

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>SELBY SLAG</u>	ProjectID: 09-05
Last Updated:	12/29/99	
City:	Selby	
County:	Contra Costa	
State:	CA	
Country:	USA	
Bodies of Water:	Carquinez Strait; San Pablo Bay; San Francisco Bay	
US EPA Region:	IX	
Status (Active, Complete, or Monitoring Only):	Complete	
Date On NPL:	N/A	
ROD/ESD Date:	N/A	
Operable Unit:	N/A	
Areas of Concern (length or acres):	Nearshore sediment area of about 17 acres fronting on 61.5 acres of shoreline property and extending out into the water a maximum of 280 feet.	
Other Characteristics of Water Body:	Across the 17 acres, water depths ranged from 2 to 35 feet.	
Contaminants of Concern:	lead	
Source of Contamination:	<p>Site investigations in the 1980s showed that slag, a waste material from previous smelting operations, lay both on- and off-shore at the site. The slag waste contained varying concentrations of metals, including lead, zinc, arsenic, mercury, chromium, copper and cadmium. Sulfuric acid was also present in soils in the eastern portion of the property, at the former location of an acid plant used to store acidic by-products of the smelting operation.</p> <p>The slag was deposited on-site by the American Smelting and Refining Company (ASARCO) between 1886 and 1970. Slag was deposited on upland areas owned by ASARCO as well as tideland areas owned by the California State Lands Commission. During the period from 1971 through 1976, Virginia Chemicals, Inc., reportedly operated the acid plant, refining and selling the "waste" sulfuric acid to industrial customers. Wickland Oil Company purchased the portion of the site owned by ASARCO in 1977 and leased the portion of the site owned by the California State Lands Commission in 1981.</p>	
Contaminated Area Physical Characteristics:	<p>Lead concentrations in the top six inches of sediment in the 17-acre nearshore area ranged from 14 to 320 ppm, based on three 1981 core samples and six 1987 core samples. Maximum lead concentrations below six inches, based on these same core samples, were 160 ppm at zero to one foot depth and 130 ppm at one to two foot depth. Below two feet, of the 22 interval samples from these same nine cores, two exceeded 100 ppm lead (120 and 140 ppm, respectively).</p> <p>Based on sample data, a 2-2.5 foot sediment removal depth was targeted for the great majority of the 17-acre nearshore area.</p> <p>Sediments ranged from silty clay to fine and medium sand. Sandier sediments were primarily located in the upper few feet of sediments. There was reportedly no discernible correlation between sediment type and lead concentration.</p>	
Type of Regulatory Action:	Interim Remedial Measures approved by the California EPA's Department of Toxic Substances Control	

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Overall Status Summary:

A nearshore marine area of about 17 acres in the Carquinez Strait (California) adjacent to the Selby Slag site was mechanically dredged in late 1991 as an Interim Remedial Measure. A volume variously reported as between 92,500 and 110,000 cubic yards was removed, deposited onsite, spread and dried, and incorporated into a site-wide cap. The contaminants of concern were metals originating from onsite slag waste. The dredging was accomplished to pre-designated depths based on characterization data, with the intent of achieving lead levels of less than 50 ppm.

Remedial Action Planned:



Risk Assessment:



Remedial Action Implemented:



Status of Dredging



PRPs:



Contacts:



References:



Modeling:



Fishing Advisory:



Key Conditions:

