Background on Operable Unit-2B

Excerpted from the Work Plan prepared by Shaw Environmental (Navy contractor) for testing heat treatment to remove chlorinated solvents in groundwater at Operable Unit 2B
March 17, 2011

Site Conditions and History

Alameda Point is located on the western tip of Alameda Island, which is along the eastern margin of the San Francisco Bay and west of the City of Oakland. The northern portion of Alameda Island was formerly tidelands, marshlands, and sloughs adjacent to the historical San Antonio Channel, now known as the Oakland Inner Harbor. Most of the land that is now Alameda Point was created by filling subtidal areas, natural tidelands, marshlands, and sloughs with dredge spoils from the surrounding San Francisco Bay, Seaplane Lagoon, and Oakland Inner Harbor. Alameda Point is a roughly rectangular area approximately 2 miles wide from east to west and 1 mile from north to south, occupying approximately 1,734 acres of land.

Installation Restoration Sites 3, 4, 11, and 21 are designated as OU-2B under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and have been the subject of environmental investigations due to historical documentation of petroleum, oil, and solvent usage related to bulk fuel service and ship and aircraft maintenance and repair.

Site 4 comprises approximately 14 acres, is approximately 65 percent open space, and has infrastructure that includes paved parking lots, storage areas, and a sports field. Site 4 includes Building 360, a former Aircraft Engine Facility that contained multiple process shops, including a blast shop, cleaning shop, paint shop, welding shop, plating shop, various aircraft component repair rooms, and nondestructive testing facilities.

Site 11 is approximately 5.3 acres in size and is located in the eastern portion of Alameda Point. Site 11 is considered a heavily developed area and is bordered by heavily developed areas. Approximately 95 percent of Site 11 consists of buildings, roads, and parking lots covered with asphalt and concrete. Site 11 contains Building

14, an engine test cell. Building 14 was constructed in 1940 and operated as an aircraft testing and repair facility. Operations ceased in April 1997. Building 14 is currently occupied by a woodworking shop.

Site 21 comprises approximately 7 acres, 50 percent of which is intensively developed with infrastructure that includes paved parking lots, buildings, and roads. Site 21 includes Building 162, which operated as a ship and aircraft maintenance shop from 1945 until 1997. Activities included engine testing, parts cleaning and degreasing, use of miscellaneous chemicals, use of paint spray booth, storage of bulk fuels, and abrasive blasting material. Alameda Municipal Power currently uses Building 162 as a storage facility.

Alameda Point was identified for closure in September 1993, and all naval operations ceased in April 1997. In July 1999, Alameda Point was identified as a National Priority List site. The Navy is currently conducting an investigation in accordance with CERCLA at 35 Installation Restoration sites.

Previous Investigations

Previous investigations conducted under the Installation Restoration Program have included collecting soil, groundwater, and soil gas samples at and adjacent to Sites 3, 4, 11, and 21.

Soil and groundwater data gaps requiring further characterization were identified during the remedial investigations conducted for OU-2B. A data gap investigation of soil and groundwater was subsequently performed at OU-2B Sites 3, 4, 11, and 21. Figure 2 presents the approximate extent of groundwater contamination in OU-2B and highlights the study area, which is the focus of this [treatability study]. The nature and extent of a VOC plume across OU-2B were characterized as part of the data gap investigation. The characterization was based on results from the OU-2B groundwater investigation, existing wells sampled as part of the base-wide groundwater monitoring program, and, in some cases, historical samples from pilot tests or previous investigations

.

Geology and Hydrogeology

The area of the study location straddles the boundary between IR Sites 11 and 21. This area is a former estuarine depositional environment, so sediments within the treatment zone are relatively homogeneous and include sands with silt and clay, and

sandy silts, with relatively thin (up to 5 ft thick) silt and clay lenses. Hydraulic conductivity ranges from 2.1 to 7.3 ft per day. Seepage velocity is estimated between 7.7 to 26.6 ft per year, and is based on a gradient of 0.003 foot per foot and effective porosity of 0.3.

Twenty-seven borings were advanced at Site 11 during the data gap investigation activities. Most borings were terminated at 5 ft below ground surface (bgs). The deepest boring was advanced to 73 ft bgs. Fine sand (artificial fill) was encountered from the surface to 7.5 ft bgs. Underlying the artificial fill was sand with silt and clay inclusions and lenses (Bay Sediment Unit [BSU]) from 12 to 20 ft bgs (depth to the base of this unit varies with location and generally deepens to the west). Shells were present intermittently in this layer.

