

**FOURTH FIVE-YEAR REVIEW REPORT FOR**  
**LIQUID GOLD OIL CORPORATION SITE**  
**CONTRA COSTA COUNTY, CALIFORNIA**

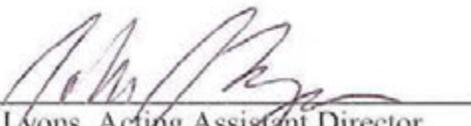


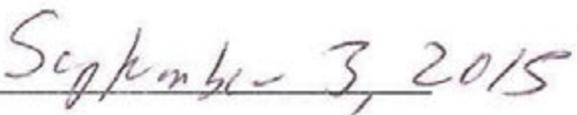
PREPARED BY

U.S. Army Corps of Engineers, Seattle District

FOR

U.S. Environmental Protection Agency  
Region IX  
San Francisco, California

  
\_\_\_\_\_  
John Lyons, Acting Assistant Director  
Site Cleanup Branch, Superfund Division  
U.S. Environmental Protection Agency, Region IX

  
\_\_\_\_\_  
September 3, 2015

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# Executive Summary

This is the fourth Five-Year Review (FYR) of the Liquid Gold Oil Corporation Site (Site) located in Richmond, Contra Costa County, California. The purpose of this FYR is to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this FYR was the signing of the previous FYR on September 21, 2010.

The Liquid Gold Oil Corporation property consists of approximately 18 acres of a 29-acre property previously owned by Southern Pacific Transportation Company and currently owned by the Union Pacific Railroad (UPRR). A portion of the site was leased to an oil storage and transfer facility known as the Liquid Gold Oil Corporation. From 1965 to 1980, the Site was operated as a used oil and solvent collection, storage, and transfer facility. Used motor oil, solvents, bunker oil, diesel fuel, oil-water mixtures and emulsions, tank bottom wastes, and coolants were stored in storage tanks on-site. As a result of Liquid Gold's operations, hazardous substances leaked or spilled onto the ground, discharged into ponds, sumps, and ditches, and drained into wetland areas. Liquid Gold ceased operations and went out of business in 1982.

Subsequent investigations revealed elevated concentrations of lead, copper, and mercury. Copper and mercury appeared to be randomly distributed and did not appear to have a source area. Elevated concentrations of lead were detected primarily in a 5-acre area in the central portion of the Site. Polycyclic aromatic hydrocarbons (PAHs) were also found in elevated concentrations in the same 5-acre portion of the Site.

Beginning in 1982, the property owner performed several interim remedial measures at the Site including removal of 25 bulk storage tanks, 73 drums containing hazardous wastes, 760 cubic yards of contaminated soil, and any remaining structures, debris, and asbestos for off-site disposal. The Site was listed on the National Priorities List in 1983. On June 21, 1993, the U.S. Environmental Protection Agency selected a remedy that included:

- A deed restriction prohibiting residential development;
- Grading, addition of soil, and seeding to control runoff patterns;
- Groundwater monitoring for a minimum of five years; and
- Removal of sediments and debris from two drainage channels leading to the adjacent marsh to mitigate possible past adverse impacts from Liquid Gold.

Approximately 2.1 acres were capped in 1994, and a deed restriction for 7.5 acres was recorded in 1995. The Site achieved construction completion with the signing of the Preliminary Close-Out Report on September 27, 1995, and was deleted from the National Priorities List on September 11, 1996. Biennial groundwater monitoring is conducted as part of the remedy, and the last monitoring event was completed in 2013.

The technical assessment performed during this FYR determined that the remedy is functioning as intended by the Record of Decision (ROD), although some issues remain to be addressed. Negotiations between UPRR and East Bay Regional Park District are ongoing regarding the relocation of a fence. There have been no changes in the physical condition of the Site that would affect the protectiveness of the remedy. Occasional trespassing occurs at the Site, but an increased frequency of Site inspections has improved Site security.

The most recent biennial report indicated that two monitoring wells were dry. Redevelopment of those wells, hydrologic conditions permitting, could provide more complete groundwater information during future monitoring events. Trend analysis indicates that, for most metals, chemical concentrations are stable or show no trend over time. One possible exception is that mercury and total petroleum hydrocarbons as diesel (TPH-D) appear to be increasing in concentration at one upgradient well.

The remedy at the Liquid Gold Oil Corporation Site currently protects human health and the environment because all immediate threats at the Site have been addressed through the removal of contaminated material, stabilization and capping of on-site contaminated soils, access restrictions including fencing and warning signs, regular maintenance, and a deed restriction that restricts land use. However, in order to ensure long-term protection of human health and the environment, Union Pacific Railroad must complete the fence realignment project to completely enclose the vegetated cap within the fence, and revise the deed restriction to ensure that it is consistent with California regulations and covers the appropriate Site area.

## Five-Year Review Summary Form

SITE IDENTIFICATION		
<b>Site Name:</b> Liquid Gold Oil Corporation		
<b>EPA ID:</b> CAT000646208		
<b>Region:</b> 9	<b>State:</b> CA	<b>City/County:</b> Richmond, Contra Costa
SITE STATUS		
<b>NPL Status:</b> Deleted		
<b>Multiple OUs?</b> No	<b>Has the site achieved construction completion?</b> Yes	
REVIEW STATUS		
<b>Lead agency:</b> California Department of Toxic Substances Control <b>If “Other Federal Agency” was selected above, enter Agency name:</b> <a href="#">Click here to enter text.</a>		
<b>Author name (Federal or State Project Manager):</b> Lynn Nakashima		
<b>Author affiliation:</b> DTSC		
<b>Review period:</b> December 18, 2014 – May 31, 2015		
<b>Date of site inspection:</b> February 27, 2015		
<b>Type of review:</b> Statutory		
<b>Review number:</b> 4		
<b>Triggering action date:</b> September 21, 2010		
<b>Due date (five years after triggering action date):</b> September 21, 2015		
Issues/Recommendations		

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): Cap Cover Area	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;"><b>Issue Category:</b> Site Access/Security</td> </tr> <tr> <td style="padding: 5px;"><b>Issue:</b> The fence realignment identified in the previous FYR is not resolved.</td> </tr> <tr> <td style="padding: 5px;"><b>Recommendation:</b> Complete the fence realignment to fully enclose the vegetated cap inside the perimeter fence.</td> </tr> </table>	<b>Issue Category:</b> Site Access/Security	<b>Issue:</b> The fence realignment identified in the previous FYR is not resolved.	<b>Recommendation:</b> Complete the fence realignment to fully enclose the vegetated cap inside the perimeter fence.
<b>Issue Category:</b> Site Access/Security				
<b>Issue:</b> The fence realignment identified in the previous FYR is not resolved.				
<b>Recommendation:</b> Complete the fence realignment to fully enclose the vegetated cap inside the perimeter fence.				

Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	Union Pacific RR	EPA/DTSC	September 30, 2016
OU(s): Cap Cover Area	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> The deed restriction does not comply with current California regulations.			
	<b>Recommendation:</b> Once the property boundary issue has been resolved, update the deed restriction.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	Union Pacific RR	EPA/DTSC	September 30, 2017
<b>Sitewide Protectiveness Statement</b>				

<i>Sitewide Protectiveness Determination:</i> <i>Short-term Protective</i>	<i>Addendum Due Date not applicable</i>
<i>Protectiveness Statement:</i> The remedy at the Liquid Gold Oil Corporation Superfund Site currently protects human health and the environment because all immediate threats at the Site have been addressed through the removal of contaminated material, stabilization and capping of on-site contaminated soils, access restrictions (fencing, warning signs), regular maintenance of engineered control structures, and institutional controls (deed restriction) that restrict land use. However, in order to ensure long-term protection of human health and the environment, Union Pacific Railroad must complete the fence realignment project to completely enclose the vegetated cap within the fence, and revise the deed restriction to ensure that it is consistent with California regulations and covers the appropriate Site area.	

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# List of Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cy	cubic yards
DOT	California Department of Transportation
DTSC	California Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
EBRPD	East Bay Regional Park District
FYR	Five-Year Review
MCC	State of California Marine Chronic Criteria
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m <sup>3</sup>	milligrams per cubic meter
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priority List
PVC	polyvinyl chloride
O&M	operation and maintenance
OU	Operable Unit
PAH	polycyclic aromatic hydrocarbon
RI/FS	Remedial Investigation/Feasibility Study
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RWQCB	San Francisco Bay Regional Water Quality Control Board
Site	Liquid Gold Oil Corporation Superfund Site
SPT	Southern Pacific Transportation Company
TPH	total petroleum hydrocarbons
TPH-D	diesel range total petroleum hydrocarbons
TPH-G	gasoline range total petroleum hydrocarbons
TPH-O/G	oil and gas range total petroleum hydrocarbons
µg/L	micrograms per liter
UPRR	Union Pacific Railroad Company
USACE	U.S. Army Corps of Engineers

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# Fourth Five-Year Review Report

for

## Liquid Gold Oil Corporation Site

### 1. Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of these reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA 121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA interpreted this requirement further in the NCP, 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action.*

This is the fourth FYR for the Liquid Gold Oil Corporation Superfund Site (Site), located in Richmond, Contra Costa County, California. The California Department of Toxic Substances Control is the lead agency.

The triggering action for this statutory review is the completion of the third FYR on September 21, 2010. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

The Site consists of one Operable Unit (OU), a 2.1-acre area that was capped in 1994, and associated groundwater contamination. The selected remedy for the OU included capping of the contaminated soils, removal of contaminated sediments, groundwater monitoring, and a deed restriction prohibiting residential development. The Site was deleted from the National Priority List in 1996. Groundwater monitoring is conducted every two years, and the last monitoring event was completed in 2013.

## 2. Site Chronology

Table 1 lists the dates of important events for the Liquid Gold Oil Corporation Site.

**Table 1. Chronology of Site Events**

<b>Event</b>	<b>Date</b>
Removal activities – storage tanks and contents removed and disposed of off site	1982-1983
Site listed on the California State Superfund List	January 1983
Site listed on the EPA National Priority List	September 1983
Removal activities – drums of hazardous waste removed and disposed of off site	1984
Removal activities – 760 cubic yards (cy) of contaminated soil and demolition debris removed and disposed of off site	1985
California Department of Health Services (now the California Department of Toxic Substances Control [DTSC]) issues Consent Order to Southern Pacific Land Corporation and Liquid Gold Oil Corporation	January 1988
Removal activities – Site buildings demolished and debris disposed of off site	1989
Remedial Investigation/Feasibility Study conducted	1988-1992
Remedial Action Plan signed by California Department of Toxic Substances Control (DTSC)	June 8, 1993
Record of Decision (ROD) signed by U.S. Environmental Protection Agency (EPA)	June 21, 1993
On-site mobilization	July 7, 1994
Marsh channel sediment excavated and soil cap installed	July 1994
Final cap installation inspection conducted	February 1995
Deed restriction recorded	September 1995
Operation and Maintenance Plan finalized	September 1995
Site deleted from EPA National Priority List	September 1996
Five-Year Review (FYR) Report completed by EPA	September 2000

