



US Army Corps
of Engineers
Huntsville Center

Environmental and Munitions Center of Expertise (EM CX)

Remediation System Evaluations

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Background

What is a Remediation System Evaluation (RSE)?

The RSE process was developed by the U.S. Army Corps of Engineers Environmental and Munitions Center of Expertise (HTRW CX) during the late 1990's to assess the protective-ness and cost effectiveness of an operational system. Specifically, RSEs are intended to:

- identify and troubleshoot remedy effectiveness problems,
- reduce operating costs,
- confirm the project team has a clear exit strategy for the site, and
- verify proper maintenance of government-owned equipment.

The RSE provides an independent technical review of system operations and costs by a team of senior technical staff in consultation with the project team.

Who Has Used RSEs

The RSE process has been successfully used on behalf of several federal agencies at more than 55 sites across the country. EPA has adopted the RSE process for evaluating the cost-effectiveness of remedies at fund-financed sites and has applied, with assistance of USACE staff and contractors, the RSE process at more than 45 Superfund sites. Other users of RSEs are the Department of Defense, the Department of Energy and NASA.

Two case studies are described on page 2. A list of USACE-conducted RSEs is available at: <http://www.environmental.usace.army.mil/docs/HistoricalRSEs.xls>.



Courtesy photo

The project team uses the RSE at this site. The RSE process reduces the annual operation and maintenance costs by 20 to 30 percent.

Benefits

Periodic optimization of the systems can improve their effectiveness in protecting human health and the environment, speed clean up, and substantially reduce costs for operation, maintenance and monitoring.

Optimization efforts conducted to date at federal sites suggest that annual O&M costs may be reduced by 20-30 percent (or more) using the RSE process. RSEs have identified potential cost savings of \$35,000 to more than \$500,000 per year in operations and maintenance at each site.

Costs

An RSE typically costs less than \$30,000 and can be completed in two to three months. This includes senior staff labor and travel.

For more information

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Visit the RSE Web site at: <http://www.environmental.usace.army.mil/rse.htm>.

For more optimization information, visit the Federal Remediation Technology Roundtable optimization page at <http://www.frtr.gov/optimization/>.



Case Study Number 1

Background

A facility-wide RSE was performed at a 5,000 acre Air Force base in the central U. S. The RSE addressed contamination in 12 operable units (OUs). The RSE evaluated multiple ground water extraction, soil vapor extraction, multiphase extraction systems and associated treatment facilities.



Groundwater treatment facility flow rates ranged from 15 to 100 gpm.

Primary water treatment processes consisted of air

stripping and granular carbon adsorption. Contaminants included petroleum hydrocarbons, chlorinated solvents and selenium.

Findings

The existing operations staff was continuously evaluating methods of optimizing operations. The RSE evaluators made the following recommendations:

- Perform additional capture zone analyses at three OUs,
- Modify pumping rates at two OUs,
- Reduce groundwater monitoring frequency at numerous OUs,
- Consider converting one SVE system to Bioventing,
- Convert four extraction systems to monitored natural attenuation,
- Use an alternative discharge point from the primary treatment facility,
- Modify the existing well maintenance program,
- Develop a closure strategy plan.

Costs

Annual operations and maintenance cost is \$1.4 million and the RSE cost is \$35,000. The projected annual savings is \$350,000, or 25 percent.

Case Study Number 2

Background

An RSE was performed at a one-acre Superfund Site in Michigan. The former electroplating site lies adjacent to a stream. Untreated wastes containing volatile organic compounds (VOCs), and heavy metals from plating and finishing operations were discharged on site. Following source removal, a soil vapor extraction system was installed to remove VOCs, and a groundwater treatment facility was built to remove VOCs, heavy metals and cyanide. Processes employed included metals precipitation, air stripping and granular activated carbon at a flow rate of approximately 140 gpm.

Findings

The existing operations staff and regulators were extremely helpful in the evaluation and implementation of recommendations. The RSE team made the following recommendations:

- Perform capture zone analyses,
- Assess alternate source area treatment alternatives,
- Revise monitoring program, data evaluation protocols and reporting
- Bypass treatment plant, discharge to the POTW
- Modify the existing well maintenance program,
- Develop a closure strategy plan.
- Reduce level of operations oversight.



Costs

Annual operations and maintenance cost is \$440,000 and the RSE cost is \$25,000. The projected annual savings is \$115,000 or 27 percent.