

Project Name

Shoreco North and Shoreco South Remedial Investigation and Feasibility Study

Client

Jenny Oil Company

Services Provided

- # Assisted in Negotiating an Administrative Consent Order
- # Performed a Phase I: Interim Remedial Measures
- # Performed a Phase II: Remedial Investigation/Feasibility Study
- # Performed a Phase III: Remedial Design and Remedial Action
- # Coordinated Acute and Chronic Bioassay Tests On Effluent From Treatment System

Project Description

Shoreco North and Shoreco South, both owned by Jenny Oil Corporation, together comprised the NJDEP's highest priority groundwater contamination case. Public water supply wells for the Township of Mahwah were located within one-and-a-half miles of confirmed groundwater contamination. Both sites were contaminated with gasoline products associated with Jenny Oil's truck stop operation in Mahwah.

SAI initially assisted Jenny Oil in negotiating an Administrative Consent Order with NJDEP. Based on SAI's cost estimates, financial assurances required from Jenny Oil were reduced, by the NJDEP, by a factor of five.

SAI completed Phases II and III of this project. Work included an innovative engineering design for a dual-pump recovery system to pump groundwater and floating product that had been implemented as an interim remedial measure. Using this system, 850,000 gallons were pumped and decontaminated, thereby reducing pollutant mass in calculated groundwater systems by an estimated 30% in less than one year. At the same time, longer term measures had been evaluated as part of the feasibility study. Other innovations were also introduced, such as the use of field data to calibrate the computer model which was used in the remedial investigation process to simulate conditions of the aquifer in response to alternative remediation scenarios.

Approach

Phase I - Interim Measures and Biological Testing

The dual-pump recovery system designed by SAI used sand filters to recover free floating oil and carbon units to treat the water recovered. Other Phase I tasks included ongoing weekly sampling at discharge points for specific pollutant parameters and maintenance of monitoring wells for groundwater sampling. Drums of soil and groundwater from previous excavations and monitoring wells were classified and disposed of off-site.

Jenny Oil Project History Continued:

In order to secure all necessary NJDEP permits, SAI assisted the Client in performing acute and chronic bioassay testing of the treatment system effluent. A 96-hour acute bioassay test was performed on the test species Pimephales promelas, and a chronic toxicity characterization bioassay test was performed on the same species for a seven-day larval survival and growth test, and on Ceriodaphnia dubia for a three brood survival and reproduction test. The tests were performed in accordance with N.J.A.C. requirements. As a result of the bioassay tests, NJDEP eliminated the bioassay requirement from the facility's permit.

Phase 2 - Remedial Investigation / Feasibility Study

- a. Field Investigation Work - The impact of stormwater discharge on the aquifer was studied with storm sewer inspection using remote television monitoring. Sediment and surface water sampling included (1) measurement of the free floating product (found to be of insignificant volume); (2) groundwater elevation measurement to evaluate the spatial and temporal direction of flow; and (3) standard groundwater and soil sampling.

In addition, a step-drawdown and 48-hour aquifer tests were performed. The pump test report was submitted to NJDEP and was used for calibrating a model simulating aquifer conditions. Advanced techniques were also used to perform a soil gas survey to investigate contaminant impact in the unsaturated zone. Samples were collected along a grid to delineate the plume, which corresponded with expectations derived from groundwater sampling. Results of these surveys were used in turn to place four new monitoring wells.

- B. Analysis - Groundwater elevation data and pump data were used to determine additional aquifer characteristics such as transmissivity, permeability, storativity coefficient and well efficiency, which were also used in model calibration. The model used to simulate conditions of the aquifer at the site was the three-dimensional U.S. Geological Survey computer model which SAI calibrated based on actual conditions using state-of-the-art techniques that combined optimization and sensitivity analysis.

A three-dimensional representation was developed for the local geology using data from soil borings, and a fence diagram was submitted to the NJDEP. Data from sampling and modeling were synthesized to delineate the plume of contamination, and the impact of alternative proposed systems to remove contaminated water from the aquifer were simulated to ensure a feasible and efficient solution. Options evaluated included use of a recovery well system and use of subsurface drains.

A feasibility study was completed and a groundwater system is operating at the site.