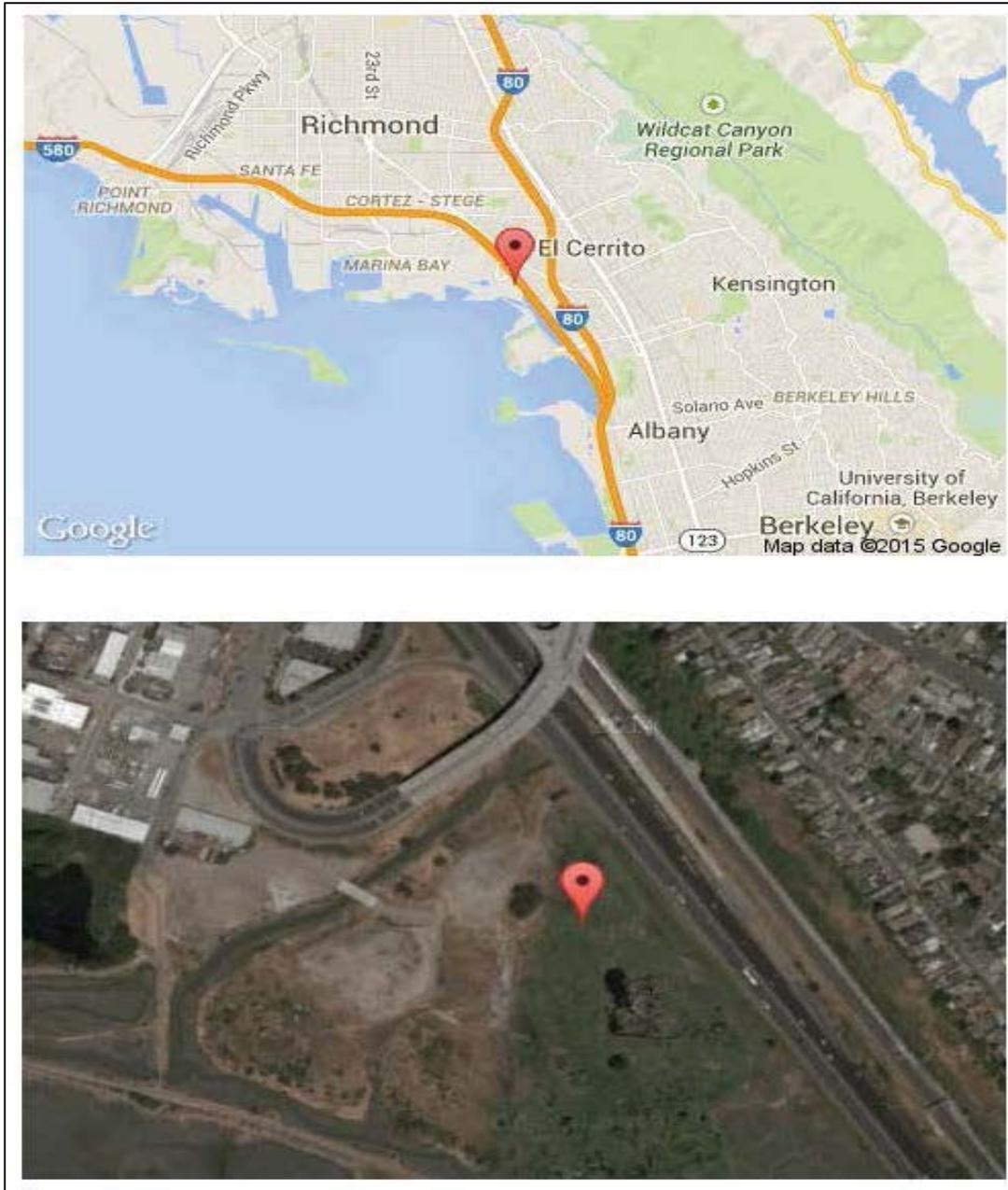
<b>Event</b>	<b>Date</b>
FYR Report completed by DTSC	June 2003
2005 Biennial Groundwater Monitoring Report completed	March 2006
Second FYR Report completed by EPA	September 2005
2006 Annual Inspection	September 2006
2006 Annual Inspection Report	October 2006
Draft Site Fence Realignment Work Plan	February 2007
Installation of new chain-link fence along the southern and southwestern perimeters of the Site cap partially completed	Spring 2007
Union Pacific Railroad Company (UPRR) initiated easement request process with East Bay Regional Park District (EBRPD) in order to complete fence realignment	Spring 2007
EBRPD indicates they would prefer a land swap (or lot line adjustment) rather than an encroachment permit to complete fence realignment around the Site cap	January 2008
UPRR submitted the Site Security Plan and initiated Site control inspections every two weeks	December 2008
2007 Biennial Groundwater Monitoring Report completed	March 2008
2009 Biennial Groundwater Monitoring Report completed	November 2009
Third FYR completed by EPA	September 21, 2010
2011 Biennial Groundwater Monitoring Report completed	December 12, 2011
Soil sampling for fence realignment conducted by CH2M HILL	September 2013
2013 Biennial Groundwater Monitoring Report completed	May 19, 2014

## 3. Background

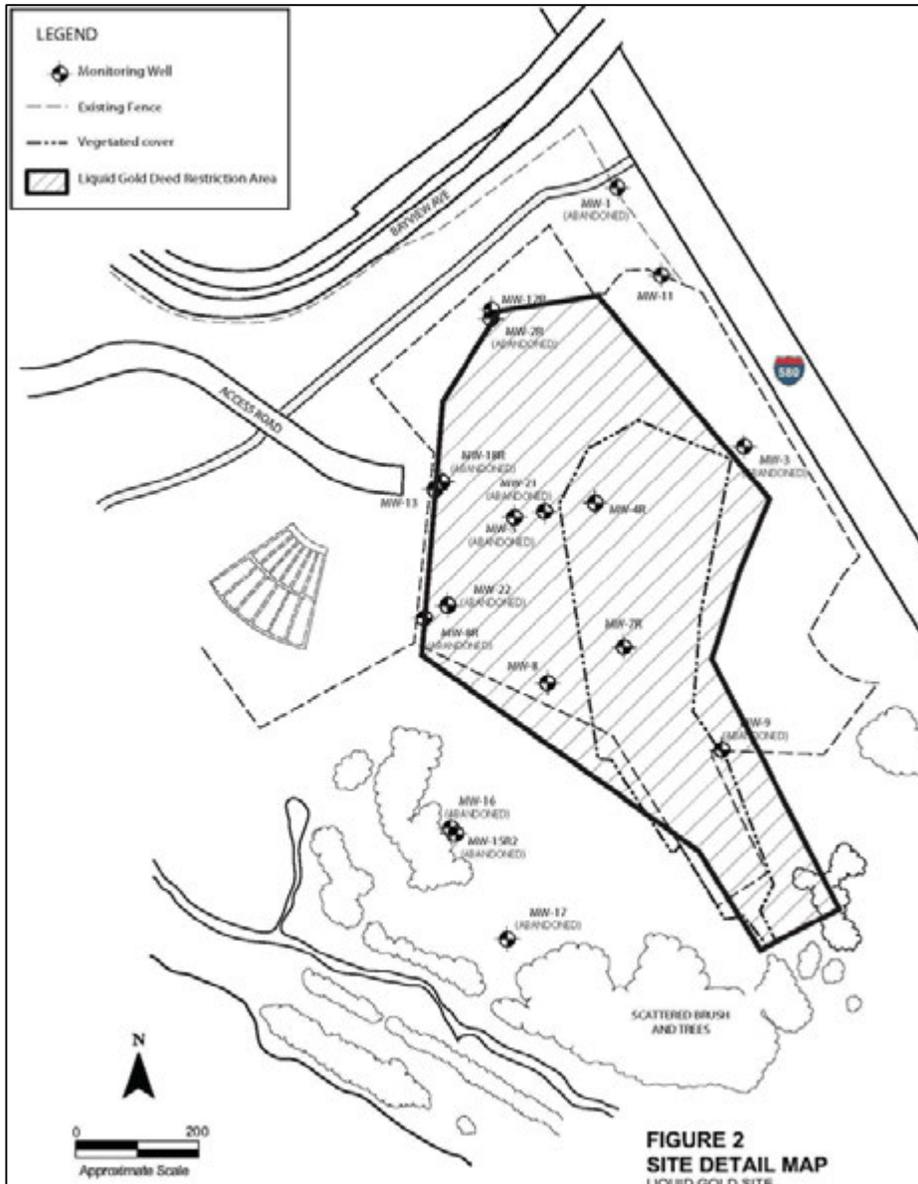
### 3.1. Physical Characteristics

The Liquid Gold Oil Corporation Superfund Site (Site) consists of approximately 18 acres of a 29-acre property in Richmond, California, (Figure 1) previously owned by Southern Pacific Transportation Company (SPT) and currently owned by the Union Pacific Railroad (UPRR). Approximately 2.1 acres are capped within a 7.5-acre deed-restricted area (Figure 2). This Five-Year Review (FYR) primarily addresses the 2.1-acre capped area. Originally, a major portion of the property was marshland, which was filled in the 1940s and 1950s. The Site is adjacent to the San Francisco Bay, west of Interstate 580, and south of the Bayview Avenue highway overpass. It is bounded by Hoffman Marsh to the east and southeast and by drainage channels connecting to San Francisco Bay on the west and southwest. Approximately 92,000 people live within four miles of the Site. There are public wells located within

one half mile of the Site, and nine private wells are located within three miles of the Site. The Site is fenced, and the only activities occurring are long-term monitoring and inspections.



**Figure 1: Liquid Gold Site Location**



**Figure 2: Liquid Gold Site Detail Map**

### 3.2. Geology and Hydrogeology

The area in the vicinity of the Site is geomorphologically a transition zone between an active alluvial fan deposition zone and the tidal saltwater estuarine marsh environment, including Hoffman Marsh to the southeast (Helley, et al. 1979).

The general stratigraphic profile at the Site consists of artificial fill at the surface underlain by natural soil, which consists of the Bay Mud typical of the San Francisco Bay margin. The Bay Mud at the Site is an unconsolidated or semi-consolidated, usually saturated, dark, plastic clay and silty clay rich in organic materials. As reported by the U.S. Geological Survey, the Bay Mud is underlain by older alluvial surficial deposits of the probable age of the Colma, Merritt, and Temescal Formations

(Schlocker 1974). These surficial deposits probably extend under the Bay Mud westward about four miles from the Site and eastward to the uplands of El Cerrito, approximately one mile from the site.

The Bay Mud at the Site is overlain by recent fill material. This fill was probably brought to the Site from various sources over time as more of the Site was used for industrial or other human activities. This progressive filling of the intertidal zone at the Site can be seen chronologically in a sequence of historical aerial photographs. The fill consists of dredged Merritt Formation sand, material from the Temescal Formation, and miscellaneous refuse (e.g., broken concrete). The U.S. Geological Survey reports that the Merritt and Temescal Formations are contemporary with the Colma Formation (Schlocker 1974) and, thus, would likely be of similar age to the deposits which underlie the Bay Mud at the Site (Figure 3).

Two groundwater zones have been investigated at the Site:

- The shallow groundwater zone within the fill material above the Bay Mud. This fill unit ranges in thickness from ground surface to approximately 10 feet below ground surface (bgs).
- The deep groundwater zone, separated from the shallow zone by Bay Mud which serves as an aquitard, is in a sandy alluvial unit, the upper limit of which is encountered at depths of 17 feet bgs or greater.

The depth to shallow groundwater varies from approximately two to eight feet bgs. Groundwater flow direction in the shallow zone varies due to tidal and seasonal influences, and velocities are generally on the order of 6 to 250 feet per year in the southwest direction. In the deep groundwater zone, the groundwater flow direction is to the southwest and is independent of seasonal water level variations. The Remedial Investigation (RI) presented observations from monitoring wells that indicated that the two aquifers are not likely hydraulically connected.

The occurrence of surface water on the Site corresponds to rainfall events where the water either ponds on-site or discharges to the adjacent wetlands via drainage paths. Surface water is present in areas such as Hoffman Marsh, Stege Drainage Channel, and the drainage channel along the western side of the Site. Surface water adjacent to the Site is influenced by the tides.

