NEX Gas Station Site Update, DoDHF Novato, California

June 2004

INTRODUCTION

This fact sheet summarizes the ongoing environmental activities being conducted by the U.S. Navy at the Department of Defense Housing Facility (DoDHF) Former Underground Storage Tank (UST) Site 957/970 located on the former Hamilton Air Force Base (AFB) property in Novato, CA. This site is one of approximately 10,000 underground storage tank release sites that are known to exist in the Bay Area. Former UST Site 957/970, also referred to as the "Naval Exchange (NEX) Gas Station Site", is located west of C Street, between Main Entrance Road and the railroad tracks located north of State Access Road (Figure 1). The NEX Gas Station Site is bound by the Novato Charter School and North Bay Children's Center to the east; residential housing to the northeast, west, and south; and Pacheco Creek and open space to the north.

The NEX Gas Station Site comprises an approximate 13-acre area of Navy property that has been impacted by gasoline products that leaked from the USTs at the NEX and Public Works Center (PWC) gas stations. The NEX Gas Station had three USTs containing gasoline and one containing waste oils; the PWC gas station had one UST containing gasoline. These gasoline releases impacted the soil surrounding the tanks and shallow groundwater at the site extending north of Navy property. The gas stations were in operation from the mid-1970s to the early 1990s. In 1992, site investigation activities started; removal of tanks and impacted soils occurred from 1992 to 1996. The sources of contamination were removed at this time, which means that there is no longer a source for groundwater contamination at the site. Active treatment systems have been operated at the site to clean up the soil and groundwater beginning in 1998. An in situ air sparging (IAS) and soil vapor extraction (SVE) system was operated during 1998 and 1999; a biosparging treatment system has been operational since 2002. Sampling results have shown that the active treatment systems have been successful in dramatically decreasing the gasoline constituent concentrations in both soil and groundwater at the site.

The U.S. Navy is the lead agency administrating the remediation and closure of the NEX Gas Station Site, and it is Department of Defense (DoD) policy to achieve site closure with the agreement of local regulatory authorities. Regulatory agencies, including the Department of Toxic Substances Control (DTSC) and Regional Water Quality Control Board (RWQCB), are involved to ensure that the cleanup and remediation activities taking place are protective of human health and the environment, and are conducted in a timely manner. The agency representatives also ensure that the Navy adequately addresses any concerns expressed by the regulatory agencies, members of the Restoration Advisory Board (RAB), the general public, and other stakeholders. The RAB is an advisory group that includes community members and provides two-way communication between the community, the Navy, and regulatory agencies on cleanup issues. The Navy reports the status of the site cleanup to the regulatory agencies monthly and to the RAB quarterly.

SITE CONDITIONS

The depth to groundwater at the site ranges from approximately 6.5 to 13.5 feet below the ground surface, and is influenced by seasonal rainfall. Typical compounds in gasoline, including benzene, toluene, ethylbenzene, and xylenes (BTEX), have been detected in groundwater beneath the

