sampling methods using non-dedicated equipment.

Field duplicates are replicate samples collected at the same location during the same sampling session and at the same time. Field duplicate samples are submitted to the contract laboratory and provide an indication of the reproducibility (accuracy) of the sampling and analysis procedures for a given sample matrix, including heterogeneity of the sample itself. The field duplicates will be collected in the same container types and handled and analyzed in the same manner as primary samples. Field duplicate samples will be collected for waste rock, tailings and building/equipment material sample matrices.

Equipment rinsate blanks are samples designed to assess the potential for cross-contamination after equipment decontamination. These samples are collected from the final de-ionized water rinse, following equipment decontamination. Equipment blank samples are collected directly into water sample containers. The sampling protocols and equipment have been designed to minimize the potential for cross-contamination and to limit the amount of equipment decontamination required in the field.

Equipment blanks for waste rock and tailings sampling equipment will be collected from shovels, mixing bowls, and other non-dedicated equipment which contacts the samples. Waste rock and tailings sampling equipment blanks will be analyzed for total mercury.

3.3.2 Laboratory Quality Control

The detailed requirements for the laboratory QC procedures are given in the USEPA method protocols that have been referenced and the laboratories' standard operating procedures and QA manuals. These requirements also include control limits and corrective actions. The laboratory will adhere to the QC procedures in the method protocols and this QAPP. Laboratory QC samples will include method blanks, matrix spike/matrix spike duplicates, and duplicates, as appropriate for the analytical method. The frequency of laboratory QC samples will be one every twenty samples, with a minimum of one per extraction batch.

The control limits, or method quality objectives, for the applicable recoveries and relative percent differences are given in Tables 2 and 3. These performance-based control limits have been established by the laboratory as required by the applicable methods and these criteria will be used by the laboratory to determine the acceptability of the data.

3.4 EQUIPMENT CALIBRATION PROCEDURES

Field measurements during the sampling event may be collected using a global positioning system (GPS) unit. If possible, each sample location will be recorded using a GPS unit for accuracy in mapping. ERM will follow the manufacturer's specific instructions for the calibration, operation, and maintenance of the GPS unit.

Analytical laboratory instruments and measurement equipment will be calibrated in accordance with manufacturer's instructions and the analytical laboratories' quality assurance manual (QAM). Records of standard preparation and instrument calibration data shall be maintained by the laboratory.

3.5 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

The quality of the supplies and consumables used during sample collection and analysis can affect the quality of the data. Non-dedicated sampling equipment will be decontaminated prior to use to help ensure that no detectable contamination is introduced to the samples.

The laboratory will provide cleaned and documented sample containers for waste rock, tailings, building/equipment material, and water sample collection. The containers will be visually inspection prior to use. Any suspect containers will be discarded.

Reagents used in equipment decontamination will have documented purity, and the containers will be initialed and dated when opened. Laboratory-provided de-ionized water, with documented quality, should be used for collecting equipment blanks and the final rinse during equipment decontamination. If de-ionized water that is not sourced from the laboratory is used, a de-ionized water blank sample will be required for analysis.

Reagents and calibration standards of appropriate purity, and suitably cleaned equipment will be used during the laboratory analysis. The acceptance criteria for the laboratory supplies and equipment are detailed in the laboratory SOPs and QAM. The documentation and certifications for field supplies and equipment will be retained by ERM, whereas the documentation and certifications for laboratory supplies and equipment will be retained by the laboratory.

3.6 DATA MANAGEMENT

Data for this project will be generated in the field and the laboratory, then reviewed for acceptability, and entered in the project database.

3.6.1 Field Data

Data generated in the field will include field log book entries, sample dates, field parameter measurements, observations, and additional information (such as field duplicate number). These data will be manually entered into an electronic format, and then checked by a second person, before final inclusion in the database.

3.6.2 Laboratory Data

Data generated by the subcontract laboratories will undergo data reduction and review procedures described in the laboratory QAM and SOPs. Data generated, reduced, and reviewed by the laboratories will undergo a comprehensive data review under the direction of the laboratory QA Officer or designee.

Upon acceptance of the data by the laboratory QA Officer, or designee, deliverables will be generated and submitted to the ERM Project Director. Each data report package submitted to the ERM Project Director will contain the laboratory's written certification that the requested analytical method was run and that all laboratory QC checks were performed.

Along with a hardcopy of the results, the laboratory data (including QC sample results) will also be reported as an electronic data deliverable (EDD) suitable for import to the project database.

4.0 ASSESSMENT AND OVERSIGHT

ERM will be responsible for the monitoring of field and sampling activities to maintain an appropriate level of sample QA. This project has a limited scope and only involves a small number of project team members. The ERM Project Director and Field Task Manager will stay in close communication with the field sampling team and the laboratory.

4.1 ASSESSMENTS AND RESPONSE ACTIONS

It is the responsibility of every team member to report non-conformances to the ERM Project Director, ERM Field Task Manager, or the laboratory Project Manager, as applicable. The ERM Project Director will ensure that the non-conforming data are not used until the non-conformance is corrected.

The planned assessment activities that ERM will perform include readiness reviews prior to sampling and prior to the release of final results to data users. Internal reviews will be on-going throughout the implementation of the project. No reports will be generated from the readiness reviews.

Pre-sampling preparation includes organizational and procedural planning before the actual sampling takes place. Each team member will understand their specific role and the roles of the other team members so that the sampling event reflects a coordinated effort. Each team member will understand the proper equipment and procedures to be used, the schedule of sampling events, the sequence of activities during any given event, and the health and safety procedures for the project. The Field Work Task Lead will verify that all field equipment is ready to be used at the site, that appropriate subcontractors have been contracted, scheduled and briefed (including a project specific health and safety briefing). Any deficiencies noted during this review will be corrected prior to commencing field work.

A second readiness review will be conducted prior to the release of final data to the users. The Laboratory Coordinator will verify that all analytical data have been received from the laboratory, that data validation and quality assessment have been completed, and appropriate data qualifiers have been entered into the database. Deficiencies found during this review will be corrected by the data manager or Project

Director. Data users will be notified when the data are ready for distribution.

Review of work products will be conducted through this project to ensure that all phases of work follow the QA procedures in this QAPP. Issues that arise during the project can usually be resolved between the reviewer and the person generating the work product. Any problems that cannot be easily resolved will be brought to the attention of the ERM Project and Field Task Managers. The ERM Project Director will notify the Homestake Project Coordinator upon identification of any QA problems that may affect the data's use for meeting project objectives.

The laboratory has implemented an internal review system that formalizes the assessment and reporting of laboratory activities and QA procedures. Each phase of work is reviewed by a supervisor before it is released. The details of the laboratory review system are described in the QAM.

If serious problems are encountered during the sampling and analysis, a technical system audit may be required. The audit would be conducted by the ERM QA Manager or the laboratory QA manager. The audits may examine any phase of the field sampling, laboratory, or data management activities related to the project. The results of audits will be included in the laboratory data summary report.

4.2 REPORTS TO MANAGEMENT

All communications with Homestake's Project Coordinator will be through the ERM Project or Task Manager.

Deviations from methods or QA requirements described in this QAPP and the related SAP will be corrected immediately if possible. The ERM Project Director will be notified, and assist in the resolving the issue if needed. It is not anticipated that a formal corrective action plan will be required. However, non-conformances that affect the quality of the data, or result in a change in scope, will be noted in the field logbook. This documentation will serve as the Corrective Action Report. The data summary report will include a description of the non-conforming issue, any attempted resolutions, and any effect on the quality and usability of the data.

Non-conformances discovered in the laboratory will be reported and resolved through the procedures detailed in the laboratory QAM and the appropriate method protocols. Laboratory non-conformances and the effects on data quality will be described in the data summary report.

5.0 DATA VALIDATION AND USABILITY

The field and laboratory data will be verified and validated according to the procedures and criteria described in this section. Data review and assessment for this project will follow guidance from USEPA and will be conducted under the supervision of the ERM Chemist. The quality and usability of the data will be evaluated and discussed in the data summary report.

5.1 DATA REVIEW, VERIFICATION, AND VALIDATION REQUIREMENTS

The field and laboratory data generated during this project will be verified and validated. Errors that are found during verification of the field data, laboratory data, and database entries will be corrected prior to the distribution of the final data.

The ERM QA Manager will review data reports and field data before data are used in an application or incorporated into a technical report. All analytical data will be reviewed by the laboratory and by the ERM Chemist to ensure that data are technically valid, defensible, and in general compliance with DQOs. Sample matrix effects will be evaluated and data will be appropriately identified, qualified, or disregarded. Qualified data will be so noted in the database and these data, as appropriate, may be excluded from certain project applications.

All tabular and graphical data representations will be reviewed to ensure that information is accurately portrayed. The ERM Project Director will review all deliverable work products to ensure that all findings and conclusions are based upon correct and accurate data. All reports will be prepared to ensure compliance with stipulated regulatory requirements and agency expectations. In situations that require review and evaluation of historic data, the limitations of reliance and the objectives of incorporation in the presentation will be clearly stated.

5.2 VERIFICATION AND VALIDATION METHODS

Field data will be verified during sample preparation and COC documentation, as well as at the completion of the field effort. The field data entries in the database will also be verified, and any errors corrected.

Data provided by the analytical laboratories will be reviewed and approved by the laboratories as described in Section 3.6.2 of this QAPP. Explanations of results outside of control limits and corrective actions taken by the laboratory will be described in the case narrative. The laboratory performs a data completeness check and verification as part of the preparation of the EDD. Data entries (including qualifier entries) in the database will be verified against hardcopies. Any errors will be corrected before final release of the data.

Laboratory data verification and validation for waste rock, tailings, building/equipment material, and water analyses will be completed as a summary data quality review to be performed in general accordance with the USEPA functional guidelines for data review (USEPA 2004) and the applicable analytical methods. The summary data quality review will include reviewing the laboratory documentation, results of quality control samples, assessment of data completeness, comparison to the data quality objectives, and an assessment of the overall quality of the data, including qualifiers and limitations on the use of the data.

The performance-based control limits, established by the laboratory, that will be used to assess the data quality are presented in Tables 2 and 3. The summary data quality review will consist of a review of the following:

- Holding times;
- Initial and continuing calibrations;
- System performance;
- Method blanks;
- Matrix spike / matrix spike duplicates;
- Field duplicates;
- Compound identification;
- Compound quantification; and
- Reporting limits.

The summary data quality review will not include checking calculations and raw data. In the event that the summary data quality review identifies a significant problem that may affect data usability, the ERM QA Coordinator or ERM Project Manager will contact the lab to initiate corrective action. If necessary, review of raw data associated with the identified problem will be performed. This further review will focus only on the identified problem, and will not include any analyses that did not exhibit serious deficiencies for an important target analyte.

5.3 RECONCILIATION WITH USER REQUIREMENTS

The purpose of data validation is to determine the quality of the data gathered for each point. Data is evaluated against performance-based control limits. Non-conforming data may be either qualified or rejected. The data qualifiers used for this project will be taken from the USEPA function guidelines for data review. Rejected data will not be used.

Limitations on data use that are found during validation will be discussed in the data summary report. Data users will be informed on the limitations of the data and the potential effect on data interpretation and analysis.

6.0 REFERENCES

American Public Health Association (APHA). 1998. Standard Methods for the Examination of Water and Wastewater. 20th ed. American Public Health Association, Washington, D.C.

Central Valley Regional Water Quality Control Board (CVRWQCB). 2007. *Sulphur Creek TMDL for Mercury - Final Staff Report. Sacramento, CA.*

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Tables

Table 1

Summary of Sample Analyses and Laboratory Control Limits
Central Mine Group and Wide Awake Mine
Sulphur Creek Mining District, Colusa County, California

Sample Materials	Parameter	Laboratory Information [1]									Sample Collection		
		Analytical Method	Method Detection Limit	Method Reporting Limit	Laboratory Control Limits						Approximate Number of Field Samples	Approximate Number of Field Duplicates	Approximate Number of Equipment Rinsate Blanks
					Duplicate RPD	Matrix Spike		Blank Spike					
						Percent Recovery	RPD	Percent Recovery	RPD				
Waste Rock, Tailings, Ceramic, Brick, and Concrete	STLC Mercury	CalWET	0.0001 mg/L	0.02 mg/L	20	75-125	20	80-120	20		25	2	0
	Total Mercury	USEPA 7471A	0.0025 mg/kg	0.02 mg/kg	20	75-125	20	80-120	20		13	1	1

Notes:

[1]Per TestAmerica Laboratories Inc.
CalWET = California Waste Extraction Test

Table 2

Laboratory Methods and Control Limits - Water Samples
Central Mine Group and Wide Awake Mine
Sulphur Creek Mining District, Colusa County, California

Sample Group	Constituent	Method	MDL	MRL	Units	Laboratory Control Limits				
						Duplicate	Matrix Spike		Blank Spike	
						RPD	%Rec	RPD	%Rec	RPD
Rinsate Blanks	Mercury	USEPA 1631	0.077	0.5	ng/L	25	75-125	25	80-120	25

Notes:
%Rec - Percent recovery
ng/L - nanograms per liter
MDL - Method Detection Limit
MRL - Method Reporting Limit
RPD - relative percent difference
USEPA - United States Environmental Protection Agency

Table 3

Sample Container, Preservation, and Holding Time Requirements
Central Mine Group and Wide Awake Mine
Sulphur Creek Mining District, Colusa County, California

Analysis	Method	Preservation	Hold Time (days)	Container	Amount Needed
Waste Rock, Tailings, and Building Material Samples					
STLC Mercury	CalWET	NA (cool ≤ 6°C)	90	glass jar (8 oz)	250 g
Water Samples					
Total Mercury	USEPA 1631	NA (cool ≤ 6°C)	28	glass bottle (12 oz)	12 oz

Notes:
CalWET = California Waste Extraction Test
g = Grams
NA = Not applicable
oz = Ounce
STLC = Soluble Threshold Limit Concentration
USEPA - United States Environmental Protection Agency

Attachment 1
Test America Laboratory Quality Assurance Manual

(Available on CD by request)

Appendix D
Waste Characterization Laboratory Reports

AcmeLabs Acme Analytical Laboratories (Vancouver) Ltd.
1020 Cordova St. East Vancouver BC V6A 4A3 Canada
Phone (604) 253-3158 Fax (604) 253-1716
www.acmelab.com

Client: **ERM**
130 - 915 118th Ave. S.E.
Bellevue WA USA

Submitted By:	Mike Arnold
Receiving Lab:	Canada-Vancouver
Received:	March 24, 2010
Report Date:	April 05, 2010
Page:	1 of 2

CERTIFICATE OF ANALYSIS VAN10001147.1

CLIENT JOB INFORMATION

Project:	Sulphur Creek
Shipment ID:	
P.O. Number	108205.04
Number of Samples:	11

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Method Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
R200-250	11	Crush, split and pulverize 250 g rock to 200 mesh			VAN
3B01	11	Fire assay fusion Au by ICP-ES	30	Completed	VAN

SAMPLE DISPOSAL

STOR-PLP	Store After 90 days Invoice for Storage
DISP-RJT	Dispose of Reject After 90 days

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

ADDITIONAL COMMENTS

Invoice To: ERM
130 - 915 118th Ave. S.E.
Bellevue WA
USA

CC: Laura Tesch

This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only.
All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of analysis only.
"*" asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.

Acme Analytical Laboratories (Vancouver) Ltd.
1020 Cordova St. East Vancouver BC V6A 4A3 Canada
Phone (604) 253-3158 Fax (604) 253-1716
www.acmelab.com

Client: **ERM**
130 - 915 118th Ave. S.E.
Bellevue WA USA

Project: Sulphur Creek
Report Date: April 05, 2010

CERTIFICATE OF ANALYSIS VAN10001147.1

	Method	WGHT	3B
	Analyte	Wgt	Au
	Unit	kg	ppb
	MDL	0.01	2
WA-WR-C1	Rock	1.87	656
WA-WS-C2	Rock	1.63	337
WA-CT-C3	Rock	2.01	1565
WA-WR-C4	Rock	1.69	565
MA-WR-C1	Rock	1.38	724
MA-WR-C2	Rock	1.37	6403
MA-WR-C3	Rock	1.39	5433
WE-WR-C1	Rock	1.55	5972
WE-WR-C2	Rock	1.72	>10000
CH-WR-C1	Rock	1.14	811
WE-WR-C1-D	Rock	1.81	4867

Acme Analytical Laboratories (Vancouver) Ltd.
1020 Cordova St. East Vancouver BC V6A 4A3 Canada
Phone (604) 253-3158 Fax (604) 253-1716
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Client: **ERM**
130 - 915 118th Ave. S.E.
Bellevue WA USA

Project: Sulphur Creek
Report Date: April 05, 2010

QUALITY CONTROL REPORT VAN10001147.1

	Method	WGHT	3B
	Analyte	Wgt	Au
	Unit	kg	ppb
	MDL	0.01	2
Reference Materials			
STD OXD73	Standard		405
STD OXD73	Standard		417
STD OXH66	Standard		1261
STD OXH66	Standard		1256
STD OXD73 Expected			416
STD OXH66 Expected			1285
BLK	Blank		<2
BLK	Blank		<2
BLK	Blank		<2
BLK	Blank		<2
Prep Wash			
G1	Prep Blank	<0.01	254
G1	Prep Blank	<0.01	5

ANALYTICAL REPORT

Job Number: 720-26781-1

Job Description: Bellview Creek

For:
ERM-West
915 118th Avenue SE, Suite 130
Bellevue, WA 98005

Attention: Mike Arnold

Designee for
Dimple Sharma
Project Manager I
dimple.sharma@testamericainc.com
04/02/2010

cc: Mr. Lance Jones

CA ELAP Certification # 2496
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TestAmerica Laboratories, Inc.
TestAmerica San Francisco 1220 Quarry Lane, Pleasanton, CA 94566
Tel (925) 484-1919 Fax (925) 600-3002 www.testamericainc.com

Job Narrative
720-26781-1

Comments
No additional comments.

Receipt
Received sample CH-CO-01on 3/23/10.

All other samples were received in good condition within temperature requirements.

Metals
Method 7471A: The matrix spike / matrix spike duplicate (MS/MSD) precision for batch 68709 was outside control limits. Non-homogeneity of the sample matrix is suspected. The associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) precision met acceptance ciriteria.

