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INSTALLATION RESTORATION PROGRAM NEWSLETTER DECEMBER 1995 NSB KINGS  
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# ENVIROUPDATE

## KINGS BAY, GEORGIA

### Installation Restoration Program Newsletter

### December 1995

Volume 1, Number 7

*This newsletter is provided to the community on a quarterly basis or when significant developments occur in the environmental cleanup program. Copies of previous editions of EnviroUpdate can be obtained through the Public Affairs Office. For more information, contact Robert Steller, Public Affairs Office, (912) 673-2001 ext. 4714.*

### ***Coming Soon: IM Upgrades!***

In 1992 the Navy confirmed through a series of investigations that the groundwater under SUBASE's Old County Landfill and the Crooked River Plantation subdivision contained volatile organic compounds. These man-made chemicals do not occur naturally in the environment and SUBASE immediately focused all efforts on cleaning up the affected groundwater.

The Navy proactively began designing and testing a groundwater treatment system to stop further movement of the affected groundwater and to reduce the levels of the chemicals in the groundwater. This system is called an **interim measure (IM)** because the cleanup action is implemented quickly while further evaluation continues and long-term cleanup options are considered. The Navy is conducting the IM in two phases. Phase I, completed in 1994, tested two technologies – air stripping and biological treatment. Phase II will focus on enhancing the existing groundwater extraction and treatment system.

Presently, the IM treatment system consists of five pumping or extraction wells that together pump 35 gallons of groundwater each minute to the surface. A buried pipeline then carries the groundwater away from the wells to an onsite treatment location. The contaminated groundwater during Phase I was treated primarily by the air stripping technology with a smaller portion treated by biological technologies.

The results of Phase I showed that air stripping is a very effective treatment process. It uses simple equipment to transfer the contaminants from the water into air in a

completely closed system. The air is then treated for some contaminants and discharged to the atmosphere with periodic monitoring for volatile organic compounds.

### ***Phase II Interim Measure Upgrades***

Interim measure activities are ongoing at SUBASE and will continue over the next few years. By reviewing available data from Phase I, SUBASE has identified a number of modifications and upgrades to the current treatment system. System upgrades will include installing additional recovery wells and modifying treatment operations.

SUBASE is currently preparing a Corrective Action Plan for Phase II operations to describe the upgrades to the system and to outline the approach and rationale for the collection of more data. This document will be available for review in the first quarter of 1996 at the Information Repository or by contacting the Public Affairs Office. The upgrades to the system are then expected to be implemented later in 1996.

### ***Additional Data Collection***

ABB Environmental Services, Inc. (ABB), the Navy's environmental consultants, and the U.S. Geological Survey (USGS) are working together to collect more data for the Phase II upgrades. Activities will take place on base property and will include installing monitoring and recovery wells to improve the current system. Groundwater modeling will be used to determine the location and number of wells that are required. USGS began drilling new wells in early December 1995 and data collection will continue in early 1996.

*[continued on next page]*

ABB and the USGS will conduct groundwater sampling and monitoring tests to further define the nature of the aquifer and to analyze its response to the pumping activities over the last two years (i.e., to study how the pumping activities effect the rate and flow of the groundwater). Through this joint effort, SUBASE will collect additional information which will help them understand the groundwater system and ultimately expedite cleanup activities.

### **RAB Update**

The last Restoration Advisory Board (RAB) meeting was held on October 26th at the St. Mary's Library. Georgia Department of Natural Resources (GADNR), the state agency overseeing the cleanup at SUBASE, provided an overview of its ground-water cleanup requirements for the Old County Landfill.

In their presentation, GADNR representatives stated that contaminants in groundwater at SUBASE should be cleaned up to concentrations at or below federal/state drinking water standards, known as Maximum Contaminant Levels (MCLs). If a particular contaminant does not have an MCL, then GADNR requires cleanup to that contaminant's background level (that is, the concentration at which it occurs naturally in the environment). This level would be a concentration of zero for some of the man-made chemicals found in the groundwater.

