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NCBC DAVISVILLE
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FACT SHEET 13

SITE 03 / NIKE CHARACTERIZATION
NAVAL CONSTRUCTION BATTALION CENTER, DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND
December 1998

SITE INVESTIGATIONS - MAJOR FINDINGS

The results of the many samples collected show that a chlorinated volatile organic compound (CVOC) plume in deep ground water has migrated north beneath adjacent private property. Additional work is being planned to further assess the extent of that plume and potential alternatives to remediate the plume.

The information available confirms that there is not an imminent threat to the eight residential water wells identified along Fletcher Avenue north of the former Nike Site.

Introduction

This fact sheet summarizes the findings of the "Installation Restoration (IR) Program Site 03/Nike Source Area Characterization, Offsite Investigation, and Natural Attenuation Investigation". The investigation addressed the western portion of Zone 3 and adjacent areas to the north and south at the Naval Construction Battalion Center (NCBC) Davisville, Rhode Island (Figure 1).

Key purposes of the investigation were (1) to obtain a sufficient understanding of the subsurface conditions as they pertain to the plume of CVOC detected in ground water extending from the former Nike Site area east under the adjacent Navy property and (2) to aid in the Navy's decision-making process for this area of NCBC.

The investigation was conducted based upon the findings of the Draft Final "Study Areas 01 and 04, IR Program Sites 02 and 03, and Nike Site Phase III Remedial Investigation (RI) Report" dated February 1996. This report stated that the main source area for the CVOC plume was in the vicinity of monitoring well MW03-14D located west and upgradient from Navy property. The CVOC plume is approximately 30 ft below grade (bg) near the apparent source area and over 80 ft bg near the north edge (Perimeter Road) of the Navy property.

The "Nike Source Area Characterization" portion of the investigation is being performed with the support and cooperation of the U.S. Army Corps of Engineers (USACE). The Navy also acknowledges the cooperation from the Carriage Hill Association and the Rhode Island Economic Development Corporation (RIEDC) for access to adjacent properties.

How to find out more information about the Site 03/Nike Investigation Results

The public is invited to review the final report for the Site 03/Nike Source Area Characterization and Offsite Investigation at the following locations:

NORTH KINGSTOWN FREE LIBRARY
100 Boone Street, North Kingstown, RI 02852

Monday - Thursday, 9:00 a.m. - 6:30 p.m.
Friday and Saturday, 9:00 a.m. - 5:00 p.m.

CARETAKER SITE OFFICE
NCBC Davisville
1330 Davisville Road, First Floor
North Kingstown, RI 02852

Tuesday - Friday, 7:30 a.m. - 4:00 p.m.
***By appointment:* Contact Mr. Walter Davis at**
(401) 294-6108 or Fax (401) 294-2207

Additionally, your questions are welcome at the next Restoration Advisory Board (RAB) meeting.

INTERESTED IN THE SITE 03/NIKE RESULTS?

The Restoration Advisory Board (RAB) meetings are held every two months. The next RAB meeting is at 7:00 PM on 10 December 1998 at the Caretaker Site Office. (See above address)

Site Description and History

The investigated area includes both the former Nike Site (Nike Battery Site PR-58) and four Navy sites at NCBC Davisville (Figure 1).

The former Nike Site is currently owned by RIEDC and has been the subject of environmental investigations by USACE under the Formerly Used Defense Sites (FUDS) program. The area bounded by Perimeter Road, Seabee Avenue, and Babcock Road, which was part of Camp Thomas, was not used after World War II until 1955-1956, when the USACE constructed a Nike Missile battery at the far west end of the Navy property. The area between the Nike Site and Seabee Avenue has apparently not been used since World War II as evidenced by the mature forest which this area now supports. Aerial photographs from 1951 to 1976 show the area as vegetated and undeveloped.

The former Nike Site included three underground missile silos (Buildings 347, 348 and 349), a refueling area located to the south of Building 347, a missile assembly and test building (Building 344) with an underground storage tank (UST), a generator building with a 4,000 gal UST (Building 345), and personnel quarters. The facility was constructed during the mid-1950s and was equipped with short-range, conventionally armed Nike Ajax missiles. The facility was deactivated in 1962. In 1995, the Army placed holes in the bottom of each silo, backfilled the silos with clean sand, and demolished the concrete pads around the silos.

The Navy reportedly used the area west of the missile silos as the Disaster Recovery Training Area between 1964 and 1974. The training consisted of classroom instruction and hands-on training. Reportedly, tear gas grenades, smoke pots, and biological agent simulants were used. Detonation cord, blasting caps and plastic explosives were also used in small quantities. These materials were reportedly consumed in use.

In 1974, the land west of Seabee Avenue was transferred to the General Services Administration (GSA). In 1978, the GSA transferred ownership to Rhode Island Port Authority (RIPA) (now RIEDC). RIPA leased 2.2 acres of land to Peabody Clean Industries (PCI) between 1980 and 1982 for use as a hazardous waste tank farm. At any one time, an estimated maximum of 50,000 gallons of oil/water waste, 10,000 gallons of waste solvent, waste oil and sludge and 20 drums of various hazardous materials were onsite. In 1983, the Rhode Island Department of Environment Management (RIDEM) directed PCI in a cleanup of soil impacted by the PCI activities at the site. RIPA removed the 4,000-gal UST at Building 345 and demolished many structures, including Building 345, as part of the cleanup/closure activities.