Modifications to the groundwater monitoring program, with DTSC concurrence, have reduced the number of wells in the monitoring network. The six remaining monitoring wells at the Site, wells MW-4R, MW-7R, MW-8, MW-11, MW-12R, and MW-13 (Figure 2), have been monitored biennially since the last FYR in 2010. Groundwater was analyzed for chromium, copper, lead, mercury, nickel, zinc, and diesel range total petroleum hydrocarbons (TPH-D). Based on the recommendations in the 2005 FYR, groundwater samples are filtered in the field and analyzed for dissolved metals.



20 storage tanks and drums and included waste motor oil, organic solvents, bunker oil, diesel fuel, oil-water emulsions and mixtures, and tank bottom waste. As a result of Site operations, hazardous substances leaked or spilled onto the ground and were discharged into ponds, sumps, and ditches and subsequently drained into the wetland areas. In 1982, Liquid Gold Oil Corporation ceased operations and left several deteriorating buildings and 25 storage tanks of various sizes on the Site.

In the 1970s and early 1980s, investigations by the San Francisco Bay Regional Water Quality Control Board (RWQCB) and the U.S. Coast Guard documented spills of oil and chemicals. In addition, investigations conducted by the California Department of Health Services, now the California Department of Toxic Substances Control (DTSC), documented releases of hazardous substances onto the ground and into ponds, sumps, and ditches. Consequently, the Site was listed on the California State Superfund List in January 1983. The EPA listed the Site on the NPL in September 1983. DTSC assumed lead responsibility for overseeing environmental investigations and cleanup actions at the Site. The Site was removed from the NPL in 1996.

### Soil and Sediment

Approximately 500 soil samples were collected from surface and subsurface soils (to depths of 30 feet) and over 60 sediment samples were collected from the marsh. Samples were analyzed for various metals, PAHs, and oil and grease. The results of these analyses are summarized below.

- **Metals** - Elevated concentrations of lead, copper, and mercury were found at the Site. Copper and mercury appeared randomly distributed and did not appear to have a source area. Elevated concentrations of lead were detected primarily in a 5-acre area in the central portion of the Site. The average lead concentration in soil in this area was approximately 1,000 milligrams per kilogram (mg/kg). The highest concentrations of lead were detected within the fill material at depths between 5 to 6.5 feet bgs.
- **PAHs** - PAHs were detected in five surface samples. PAHs in the subsurface were primarily confined to the same 5-acre area in the central portion of the Site in which elevated concentrations of metals were detected. Levels of total PAHs varied from 0.4 to 14 mg/kg.
- **Oil and Grease** - Soil samples were analyzed for total petroleum hydrocarbons (TPH) as oil and grease (TPH-O/G) as an indicator of the amount of petroleum products in the soil. Elevated levels of TPH-O/G appeared to be randomly distributed throughout the Site and obvious sources did not appear to exist.

### Groundwater

Sixteen groundwater monitoring wells were installed prior to or during the RI. The monitoring well network at that time consisted of seven deep wells (Wells MW-1, MW-2, MW-3, MW-6, MW-9, MW-16, and MW-18) and nine shallow wells (Wells MW-4, MW-5, MW-7, MW-8, MW-11, MW-12, MW-13, MW-15, and MW-17). The well locations are shown on Figure 2.

Quarterly sampling of the monitoring wells was conducted between October 1988 and October 1989 in accordance with the Remedial Investigation/Feasibility Study Work Plan (Kennedy/Jenks 1988). Additional quarterly groundwater sampling began in October 1990. The major constituents analyzed in groundwater samples were total metals (specifically, chromium, copper, lead, mercury, nickel, and zinc) and TPH (specifically, as diesel [TPH-D], as gasoline [TPH-G], and TPH-O/G).

### 3.5. Initial Response

The property owner performed a number of interim actions prior to and after the state and federal Superfund listings of the Site. Some surface soils were removed in 1974, and liquid waste and soil from a drainage area and holding pond were removed in 1980. Between 1982 and 1989, the property owner performed the following removal measures:

- Twenty-five storage tanks and more than 70 drums of hazardous waste were removed and disposed off-site from 1982 to 1984;
- In 1985, 760 cy of contaminated soil were excavated from the former east tank farm, former asphalt facility, areas near the former asphalt facility, and the former west tank farm;
- A wooden building in the former asphalt facility was removed in 1985, resulting in off-site disposal of an additional 65 cy of wood and metal debris.
- The remaining Site buildings were demolished and the debris disposed off-site in 1989.

### 3.6. Basis for Taking Action

Soil investigations at the Site revealed areas with concentrations of lead and PAHs greater than those acceptable for residential exposure. Concentrations of metals (lead, nickel, and zinc) detected in groundwater samples were found to be elevated in one monitoring well in the shallow groundwater zone.

The human health risk assessment (HHRA) determined that the only significant potential exposure pathway was contact with soil. Groundwater at the Site is not a potential drinking water source due to its high salinity. The HHRA found that the levels of metals, PAHs, and TPH remaining in the Site soil after the completion of the removal measures exceeded levels protective for residential use. Specifically, soils with lead concentrations greater than 370 mg/kg posed an unacceptable level of noncarcinogenic risk to a hypothetical child resident.

Surface water is present in two tidally influenced channels that receive runoff from the Site. The ecological risk assessment concluded that adverse impacts to aquatic organisms were possibly occurring in the drainage channels leading from the Site into San Francisco Bay. This assessment was based on the observation that the sediment-dwelling organisms observed were typical of a benthic community affected by petroleum contamination. In addition, sediment toxicity to bivalve larvae was observed in laboratory bioassays.

The Record of Decision (ROD) presented groundwater analytical data that indicated concentrations of copper, lead, and nickel exceeded the State of California Marine Chronic Criteria (MCC) water quality objectives. Table 2 gives MCC values for Site contaminants of concern that were presented as to-be-considered (TBC) criteria in the ROD, although no cleanup standard was selected for groundwater.

**Table 2. California Marine Chronic Criteria**

<b>Chemical</b>	<b>California Water Quality Objectives (marine chronic criteria dissolved) (mg/L)</b>
Chromium	0.05
Copper	0.0031
Lead	0.0081
Nickel	0.0082
Zinc	0.081
Mercury	0.000025

Note: mg/L = milligrams per liter.

The ROD did not select cleanup criteria for groundwater, but mentioned the Marine Chronic Criteria as TBCs.

## 4. Remedial Actions

### 4.1. *Remedy Selection*

EPA signed the ROD on June 21, 1993. The prior removal activities addressed the principal human health and environmental threats at the Site. The ROD concurred with and selected the remedy chosen in the State's Remedial Action Plan (RAP), which addressed the residual sediment, soil, and groundwater impacts remaining at the Site. Remedial Action Objectives were not explicitly stated in the ROD or RAP, but can be inferred to include:

- Improve the ecological value of the sediments in the drainage channels leading into Hoffman Marsh to mitigate any adverse impacts which may have resulted from past Site activities.
- Prevent off-site migration of contaminated soils and/or groundwater and conduct long-term monitoring of groundwater to determine changes in groundwater quality.
- Prevent exposure to residual contaminated soils by restricting development at the Site

The components of the selected remedy include:

- A deed restriction prohibiting residential development.
- Grading, addition of soil, and seeding to control runoff patterns;
- Groundwater monitoring for a minimum of five years; and
- Removal of sediments and debris from two drainage channels leading to the adjacent marsh to mitigate possible past adverse impacts from Liquid Gold.

Specifically, the selected remedial action for this Site included removing approximately 1,000 cubic yards of contaminated sediment and debris from the drainage channels leading to Hoffman Marsh; consolidating the sediments on site; installing a RCRA-hybrid soil cap over the contaminated on-site

soils; grading and vegetating the Site to control runoff; monitoring groundwater; and implementing institutional controls, including deed restrictions.

## ***4.2. Remedy Implementation***

### Drainage Channel Excavations

In 1994, roughly 1,000 cy sediments were excavated from two channels in Hoffman marsh. Confirmation sampling, which included chemical analysis and bioassay testing, was performed to evaluate the impact of remaining Site contamination on aquatic receptors. The results showed that sediments from the middle of one of the channels were toxic to bivalve larvae, prompting additional sampling in February 1995. The February 1995 data confirmed that some sediments were toxic to bivalve larvae, although the data indicated that the toxicity was probably due to factors unrelated to Site contaminants, such as naturally occurring ammonia. Additional tests were performed in August 1995, and the results indicated that the toxicity associated with the sediments did not appear to be related to Site contaminants and that further sediment sampling was not warranted. In a letter dated November 22, 1995, DTSC concurred that additional sediment sampling was not necessary.

### Vegetated Soil Cover

The vegetated soil cover was installed over contaminated soils in July 1994 and included the placement of two feet of clean imported fill, graded to maximize Site drainage and prevent ponding. Following grading, the area was seeded with native plants, and a fence was erected to prevent unauthorized access to the Site. The initial cap installation inspection by regulators in February 1995 resulted in additional sampling and minor cap repairs. The final cap installation inspection occurred in July 1995, and DTSC certified the remedial action as complete in August 1995. A deed restriction was recorded on September 13, 1995 restricting the residential use of the Site.

## ***4.3. Operation and Maintenance***

The six remaining monitoring wells at the Site, Wells MW-4R, MW-7R, MW-8, MW-11, MW-12R, and MW-13, have been monitored biennially since the last FYR in 2010. Groundwater was analyzed for chromium, copper, lead, mercury, nickel, zinc, and TPH-D. Based on the recommendations in the 2005 FYR, groundwater samples are now filtered in the field and analyzed for dissolved metals instead of total metals.

Two biennial Site inspections have been conducted since the 2010 FYR Report; the first inspection was completed on October 3, 2011 and the second was completed on October 15, 2013. The findings from these Site inspections prompted minor maintenance and repairs to the cap and perimeter fence. The inspections did not indicate any significant Site security problems, although occasional trespassing and illegal dumping have been reported. To improve security, UPRR has performed Site inspections every month since 2011. CH2M HILL also conducted an additional inspection on November 21, 2013 to determine the condition of the cap and look for indications of wind or water

erosion or other signs of damage to the remedy. Operation and maintenance (O&M) costs for groundwater sampling and Site monitoring are presented in Table 3.

**Table 3. Annual O&M Costs**

<b>Date Range</b>	<b>Total Cost (rounded to the nearest \$1,000)</b>
DTSC 2013 Groundwater Monitoring Report	\$2,000
2011 – 2014 (Groundwater monitoring)	\$8,000 per year
2011- 2014 (Site monitoring)	\$1,000 per year

## 5. Progress Since the Last Five-Year Review

### 5.1. Previous Five-Year Review Protectiveness Statement and Issues

The protectiveness statement from the 2010 FYR for the Liquid Gold Site stated the following:

*The remedy at the Liquid Gold Site currently protects human health and the environment, because all immediate threats at the site have been addressed through the removal of contaminated material, stabilization and capping of on-site contaminated soils, access restrictions (fencing, warning signs), regular maintenance of engineered control structures, and institutional controls (deed restriction) that restrict land uses. However, in order to ensure long-term protection of human health and the environment, Union Pacific Railroad must complete the fence realignment project to completely enclose the vegetated cap within the fence, and revise the deed restriction to ensure that it is consistent with California regulations and covers the appropriate site area.*

The 2010 FYR included two issues and recommendations. The current status of actions taken to address the issues are discussed in Table 4.

