

ENVIRONMENTAL REPORT

U. S. ARMY SOLDIER SYSTEMS CENTER • NATICK LABS • NATICK, MASSACHUSETTS

New Pumping Wells Enhance Treatment System

Since late 1997, the Army has been successfully pumping and treating contaminated groundwater in the T-25, Warehouse Area. By pumping underground water from two extraction wells (MW90B-4 and MW15B), located in areas with highest contaminant levels, the Army has removed and treated more than 125 million gallons of contaminated water. In addition, the treatment system has effectively contained the contaminated groundwater in the area of the Warehouse, helping to prevent its further movement off the property (see Warehouse Clean-Up Plan Finalized, *Environmental Report*, Summer 2002).

Over the years the Army has continually monitored the effectiveness of the treatment system. Monitoring data are evaluated at both on-site and off-site locations to ensure that contaminant levels are naturally degrading to acceptable levels as determined by the Environmental Protection Agency as safe. The Army has also studied ways to improve the system's effectiveness by developing a groundwater model for the area. After studying how the treatment system has performed over time, the modelers recommended several activities to help optimize the effectiveness of the pumping wells. In order to remove the maximum amount of contaminants from the groundwater, three new extraction or pumping well locations were suggested. These wells will supplement the existing extraction network of the T-25 Area groundwater treatment system.

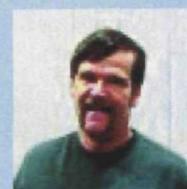
Recommendations based on the groundwater model are presented in the report "Optimization of a Ground Water Extraction Network (GWEN) to Achieve Effective Remediation at the T-25 Area" by HydroGeologic, Inc. (June 2002)." The report recommends taking one of the original extraction wells (MW-15B) off-line and discontinuing its use once the three new extraction wells are operational. The resulting network will consist of four wells including the original well MW90B-4 (see Figure 1 for the extraction well locations).

The three new extraction wells were installed in early Fall 2002 and were constructed just like the existing well (MW90B-4). Boreholes were drilled to between 65 and 80 feet below ground surface with soil samples collected throughout the borehole. After drilling, the extraction wells were installed using four-inch diameter

Our Year in Review

*John McHugh,
Environmental Restoration Officer*

Over the last year we have accomplished a great deal in our environmental restoration program. I am happy to report that our treatment system at the T-25, Warehouse Area, designed to remove organic compounds from the groundwater, is performing as expected. Over the last five years we have cleaned more than 125 million gallons of contaminated water at the T-25 treatment system. This year our focus has been



John McHugh

to improve the system's performance even further. We developed a groundwater model, using the vast amounts of data collected, to help us get a good picture of the underground system. Based on the modeling information we have recently installed three new pumping wells in the area. These wells, brought online this summer, are designed to enhance the treatment system. So now we are operating a total of 4 wells, instead of 2, with all wells pumping groundwater to the surface for treatment. We will add more monitoring wells this fall at locations just north of the property so we can measure off-site contaminant levels and get a better 3-dimensional look at the groundwater plume. In addition, work continues at several sites as work winds down at several others. Presently we are finishing the Tier III Ecological Risk Assessment at the T-25 and Main Outfalls. Also, three site investigations are underway at Buildings 22 and 36, Buildings 2 and 45, and Buildings 13 and 14 to determine site conditions and levels of contamination. The community continues to be a vital partner in our efforts. We have welcomed three new Restoration Advisory Board (RAB) members and say good-bye and thank you to Helen Crawford-Kurt, Marilyn Lourandos and Pam Winters for their dedicated service. Our regular RAB meetings are a great way to hear about what's going on at SSC. I hope to see you there. ♦

Continued on page 2



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stainless steel, continuous-slot screen. The area between the hole and the well screen was then filled with a sand/filter pack and a cement seal near the surface. The wells were then finished by placing a concrete vault on each well and by connecting each well to the existing treatment system in Building 94. In October the wells were developed in order to remove any suspended sediments and fines from the well and filter packs. Then a submersible pump was used to determine well yields. Yields for MW94B-4 and MW96B-4 were approximately 25 gallons per minute and approximately 15 gallons per minute for MW95B-4.

