TechData Sheet

Naval Facilities Engineering Service Center
Port Hueneme, California 93043-4370

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Assessment and Remediation Technologies for Environmental Cleanup

Modified Direct Push Monitoring Well Installation

The Naval Facilities Engineering Service Center (NFESC) and Naval Station Mayport, Florida, recently completed an innovative technology demonstration for installation of a modified direct push well (DPW) (Figure 1). The demonstration was accomplished under the Broad Agency Announcement (BAA) program and the Navy Environmental Leadership Program (NELP).

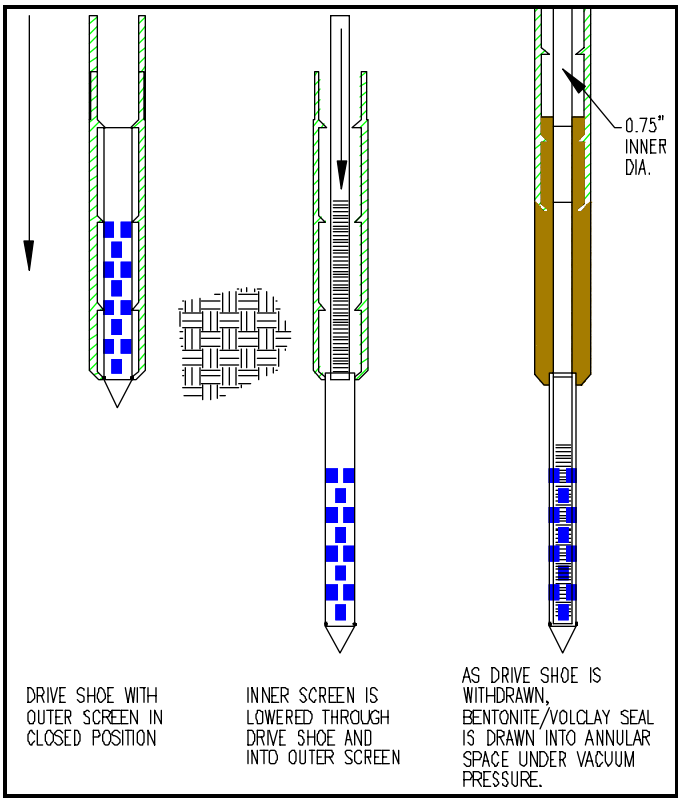

Figure 1. Installation steps for a modified direct push well.

Background and Schedule. Two sites at Naval Station Mayport were previously investigated due to the discovery of tetrachloroethene (PCE) and pesticides (benzene hexachloride and arsenic). Soil contamination has been characterized while groundwater impacts have not been investigated. This project addresses contaminants in the subsurface using DPW technology and modified borehole geophysical survey techniques. Additionally, it allows us to compare installation costs and sampling techniques with conventional wells.

Demonstration Schedule
Naval Station Mayport

Contract Award	9/96
Work Plans Draft	12/96
Work Plans Final	2/97
Phase I: 32 DPWs Installed, 4 Borings Logged	4/97
Report of Preliminary Results	6/97
Phase II: Additional DPWs and Conventional Well Installation	8/97
Final Report Complete	1/98

Innovative Technology. The innovative DPWs consist of a double screen system, protected by a steel drive tube with a sacrificial sealed tip, that is driven to within five feet of the desired screened interval (Figure 1). Once a desired depth is reached, a 1¼-inch diameter outer screen (Figure 2) is pushed out of the drive shoe and into the aquifer. A ¾-inch inner screen is then lowered down into the outer screen. A bentonite slurry is placed in the annular space through the drive shoe to seal the well. A packer prevents the grout from reaching the screened interval. This method minimizes the downwards migration of contaminates that can occur with traditional drilling methods.

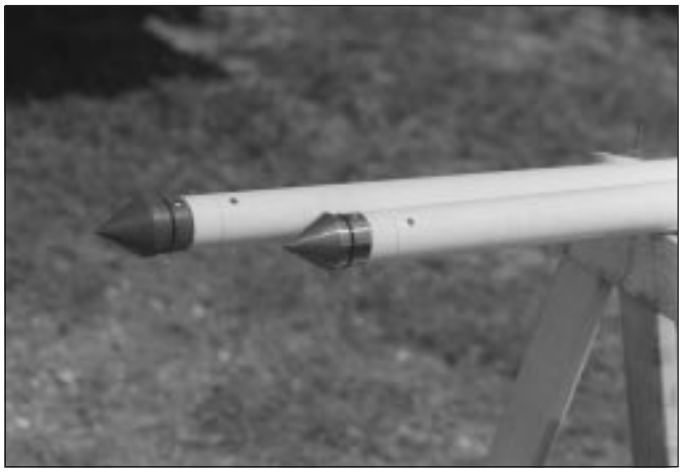

Figure 2. 1.25-Inch outer screen.

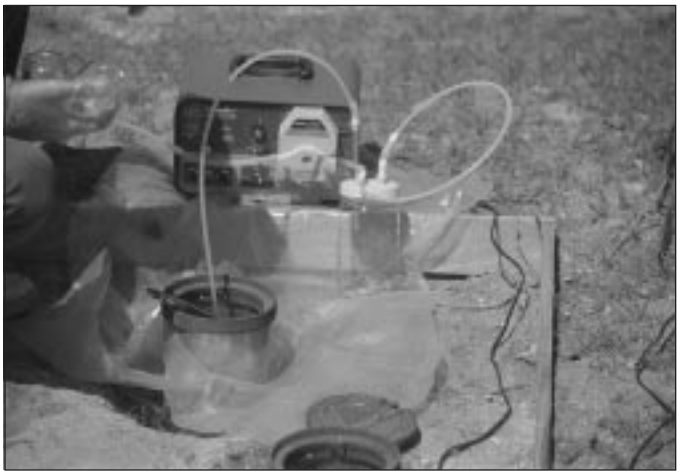

Figure 3. Down-hole sample collection.

Field Demonstration. Specific tasks accomplished in the field:

1. Boreholes were drilled at each site using a rotary wash method. A geologist used geophysical logging tools to characterize the subsurface geology at each borehole prior to installing the DPWs.

2. Forty-two DPWs were installed at depths of 3 to 10 feet (shallow), 10 to 15 feet (intermediate), and 27 to 32 feet (deep). Some wells were clustered to characterize shallow, intermediate, and deep geological conditions in specified areas.

3. Four 2-inch diameter monitoring wells, using hollow stem auger techniques were installed adjacent to DPWs to compare sampling and logging data, aquifer test results, and installation costs.

Sampling, Logging Data, and Aquifer Results. A series of chemical analyses and hydrogeolgic tests were run on the DPW and the 2-inch diameter hollow stem auger wells installed nearby (Figure 3). Analyte concentrations, specific conductance, and turbidity in the DPWs were approximately 6% to 30% higher than the conventional wells. Hydraulic conductivity values for DPWs, using the Bouwer and Rice Method of Data Evaluation, were 20% to 50% lower than the conventional wells. Hydraulic head values were the same.

Cost Comparisons. The cost of installing DPWs at each site was about 50% lower for shallow DPWs and 75% lower for deep DPWs, than the cost of installing conventional monitoring wells. The average cost for each DPW installation varied between $190.00 and $420.00 depending upon depth and geologic conditions.

This document is for informational purposes only and is not an endorsement. Applicability for remediation must be evaluated on a site-specific basis.

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