**Table 4. Status of Recommendations from the 2010 FYR**

<b>Issues from previous FYR</b>	<b>Recommendations</b>	<b>Action Taken and Outcome</b>	<b>Date of Action</b>
The fence does not completely surround the vegetated cap.	Complete the fence realignment project, fully enclosing the vegetated cap within the Site fencing.	Fence realignment discussions are continuing between UPRR and East Bay Regional Park District. CH2MHILL conducted soil sampling along the realignment corridor, which revealed elevated metal concentrations.	Ongoing

Issues from previous FYR	Recommendations	Action Taken and Outcome	Date of Action
The parcel numbers in the deed restriction are ambiguous, and the deed restriction is not consistent with current California regulations.	Investigate why the legal description of the deed-restricted area, specifically the parcel numbers, are unclear in the Covenant to Restrict Use of Property. Provide an analysis of this issue to EPA. EPA will determine, after reviewing this analysis, whether follow-up actions are needed. When the deed restriction is amended, determine if it is consistent with current California regulations.	This issue is tied to the fence realignment discussions and will be a component of that action.	Ongoing

## 5.2. Work Completed at the Site During this Five-Year Review Period

Two biennial groundwater monitoring reports were completed on October 3, 2011 and October 15, 2013. Monthly inspections of the Site have also been conducted, and UPRR regularly made minor repairs such as replacing locks and repairing fences. Negotiations between the East Bay Regional Park District (EBRPD) and the UPRR to resolve the fence realignment problem are ongoing. As part of the negotiations, an investigation was conducted to assess the potential presence and extent of impacted soil beneath the Site’s vegetated soil cover on EBRPD property. Soil samples were collected August 15 and 16, 2012, along the realignment corridor and analyzed for TPH-D, PAHs, metals, and mercury. Soil sampling results for arsenic (all depths sampled 0-5’), zinc (all depths sampled), benzo(a)anthracene (all depths sampled), benzo(a)pyrene (all depths sampled), benzo(b) fluoranthene (all depths sampled), chrysene (3-7’), dibenz(a,h)anthracene (5-7’), indeno(1,2,3-cd)pyrene (5-7’), and pyrene(7’) exceeded EPA residential screening levels.

## 6. Five-Year Review Process

### 6.1. Administrative Components

EPA Region 9 initiated the FYR process in October 2014. The EPA Liquid Gold FYR review team included Lynn Nakashima, DTSC; Rachele Thompson, EPA Remedial Project Manager (RPM), Miriam Gilmer, USACE project manager; Deborah Johnston, USACE biologist; and Peter Krembs, USACE geologist.

## 6.2. *Community Involvement*

On November 21, 2014, a public notice was published in the *Bay Area News Group* announcing the commencement of the FYR process for the Site, providing contact information for EPA and DTSC, and inviting community participation. A copy of the newspaper announcement is provided in Appendix B. No one contacted EPA or DTSC as a result of this notice.

The FYR report will be made available to the public once it has been finalized. Copies of this document will be placed in the designated public repository: Richmond Public Library, 325 Civic Center Plaza, Richmond, California 94804. The document will also be available online from EPA at [epa.gov/region09/liquidgold](http://epa.gov/region09/liquidgold) and from DTSC at [http://www.envirostor.dtsc.ca.gov/public/profile\\_report.asp?global\\_id=07290039](http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=07290039). Copies will also be available at the EPA Superfund Records Center, located at 75 Hawthorne Street, Room 3110, San Francisco, California 94105.

## 6.3. *Document Review*

### Applicable or Relevant and Appropriate Requirements Review

Section 121 (d)(2)(A) of CERCLA specifies that Superfund remedial actions must meet any Federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements (ARARs). ARARs are those standards, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, action, location, or other circumstance at a CERCLA site.

No chemical-specific ARARs were chosen in the ROD. EPA considered the California MCCs since the groundwater is saline in nature and has the potential to daylight in San Francisco Bay. However, the ROD states that “current groundwater monitoring data does not indicate movement of contaminants off-site. Therefore, no cleanup standard has been adopted.”

Action-specific ARARs identified in the ROD are the California Hazardous Waste Control Law and the California Coastal Zone Management Act. However, construction is complete and the response action has transitioned from construction to long-term O&M phase work (Table 5), so these two ARARs identified in the ROD are no longer pertinent. There have been no revisions to laws and regulations that affect the protectiveness of the remedy.

**Table 5. Applicable or Relevant and Appropriate Requirements Evaluation**

<b>Requirement And Citation</b>	<b>Document</b>	<b>Description</b>	<b>Effect on Protectiveness</b>	<b>Comments</b>
California Hazardous Waste Control Law 22 California Code of Regulations 66264.310	ROD	California Hazardous Waste Control Law closure requirements are relevant and appropriate because the Site is more closely analogous to a landfill unit than to any other type of RCRA unit.	No longer relevant	Conditions at this Site are appropriate for hybrid closure because the soil contaminant levels have been reduced to acceptable concentrations for current and expected uses; groundwater is naturally nonpotable; and the low level groundwater contaminants are not moving off-site.
California Coastal Zone Management Act Section 307(c)(1)	ROD	Preserve and maintain the Bay's ecological integrity; actions must be consistent with approved State coastal zone management programs.	No longer relevant	No actions are occurring at the Site that fall under the purview of the California Coastal Commission, which administers the California Coastal Zone Management Act.

Human Health Risk Assessment Review

The risk assessment was reviewed to identify any possible changes in exposure or toxicity that would impact the protectiveness of the remedy. A Preliminary Public Health and Environmental Evaluation for the Site was conducted in 1988, and was expanded upon in the 1990 RI. The investigation evaluated potential exposure pathways including airborne dust, groundwater and surface water ingestion, dermal contact, soil and sediment ingestion, and shellfish consumption.

Concentrations of chemicals in groundwater and soil were compared to EPA's Regional Screening Levels (RSLs). RSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. These values are used for site screening to help identify areas, contaminants, or conditions that require further evaluation. Potential risks due to ingestion and inhalation of chemicals in surface and subsurface soil were evaluated. Potential exposure scenarios evaluated included residential exposure to children and adults, office building exposure to adults, and exposure to trespassing children. A potential future risk from exposure to noncarcinogenic chemicals was identified for ingestion exposure to residential children. Lead in soil resulted in a hazard index above one for residential child ingestion exposure. However, residential use is prohibited by institutional controls so this exposure pathway is incomplete. No other exposure scenarios posed significant risks from carcinogenic or noncarcinogenic chemicals.

Vapor Intrusion: EPA's understanding of contaminant migration from soil gas and/or groundwater into buildings has evolved over the past few years, leading to the conclusion that vapor intrusion may pose a greater potential risk to human health than assumed when the ROD was adopted. However, subsurface vapor was not investigated at the Site during the RI because the chemicals of interest are not volatile and therefore do not produce appreciable vapors. Further, there are no buildings currently on the Site and the deed restriction does not allow for residential use. Therefore, the vapor intrusion pathway is incomplete and no further evaluation is recommended for this Site.

Toxicity values: The information presented in the human health and ecological assessments is still applicable. The soil cover and perimeter fencing prevent a complete pathway for soil exposure. Since the groundwater is considered nonpotable because of salinity, a complete pathway for groundwater does not exist. Therefore, no complete exposure pathways exist.

#### Ecological Review

An environmental evaluation for the Site was conducted in 1988 as part of the RI. The evaluation looked at complete pathways including bioaccumulation, and bioassay testing was conducted. No detrimental effects attributable to chemical toxicity were observed in bioassays performed on one invertebrate test species, *Ceriodaphnia dubia*, and one species of alga, *Selenastrum capricornutum*. The benthos community results were correlated with the chloride content in the sediment (a measurement of salinity) and not correlated with concentrations of chemicals related to the former operations of the Site. Therefore, although oil and grease were detected off-site, no toxic effects to the benthos community in Hoffman Marsh could be identified during the study. No correlations between chemicals originating on the Site and concentrations of chemicals in tissue were observed. Risk to higher trophic level organisms in marsh areas was also evaluated and determined to be insignificant.

## **6.4. Data Review**

Data reviewed for this FYR primarily include the two biennial groundwater monitoring reports. Groundwater trend analyses were conducted for the Site contaminants of concern.

#### Soil

As part of the negotiations between UPRR and the EBRPD, soil samples were collected to assess the potential presence and extent of chemically impacted soil beneath the Site's vegetated soil cover on EBRPD property. Soil samples were collected on August 15 and 16, 2012, along the realignment corridor and analyzed for TPH-D, PAHs, metals, and mercury (see Section 5.2 for results). This information will be utilized in determining what area needs to be included in the perimeter fence.

#### Groundwater

Groundwater analytical results collected over the previous ten years were reviewed to determine if contaminant concentrations at the Site are increasing, decreasing, or stable. DTSC previously approved the abandonment of all Site monitoring wells except wells MW-4R, MW-7R, MW-8, MW-11, MW-12R, and MW-13 (wells designated with an R are replacements for damaged or destroyed wells between 1987 and 1990). Therefore, the chemical concentration trends in groundwater presented in the following subsections are based on analytical data from the six remaining monitoring

wells. According to the RI, MWs 4R, 7R, 8, 12R, and 13 are shallow wells screened at depths between 5 to 11 feet bgs. MW-11 is a shallow upgradient well. Groundwater elevations are presented in Table 6 below.

**Table 6. Groundwater Elevations**

Well ID	Date	Top of Casing (feet msl)	Depth to Water (feet)	Groundwater Elevation (feet msl)
MW-4R	9/27/2005	11.44	8.77	2.67
MW-4R	1/30/2008		5.46	5.98
MW-4R	10/2/2009		8.95	2.49
MW-4R	10/3/2011		8.60	2.84
<b>MW-4R</b>	<b>10/15/2013</b>		<b>dry</b>	<b>--</b>
MW-7R	9/27/2005	11.31	8.64	2.67
MW-7R	1/30/2008		5.49	5.82
MW-7R	10/2/2009		8.78	2.53
MW-7R	10/3/2011		8.69	2.62
<b>MW-7R</b>	<b>10/15/2013</b>		<b>8.78</b>	<b>2.53</b>
MW-8	9/27/2005	8.56	5.97	2.59
MW-8	1/30/2008		2.96	5.60
MW-8	10/2/2009		6.12	2.44
MW-8	10/3/2011		5.90	2.66
<b>MW-8</b>	<b>10/15/2013</b>		<b>6.41</b>	<b>2.15</b>
MW-11	9/27/2005	11.37	8.74	2.63
MW-11	1/30/2008		6.03	5.34
MW-11	10/2/2009		8.75	2.62
MW-11	10/3/2011		8.72	2.65
<b>MW-11</b>	<b>10/15/2013</b>		<b>9.10</b>	<b>2.27</b>
MW-12R	9/27/2005	9.65	6.61	3.04
MW-12R	1/30/2008		4.94	4.71
MW-12R	10/2/2009		6.57	3.08
MW-12R	10/3/2011		6.68	2.97
<b>MW-12R</b>	<b>10/15/2013</b>		<b>6.65</b>	<b>3.00</b>
MW-13	9/27/2005	9.34	6.56	2.78
MW-13	1/30/2008		3.56	5.78
MW-13	10/2/2009		6.97	2.37
MW-13	10/3/2011		5.86	3.48
<b>MW-13</b>	<b>10/13/2013</b>		<b>dry</b>	<b>--</b>

Notes: msl = mean sea level

a = well was dry, unable to measure water level.

Bolded values are from the most recent monitoring event (October 2013).

During the 2011 and 2013 biennial groundwater monitoring events, chromium, lead, nickel, and zinc were analyzed using EPA Method 6010B, which differs slightly from the method originally listed in

the January 1995 Groundwater Monitoring Plan. Mercury was analyzed using EPA Method 7470. Since the 2005 FYR, groundwater samples for metals analyses have been field-filtered prior to preservation. Field filtration is used to remove suspended sediment particles from groundwater and provides a more accurate measurement of the concentration of dissolved metals. Due to the different sampling procedures, the recent monitoring results are not directly comparable to the historical data. Thus, since samples were field-filtered prior to preservation during the 2005, 2007, 2009, 2011 and 2013 biennial groundwater monitoring events, only these data are used in this technical analysis. The data from these monitoring events are shown in Table 7.

