

**Environmental
Resources
Management**

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14 November 2005
Reference: 0031460

Massachusetts Department of Environmental Protection
Northeast Region Office
Bureau of Waste Site Cleanup
1 Winter Street
Boston, MA 02108



RE: Remedy Operation Status Report
May 2005 through November 2005
Former Raytheon Facility (the "Site")
Wayland, Massachusetts
Release Tracking Number 3-13302, Tier IB Permit No. 133939

To Whom It May Concern:

On behalf of Raytheon Company (Raytheon), Environmental Resources Management (ERM) is pleased to submit this Remedy Operation Status (ROS) report for the Former Raytheon Facility located at 430 Boston Post Road in Wayland, Massachusetts (Figure 1) for the period from May 2005 through November 2005. This ROS report was prepared to satisfy the requirements of the Massachusetts Contingency Plan (MCP) 310 CMR 40.0893. The original Massachusetts Department of Environmental Protection (Department) ROS transmittal form (BWSC 108) is attached to this report. A copy is included in Appendix A.

BACKGROUND

A Phase IV Completion Report was submitted to the Department in November 2004 for portions of the approximately 83-acre property (Figure 2). For purposes of this document, the Site is defined as the portion of the Former Raytheon Property covered under Release Tracking Number (RTN) 3-13302 and Tier IB Permit Number 133939. The Phase IV Completion Report documented wetland remediation activities conducted from October 2003 through October 2004, and groundwater remediation activities conducted from May through July 2004. An ROS report was also submitted to the Department for activities performed from November 2004 through April 2005.

Since remedial activities did not include the installation of an active treatment system, this ROS will only discuss wetland and groundwater monitoring activities that have been conducted since the submission of the last ROS report.

MONITORING DATA

Wetlands Monitoring Activities

Wetlands monitoring activities during this reporting period included invasive species control and annual monitoring tasks. Seed heads of Purple Loosestrife and Barnyard Grass were manually removed throughout the wetland remediation area in August 2005 to reduce the population for the next growing season. A small stand of Common Reed was also removed and the area in which they were located was covered with black plastic to prevent the tubers from sprouting.

For the next three years (2006-2008), annual monitoring activities will be conducted in accordance with the Phase IV Completion Report (ERM, 2004) from May through September each year. An annual monitoring report will be submitted to the Department under separate cover.

The overall success of the restoration is evaluated based on the following success standards:

- survivorship of planted stock;
- percent areal cover;
- invasive species control; and
- erosion control.

Corrective actions are taken for each standard that does not meet its criteria for success. Results of monitoring activities and corrective actions, if any, will be presented in future ROS reports.

Groundwater Monitoring Activities

Groundwater monitoring was conducted in accordance with the Phase IV Completion Report to evaluate the efficacy of the In-situ Chemical Oxidation (ISCO) treatment program over time. Originally groundwater

monitoring activities were conducted quarterly, however during this reporting period ERM determined that the groundwater conditions were static enough to require semiannual monitoring data. Monitoring activities thus only occurred in October 2005. The groundwater-monitoring program will continue semiannually until such time as permanganate concentrations have significantly decreased in Site monitoring wells. The monitoring program includes the following wells (Figure 3):

- MW-102 Area (18 wells): MW-47S, MW-47M, MW-47D, MW-101, MW-102, MW-103, MW-201S, MW-201M, MW-201D, MW-203S, MW-203M, MW-203D, MW-204S, MW-204M, MW-204D, MW-213, MW-214 and MW-403;
- MW-33 Area (11 wells): MW-33S, MW-33M, MW-107, MW-109, MW-111, MW-113, MW-115, MW-202S, MW-202M, MW-208S and MW-208M;
- MW-43 Area (11 wells): MW-43S, MW-104, MW-105, MW-105M, MW-106, MW-106M, MW-209, MW-210, MW-211, MW-212 and MW-212M;
- MW-40 Area (two wells): MW-40 and MW-40S; and
- Main Building Area (five wells): MW-117, MW-118, MW-404, MW-405S, IP-16S, IP-16D and IP-17D.