Data show that contaminant concentrations are decreasing on the western and northern edges of the plume. Wells on Lakewood Road show steadily decreasing TCE concentrations. This suggests that the contaminant mass is being pulled back toward the T-25 Area and that freshwater is now entering the system.

New Monitoring Wells Off Fisher and Arcadia Streets.

The T-25 Area Record of Decision (ROD) requires the Army to address the following three long-term monitoring issues:

1. evaluate the efficiency of the clean-up action in



Site Aerial Photo

order to meet federal drinking water standards

2. make sure levels of both perchlorethylene (PCE) and trichloroethylene (TCE) are decreasing both on and off the property
3. look at the hydraulic containment of the T-25 area

In early Fall 2003, the Army plans to install additional off-site monitoring wells to study these issues. The Army's technical specialists recommend four additional monitoring well locations to better define the shape of the plume and to get important information about the hydraulics of the system. Although all locations are not definite at this time, one well will be located north of the site on Fisher Street. Another well, a deep well, will also be located north of the site. Wells located on Fisher Street will help to define the groundwater capture zone and the shape of the plume. Another well in this area, specifically required by the ROD, will help to define the plume vertically. Other new monitor-

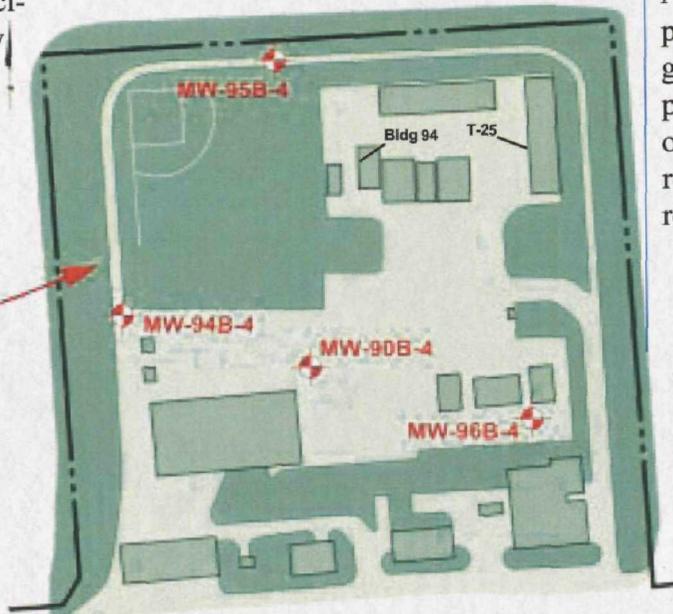


Figure 1: Extraction Well Locations at T-25 Area

ing wells are planned near Arcadia Road and will help understand groundwater flow paths from the T-25 area to the

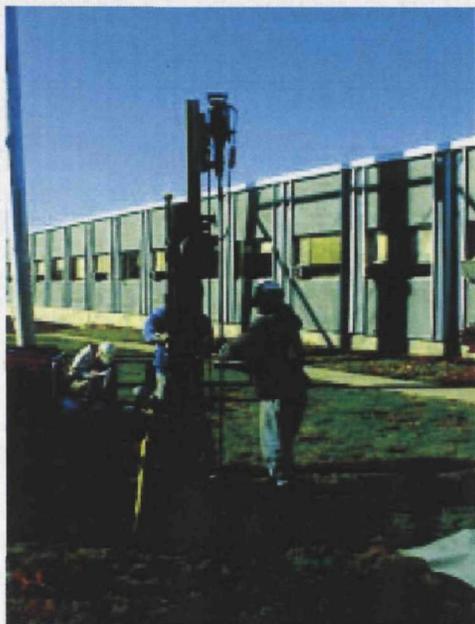
Springvale wells. The deep well in the area will also help identify the vertical limits of the plume. ♦