**Table 7. Dissolved Metal Concentrations in Shallow Groundwater**

Well	Date	Chromium µg/L	Copper µg/L	Lead µg/L	Mercury µg/L	Nickel µg/L	Zinc µg/L
Marine Chronic Criteria		50	3.1	8.1	0.025	8.2	81
MW 4R	Sep-05	<5	<5	<5	<0.2	<b>25</b>	<10
MW 4R	Jan-08	<5	<10	<5	<0.2	<10	52
MW 4R	Oct-09	<10	<20	<b>9.5</b>	<0.2	<b>15</b>	23
MW 4R	Oct-11	<2	<2	<5.1	<b>0.51</b>	0.02	<20
MW 4R	Oct-13	dry	--	--	--	--	--
MW 7R	Sep-05	<5	<5	<5	<0.2	<b>23</b>	<10
MW 7R	Jan-08	<5	<10	<5	<0.2	<10	<20
MW 7R	Oct-09	<10	<b>37</b>	<b>16</b>	<0.2	<5	<20
MW-7R	Oct-11	<2	1.2	<b>13</b>	0.2	3.6	20
MW-7R	Oct-13	2.9	1.7J	1.2	<0.2	<b>10</b>	<20
MW 8	Sep-05	10	<5	<5	<0.2	<5	<10
MW 8 DUP	Sep-05	11	<5	<5	<0.2	<5	<10
MW 8	Jan-08	<5	<10	<5	<0.2	<10	<20
MW 8 DUP	Jan-08	<5	<10	<5	<0.2	<10	<20
MW 8	Oct-09	18	<20	<5	<0.2	<10	<b>150 J</b>
MW 8 DUP	Oct-09	15	<20	<5	<0.2	<10	<20 J
MW 8	Oct-11	15	<10	<5	<0.2	<10	<20
MW 8 DUP	Oct-11	16	<0.01	<5	<0.2	<10	<20
MW 8	Oct-13	4.9	1.1	<1	<b>0.43</b>	3.2	<20
MW 8 DUP	Oct-13	5	1.2	<1	<b>0.39</b>	3.1	<20
MW 11	Sep-05	<5	<5	<5	<0.2	<b>24</b>	<10
MW 11	Jan-08	<5	<10	<5	<0.2	<10	<20
MW 11	Oct-09	<b>68</b>	<b>63</b>	<b>32</b>	<0.2	<b>94</b>	<b>120</b>
MW 11	Oct-11	8.1	<b>12</b>	3.4	<b>0.23</b>	<b>13</b>	20
MW 11	Oct-13	21	2.8	<5	<b>0.41</b>	<b>10</b>	6.3

Well	Date	Chromium µg/L	Copper µg/L	Lead µg/L	Mercury µg/L	Nickel µg/L	Zinc µg/L
MW 12R	Sep-05	21	<5	<5	<0.2	5.8	<10
MW 12R	Jan-08	<5	<10	<5	<0.2	<10	<20
MW 12R	Oct-09	27	<b>31</b>	<5	<0.2	<10	<20
MW 12R	Oct-11	25	<20	<10	<0.2	<20	<100
MW 12R	Oct-13	30	1.6	0.97	<0.2	<b>8.9</b>	<20
MW 13	Sep-05	7.2	<5	<5	<0.2	5.5	<10
MW 13	Jan-08	<5	<10	<5	<0.2	<10	<20
MW 13	Oct-09	NS	NS	NS	NS	NS	NS
MW 13	Oct-11	<2	<b>18</b>	2.6	<0.2	<b>20</b>	22
MW 13	Oct-13	dry	--	--	--	--	--

Notes: **BOLD** = exceeds California marine chronic criteria.  
µg/L = micrograms per liter  
DUP = duplicate sample  
J = estimated result  
R = replacement well

Analytical results obtained during the 2011 and 2013 biennial groundwater monitoring events detected chromium, copper, lead, nickel, and zinc in the monitoring wells. Mercury was detected in MW 4R, MW 8, and MW 11 at concentrations above the State of California MCC (0.025 µg/L). The MCCs are listed in Table 2 for reference, but were not adopted as cleanup standards in the ROD.

Trend analyses (Figure 4 through 9) for dissolved metals were performed using historical data from 2005 onward, including the biennial monitoring events performed in 2011 and 2013. The trend analyses used the Mann-Kendall methodology. The analyses suggested that metal concentrations are either stable or show no increasing or decreasing trend except for mercury at MW 11.

MW11 is located upgradient from the Site, so the increasing mercury trend in groundwater at that location could hypothetically indicate on-site migration from another source and should be investigated further if concentrations continue to increase.