An approximately 1-ft-thick dark greenish gray clay (BSU Aquitard) is present from 8 to 10 ft bgs in the eastern portion but is absent in the western portion, adjacent to Seaplane Lagoon. Underlying the BSU at this location were interbedded fine clayey and silty sands, sandy clays, silty sands, and sands (Posey/Merritt/San Antonio Formation) to 70 ft bgs.

A clay layer was encountered at the transition from the BSU to the Posey/Merritt/San Antonio Formation from approximately 16 to 18 ft bgs in borings along Seaplane Lagoon. Clay interbedded with sandy clay occurs between 30 to 40 ft bgs in some locations. Dark gray to very dark greenish gray clay with sand and clayey sand (possibly Old Bay Mud/Yerba Buena Mud) was encountered in the deepest boring from 70 to 73 ft bgs.

Groundwater was encountered in first water-bearing zone (FWBZ) borings at depths of approximately 5 ft bgs. The FWBZ and second water-bearing zone (SWBZ) are separated by the BSU Aquitard present at approximately 10 ft bgs in the eastern portion or by the clay layer present at approximately 16 ft bgs in the western portion. The FWBZ and SWBZ are in hydraulic communication within the study area in the alley between Buildings 14 and 162 where neither clay layer was encountered.

Due to the site's close proximity to San Francisco Bay, the aquifer is expected to have saline conditions. As a result, the aquifer will be monitored during the treatability study to determine if there is an influence from these conditions.

Summary of Interpreted Contaminant of Concern Extent and Distribution

Figure 2 presents the plume impacting the study area. The plume, which was mapped based on investigation results, has two lobes with sources in Site 4. The northern lobe starts north of Building 360 (Plume 4-1), and the southern lobe starts in the west of the center of Building 360 (Plume 4-2). CVOCs from these two lobes migrate to the west in the general direction of groundwater flow and merge to form one plume. The treatment zone is the volume defined by total CVOC concentrations exceeding 10,000 ug/L down to 30 ft bgs; encountered along the utility corridor between Buildings 162 and 14. The study's treatment zone dimensions are 130 ft long x 50 ft wide x 30 ft deep.