Buildings 22 and 36: Remedial Investigation Complete, Onto the Feasibility Study

During the Boiler Plant Investigation in 1998 an area of PCE-contaminated groundwater was found extending from Building 22 to Building 36 in the southwestern portion of SSC. These buildings are located east and north of the Boiler Plant (Building 19). Building 22 is a concrete block structure (12 x 24 feet) that was used to store hazardous materials from the 1950s to 1988. Building 36, built in the 1960s, is an H-shaped building, and is located at the intersection of C Street and First Avenue. The Army used the larger northern portion of the building for food and packaging research and the smaller southern portion of the building for administrative offices.

A Preliminary Investigation was completed in 1998 and found PCE in groundwater, lower levels of PAHs and pesticides in surface soil, and low levels of PAHs in near shore sediments. As a result, a Remedial Investigation (RI) was recommended to:

- Further characterize the PCE contamination in groundwater near the buildings and at the lake shoreline;
- Attempt to identify a possible source for the PCE in groundwater;
- Characterize in more detail the site geology/hydrogeology;
- Evaluate the potential impact on sediments and surface water from groundwater discharge;
- Install additional groundwater sampling points; and



Building 36

- Estimate the current and potential future risk to human health and the environment from detected contaminants.

The field activities began in Fall 2000 and were completed in June 2001 with the second round of groundwater sampling. Activities included:

- a geophysical survey;
- a bathymetry survey of the cove south of Building 22 to identify possible groundwater discharge areas;
- passive vapor diffusion sampling at 23 locations in the cove and 35 shoreline locations west of Building 36 to identify contaminated groundwater discharge areas;
- installation and sampling of 27 small



Building 22

diameter groundwater sampling points to define the area of contamination;

- installation of four monitoring wells;
- more than 20 surface water and sediment samples for analysis.

RI data indicate a saddle-shaped PCE groundwater plume in the area of Buildings 22 and 36. It extends from the northwest corner of Building 36 in a south-southeasterly direction to the cove south of Building 22. The center of the plume is below Building 36 at depths of 62 to 80 feet below ground surface (40 to 48 feet below the water table).

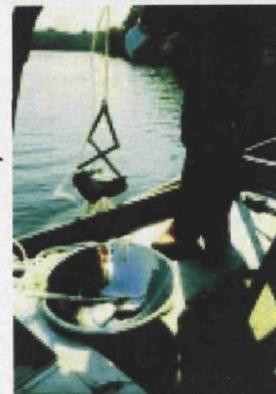
Because of the considerable amount of clean water above the plume, there does not appear to be a continuing source of contamination at or near the surface. The vapor diffusion sampling showed that the contaminated groundwater is discharging to the near shore area in the cove south of Building 22 and at the shoreline west and northwest of Building 36. PCE and its degradation products TCE and dichlorethene (DCE) were found in nearshore sediments both in the cove and along the western shoreline.

The risk assessment concluded that there is a potential human health risk associated with using the groundwater in the area as drinking water. A Feasibility Study is currently underway to address this potential risk and identify possible clean-up actions. A draft report is expected in Fall 2003. The Army is continuing the groundwater monitoring of the area as part of the Installation-Wide Quarterly Groundwater Sampling Program. Contaminant concentrations in groundwater will be evaluated over time.