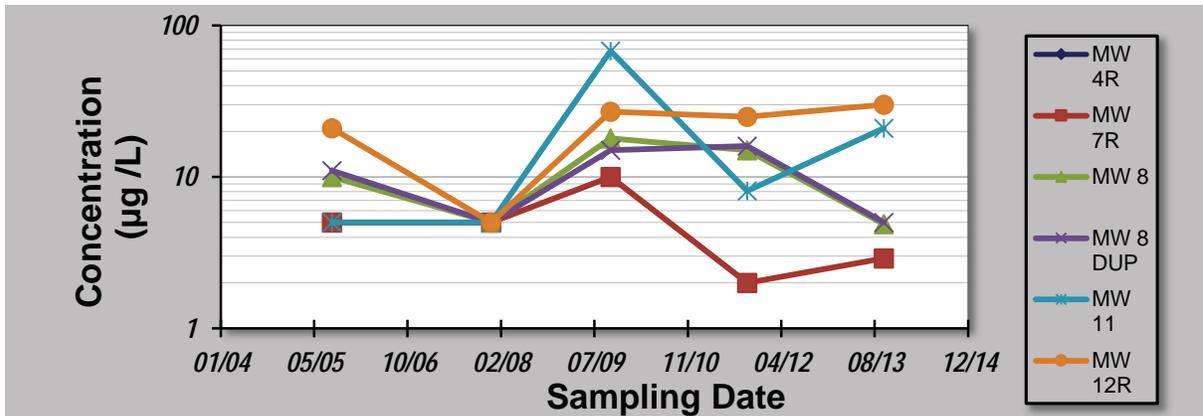


Figure 4: Chromium Trends

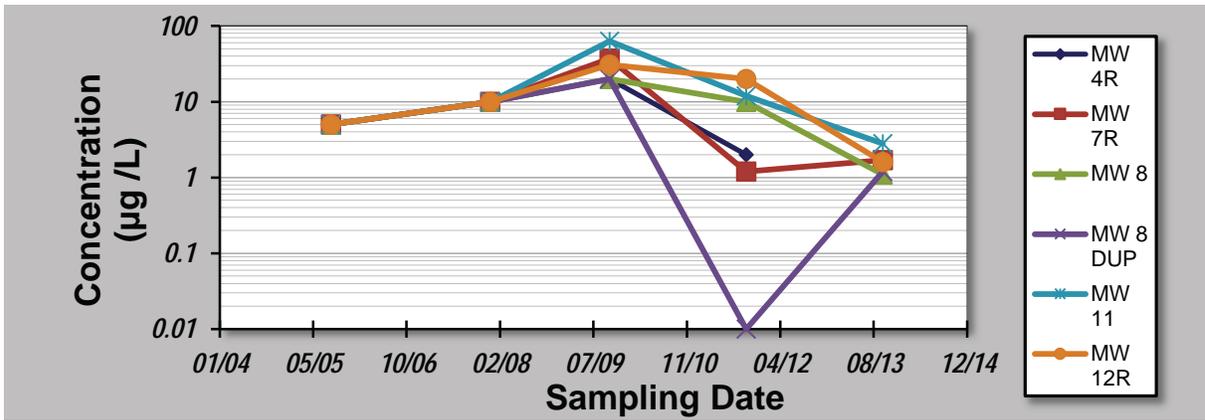


Figure 5: Copper Trends

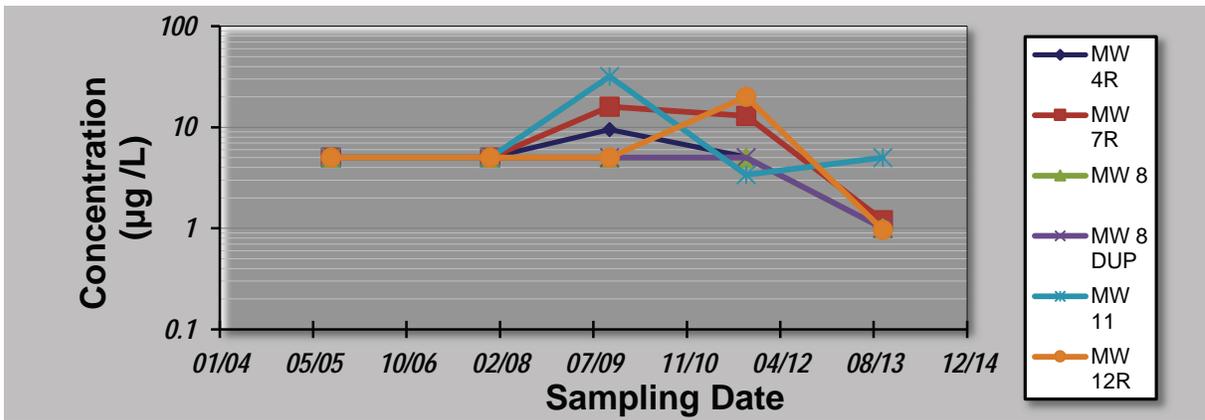


Figure 6: Lead Trends

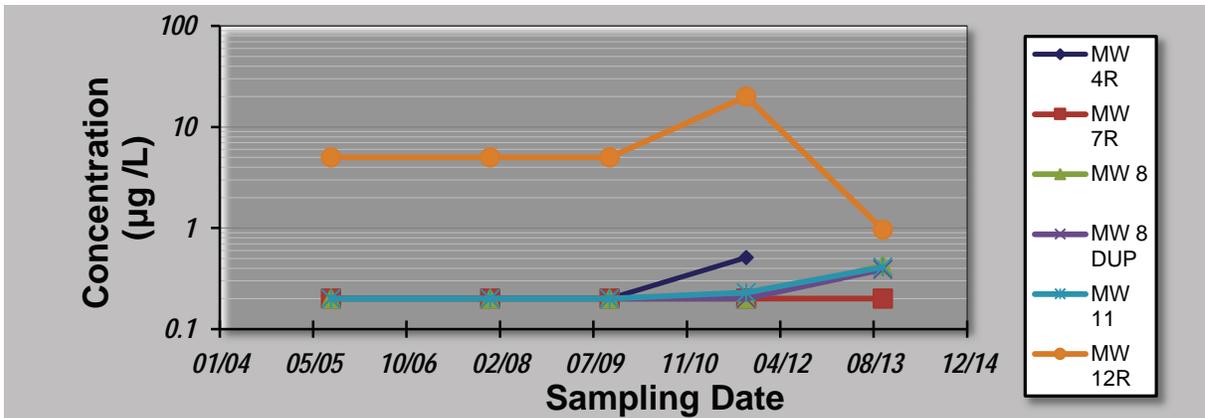
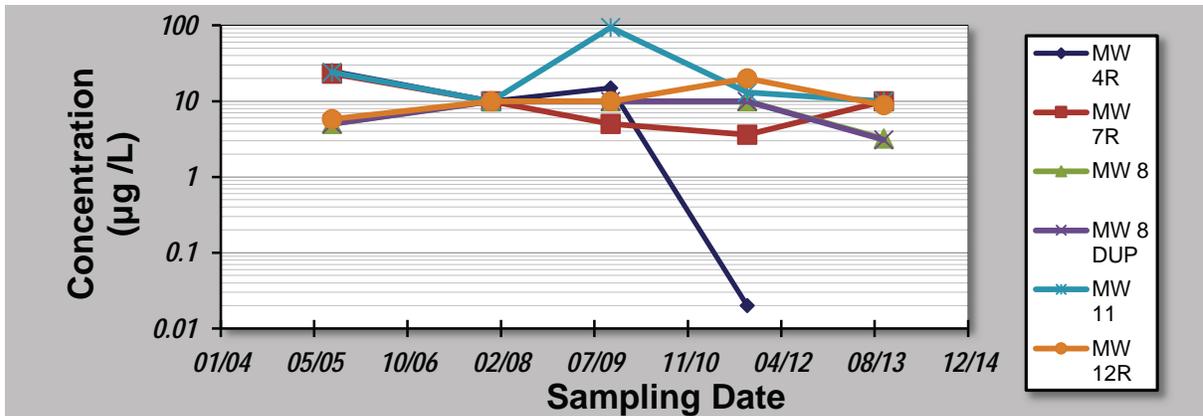
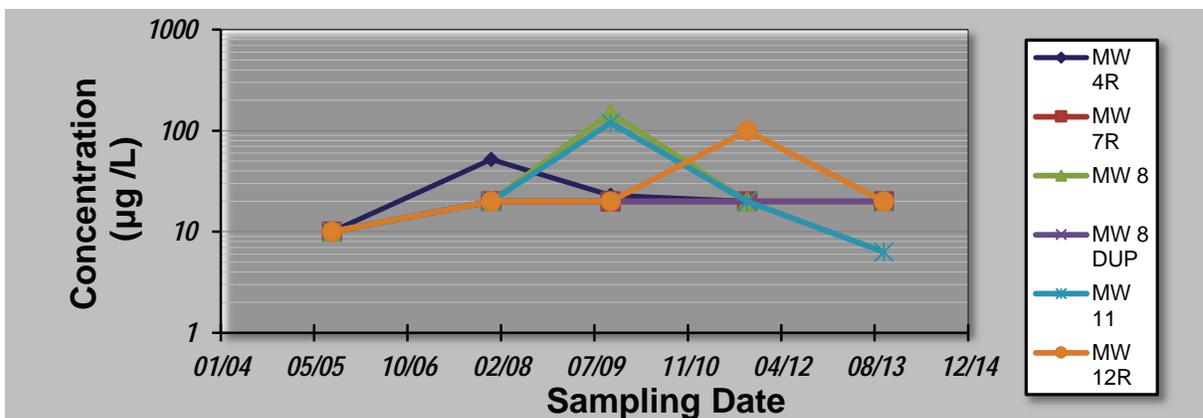


Figure 7: Mercury Trends



**Figure 8: Nickel Trends**



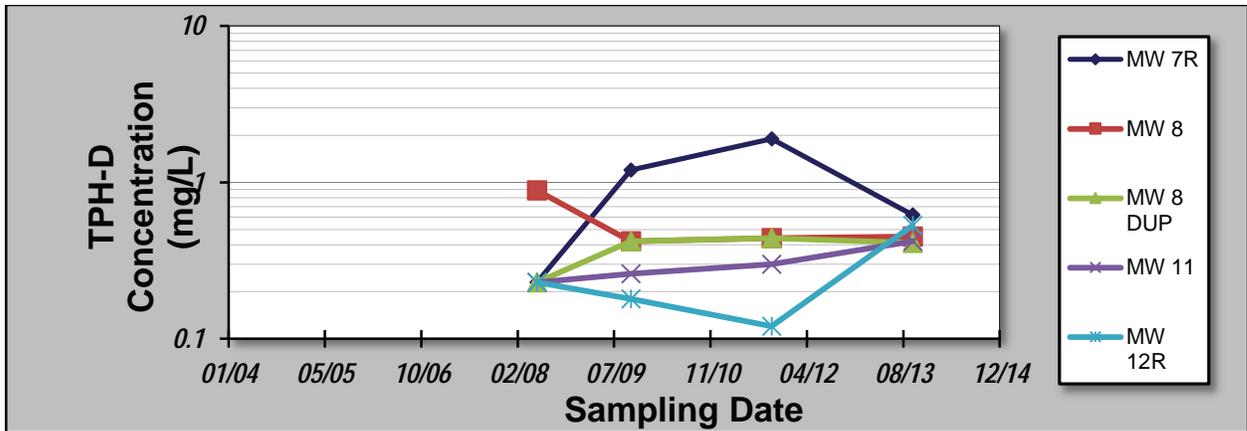
**Figure 9: Zinc Trends**

TPH-D has historically been detected in all groundwater monitoring wells. The data summary for TPH-D groundwater sampling results is presented in Table 8, and the Mann-Kendall trend analysis is shown in Figure 10. The analysis used TPH-D concentrations from 2008 to 2013. MW-4R and MW-13 were not included in the trend analysis because these wells were dry. For instances where the TPH-D concentration was below the detection limit, half of the detection limit was used in the trend analysis. For MW-7R, MW-8, and MW-12R, the results indicate that the trend is either stable or that no trend was detected. MW-11 showed an increasing trend (95.8 percent confidence factor). However, all levels of TPH-D used in the analysis were below the laboratory detection limit of 0.47 mg/L.

**Table 8. TPH-D Concentrations**

<b>Well</b>	<b>Date</b>	<b>TPH-D (mg/L)</b>
MW 4R	Jan-08	<0.47
MW 4R	Oct-09	0.97
MW 4R	Oct-11	1.5
MW 4R	Oct-13	dry
MW 7R	Jan-08	<0.47
MW 7R	Oct-09	1.2
MW-7R	Oct-11	1.9
MW-7R	Oct-13	0.62
MW 8	Jan-08	0.89
MW 8 DUP	Jan-08	<0.47
MW 8	Oct-09	0.42
MW 8 DUP	Oct-09	0.42
MW 8	Oct-11	0.44
MW 8 DUP	Oct-11	0.44
MW 8	Oct-13	0.45
MW 8 DUP	Oct-13	0.41
MW 11	Jan-08	<0.47
MW 11	Oct-09	0.26
MW 11	Oct-11	0.3
MW 11	Oct-13	0.42
MW 12R	Jan-08	<0.47
MW 12R	Oct-09	0.18
MW 12R	Oct-11	0.12
MW 12R	Oct-13	0.53
MW 13	Jan-08	<0.49
MW 13	Oct-09	NS
MW 13	Oct-11	0.25
MW 13	Oct-13	dry

Notes: mg/L = milligrams per liter  
DUP = duplicate sample  
R = replacement well



**Figure 10: TPH-D**

### 6.5. Site Inspection

The Site inspection was conducted on February 27, 2015, and included a walking survey of the vegetated cap. The inspection was conducted by Rachele Thompson, EPA; Jacinto Soto, DTSC; Roxanne Grillo, U.S. Army Corps of Engineers (USACE), and David Hodson of CH2M HILL for UPRR. O&M activities primarily consist of monthly or quarterly inspections of the overall property, checking for illegal dumping, trespassing, or damage to the property fence. Other O&M activities include biennial cap inspections and groundwater monitoring by UPRR’s consultant, CH2M HILL.

All access gates to the Site were found to be locked and in working condition. The team observed damage to the interior (nonperimeter) fence at the southernmost corner of the Site due to the growth of large pampas grass; however, the exterior (perimeter) fence still prevented access to the Site. The team observed some broken barbed wire at the top of the chain link interior (nonperimeter) fence in the southwest portion of the Site; however, the fence itself was still intact. A small portion of the vegetated cap slope extends beyond the fence. There was one very minor graffiti marking in white paint on the Site access gate. However, the team did not observe any other evidence of vandalism or trespassing such as trash or refuse. The team observed one bare spot in the vegetation covering the central portion of the cap, approximately six feet by six feet in size, but it did not appear to be eroding or depressed. This is a minor issue that does not appear to be negatively impacting the effectiveness of the vegetated cap. All active wells, including wells MW-4R, MW-7R, MW-8, MW-11, MW-12R, and MW-13, were located and inspected.

### 6.6. Interviews

During the FYR process, an interview was conducted with Site stakeholders. The purpose of the interview was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy that have been implemented. The interview was conducted during the Site visit on February 27, 2015, and is summarized below. The complete interview record is included in Appendix C.

Roxanne Grillo of USACE interviewed Mr. David Hodson of CH2M HILL, the project manager representing UPRR, during the Site visit. Mr. Hodson indicated that monthly or quarterly Site inspections are conducted to check for illegal dumping, trespassing, and damage to the property fence. The vegetated cover is functioning as designed. Biennial groundwater sampling is conducted, and the data show relatively low and stable contaminant concentrations. Mr. Hodson indicated that the remedy is performing as intended and gave no suggestions or recommendations for improvement.

## ***6.7. Institutional Controls***

The primary institutional control for the Site is a Covenant to Restrict Use of Property, recorded on September 13, 1995. A preliminary title report from 2010 noted the 1995 Covenant to Restrict Use of Property. The issue of fence alignment and ambiguous parcel numbers from the previous two FYRs has not been resolved. The deed restriction needs to be amended to include the slope component of the vegetated cap and comply with California Civil Code Section 1471 and California Code of Regulations Section 67391.1. No additional institutional controls are recommended.

# **7. Technical Assessment**

## ***7.1. Question A: Is the Remedy Functioning as Intended by the Decision Documents?***

Yes, the remedy is functioning as intended by the decision document.

The implied remedial objectives established for the Site included improving the ecological value of the sediments in the drainage channels leading to Hoffman Marsh, preventing off-site migration of contaminated soils and/or groundwater, and preventing exposure to residual contaminated soils.

The Site inspection indicated that the vegetative soil cover (cap) and perimeter fencing reduce the potential for off-site migration of soils, as well as human exposure to residual contaminated soils. Both the interior (non-perimeter) and exterior (perimeter) fencing are in good working order. The existing deed restriction provides further protection from human exposure to residual soil contamination by restricting residential development of the Site.

For most Site contaminants, chemical concentrations detected in groundwater samples are stable or show no increasing or decreasing trend. Mercury and TPH-D appear to be increasing in concentration at upgradient well MW-11. The 2013 biennial report noted that two wells are dry. Redevelopment of those wells, hydrologic conditions permitting, could provide more complete groundwater information during future monitoring events.

The main outstanding issue is that the perimeter fence, the edge of the vegetated cap, and the deed restricted area do not appear to be aligned in one small area along the southwest boundary. The discrepancy was identified years ago, and DTSC and UPRR are taking steps to find a solution, but have so far failed to resolve the issue.

## ***7.2. Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?***

Yes, the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection are still valid.

The remedy for the Site was risk-based, and no chemical-specific ARARs were identified for soil or groundwater in the ROD. The RI established that groundwater did not meet the definition of a potential drinking water source due to elevated salinity caused by tidal influence. Therefore, drinking water Maximum Contaminant Levels do not apply. The human health risk assessment stated that the carcinogenic risks at the Site were within EPA's acceptable risk range. The vegetative cap is in place and in good condition and prevents exposure to contaminated soils. The deed restriction prevents residential usage. No complete pathways exist to pose a risk to any receptors.

Action-specific ARARs identified in the ROD as relevant and appropriate in carrying out remedial actions (capping, grading, sediment excavation) were the closure requirements of the California Hazardous Waste Control Law and the Coastal Zone Management Act. Construction at the Site complied with these ARARs.

## ***7.3. Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?***

No additional information has been identified that would call into question the protectiveness of the remedy.