The Navy sites include Study Area 1 (CED Drum Storage Area), Site 02 (CED Battery Acid Disposal Area), Site 03 (CED Solvent Disposal Area), and Study Area 04 (Asphalt Disposal Area) (Figure 1). The Navy has conducted environmental investigations of these sites under the IR Program.

Study Area 01 is located approximately 200 ft north of Building 224. It is currently a grassy, open field. A portion of the field was converted into a leaching field that was reportedly operated from December 1991 to April 1992 to dispose surface water runoff and storm water from a former truck washing area located at Building 224. The leaching field was closed in accordance with RIDEM regulations. From the late 1960's to 1974, as many as 500 55-gal drums, reportedly containing waste oil and solvent, were stored in the area at one time. The drums were removed in 1974.

Site 02 is a paved, flat area by Building 224. The site was a dry well and a leaching field located adjacent to the former Battery Shop. Dilute sulfuric acid containing lead was reportedly disposed between 1955 and 1980. The drywell and associated leach field were removed in June 1996.

Site 03 is an unmarked, previously paved lot to the west of Sayers Road, north of Parade Road and south of Battalion Blvd. From 1955 to the late 1970s, paint thinners and unidentified solvents were disposed on the ground, west of Sayers Street and Building 224. Part of Site 03 was also used to store heavy equipment. Aerial photographs from 1951 to 1970 show the area between Battalion Boulevard, Seabee Avenue and Parade Road was paved and used for vehicle and equipment storage. Vehicles awaiting maintenance were also temporarily stored in this area. All vehicle maintenance reportedly occurred in Building 224.

Study Area 04 is located approximately 800 ft west of Building 224 and 80 ft north of Battalion Blvd. Sometime in the late 1960's, a black, pliable, solid, asphaltic material was disposed in a trench. The source of this material is unknown. The asphaltic material and affected soil in this area were excavated in November 1996. The excavations were backfilled with clean soil in December 1996.

Field Investigations Performed

Field investigations of the former Nike Site and offsite areas from 1996 through March 1998 occurred in three stages, each based upon the results of the previous stage. The 1996 work was based upon the findings presented in the Draft Final "Study Areas 01 and 04, IR Program Sites 02 and 03, and Nike Site Phase III RI Report" dated February 1996. The field investigations included:

- Geophysical studies to assess the depth to bedrock and the configuration of the competent (solid) bedrock surface.
- Installation of 13 monitoring wells screened in the till and weathered bedrock zone, including 1 well located at the north edge of the site (EA-106D) and 2 wells located north of the site on private property (EA-112D and EA-113D).
- Installation of 4 monitoring wells screened in the upper 20-30 ft of competent bedrock, including 1 well located at the north edge of the site (EA-106R) and one well north of the site on private property (EA-112R).
- Sampling and analysis of subsurface soil for VOC.
- Sampling and analysis of ground water for VOC.

Investigation Findings

The subsurface geology from the former Nike Site to the Sites 01 and 02 area is characterized by Quaternary glacial deposits (sand, silt, and gravel) mantling the quartzitic and phyllitic bedrock (weathered and competent, coreable zones) of the Rhode Island Formation. In general, the unconsolidated glacial deposits consist of the following units presented in order from the ground surface downward: (1) glacio-fluvial deposits of sand with varying amounts of silt and/or gravel; (2) glacio-lacustrine deposits of silt to very fine sand and silt; and (3) sandy silty gravel to sandy gravelly silt (possibly till).

The geological units have been divided into three hydrogeological zones (beginning with the uppermost zone): (1) shallow ground-water zone (typically the glacio-fluvial sand unit); (2) deep ground-water zone (the sandy silty gravel to sandy gravelly silt [possibly till] unit and the weathered bedrock zone); and (3) competent bedrock ground-water zone (the upper approximately 25 ft of competent bedrock).

The deep zone ground water is interpreted to flow southeast, away from the former Nike site and the residential area located north of the Nike Site, and then, east/southeast across Site 03 to an area where a slight ground-water mound is present northeast of the intersection of Marine Road and Davisville Road. Because of this slight mound, the ground-water flow east from the Nike Site appears to diverge in the vicinity of Building 224 to the northeast and southeast. There is also a small area west of the former Nike missile silos where deep ground water is interpreted to flow toward the west.

Ground water in the bedrock is interpreted to flow southeast, away from the former Nike site and the residential area located north of the former Nike Site.

The MW03-14D area of the deep ground-water zone appears to be the subsurface source area of the CVOC remaining from a historical release(s)/spill(s). Although the exact location of the original CVOC release(s)/spill(s) is not known, this subsurface area appears to be the source for the CVOC plume in ground water. Residual dense non-aqueous phase liquid (DNAPL) CVOC may be present on the soil, or as ganglia between the soil particles, in the vicinity of the MW03-14D screened interval. If present, residual CVOC DNAPL would serve as a continual source for the dissolved CVOC plume in ground water.