Monitoring activities include:

- measurement of groundwater elevations;
- the visual determination of groundwater color (indicative of the presence of permanganate);
- the collection of groundwater samples for analysis of permanganate concentration;
- the measurement of groundwater geochemical field parameters, including temperature, conductivity, pH, dissolved oxygen (DO), and oxidation-reduction potential (ORP); and
- the collection of groundwater samples for laboratory analyses.

Geochemical parameters were only recorded for groundwater samples showing no visible permanganate color, because exposure of the water-quality instrumentation to permanganate would cause physical damage

to the instrument. Table 1 summarizes the monitoring wells where visible permanganate was observed and which locations were analyzed for VOCs for each sampling event since the ISCO injection.

Groundwater Gauging

ERM conducted groundwater gauging at all accessible Site wells on 26 September 2005. Table 2 presents groundwater gauging results for each round. Table 3 presents calculated vertical hydraulic gradients. Shallow and deep-aquifer groundwater elevation contour maps for the October 2005 gauging events are presented in Figures 4 and 5, respectively.

Groundwater Monitoring – Physical Parameters, Color and Permanganate

Groundwater monitoring was conducted in October 2005. The results from the field parameter monitoring events are summarized on Table 4.

Color and permanganate data collected are presented in Table 5. Color was employed as a tracer to monitor the presence, approximate concentration and distribution of permanganate over time. Color observations confirmed the presence and persistence of residual permanganate in the application areas at varying, but generally decreasing, concentrations over time in each injection area.

Groundwater Monitoring – Laboratory Analyses

Groundwater samples were collected from those wells listed above for laboratory analyses of dissolved sodium by EPA Method 6010B, and volatile organic compounds (VOCs) by EPA Method 8021B.

Table 6 summarizes VOC analytical results. Table 7 presents dissolved sodium and historical chloride results. Laboratory analytical reports are presented in Appendix B.

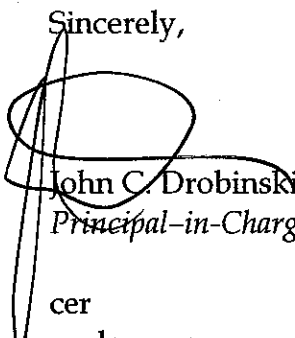
ERM ceased collection of chloride analyses following the December 2004 sampling event. Chloride is a byproduct of the groundwater remediation process (i.e. oxidation of chlorinated ethenes). An evaluation of the baseline and subsequent chloride data could not resolve, increases and decreases of chloride concentrations with ISCO injections. Going forward, we do not anticipate being able to use chloride concentration data to support our ongoing evaluation of groundwater remediation activities.

REMEDY OPERATING STATUS OPINION


See BWSC Form 108 in Appendix A.

If you have any questions or comments in regard to this submittal please contact the undersigned at (617) 646-7800.

Sincerely,



John C. Drobinski, P.G., LSP
Principal-in-Charge



Jeremy J. Picard, P.G.
Project Manager

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enclosures:

Table 1 VOC Groundwater Monitoring Schedule
Table 2 Summary of Groundwater Gauging Data
Table 3 Summary of Vertical Hydraulic Gradients Data
Table 4 Summary of Groundwater Field Parameter Measurements
Table 5 Summary of Permanganate Concentration and Color
Table 6 Summary of Groundwater VOC Analytical Data
Table 7 Summary of Groundwater Sodium and Chloride Analytical Reports

Figure 1 Site Locus Map
Figure 2 Remediation Site Plan
Figure 3 ISCO Treatment Areas
Figure 4 Upper Potentiometric Surface - October 2005
Figure 5 Lower Potentiometric Surface - October 2005

Appendix A BWSC Form
Appendix B Analytical Data Reports

cc: Edwin Madera, Raytheon
Benson Gould, CMG
Brian Monahan, Town of Wayland Conservation Commission
Public Repositories (2)
Paula Phillips, Congress Group