

**STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION**

**MONITORING AND REPORTING PROGRAM NO. CI- 8567
FOR
RAYTHEON COMPANY
FORMER HUGHES MISSILE SYSTEM COMPANY**

**ORDER NO.R4-2002-0030 (SERIES NO. 022)
(SLIC NO. 693; SITE ID NO. 2043t00)
FILE NO. 94-45**

The Discharger shall implement this monitoring and reporting program on the effective date of this Order.

I. GROUNDWATER MONITORING PROGRAM

The three primary monitoring wells (RW-6, RW-14, and MW-36) will be sampled at two (2), five (5), fifteen (15), twenty five (25), and thirty five (35) weeks after the initiation of the pilot test. Groundwater samples will be collected for water quality parameter measurements at the site (field measurements) and shipped for additional analyses to the off-site laboratory. Field measurements will include dissolved oxygen, specific conductance, oxidation-reduction potential, pH, and temperature. The laboratory analyses will include the following analyte groups:

1. Volatile organic compounds (VOCs) – including chlorinated ethenes by EPA Method 8260B,
2. Organic acids (OA) - lactic acid, propionic acid, butyric acid, pyruvic acid, and acetic acid by Ion Chromatography,
3. Dissolved gasses (DGs) - methane, ethane, ethylene, and carbon dioxide by Method RSK 175
4. Selected anions and cations – chloride, sulfate by EPA Method 300, sulfide by EPA Method 376 and ferrous iron by SM 3500.

The list of analytes for the VOCs group consists of chlorinated ethenes, which are targeted for degradation in the bioremediation process. Organic acid analysis will allow for monitoring the degradation of injected substrate and for the estimation of hydrogen concentrations available for the reduction processes including reductive dechlorination. Analytical results for methane will indicate if methanogenesis processes have occurred. The ethylene results will provide an indication of chlorinated ethene degradation products. Selected anions and cations include chloride, sulfate, sulfide, and ferrous iron. Chloride levels are expected to increase as a result of chlorinated solvent degradation. Monitoring concentrations of sulfate and sulfide concentration levels will help in estimating sulfate reduction rates while levels of ferrous iron will indicate the presence of the iron reduction process.

The detailed monitoring program is presented in Table 1. Baseline sampling data was obtained earlier for the proposed lactate injection. Additional baseline sampling will take place prior to injection to enhance baseline analytical data for VOCs. Samples collected prior to injection activities will be analyzed for dissolved gases since results for the other monitoring analytes are available. The three monitoring wells will be sampled two (2), five (5), fifteen (15), twenty five

(25), and thirty five (35) weeks after the initiation of the pilot test. It is noted that several wells within and adjacent to the proposed pilot test area (e.g. RW-6, RW-14, and M-1) are part of the semiannual monitoring program which will continue to provide data after the proposed duration of the pilot test. All sampling performed will be in accordance with the current sampling procedures used for the semi-annual and annual sampling events.

Groundwater flow direction and groundwater well and amendment point locations are shown in attached Figure 1.

Table 1. Pilot Test Monitoring Program

<u>CONSTITUENT</u>	<u>UNITS</u>	<u>TYPE OF SAMPLE</u>	<u>MINIMUM FREQUENCY OF ANALYSIS</u>
Groundwater Elevation	Feet, bgs*	In situ	Weeks 2, 5, 15, 25, and 35.
Dissolved Oxygen	mg/l	grab	Weeks 2, 5, 15, 25, and 35.
Specific Conductance	mS/cm	grab	Weeks 2, 5, 15, 25, and 35.
Oxidation-Reduction Potential	MV	grab	Weeks 2, 5, 15, 25, and 35.
PH	--	grab	Weeks 2, 5, 15, 25, and 35.
Temperature	Degrees C	grab	Weeks 2, 5, 15, 25, and 35.
Chlorinated Volatile Organic Compounds (EPA Method 8260B)	µg/l	grab	Weeks 5, 15, 25, and 35.
Organic Acids (in-house method)	mg/l	grab	Weeks 2, 5, 15, 25, and 35.
Dissolved Gases (Method RSK 175)	µg/l	grab	Weeks 2, 5, 15, 25, and 35.
Chloride and Sulfate (EPA Method 300)	mg/l	grab	Weeks 2, 5, 15, 25, and 35.
Sulfide (EPA Method 376)	mg/l	grab	Weeks 2, 5, 15, 25, and 35.
Ferrous Iron (Method SM 3500)	mg/l	grab	Weeks 2, 5, 15, 25, and 35.
Dissolved Metals (Fe/Mn/Mg)	mg/l	grab	Weeks 2, 5, 15, 25, and 35.
Major Anions Nitrate, Nitrite	mg/l	grab	Weeks 2, 5, 15, 25, and 35.