At this time, GADNR cannot permit the Navy to determine an acceptable contaminant level based on results of a risk assessment. This scientific study calculates the risk to human health and the environment based on several site conditions and exposure scenarios. Unable to use such studies currently, GADNR is making strides towards allowing the use of risk-based cleanup standards. In the meantime, GADNR and the Navy are working closely to continue to remove contaminants in the most affected areas of the aquifer.

RAB members and interested citizens were also given a tour of the landfill and groundwater treatment area following the meeting. As a group, the RAB decided to conduct their meetings during the day at the St. Marys Library. The dates and times of future meetings will be announced in our local newspapers and radio stations.

The next meeting will be held January 18th, 1996, at 10:00 a.m. at the St. Mary's Library. A technical presentation will be given by SUBASE on ground-water flow fundamentals. If you are interested in attending the meeting, please contact Bob Steller at (912) 673-2001, extension 4714.

## **Groundwater - It**

Geology and hydrology are two disciplines that are important to any environmental investigation and cleanup. Hydrogeology is an exciting and extremely challenging science because it involves studying the occurrence and movement of water under the ground's surface. Because this environment is complex and hidden from direct observation, scientists collect data in a number of ways to measure and characterize the groundwater in an area.

In the ground, water does not occur in underground rivers or lakes. Instead, it fills openings or pore spaces between sand grains, soil particles and rock layers. For simplicity, let's consider the underground water-bearing environment as two zones. The first zone is typically close to the surface and the pore spaces between soil and rock particles are filled with both air and water. This area is referred to as the **unsaturated zone**. Below this zone is the second zone where water completely fills the pore spaces. The top of this **saturated zone** is called the water table, and is shown in Figure 1 as the "pre-pumping water level".

Soil or rock units that are saturated with water have the ability to store and transmit water. These units are referred to as aquifers. When rain water seeps into the soils and reaches the water table, it enters the saturated zone and continues to move downward and laterally under pressure gradients to areas where groundwater is discharged at the surface.

The following factors control the groundwater's movement: 1) soil type; 2) how well pore spaces are connected; and 3) hydraulic gradient (higher to lower elevation). In addition, many external factors affect the occurrence and movement of groundwater such as the amount of precipitation and pumping of water out of the system via wells. The water table may rise or fall depending on these factors.

Monitoring wells and pumping wells are our windows into the groundwater system. These wells are specially dug to ensure accuracy of the data. Wells provide information on water depth and allow us to take soil and groundwater samples from different depths in the system. By piecing together the data collected, scientists and engineers can create a picture of the subsurface conditions and predict groundwater flow and movement. Also by conducting various pumping tests and measuring how the water levels respond in surrounding wells, scientists can understand the effects of any pumping on the system.

## Out-of-Sight!

It appears from the data collected at SUBASE during Phase I that a significant part of the affected groundwater is captured during the pumping of the current extraction system. Figure 1 shows groundwater flow patterns around a pumping well that would be typical of wells at Site 11. Pumping causes the water level to drop around the well to form a cone-shaped depression in the water level. The "zone of influence" is the extent to which the pumping well has an effect on water levels. The "capture zone" is the actual area from which the pumping well draws its water.

Recovery wells were designed to create a series of individual capture zones around each well and were placed in areas most affected by releases from the landfill. Individual capture zones overlap to form a larger capture zone designed to collect groundwater flowing westward from the landfill. The upgrades to the system covered by the Phase II CAP will improve this system's ability to capture affected groundwater. The upgrades will also minimize any groundwater that may "slip through" or between the individual capture zones.

