MCLB Albany, GA

CASE STUDY

Ground Water Monitoring Optimization

Industrial Wastewater Treatment Plant Sludge Drying Beds Ground Water Monitoring

Summary

The Navy, in conjunction with regulators, reduced the sampling frequency at a former sludge drying bed site at Marine Corps Logistics Base (MCLB) Albany from quarterly to semiannually. In addition, the Navy changed the contract type from a cost plus to a fixed price contract and significantly decreased the number of contractor maintenance visits. These actions have saved the Base nearly $250,000 in long term monitoring/remedial action operation (LTM/RAO) costs annually. MCLB Albany is currently investigating the possibility of ceasing pump and treat operations and including this site in a broader ground water management program to further optimize the cost effectiveness of the program.

1.0 Site Background

1.1 Site History

Marine Corps Logistics Base (MCLB) Albany is located approximately 192 miles south of Atlanta and 225 miles northwest of Jacksonville, Florida. Because MCLB Albany includes a depot maintenance facility, large quantities of industrial wastewater are generated from various industrial processes such as degreasing, paint stripping, and electroplating. All of the industrial wastewater is treated at the Base's Industrial Wastewater Treatment Plant (IWTP).

The IWTP began operations in 1977 and remains in service today. Initially, the plant pretreated industrial wastewater, which was then routed to the Base's Domestic Wastewater Treatment Plant (DWTP). The Base DWTP was closed in 1990, and the IWTP currently discharges to the City of Albany DWTP.

Three sludge drying beds associated with the IWTP leaked chlorinated solvents and metals to underlying soil and ground water. These drying beds were closed in 1987, following approximately 10 years of service. At the time of closure, 3 to 4 feet of soil was removed under the beds. The excavation was then backfilled with clay and capped with 12 inches of concrete.

A pump and treat system has been in operation at the site since January 1990. This system initially had three recovery wells, and an additional three wells were added in February 1995.

There is a trichloroethylene (TCE) plume in ground water at the site, with concentrations ranging up to 44 μg/L. TCE is the only compound above regulatory limits, and concentrations appear to be stabilizing. Upgradient ground water at this site has higher concentrations of TCE than measured in site monitoring wells.

1.2 Site Geology and Hydrogeology

MCLB Albany is located within the coastal plain of Georgia. The coastal plain sediments underlying the Albany area consist of alternating layers of sand, clay, shale, and limestone, which exhibit lateral variations in thickness and lithology. The uppermost

water-bearing formations that underlie the sludge drying bed site are the Residuum and the Ocala Limestone. The Residuum is the weathered portion of the Ocala Limestone, and consists of reddish-brown sandy, silty clay with residual limestone. The Residuum varies in depth below surface from approximately 60 to 100 feet across the site. The Ocala Limestone is variably fine to coarse grained, chalky, and fossiliferous (Hicks, et al., 1981). Recovery wells are screened at the bottom of the Residuum.

The Ocala aquifer is recharged primarily by the infiltration of rainfall through the Residuum. This aquifer is generally confined wherever it is overlain by Residuum. Seasonal fluctuations within the Ocala result from higher precipitation and lower evapotranspiration rates in the winter months. Increased pumping for irrigation in the summer months also contributes to the seasonal fluctuations. Although the regional ground water flow for the Ocala Aquifer is to the south, ground water flow in the area of the sludge drying beds is to the west. Ground water flow direction in the area of MCLB Albany is influenced by the Flint River, located to the west.

2.0 Program Status

The sludge drying beds are in RAO status, and are being remediated under the Resource Conservation and Recovery Act (RCRA). Ground water at the site has been monitored since 1994, and has been on a semiannual schedule since 1997. Reporting for the LTM program is also done on a semiannual basis.

3.0 LTM Program Summary

3.1 Initial Program

The initial ground water monitoring program included 11 monitoring wells, which were sampled quarterly and analyzed for 23 parameters. The ground water monitoring network for the site included a background well and 10 “point of compliance” (POC) wells.

3.2 Current Program

Under the current RCRA post-closure permit, the same 11 monitoring wells specified in the original permit are required to be sampled semiannually and analyzed for nine parameters.

4.0 Contaminants

Site contaminants consist primarily of chlorinated solvents and metals. Currently, only TCE exceeds regulatory limits, and concentrations of this compound have declined and stabilized over time. Ground water samples from the site were initially analyzed for a total of 23 constituents, but in 1997 the Navy in conjunction with the State decreased the number of site analytes to nine. The current analyte list for the site is:

- pH
- Specific conductance
- 1,1-Dichloroethane
- 1,1-Dichloroethylene
- 1,2-Dichloroethylene
- Cis 1,2-Dichloroethylene
- 1,1,1-Trichloroethane
- Trichloroethylene
- Total Xylenes

5.0 Ground Water Monitoring Network

A total of 16 monitoring wells and six recovery wells have been installed at the sludge drying beds site. Figure 1 shows a map of the site, including the monitoring and recovery well network. Table 1 shows the wells required to be monitored by the current RCRA post-closure permit.

6.0 Contract Type

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

Table 1. Monitoring Wells in the Ground Water Monitoring Program

	Background	Point of Compliance
Wells Required by RCRA Post-Closure Permit	MW-15	MW-2, MS-3, MW-4, MW-4B, MW-5, MW-6, MW-6A, MW-7, MW-17, P6
Other Site Monitoring Wells	MW-1, MW-10, MW-11, MW-13, MW-14	

7.0 Cost of Ground Water Monitoring

The annual cost of the LTM program in 1995 was $351,040. In 1998, the annual cost was $102,280, reflecting annual savings of approximately $250,000.