* Below ground surface (bgs)

Raytheon Systems Company (Raytheon) is currently operating a pump and treat system to treat the contaminated groundwater on-site. Entire groundwater contaminated plume is contained. Figure 1 shows a large number of wells including sparge and vapor extraction well (SW/VW) in the pilot test area. Raytheon installed an additional monitoring well (MW-36) in the center of the pilot test area to monitor the efficacy of the lactate solution injection to the groundwater. Several extraction wells (RW) and monitoring wells (MW) within and adjacent to the proposed pilot test area (e.g. RW-6, RW-14, RW-13, RW-15, RW-16 and M-1 and MW-17) are part of the quarterly and semiannual

monitoring programs which will continue to provide data after the proposed duration of the pilot test. RW-6 and RW-14 are on the west, down-gradient border of the pilot test area. The newly installed monitoring well, MW-36 must be included in the existing groundwater monitoring program.

The sampling schedule is presented in Table 2.

Table 2. Quarterly and Semi-annual Monitoring Program

<u>CONSTITUENT</u>	<u>UNITS</u>	<u>TYPE OF SAMPLE</u>	<u>MINIMUM FREQUENCY OF ANALYSIS</u>
Groundwater Elevation	Feet, below ground surface (bgs)	In situ	Quarterly
Chlorinated Volatile Organic Compounds (EPA Method 8260B)	µg/l	grab	Quarterly

Quarterly monitoring reports shall be received by the dates in the following schedule:

<u>Reporting Period</u>	<u>Report Due</u>
January – March	April 15
April – June	July 15
July – September	October 15
October – December	January 15

The first report is due by July 15, 2003.

All groundwater monitoring reports must include, at minimum, the following:

- a. Well identification, date and time of sampling;
- b. Sampler identification, and laboratory identification;
- c. Quarterly observation of groundwater levels, recorded to 0.01 feet mean sea level and groundwater flow direction.

II. AMENDMENT INJECTION MONITORING REQUIREMENTS

The reports shall contain the following information regarding injection activities:

1. Depth of injection points;
2. Quantity of amendment injected and dates injected;
3. Total amount of amendment injected.

III. REPORTING REQUIREMENTS

The first monitoring report under this Program is due within four months after the first set of injection. A final report will be submitted within 60 days after the pilot test is completed. The

groundwater monitoring wells and amendment points will be gauged, sampled, and results will be reported to the Regional Water Quality Control Board (Regional Board) under the Monitoring and Reporting Program for the General Waste Discharge Requirements.

Monitoring reports must be addressed to the Regional Board, Attention: Information Technology Unit. The Discharger shall comply with requirements contained in Order No. R4-2002-0030 "Monitoring and Reporting Requirements" in addition to the aforementioned requirements.

IV. CERTIFICATION STATEMENT

Each report shall contain the following completed declaration:

"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

Executed on the ____ day of _____ at _____.

_____(Signature)

_____(Title)"

V. MONITORING FREQUENCIES

Specifications in this monitoring program are subject to periodic revisions. Monitoring requirements may be modified or revised by the Executive Officer based on review of monitoring data submitted pursuant to this Order. Monitoring frequencies may be adjusted to a less frequent basis or parameters and locations dropped by the Executive Officer if the Discharger makes a request and the request is backed by statistical trends of monitoring data submitted.

These records and reports are public documents and shall be made available for inspection during normal business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region.

Ordered by: _____
Dennis A. Dickerson
Executive Officer

Date: _____