

January 31, 2002

Mr. Jeff Ritter  
Executive Secretary  
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*  
*RTN 3-13574, Permit No. 133939*

Dear Mr. Ritter:

Raytheon Company has submitted a report summarizing preliminary activities and 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. A summary of the report is enclosed.

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.

This is the first report Raytheon has submitted to DEP since the public meeting held with the Public Involvement Plan (PIP) participants on August 31, 2001 to review the pilot study. 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. This pilot study will provide the company, as well as the community, valuable information to identify the most effective method for treating the groundwater. If you have any questions regarding the report, please contact me at (508) 490-1707 or at the address listed below.

Sincerely,



Ronald C. Slager, Jr.  
Raytheon Company  
Restoration Program Manager  
1001 Boston Post Road  
M/S 1-2-1567  
Marlborough, MA 01752

Enclosure

cc: Mr. John Drobinski, ERM, 399 Boylston Street, 6<sup>th</sup> 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 Oxidation Pilot Study Status Report**  
*(Release Abatement Measure - RTN 3-13574, Permit No. 133939)*

Raytheon Company is conducting a pilot study to evaluate the effectiveness of in-situ chemical oxidation in reducing the concentrations of chlorinated volatile organic compounds (CVOCs) in the groundwater. In situ chemical oxidation is a process that breaks down CVOCs 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.

The status report reviews the following preliminary tasks and findings of the pilot study:

- **Install monitoring wells:** The purpose of this task was to conduct a detailed evaluation of hydrogeology within the pilot study areas and provide a detailed well network to evaluate the effectiveness of the pilots.
- **Conduct bench-scale oxidant demand tests:** These tests were conducted to evaluate the amount of oxidant used by naturally occurring material in the soil which, along with the observed CVOC concentrations in groundwater, were used to calculate the type and quantity of oxidant to be used in the pilot study. In this case, permanganate (sodium and potassium) was chosen as the oxidant to be injected in the pilot test areas.
- **Establish baseline groundwater data:** The purpose of this task was to establish baseline conditions for groundwater flow and quality within the pilot test areas prior to injection.
- **Inject Permanganate:** On October 6 and 7, 2001, approximately 2,500 gallons of 2% potassium permanganate was injected under pressure in one pilot study area and approximately 250 gallons of 4% sodium permanganate was injected via gravity feed, passive injection, in a second area.
- **Post-injection groundwater monitoring:** The purpose of this task was to monitor groundwater flow and quality within the pilot test areas after conducting the injections. Additional groundwater monitoring of the pilot test areas is planned and will be conducted in accordance with the RAM Plan dated September 11, 2001.

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 area impacted by the permanganate varied according the delivery method. The high pressure injection resulted in an apparent radius of influence of at least 20 feet. Gravity feed injection resulted in an apparent radius of influence of approximately five to ten feet.

2. Permanganate reacted with the dissolved CVOCs in groundwater and the naturally occurring soil material
3. Within the pilot test areas, treated groundwater and residual permanganate flowed with groundwater in a southwesterly (downgradient) direction. Decreases in CVOC concentrations in some monitoring wells were observed.
4. Increases in CVOC concentrations were noted at some monitoring wells. These concentration variations fall within historical concentration ranges for wells in the pilot test areas. The increases are believed to be related to a significant decrease in the groundwater table and/or desorption of CVOCs from soil following permanganate injection.

A more detailed summary of the Pilot Study Status Report can be found at the Wayland Public Library and the Wayland Board of Health.