No other analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

EXECUTIVE SUMMARY - Detections

Client: ERM-West   Job Number: 720-26781-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier	Reporting Limit	Units	Method
720-26781-1	**CE-RT1-BR-01**				
Mercury		0.33	0.020	mg/Kg	7471A
720-26781-2	**CE-RT1-CE-01**				
Mercury		34	0.97	mg/Kg	7471A
720-26781-5	**MA-WR-C1**				
Soluble					
pH-Soluble		2.68	0.100	SU	9045C
720-26781-6	**MA-WR-C2**				
Soluble					
pH-Soluble		3.78	0.100	SU	9045C
720-26781-7	**MA-WR-C3**				
Soluble					
pH-Soluble		4.08	0.100	SU	9045C
720-26781-8	**WE-WR-C1**				
Soluble					
pH-Soluble		4.96	0.100	SU	9045C
720-26781-9	**WE-WR-C2**				
Soluble					
pH-Soluble		5.69	0.100	SU	9045C
720-26781-10	**WE-WR-C1-D**				
Soluble					
pH-Soluble		4.93	0.100	SU	9045C
720-26781-11	**WA-RT5-BR-05**				
Mercury		13	10	mg/Kg	7471A

EXECUTIVE SUMMARY - Detections

Client: ERM-West

Job Number: 720-26781-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier	Reporting Limit	Units	Method
720-26781-12	**WA-RT5-ASH-02**				
STLC Citrate					
Mercury		0.11	0.10	mg/L	7470A
720-26781-15	**WA-RT6-BR-07**				
Mercury		0.21	0.10	mg/Kg	7471A
720-26781-21	**WA-WR-C1**				
Soluble					
pH-Soluble		8.65	0.100	SU	9045C
720-26781-22	**WA-RT1-BR-01**				
Mercury		2.0	0.10	mg/Kg	7471A
720-26781-24	**WA-WS-C2**				
Soluble					
pH-Soluble		8.70	0.100	SU	9045C
720-26781-25	**WA-CT-C3**				
Soluble					
pH-Soluble		9.25	0.100	SU	9045C
720-26781-26	**WA-RT2-BR-2**				
Mercury		0.15	0.10	mg/Kg	7471A
720-26781-27	**WA-WR-C4**				
Soluble					
pH-Soluble		8.39	0.100	SU	9045C
720-26781-28	**WA-RT3-BR-3**				
Mercury		0.65	0.39	mg/Kg	7471A

EXECUTIVE SUMMARY - Detections

Client: ERM-West

Job Number: 720-26781-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier	Reporting Limit	Units	Method
720-26781-29	**WA-RT3-CO-1**				
Mercury		50	0.97	mg/Kg	7471A
720-26781-31	**CH-WR-C1**				
Soluble					
pH-Soluble		7.39	0.100	SU	9045C
720-26781-33	**CH-CO-01**				
Mercury		1.1	0.10	mg/Kg	7471A

METHOD SUMMARY

Client: ERM-West

Job Number: 720-26781-1

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Mercury (CVAA)	TAL SF	SW846 7470A	
California - Waste Extraction Test with Citrate Leach	TAL SF		CA-WET CA WET Citrate
Preparation, Mercury	TAL SF		SW846 7470A
Mercury (CVAA)	TAL SF	SW846 7471A	
Preparation, Mercury	TAL SF		SW846 7471A
Sulfide, Acid Soluble and Insoluble (Titrimetric)	TAL CHI	SW846 9034	
Sulfide, Distillation (Acid Soluble and Insoluble)	TAL CHI		SW846 9030B
pH	TAL SF	SW846 9045C	
Deionized Water Leaching Procedure	TAL SF		ASTM DI Leach
General Sub Contract Method		Subcontract	

Lab References:

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TAL CHI = TestAmerica Chicago

TAL SF = TestAmerica San Francisco

Method References:

ASTM = ASTM International

CA-WET = California Waste Extraction Test, from Title 22

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

SAMPLE SUMMARY

Client: ERM-West

Job Number: 720-26781-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
720-26781-1	CE-RT1-BR-01	Solid	03/18/2010 1720	03/22/2010 1800
720-26781-2	CE-RT1-CE-01	Solid	03/18/2010 1725	03/22/2010 1800
720-26781-3	CE-WR-C3	Solid	03/18/2010 1750	03/22/2010 1800
720-26781-4	CE-WR-C4	Solid	03/18/2010 1803	03/22/2010 1800
720-26781-5	MA-WR-C1	Solid	03/19/2010 0925	03/22/2010 1800
720-26781-6	MA-WR-C2	Solid	03/19/2010 0945	03/22/2010 1800
720-26781-7	MA-WR-C3	Solid	03/19/2010 1004	03/22/2010 1800
720-26781-8	WE-WR-C1	Solid	03/19/2010 1315	03/22/2010 1800
720-26781-9	WE-WR-C2	Solid	03/19/2010 1347	03/22/2010 1800
720-26781-10	WE-WR-C1-D	Solid	03/19/2010 1316	03/22/2010 1800
720-26781-11	WA-RT5-BR-05	Solid	03/18/2010 1530	03/22/2010 1800
720-26781-12	WA-RT5-ASH-02	Solid	03/18/2010 1535	03/22/2010 1800
720-26781-14	WA-RT5-BR-06	Solid	03/18/2010 1531	03/22/2010 1800
720-26781-15	WA-RT6-BR-07	Solid	03/18/2010 1550	03/22/2010 1800
720-26781-16	WA-RT6-BR-08	Solid	03/18/2010 1553	03/22/2010 1800
720-26781-17	WA-CT-C4	Solid	03/18/2010 1605	03/22/2010 1800
720-26781-18	WA-RT7-BR-09	Solid	03/18/2010 1615	03/22/2010 1800
720-26781-19	CE-CT-C1	Solid	03/18/2010 1705	03/22/2010 1800
720-26781-20	CE-CT-C2	Solid	03/18/2010 1710	03/22/2010 1800
720-26781-21	WA-WR-C1	Solid	03/18/2010 1115	03/22/2010 1800
720-26781-22	WA-RT1-BR-01	Solid	03/18/2010 1235	03/22/2010 1800
720-26781-23	WA-ASH-01	Solid	03/18/2010 1155	03/22/2010 1800
720-26781-24	WA-WS-C2	Solid	03/18/2010 1205	03/22/2010 1800
720-26781-25	WA-CT-C3	Solid	03/18/2010 1250	03/22/2010 1800
720-26781-26	WA-RT2-BR-2	Solid	03/18/2010 1308	03/22/2010 1800
720-26781-27	WA-WR-C4	Solid	03/18/2010 1320	03/22/2010 1800
720-26781-28	WA-RT3-BR-3	Solid	03/18/2010 1459	03/22/2010 1800
720-26781-29	WA-RT3-CO-1	Solid	03/18/2010 1500	03/22/2010 1800
720-26781-30	WA-RT4-BR-04	Solid	03/18/2010 1515	03/22/2010 1800
720-26781-31	CH-WR-C1	Solid	03/19/2010 1455	03/22/2010 1800
720-26781-31MS	CH-WR-C1	Solid	03/19/2010 1455	03/22/2010 1800
720-26781-31MSD	CH-WR-C1	Solid	03/19/2010 1455	03/22/2010 1800
720-26781-33	CH-CO-01	Solid	03/19/2010 1520	03/22/2010 1800

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **CE-RT1-BR-01**

Lab Sample ID: 720-26781-1 | Date Sampled: 03/18/2010 1720
Client Matrix: Solid | Date Received: 03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1417			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68544	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68500	Lab File ID:	N/A
Dilution:	1.0		Initial Weight/Volume:	0.61 g
Date Analyzed:	03/29/2010 1651		Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		0.33		0.020

Client: ERM-West Job Number: 720-26781-1

Client Sample ID: **CE-RT1-CE-01**

Lab Sample ID:	720-26781-2	Date Sampled:	03/18/2010 1725
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1419			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68545	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68500	Lab File ID:	N/A
Dilution:	50		Initial Weight/Volume:	0.62 g
Date Analyzed:	03/29/2010 1734		Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		34		0.97

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **CE-WR-C3**

Lab Sample ID: 720-26781-3 | Date Sampled: 03/18/2010 1750
Client Matrix: Solid | Date Received: 03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1421			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West Job Number: 720-26781-1

Client Sample ID: **CE-WR-C4**

Lab Sample ID:	720-26781-4	Date Sampled:	03/18/2010 1803
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1424		Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226			
Date Leached:	03/29/2010 1613			

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **MA-WR-C1**

Lab Sample ID:	720-26781-5	Date Sampled:	03/19/2010 0925
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880	Instrument ID: LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768	Lab File ID: N/A
Dilution:	1.0	Leachate Batch: 720-68530	Initial Weight/Volume: 1 mL
Date Analyzed:	04/02/2010 1431		Final Weight/Volume: 50 mL
Date Prepared:	04/01/2010 1226		
Date Leached:	03/29/2010 1613		

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West Job Number: 720-26781-1

Client Sample ID: **MA-WR-C2**

Lab Sample ID:	720-26781-6	Date Sampled:	03/19/2010 0945
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch:	720-68880	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch:	720-68768	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch:	720-68530	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1433			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **MA-WR-C3**

Lab Sample ID: 720-26781-7 | Date Sampled: 03/19/2010 1004
Client Matrix: Solid | Date Received: 03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1435			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West Job Number: 720-26781-1

Client Sample ID: **WE-WR-C1**

Lab Sample ID:	720-26781-8	Date Sampled:	03/19/2010 1315
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1438			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WE-WR-C2**

Lab Sample ID:	720-26781-9	Date Sampled:	03/19/2010 1347
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880	Instrument ID: LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768	Lab File ID: N/A
Dilution:	1.0	Leachate Batch: 720-68530	Initial Weight/Volume: 1 mL
Date Analyzed:	04/02/2010 1440		Final Weight/Volume: 50 mL
Date Prepared:	04/01/2010 1226		
Date Leached:	03/29/2010 1613		

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WE-WR-C1-D**

Lab Sample ID:	720-26781-10	Date Sampled:	03/19/2010 1316
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1443			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-RT5-BR-05**

Lab Sample ID:	720-26781-11	Date Sampled:	03/18/2010 1530
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1445		Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226			
Date Leached:	03/29/2010 1613			

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68655	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68595	Lab File ID:	N/A
Dilution:	500		Initial Weight/Volume:	0.60 g
Date Analyzed:	03/30/2010 1841		Final Weight/Volume:	50 mL
Date Prepared:	03/30/2010 1406			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		13		10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-RT5-ASH-02**

Lab Sample ID:	720-26781-12	Date Sampled:	03/18/2010 1535
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1447			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		0.11		0.10

Analytical Data

Client: ERM-West

Job Number: 720-26781-1

Client Sample ID: **WA-RT6-BR-07**

Lab Sample ID:	720-26781-15	Date Sampled:	03/18/2010 1550
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68530		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1450			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1613				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68545	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68500	Lab File ID:	N/A
Dilution:	5.0		Initial Weight/Volume:	0.60 g
Date Analyzed:	03/29/2010 1739		Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		0.21		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-RT6-BR-08**

Lab Sample ID:	720-26781-16	Date Sampled:	03/18/2010 1553
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1500		Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226			
Date Leached:	03/29/2010 1616			

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68545	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68500	Lab File ID:	N/A
Dilution:	50		Initial Weight/Volume:	0.57 g
Date Analyzed:	03/29/2010 1743		Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		ND		1.1

Analytical Data

Client: ERM-West

Job Number: 720-26781-1

Client Sample ID: **WA-CT-C4**

Lab Sample ID:	720-26781-17	Date Sampled:	03/18/2010 1605
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1503			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-RT7-BR-09**

Lab Sample ID: 720-26781-18 | Date Sampled: 03/18/2010 1615
Client Matrix: Solid | Date Received: 03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch:	720-68880	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch:	720-68768	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch:	720-68532	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1505			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch:	720-68545	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch:	720-68500	Lab File ID:	N/A
Dilution:	5.0			Initial Weight/Volume:	0.61 g
Date Analyzed:	03/29/2010 1741			Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002				

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		ND		0.098

Analytical Data

Client: ERM-West

Job Number: 720-26781-1

Client Sample ID: **CE-CT-C1**

Lab Sample ID:	720-26781-19	Date Sampled:	03/18/2010 1705
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1507		Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226			
Date Leached:	03/29/2010 1616			

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Analytical Data

Client: ERM-West

Job Number: 720-26781-1

Client Sample ID: **CE-CT-C2**

Lab Sample ID:	720-26781-20	Date Sampled:	03/18/2010 1710
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68880		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68768		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1510			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West Job Number: 720-26781-1

Client Sample ID: **WA-WR-C1**

Lab Sample ID:	720-26781-21	Date Sampled:	03/18/2010 1115
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68866	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68772	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1240		Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311			
Date Leached:	03/29/2010 1616			

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-RT1-BR-01**

Lab Sample ID: 720-26781-22 | Date Sampled: 03/18/2010 1235
Client Matrix: Solid | Date Received: 03/22/2010 1800

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68781	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68709	Lab File ID:	N/A
Dilution:	5.0		Initial Weight/Volume:	0.59 g
Date Analyzed:	04/01/2010 1351		Final Weight/Volume:	50 mL
Date Prepared:	03/31/2010 1617			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		2.0		0.10

Client Sample ID: **WA-ASH-01**

Lab Sample ID:	720-26781-23	Date Sampled:	03/18/2010 1155
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68866	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68772	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1242		Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311			
Date Leached:	03/29/2010 1616			

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68655	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68595	Lab File ID:	N/A
Dilution:	20		Initial Weight/Volume:	0.61 g
Date Analyzed:	03/30/2010 1848		Final Weight/Volume:	50 mL
Date Prepared:	03/30/2010 1406			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		ND		0.39

Client: ERM-West

Job Number: 720-26781-1

Client Sample ID: **WA-WS-C2**

Lab Sample ID:	720-26781-24	Date Sampled:	03/18/2010 1205
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68866	Instrument ID: LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68772	Lab File ID: N/A
Dilution:	1.0	Leachate Batch: 720-68532	Initial Weight/Volume: 1 mL
Date Analyzed:	04/02/2010 1245		Final Weight/Volume: 50 mL
Date Prepared:	04/01/2010 1311		
Date Leached:	03/29/2010 1616		

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-CT-C3**

Lab Sample ID:	720-26781-25	Date Sampled:	03/18/2010 1250
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68866	Instrument ID: LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68772	Lab File ID: N/A
Dilution:	1.0	Leachate Batch: 720-68532	Initial Weight/Volume: 1 mL
Date Analyzed:	04/02/2010 1252		Final Weight/Volume: 50 mL
Date Prepared:	04/01/2010 1311		
Date Leached:	03/29/2010 1616		

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-RT2-BR-2**

Lab Sample ID:	720-26781-26	Date Sampled:	03/18/2010 1308
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68866		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68772		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1254			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68545	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68500	Lab File ID:	N/A
Dilution:	5.0		Initial Weight/Volume:	0.58 g
Date Analyzed:	03/29/2010 1746		Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		0.15		0.10

Analytical Data

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-WR-C4**

Lab Sample ID:	720-26781-27	Date Sampled:	03/18/2010 1320
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68866		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68772		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1257			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-RT3-BR-3**

Lab Sample ID:	720-26781-28	Date Sampled:	03/18/2010 1459
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch:	720-68866	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch:	720-68772	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch:	720-68532	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1300			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch:	720-68655	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch:	720-68595	Lab File ID:	N/A
Dilution:	20			Initial Weight/Volume:	0.62 g
Date Analyzed:	03/30/2010 1851			Final Weight/Volume:	50 mL
Date Prepared:	03/30/2010 1406				

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		0.65		0.39

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **WA-RT3-CO-1**

Lab Sample ID:	720-26781-29	Date Sampled:	03/18/2010 1500
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68866		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68772		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1302			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68545	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68500	Lab File ID:	N/A
Dilution:	50		Initial Weight/Volume:	0.62 g
Date Analyzed:	03/29/2010 1748		Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		50		0.97

Client: ERM-West

Job Number: 720-26781-1

Client Sample ID: **CH-WR-C1**

Lab Sample ID:	720-26781-31	Date Sampled:	03/19/2010 1455
Client Matrix:	Solid	Date Received:	03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch:	720-68866	Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch:	720-68772	Lab File ID:	N/A
Dilution:	1.0	Leachate Batch:	720-68532	Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1237			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

Client: ERM-West | Job Number: 720-26781-1

Client Sample ID: **CH-CO-01**

Lab Sample ID: 720-26781-33 | Date Sampled: 03/19/2010 1520
Client Matrix: Solid | Date Received: 03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-68866		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-68772		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-68532		Initial Weight/Volume:	1 mL
Date Analyzed:	04/02/2010 1305			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				
Date Leached:	03/29/2010 1616				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-68545	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-68500	Lab File ID:	N/A
Dilution:	5.0		Initial Weight/Volume:	0.59 g
Date Analyzed:	03/29/2010 1750		Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		1.1		0.10

General Chemistry

Client Sample ID: **MA-WR-C1**

Lab Sample ID: 720-26781-5 Date Sampled: 03/19/2010 0925
Client Matrix: Solid Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	25	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1221 (End) 03/31/2010 1221 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	2.68		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

General Chemistry

Client Sample ID: **MA-WR-C2**

Lab Sample ID: 720-26781-6 Date Sampled: 03/19/2010 0945
Client Matrix: Solid Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	24	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1221 (End) 03/31/2010 1222 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	3.78		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

General Chemistry

Client Sample ID: **MA-WR-C3**

Lab Sample ID: 720-26781-7   Date Sampled: 03/19/2010 1004
Client Matrix: Solid   Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	25	1.0	9034

Analysis Batch: 500-83087   Date Analyzed (Start): 03/31/2010 1222 (End) 03/31/2010 1223   DryWt Corrected: N
Prep Batch: 500-83028   Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	4.08		SU	0.100	1.0	9045C

Analysis Batch: 720-68516   Date Analyzed: 03/29/2010 1344   DryWt Corrected: N

General Chemistry

Client Sample ID: **WE-WR-C1**

Lab Sample ID: 720-26781-8 Date Sampled: 03/19/2010 1315
Client Matrix: Solid Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	24	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1223 (End) 03/31/2010 1223 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	4.96		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

General Chemistry

Client Sample ID: **WE-WR-C2**

Lab Sample ID: 720-26781-9 Date Sampled: 03/19/2010 1347
Client Matrix: Solid Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	23	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1223 (End) 03/31/2010 1224 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	5.69		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

General Chemistry

Client Sample ID: **WE-WR-C1-D**

Lab Sample ID: 720-26781-10 Date Sampled: 03/19/2010 1316
Client Matrix: Solid Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	25	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1224 (End) 03/31/2010 1225 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	4.93		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

General Chemistry

Client Sample ID: **WA-WR-C1**

Lab Sample ID: 720-26781-21 Date Sampled: 03/18/2010 1115
Client Matrix: Solid Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	24	1.0	9034
	Analysis Batch: 500-83087	Date Analyzed (Start): 03/31/2010 1225 (End) 03/31/2010 1225				DryWt Corrected: N
	Prep Batch: 500-83028	Date Prepared: 03/31/2010 0820				

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	8.65		SU	0.100	1.0	9045C
	Analysis Batch: 720-68516	Date Analyzed: 03/29/2010 1344				DryWt Corrected: N

General Chemistry

Client Sample ID: **WA-WS-C2**

Lab Sample ID: 720-26781-24 Date Sampled: 03/18/2010 1205
Client Matrix: Solid Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	23	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1225 (End) 03/31/2010 1226 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	8.70		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

General Chemistry

Client Sample ID: **WA-CT-C3**

Lab Sample ID: 720-26781-25
Client Matrix: Solid

Date Sampled: 03/18/2010 1250
Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	24	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1226 (End) 03/31/2010 1226 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	9.25		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

Client: ERM-West | Job Number: 720-26781-1

General Chemistry

Client Sample ID: **WA-WR-C4**

Lab Sample ID: 720-26781-27 | Date Sampled: 03/18/2010 1320
Client Matrix: Solid | Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	24	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1226 (End) 03/31/2010 1227 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	8.39		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

General Chemistry

Client Sample ID: **CH-WR-C1**

Lab Sample ID: 720-26781-31 Date Sampled: 03/19/2010 1455
Client Matrix: Solid Date Received: 03/22/2010 1800

Analyte	Result	Qual	Units	RL	Dil	Method
Sulfide	ND		mg/Kg	24	1.0	9034

Analysis Batch: 500-83087 Date Analyzed (Start): 03/31/2010 1227 (End) 03/31/2010 1228 DryWt Corrected: N
Prep Batch: 500-83028 Date Prepared: 03/31/2010 0820

Analyte	Result	Qual	Units	RL	Dil	Method
pH-Soluble	7.39		SU	0.100	1.0	9045C

Analysis Batch: 720-68516 Date Analyzed: 03/29/2010 1344 DryWt Corrected: N

DATA REPORTING QUALIFIERS

Lab Section	Qualifier	Description

Client: ERM-West

Job Number: 720-26781-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 720-68500					
LCS 720-68500/2-A	Lab Control Sample	T	Solid	7471A	
LCSD 720-68500/3-A	Lab Control Sample Duplicate	T	Solid	7471A	
MB 720-68500/1-A	Method Blank	T	Solid	7471A	
720-26781-1	CE-RT1-BR-01	T	Solid	7471A	
720-26781-2	CE-RT1-CE-01	T	Solid	7471A	
720-26781-15	WA-RT6-BR-07	T	Solid	7471A	
720-26781-16	WA-RT6-BR-08	T	Solid	7471A	
720-26781-18	WA-RT7-BR-09	T	Solid	7471A	
720-26781-26	WA-RT2-BR-2	T	Solid	7471A	
720-26781-29	WA-RT3-CO-1	T	Solid	7471A	
720-26781-33	CH-CO-01	T	Solid	7471A	
Prep Batch: 720-68530					
720-26781-1	CE-RT1-BR-01	C	Solid	CA WET Citrate	
720-26781-1MS	Matrix Spike	C	Solid	CA WET Citrate	
720-26781-1MSD	Matrix Spike Duplicate	C	Solid	CA WET Citrate	
720-26781-2	CE-RT1-CE-01	C	Solid	CA WET Citrate	
720-26781-3	CE-WR-C3	C	Solid	CA WET Citrate	
720-26781-4	CE-WR-C4	C	Solid	CA WET Citrate	
720-26781-5	MA-WR-C1	C	Solid	CA WET Citrate	
720-26781-6	MA-WR-C2	C	Solid	CA WET Citrate	
720-26781-7	MA-WR-C3	C	Solid	CA WET Citrate	
720-26781-8	WE-WR-C1	C	Solid	CA WET Citrate	
720-26781-9	WE-WR-C2	C	Solid	CA WET Citrate	
720-26781-10	WE-WR-C1-D	C	Solid	CA WET Citrate	
720-26781-11	WA-RT5-BR-05	C	Solid	CA WET Citrate	
720-26781-12	WA-RT5-ASH-02	C	Solid	CA WET Citrate	
720-26781-15	WA-RT6-BR-07	C	Solid	CA WET Citrate	