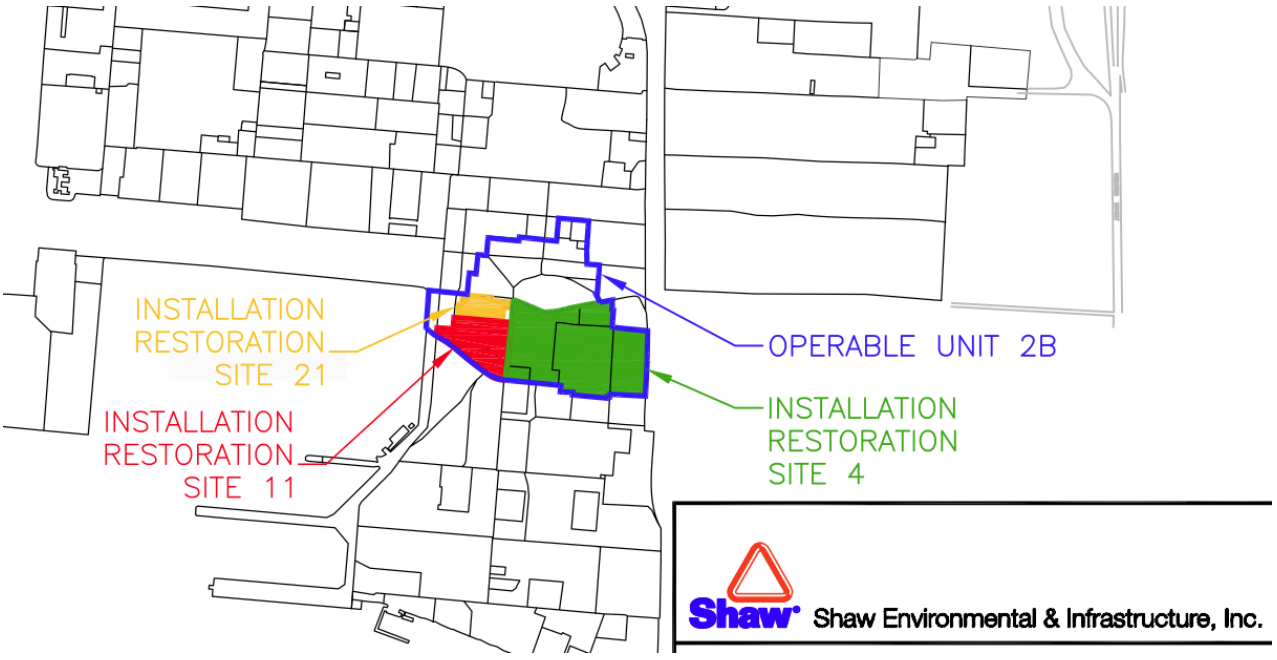
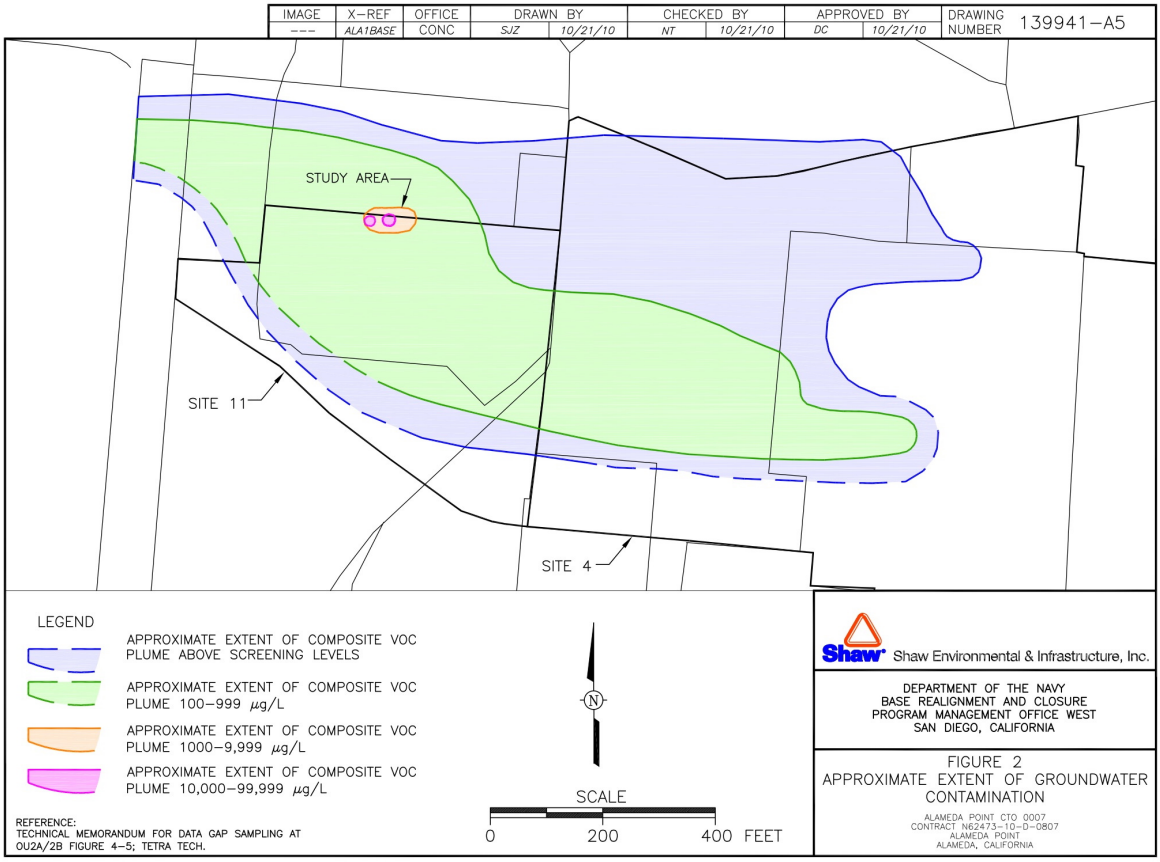


Figure 1



IMAGE

X-REF
ALA1BASE
OFFICE
CONC
DRAWN BY
SJZ
10/21/10
CHECKED BY
NT
10/21/10
APPROVED BY
DC
10/21/10
DRAWING NUMBER
139941-A5
STUDY AREA
SITE 11
SITE 4
LEGEND
APPROXIMATE EXTENT OF COMPOSITE VOC PLUME ABOVE SCREENING LEVELS
APPROXIMATE EXTENT OF COMPOSITE VOC PLUME 100-999 µg/L
APPROXIMATE EXTENT OF COMPOSITE VOC PLUME 1000-9,999 µg/L
APPROXIMATE EXTENT OF COMPOSITE VOC PLUME 10,000-99,999 µg/L
REFERENCE:
TECHNICAL MEMORANDUM FOR DATA GAP SAMPLING AT OU2A/2B FIGURE 4-5; TETRA TECH.
N
SCALE
0
200
400 FEET
Shaw Environmental & Infrastructure, Inc.
DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA
FIGURE 2
APPROXIMATE EXTENT OF GROUNDWATER CONTAMINATION
ALAMEDA POINT CTO 0007
CONTRACT N62473-10-D-0807
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Figure 2