Tier III Ecological Risks Evaluated

The Army continues to evaluate ecological risks that may exist to organisms living in the lake sediments close to

SSC. The Tier III Ecological Risk Assessment (ERA) is the third level of study that the Army has conducted to evaluate chemical concentrations in sediments and their



Sediment Sampling

associated health effects. The Tier III ERA is built upon the results of the earlier Tier I and Tier II assessments. These earlier studies concluded that PCBs and pesticides are the primary Contaminants of Concern (COC) in



Lake Sampling

sediments with Polycyclic Aromatic Hydrocarbons (PAHs) and metals representing a secondary concern. Then a further study, the Tier III ERA, was started. The Tier III is designed to answer the

following question: Are the COC concentrations in sediments high enough to cause acute or chronic health effects in exposed aquatic animals? The study examined the following aquatic species:

- Aquatic invertebrates (freshwater mussels)
- Fish (Largemouth Bass, Bluegill, and American Eel)



Fish Sampling

- Aquatic birds (Great Blue Heron, Belted Kingfisher, Osprey)
- Aquatic mammals (raccoon and mink)

In the Tier III sampling program, the Army collected nearly 200 fish and mussel samples and many sediment samples. All the tissue and sediment samples were tested for pesticides, PCBs and mercury. Some of the tissue and sediment samples were also tested for PAHs and metals. Additional activities included:

- invertebrate tissue analysis
- field observation of fish
- fish tissue analysis
- food chain modeling of COCs consumed by bird and mammal communities

The draft report is expected in Fall 2003. Preliminary results show some toxicity and impairment (limited growth) in the invertebrate community. However, no visible impact was observed on the health of the fish, birds, and mammals in the area. The site provides a suitable habitat based on the wildlife surveys. ♦

Planning Additional Work at Buildings 2, 45, 13, and 14

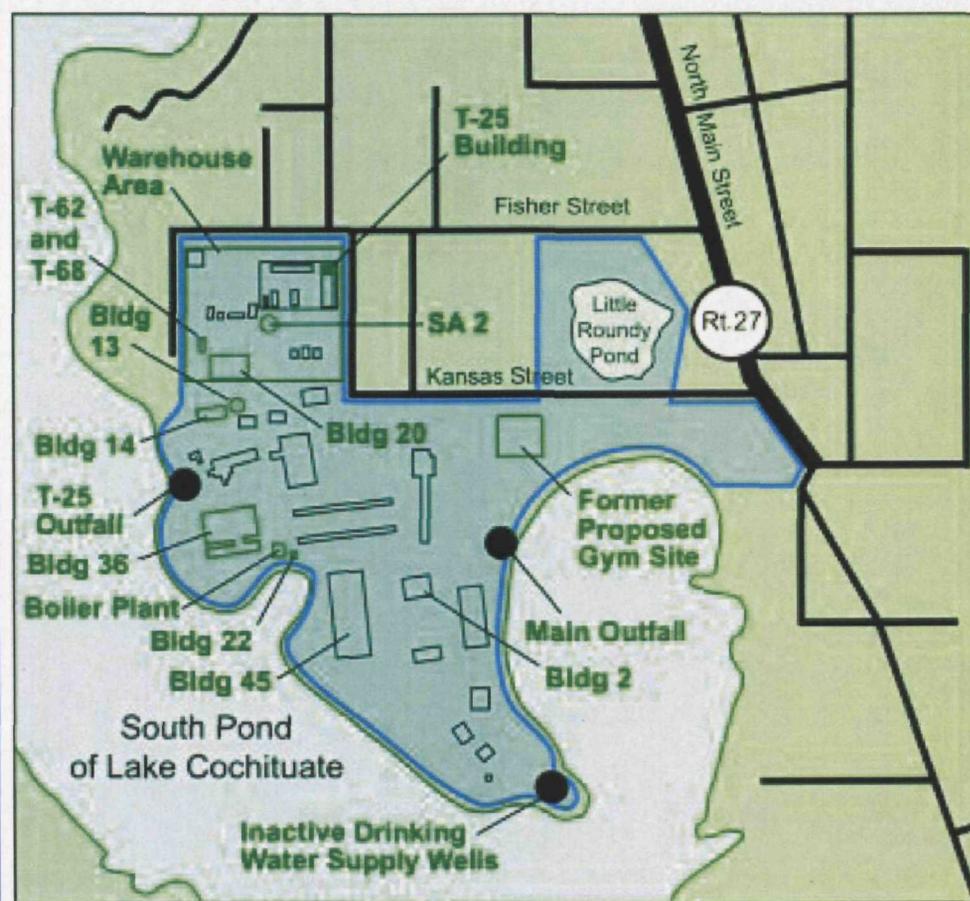
Work is in progress at two new areas. The Army is conducting investigations at Buildings 2 and 45 and at Buildings 13 and 14. Work plans have recently been reviewed and fieldwork is underway or about to begin.