Quality Control Results

Client: ERM-West

Job Number: 720-26781-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 720-68532					
720-26781-16	WA-RT6-BR-08	C	Solid	CA WET Citrate	
720-26781-17	WA-CT-C4	C	Solid	CA WET Citrate	
720-26781-18	WA-RT7-BR-09	C	Solid	CA WET Citrate	
720-26781-19	CE-CT-C1	C	Solid	CA WET Citrate	
720-26781-20	CE-CT-C2	C	Solid	CA WET Citrate	
720-26781-21	WA-WR-C1	C	Solid	CA WET Citrate	
720-26781-23	WA-ASH-01	C	Solid	CA WET Citrate	
720-26781-24	WA-WS-C2	C	Solid	CA WET Citrate	
720-26781-25	WA-CT-C3	C	Solid	CA WET Citrate	
720-26781-26	WA-RT2-BR-2	C	Solid	CA WET Citrate	
720-26781-27	WA-WR-C4	C	Solid	CA WET Citrate	
720-26781-28	WA-RT3-BR-3	C	Solid	CA WET Citrate	
720-26781-29	WA-RT3-CO-1	C	Solid	CA WET Citrate	
720-26781-31	CH-WR-C1	C	Solid	CA WET Citrate	
720-26781-31MS	Matrix Spike	C	Solid	CA WET Citrate	
720-26781-31MSD	Matrix Spike Duplicate	C	Solid	CA WET Citrate	
720-26781-33	CH-CO-01	C	Solid	CA WET Citrate	
Analysis Batch:720-68539					
LCS 720-68500/2-A	Lab Control Sample	T	Solid	7471A	720-68500
LCSD 720-68500/3-A	Lab Control Sample Duplicate	T	Solid	7471A	720-68500
MB 720-68500/1-A	Method Blank	T	Solid	7471A	720-68500
Analysis Batch:720-68544					
720-26781-1	CE-RT1-BR-01	T	Solid	7471A	720-68500
Analysis Batch:720-68545					
720-26781-2	CE-RT1-CE-01	T	Solid	7471A	720-68500
720-26781-15	WA-RT6-BR-07	T	Solid	7471A	720-68500
720-26781-16	WA-RT6-BR-08	T	Solid	7471A	720-68500
720-26781-18	WA-RT7-BR-09	T	Solid	7471A	720-68500
720-26781-26	WA-RT2-BR-2	T	Solid	7471A	720-68500
720-26781-29	WA-RT3-CO-1	T	Solid	7471A	720-68500
720-26781-33	CH-CO-01	T	Solid	7471A	720-68500
Prep Batch: 720-68595					
LCS 720-68595/2-A	Lab Control Sample	T	Solid	7471A	
LCSD 720-68595/3-A	Lab Control Sample Duplicate	T	Solid	7471A	
MB 720-68595/1-A	Method Blank	T	Solid	7471A	
720-26781-11	WA-RT5-BR-05	T	Solid	7471A	
720-26781-23	WA-ASH-01	T	Solid	7471A	
720-26781-28	WA-RT3-BR-3	T	Solid	7471A	

Client: ERM-West

Job Number: 720-26781-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:720-68655					
LCS 720-68595/2-A	Lab Control Sample	T	Solid	7471A	720-68595
LCSD 720-68595/3-A	Lab Control Sample Duplicate	T	Solid	7471A	720-68595
MB 720-68595/1-A	Method Blank	T	Solid	7471A	720-68595
720-26781-11	WA-RT5-BR-05	T	Solid	7471A	720-68595
720-26781-23	WA-ASH-01	T	Solid	7471A	720-68595
720-26781-28	WA-RT3-BR-3	T	Solid	7471A	720-68595
Prep Batch: 720-68709					
LCS 720-68709/2-A	Lab Control Sample	T	Solid	7471A	
LCSD 720-68709/3-A	Lab Control Sample Duplicate	T	Solid	7471A	
MB 720-68709/1-A	Method Blank	T	Solid	7471A	
720-26781-22	WA-RT1-BR-01	T	Solid	7471A	
Prep Batch: 720-68768					
LCS 720-68768/2-A	Lab Control Sample	T	Water	7470A	
LCSD 720-68768/3-A	Lab Control Sample Duplicate	T	Water	7470A	
MB 720-68768/1-A	Method Blank	T	Water	7470A	
720-26781-1	CE-RT1-BR-01	C	Solid	7470A	720-68530
720-26781-1MS	Matrix Spike	C	Solid	7470A	720-68530
720-26781-1MSD	Matrix Spike Duplicate	C	Solid	7470A	720-68530
720-26781-2	CE-RT1-CE-01	C	Solid	7470A	720-68530
720-26781-3	CE-WR-C3	C	Solid	7470A	720-68530
720-26781-4	CE-WR-C4	C	Solid	7470A	720-68530
720-26781-5	MA-WR-C1	C	Solid	7470A	720-68530
720-26781-6	MA-WR-C2	C	Solid	7470A	720-68530
720-26781-7	MA-WR-C3	C	Solid	7470A	720-68530
720-26781-8	WE-WR-C1	C	Solid	7470A	720-68530
720-26781-9	WE-WR-C2	C	Solid	7470A	720-68530
720-26781-10	WE-WR-C1-D	C	Solid	7470A	720-68530
720-26781-11	WA-RT5-BR-05	C	Solid	7470A	720-68530
720-26781-12	WA-RT5-ASH-02	C	Solid	7470A	720-68530
720-26781-15	WA-RT6-BR-07	C	Solid	7470A	720-68530
720-26781-16	WA-RT6-BR-08	C	Solid	7470A	720-68532
720-26781-17	WA-CT-C4	C	Solid	7470A	720-68532
720-26781-18	WA-RT7-BR-09	C	Solid	7470A	720-68532
720-26781-19	CE-CT-C1	C	Solid	7470A	720-68532
720-26781-20	CE-CT-C2	C	Solid	7470A	720-68532

Client: ERM-West

Job Number: 720-26781-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 720-68772					
LCS 720-68772/2-A	Lab Control Sample	T	Water	7470A	
LCSD 720-68772/3-A	Lab Control Sample Duplicate	T	Water	7470A	
MB 720-68772/1-A	Method Blank	T	Water	7470A	
720-26781-21	WA-WR-C1	C	Solid	7470A	720-68532
720-26781-23	WA-ASH-01	C	Solid	7470A	720-68532
720-26781-24	WA-WS-C2	C	Solid	7470A	720-68532
720-26781-25	WA-CT-C3	C	Solid	7470A	720-68532
720-26781-26	WA-RT2-BR-2	C	Solid	7470A	720-68532
720-26781-27	WA-WR-C4	C	Solid	7470A	720-68532
720-26781-28	WA-RT3-BR-3	C	Solid	7470A	720-68532
720-26781-29	WA-RT3-CO-1	C	Solid	7470A	720-68532
720-26781-31	CH-WR-C1	C	Solid	7470A	720-68532
720-26781-31MS	Matrix Spike	C	Solid	7470A	720-68532
720-26781-31MSD	Matrix Spike Duplicate	C	Solid	7470A	720-68532
720-26781-33	CH-CO-01	C	Solid	7470A	720-68532
Analysis Batch:720-68776					
LCS 720-68709/2-A	Lab Control Sample	T	Solid	7471A	720-68709
LCSD 720-68709/3-A	Lab Control Sample Duplicate	T	Solid	7471A	720-68709
MB 720-68709/1-A	Method Blank	T	Solid	7471A	720-68709
Analysis Batch:720-68781					
720-26781-22	WA-RT1-BR-01	T	Solid	7471A	720-68709
Analysis Batch:720-68866					
LCS 720-68772/2-A	Lab Control Sample	T	Water	7470A	720-68772
LCSD 720-68772/3-A	Lab Control Sample Duplicate	T	Water	7470A	720-68772
MB 720-68772/1-A	Method Blank	T	Water	7470A	720-68772
720-26781-21	WA-WR-C1	C	Solid	7470A	720-68772
720-26781-23	WA-ASH-01	C	Solid	7470A	720-68772
720-26781-24	WA-WS-C2	C	Solid	7470A	720-68772
720-26781-25	WA-CT-C3	C	Solid	7470A	720-68772
720-26781-26	WA-RT2-BR-2	C	Solid	7470A	720-68772
720-26781-27	WA-WR-C4	C	Solid	7470A	720-68772
720-26781-28	WA-RT3-BR-3	C	Solid	7470A	720-68772
720-26781-29	WA-RT3-CO-1	C	Solid	7470A	720-68772
720-26781-31	CH-WR-C1	C	Solid	7470A	720-68772
720-26781-31MS	Matrix Spike	C	Solid	7470A	720-68772
720-26781-31MSD	Matrix Spike Duplicate	C	Solid	7470A	720-68772
720-26781-33	CH-CO-01	C	Solid	7470A	720-68772

Client: ERM-West

Job Number: 720-26781-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:720-68880					
LCS 720-68768/2-A	Lab Control Sample	T	Water	7470A	720-68768
LCSD 720-68768/3-A	Lab Control Sample Duplicate	T	Water	7470A	720-68768
MB 720-68768/1-A	Method Blank	T	Water	7470A	720-68768
720-26781-1	CE-RT1-BR-01	C	Solid	7470A	720-68768
720-26781-1MS	Matrix Spike	C	Solid	7470A	720-68768
720-26781-1MSD	Matrix Spike Duplicate	C	Solid	7470A	720-68768
720-26781-2	CE-RT1-CE-01	C	Solid	7470A	720-68768
720-26781-3	CE-WR-C3	C	Solid	7470A	720-68768
720-26781-4	CE-WR-C4	C	Solid	7470A	720-68768
720-26781-5	MA-WR-C1	C	Solid	7470A	720-68768
720-26781-6	MA-WR-C2	C	Solid	7470A	720-68768
720-26781-7	MA-WR-C3	C	Solid	7470A	720-68768
720-26781-8	WE-WR-C1	C	Solid	7470A	720-68768
720-26781-9	WE-WR-C2	C	Solid	7470A	720-68768
720-26781-10	WE-WR-C1-D	C	Solid	7470A	720-68768
720-26781-11	WA-RT5-BR-05	C	Solid	7470A	720-68768
720-26781-12	WA-RT5-ASH-02	C	Solid	7470A	720-68768
720-26781-15	WA-RT6-BR-07	C	Solid	7470A	720-68768
720-26781-16	WA-RT6-BR-08	C	Solid	7470A	720-68768
720-26781-17	WA-CT-C4	C	Solid	7470A	720-68768
720-26781-18	WA-RT7-BR-09	C	Solid	7470A	720-68768
720-26781-19	CE-CT-C1	C	Solid	7470A	720-68768
720-26781-20	CE-CT-C2	C	Solid	7470A	720-68768

<u>**Report Basis**</u>

C = STLC Citrate

T = Total

Client: ERM-West	Job Number: 720-26781-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 720-68498					
LCS 720-68498/1-A	Lab Control Sample	S	Solid	DI Leach	
720-26781-5	MA-WR-C1	S	Solid	DI Leach	
720-26781-6	MA-WR-C2	S	Solid	DI Leach	
720-26781-7	MA-WR-C3	S	Solid	DI Leach	
720-26781-8	WE-WR-C1	S	Solid	DI Leach	
720-26781-9	WE-WR-C2	S	Solid	DI Leach	
720-26781-10	WE-WR-C1-D	S	Solid	DI Leach	
720-26781-21	WA-WR-C1	S	Solid	DI Leach	
720-26781-24	WA-WS-C2	S	Solid	DI Leach	
720-26781-25	WA-CT-C3	S	Solid	DI Leach	
720-26781-27	WA-WR-C4	S	Solid	DI Leach	
720-26781-31	CH-WR-C1	S	Solid	DI Leach	
720-26781-31DU	Duplicate	S	Solid	DI Leach	
Analysis Batch:720-68516					
LCS 720-68498/1-A	Lab Control Sample	S	Solid	9045C	
720-26781-5	MA-WR-C1	S	Solid	9045C	
720-26781-6	MA-WR-C2	S	Solid	9045C	
720-26781-7	MA-WR-C3	S	Solid	9045C	
720-26781-8	WE-WR-C1	S	Solid	9045C	
720-26781-9	WE-WR-C2	S	Solid	9045C	
720-26781-10	WE-WR-C1-D	S	Solid	9045C	
720-26781-21	WA-WR-C1	S	Solid	9045C	
720-26781-24	WA-WS-C2	S	Solid	9045C	
720-26781-25	WA-CT-C3	S	Solid	9045C	
720-26781-27	WA-WR-C4	S	Solid	9045C	
720-26781-31	CH-WR-C1	S	Solid	9045C	
720-26781-31DU	Duplicate	S	Solid	9045C	
Prep Batch: 500-83028					
LCS 500-83028/2-A	Lab Control Sample	T	Solid	9030B	
MB 500-83028/1-A	Method Blank	T	Solid	9030B	
720-26781-5	MA-WR-C1	T	Solid	9030B	
720-26781-6	MA-WR-C2	T	Solid	9030B	
720-26781-7	MA-WR-C3	T	Solid	9030B	
720-26781-8	WE-WR-C1	T	Solid	9030B	
720-26781-9	WE-WR-C2	T	Solid	9030B	
720-26781-10	WE-WR-C1-D	T	Solid	9030B	
720-26781-21	WA-WR-C1	T	Solid	9030B	
720-26781-24	WA-WS-C2	T	Solid	9030B	
720-26781-25	WA-CT-C3	T	Solid	9030B	
720-26781-27	WA-WR-C4	T	Solid	9030B	
720-26781-31	CH-WR-C1	T	Solid	9030B	
720-26781-31MS	Matrix Spike	T	Solid	9030B	
720-26781-31MSD	Matrix Spike Duplicate	T	Solid	9030B	

Client: ERM-West

Job Number: 720-26781-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:500-83087					
LCS 500-83028/2-A	Lab Control Sample	T	Solid	9034	500-83028
MB 500-83028/1-A	Method Blank	T	Solid	9034	500-83028
720-26781-5	MA-WR-C1	T	Solid	9034	500-83028
720-26781-6	MA-WR-C2	T	Solid	9034	500-83028
720-26781-7	MA-WR-C3	T	Solid	9034	500-83028
720-26781-8	WE-WR-C1	T	Solid	9034	500-83028
720-26781-9	WE-WR-C2	T	Solid	9034	500-83028
720-26781-10	WE-WR-C1-D	T	Solid	9034	500-83028
720-26781-21	WA-WR-C1	T	Solid	9034	500-83028
720-26781-24	WA-WS-C2	T	Solid	9034	500-83028
720-26781-25	WA-CT-C3	T	Solid	9034	500-83028
720-26781-27	WA-WR-C4	T	Solid	9034	500-83028
720-26781-31	CH-WR-C1	T	Solid	9034	500-83028
720-26781-31MS	Matrix Spike	T	Solid	9034	500-83028
720-26781-31MSD	Matrix Spike Duplicate	T	Solid	9034	500-83028

Report Basis
S = Soluble
T = Total

Client: ERM-West | Job Number: 720-26781-1

Method Blank - Batch: 720-68768

Method: 7470A
Preparation: 7470A

Lab Sample ID:	MB 720-68768/1-A	Analysis Batch:	720-68880	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-68768	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	1.0 mL
Date Analyzed:	04/02/2010 1403			Final Weight/Volume:	1.0 mL
Date Prepared:	04/01/2010 1226				

Analyte	Result	Qual	RL
Mercury	ND		0.0020

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 720-68768

Method: 7470A
Preparation: 7470A

LCS Lab Sample ID:	LCS 720-68768/2-A	Analysis Batch:	720-68880	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-68768	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	25 mL
Date Analyzed:	04/02/2010 1405			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				

LCSD Lab Sample ID:	LCSD 720-68768/3-A	Analysis Batch:	720-68880	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-68768	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	25 mL
Date Analyzed:	04/02/2010 1408			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1226				

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	98	97	80 - 120	2	20		

Client: ERM-West

Job Number: 720-26781-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 720-68768

Method: 7470A
Preparation: 7470A
STLC Citrate

MS Lab Sample ID: 720-26781-1	Analysis Batch: 720-68880	Instrument ID:	LL_HG Analyzer
Client Matrix: Solid	Prep Batch: 720-68768	Lab File ID:	N/A
Dilution: 1.0		Initial Weight/Volume:	1 mL
Date Analyzed: 04/02/2010 1413		Final Weight/Volume:	50 mL
Date Prepared: 04/01/2010 1226			
Date Leached: 03/29/2010 1613	Leachate Batch: 720-68530		

MSD Lab Sample ID: 720-26781-1	Analysis Batch: 720-68880	Instrument ID:	LL_HG Analyzer
Client Matrix: Solid	Prep Batch: 720-68768	Lab File ID:	N/A
Dilution: 1.0		Initial Weight/Volume:	1 mL
Date Analyzed: 04/02/2010 1415		Final Weight/Volume:	50 mL
Date Prepared: 04/01/2010 1226			
Date Leached: 03/29/2010 1613	Leachate Batch: 720-68530		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Mercury	98	92	75 - 125	5	20		

Client: ERM-West Job Number: 720-26781-1

Method Blank - Batch: 720-68772

Method: 7470A
Preparation: 7470A

Lab Sample ID:	MB 720-68772/1-A	Analysis Batch:	720-68866	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-68772	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	25 mL
Date Analyzed:	04/02/2010 1224			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				

Analyte	Result	Qual	RL
Mercury	ND		0.0040

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 720-68772

Method: 7470A
Preparation: 7470A

LCS Lab Sample ID:	LCS 720-68772/2-A	Analysis Batch:	720-68866	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-68772	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	25 mL
Date Analyzed:	04/02/2010 1226			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				

LCSD Lab Sample ID:	LCSD 720-68772/3-A	Analysis Batch:	720-68866	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-68772	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	25 mL
Date Analyzed:	04/02/2010 1228			Final Weight/Volume:	50 mL
Date Prepared:	04/01/2010 1311				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	102	100	80 - 120	1	20		

Quality Control Results

Client: ERM-West | Job Number: 720-26781-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 720-68772

Method: 7470A
Preparation: 7470A
STLC Citrate

MS Lab Sample ID: 720-26781-31	Analysis Batch: 720-68866	Instrument ID:	LL_HG Analyzer
Client Matrix: Solid	Prep Batch: 720-68772	Lab File ID:	N/A
Dilution: 1.0		Initial Weight/Volume:	1 mL
Date Analyzed: 04/02/2010 1233		Final Weight/Volume:	50 mL
Date Prepared: 04/01/2010 1311			
Date Leached: 03/29/2010 1616	Leachate Batch: 720-68532		

MSD Lab Sample ID: 720-26781-31	Analysis Batch: 720-68866	Instrument ID:	LL_HG Analyzer
Client Matrix: Solid	Prep Batch: 720-68772	Lab File ID:	N/A
Dilution: 1.0		Initial Weight/Volume:	1 mL
Date Analyzed: 04/02/2010 1235		Final Weight/Volume:	50 mL
Date Prepared: 04/01/2010 1311			
Date Leached: 03/29/2010 1616	Leachate Batch: 720-68532		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Mercury	100	100	75 - 125	0	20		

Client: ERM-West | Job Number: 720-26781-1

Method Blank - Batch: 720-68500

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 720-68500/1-A	Analysis Batch:	720-68539	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68500	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.57 g
Date Analyzed:	03/29/2010 1553			Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002				

Analyte	Result	Qual	RL
Mercury	ND		0.021

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 720-68500

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 720-68500/2-A	Analysis Batch:	720-68539	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68500	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.58 g
Date Analyzed:	03/29/2010 1555			Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002				

LCSD Lab Sample ID:	LCSD 720-68500/3-A	Analysis Batch:	720-68539	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68500	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.63 g
Date Analyzed:	03/29/2010 1557			Final Weight/Volume:	50 mL
Date Prepared:	03/29/2010 1002				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	104	103	80 - 120	9	20		

Quality Control Results

Client: ERM-West | Job Number: 720-26781-1

Method Blank - Batch: 720-68595

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 720-68595/1-A	Analysis Batch:	720-68655	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68595	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.59 g
Date Analyzed:	03/30/2010 1820			Final Weight/Volume:	50 mL
Date Prepared:	03/30/2010 1406				

Analyte	Result	Qual	RL
Mercury	ND		0.020

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 720-68595

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 720-68595/2-A	Analysis Batch:	720-68655	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68595	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.59 g
Date Analyzed:	03/30/2010 1822			Final Weight/Volume:	50 mL
Date Prepared:	03/30/2010 1406				

LCSD Lab Sample ID:	LCSD 720-68595/3-A	Analysis Batch:	720-68655	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68595	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.59 g
Date Analyzed:	03/30/2010 1825			Final Weight/Volume:	50 mL
Date Prepared:	03/30/2010 1406				

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	101	101	80 - 120	0	20		

Client: ERM-West Job Number: 720-26781-1

Method Blank - Batch: 720-68709

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 720-68709/1-A	Analysis Batch:	720-68776	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68709	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.59 g
Date Analyzed:	04/01/2010 1214			Final Weight/Volume:	50 mL
Date Prepared:	03/31/2010 1617				