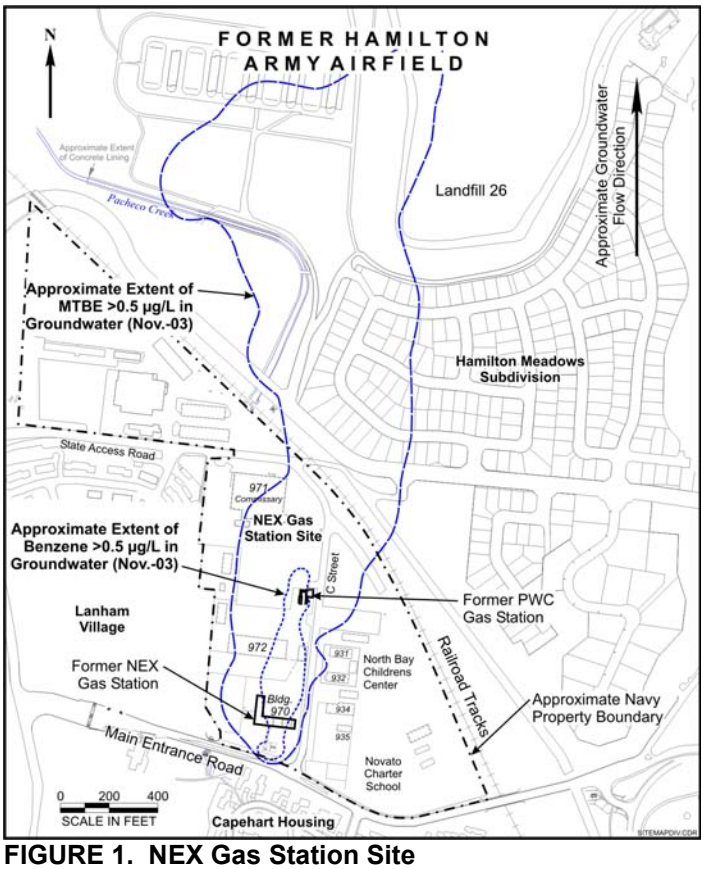

FIGURE 1. NEX Gas Station Site

site. Results of extensive sampling investigations have shown that BTEX compounds in groundwater have been primarily limited to Navy property; concentrations reported off Navy property have been infrequent and at extremely low levels (benzene extent is shown on Figure 1). Methyl-*tert*-butyl ether (MTBE), a gasoline oxygenate additive that has been added to gasoline since the late 1970s and is a common constituent of Reformulated Gasoline (RFG) and California's Cleaner Burning Gasoline, also has been reported in groundwater at the site. MTBE in groundwater originates from the former NEX gas station, and concentrations decrease as the plume extends north. Over six years of quarterly groundwater monitoring results have shown that gasoline components, including BTEX and MTBE, are stable and decreasing in concentration (with the exception of some minor MTBE concentration increases at the northeast leading edge of the plume). Many samples have been collected and studies completed to understand the site conditions and extent of environmental impacts. A summary of selected studies completed to date is provided in Table 1; a description of the groundwater conditions and site cleanup program is summarized below. Most documents in Table 1 can be reviewed at the South Novato Public Library.

SITE CLEANUP PROGRAM

Initial Cleanup System

In 1998, the Navy performed an Interim Remedial Action to reduce gasoline concentrations in soil and groundwater at the NEX Gas Station Site. While the interim action was being performed, site investigations and risk assessment activities were taking place to better characterize the site conditions. In situ air sparging (IAS) with soil vapor extraction (SVE) was used to reduce the mass of gasoline in soil and groundwater at four "hot spots." After 16 months of operation the IAS/SVE had removed 23,000 lb of gasoline from groundwater and soil based on vapor extraction alone, and concentrations of BTEX and MTBE in soil and groundwater were reduced considerably. By October 1999, the IAS/SVE system was no longer operating efficiently, and was shut down.

Current Cleanup System

In July 2000, the San Francisco Bay Area RWQCB issued Order No. 00-064, which identified cleanup requirements for the NEX Gas Station Site. The Navy has complied with tasks set forth in the Order in an effort to ensure the continued safety of area residents, students, and faculty, and

TABLE 1. Chronology of Selected Environmental Activities Conducted by the U.S. Navy at NEX Gas Station Site

Time of Action	Action
March 1992-July 1996	UST 957 (PWC gas station), USTs 970-1, 970-2, 970-3, 970-Waste oil (NEX gas station) removed
October 1996	Installed groundwater monitoring wells in area of former USTs 957/970
July 1997-Jan 1998	Literature review conducted to assess risk; Work Plan and Groundwater Monitoring Plan prepared
February 1998	Tier 1 Risk-Based Corrective Action (RBCA) Assessment prepared
March 1998	Investigation to identify extent of MTBE in groundwater; Addendum to Work Plan prepared to characterize transport of gasoline constituents at site; Quarterly sampling of groundwater well network began
April-May 1998	Interim remedial action initiated (in-situ air sparging with soil vapor extraction [IAS/SVE]); extensive groundwater monitoring network installed at site
October 1998	IAS/SVE system expanded to almost twice original size
March 1999	Tier 2 RBCA Assessment conducted; Tier 3 RBCA Assessment planned
April 1999	Groundwater data study to determine if natural attenuation might be effective
July 1999	Tier 3 RBCA Assessment evaluated risk from exposure to indoor air
October 1999	Two soil-gas monitoring arrays installed; Final Tier 3 RBCA Assessment shows protective concentrations based on RWQCB methodology; IAS/SVE system no longer cost-effective and is shut down
December 1999	Draft Ecological Risk Scoping Assessment prepared
March 2000	Final Work Plan for Hydraulic Lift and Oil/Water Separator Removal prepared
April-June 2000	Hydraulic lift and oil/water separator removal activities conducted
June 2000	Surface water monitoring began in Pacheco Creek and culverts
July 2000	RWQCB issued Board Order No. 00-064
August 2000	Final Work Plan for Remedial Investigation of Former UST Site 957/970 prepared
September 2000	Groundwater Monitoring Plan (GWMP), Monitoring Well Protection Plan, Draft Interim Site Control Plan for DoDHF Novato prepared; Remedial Investigation activities conducted
October 2000-present	Site status reports prepared and distributed
January 2001	Final Remedial Investigation Report prepared
June 2001	Final Revised Risk Assessment prepared using DTSC methods
October 2001	Additional Subsurface Characterization in Public Benefit Conveyance Parcel 2 (east of C Street)
November 2001	Interim Site Controls of Soil and Groundwater implemented
March 2002	Final Corrective Action Plan for Groundwater prepared
September 2002	Biosparging system started up
December 2002	Final Remedial Design and Work Plan for Former UST Site 957/970 prepared
October 2003	Final Work Plan Describing Proposed Bedrock Well Installation Activities at Former UST Site 957/970 prepared
May 2004	Risk Evaluations of the North Bay Children's Center, 932 C Street, Novato, CA 94949; the Novato Charter School, 940 C Street, Novato, CA 94949; and Pacheco Creek, Novato, California. Memorandum dated May 10, 2004.