## ***7.4. Technical Assessment Summary***

According to the data reviewed, the remedy is functioning as intended by the ROD. There have been no changes in the physical condition of the Site that would affect the protectiveness of the remedy. Occasional trespassing is not completely preventable, but the increased frequency of Site inspections since 2011 has improved Site security. The RI risk evaluation indicated that risks to occasional trespassers were within an acceptable range. Concentrations of mercury and TPH-D may be increasing in upgradient monitoring well MW11, which should be investigated further if they continue to increase. The remaining issues are related to the alignment of the fence with the edge of the cap and the property boundary. The discrepancy has been noted many times before but UPRR's efforts to resolve the issue have so far been ineffective.

# **8. Issues**

Current issues for the Site are summarized in Table 9.

**Table 9. Current Issues for the Site**

Issue	Affects Current Protectiveness (Yes or No)	Affects Future Protectiveness (Yes or No)
The fence realignment issue identified in the previous FYR is not resolved.	No	Yes
The deed restriction does not comply with current California regulations.	No	Yes

## 9. Recommendations and Follow-up Actions

Recommendations to address the current issues at the Site are presented in Table 10.

**Table 10. Recommendations to Address Current Issues at the Site**

Issue	Recommendations/ Follow-up Actions	Party Responsible	Over-sight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
The fence realignment identified in the previous FYR is not resolved.	Complete the fence realignment to fully enclose the vegetated cap inside the perimeter fence.	UPRR	EPA/ DTSC	2016	No	Yes
The deed restriction does not comply with current California regulations.	Once the property boundary issue has been resolved, update the deed restriction.	UPRR	EPA/ DTSC	2017	No	Yes

An informal recommendation is to perform a more detailed inspection of wells MW-4R and MW-13. Although they may be seasonally dry due to natural conditions, a TV inspection with a downhole camera might be in order to determine the condition of the well screens. Also, it was noted during the 2013 inspection that the top 2 feet of PVC pipe was not secured to the well casing.

## 10. Protectiveness Statement

The remedy at the Liquid Gold Oil Corporation Site currently protects human health and the environment because all immediate threats at the Site have been addressed through the removal of contaminated material, stabilization and capping of on-site contaminated soils, access restrictions (fencing, warning signs), regular maintenance of engineered control structures, and institutional controls (deed restriction) that restrict land use. However, in order to ensure long-term protection of human health and the environment, Union Pacific Railroad must complete the fence realignment project to completely enclose the vegetated cap within the fence, and revise the deed restriction to ensure that it is consistent with California regulations and covers the appropriate Site area.

## 11. Next Review

This Site requires ongoing FYRs as long as waste is left at the Site that does not allow for unlimited use and unrestricted exposure. The next statutory FYR will be due within five years of the signature date of this FYR.

# Appendix A

## List of Documents Reviewed

- California Department of Transportation (DOT). 1978. Groundwater Investigation for the Richmond Semi-Depressed Section. Caltrans Report No. -04-CC-17City of Richmond. 2013. South Shoreline Specific Plan: Existing Conditions.
- City of Richmond. 2014. South Shoreline Specific Plan: Recommended Land Use Map.
- CH2M HILL. 2013. Addendum to Revised Soil Investigation to support Fence Realignment at the Liquid Gold Site, Stege Property, Richmond, California.
- CH2M HILL. 2013. 2013 Biennial Groundwater Monitoring Event former Liquid Gold Site Richmond, California.
- CH2M HILL. 2012. 2011 Biennial Groundwater Monitoring Event Former Liquid Gold Site Richmond, California.
- Ecology and Environment. 1983. Plan for Soil and Groundwater Investigation Southern Pacific Transportation Company Stege/Liquid Gold Site, Richmond, California.
- Ecology and Environment. 1984. Site Investigation of the Southern Pacific Stege Lease/Liquid Gold Site in Richmond, California.
- Environmental Resources Management. 2005. Union Pacific Railroad Company Second Five-Year Review Report Liquid Gold Site Richmond, California.
- EPA. 1993. EPA Superfund Record of Decision: Liquid Gold Oil Corp. EPA ID: CAT00064208 Ou1 Richmond, CA. EPA/ROD/R09-93/091 1993
- EPA. 2002. Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California. *Federal Register*/Vol. 65:, No. 97 (Thursday, May 18, 2000) Rules and Regulations. May 18.
- Helley. E.J., K.R. LaJoie, W.E. Spangle, and M.L. Blair. 1979. Flatland Deposits of the San Francisco Bay Region, California: Their Geology and Engineering Properties and Their Importance to Comprehensive Planning, U.S. Geological Survey Professional Paper No. 943.
- Kennedy/Jenks Consultants. 1993. Draft Remedial Investigation/Feasibility Study Plan Liquid Gold Site, Richmond, California.
- Kennedy/Jenks Consultants. 1990. Final Remedial Investigation Report Liquid Gold Site, Richmond, California.
- Kennedy/Jenks Consultants. 1993. Draft Remedial Action Plan Liquid Gold Site, Richmond, California.
- Schlocker, J. 1974. Geology of the San Francisco North Quadrangle, California. U.S. Geological Survey Professional Paper No. 782.

# Appendix B

## Press Notice



### **PUBLIC NOTICE** **The Fourth Five-Year Review of the Cleanup** **at the Liquid Gold Oil** **Corporation Former Superfund Site Begins**

The California Department of Toxic Substances Control (DTSC) and the United States Environmental Protection Agency (EPA) have begun the Fourth Five-Year Review (FYR) for the former Liquid Gold Oil Corporation Superfund Site (Site) located in Richmond, CA. DTSC is the lead agency responsible for overseeing the remaining environmental investigations and cleanup actions at the Site. The purpose of this review is to confirm that cleanup actions at the Site continue to be protective of human health and the environment.

#### **The Review Process**

The primary purpose of a FYR is to determine whether the Site's remedy remains protective of human health and the environment. EPA generally conducts FYRs when hazardous substances remain above risk-based levels that prevent unrestricted use and exposure. As part of the review, EPA will be looking at how well the remedy is achieving EPA's cleanup goals, changes in scientific knowledge about site contaminants, changes in potential risks, and changes in regulations. Three previous reviews were completed at this Site in 2000, 2005, and 2010.

#### **Site History**

The Site is part of an approximately 40-acre parcel that was previously owned by Southern Pacific Transportation Company, but is now owned by Union Pacific Railroad Company. Approximately 2.1 acres are capped within a 7.5 acre deed-restricted area. Liquid Gold leased the property from 1965 until 1982, and stored waste oils and solvents in tanks on the Site. Investigations conducted in the 1970s by the California Department of Health Services (now DTSC) and the San Francisco Bay Regional Water Quality Control Board documented releases of hazardous substances onto the ground and into ponds, sumps, and ditches. Consequently, the Site was listed on the California State Superfund List in January 1983, and added to EPA's National Priority List (NPL) in September 1983. The final remedy included excavating contaminated material from the drainage channels, and constructing a vegetated soil cap to cover these soils and sediments. In addition, a deed restriction prohibiting residential development at the Site was signed and recorded. These remedial activities were completed in 1995, although maintenance of the cap and monitoring is ongoing. The Site was deleted from EPA's National Priority List in September 1996.

#### **Get Involved**

If you have any concerns about the Liquid Gold Site, and particularly if you have direct knowledge regarding the operation and maintenance of the remedy, then EPA and DTSC would like to talk with you. If you are interested in being interviewed, please contact Jackie Lane, EPA Community Involvement Specialist, at (415) 972-3236 or [lane.jackie@epa.gov](mailto:lane.jackie@epa.gov) to make an appointment before January 31, 2015. If you have questions about the Site you can also contact the DTSC Project Manager Lynn Nakashima at (510) 540-3839 or [Lynn.Nakashima@dtsc.ca.gov](mailto:Lynn.Nakashima@dtsc.ca.gov). The Five-Year Review report is scheduled to be completed by September 2015 and will be available at the Richmond Public Library and online at [www.epa.gov/region09/LiquidGold](http://www.epa.gov/region09/LiquidGold).

CNSB#2689685

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# Appendix C:

## Interview Forms

Five-Year Review Interview Record				
<b>Site:</b>	Liquid Gold Oil Corporation Superfund Site, Richmond, CA		<b>EPA ID No:</b>	CAT000646208
Interview Type: Site Visit Location of Visit: Liquid Gold Oil Corporation Superfund Site, South 51 <sup>st</sup> Street, Richmond, CA Date: 27 February 2015 Time: 12:00 pm				
Interviewers				
<b>Name</b>	<b>Title</b>		<b>Organization</b>	
Roxanne Grillo	Physical Scientist		USACE-SPN	
Interviewees				
<b>Name</b>	<b>Organization</b>	<b>Title</b>	<b>Telephone</b>	<b>Email</b>
David Hodson	CH2M HILL	Project Manager	(510) 316-2323	David.Hodson@ch2m.com
Summary of Conversation				
<p>1) What is your overall impression of the project? The current state of the project is as it is anticipated to be.</p> <p>2) Is the remedy functioning as expected? How well is the remedy performing? The remedy is functioning as intended.</p> <p>3) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing? The groundwater monitoring data shows relatively low and stable contaminant concentrations.</p> <p>4) Is there a continuous O&amp;M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities. O&amp;M consists of biennial cap inspections by Union Pacific Railroad's consultants, CH2M HILL. There are also frequent (monthly to quarterly) inspections of the overall property conducted by United Pumping Service, Inc., that specifically check for illegal dumping, trespassing, and damage to the property fence by Union Pacific Railroad's contractor.</p> <p>5) Have there been any significant changes in the O&amp;M requirements, maintenance schedules, or sampling routines in the last five years? If so, do they affect protectiveness of the remedy? Please describe changes and impacts. No.</p> <p>6) What are the annual operating costs for your organization's involvement with the site? The costs for CH2M HILL's activities are approximately \$8,000 per year. The majority of this cost can be attributed to groundwater monitoring activities. United Pumping Service, Inc's activities are approximately \$1,000 for site inspections of the entire property (including the Liquid Gold Oil Corporation Superfund Site).</p> <p>7) Have there been unexpected O&amp;M difficulties or costs at the site in the last five years? If so, please give details. No.</p> <p>8) Have there been opportunities to optimize O&amp;M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency. No.</p> <p>9) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the remedy? No.</p> <p>10) Do you have any comments, suggestions, or recommendations regarding the project? No.</p>				
Additional Site-Specific Questions				
<i>[If needed]</i>				







<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
	Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Type of monitoring ( <i>e.g.</i> , self-reporting, drive by) <u>On-foot Site Inspections</u>		
	Frequency <u>Monthly-Quarterly and Biennial</u>		
	Responsible party/agency <u>United Pumping Service, Inc., for Union Pacific Railroad; biennial reports are prepared by CH2M HILL for Union Pacific Railroad</u>		
	Contact <u>Bob Rico</u> <u>Sales Representative</u>		
	<u>bobrico@unitedpumping.com</u>		
	Name	Title	Email
	Reporting is up-to-date <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	Reports are verified by the lead agency <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	Specific requirements in deed or decision documents have been met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
	Violations have been reported <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
	Other problems or suggestions: <input type="checkbox"/> Report attached		
	<u>Please see #2 Adequacy below.</u>		
2.	<b>Adequacy</b>	<input type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
	Remarks: <u>All institutional controls are adequate except for the following:</u>		
	<u>The team observed a small portion of the vegetated cap that continues to extend outside of the fence. It appears that the slope area of the cap is outside of the fence. Because of the location of this area (no roads or paths nearby), the likelihood of exposure to the public is small. This was a known issue prior to the 2015 Site inspection, and it was noted in the 2010 FYR Report. Mr. Hodson indicated that the Union Pacific Railroad is currently undergoing lengthy negotiations to complete a land swap transaction to remedy this issue. Because the Union Pacific Railroad does not own or have an encroachment permit to access to this property yet, the deed restriction has not yet been updated to include the specific parcel number of this area.</u>		
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident
	Remarks: <u>There was one very minor graffiti marking in white paint on the Site access gate. However, the team did not observe any other evidence of vandalism or trespassing on Site (such as trash, refuse, or other vandalism).</u>		
	<u>Outside of the Site, along the access road, the team observed a hole in the fence that was covered by an old pallet. The adjacent property owner may have installed this pallet. The hole in this fence does not affect access to the Superfund Site area.</u>		
2.	<b>Land use changes on site</b>	<input checked="" type="checkbox"/> N/A	
3.	<b>Land use changes off site</b>	<input checked="" type="checkbox"/> N/A	
<b>VI. GENERAL SITE CONDITIONS</b>			
	<b>A. Roads</b>	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Roads damaged</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A
	Remarks: <u>There are no paved roads within the Site boundaries. Mr. Hodson indicated that this Site only experiences very infrequent vehicular traffic. There is one paved road that leads to the Site, and it appeared to be in good condition.</u>		