Analyte	Result	Qual	RL
Mercury	ND		0.020

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 720-68709

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 720-68709/2-A	Analysis Batch:	720-68776	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68709	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.62 g
Date Analyzed:	04/01/2010 1216			Final Weight/Volume:	50 mL
Date Prepared:	03/31/2010 1617				

LCSD Lab Sample ID:	LCSD 720-68709/3-A	Analysis Batch:	720-68776	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-68709	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.62 g
Date Analyzed:	04/01/2010 1218			Final Weight/Volume:	50 mL
Date Prepared:	03/31/2010 1617				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	105	103	80 - 120	2	20		

Quality Control Results

Client: ERM-West Job Number: 720-26781-1

Method Blank - Batch: 500-83028

Method: 9034
Preparation: 9030B

Lab Sample ID: MB 500-83028/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 03/31/2010 1220
Date Prepared: 03/31/2010 0820

Analysis Batch: 500-83087
Prep Batch: 500-83028
Units: mg/Kg

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 10.0000 g
Final Weight/Volume: 10 mL

Analyte	Result	Qual	RL
Sulfide	ND		25

Lab Control Sample - Batch: 500-83028

Method: 9034
Preparation: 9030B

Lab Sample ID: LCS 500-83028/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 03/31/2010 1220
Date Prepared: 03/31/2010 0820

Analysis Batch: 500-83087
Prep Batch: 500-83028
Units: mg/Kg

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 10.0000 g
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfide	185	192	104	80 - 120	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 500-83028

Method: 9034
Preparation: 9030B

MS Lab Sample ID: 720-26781-31
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 03/31/2010 1228
Date Prepared: 03/31/2010 0820

Analysis Batch: 500-83087
Prep Batch: 500-83028

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 10.3337 g
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 720-26781-31
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 03/31/2010 1228
Date Prepared: 03/31/2010 0820

Analysis Batch: 500-83087
Prep Batch: 500-83028

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 10.4859 g
Final Weight/Volume: 10 mL

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfide	96	92	75 - 125	6	20		

Quality Control Results

Client: ERM-West

Job Number: 720-26781-1

Lab Control Sample - Batch: 720-68516

Method: 9045C
Preparation: N/A

Lab Sample ID:	LCS 720-68498/1-A	Analysis Batch: 720-68516		Instrument ID:	Orion pH Probe
Client Matrix:	Solid	Prep Batch: N/A		Lab File ID:	N/A
Dilution:	1.0	Units: SU		Initial Weight/Volume:	50 mL
Date Analyzed:	03/29/2010 1344			Final Weight/Volume:	50 mL
Date Prepared:	N/A				
Date Leached:	03/29/2010 0940	Leachate Batch: 720-68498			

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
pH-Soluble	7.00	6.990	100	99 - 101	

Duplicate - Batch: 720-68516

Method: 9045C
Preparation: N/A

Lab Sample ID:	720-26781-31	Analysis Batch: 720-68516		Instrument ID:	Orion pH Probe
Client Matrix:	Solid	Prep Batch: N/A		Lab File ID:	N/A
Dilution:	1.0	Units: SU		Initial Weight/Volume:	20 mL
Date Analyzed:	03/29/2010 1344			Final Weight/Volume:	20 mL
Date Prepared:	N/A				
Date Leached:	03/29/2010 0940	Leachate Batch: 720-68498			

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
pH-Soluble	7.39	7.220	2	20	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TESTAMERICA San Francisco Chain of Custody

1220 Quarry Lane • Pleasanton CA 94566-4756

~~Phone: (925) 484-1919 Fax: (925) 484-1002~~ 720-26781-revised

Reference #: ______ Date 3.22.10 Page 1 of 4

Report To	
Attn: Mike Arnold	
Company: ERM	
Address: 915 118th Ave. SE. Suite 130, Bellevue, WA	
Phone: 425.462.8591	Email: mike.arnold@erm.com
Bill To: ERM	Sampled By: Mullenmiester / Piper
Attn:	Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analysis	Crush 16oz jar (use for sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick / Do total Hg on crushed brick	Crush | brick	Number of Containers
CE-RT1-BR-01	3.18.10	1720	brick	none										/			/						/	/	2
CE-RT1-CE-01*	↓	1725	ceramic	↓										/			/								1
CE-WR-C3	↓	1750	Soil	↓													/					/			2
CE-WR-C4	↓	1803	soil	↓													/					/			2
MA-WR-C1*	3.19.10	0925	soil	↓									/				/	/			/				2
MA-WR-C2*	↓	0945	soil	↓									/				/	/			/				2
MA-WR-C3	↓	1004	soil	↓																/					2
WE-WR-C1*	↓	1315	soil	↓									/				/	/			/				2
WE-WR-C2*	↓	1347	soil	↓									/				/	/			/				2
WE-WR-~~GD~~* C1-D*	↓	1316	soil	↓									/				/	/			/				2

Project Info.	Sample Receipt
Project Name:	# of Containers:
Project#:	Head Space:
PO#:	Temp:
Credit Card#:	Conforms to record:

TAT	5 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF

Special Instructions / Comments: ☐ Global ID ______

* Crush ½ material in bag, used crushed material for Total Hg, uncrushed for STLC test.

* Do STLC for Hg on uncrushed material in 8oz jar

See Terms and Conditions on reverse

*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

1) Received by:	2) Received by:	3) Received by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

Rev09/09

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TESTAMERICA San Francisco Chain of Custody

1220 Quarry Lane • Pleasanton CA 94566-4756

Phone: (925) 484-1919 • Fax: (925) 600-3002

720-26781 - revised

Reference #: ______

Date 3.22.10 Page 2 of 4

Report To

Attn: Mike Arnold

Company: ERM

Address: 915 118th Ave. S.E. Suite 130, Bellevue WA

Phone: 425.462.8591 Email: mike.arnold@erm.com

Bill To: ERM

Sampled By: Mullenmiester / Piper

Attn:

Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analysis	Crush 16 oz jar (use for Sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick / Do total Hg on crushed brick	Crush 1 brick	Number of Containers
WA-RT5-BR-05	3.18.10	1530	Brick	none																✓					1
WA-RT5-ASH-02		1535	soil																	✓					1
WA-RT5-ASH-03		1540	soil																	✓					1
WA-RT5-BR-06		1531	Brick																	✓					1
WA-RT6-BR-07		1550	Brick																	✓					1
WA-RT6-BR-08		1553	Brick																	✓					1
WA-CT-C4		1605	soil																	✓					1
WA-RT7-BR-09		1615	Brick											✓			✓			~~✓~~			✓	✓	2
CE-CT-C1		1705	soil														✓			-		✓			
CE-CT-C2		1710	soil																	✓					2

Project Info.	Sample Receipt
Project Name:	# of Containers:
Project#:	Head Space:
PO#:	Temp:
Credit Card#:	Conforms to record:

T A T	5 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF

Special Instructions / Comments: ☐ Global ID ______

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

1) Received by:	2) Received by:	3) Received by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

See Terms and Conditions on reverse

*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

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TESTAMERICA San Francisco Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

720-26781 -revised

Reference #: ______

Date 3.22.10 Page 3 of 4

Report To

Attn: Mike Arnold
Company: ERM
Address: 915 118th Ave. SE, Suite 130, Bellevue, WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: Mullenmeister / Piper
Attn:
Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC)-Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO4 ☐ NO3 ☐ F ☐ Br ☐ NO2 ☐ PO4~~ Hold for Potential analysis	Crush 16oz jar (use for Sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick / Do total Hg on crushed brick	Crush 1 brick	Number of Containers
WA-WR-C1*	3.18.10	1115	Soil	none									/				/	/			/	/			2
WA-RT1-BR-01	↓	1235	brick	↓										/			/						/	/	2
WA-ASH-01		1155	Soil											/			/								1
WA-WS-C2 *		1205	soil										/				/	/			/				2
WA-CT-C3 *		1250	soil										/				/	/			/				2
WA-RT2-BR-2		1308	brick																	/					
WA-WR-C4 *		1320	Soil										/				/	/			/				2
WA-RT3-BR-3*		1459	brick											/			/						/	/	1
WA-RT3-CO-1*		1500	Concrete											/			/						/	/	1
WA-RT4-BR-04	↓	1515	brick	↓																					2

Project Info.

Project Name:
Project#:
PO#:
Credit Card#:

Sample Receipt

# of Containers:
Head Space:
Temp:
Conforms to record:

TAT	5 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF

Special Instructions / Comments: ☐ Global ID
* Do STLC for Hg on uncrushed material in 8oz jar
★ Crush ½ of brick or concrete

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

1) Received by:	2) Received by:	3) Received by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

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TESTAMERICA San Francisco Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

720-26781 - Revised

Reference #: ______
Date 3.22.10 Page 4 of 4

Report To

Attn: Mike Arnold
Company: ERM
Address: 915 118th Ave. SE, Suite 130, Bellevue, WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: Mullenmiester / Piper
Attn:
Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum ☐ Total (EPA 1664)	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analysis	Crush 16oz jar (use for sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed concrete / Do total Hg on crushed concrete	Crush 1 Concrete	Number of Containers
CH-WR-C1 *	3.19.10	1455	Soil	none									/				/	/			/				2
CH-CO-01	↓	1520	Concrete	none										/			/						/	/	1

Project Info. / Sample Receipt

Project Name:	# of Containers:
Project#:	Head Space:
PO#:	Temp:
Credit Card#:	Conforms to record:

TAT: ☐ 5 Day ☐ 3 Day ☐ 2 Day ☐ 1 Day Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF

Special Instructions / Comments: ☐ Global ID ______

* Do STLC for mercury on uncrushed material in 8oz jar

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

1) Received by:	2) Received by:	3) Received by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

Rev09/09

Sharma, Dimple

From: Mike Arnold [Mike.Arnold@erm.com]
Sent: Wednesday, March 24, 2010 3:30 PM
To: Sharma, Dimple
Cc: Laura Tesch; Jennifer Barrett; Sarah Piper; hardrockgeo@yahoo.com
Subject: RE: Additional analyses for ERM 3/22/10 samples

Dimple,

Please also include the following analyses:

Page 1 of 4:
MA-WR-C3 - pH and total sulfides (USEPA 9034)

Thanks!
Mike

A. Michael Arnold, R.G., R.H.G.
Senior Project Manager
ERM
915 118th Avenue S.E., Suite 130
Bellevue, WA 98005

Office: +1 425 462 8591 x4004
Direct: +1 425 214 0454
Fax: +1 425 455 3573
Cell: +1 425 761 2603
mike.arnold@erm.com
www.erm.com

From: Mike Arnold
Sent: Wednesday, March 24, 2010 1:37 PM
To: 'dimple.sharma@testamericainc.com'
Cc: Laura Tesch; Jennifer Barrett; Sarah Piper; 'hardrockgeo@yahoo.com'
Subject: Additional analyses for ERM 3/22/10 samples

Dimple,

Please add the following analyses for the samples marked as "hold" on the attached chains of custody:

Page 1 of 4:
MA-WR-C3 - STLC Mercury by CalWET

Page 2 of 4:
WA-RT5-BR-05 - Total mercury by USEPA 7471A and STLC Mercury by CalWET
WA-RT5-ASH-02 - STLC Mercury by CalWET

WA-RT5-ASH-03 - No analyses
WA-RT5-BR-06 - No analyses
WA-RT6-BR-07 - Total mercury by USEPA 7471A and STLC Mercury by CalWET
WA-RT6-BR-08 - Total mercury by USEPA 7471A and STLC Mercury by CalWET
WA-CT-C4 - STLC Mercury by CalWET
CE-CT-C2 - STLC Mercury by CalWET

Page 3 of 4:
WA-RT2-BR-2 - Total mercury by USEPA 7471A and STLC Mercury by CalWET

When the analyses are complete, please send the results to me and to the people indicated in the "cc" to this email.

Thanks!
Mike

A. Michael Arnold, R.G., R.H.G.
Senior Project Manager
ERM
915 118th Avenue S.E., Suite 130
Bellevue, WA 98005

Office: +1 425 462 8591 x4004
Direct: +1 425 214 0454
Fax: +1 425 455 3573
Cell: +1 425 761 2603
mike.arnold@erm.com
www.erm.com

TestAmerica
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TESTAMERICA San Francisco Chain of Custody
1220 Quarry Lane ● Pleasanton CA 94566-4756
Phone: (925) 484-1919 Fax: (925) 600-3002

720-26781

Reference #: 123176

Date 3.22.10 Page 1 of 4

Report To

Attn: Mike Arnold
Company: ERM
Address: 915 118th ~~Ave~~ SE, Suite 130, Bellevue, WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: ~~Mullenmiester~~ / Piper
Attn:
Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease (EPA 1664) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other	Low Level Metals by EPA 200.8/6020 (ICP-MS)	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analysis	Crush 16oz jar (use for sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick / Do total Hg on crushed brick	Crush | brick	Number of Containers
CE-RT1-BR-01	3.18.10	1720	brick	none										/			/						/	/	2
CE-RT1-CE-01*		1725	ceramic											/			/								1
CE-WR-C3		1750	soil														/					/			2
CE-WR-C4		1803	soil														/					/			2
MA-WR-C1*	3.19.10	0925	soil										/				/	/			/				2
MA-WR-C2*		0945	soil										/				/	/			/				2
MA-WR-C3		1004	soil																	/					2
WE-WR-C1*		1315	soil										/				/	/			/				2
WE-WR-C2*		1347	soil										/				/	/			/				2
WE-WR-~~0D~~ C1-D*		1316	soil										/				/	/			/				2

Project Info.

Project Name:
Project#:
PO#:
Credit Card#:

Sample Receipt

\# of Containers:
Head Space:
Temp: 4.7°C
Conforms to record:

T A T	5 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF ☐ Global ID

Special Instructions / Comments:
* Crush ½ material in bag, used crushed material for Total Hg, uncrushed for STLC test.
★ Do STLC for Hg on uncrushed material in 8oz jar

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: Sarah Piper Time: 1500	Signature: Ed Martinez Time: 1800	Signature: Time:
Printed Name: SARAH PIPER Date: 3.22.10	Printed Name: Ed Martinez Date: 3.22.10	Printed Name: Date:
Company: ERM	Company: TAFO	Company:
1) Received by:	**2) Received by:**	**3) Received by:**
Signature: Ed Martinez Time: 1500	Signature: [signature] Time: 1800	Signature: Time:
Printed Name: Ed Martinez Date: 3-22-10	Printed Name: [illegible] Date: 3/22/10	Printed Name: Date:
Company: TestAmerica	Company: TASF	Company:

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

Rev09/09

Reference #: 123176

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TESTAMERICA San Francisco Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002
720-2678

Date 3.22.10 Page 2 of 4

Report To
Attn: Mike Arnold
Company: ERM
Address: 915 118th Ave. S.E. Suite 130, Bellevue WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: Mullenmiester / Piper
Attn:
Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analysis	Crush 16 oz jar (use for Sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick / Do total Hg on crushed brick	Crush 1 brick	Number of Containers
WA-RT5-BR-05	3.18.10	1530	Brick	none																/					1
WA-RT5-ASH-02	↓	1535	soil	↓																/					1
WA-RT5-ASH-03		1540	soil																	/					1
WA-RT5-BR-06		1531	Brick																	/					1
WA-RT6-BR-07		1550	Brick																	/					1
WA-RT6-BR-08		1553	Brick																	/					1
WA-CT-C4		1605	soil																	/					1
WA-RT7-BR-09		1615	Brick											/			/			for			/	/	2
CE-CT-C1		1705	soil														/					/			
CE-CT-C2	↓	1710	soil	↓																/					2

Project Info.
Project Name:
Project#:
PO#:
Credit Card#:

Sample Receipt
# of Containers:
Head Space:
Temp: 4.7°C
Conforms to record:

TAT: 5 Day | 3 Day | 2 Day | 1 Day | Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF ☐ Global ID

Special Instructions / Comments:

1) Relinquished by:
Signature: Sarah Piper Time: 1500
Printed Name: SARAH PIPER Date: 3.22.10
Company: ERM

2) Relinquished by:
Signature: Ed Martinez Time: 1800
Printed Name: Ed Martinez Date: 3-22-10
Company: TASF

3) Relinquished by:
Signature: Time:
Printed Name: Date:
Company:

1) Received by:
Signature: Ed Martinez Time: 1500
Printed Name: Ed Martinez Date: 3-22-10
Company: Test America

2) Received by:
Signature: Time: 1800
Printed Name: Date: 3/22/10
Company: TASF

3) Received by:
Signature: Time:
Printed Name: Date:
Company:

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

Rev09/09

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TESTAMERICA San Francisco Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone (925) 484-1919 Fax (925) 600-3002

Reference #: 123176

720-26781

Date 3.22.10 Page 3 of 4

Report To

Attn: Mike Arnold
Company: ERM
Address: 915 118th Ave. SE, Suite 130, Bellevue, WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: Mullenmeister / Piper
Attn:
Phone:

Analysis Request

#	Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other	Low Level Metals by EPA 200.8/6020 (ICP-MS)	☒ W.E.T (STLC)-mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO4 ☐ NO3 ☐ F ☐ Br ☐ NO2 ☐ PO4~~ Hold for potential analysis	Crush 16oz jar (use for Sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick / Do total Hg on crushed brick	Crush 1 brick	Number of Containers
1	WA-WR-C1*	3.18.10	1115	soil	none									/				/	/			/	X SR			2
2	WA-RT1-BR-01	↓	1235	brick	↓										/			/						/	/	2
3	WA-ASH-01	↓	1155	soil	↓										/			/								1
4	WA-WS-C2*	↓	1205	soil	↓									/				/	/			/				2
5	WA-CT-C3*	↓	1250	soil	↓									/				/	/			/				2
6	WA-RT2-BR-2	↓	1308	brick	↓																/					
7	WA-WR-C4*	↓	1320	soil	↓									/				/	/			/				2
8	WA-RT3-BR-3★	↓	1459	brick	↓										/			/						/	/	1
9	WA-RT3-CO-1★	↓	1500	concrete	↓										/			/						/	/	1
10	WA-RT4-BR-04	↓	1515	brick	↓																					2

Project Info.

Project Name:
Project#:
PO#:
Credit Card#:

Sample Receipt

# of Containers:
Head Space:
Temp: 4.7°C
Conforms to record:

TAT: 5 Day / 3 Day / 2 Day / 1 Day
Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF
☐ Global ID

Special Instructions / Comments:
* Do STLC for Hg on uncrushed material in 8oz jar
★ Crush 1/2 of brick or concrete

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: Sarah Piper Time: 1500	Signature: Ed Martinez Time: 1800	Signature: Time:
Printed Name: SARAH PIPER Date: 3.22.10	Printed Name: Ed Martinez Date: 3-22-10	Printed Name: Date:
Company: ERM	Company: TASF	Company:

1) Received by:	2) Received by:	3) Received by:
Signature: Ed Martinez Time: 1500	Signature: [signature] Time: 1800	Signature: Time:
Printed Name: Ed Martinez Date: 3-22-10	Printed Name: [illegible] Date: 3/22/10	Printed Name: Date:
Company: TestAmerica	Company: TASF	Company:

Rev09/09

Reference #: 123176

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TESTAMERICA San Francisco Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone (925) 484-1919 • Fax (925) 600-3002

720-26781

Date 3.22.10 Page 4 of 4

Report To

Attn: Mike Arnold
Company: ERM
Address: 915 118th Ave. SE. Suite 130 Bellevue, WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: Mullenmiester / Piper
Attn:
Phone:

Analysis Request

	Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analyses Crush 16oz jar	(use for sulfide, pH, total Hg) Hold 8oz jar for potential future analysis	Do STLC on uncrushed concrete Do total Hg on crushed concrete	Crush / Concrete	Number of Containers
31	CH-WR-C1 ★	3.19.10	1455	Soil	none									/				/	/		/				2
32	CH-CO-01	↓	1520	Concrete	none										/			/					/	/	1

Project Info.

Project Name:
Project#:
PO#:
Credit Card#:

Sample Receipt

of Containers:
Head Space:
Temp: 4.7°C
Conforms to record:

TAT	5 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF
Special Instructions / Comments: ☐ Global ID
★ Do STLC for mercury on uncrushed material in 8oz jar

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: Sarah Piper Time: 1500	Signature: Ed Martinez Time: 1800	Signature: Time:
Printed Name: SARAH PIPER Date: 3.22.10	Printed Name: Ed Martinez Date: 3-22-10	Printed Name: Date:
Company: ERM	Company: TASF	Company:

1) Received by:	2) Received by:	3) Received by:
Signature: Ed Martinez Time: 1500	Signature: [illegible] Time: 1800	Signature: Time:
Printed Name: Ed Martinez Date: 3-22-10	Printed Name: Mielt Date: 3/22/10	Printed Name: Date:
Company: Test America	Company: TASF	Company:

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

Rev09/09

Login Sample Receipt Check List

Client: ERM-West | Job Number: 720-26781-1

Login Number: 26781 | **List Source: TestAmerica San Francisco**
Creator: Hoang, Julie
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified	True	

Login Sample Receipt Check List

Client: ERM-West

Job Number: 720-26781-1

Login Number: 26781
Creator: Lunt, Jeff T
List Number: 1

List Source: TestAmerica Chicago
List Creation: 03/30/10 10:36 AM

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified	True	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 720-26781-2

Job Description: Bellview Creek

For:
ERM-West
915 118th Avenue SE, Suite 130
Bellevue, WA 98005

Attention: Mike Arnold

Surinder Sidhu

Approved for release.
Surinder Sidhu
Customer Service Manager
4/15/2010 5:26 PM

Designee for
Dimple Sharma
Project Manager I
dimple.sharma@testamericainc.com
04/15/2010

cc: Mr. Lance Jones

CA ELAP Certification # 2496

The Chain(s) of Custody are included and are an integral part of this report.

