Raytheon

Raytheon Systems Company
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Sudbury, Massachusetts
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January 31, 2003

Mr. Jeff Ritter
Wayland Town Hall
41 Cochituate Road
Wayland, MA 01778

Re: Pilot Study Status Report
Release Abatement Measure 120-Day Status Report
Former Raytheon Facility
430 Boston Post Road
Wayland, Massachusetts (the "Site")
RTN 3-13302, Permit No. 133939

Dear Mr. Jeff Ritter:

Raytheon Company has submitted a report summarizing activities and preliminary findings of a pilot study it is conducting to evaluate the effectiveness of a method to treat the groundwater, in-situ chemical oxidation, at its former Site in Wayland. Copies of the report submitted to the Massachusetts Department of Environmental Protection (DEP) are available at the Wayland Public Library and the Wayland Board of Health. The document is also located on the Site Webpage:

www.ermne.com
username: raytheon
password: wayland
*case sensitive

In situ chemical oxidation is a process that breaks down chlorinated volatile organic compounds in the groundwater into harmless end-products, such as carbon dioxide, water and chloride. A chemical oxidant is injected into the ground to stimulate the chemical breakdown. The entire process, which takes place in the ground (in situ), is safe to the environment.

A summary of the report is enclosed. Additional reports will be submitted as the pilot study progresses. At the conclusion, a public meeting will be held to review the findings of the study and to discuss an effective method for treating the groundwater.

Raytheon looks forward to continued participation with the community throughout the completion of this important project. If you have any questions regarding the report, please contact me at (978) 440-1813 or at the address listed below.

Sincerely,

Edwin P. Madera
Raytheon Company
Sr. Environmental Engineer
528 Boston Post Road
M/S 1880
Sudbury, MA 01776

Enclosure

cc: Mr. John Drobinski, ERM, 399 Boylston Street, 6th Floor, Boston, MA 02116
Massachusetts Department of Environmental Protection –Wilmington, MA 01887
Wayland Board of Health (PIP Repository)
Wayland Public Library (PIP Repository)
PIP Participants

Summary
In Situ Chemical Pilot Study Status Report
(Release Abatement Measure - RTN 3-13302, Permit No. 133939)

Raytheon Company (Raytheon) is continuing pilot studies to evaluate the effectiveness of in-situ chemical oxidation (ISCO) in reducing the concentrations of chlorinated volatile organic compounds (CVOCs) in the groundwater. A chemical oxidant is injected into the ground to stimulate this chemical breakdown. The entire process, which takes place below ground (in situ), is safe to the environment.

Raytheon initiated ISCO pilot studies at the site in October 2001 as a Release Abatement Measure (RAM). Raytheon submitted a Modification to the initial RAM Plan in October 2002 to conduct an expanded pilot study in the MW-43 area. This expanded pilot test was designed to evaluate the ability to reduce the concentration of CVOCs using pressurized injection of oxidant (sodium permanganate) and multiple injection points and injection intervals. The activities were selected to provide additional treatment of the subsurface materials while building upon the results from the previous RAM activities.

The status report provides a discussion of the following tasks completed to date as part of the expanded pilot study:

- Installed six additional monitoring points:
    - Four monitoring wells were installed adjacent to either existing shallower wells or between shallow and deeper wells; and,
    - Two shallow wells were installed in accessible areas beneath the existing building.
- Established baseline groundwater flow and quality data within the pilot test area prior to injection.
- Injected Permanganate: Approximately 9,000 gallons of a 23% sodium permanganate solution were injected into five application points.
- Installed confirmatory soil borings: Four soil cores were collected in the pilot area to evaluate the extent (vertically and laterally from the application points) of permanganate distribution in soil.
- Conducted post-injection groundwater flow and quality monitoring within the pilot test area after conducting the injections.

The following provides some preliminary findings from the pilot study. Future monitoring will be conducted to better understand the effectiveness of the pilot study.

1. The baseline monitoring data indicated that groundwater elevations were consistent with historical data, the permanganate previously added in this area had fully reacted prior to this injection event and the concentrations of CVOCs in this area were within the range of concentrations detected prior to the initial pilot study.
2. Sodium permanganate was injected into the subsurface in the MW-43 pilot area under pressure. The permanganate application was conducted using five application points at vertical intervals from 16 to 27 feet in depth. The injections were conducted at pressures generally ranging from 80 to 160 pounds per square inch (psi). Based on the results of confirmatory soil borings and groundwater monitoring data, the lateral distribution of permanganate was observed to be between 15 and 30 feet and the vertical distribution was observed to be between 13 and 18 feet. This is a significantly larger distribution than that resulting from the gravity addition (5 to 10 feet) conducted earlier in this area.
3. Permanganate persisted in the immediate vicinity of the injection throughout the monitoring period. Continued monitoring will be conducted to evaluate the permanganate consumption rate.

A more detailed summary of the RAM Plan Modification Status Report can be found at the public repositories located at the Wayland Public Library and Wayland Board of Health Office and Site Webpage.