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20 May 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
December 2004 through April 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 November 2004 through April 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 (ERM, 2004) 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 (ERM, 2004) documented wetland remediation activities conducted from October 2003 through October 2004, and groundwater remediation activities conducted from May through July 2004.

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 Phase IV Completion Report (ERM, 2004).

MONITORING DATA

Wetlands Monitoring Activities

There were no wetlands monitoring activities conducted since the submission of the Phase IV Completion Report (ERM, 2004). The 2004 Restoration Monitoring Report is included as Appendix B. The monitoring report includes monitoring methods, standards for success and results.

For the next four years (2005-2008), 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.

At the end of the second year (i.e. 2005), overall success of the restoration will be evaluated based on the following success standards:

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

Corrective actions will be 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 (ERM, 2004) to evaluate the efficacy of the In situ Chemical Oxidation (ISCO) treatment program over time. The groundwater-monitoring program will be continued until such time as permanganate concentrations have significantly decreased in Site monitoring wells. The monitoring program includes the following wells:

- MW-102 Area (18 wells): MW-101, MW-102, MW-103, MW-213, MW-214, MW-47S, MW-47M, MW-47D, MW-201S, MW-201M, MW-201D, MW-203S, MW-203M, MW-203D, MW-204S, MW-204M, MW-204D 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 well MW-405D (Main Building Area) was damaged and will no longer be used a long term monitoring point. IP-17D is being sampled in its place. IP-16S and IP-16D were also added to the long-term monitoring schedule.

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. VOC samples were also not taken at these locations either, as quantities of permanganate would interfere with VOC analyses. Table 1 summarizes what monitoring wells that 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 6 December 2004 and 18 April 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 April 2005 gauging events are presented in Figures 3 and 4, respectively.

Groundwater Monitoring – Physical Parameters, Color and Permanganate

Groundwater monitoring was conducted in December 2004 and April 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 sodium, chloride, and volatile organic compounds (VOCs) by EPA Method 8021B.

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

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. 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	Shallow Potentiometric Surface – April 2005
Figure 4	Deep Potentiometric Surface – April 2005
Figure 5	TCE Groundwater Concentrations - April 2005

Appendix A	BWSC Form
Appendix B	2004 Restoration Monitoring Report
Appendix C	Analytical Data Reports

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