A trip blank is required to be provided for volatile analyses. If trip blank results are not included in the report, either the trip blank was not submitted or requested to be analyzed.

TestAmerica Laboratories, Inc.

TestAmerica San Francisco 1220 Quarry Lane, Pleasanton, CA 94566

Tel (925) 484-1919 Fax (925) 600-3002 www.testamericainc.com

Job Narrative
720-26781-2

Comments
No additional comments.

Receipt
Received sample CH-CO-01on 3/23/10.

All other samples were received in good condition within temperature requirements.

Metals
No analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

EXECUTIVE SUMMARY - Detections

Client: ERM-West

Job Number: 720-26781-2

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier	Reporting Limit	Units	Method
720-26781-30	**WA-RT4-BR-04**				
Mercury		2.3	0.40	mg/Kg	7471A

METHOD SUMMARY

Client: ERM-West | Job Number: 720-26781-2

Description	Lab Location	Method	Preparation Method
Matrix Solid			
Mercury (CVAA)	TAL SF	SW846 7470A	
California - Waste Extraction Test with Citrate Leach	TAL SF		CA-WET CA WET Citrate
Preparation, Mercury	TAL SF		SW846 7470A
Mercury (CVAA)	TAL SF	SW846 7471A	
Preparation, Mercury	TAL SF		SW846 7471A

Lab References:

TAL SF = TestAmerica San Francisco

Method References:

CA-WET = California Waste Extraction Test, from Title 22

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

SAMPLE SUMMARY

Client: ERM-West

Job Number: 720-26781-2

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
720-26781-30	WA-RT4-BR-04	Solid	03/18/2010 1515	03/22/2010 1800

Client: ERM-West | Job Number: 720-26781-2

Client Sample ID: **WA-RT4-BR-04**

Lab Sample ID: 720-26781-30 | Date Sampled: 03/18/2010 1515
Client Matrix: Solid | Date Received: 03/22/2010 1800

7470A Mercury (CVAA)-STLC Citrate

Method:	7470A	Analysis Batch: 720-69662		Instrument ID:	LL_HG Analyzer
Preparation:	7470A	Prep Batch: 720-69618		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 720-69454		Initial Weight/Volume:	1 mL
Date Analyzed:	04/15/2010 1646			Final Weight/Volume:	50 mL
Date Prepared:	04/15/2010 1247				
Date Leached:	04/13/2010 1209				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Mercury		ND		0.10

7471A Mercury (CVAA)

Method:	7471A	Analysis Batch: 720-69623	Instrument ID:	LL_HG Analyzer
Preparation:	7471A	Prep Batch: 720-69537	Lab File ID:	N/A
Dilution:	20		Initial Weight/Volume:	0.60 g
Date Analyzed:	04/15/2010 1306		Final Weight/Volume:	50 mL
Date Prepared:	04/14/2010 1249			

Analyte	DryWt Corrected: N	Result (mg/Kg)	Qualifier	RL
Mercury		2.3		0.40

DATA REPORTING QUALIFIERS

Lab Section	Qualifier	Description

Client: ERM-West

Job Number: 720-26781-2

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 720-69454					
720-26781-30	WA-RT4-BR-04	C	Solid	CA WET Citrate	
720-26781-30MS	Matrix Spike	C	Solid	CA WET Citrate	
720-26781-30MSD	Matrix Spike Duplicate	C	Solid	CA WET Citrate	
Prep Batch: 720-69537					
LCS 720-69537/2-A	Lab Control Sample	T	Solid	7471A	
LCSD 720-69537/3-A	Lab Control Sample Duplicate	T	Solid	7471A	
MB 720-69537/1-A	Method Blank	T	Solid	7471A	
720-26781-30	WA-RT4-BR-04	T	Solid	7471A	
Prep Batch: 720-69618					
LCS 720-69618/2-A	Lab Control Sample	T	Water	7470A	
LCSD 720-69618/3-A	Lab Control Sample Duplicate	T	Water	7470A	
MB 720-69618/1-A	Method Blank	T	Water	7470A	
720-26781-30	WA-RT4-BR-04	C	Solid	7470A	720-69454
720-26781-30MS	Matrix Spike	C	Solid	7470A	720-69454
720-26781-30MSD	Matrix Spike Duplicate	C	Solid	7470A	720-69454
Analysis Batch:720-69623					
LCS 720-69537/2-A	Lab Control Sample	T	Solid	7471A	720-69537
LCSD 720-69537/3-A	Lab Control Sample Duplicate	T	Solid	7471A	720-69537
MB 720-69537/1-A	Method Blank	T	Solid	7471A	720-69537
720-26781-30	WA-RT4-BR-04	T	Solid	7471A	720-69537
Analysis Batch:720-69662					
LCS 720-69618/2-A	Lab Control Sample	T	Water	7470A	720-69618
LCSD 720-69618/3-A	Lab Control Sample Duplicate	T	Water	7470A	720-69618
MB 720-69618/1-A	Method Blank	T	Water	7470A	720-69618
720-26781-30	WA-RT4-BR-04	C	Solid	7470A	720-69618
720-26781-30MS	Matrix Spike	C	Solid	7470A	720-69618
720-26781-30MSD	Matrix Spike Duplicate	C	Solid	7470A	720-69618

Report Basis

C = STLC Citrate

T = Total

Quality Control Results

Client: ERM-West | Job Number: 720-26781-2

Method Blank - Batch: 720-69618

Method: 7470A
Preparation: 7470A

Lab Sample ID:	MB 720-69618/1-A	Analysis Batch:	720-69662	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-69618	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	25 mL
Date Analyzed:	04/15/2010 1631			Final Weight/Volume:	50 mL
Date Prepared:	04/15/2010 1247				

Analyte	Result	Qual	RL
Mercury	ND		0.0040

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 720-69618

Method: 7470A
Preparation: 7470A

LCS Lab Sample ID:	LCS 720-69618/2-A	Analysis Batch:	720-69662	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-69618	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	25 mL
Date Analyzed:	04/15/2010 1634			Final Weight/Volume:	50 mL
Date Prepared:	04/15/2010 1247				

LCSD Lab Sample ID:	LCSD 720-69618/3-A	Analysis Batch:	720-69662	Instrument ID:	LL_HG Analyzer
Client Matrix:	Water	Prep Batch:	720-69618	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/L	Initial Weight/Volume:	25 mL
Date Analyzed:	04/15/2010 1636			Final Weight/Volume:	50 mL
Date Prepared:	04/15/2010 1247				

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	101	97	80 - 120	4	20		

Quality Control Results

Client: ERM-West | Job Number: 720-26781-2

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 720-69618

Method: 7470A
Preparation: 7470A
STLC Citrate

MS Lab Sample ID:	720-26781-30	Analysis Batch: 720-69662	Instrument ID: LL_HG Analyzer
Client Matrix:	Solid	Prep Batch: 720-69618	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 1 mL
Date Analyzed:	04/15/2010 1641		Final Weight/Volume: 50 mL
Date Prepared:	04/15/2010 1247		
Date Leached:	04/13/2010 1209	Leachate Batch: 720-69454	

MSD Lab Sample ID:	720-26781-30	Analysis Batch: 720-69662	Instrument ID: LL_HG Analyzer
Client Matrix:	Solid	Prep Batch: 720-69618	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 1 mL
Date Analyzed:	04/15/2010 1643		Final Weight/Volume: 50 mL
Date Prepared:	04/15/2010 1247		
Date Leached:	04/13/2010 1209	Leachate Batch: 720-69454	

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Mercury	102	101	75 - 125	1	20		

Client: ERM-West | Job Number: 720-26781-2

Method Blank - Batch: 720-69537

Method: 7471A
Preparation: 7471A

Lab Sample ID:	MB 720-69537/1-A	Analysis Batch:	720-69623	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-69537	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.60 g
Date Analyzed:	04/15/2010 1220			Final Weight/Volume:	50 mL
Date Prepared:	04/14/2010 1249				

Analyte	Result	Qual	RL
Mercury	ND		0.020

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 720-69537

Method: 7471A
Preparation: 7471A

LCS Lab Sample ID:	LCS 720-69537/2-A	Analysis Batch:	720-69623	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-69537	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.60 g
Date Analyzed:	04/15/2010 1222			Final Weight/Volume:	50 mL
Date Prepared:	04/14/2010 1249				

LCSD Lab Sample ID:	LCSD 720-69537/3-A	Analysis Batch:	720-69623	Instrument ID:	LL_HG Analyzer
Client Matrix:	Solid	Prep Batch:	720-69537	Lab File ID:	N/A
Dilution:	1.0	Units:	mg/Kg	Initial Weight/Volume:	0.60 g
Date Analyzed:	04/15/2010 1225			Final Weight/Volume:	50 mL
Date Prepared:	04/14/2010 1249				

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Mercury	101	100	80 - 120	1	20		

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TESTAMERICA San Francisco Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) [illegible]-1002

Reference #: ______

720-26781-revised

Date 3.22.10 Page 1 of 4

Report To

Attn: Mike Arnold
Company: ERM
Address: 915 118th Ave. SE. Suite 130, Bellevue, WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: Mullenmiester / Piper
Attn:
Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease (EPA 1664) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analysis	Crush 16oz jar (use for sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick / Do total Hg on crushed brick	Crush / brick	Number of Containers
CE-RT1-BR-01	3.18.10	1720	brick	none										/			/						/	/	2
CE-RT1-CE-01*	↓	1725	ceramic	↓										/			/								1
CE-WR-C3	↓	1750	soil	↓													/					/			2
CE-WR-C4	↓	1803	soil	↓													/					/			2
MA-WR-C1*	3.19.10	0925	soil	↓									/				/	/			/				2
MA-WR-C2*	↓	0945	soil	↓									/				/	/			/				2
MA-WR-C3	↓	1004	soil	↓																/					2
WE-WR-C1*	↓	1315	soil	↓									/				/	/			/				2
WE-WR-C2*	↓	1347	soil	↓									/				/	/			/				2
WE-WR-~~C1D~~ C1-D*	↓	1316	soil	↓									/				/	/			/				2

Project Info. | **Sample Receipt**

Project Info.	Sample Receipt
Project Name:	# of Containers:
Project#:	Head Space:
PO#:	Temp:
Credit Card#:	Conforms to record:

TAT	5 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF

Special Instructions / Comments: ☐ Global ID ______

* Crush ½ material in bag, used crushed material for Total Hg, uncrushed for STLC test.
* Do STLC for Hg on uncrushed material in 8oz jar

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

1) Received by:	2) Received by:	3) Received by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

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Phone: (925) 484-1919 • Fax: (925) 600-3002

720-26781 - revised

Reference #: ______

Date 3.22.10 Page 2 of 4

Report To	
Attn: Mike Arnold	
Company: ERM	
Address: 915 118th Ave. S.E. Suite 130, Bellevue WA	
Phone: 425.462.8591	Email: mike.arnold@erm.com
Bill To: ERM	Sampled By: Mullenmiester / Piper
Attn:	Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv.	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analysis	Crush 16 oz jar (use for Sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick	Do total Hg on crushed brick	Crush 1 brick	Number of Containers
WA-RT5-BR-05	3.18.10	1530	Brick	none																/						1
WA-RT5-ASH-02	↓	1535	soil	↓																/						1
WA-RT5-ASH-03	↓	1540	soil	↓																/						1
WA-RT5-BR-06	↓	1531	Brick	↓																/						1
WA-RT6-BR-07	↓	1550	Brick	↓																/						1
WA-RT6-BR-08	↓	1553	Brick	↓																/						1
WA-CT-C4	↓	1605	soil	↓																/						1
WA-RT7-BR-09	↓	1615	Brick	↓										/			/			~~/~~			/	/		2
CE-CT-C1	↓	1705	soil	↓													/					/				
CE-CT-C2	↓	1710	soil	↓																/						2

Project Info.	Sample Receipt
Project Name:	# of Containers:
Project#:	Head Space:
PO#:	Temp:
Credit Card#:	Conforms to record:

TAT: ☐ 5 Day ☐ 3 Day ☐ 2 Day ☐ 1 Day Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF

Special Instructions / Comments: ☐ Global ID ______

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

1) Received by:	2) Received by:	3) Received by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

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Phone: (925) 484-1919 • Fax: (925) 600-3002

720-26781 -revised

Reference #:

Date 3.22.10 Page 3 of 4

Report To

Attn: Mike Arnold
Company: ERM
Address: 915 118th Ave. SE, Suite 130, Bellevue, WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: Mullenmeister / Piper
Attn:
Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC)-Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO4 ☐ NO3 ☐ F ☐ Br ☐ NO2 ☐ PO4~~ Hold for Potential analysis	Crush 16oz jar (use for Sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed brick Do total Hg on crushed brick	Crush 1 brick	Number of Containers
WA-WR-C1*	3.18.10	1115	Soil	none									/				/	/			/	X			2
WA-RT1-BR-01	↓	1235	brick	↓										/			/						/	/	2
WA-ASH-01	↓	1155	Soil	↓										/			/								1
WA-WS-C2*	↓	1205	Soil	↓									/				/	/			/				2
WA-CT-C3*	↓	1250	Soil	↓									/				/	/			/				2
WA-RT2-BR-2	↓	1308	brick	↓																/					
WA-WR-C4*	↓	1320	Soil	↓									/				/	/			/				2
WA-RT3-BR-3*	↓	1459	brick	↓										/			/						/	/	1
WA-RT3-CO-1*	↓	1500	Concrete	↓										/			/						/	/	1
WA-RT4-BR-04	↓	1515	brick	↓																					2

Project Info. / Sample Receipt

Project Info.	Sample Receipt
Project Name:	# of Containers:
Project#:	Head Space:
PO#:	Temp:
Credit Card#:	Conforms to record:

TAT	5 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF
Special Instructions / Comments: ☐ Global ID
* Do STLC for Hg on uncrushed material in 8oz jar
★ Crush ½ of brick or concrete

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

1) Received by:	2) Received by:	3) Received by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_8-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

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TestAmerica
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TESTAMERICA San Francisco Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

720-26781-Revised

Reference #: ____
Date 3.22.10 Page 4 of 4

Report To

Attn: Mike Arnold
Company: ERM
Address: 915 118th Ave. SE, Suite 130, Bellevue, WA
Phone: 425.462.8591 Email: mike.arnold@erm.com
Bill To: ERM
Sampled By: Mullenmiester / Piper
Attn:
Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	TPH EPA - ☐ 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE	TEPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	(HVOCs) EPA 8021 by 8260B	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B ☐ 624	Semivolatiles GC/MS ☐ EPA 8270 ☐ 625	Oil and Grease ☐ Petroleum (EPA 1664) ☐ Total	Pesticides ☐ EPA 8081 ☐ 608 PCBs ☐ EPA 8082 ☐ 608	~~PNAs by ☐ 8270 ☐ 8310~~ Sulfide USEPA 9034	~~CAM17 Metals (EPA 6010/7470/7471)~~ Total Mercury USEPA 7471A	Metals: ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Low Level Metals by EPA 200.8/6020 (ICP-MS):	☒ W.E.T (STLC) Mercury ☐ TCLP	☐ Hexavalent Chromium ☒ pH (24h hold time for H_2O)	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ TDS	~~Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4~~ Hold for potential analysis	Crush 16oz jar (use for sulfide, pH, total Hg)	Hold 8oz jar for potential future analysis	Do STLC on uncrushed concrete / Do total Hg on crushed concrete	Crush / Concrete	Number of Containers
CH-WR-C1 *	3.19.10	1455	soil	none									/				/	/			/				2
CH-CO-01	↓	1520	concrete	none										/			/						/	/	1

Project Info. / **Sample Receipt**

Project Info.	Sample Receipt
Project Name:	# of Containers:
Project#:	Head Space:
PO#:	Temp:
Credit Card#:	Conforms to record:

TAT	5 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ State Tank Fund EDF
Special Instructions / Comments: ☐ Global ID ____
* Do STLC for mercury on uncrushed material in 8oz jar

See Terms and Conditions on reverse
*TestAmerica SF reports 8015M from C_9-C_{24} (industry norm). Default for 8015B is C_{10}-C_{28}

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company
1) Received by:	**2) Received by:**	**3) Received by:**
Signature Time	Signature Time	Signature Time
Printed Name Date	Printed Name Date	Printed Name Date
Company	Company	Company

Rev09/09

Sharma, Dimple

From: Mike Arnold [Mike.Arnold@erm.com]
Sent: Wednesday, March 24, 2010 3:30 PM
To: Sharma, Dimple
Cc: Laura Tesch; Jennifer Barrett; Sarah Piper; hardrockgeo@yahoo.com
Subject: RE: Additional analyses for ERM 3/22/10 samples

Dimple,

Please also include the following analyses:

Page 1 of 4:
MA-WR-C3 - pH and total sulfides (USEPA 9034)

Thanks!
Mike

A. Michael Arnold, R.G., R.H.G.
Senior Project Manager
ERM
915 118th Avenue S.E., Suite 130
Bellevue, WA 98005

Office: +1 425 462 8591 x4004
Direct: +1 425 214 0454
Fax: +1 425 455 3573
Cell: +1 425 761 2603
mike.arnold@erm.com
www.erm.com

From: Mike Arnold
Sent: Wednesday, March 24, 2010 1:37 PM
To: 'dimple.sharma@testamericainc.com'
Cc: Laura Tesch; Jennifer Barrett; Sarah Piper; 'hardrockgeo@yahoo.com'
Subject: Additional analyses for ERM 3/22/10 samples

Dimple,

Please add the following analyses for the samples marked as "hold" on the attached chains of custody:

Page 1 of 4:
MA-WR-C3 - STLC Mercury by CalWET

Page 2 of 4:
WA-RT5-BR-05 - Total mercury by USEPA 7471A and STLC Mercury by CalWET
WA-RT5-ASH-02 - STLC Mercury by CalWET

WA-RT5-ASH-03 - No analyses
WA-RT5-BR-06 - No analyses
WA-RT6-BR-07 - Total mercury by USEPA 7471A and STLC Mercury by CalWET
WA-RT6-BR-08 - Total mercury by USEPA 7471A and STLC Mercury by CalWET
WA-CT-C4 - STLC Mercury by CalWET
CE-CT-C2 - STLC Mercury by CalWET

Page 3 of 4:
WA-RT2-BR-2 - Total mercury by USEPA 7471A and STLC Mercury by CalWET

When the analyses are complete, please send the results to me and to the people indicated in the "cc" to this email.