CVOC were not detected in the ground-water samples from EA-103 and EA-105. These wells are located adjacent to and within areas reportedly used in the past by the Navy for training activities.

The highest concentrations of total CVOC in deep and bedrock ground water were detected in the samples from MW03-14. The CVOC plume appears to be migrating with ground-water flow from the former Nike Site area toward the east beneath the Navy property as well as toward the northeast. There appears to be little or no CVOC migrating west and north toward the property boundary from the MW03-14 vicinity. Northeast of the MW03-14 area, total CVOC was detected at 42.8 µg/L in well EA-112D located offsite on private property.

Based upon data from EA-106D/R and EA-113D (located between the former Nike Site [and the CVOC detected at offsite well cluster EA-112] and the five nearest identified residential water supply wells north of the site), total detected CVOC ranges from 'not detected' to 1.5 µg/L. The individual CVOC detected in these three monitoring wells do not exceed RIDEM ground-water standards.

Additionally, the interpreted direction of deep ground-water flow is southeast, away from these residential water

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supply wells. However, higher concentrations of total CVOC were detected in wells EA-112D (42.8 µg/L) and EA-112R (168 µg/L). One CVOC, trichloroethene [TCE], was detected in offsite wells EA-112D/R at concentrations that exceed RIDEM ground-water standards.

The Town of North Kingstown reviewed its water department records for the area north of Perimeter Road and identified eight private wells (Figure 1). The Rhode Island Department of Health (RIDOH) received permission to sample seven of these wells. On 6 May 1997, RIDOH sampled the seven wells for analysis of VOC. None of the VOC were detected in samples from the four sampled wells closest to the former Nike Site, nor in samples from the two northeastern-most wells along Fletcher Road. Trace concentrations of tetrachloroethene (0.7 µg/L) and 1,1,1-trichloroethane (1 µg/L) detected in the 'Matoes' well sample did not exceed the RIDEM standards (5 µg/L and 200 µg/L, respectively). This well is located more than 3,000 ft from the former Nike Site northeast along Fletcher Road. There are no data with which to infer a connection between this well and the former Nike or Navy NCBC sites.

The southwestern, western, northern, eastern, and southeastern extent of the monitoring well network appears to be beyond or at the fringe of the CVOC in the deep ground water. These areas continue to be good locations to monitor plume extent in the deep zone. The exception is toward the northeast and offsite at EA-112D/R. No residential water supply wells have been identified by the Town northeast from EA-112D/R along the apparent trend of this relatively small portion of the CVOC plume.

Next Step

The Navy will be working with USACE to develop a work plan for additional characterization required to produce the Feasibility Study, Proposed Plan, and Record of Decision for the Navy's Sites 02 and 03 and Study Areas 01 and 04. The USACE will develop a work plan for additional characterization of the Nike Site to assess remedial alternatives.

Questions? For more information...

If you have any questions about the site or would like more information, call or write to any of the following:

Mr. Philip S. Otis, P.E., Code 1823/PO
Northern Division, Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, PA 19113-2090
Phone: (610) 595-0567, ext. 155 Fax: (610) 595-0555

Mr. Walter Davis
Caretaker Site Office NCBC Davisville
1330 Davisville Road, First Floor
North Kingstown, RI 02852
Phone: (401) 294-6108 Fax: (401) 294-2207

Ms. Christine Williams
U.S. Environmental Protection Agency, Region I
Office of Site Remediation and Restoration
JFK Federal Building (HBT)
Boston, MA 02203-2211
Phone: (617) 918-1384 Fax: (617) 918-1294

Mr. Richard Gottlieb, P.E.
R.I. Department of Environmental Management
Office of Waste Management
235 Promenade Street
Providence, RI 02908-5767
Phone: (401) 222-2797, ext. 7138 Fax: (401) 222-3813

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LEGEND

- MONITORING WELL
- LOCATION OF PROPERTY WITH RESIDENTIAL WATER WELL
- APPROXIMATE EXTENT OF CHLORINATED VOLATILE ORGANIC COMPOUND PLUME IN DEEP ZONE GROUND WATER (10 ppb)
- INTERPRETED DIRECTION OF DEEP ZONE GROUND-WATER FLOW

500 250 0 500 1000

GRAPHIC SCALE IN FEET

NOTES:

MONITORING WELL LOCATIONS ARE APPROXIMATE

BASE MAP (SOUTH OF PERIMETER RD) DIGITIZED FROM: NCBC CENTER DAVISVILLE RI STATION MAP, SEPT 1992; ADDITIONAL ROADS ADDED FROM AERIAL PHOTO DATED 4/95

OFFSITE AREA (NORTH OF PERIMETER RD) DIGITIZED FROM A DRAWING PROVIDED BY THE TOWN OF NORTH KINGSTOWN, RI

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

NORTHERN DIVISION
FACT SHEET 13
SITE 03/NIKE CHARACTERIZATION
NCBC DAVISVILLE, RHODE ISLAND

SITE MAP

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