8.0 What Prompted Review of LTM at the Site?

As levels of contaminants decreased in the ground water, the Navy and the State of Georgia agreed that the monitoring effort could be reduced. Recommendations to decrease monitoring frequency and modify the RCRA permit were supported by site data.

9.0 Actions Taken To Reduce Long Term Ground Water Monitoring Costs

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

- Change the contractor being used, and change the contract type from cost plus to fixed price.
- Reduce the frequency of sampling from quarterly to semi-annually.
- Decrease operation and maintenance of RAO from weekly to quarterly, and allow for two emergency service visits.
- Decrease the number of analytes from 23 to nine.
- Shift some of the routine monitoring tasks for the pump and treat system away from contractor personnel to Base personnel.

10.0 Regulator Interface

Although there were some growing pains when MCLB Albany transitioned to a new LTM contractor; the Base, current contractors, and the State have now established a cooperative working relationship. It has been the MCLB and the State's cooperative initiative to reduce the amount of monitoring being performed at the sludge drying beds.

Ground water data for the site supported a reduction in monitoring around the sludge drying beds. Site contaminant levels were decreasing asymptotically to near the ground water standards, but it appeared that the rate of reduction from pumping and treating ground water was slowing significantly. When MCLB Albany's permit was up for renewal, the State suggested that the LTM contractor include recommendations in their next report for streamlining the program. As a result, the LTM permit requirements were significantly reduced. The State and the Navy are currently looking at an integrated Basewide LTM program to more effectively manage ground water. This will further improve the overall understanding of ground water quality in a more cost-effective manner.

11.0 Other Actions Being Considered

Other actions being considered to further optimize the LTM program at the site include:

- Ceasing operation of the pump and treat system—this could save approximately $25,000, or nearly 25 percent of the RAO/LTM budget, annually.

- Including this site in a broader ground water management strategy—this could result in “economy of scale” cost savings.

12.0 Contact Information

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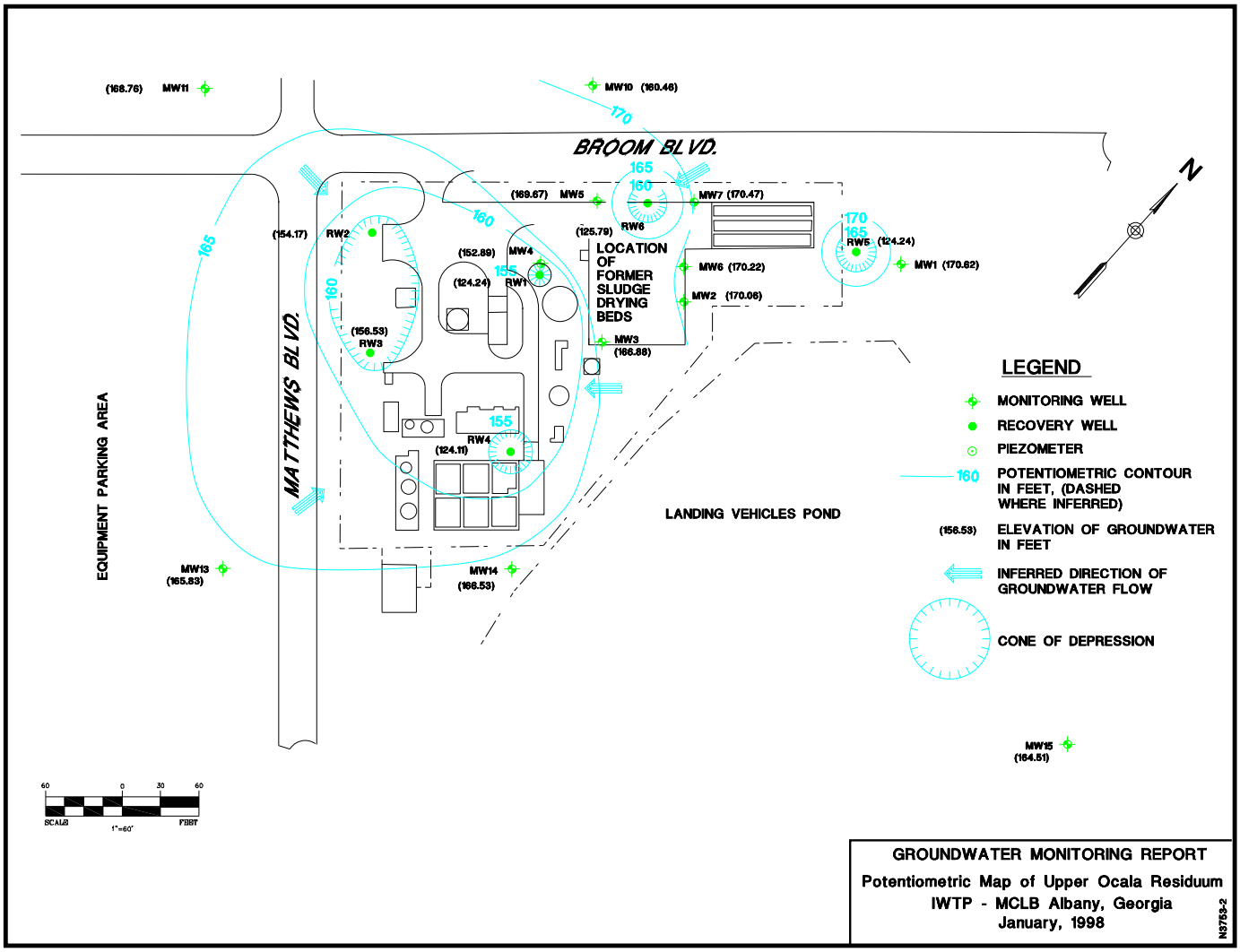

Figure 1. Monitoring Well Network for the Sludge Drying Beds