Thanks!
Mike

A. Michael Arnold, R.G., R.H.G.
Senior Project Manager
ERM
915 118th Avenue S.E., Suite 130
Bellevue, WA 98005

Office: +1 425 462 8591 x4004
Direct: +1 425 214 0454
Fax: +1 425 455 3573
Cell: +1 425 761 2603
mike.arnold@erm.com
www.erm.com

Login Sample Receipt Check List

Client: ERM-West

Job Number: 720-26781-2

Login Number: 26781

List Source: TestAmerica San Francisco

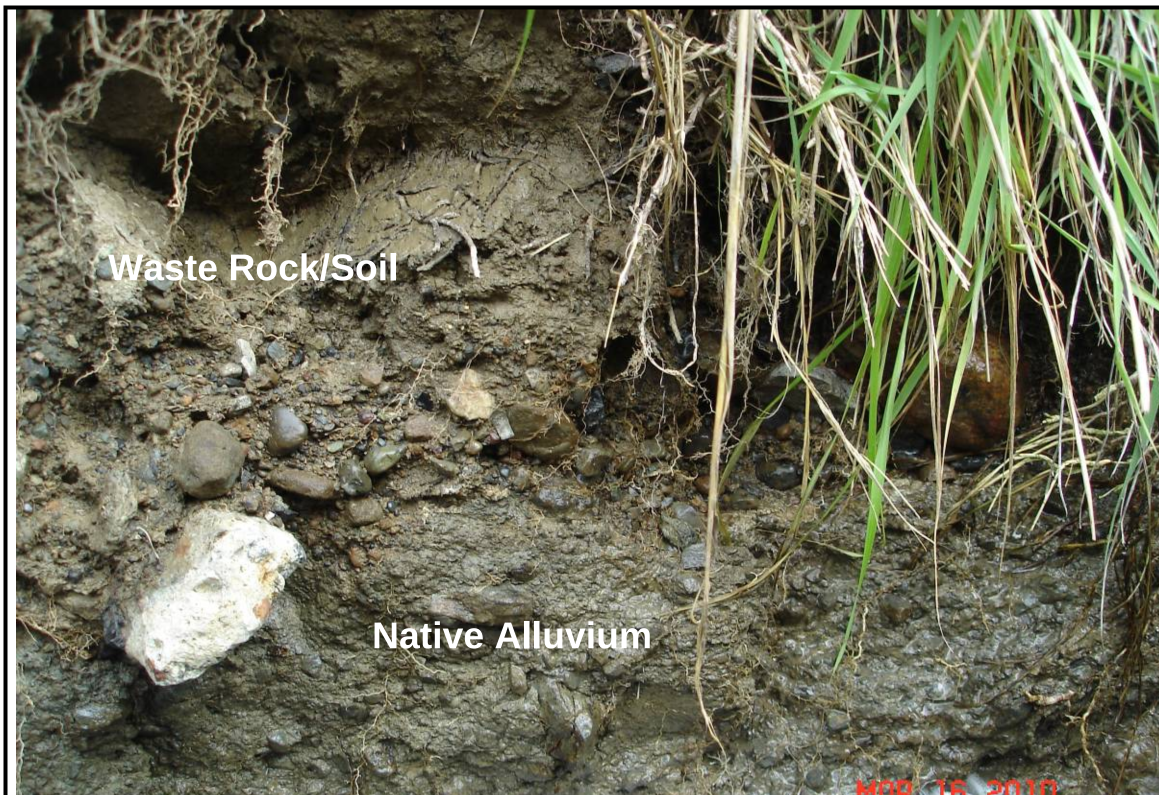
Creator: Hoang, Julie

List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified	True	

Appendix E
Site Photographs

Photograph: *E-1*	West End Mine waste rock/native soil interface.	
Homestake Mining Company of California	***ERM***	*Colusa County, California*

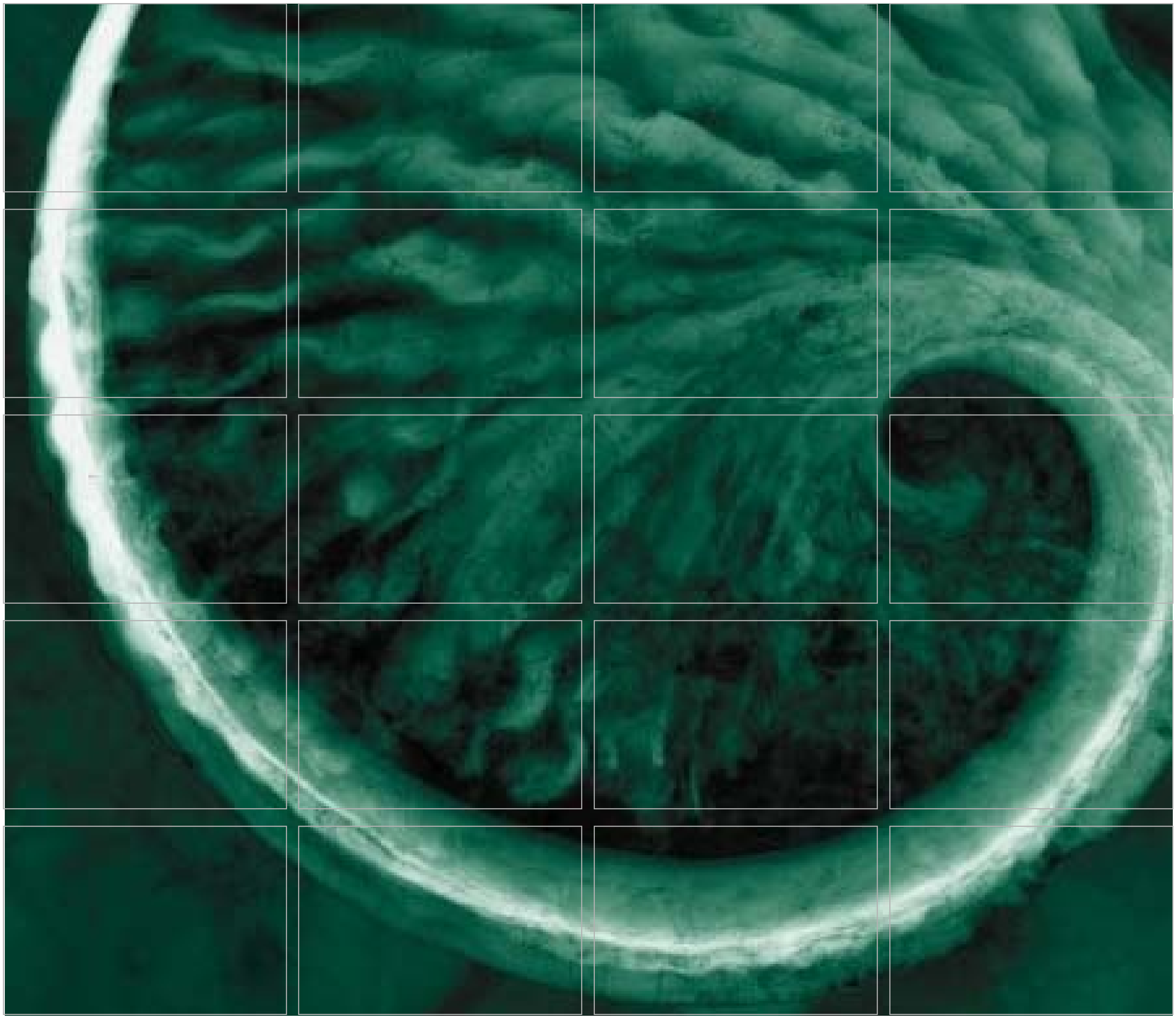


Photograph: *E-2*	Wide Awake Mine Lower Dump waste rock/native alluvium interface. The white cobble is native silicified-channel rock from up gradient.	
Homestake Mining Company of California	***ERM***	*Colusa County, California*

Photograph: *E- 3*	Wide Awake Mine lower dump waste rock/native alluvium interface.

Homestake Mining Company of California	***ERM***	*Colusa County, California*

Appendix F
Vegetation Restoration Plan



APPENDIX F

Draft Vegetation Restoration Plan for Wide Awake and Central Area Mines

Prepared for:
Homestake Mining Company
of California

Sulphur Creek Mining District
Colusa County, CA

September 2010

www.erm.com

ERM

Delivering sustainable solutions in a more competitive world

Homestake Mining Company of California

Draft Vegetation Restoration Plan for Wide Awake and Central Area Mines

Sulphur Creek Mining District
Colusa County, CA

September 2010

Project No. 0116443

DRAFT

Laura A. Tesch
Program Director

DRAFT

Mark Shibata
Senior Ecologist

DRAFT

Sarah Piper
Project Biologist

ERM-West, Inc.
915 118th Avenue Southeast, Suite 130
Bellevue, Washington 98005
T: 425-462-8591
F: 425-455-3573

TABLE OF CONTENTS

***LIST OF FIGURES** (immediately following text)*

LIST OF TABLES (immediately following Figures)

LIST OF ATTACHMENTS

1.0 INTRODUCTION

The Central Valley Regional Water Quality Control Board (CVRWQCB) issued Technical and Monitoring Report Orders R5-2010-0048 and R5-2010-0049 (Orders)[1], which require the submittal of a Mining Waste Characterization Work Plan (Characterization Plan) and a Mining Waste Characterization Report (Characterization Report) for the Wide Awake Mine and five mines within the Central Mine Group (Central, Cherry Hill, Empire, Manzanita, and West End). The Orders were issued by the CVRWQCB based on provisions of California Water Code Section 13267. The six mines addressed by the Orders are located within the Sulphur Creek Mining District (the District), and for purposes of this document, these six mines are collectively referred to as "the Site".[2]

The Orders were issued to several Potentially Responsible Parties, including Homestake Mining Company of California (Homestake), which are referred to as Dischargers in the Orders. The CVRWQCB has recognized that Homestake did not engage in any of the mining activities that resulted in the mining materials that are being addressed by the Orders.

On behalf of Homestake, Environmental Resources Management, Inc (ERM) prepared this Vegetation Restoration Plan (Revegetation Plan) for the following mine sites:

- Wide Awake Mine; and
- Central Group Mine Area (Central, West End, Cherry Hill, Manzanita, and Empire mines[3]).

These mine areas are located within the Sulphur Creek Mining District (District), Colusa County.

---

1 Both dated May 27, 2010

2 The Site includes a cumulative area of about 465 acres within the Sulphur Creek watershed in Colusa County, and is located in Sections 28 and 29, Township 14 North, Range 5 West, Mount Diablo Base and Meridian. The specific parcel numbers included within the Site are listed on the Orders.

3 Since no reclamation is required at the Empire mine area (see Work Plan), there are no revegetation plans for the Empire mine area.

The purpose of this Revegetation Plan is to supplement the *Mining-Related Materials Characterization and Remediation Work Plan* (ERM 2010) (Remediation Work Plan) and describes the approach, scope, and specific protocols for introducing vegetation to (a) control soil erosion and (b) promote the future succession of plant communities at these sites.

1.1 RECENT AGREEMENTS

During a meeting on 11 August 2010 between Homestake and the CVRWQCB, the two parties discussed CVRWQCB comments on the Draft Work Plan (dated April 2010). Based on that discussion, Homestake agreed to prepare this Revegetation Plan for the Site.

As agreed between Homestake and the CVRWQCB, Homestake is responsible for the initial broadcast seeding of early succession stage herbaceous grasses and/or forbs. Plans after Year 1 of the initial broadcast seeding (including any applicable permit conditions) would be the responsibility of the other Dischargers. Accordingly, this Revegetation Plan focuses on Year 1, *Seeding of Early Succession Herbaceous Grasses and/or Forbs*.

As underlying substrate and slope of areas following reclamation cannot be accurately defined at this time, the Revegetation Plan will be supplemented following completion of restoration efforts at each mine site. Accordingly, this plan describes features and general principles in response to requests from the CVRWQCB. Activities described in this Revegetation Plan will be conducted in accordance with applicable agreements reached between Homestake and the CVRWQCB, and applicable state and local guidelines.

1.2 ENVIRONMENTAL SETTING

This section is intended to provide the environmental context for mine areas slated for vegetation restoration as described in this Plan. Hence, this section provides a brief description of the general environmental setting found within the District. Setting attributes include location, geology, hydrogeology, and land use and mining history. A more detailed description of the environmental setting can be found in the *Mining-Related Materials Characterization and Remediation Work Plan* (ERM 2010).

1.2.1 Location

The Sulphur Creek Mining District encompasses an area of about 22 square miles. This area includes the Sulphur Creek watershed and adjoining portions of the Bear Creek watershed to the north in Colusa County and the Harley Gulch watershed to the south located in Lake County (see **Figure 2-1** of the Remediation Work Plan).

The Sulphur Creek watershed is located within the eastern side of the Coast Range geomorphic province of California, about 8 miles west of the western margin of California's central valley and approximately 20 miles west of Williams, California (see **Figure 2-2** of Remediation Work Plan). Sulphur Creek is an intermittent stream with continuous flows between the fall and spring months (October through June). Stretches of the stream are wet throughout the year because of inputs from geothermal springs (CVRWQCB 2007a). Sulphur Creek is a tributary within the larger, 6,543-acre, Cache Creek watershed that drains into the Yolo Bypass.

Figure 2-3 of the Remediation Work Plan is a site map showing the locations of the mine sites addressed in this Revegetation Plan:

- Wide Awake mine;
- Central mine,
- West End mine,
- Cherry Hill mine, and

- Manzanita mine.[4]

1.2.2 *Geology*

The Sulphur Creek watershed is located in the northern California Coast Range near the Coast Range Thrust Fault. The Coast Range Thrust pushed a thick sheet of mostly sedimentary rocks (the Great Valley sequence) over the metamorphic rocks of the Franciscan complex. Numerous faults underlie the area surrounding Sulphur Creek. The eastern edge of the Stony Creek Thrust is slightly north of Sulphur Creek. The western end of the Resort Fault Zone is located within the Sulphur Creek watershed. The Resort Fault Zone is 2 kilometers wide and consists of numerous straight, steep-dipping faults that offset the Coast Range ophiolite and Great Valley sequence (McLaughlin 1990). Common lithologies in the area include detrital serpentines, sandstone, and mudstone. **Figure 2-4** of the Remediation Work Plan is a geological map of the District.

1.2.3 *Hydrology*

The District is divided into three watersheds: Harley Gulch, Sulphur Creek, and Bear Creek. There are no water wells reported within 1 mile of the District (California Department of Water Resources database), thus little information is available pertaining to the hydrogeology surrounding Harley Gulch, Sulphur Creek, and Bear Creek.

Groundwater beneath the District is primarily hydrothermal. The U.S. Geological Survey (USGS) has mapped numerous hot springs discharging in the area (Barnes *et al.*, 1975). A shallow magma chamber beneath the Geysers-Clear Lake area is the most likely source of geothermal activity and springs in the Sulphur Creek watershed. The local concentrated fractures in the area, particularly cross-cutting structures, have likely focused increased hydrothermal convection from a magma heat source under the area. The detrital serpentines within and below the Great Valley sequence may channel hydrothermal solutions. Geothermal springs discharging to Sulphur Creek include the Jones Fountain of Life, Blanck Springs, Elbow Springs, Elgin Spring, and the Wilbur Hot Springs

[4] Note that no reclamation is required at the Empire mine area (see Remediation Work Plan). Accordingly, there are no vegetation restoration plans for the Empire mine area.

(CVRWQCB 2007a). Several unnamed hydrothermal springs emanating from the bed are also likely to contribute to Sulphur Creek (Tetra Tech 2003). **Figure 2-5** of the Remediation Work Plan shows the locations of wetlands in the area and **Figure 2-6** of the Remediation Work Plan shows the locations of geothermal springs.

1.2.4 Land Use and Mining History

Land use within the District is predominantly rangeland in undeveloped chaparral and California scrub oak (Foe and Croyle 1998). Part of the Sulphur Creek watershed is privately owned and cattle graze on some private property in the lower watershed. The U.S. Bureau of Land Management (USBLM) administers public land in the upper portion of the watershed and is the largest land owner in the District. The Wilbur Hot Springs resort is located about 1-$^{1}/_{3}$ miles northeast of Harley Gulch. **Figure 2-8** of the Remediation Work Plan shows land ownership in the area.

There are no year-round residences in the watershed, except those associated with the Wilbur Hot Springs resort (CVRWQCB 2007a). The nearest community to the District is the town of Williams about 24 miles to the east.

Mining and mining-related processing began in the District approximately 140 years ago. Numerous mines were developed for mercury and/or gold between the 1860s and 1970s (described in greater detail in Churchill and Clinkenbeard 2003). Mines of interest for this Plan include the Wide Awake Mine and mines in the Central Mine Area (**Figure 2-3** of the Remediation Work Plan).

1.3 DOCUMENT ORGANIZATION

This Revegetation Plan document is organized as follows:

- Section 2 – describes the purpose and scope of the vegetation restoration and reviews the restoration strategy;
- Section 3 – describes specific vegetation restoration activities on a site-by-site basis; and
- Section 4 – provides a list of literature cited.

Supplemental information is provided in the following two attachments:

- Attachment A – provides suggested revegetation monitoring and performance goals (as requested by the CVRWQCB) for post-Year 1 vegetation restoration efforts; and
- Attachment B – provides photographs of the areas slated for the Year 1 initial broadcast seeding.

2.0 VEGETATION RESTORATION PLAN

The goal of this Revegetation Plan is to introduce early succession stage vegetation that will (a) control soil erosion and (b) promote future succession of plant communities at the identified mine sites. As underlying substrate and slope of areas following remediation cannot be accurately determined at this time, the Revegetation Plan will be supplemented following completion of restoration efforts at each mine site. It should also be noted that various permits may include conditions related to the revegetation activities and as such, this plan may need to be revised to incorporate applicable permit conditions upon receipt of permit approvals. Accordingly, this section describes plan features and general principles in response to requests from the CVRWQCB.

Key features of the Plan that will be discussed in this section include:

- Phased approach;
- Location and areal extent;
- Seed mixes;
- Seeding schedule;
- Evaluate the effectiveness of the restoration against performance-based goals; and
- Monitor to verify the effectiveness of the restoration.

As agreed between Homestake and the CVRWQCB, Homestake is responsible for the initial broadcast seeding of early succession stage herbaceous grasses and/or forbs. Accordingly, this Plan focuses on Year 1, *Seeding of Early Succession Herbaceous Grasses and/or Forbs* (see Section 2.1). A summary of Year 1 Plan features is provided in **Table 2-1**.

Planning and implementation of subsequent phases of the vegetation restoration effort is the responsibility of the other named Dischargers.[5]

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[5] At the request of CVRWQCB, considerations for subsequent phases of the vegetation restoration effort at mine sites are provided in Attachment A.

2.1 PHASED APPROACH

To promote adaptive management, a phased vegetation restoration approach will be used. A phased approach has the following advantages:

- Provides opportunities for regular input and direction by decision-makers;
- Provides a logical, stepwise approach for compiling and analyzing more site-specific information;
- Provides opportunities to streamline and focus the restoration effort at each phase; and
- Provides opportunities to eliminate from further consideration areas where restoration goals have been achieved, thereby focusing on those areas requiring additional attention.

Year 1 (the first phase) of the Revegetation Plan implements the introduction/broadcast seeding of early succession herbaceous grasses and/or forbs to control erosion in reclaimed areas (**Figure 2-1**). Subsequent phases of the Revegetation Plan may include:[6]

- **Year 2:** Increase cover of early succession stage herbaceous grasses and/or forbs.
- **Year 3:** Seed/transplant woody plants/shrub species that provide cover and forage for wildlife.
- **Year 5:** Increase yield/cover/diversity of mid-succession stage plant communities.

A decision point exists at the conclusion of each phase of the Plan, when it is imperative to decide:

1. Whether or not the restoration effort, in its current state, meets performance-based goals; or

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6 As agreed with the CVRWQCB, Homestake's responsibility is confined to Year 1 of the Plan. This document acknowledges that there may be subsequent phases of the Plan. As acknowledged by the CVRWQCB, these subsequent phases of the Plan are the responsibility of the other Dischargers. At the request of the CVRWQCB, considerations for subsequent phases of the Plan are presented in Appendix A.

2. If the restoration effort is determined to be incomplete, whether or not refinement of the current phase or progression to the next phase would provide a sufficient benefit to warrant the additional effort.

2.2 *YEAR 1 LOCATION AND AREAL EXTENT*

The location and areal extent of Year 1 vegetation restoration efforts are specified on a mine-by-mine basis in Section 3 of this Plan and are focused on post-reclamation areas at and access to:

- Wide Awake mine;
- Central mine;
- West End mine;
- Cherry Hill mine; and
- Manzanita mine.

Maps of areas within the Site slated for Year 1 restoration activities are provided in Section 3.[7] The spatial extent of future phases of vegetation restoration may be further focused based on the performance of the vegetation restoration effort.

A part-time residence is located within the former Empire mine area. The waste rock pile appeared to be capped with topsoil, and there is no evidence of erosion (or a threat of erosion) of mining-related material into Sulphur Creek at this location. Thus, no reclamation activities are planned by Homestake for the Empire mine area. Since reclamation activities will not be conducted, no Year 1 vegetation restoration actions are proposed at the Empire mine.

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[7] Areas with rocky outcrops and exposed bedrock will not be re-vegetated given the lack of growth substrate.

2.3 YEAR 1 SEED MIXES

2.3.1 Native Plants

There has been an increased interest in the preservation and restoration of native plant communities by both natural resource trustees and the general public. In an effort to promote sustainable plant communities, Homestake will preferentially use seed mixes comprised of native grasses and/or forbs, where appropriate and applicable. The preferential use of native plants is made in light of the fact that previous restoration efforts in nearby areas found that seeding/introduction of native plants species rarely resulted in the establishment of native plant communities (Thomsen; Homestake 2001). Weedy non-native grasses and forbs dominate much of the surrounding landscape and, in many cases, will out-compete native species.

In general, native plants require the same care in installation as do non-native plants and are valued for their economic, ecological, and/or aesthetic benefits as well as the growing societal belief in their intrinsic value as living species including, but not limited to (Dorner and Brown 2000):

- Adding beauty to the landscape;
- Requiring very little long-term maintenance if properly planted and established;
- Aiding in controlling soil erosion; and
- Providing habitat and forage for wildlife.

Accordingly, where the capability to reduce soil erosion is comparable, Year 1 seed mixes comprised of native plants will be preferred over seed mixes comprised of non-native plants and used in Year 1 restoration efforts at areas that are deemed likely to support successful vegetation of native mixes.