will continue to work to fulfill the ongoing requirements in close cooperation with the RWQCB and other regulatory agencies. One of the main requirements of the Order was the preparation of a Corrective Action Plan (CAP), which evaluated remedial actions and presented recommended actions to protect human health and the environment by stabilizing and containing the areas with the highest MTBE concentrations on Navy property.

In accordance with the Final CAP, the Navy initiated a biosparging system in September 2002. The biosparging system operates in the area of higher MTBE concentrations on Navy property, reducing contaminant concentrations by injecting air into the subsurface. The system will operate until the performance goals are met or system operation is no longer cost-effective. Please see the document repository at the South Novato Public Library for more information about how biosparging works and why it was selected for remediation of this site. Biosparging operation includes monthly monitoring of groundwater and soil gas to ensure safe and effective system operation. Also, an SVE system was designed and installed as an extra safety measure in the event that gasoline component concentrations in soil gas were to approach a level presenting risks to nearby populations. All of the monitoring results collected during biosparging operation indicate that the system is safely and successfully removing BTEX and MTBE. Initiation of the SVE contingency system has not been necessary during 20 months of biosparging operation.

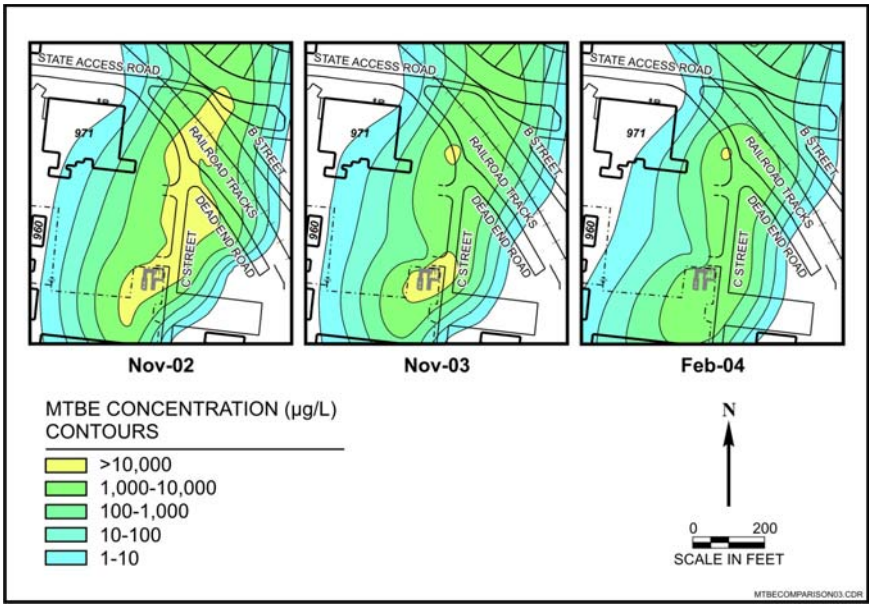

FIGURE 2. MTBE Concentrations in Biosparging Treatment Area

Figure 2 shows MTBE plume maps in the biosparging treatment area. It is evident that the higher MTBE concentrations, represented by yellow, are decreasing through biosparging system operation. Over 20 months of operation, September 2002 to present (June 2004), the average MTBE concentration in the performance monitoring wells has decreased by 78%. The Navy and regulatory agencies will work closely to determine when it is appropriate to turn off the biosparging system. The Navy anticipates that system will be turned off in the summer of 2004, but this decision will be based on a detailed evaluation of the system performance goals and cost-effectiveness. Once this system is turned off the Navy will continue to carefully monitor site conditions to ensure that contaminant concentrations are stable and continue to decrease. The system will remain in place in the event that the Navy and agencies deem it appropriate to turn the system back on. The Navy and agencies will continue to work closely to ensure that conditions remain safe and make adjustments as appropriate. Navy has collected groundwater and surface water data quarterly for more than 6 years. Table 2 summarizes the current monitoring schedule for groundwater, surface water, and soil gas. The Navy will continue to ensure that gasoline constituents in the soil, groundwater, soil gas, and surface water do not adversely impact future and existing occupants of the site and nearby properties.