VII. <del>LANDFILL COVERS</del> VEGETATED CAP (NOT LANDFILL) <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
<b>A. <del>Landfill Surface</del> Vegetated Cap Surface</b>		
1.	<b>Settlement</b> (Low spots) Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Settlement not evident
2.	<b>Cracks</b> Lengths _____ Widths _____ Depths _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident
3.	<b>Erosion</b> Areal extent _____ Depth _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident
4.	<b>Holes</b> Remarks <u>The team observed an abandoned Site groundwater monitoring well that may have caved in near Well MW-21 on the Site map (outside of the vegetated cap area). This is a minor issue that does not appear to be negatively impacting the effectiveness of the vegetated cap. Mr. Hodson stated that this would be fixed during United Pumping Service's next Site inspection.</u>	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Holes not evident
5.	<b>Vegetative Cover</b> Remarks <u>Large pampas grasses, generally greater than 5 feet tall, are located throughout the vegetative cap preventing a thorough inspection of the cap.</u>  <u>Additionally, the team observed one bare spot in the central portion of top of the cap that measured approximately 6 feet by 6 feet. This area did not appear to be eroding or depressed. This is a minor issue that does not appear to be negatively impacting the effectiveness of the vegetated cap.</u>	<input checked="" type="checkbox"/> Grass <input checked="" type="checkbox"/> Cover properly established <input checked="" type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram)
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks _____	<input checked="" type="checkbox"/> N/A
7.	<b>Bulges</b> Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Bulges not evident
8.	<b>Wet Areas/Water Damage</b> Remarks <u>There was a wet area northwest of the cap that was used previously for staging and stockpiling materials during the pistol range remediation. This area is surrounded by old silt fence and consists of very compact, somewhat impermeable soil.</u>  <u>Additionally, the team observed ponding in the easternmost area of the Site, outside of the vegetated cap area. The team observed scrap concrete and one feral cat in this area.</u>  <u>Lastly, the team observed ponding in an area west of the vegetated cap. In the documentation for previous FYR reports, this area has been referred to as a low spot</u>  <u>None of the observed areas listed above appear to be negatively impacting the effectiveness of the vegetated cap.</u>	<input checked="" type="checkbox"/> Wet areas/water damage not evident <input checked="" type="checkbox"/> Wet areas <input checked="" type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____
9.	<b>Slope Instability</b> Remarks _____	<input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No evidence of slope instability

<b>B. Benches</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
<b>C. Letdown Channels</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
<b>D. <del>Cover</del> Vegetated Cap Penetrations</b>	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1. <b>Gas Vents</b>	<input checked="" type="checkbox"/> N/A	
2. <b>Gas Monitoring Probes</b>	<input checked="" type="checkbox"/> N/A	
3. <b>Monitoring Wells</b> (within surface area of vegetated cap)	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs Maintenance
	<input checked="" type="checkbox"/> Routinely sampled	<input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> N/A	
Remarks: Only two out of six total groundwater monitoring wells are located within the vegetated cap area (MW-4R and MW-7R).		
4. <b>Leachate Extraction Wells</b>	<input checked="" type="checkbox"/> N/A	
5. <b>Settlement Monuments</b>	<input checked="" type="checkbox"/> N/A	
<b>E. Gas Collection and Treatment</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>F. Cover Drainage Layer</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>G. Detention/Sedimentation Ponds</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>H. Retaining Walls</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>I. Perimeter Ditches/Off-Site Discharge</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>VIII. VERTICAL BARRIER WALLS</b>		
	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		
	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>C. Treatment System</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
<b>D. Monitoring Data</b>		
1. Monitoring Data (Groundwater)	<input checked="" type="checkbox"/> Is routinely submitted on time	<input checked="" type="checkbox"/> Is of acceptable quality
2. Monitoring data suggests:	<input type="checkbox"/> Groundwater plume is effectively contained	<input type="checkbox"/> Contaminant concentrations are declining
<b>D. Monitored Natural Attenuation</b>		
1. <b>Monitoring Wells</b> (natural attenuation remedy)	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning
	<input checked="" type="checkbox"/> All required wells located	<input type="checkbox"/> Needs Maintenance
	<input checked="" type="checkbox"/> Routinely sampled	<input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> N/A	
Remarks: All active wells were observed: MW-4R, MW-7R, MW-8, MW-11, MW-12R, and MW-13.		

<b>X. OTHER REMEDIES</b>	
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.	
<b>XI. OVERALL OBSERVATIONS</b>	
<b>A.</b>	<b>Implementation of the Remedy</b>
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).	
<u>The remedy at the Liquid Gold Oil Corporation Superfund site included removal of sediments and debris from two drainage channels; grading, addition of soil, and seeding to create a vegetative cap to encapsulate contaminated soils; groundwater monitoring; and a deed restriction prohibiting residential development. During the 2015 site inspection, the cap appeared to be in good condition, and the fencing was intact. However, the team observed a small portion of the vegetated cap (the slope area) that continues to extend outside of the fence. This was a known issue prior to the 2015 Site inspection, and it was noted in the 2010 FYR Report. Mr. Hodson indicated that the Union Pacific Railroad is currently undergoing lengthy negotiations to complete a land swap transaction to remedy this issue. Once Union Pacific Railroad owns or holds an encroachment permit to access this property, the deed restriction needs to be updated to include the specific parcel number of this area.</u>	
<b>B.</b>	<b>Adequacy of O&amp;M</b>
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>No disturbance to the vegetated cap was observed and the Site fencing was functioning as intended. Monitoring appears to adequately address minor issues, such as fence repairs, as they arise.</u>	
<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>Large pampas grasses that are generally greater than 5 feet tall have grown throughout the vegetated cap area and are preventing a thorough inspection of the cap. One upgradient monitoring well may show signs of increasing mercury and TPH-d trends.</u>	
<b>D.</b>	<b>Opportunities for Optimization</b>
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>No opportunities for optimization are identified at this time.</u>	

# Appendix E:

## PHOTOGRAPHS FROM SITE INSPECTION VISIT

Photographs were taken during the Site visit on February 27, 2015.



Photograph 1 (taken facing east): Most Exterior Access Gate to the Property from South 51<sup>st</sup> Street



Photograph 2, (taken facing east): Third Locked Gate along the Access Road Sometimes referred to as an interior (nonperimeter) gate to access the Site.



Photograph 3, (taken facing northeast): Sea Fig Plants Growing at the Base of the Fence along Interstate Highway 580



Photograph 4 (taken facing northwest): Side Slope of the Vegetated Cap  
An example of the pampas plants that have grown throughout cap area.



Photograph 5 (taken facing southeast): Ponded Area in the Easternmost Area of the Site,  
Outside of the Vegetated Cap Area



Photograph 6 (taken facing north): Ponding in an Area West of the Vegetated Cap  
This area has been referred to as a low spot in the documentation for previous Five Year Review reports.



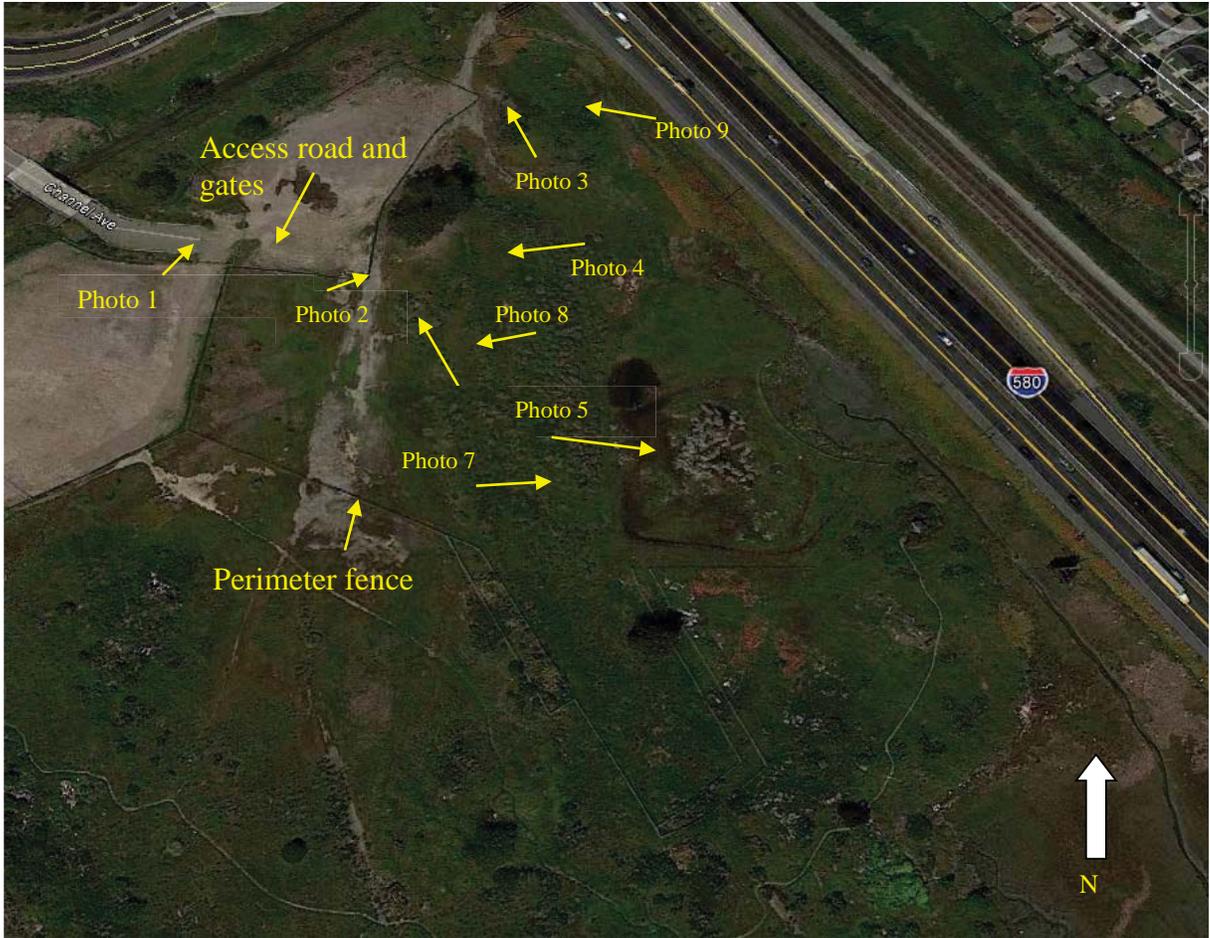
Photograph 7: The Bare Spot in the Central Portion of the Top of the Cap, Measuring Approximately 6 by 6 Feet



Photograph 8: An Abandoned Site Groundwater Monitoring Well That May Have Caved in Near Well MW-21 Outside of the vegetated cap area.



Photograph 9: Well MW-11  
All active wells were observed. All active wells were locked and in good condition.



**Site Visit Approximate Photograph Locations**