

NAS Pensacola, FL

Sludge Drying Beds/Surge Pond Ground Water Monitoring

Summary

The Navy, in conjunction with regulators, reduced the sampling frequency at a former sludge drying bed and surge pond site at Naval Air Station (NAS) Pensacola from quarterly to semiannually. The number of monitoring wells was reduced from 19 to 15. In addition, the Navy changed the contract type from a cost plus to a fixed price contract. These actions have saved the Navy over \$200,000 in annual monitoring costs. NAS Pensacola is currently investigating natural attenuation, hot spot source reduction, and the possibility of ceasing pump and treat operations to further optimize the cost effectiveness of the program.

1.0 Site Background

1.1 Site History

NAS Pensacola occupies approximately 5,800 acres on a peninsula in southern Escambia County, 5 miles south of the city of Pensacola, Florida. The former sludge drying beds and surge pond were located on a peninsula in the northeast corner of the NAS. These units are associated with the former industrial wastewater treatment plant (IWTP), now a wastewater treatment plant (WWTP), that received wastewater from activities on NAS property, including aircraft maintenance and metal plating.

Materials such as degreasers and paint strippers were leaked from various sources at NAS Pensacola, resulting in contamination of the sludge drying beds and surge pond. Consequently, soil and ground water in the area of the IWTP was contaminated by chlorinated solvents and other compounds.

In July 1986, the Environmental Protection Agency (EPA) conducted an inspection of the IWTP for compliance with the Resource Conservation and Recovery Act (RCRA). On the basis of this inspection, the EPA determined that the Navy Public Works Center was operating its IWTP in violation of regulatory and statutory requirements of RCRA. In November 1986, NAS Pensacola received a Notice of Violation (NOV) from the waste compliance section of the EPA Region IV. This NOV resulted in the closure of the sludge drying beds in 1987, on the basis that they had been receiving listed wastes (spent solvents). Following closure of the sludge drying beds, waste was dewatered to a solid state, containerized, and disposed of as a listed waste. The surge pond was closed in 1988, following installation of two aboveground surge tanks.

A ground water treatment system with seven recovery wells was activated at the site in February 1987 to contain the plume and treat ground water contamination. Ground water from the extraction wells was initially treated at the IWTP. Construction of an airstripper treatment system was begun in October 1995 to treat contaminated ground water that could no longer be sent directly to the domestic-waste-only treatment plant.

A soil removal action was conducted in 1989. Contaminated soils were excavated down to the water table. The sludge beds were removed, and the site was covered with an asphalt cap. The surge pond area was excavated and backfilled with clay.

1.2 Site Geology and Hydrology

Subsurface geology at the site consists primarily of homogeneous fine to medium grained sand. A gray clay layer was encountered between 40 and 60 feet below ground level (ft bgl) in most of the intermediate (36 to 48 ft bgl) and deep (65 to 70 ft bgl) monitoring wells. Shallow ground water monitoring wells (10 to 20 ft bgl) are all completed in fine to medium grained sand.

The ground water aquifer underlying the site is divided into three zones, corresponding with the three depths of monitoring wells. These zones display varying hydraulic gradients and conductivities, as well as flow directions and rates. Overall, site ground water flow is toward Pensacola Bay, which borders the site to the east. The depth to ground water is less than 5 ft bgl in some parts of the site.

2.0 Program Status

The sludge beds and surge pond are being remediated under RCRA. NAS Pensacola was placed on the National Priorities List (NPL) in December of 1989, and a Federal Facilities Agreement (FFA) was signed in October of 1990.

Ground water at the site has been monitored since 1990, and has been on a semiannual schedule since January 1992. Reporting for the monitoring program is also done on a semiannual basis.

3.0 Monitoring Program Summary

3.1 Initial Program

The initial ground water monitoring program included 19 monitoring wells, which were sampled quarterly and analyzed for 119 parameters. The ground water monitoring network for the site included a background well, nine "point of compliance" (POC) wells, and ten assessment wells.

3.2 Current Program

Under the current RCRA post-closure permit, 15 monitoring wells are required to be sampled semiannually and analyzed for 119 parameters. However, arsenic, vanadium and four radionuclides are analyzed only yearly. The current ground water monitoring network at the site consists of a background well, eight POC wells, and six assessment wells.