dredge spoil reuse/fill, dredging, specialty dredge, tidal fluctuations

REMEDIAL ACTION PLANNED

Project Name	<u>SELBY SLAG</u>	ProjectID: 09-05
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Target Sediment Cleanup Standards (TSCS):	50 ppm lead	
How TSCS Established:	Uncertain. Fragmentary information from References A-464 and A-465 implies that lead concentrations in off-shore sediments "exceed levels determined to be harmful to marine life" and that 50 ppm lead "is the lead background concentration around San Pablo Bay."	
Target Bank and Floodplain Cleanup Levels (if applicable):		
Other Target:		
Environmental Sample Data References:	<ul style="list-style-type: none">• Sediment: Reference A-464• Water:• Fish:	
Estimated Target Volume:	70,000 cy (Reference A-464)	
Planned Disposal Method:	Holding ponds, constructed on 15-acres of land adjacent to the site based on the assumption that the lead-contaminated sediments would not be legally hazardous (Reference A-464). Subsequently, this approach was changed (when the change was made was not determined) and the selected method was to deposit the dredge spoils onto the 61.5 acre site and incorporate them into a site cap.	
Estimated Calendar Time to Implement Remedy:		
Estimated Time to Implement Remedy:	Not Identified	
Estimated Cost to Implement Remedy:	Not Identified	
Stated Remedial Action Objectives (and Source):	Not Identified	
Measures of Success to be Used:	Not Identified	
Planned Monitoring and Restoration:	Participation in the California Mussel Watch program before remediation, to monitor intake of heavy metals by shellfish. Seven stations were deployed in the vicinity of the Selby Slag site in 1987 (Reference A-464). Results not yet obtained and other programs for before and after remediation not identified.	
Agency Position on Sediment Removal (and Source):	Not Identified	

REMEDIAL ACTION IMPLEMENTED

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Physical Target: Nearshore sediment area of about 17 acres, a marine location in the Carquinez Strait.

Goals: Apparently removal of sediments to pre-designated depths to achieve less than 50 ppm lead.

Primary Contractor: Davy Environmental

Other Contractors: Delta Dredging; Levine-Fricke (investigations and construction oversight).

Generic Remediation Method: Mechanical dredging

Equipment: Barge-based environmental clamshell bucket. The 8 cubic yard bucket consisted of a conventional clamshell with neoprene rubber seals around the bucket edges and a steel and rubber shroud over the top of the bucket.

Material Handling: As described in Reference A-465, before beginning dredging a former wharf structure was removed. To control floating debris, a containment boom was placed around the wharf. Occasionally, channel traffic would generate a wake, causing a gap between the containment boom and the water; floating debris that entered the waterway through such breaches was recovered using a small motorized skiff. The wharf was then demolished and its wooden pilings were removed. The asphalt covering the wharf was removed using the bucket of a front-end loader, and the asphalt material was mixed with on-site soils. The wharf timber was demolished using two excavators equipped with claw buckets, and was subsequently hauled off site and disposed of at the BFI Landfill in Livermore, California, a state-certified, Class III landfill.

The majority of the dredging was conducted using one 8 cy environmental bucket. A second 6 cy bucket was operated simultaneously during one week in October 1991. Between 92,500 and 110,000 cy of sediments were dredged and placed on site.

Dredging started on September 5, 1991 and was concluded on November 7, 1991. The dredging schedule was typically two shifts per day (0700 to 2300 hours), five days per week. Over the 33 days of contract dredging with the 8 cy environmental bucket, removal rates ranged from 103 to 242 cy/hour, with an average removal rate of 186 cy/hour. Removal rates were lower during eight additional days of extra "finish" dredging with a smaller bucket after the completion of contract dredging.

The dredged sediments were placed inland of a shoreline berm, in a manner consistent with applicable permit requirements. Placement was either from a barge, or directly by the clamshell bucket, depending upon the proximity of the dredge to the shore. Earthmoving equipment was used to push the material at least 100 feet from the shoreline within 72 hours of its deposition. The contractor spread the on-site dredge material across the site, and then aerated and dried the material using a bulldozer equipped with an agricultural disc. After drying, the material was placed in successive lifts and compacted in place. Once design elevation was achieved, the last lift of compacted fill was smooth-drum-rolled and finish graded to within specified tolerances. Up to five lifts of dredged materials were placed in some areas of the site. The final thickness of this compacted layer ranged up to 5 feet.

After placement of the dredged material, earthmoving equipment was used to transport and place slag from Slag Piles A and B in lifts across the site. Compactors were used to break up and compact the slag to meet compaction and sizing specifications. Once the design elevation was achieved, the slag was smooth-drum-rolled and finish graded. Up to three lifts of slag were placed across the site. The final thickness of this layer was a minimum of 16 inches.