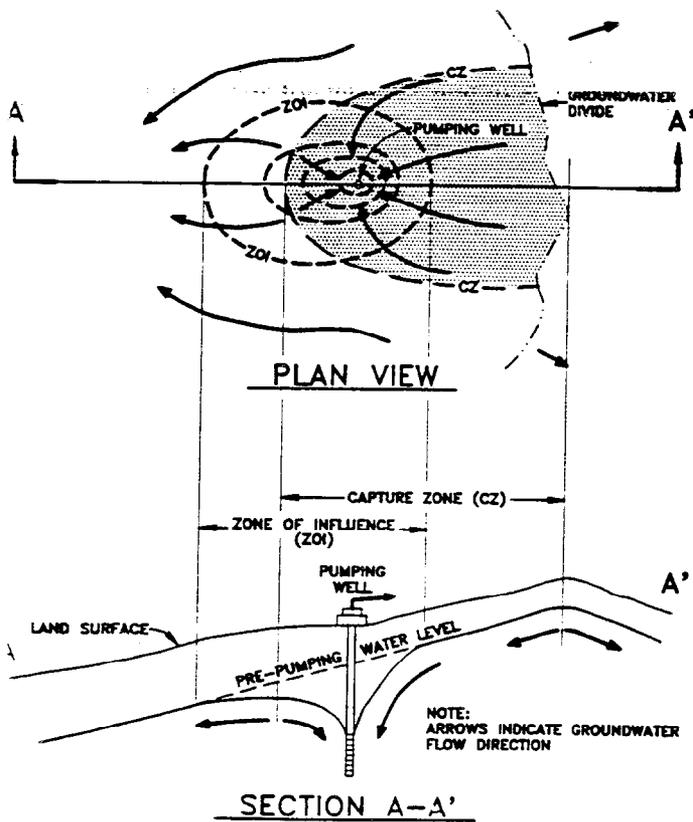


FIGURE 1

# Community Q&A

### *When is the Supplemental RCRA Facility Investigation Report expected to be complete?*

The data for the Supplemental RCRA Facility Investigation (SRFI) Report has been fully evaluated over the last year. The report will be reviewed by the Navy in February 1996 and should be available to the public in March 1996. The document may be reviewed at SUBASE's Information Repository or by contacting the Public Affairs Office at (912) 673-2001, ext. 4714.

### *What is the schedule for the Corrective Measures Study/Corrective Action Plan (CAP)?*

The CAP is one of the final steps in the RCRA Corrective Action Process. It is a document that addresses cleanup activities and identifies the selected corrective measures or actions that are most appropriate for the site (see the December 1994 edition of *EnviroUpdate* for more information). The Phase I CAP for the existing IM system has been approved by GADNR and implemented by the Navy. SUBASE is now preparing a Phase II CAP for completing the upgrades discussed earlier. The Phase II CAP is expected to be available for public review in March 1996. Once approved, construction activities may begin. A Final CAP for the overall cleanup at the landfill will be prepared once the results of the SRFI report are discussed and cleanup goals for soil and groundwater are determined by GADNR and the Navy.

### *How is groundwater modeling used during cleanup?*

Groundwater modeling uses mathematical equations that govern particle movement. It allows scientists to develop a hydrogeologic system that simulates a real life system. Computer, physical, and mathematical models help us to understand why a groundwater system is behaving in a particular manner and to predict how it will behave in response to different flow conditions. At SUBASE, modeling will be used to support the location and number of recovery wells that are needed to enhance the current treatment system.

## **Questions & Answers**

### **Naval Submarine Base Kings Bay - Who To Call?**

For general questions or information about SUBASE and the environmental program, contact:



**Robert Steller**  
**Public Affairs Officer**  
**(912) 673-2001 ext. 4714**



An Information Repository containing documents related to the environmental cleanup activities at SUBASE is also available to the public.

The Information Repository is located at:

**St. Marys Public Library**  
**100 Herb Bauer Drive**  
**St. Marys, Georgia 31558**  
**Telephone: (912) 882-4800**

**Become involved in the environmental program at SUBASE, attend a RAB meeting!**  
**These meetings are held quarterly and are open to the public.**  
**Mark your calendars for the next meeting scheduled for January 18th at 10:00 a.m.**

**Public Affairs Office**  
**Naval Submarine Base**  
**1063 USS Tennessee Avenue**  
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