4.0 Contaminants

Site contaminants consist primarily of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals resulting from the handling of hazardous materials at NAS Pensacola. Ground water samples from the site are analyzed for a total of 119 constituents, as outlined below (EPA analytical method in parentheses):

- VOCs (8260)
- SVOCs (8270)
- Metals (6010)
- Arsenic (7060)
- Lead (7421)
- Mercury (7470)
- Selenium (7740)
- Chloride (325.2)
- Fluoride (340.2)
- Sulfate (9036)
- Nitrate (325.1)
- Complexed cyanides (9012)
- Gross alpha (900.0)
- Gross beta (900.0)
- Radium-226 (903.1)
- Radium-228 (904.0)
- Turbidity (180.1)
- pH (150.1)
- Specific conductance (120.1)
- Total coliform (909A)

5.0 Ground Water Monitoring Network

A total of 49 wells have been installed in the vicinity of the sludge drying beds and surge pond. Currently, 15 wells are sampled as part of the monitoring program and 20 of the remaining wells are used for determining ground water flow gradient. Attached are maps of the shallow (Figure 1) and intermediate (Figure 2) monitoring well networks. Table 1 shows the initial and current wells included in the ground water monitoring program.

6.0 Contract Type

The contract under which the ground water monitoring program is being performed is an indefinite quantity fixed price contract.

7.0 Cost of Ground Water Monitoring

The annual cost of the monitoring program in 1992 was \$302,370. In 1998, the annual cost was \$101,615, reflecting an annual savings of over \$200,000 from monitoring improvements.

8.0 What Prompted Review of Monitoring at the Site?

The Navy felt that the ground water monitoring approach was excessive and not cost effective, and began reviewing site history and data in the spring of 1996 to identify an alternative approach. In addition to monitoring improvements, it was determined that natural attenuation (under both aerobic and

anaerobic conditions) and hot spot source reduction should be evaluated to optimize the remedy.

9.0 Actions Taken To Reduce Ground Water Monitoring Costs

The following actions were taken to reduce monitoring costs associated with the site:

- Change of contractor and contract type from cost plus to fixed price.
- Reduce the frequency of sampling from quarterly to semi-annually.
- Reduce the number of monitored wells from 19 to 15.
- Shift some of the routine maintenance tasks for the pump and treat system away from contractor personnel to Base personnel.

10.0 Regulator Interface

State regulatory oversight of the sludge drying beds and surge pond monitoring program has been ongoing. When the RCRA permit was due for renewal in 1996, Southern Division technical personnel proposed an enhanced ground water management strategy based on the first year's results of an ongoing natural attenuation assessment. Natural attenuation and source reduction were proposed to be further evaluated as remedial alternatives for the site. The Navy requested a 1-year shutdown of the

Table 1. Initial and Current Monitoring Wells in the Ground Water Monitoring Program.

	Background	Point of Compliance	Assessment
Initial (19 wells total)	UG-1	PCS-1, PCI-1, PCD-1, GM-8, GM-9, GM-10, GM-68, GM-69	GM-62, GM-63, GM-64, GM-65, GM-66, GM-67, GM-11, GM-12R, GM-13, GM-14
Current (15 wells total)	UG-1	PCS-1, PCI-1, PCD-1, GM-8, GM-9, GM-10, GM-68, GM-69	GM-65, GM-66, GM-67, 33G12, 33G16, 33G20

pump and treat system to verify the effectiveness of natural attenuation and to perform source reduction of chlorinated VOCs in ground water with chemical oxidation (Fenton's Reagent). As part of the revised permit negotiations, the number of monitoring wells was reduced and constituents that had not been detected for several years were eliminated from the monitoring analyte list.

11.0 Other Actions Being Considered

Based on the successful results of the chemical oxidation source reduction completed in June 1999 and the verified effectiveness of natural attenuation, Southern Division NAV-FAC is currently preparing a Corrective Action Plan and permit modification to propose permanently discontinuing the pump and treat system and establish monitored natural attenuation as the final remedy.

Discontinuing the unnecessary pump and treat system will save an additional \$25,000 annually.