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	A top layer of oil prime coat followed by asphalt was then placed.	
Volume Removed:	92,500 cy - 110,000 cy (the contractor's daily logs report the lower volume; Reference A-465 reports, variously, 98,000 cy or 110,000 cy).	
Calendar Time:	A breakdown of the sediment-related work: (a) wharf demolition and pile removal, 7/22/91 to 8/28/91; (b) dredging, 9/5/91 to 11/7/91; (c) onsite drying and spreading of dredged material, 9/5/91 to 12/26/91 and 4/30/92 to 6/23/92.	
Time To Implement:	July 22, 1991 to June 23, 1992 (refer to "Calendar Time")	
Total Cost:	About \$2.1 million; about \$19 to \$22 per cy.	
Dredging Cost:	Not Identified	
Disposal of Sediment:	Onsite, as fill. Refer to description in "Material Handling" (above).	
Volume of Water:	A 150 foot by 200 foot by 3.5 foot deep dredge water containment pond was constructed with native material. It was not subsequently used for its intended purpose when it became apparent that little free water was generated from the dredged sediments. Accordingly, dredge water accumulation for discharge was eliminated, which required modifications to several aspects of the sampling plan. Parts of the sampling plan were therefore not conducted, including the analysis of water and sediment samples in the containment area, sampling effluent and receiving water quality, and a dilution study analysis.	
Method of Water Treatment:	None	
Water Discharge Limit:	Not Identified	
Air Monitoring During Remediation:	<p>Three stationary and one mobile high volume air samplers were placed along the inland boundaries of the site. Two samplers were placed in upwind locations, and two were placed in downwind locations. When a new phase of activities commenced, the air samplers were operated three times per week for the first two weeks. Following this initial period, the air samplers were operated once per week. The samplers were operated each day of work during slag moving activities. Samplers were operated for approximately 8-hour periods. High volume air samples were analyzed for arsenic, cadmium, lead, and zinc by a state-certified laboratory. This program was more directed at onsite material handling activities, as opposed to dredging activities. Raw data results are presented in Reference A-465, but are not interpreted. Reference A-465 does report that metals in ambient air samples "were generally at or near nondetectable concentrations."</p> <p>One day during each week of construction, personal air-monitoring devices were attached to project workers and were operated for an eight-hour period. The contractor calibrated and distributed personal air monitors, and calculated air flow rates for used monitors. Samples were analyzed for arsenic, cadmium, lead, and zinc by a state-certified laboratory. At the beginning of a new phase of activities in which affected soils were handled, air monitoring samples were collected twice per week. It is not clear whether this was done for project workers associated with the dredging activities. Reference A-465 reports that "the personal air-monitor samples usually contained detectable concentrations of the three metals, but they were generally at least one order of magnitude less than the allowable OSHA standard for an 8-hour day."</p>	
Water Monitoring During Remediation:	As described in Reference A-465: "Levine Fricke conducted a dredge monitoring program during dredging activities . . . in accordance with Levine Fricke's Self-Monitoring Plan to Evaluate the Effects of Proposed Dredging of Metal-Affected Sediments. This program was designed to evaluate the effects of dredging on bay water quality and biota and to aid Regional Water Quality	

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Control Board staff in developing future dredging criteria for chemically affected offshore sediments."

"The dredge monitoring program consisted of collecting water samples daily from two sides of the dredge and analyzing these samples for settleable matter, total suspended solids, pH (three times per week), and cadmium, lead, nickel, and zinc (once per week)." (A third, background, sample was also collected each day.) "To evaluate the effects of the dredging on the biota of the Bay, a mussel study was conducted in the dredged area. Jenkins, Sanders & Associates, of Long Beach, California, deployed four mussel bag stations at locations near and away from the dredging operation. Mussel samples were analyzed for arsenic, cadmium, mercury, lead, nickel, and zinc. Results of water sampling and the mussel study are presented in Levine Fricke's dredge monitoring report." (A copy of this report has not yet been obtained.)