Buildings 2 and 45 Site Investigation (SI). Located at the southern end of SSC near the inactive drinking water supply wells, these buildings are being investigated to see if they could be a possible source of PCE and TCE in groundwater. Investigation of the supply wells showed low levels of PCE and TCE in groundwater. Building 2 is a

climatic chamber used for testing food, clothing and equipment. Built in the 1950s the chamber had 3 large (1,000 gallon) tanks used to store TCE. TCE storage was discontinued in the 1980s. Building 45 is a Support Services building, containing a parachute research and development area in the basement. Administrative and facility maintenance activities took place on the first floor of the building. Soil gas sampling around Building 2 showed TCE vapor located along the southern wall. During the SI, the Army will further define the nature and distribution of contaminants in groundwater, soil, surface water and sediment. Field work is expected to begin late summer to early fall 2003.

Buildings 13 and 14 Remedial Investigation (RI). These buildings are located at the southwestern part of the T-25 Area and were constructed in 1954. Building 13 housed an incinerator,

which was used to dispose of classified paper until 1985. The incinerator was removed in the 1990s. A slab foundation is all that remains today. Building 14 was an equipment and vehicle maintenance site. Past activities around the building included insect/rodent control, metal and brush cleaning, silk screening, rubber adhesive thinning, snow removal, equipment refueling and storage. A lot of data is available from previous studies in the area of these two buildings. Volatile organics, PAHs and petroleum hydrocarbons are the main contaminants in soil. Volatile organics and metals are found in groundwater. During the RI, the Army will further define the nature and distribution of contaminants in groundwater and soil. Field work was completed in April 2003. Soil and groundwater sampling data are currently being checked and validated. A draft report is expected in early 2004. ♦



The main study areas at the former Natick Labs.

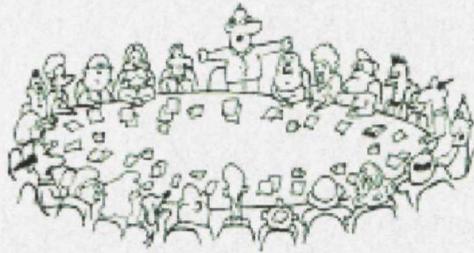
Community Involvement Makes a Difference

Join us at one of our bi-monthly **Restoration Advisory Board (RAB) Meetings** to discuss program issues.

When: First Thursday evening of the month at 7:00pm

Where: SSC Recreation Center, Kansas Street
Call (508) 233-5550 for meeting information and to confirm meeting dates.

Reports and documents related to SSC's cleanup may be reviewed by calling U.S. Army Soldier Systems Center, Environmental, Safety and Health Office at (508) 233-5550.



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- Joel McCassie, SSC Co-Chair
- Christine Williams, EPA
- Robert Campbell, MADEP
- John McHugh, SSC Restoration Officer
- James Straub, Department of Environmental Management, Lakes and Ponds

Community Members:

- Marco Kaltofen, Community Co-Chair
 - Dr. Charles Czeisler
 - Anthony Doheny
 - James Fitzgerald
 - Sidney Gantman
 - Steven Lubic, Town of Natick Representative*
 - Elizabeth McCoy, SSC Employee Member
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Please keep your questions coming!



It is our goal to keep the public informed. We appreciate and encourage your comments and suggestions.

Let us know what you think! Send in your Comment Card or contact us!

Soldier Systems Center Environmental Report

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