12.0 Contact Information

For more information regarding this NAS Pensacola case study, contact:

Remedial Project Manager, SOUTHDIV

Phone: (843) 820-7322

Fax: (843) 820-7465

Technical Manager, SOUTHDIV

Phone (843) 820-7422

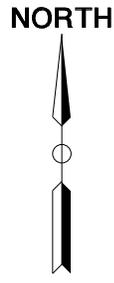
Fax: (843) 820-7465

RAO/LTM Optimization, NFESC

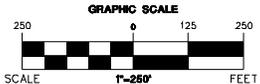
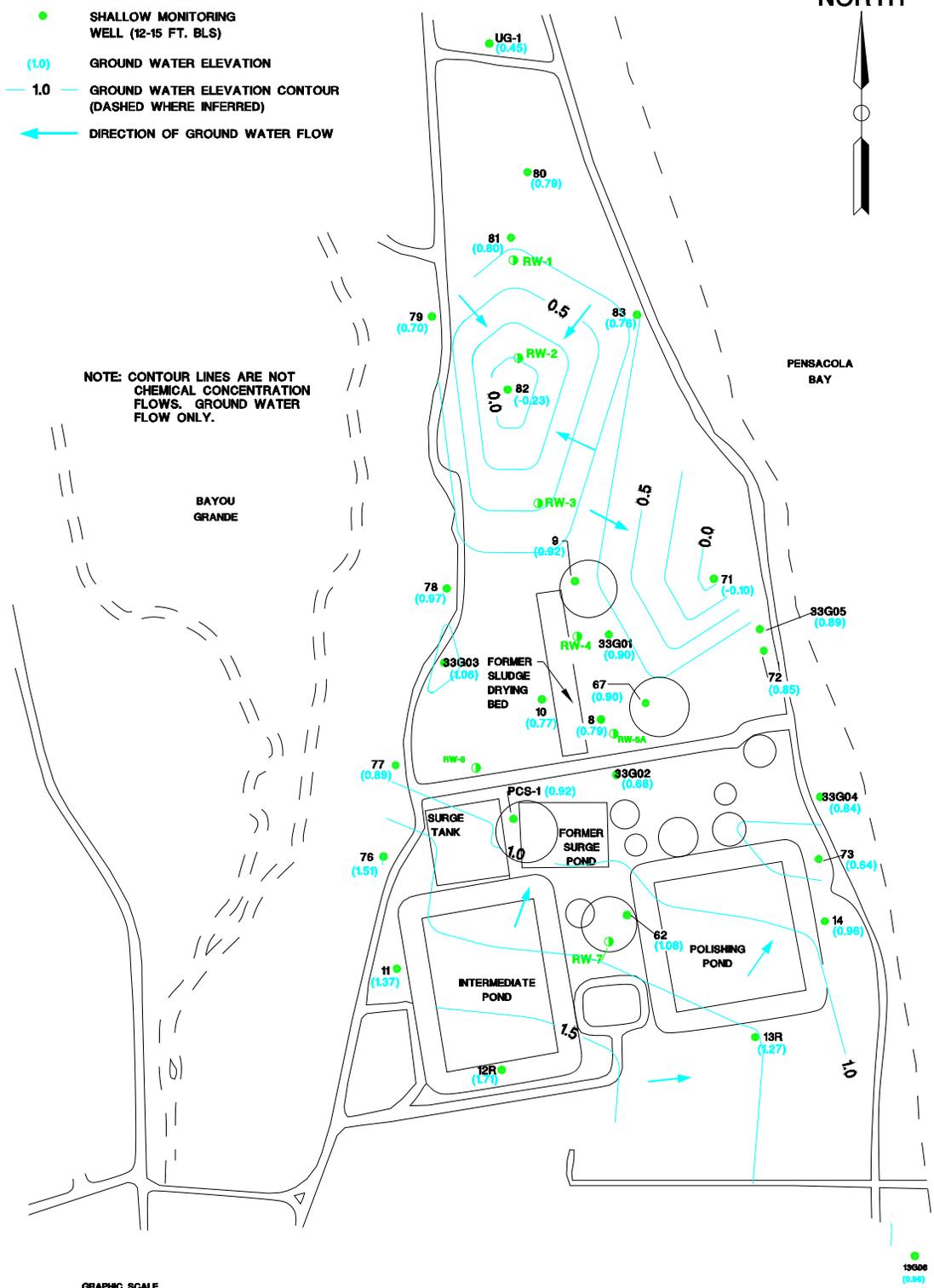
Phone: (805) 982-1556

Fax: (805) 982-4304

- LEGEND:**
- RECOVERY WELL
 - SHALLOW MONITORING WELL (12-15 FT. BLS)
 - (1.0) GROUND WATER ELEVATION
 - 1.0 — GROUND WATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
 - ← DIRECTION OF GROUND WATER FLOW



NOTE: CONTOUR LINES ARE NOT CHEMICAL CONCENTRATION FLOWS. GROUND WATER FLOW ONLY.