Non-native plant species will be used when:

- Non-native plants provide a substantial improvement of soil erosion control over native species;
- Native plants are not available; or
- Use of native plants is not feasible.

If non-native plants are selected, sterile and/or short-lived plants shall be used that are best-suited for the area and that will control soil erosion.

2.3.2 *Seed Mixes*

Habitat types/plant communities observed at the Site include:

- Annual grassland,
- Valley oak woodland,
- Mixed chaparral,
- Valley foothill riparian, and
- Wetland.

Seed mixes comprised of native plant seeds that are compatible with the habitat type observed/anticipated at reclaimed areas will be used in Year 1 restoration efforts. For example, a seed mix comprised of early succession stage grasses and/or forbs characteristic of mixed chaparral will be used to seed reclaimed areas previous supporting mixed chaparral. A qualified revegetation specialist[8] will determine the appropriate seed mix (plant species and relative proportion of seeds) for each area at the Site.

Preliminary seed mixes by habitat type are provided in **Table 2-2**. At the recommendation by Dr. Paul Aigner (UC Davis Co-Manager of McLaughlin Reserve), the actual composition of seed mixes by habitat type will be specified following completion of reclamation. Using a mix of species with slightly different requirements will encourage overall success because the expectation is that only one or two species will come to dominate a particular area. Concurrence by regulatory agencies for seed mixes will be obtained before the Year 1 vegetation restoration effort is initiated.

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[8] A *revegetation specialist* will have a background in botany, ecology, soil science, biology, or other related areas of study and a minimum of 5 years experience.

Table 2-2. Preliminary Year 1 Native and Non-Native Seed Mixes

Habitat Type	**Year 1 Seed Mix**[1]	
	Native Plant Mix	Non-Native Plant Mix
Annual Grassland	Blue wildrye California barley California onion grass Purple needlegrass Pine bluegrass Three week fescue Squirrel tail	Blando brome Wilton rose clover Berber orchard grass Annual ryegrass Alta tall fescue Intermediate wheat grass
Valley Oak Woodland	See Annual Grassland	See Annual Grassland
Mixed Chaparral	To Be Determined[1]	Blando brome Wilton rose clover Alta tall fescue Panoche red brome Intermediate wheat grass
Valley Foothill Riparian[2]	Ambrosia Creeping wildrye Mugwort Narrow-leaf goldenrod Wild grape Saltgrass	To Be Determined[1,2]
Wetland	To Be Determined[1]	To Be Determined[1]

Notes:

1. Preliminary seed mixes based on discussions with Dr. Paul Aigner (UC Davis/McLaughlin Reserve Co-Manager). The actual composition of habitat-specific seed mixes will be determined prior to completing reclamation activities and agency approval will be sought by Homestake before initiating vegetation restoration.
2. Rhizomatous plant species will be considered (Thomsen).

Native plants with the following attributes will be considered:

- Appropriate to the Site;
- Locally collected and commercially available;
- Adapted for stabilization of critical areas where erosion control is paramount;
- Adapted to the climatic regime and soil moisture conditions likely to prevail at the site;
- Having low establishment requirements;
- Having high propagation success potential; and

- Having value to wildlife.

The selection of appropriate plant species, including some hardy metal and salt tolerant plant species (e.g., saltgrass) in the re-vegetation seed mixture, are intended to enhance the long-term effectiveness of the restoration effort.[9]

2.4 *YEAR 1 SEEDING SCHEDULE*

The Year 1 seeding of herbaceous grasses and/or forbs will occur following completion of reclamation efforts at each area. Year 1 broadcast seeding will be scheduled at a time that ensures the greatest probability of germination, growth, and maximal cover during the first growing season following reclamation.

It is expected that the initial time period of the Year 1 seeding effort will occur during the fall season prior to the winter rains.[10]

2.5 *EVALUATE THE EFFECTIVENESS OF RESTORATION AGAINST PERFORMANCE-BASED GOALS*

Performance-based goals (or triggers) specify the desired or expected vegetation at a defined point in time after implementation of the vegetation restoration effort and are standards against which to evaluate the effectiveness/progress of the restoration effort. Given that data are sufficient, these triggers are used to evaluate whether to proceed to the next phase or exit the restoration effort.

Year 1 metrics include visual observations of:

- Soil erosion—e.g., gullies, slumps, accumulation of soils in lower portions of areas;

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9 Final Engineering Evaluation and Cost Analysis for the Sulphur Creek Mining District, Colusa and Lake Counties, California, CALFED-Cache Creek Study Task 5C2, Tetra Tech, September 2003. http://mercury.mlml.calstate.edu/wp-content/uploads/2008/12/finalrpt-task-5c2-final-scmd-eeca-sept-2003.pdf

10 A qualified revegetation specialist may be consulted upon completion of remediation activities.

- Plant cover (both native and non-native grasses and forbs); and
- Evidence of potential confounding factors—e.g., grazing pressure (by wildlife/cattle), competing invasive plants, and/or disease.

Observed presence of gullies, slumps, and accumulation of soils in lower portions of areas are a direct indicator of soil erosion. Plant cover was selected because it is considered a strong indicator of soil erosion control (Singer et al 1990; Zuazo and Pleguezuelo 2009). Noting unseasonal climatic conditions (e.g., high/low precipitation, temperature) and in-field observations of potential confounding factors will be used to qualify progress/achievement of Year 1 goals.

Year 1 performance-based plant cover triggers are presented in **Table 2-3.** Given recent observations and based on past experience, conditions at reclaimed areas that are anticipated to influence Year 1 restoration performance include, but are not limited to:

- Restoration habitat type;
- Substrate type (e.g., bedrock, gravel, sands);
- Presence/depth of topsoil; and
- Slope.

Accordingly, Year 1 performance-based triggers are stratified by the above attributes.

Table 2-3. Year 1 Performance-Based Plant Cover Goals/Triggers[1]

Substrate Type		Restoration Habitat Type	Slope: steep	Slope: flat
	Bedrock	All	NA	NA
	Topsoil (> 1ft bgs)	Valley Annual Grassland	To Be Determined[1]	40% cover
		Valley Oak Woodland	To Be Determined	40% cover
		Foothill Riparian	To Be Determined	40% cover
		Mixed Chaparral	To Be Determined	NA
		Wetland	To Be Determined	40% cover

Restoration Habitat Type	Slope	
	steep	flat

Notes:
NA = not applicable (given insufficient topsoil, no seeding of grasses/forbs is proposed)
steep = ≥ 5% grade
flat = < 5% grade

The Year 1 decision framework is shown in **Figure 2-1**. Based on Year 1 verification monitoring data for a particular area (see Section 2.6), if the Year 1 performance-based triggers are:

- Achieved—then Year 1 restoration actions are complete and no further Year 1 restoration actions are necessary.
- Not achieved—then additional seeding effort using herbaceous grasses and/or forbs will be conducted.

2.6 *MONITOR TO VERIFY THE EFFECTIVENESS OF RESTORATION*

The purpose of the monitoring program is to obtain information to verify the effectiveness/progress and, ultimately, the success of restoration efforts at the Site. The Year 1 verification monitoring activities will occur at the end of the first growing season (e.g. end of spring season (2012) following the initial seeding in the fall of 2011) and will consist of inspections of reclaimed areas to evaluate plant cover. The monitoring activities include:

- Randomly selecting sampling locations within restoration areas[11]
- A 10-cm by 10-cm quadrat will be randomly placed at each sampling location
- A photograph of plant cover within each 10-cm by 10-cm quadrat will be taken
- Percent plant cover will be calculated from photographs
- Visual observations by a qualified botanist will be recorded
- Those areas with evidence of active erosion (e.g., gullies, slumping) will be graded and seeded

[11] The number sampling locations at each mine will be determined following the completion of the remediation effort, once the areal extent of remediation is known.

Visual observations of evidence of soil erosion and plant cover at reclaimed areas will be compared to Year 1 performance-based goals qualified by any observed confounding factors to evaluate the effectiveness/progress of restoration efforts. If Year 1 performance goals are not met after the first growing season monitoring event (**Figure 2-1**), vegetation restoration progress will be monitored at the end of the second fall season (2012). Plant cover will be evaluated as described above.

At the end of the first fall season (2011), Homestake will prepare a summary of the initial restoration activities and Year 1 revegetation status. Revegetation activities and monitoring becomes the responsibility of the other Dischargers after the performance goal has been met.

3.0 VEGETATION RESTORATION PLAN ACTIVITIES

The Site currently supports habitat types typical for the general region in which they are located. The serpentine substrate in many areas supports mixed chaparral, which gives way to valley oak woodland and annual grassland in most areas at the Wide Awake and Central Area mines. Valley foothill riparian and wetland habitat also exists near Sulphur Creek and its tributaries. Actions will be taken to revegetate the mine areas and access ways with seed mixtures that are consistent with and intended to re-establish the habitat types currently found at/surrounding areas slated for reclamation. The habitats currently found at the Site are presented in **Figure 3-1**.

The nature of the substrate beneath the waste planned for removal at some of the mines is uncertain. It will therefore be necessary to plan the revegetation in such a way that it is understood that bedrock areas will not be revegetated, and areas with steep slopes (>5%) may need to be planted with non-native plants for greater erosion control.

Habitat types currently present at or near each of the areas to be reclaimed and planned access ways are presented below in **Table 3-1**. Figure 3-1 depicts the seed mixtures likely to be used in reclaimed areas/access ways at mine sites.

Table 3-1. Habitat Types Currently Present at Mine Sites

Mine	Annual Grassland	Oak Woodland	Foothill Riparian	Mixed Chaparral	Wetland
Wide Awake Mine	✓	✓	✓	✓	✓
Central Mine	✓	✓		✓	✓
West End Mine	✓	✓	✓	✓	✓
Cherry Hill Mine				✓	
Manzanita Mine	✓	✓	✓	✓	✓

The following sections present further details related to revegetation at each mine site. These areas are subject to change based on conditions encountered in the field.

3.1 *WIDE AWAKE MINE*

The access to this mine will traverse through annual grassland, valley oak woodland, valley foothill riparian, and wetland habitats. Several sections of the access roads are already present and need minor upgrades, so minimal habitat disturbance is anticipated for access to the Wide Awake mine. The newly disturbed areas will be re-seeded with the appropriate seed mix once the access ways are no longer in use (**Figure 3-2**).

During reclamation activities, it is likely that the area will be stripped down to bedrock in some areas to remove mining-related material. Areas of exposed bedrock will not be revegetated due to the steep slopes and lack of potential for erosion. Areas with sufficient topsoil will be seeded with the appropriate seed mixture based on the pre-remediation habitat (Figure 3-2). To the extent possible, every effort will be made to minimally disturb the wetland and riparian areas. These areas will be regraded, where necessary, and re-seeded with the appropriate mixture (Figure 3-2).

3.2 *CENTRAL MINE*

Access to the Central Mine is gained from the Manzanita mine. The access road will traverse through valley oak woodland, a small wetland, and annual grassland. These areas will be re-seeded with the appropriate seed mix once the access way is no longer in use (Figure 3-2).

The mining-related material at the Central Mine will be regraded and managed in place. These areas will be re-seeded with a mix of annual grassland and mixed chaparral, depending on the final slope and pre-reclaimed conditions (Figure 3-2).

3.3 *WEST END MINE*

The access to the West End mine will traverse through annual grassland, valley foothill riparian, and wetland habitats. These areas will be re-seeded with the appropriate seed mix once the access way is no longer in use (Figure 3-2).

During reclamation activities, it is likely that the area will be stripped down to bedrock to remove mining-related materials. Areas of exposed bedrock will not be revegetated due to the steep slopes and lack of potential for soil erosion. Areas with sufficient topsoil will be seeded with the mixed chaparral mixture (Figure 3-2).

3.4 CHERRY HILL MINE

The access to the Cherry Hill mine is from an existing developed road. No new areas will need to be disturbed to gain access, and therefore no access ways will be reseeded in relation to this mine site.

During reclamation activities, it is likely that the area will be stripped down to bedrock to remove all mining-related material. Areas stripped down to bedrock will not be revegetated due to the steep slopes and lack of potential for erosion. Areas with sufficient topsoil will be seeded with the mixed chaparral mixture (Figure 3-2).

3.5 MANZANITA MINE

The access to the Manzanita Mine traverses through annual grassland, valley foothill riparian, wetland, and mixed chaparral habitats. It will be necessary to cross over Sulphur Creek to gain access to this area. A temporary crossing will be used to access this area and will be removed following completion of reclamation activities. After removal, these areas will be regraded, where necessary, and re-seeded with the appropriate mixture (Figure 3-2). All other access ways will be reseeded upon completion of the project.

Due to the highly eroded slopes at this mine, some of the waste areas may be regraded and mining-related material managed in place. If necessary, riprap or other such engineering controls may be utilized to prevent erosion. Some areas may be stripped down to bedrock to remove mining-related material. Riprap areas and areas of exposed bedrock will not be revegetated due to the steep slopes, lack of topsoil, and minimal potential for soil erosion. Areas with sufficient topsoil will be seeded with the mixed chaparral mixture (Figure 3-2).

4.0 LITERATURE CITED

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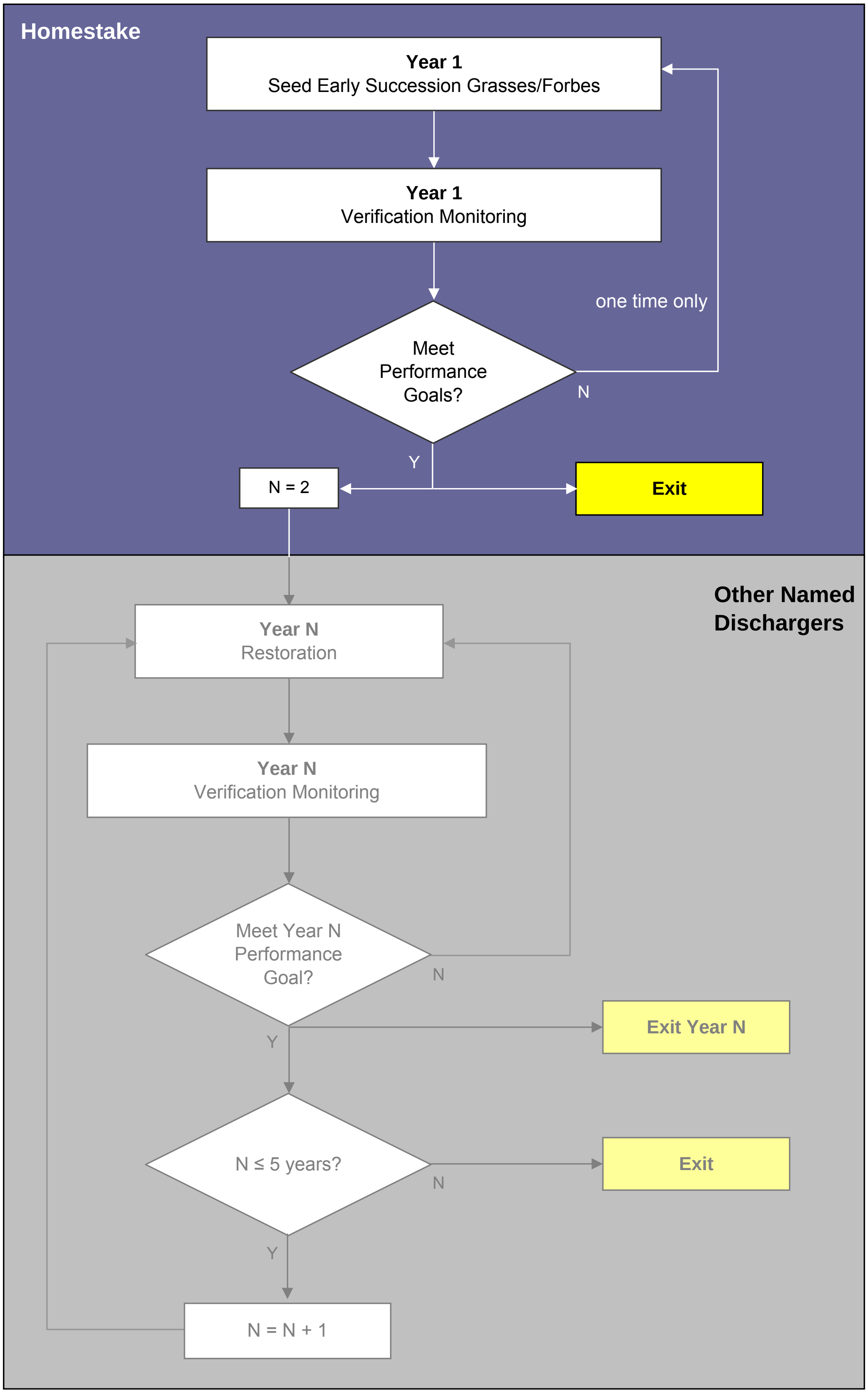
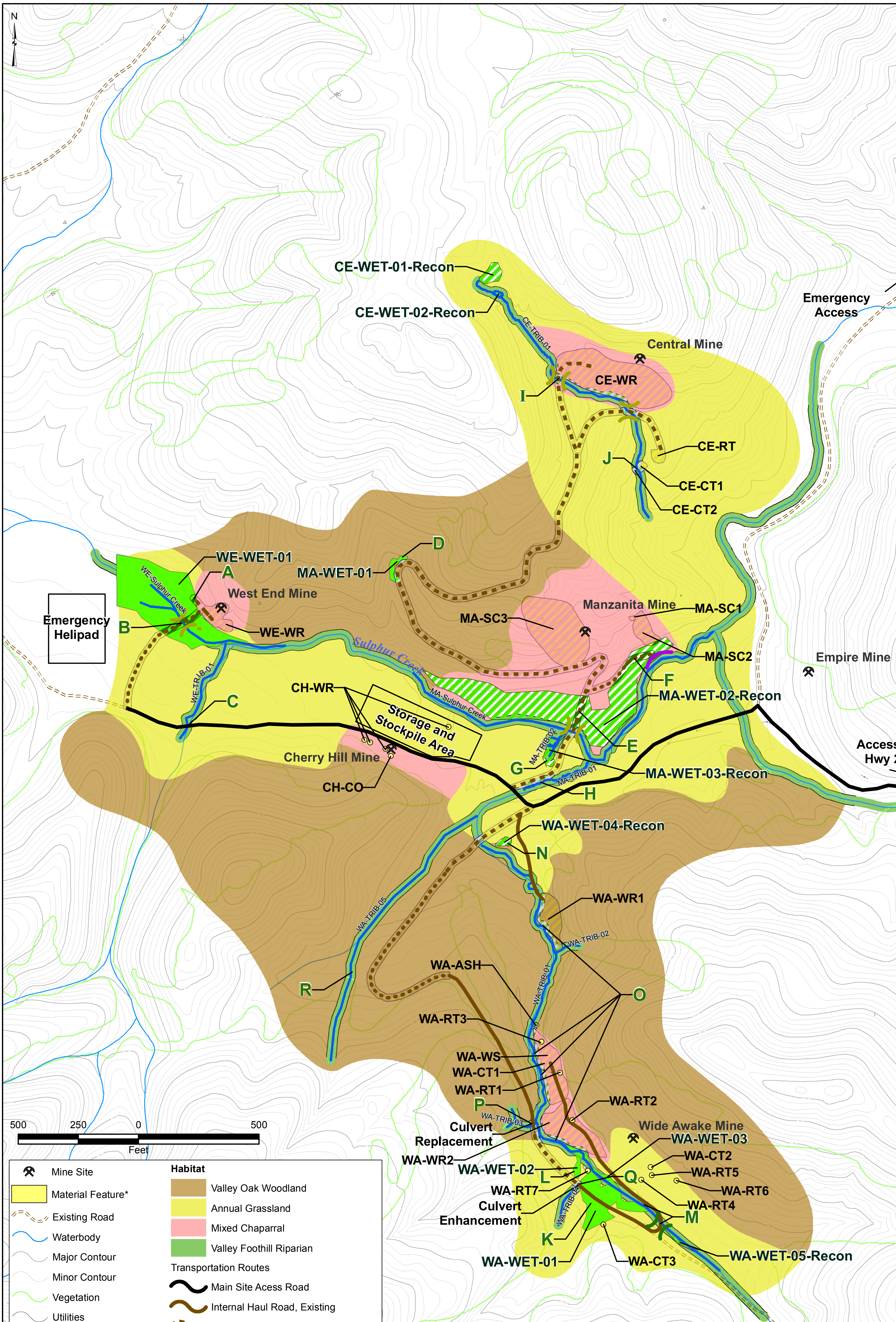
Figures