From a review of daily construction logs (attached as appendices to Reference A-465), it is apparent that this was a simplistic monitoring program with little relevance to measuring releases from the dredging activities. A turbidity limit of one ml of settleable material per liter was set, as measured using an Imhoff cone. This limit was frequently exceeded at low tide, when the dredge was operating in shallow water. No apparent corrective action was implemented.

Outcome:

A volume of between 92,500 to 110,000 cy were removed from a 17-acre marine nearshore area using mechanical dredging. The target was apparently to achieve less than 50 ppm lead, but it is not clear if this target was achieved. Sediment verification samples were not collected as dredging progressed. Dredging was apparently to pre-designated depths set based on characterization data. A pre- during, and post-remediation monitoring program using mussels was implemented, but documentation with results has not yet been obtained.

Restoration and Post-Monitoring:

No restoration of dredged areas was implemented. According to Reference A-465, a post-dredging monitoring program was designed to include:

- (a) A mussel bioaccumulation study to determine the effect of the IRMs on controlling the availability of metals to biota in the area near the shore.
- (b) Collection and analysis of off-shore sediment samples to assess the effect of the IRMs on Bay sediment quality; and
- (c) Collection and analysis of bay water samples to determine the effectiveness of the IRMs on bay water quality.

Annual monitoring was to be performed for 3 to 5 years (1993 - 1997). Annual reports have not been obtained and reviewed.

Site-Specific Difficulties:

- Numerous pilings were encountered during the dredging process, requiring removal using the clamshell bucket, and slowing the dredging. About 333 such embedded pilings were encountered and removed.
- Both cables on the spreader bar, and the bar itself, broke while pulling on a piling, causing the environmental clamshell bucket to be lost on the bottom. The bucket was located by a diver, was retrieved with slings, and was repaired, causing two days delay.
- At low tide in shallow water the dredge tended to rock against the bottom as the dredge boom was swung, stirring up sediment and causing the turbidity limit to be exceeded.
- From time to time, the dredge bucket was observed dropping dredge spoils back into the water.

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This was usually a result of debris catching in the mouth of the bucket. Substantial amounts of debris were encountered, including concrete, slag, rocks, and railroad spurs.

Monitoring Data

References:

- **Sediment**
- **Water:**
- **Fish:**

POTENTIALLY RESPONSIBLE PARTIES

Project Name **SELBY SLAG**

ProjectID: 09-05

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **SELBY SLAG**

ProjectID: 09-05

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name **SELBY SLAG**

ProjectID: 09-05

Reference Type: A

ReferenceID: 464

Title: ***Remedial Investigation Report and Interim Remedial Measures:
Selby Slag Site; Selby, California***

Location: AEM

Category: Contaminated Sediments: Investigation/Delineation

Prepared by/Author: Levine-Fricke

**Preparer/Author
Address:** 1900 Powell Street
Emeryville, CA 94608

Prepared For: Unknown

Date Published: February 2, 1988

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 465

Title: ***Interim Remedial Measures Completion Report: Selby Slag Site;
Selby, California (Volume I of III)***

Location: AEM

Category: Contaminated Sediments: Remediation Final Report

Prepared by/Author: Levine-Fricke

**Preparer/Author
Address:** 1900 Powell Street
Emeryville, CA 94608

Prepared For: Wickland Oil Company

Date Published: August 27, 1993

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 483

Title: ***CISNet San Pablo Bay Network of Environmental Stress Indicators***

Location: AEM

Category: Contaminant Background Levels in Water and Sediments

Prepared by/Author: National Center for Environmental Research and Quality Assurance

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: June 28, 1999

**Key Words and
Phrases:**

REFERENCES

Project Name **SELBY SLAG**

ProjectID: 09-05

Reference Type: L

ReferenceID: 60

Title: *AEM Notes Compiled from Daily Construction Reports*

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:** Malvern, PA 19355

Prepared For: Internal file

Date Published: December 30-31, 1999

**Key Words and
Phrases:**

Reference Type: M

ReferenceID: 193

Title: *Letter from ASARCO transmitting Table 6 results of metals in oysters (1994-1998)*

Location: AEM

Category: Fish/Biota

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: ASARCO

Date Published: June 25, 1999

**Key Words and
Phrases:**