SOURCE:
E & E - 1992
RUST - AUG. 1996

NAS Pensacola DWTP-Pensacola, Florida
Shallow Zone Wells
July 14, 1998

N803937

Figure 1. Shallow Zone Monitoring Well Network

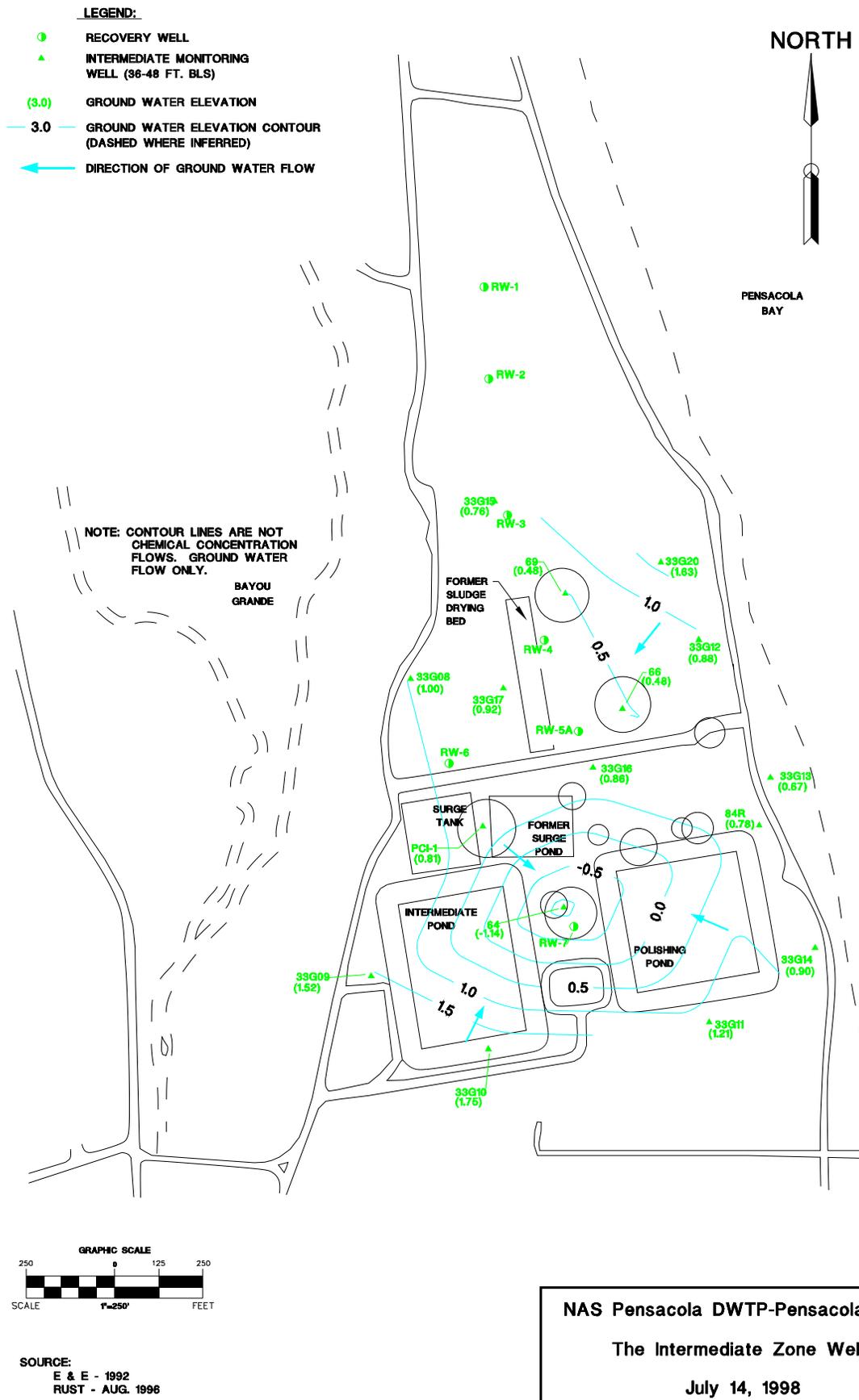


Figure 2. Intermediate Zone Monitoring Well Network