Figure 2-1. Vegetation Restoration Plan Decision Framework





Wilber Springs, CA Quadrangle
Sections 28 and 29,
Township 14N, Range 5W

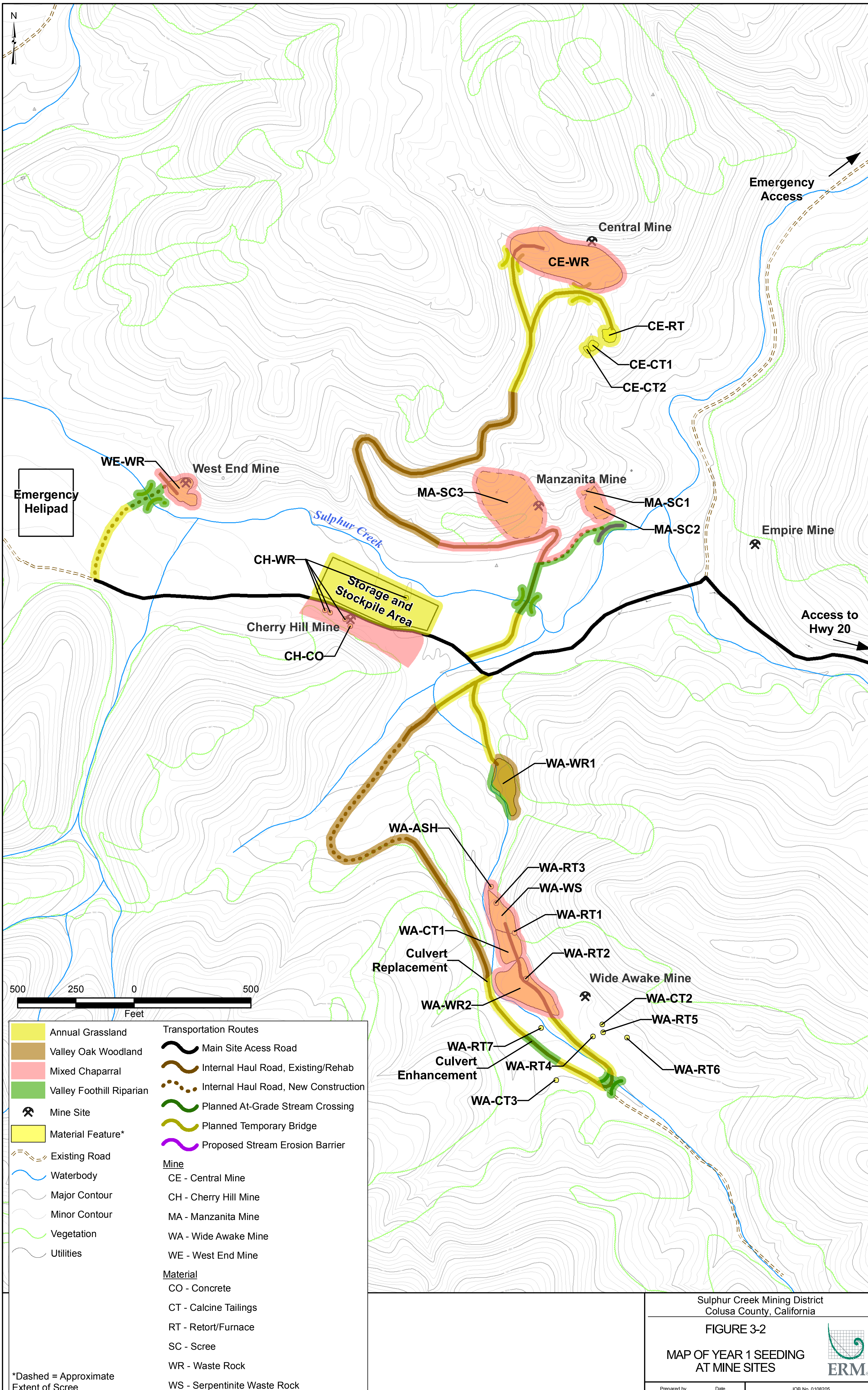
Sulphur Creek Mining District
Colusa County, California

FIGURE 3-1

HABITATS AT MINE SITES

ERM

Prepared by MKJ (ERM) | Date 09/29/10 | JOB No. 0108205 FILE: GIS/BARRICK/SCMD/FIGURE 3-1.MXD


N
Emergency Access
Central Mine
CE-WR
CE-RT
CE-CT1
CE-CT2
WE-WR
West End Mine
Emergency Helipad
Manzanita Mine
MA-SC3
MA-SC1
MA-SC2
Sulphur Creek
Empire Mine
CH-WR
Storage and Stockpile Area
Cherry Hill Mine
CH-CO
Access to Hwy 20
WA-WR1
WA-ASH
WA-RT3
WA-WS
WA-RT1
WA-CT1
Culvert Replacement
WA-RT2
Wide Awake Mine
WA-WR2
WA-CT2
WA-RT5
WA-RT7
Culvert Enhancement
WA-RT4
WA-RT6
WA-CT3
500 250 0 500
Feet
Annual Grassland
Valley Oak Woodland
Mixed Chaparral
Valley Foothill Riparian
Mine Site
Material Feature*
Existing Road
Waterbody
Major Contour
Minor Contour
Vegetation
Utilities
*Dashed = Approximate Extent of Scree
Transportation Routes
Main Site Acess Road
Internal Haul Road, Existing/Rehab
Internal Haul Road, New Construction
Planned At-Grade Stream Crossing
Planned Temporary Bridge
Proposed Stream Erosion Barrier
Mine
CE - Central Mine
CH - Cherry Hill Mine
MA - Manzanita Mine
WA - Wide Awake Mine
WE - West End Mine
Material
CO - Concrete
CT - Calcine Tailings
RT - Retort/Furnace
SC - Scree
WR - Waste Rock
WS - Serpentinite Waste Rock
Sulphur Creek Mining District
Colusa County, California
FIGURE 3-2
MAP OF YEAR 1 SEEDING AT MINE SITES
ERM
Prepared by MKJ (ERM)
Date 09/29/10
JOB No. 0108205
FILE: GIS/BARRICK/SCMD/FIGURE 3-1.MXD

Tables

Table 2-1.
Overview of the Vegetation Restoration Plan: Year 1

	Areas of Interest									
	Wide Awake Mine		Central Mine		West End Mine		Cherry Hill Mine		Manzanita Mine	
	tailings/waste	access	tailings/waste	access	tailings/waste	access	tailings/waste	access	tailings/waste	access
Program Objective	Introduce/seed herbaceous grasses/forbs to control soil erosion and promote future succession of plant communities.									
Restoration Habitat Type[1]	AG, MC, VOW, VFR,	AG, VOW, VFR, W	AG, MC, VOW	MC, AG, VOW	MC, W	AG, W	MC	None	MC	MC, AG, VFR, W
Substrate										
bedrock	TBD		TBD		TBD		TBD		TBD	
topsoil										
Slope										
steep (≥ 5% grade)	✓	✓	✓	✓	✓	✓	✓	None	✓	✓
flat (< 5% grade)	✓	✓	✓	✓	✓	✓	✓	None	✓	✓
Seed Mix	TBD	TBD	TBD	TBD	TBD	TBD	TBD	None	TBD	TBD
Performance-Based Goal[2]	40% cover	40% cover	40% cover	40% cover	40% cover	40% cover	40% cover	None	40% cover	40% cover

Notes:

1 Restoration Habitat Types = desired future habitat types

2 Progress/achievement of Year 1 performance-based triggers may be qualified to account for factors observed in the field, such as unanticipated climate (e.g., precipitation), grazing pressure (e.g., wildlife, cattle), competing invasive plants, and/or disease.

Legend:

AG = Annual Grassland
MC = Mixed Chaparral
VFR = Valley Foothill Riparian
VOW = Valley Oak Woodland
W = Wetland

Attachment A
Proposed Post-Year 1 Revegetation Plan Considerations

A.1 INTRODUCTION

As agreed by Homestake and CVRWQCB, Homestake is responsible for planning and implementing Year 1 of the Vegetation Restoration Plan (Revegetation Plan). The other responsible Dischargers as identified by the CVRWQCB will be responsible for planning and implementing subsequent phases of the Revegetation Plan.

At the request of the CVRWQCB, considerations for subsequent phases of the Revegetation Plan were identified by Homestake.

A.2 POST-YEAR 1 PLANNING CONSIDERATIONS

Subsequent phases of the Revegetation Plan may include (**Figure 2-1**):

- **Year 2:** Increase cover of early succession stage herbaceous grasses and/or forbs, if needed.
- **Year 3:** Seed/transplant woody plants/shrub species that provide cover and forage for wildlife.
- **Year 5:** Demonstrate establishment of plant communities and/or Increase yield/cover/diversity of mid-succession stage plant communities.

Considerations related to effective planning of subsequent phases of the Revegetation Plan include:

- Revisit vegetation restoration objectives
- Revisit subsequent phases of restoration
    - Year 2: Increase cover of early succession stage herbaceous grasses and forbs, where and if needed
    - Year 3: Seed/transplant woody plants/shrub species that provide cover and forage for wildlife
    - Year 5: Demonstrate establishment of plant communities and/or Increase yield/cover/diversity of mid-succession stage plant communities
- Revisit the performance goals for each phase
    - percent vegetation cover
    - erosion control
- Identify target plants and requirements

- structure—workhorse/specialist species
- function—erosion control, weed control

- Identify limiting factors, including but not limited to:
  - topsoil: soil moisture, nutrients, organic content, salts, pH, stability
  - slope: steepness, surface roughness, length
  - non-native, invasive competitors
  - grazing pressure
  - disease

- Consider maintenance measures (treatments/amendments) that address/mitigate limiting factors

- Assess site resources
  - available topsoil
  - duff, litter, and other woody material

To adaptively manage vegetation restoration efforts, managers may contemplate these considerations at the conclusion of each phase of the Revegetation Plan.

A.3 POST-YEAR 1 IMPLEMENTATION-RELATED CONSIDERATIONS

Considerations related to implementation of subsequent phases of the Revegetation Plan include:

- Consider seeding/cuttings/transplants
- Install treatments/amendments
- Install plants
- Identify plant maintenance
- Scope verification monitoring

A.4 POST-YEAR 1 PERFORMANCE-BASED TRIGGERS AND REPORTING CONSIDERATIONS

It is recommended that all plantings should be monitored and maintained as suggested above for up to five years (**Figure 2-1**). Managers should consider performance-based triggers for each phase of the Revegetation Plan that may include, but are not limited to:

- After 3 years
  - no visible evidence of active soil erosion
  - 70% plant cover
- After 5 years
  - no visible evidence of active soil erosion
  - 75% plant cover

It is suggested that the performance-based triggers for subsequent phases of the Revegetation Plan be (a) proposed by the other responsible Dischargers[12] and (b) approved by the appropriate agency prior to implementation.

If the cover requirements are not meeting performance-based triggers, the Agency should consider requiring the other responsible Dischargers to initiate replacement planting and/or other additional activities (e.g., soil amendments, watering, weeding, eradication of invasive nuisance plants) to achieve approved Plan goals.

In addition, it is also suggested that the other responsible Dischargers meet any and all permit conditions related to site restoration, erosion control, and maintenance and reporting requirements. For example, a minimum requirement is anticipated to include the submittal of a revegetation status report to the appropriate agency.

12 If needed, with the assistance of a qualified revegetation specialist.

Attachment B
Photographs/Photolog

1. View of annual grassland habitat near the West End Mine (spring)

2. View of annual grassland habitat near the West End Mine (winter)

3. View of wetland habitat near Wide Awake Mine.

4. . View of wetland habitat near West End Mine.

4. 5. View of riparian area near Wide Awake Mine.

6. View of Sulphur Creek riparian corridor near the West End Mine.

7. View of valley oak woodland habitat south of Wide Awake Mine.

8. View of mixed chaparral habitat at the Manzanita Mine.

Appendix G
Proposed Rockfill Sediment Dam Design for Wide Awake

1 Introduction

Removal of the mining-related waste rock in the very bottom of the existing channel in the Wide Awake Mine area may be difficult and may result in some material trapped in inaccessible areas of the channel floor (among boulders and in pools and pockets along the channel floor). If the estimated volume trapped is sufficiently small, then no additional collection measures shall be deemed necessary. However, if the trapped volume is estimated to be greater than 20 cubic yards (see footnote in Section 4.4.4 of Work Plan), then a temporary rockfill sediment dam structure may be constructed and operated in the channel downstream of the waste rock piles to detain and facilitate the removal of the trapped materials over a period of up to five (5) years.

2 Preliminary Design Plan

The embankment for the sediment dam should be constructed of a porous riprap material to allow water to drain freely from within the embankment and to allow at least limited overtopping of the embankment during large storm events without breaching of the embankment and avoiding the construction of a separate spillway structure (see **Figure 1**). A one (1) ft thick layer of gravel and sand will be placed on the upstream slope of the embankment to help filter and detain water in the pool area of the sediment pond. During most storm events, the water level in the pool will be controlled using a 24-inch diameter vertical HDPE riser pipe connected to a 12 inch diameter HDPE outlet pipe. The overflow elevation of the riser inlet should be set to provide one (1) ft of freeboard to the top of the embankment. The riser inlet should be protected using a galvanized rod trash rack attached to the top of the riser with a galvanized steel strap (see **Figure 2**).

The pool area of the sediment pond should be configured for the easy removal of sediment. A dedicated access ramp having a minimum width of 12 ft and a maximum gradient of 15% should be constructed at an appropriate location in the pool area to provide access for equipment used to clean accumulated sediment from the pond. On the bank opposite the access ramp, a push wall will be constructed to facilitate the efficient loading and removal of sediment using an end loader (see **Figure 3**). The wall will consist of a gabion wall reaction block faced with a reinforced concrete wall for durability. Similarly, a 6-inch reinforced concrete slab apron will protect the soil in front of the wall from the forces of excavation.

Gabions shall be of a single unit construction. The base, ends, sides, and lid shall be either welded into a single unit or shall be connected in such a manner that strength and flexibility at the connection are at least equal to that of the wire mesh. The gabions shall be fabricated in such a manner that they can be assembled at the construction site with spiral binders and connecting wire into rectangular baskets of the specified size. Rock for filling the gabions shall be not less than 4 inches nominal diameter. Rock may be obtained from any approved source. Lids shall be tied along the front, ends, and diaphragms of individual gabions and to successive gabions with 13.5-gage tie wire or with 9-gage spiral binders.

3 Maintenance and Monitoring

If the construction of the rockfill sediment dam is deemed warranted, Homestake will include this activity as part of the restoration activities. However, any inspections, maintenance and final removal will be the responsibility of other Dischargers, identified by CVRWQCB. It is expected that the CVRWQCB and other Dischargers will negotiate the terms of maintenance and monitoring of the sediment dam and pond.

Figures

Figure 1 – Rockfill Sediment Dam (Panel 1)

TYPICAL SECTION OF ROCKFILL SEDIMENT DAM AT RISER/OUTLET PIPING

NTS

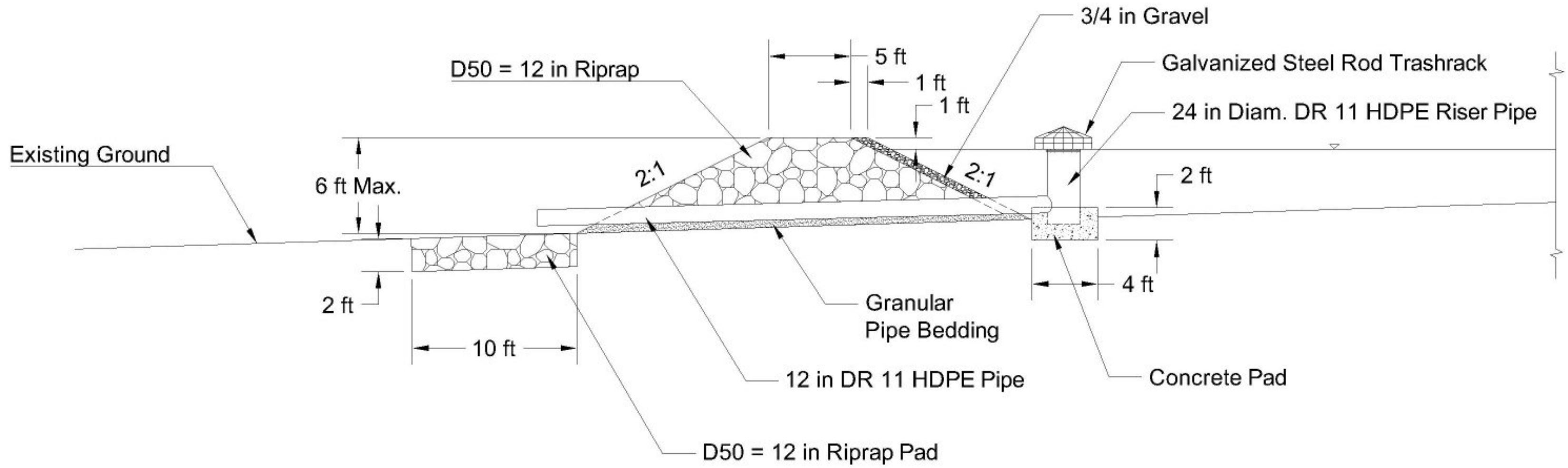


Figure 2 - Rockfill Sediment Dam (Panel 2)

TYPICAL DETAILS FOR GALVANIZED STEEL ROD TRASHRACK WITH ANTIVORTEX BAFFLE (NTS)

TYPICAL BEND PATTERN FOR STEEL RODS

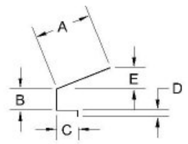
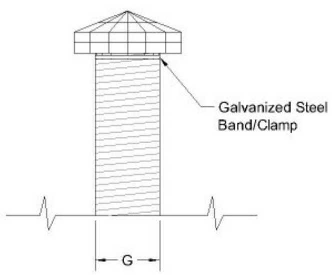


TABLE OF DIMENSIONS

Dimension	Value
A	0.89 x G
B	0.33 x G
C	0.33 x G
D	0.10 x G
E	0.33 x G
F	1.66 x G
G	1.00

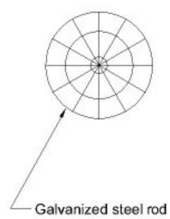
Note: All dimensions reference inside edge of bars.

SIDE VIEW



Note: G = Outside Pipe Diameter. All other dimensions are relative to G.

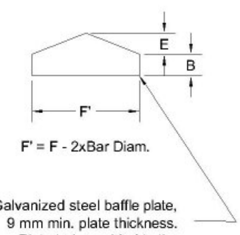
PLAN VIEW



Galvanized steel rod trashrack, 9 mm min. rod diameter or #3 epoxy coated rebar

Note: Trashrack requires 3 large rings with inside bar edge diameter of F' = F - 2xBar Diam. plus 1 medium ring of Diam. G and 1 small ring of Diam. G/4. Rings to be welded on inside of bent rod cage.

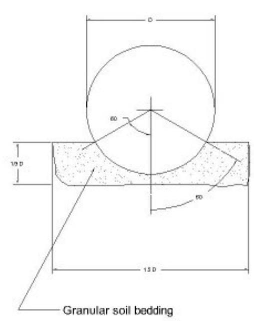
ANTIVORTEX BAFFLE PLATE



F' = F - 2xBar Diam.

Galvanized steel baffle plate, 9 mm min. plate thickness. Plate to be welded to the inside of the steel rod trashrack.

TYPICAL SECTION FOR PIPE BEDDING

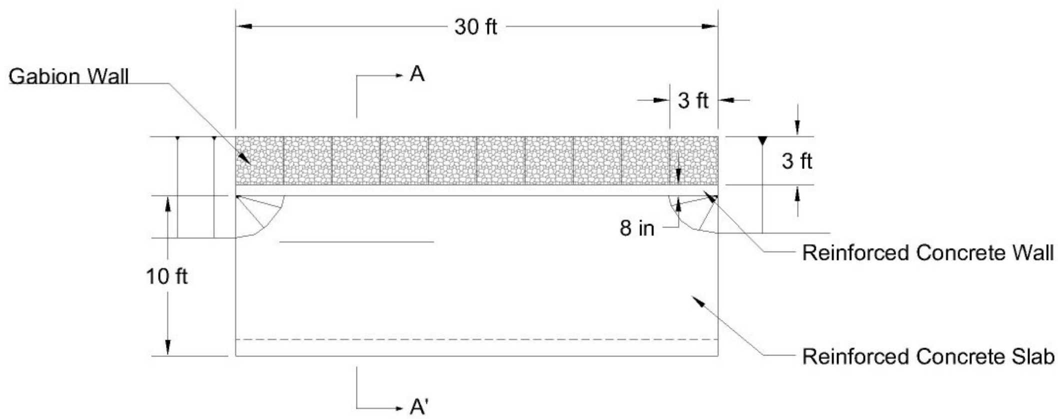


Granular soil bedding

Figure 3 - Rockfill Sediment Dam (Panel 3)

TYPICAL DETAIL FOR PUSH WALL
NTS

PLAN VIEW



SECTION AA'