TABLE 2. Current Monitoring Schedule at NEX Gas Station Site

Media	Number of Locations	Sampling Frequency
Surface water	6	Quarterly
Groundwater	8	Monthly
Groundwater	54	Quarterly
Groundwater	21	Semiannually
Groundwater	4	Annually
Shallow soil-gas	7	Monthly
System monitoring and deep soil-gas	11	Bi-monthly
RWQCB-requested soil-gas	2	Quarterly

ADJACENT PROPERTIES

North Bay Children's Center and Novato Charter School are located east of C Street and adjacent to the NEX Gas Station Site. In addition, residential properties and open space exist to the north, south, and east of the site. During additional subsurface characterization activities conducted in 2001, the presence of a bedrock high located east of C Street was confirmed (see Figure 3). This bedrock high indicates that the aquifer present west of C Street, beneath the former gas stations, does not extend to most areas east of C Street. This bedrock, composed of very low permeability sandstone, has helped to laterally confine the aquifer and the saturated MTBE plume zone to areas primarily underlying and to the west of C Street in the area of the North Bay Children's Center and Novato Charter School. Although it is possible that the bedrock is lightly fractured due to weathering, as shown in Figure 3, the bedrock elevation is higher than the elevation of the water table over almost all of the area of investigation east of C Street. Because of this bedrock high, and because groundwater flows to the north, not to the east, groundwater transport of dissolved gasoline constituents from the NEX Gas Station

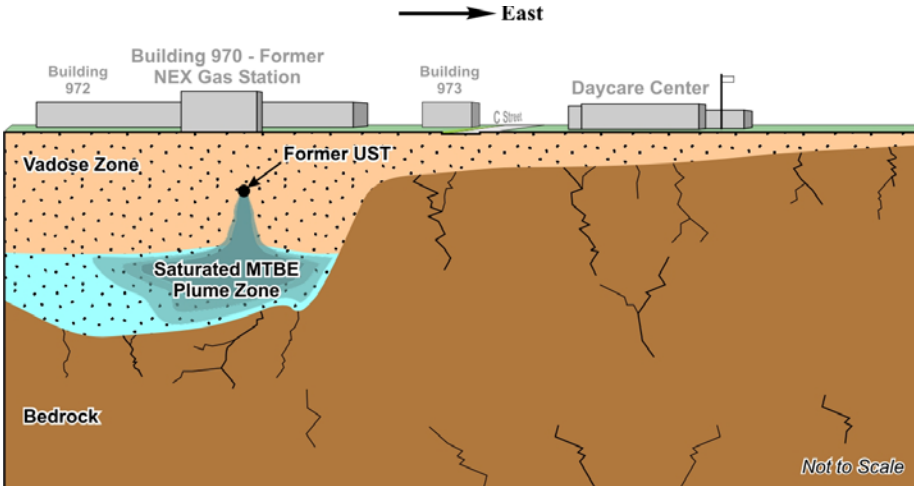

FIGURE 3. Subsurface Conditions East of C Street

site to the area of the North Bay Children's Center and Novato Charter School is not likely. Although MTBE has been detected a few times in the area of the North Bay Children's Center, these concentrations were at very low levels that do not post a risk to children or adults.

Soil gas is measured monthly at the site, including at several locations near the Novato Charter School and North Bay Children's Center. All soil gas results have shown that properties east of C Street are safe for both children and adults. The Navy has a comprehensive contingency plan in place that includes monthly measurements and active treatment if concentrations approach very conservative threshold values. The Navy reports monthly measurements to the regulatory agencies, and each measurement is evaluated to ensure that it does not present health risks to nearby residents, students, faculty, or site workers. To date, no measurements have been observed that jeopardize the health or safety of children or adults occupying or utilizing adjacent properties, as described in the DTSC's May 2004 risk memo listed in Table 1. The Navy plans to continue to carefully monitor subsurface conditions to ensure that nearby populations remain safe.

FUTURE ACTIVITIES

The Navy's biosparging system has operated safely and successfully over the last 20 months. The Navy will continue to perform sampling during treatment system operation and associated cleanup activities to ensure that nearby populations remain safe. The current remedial plans call for continued operation of the biosparging system until the cleanup goals are met or until the system is no longer cost-effectively removing gasoline compounds from groundwater. After the biosparging system is shut down, quarterly groundwater monitoring will continue to ensure that concentrations remain low.

DOCUMENT REPOSITORY

Fact sheets and a summary of environmental data collected at the NEX Gas Station Site can be found at the following website:

http://www.efdsw.navfac.navy.mil/environmental/novato.htm

A comprehensive collection of documents prepared as part of the environmental studies at the NEX Gas Station can be found in the reference section at the South Novato Public Library, located at:

South Novato Public Library
6 Hamilton Landing, Suite 140A
Novato, California 94949

For additional information or questions about the NEX Gas Station Site, please contact:

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