California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. R1-2003-085

FOR

IN-SITU HEXAVALENT CHROMIUM SOIL AND GROUNDWATER TREATMENT

WILLITS ENVIRONMENTAL REMEDIATION TRUST
Former Remco Hydraulics Facility
934 South Main Street
Willits, California

Mendocino County

MONITORING

Pre-Injection Groundwater Monitoring

1. The 23 A-zone, 7 B-zone, and 5 C-zone groundwater monitoring wells shall be sampled prior to the injection of the food grade molasses for the constituents listed in the Table 1 below.

2. The depth to groundwater shall be determined to at least 0.01 foot increments in all A-zone, B-zone and C-zone groundwater monitoring wells identified below and including groundwater monitoring wells W7A, W17A, TW-1, W12A, W11B, W8B, and W8C prior to injection.

Post-Injection Groundwater Monitoring

3. The depth to groundwater shall be determined to at least 0.01 foot increments in all A-zone, B-zone and C-zone groundwater monitoring wells identified below and including groundwater monitoring wells W7A, W17A, TW-1, W12A, W11B, W8B, and W8C weekly during the injection, monthly for three months and quarterly thereafter.

4. The 23 A-zone, the 7 B-zone, and the 5 C-zone groundwater-monitoring wells shall be sampled monthly for three months following the injection for the constituents in Table 1 below. After three monthly sampling events, the monitoring wells shall be sampled quarterly for the duration of the treatment process. Monitoring Well W17A shall be sampled quarterly. The locations of A-zone, B-zone, and C-zone monitoring wells are depicted on Figure 3.

   The 23 A-zone groundwater monitoring wells include: TW1, TW2, TW5, TW6, TW8, TW10, W14A, W17A, W21A, W22A, W24A, W37A W41A, W7, W8A, W9A, B-4, EW1A, GMX-2A, and Contingency Wells GMX-1A, GMX-3A, GMX-7A, and GMX-8A.
   The 7 B-zone groundwater monitoring wells include: EW1B, W4, W31B, W30B, and Contingency Wells GMX-4B, GMX-5B, and GMX-6B.

The 5 C-zone groundwater monitoring wells include: W3, W31C, W8C, W5, and W6.

5. Contingency Monitoring Wells GMX-1A, GMX-3A, GMX-7A and GMX-8A for the A-zone, and GMX-4B, GMX-5B, and GMX-6B for the B-zone shall be sampled weekly for four weeks. The frequency of weekly sampling may be reduced upon concurrence by the Executive Officer based on the submitted analytical data from the weekly sampling.

6. All groundwater monitoring wells shall be sampled for the following constituents using the methods provided below:

TABLE 1

Constituent	EPA Analytical Method
Total Dissolved Chromium	Method 8010
Hexavalent Chromium	Method 7196
VOCs	Method 8260
1,4-Dioxane	Method 8270C low level
Dissolved Iron, Manganese, Arsenic and Antimony	Method 6010B
Chloride	Method 300.1
Alkalinity	Method 310.1
Nitrate	METHOD 300.0
Sulfate	Method 300.0
Dissolved Sulfides	Method 9030
Total Organic Carbon	Method 415.1
Chemical Oxygen Demand	Method 410.4
Dissolved Organic Carbon	Method 450.1
Redox Potential, pH, Dissolved Oxygen, Temperature, Conductivity	Field Measurements

7. Baseline sampling of the breakdown products of 1,4-Dioxane, Diethylene Glycol and Oxalic Acid, shall be sampled in Monitoring Wells TW3, W-7, W9A, W14A, W21A, W22A, and W24A using U.S. EPA Modified 8015 Method and EPA Method 8270C. If Diethylene Glycol and Oxalic Acid are detected in the A-zone monitoring wells, sampling of Wells EW1B W4, W31B, W3, and W5 in the B- and C-zones shall occur. In six months following the injection, sampling of the A-zone wells listed above shall be sampled for Diethylene Glycol and Oxalic Acid. If the breakdown products are detected in the A-zone, the B-zone wells listed above shall also be sampled.

8. Contingency Plan

The injection of molasses into the subsurface may mobilize iron, manganese, arsenic, and/or antimony. The injection of molasses may also create a temporary increase in the concentration of VOCs in the area of the injection. If these effects remain confined to the injection area, no contingency actions will be taken. However, if any of these effects are observed downgradient of the injection area, the following contingency plan will be implemented:

If groundwater monitoring results indicate an increasing trend of VOCs or metals, a trend analysis using a Mann-Kendall Test will be conducted. If an upward trend is detected at a 90 percent confidence level, and the Maximum Contaminant Level is exceeded for the constituent with the apparent upward trend, the well in which the upward trend was detected will be resampled within three days of receipt of sample results from the laboratory. The resample will be analyzed with a 48 hour turnaround time. If the results of resampling corroborate the upward trend, an upward trend will be considered verified and contingent action will be triggered.

An in-situ oxygenated zone will be created by injecting a dilute hydrogen peroxide solution approximately 5-feet upgradient and 5 feet downgradient of the contingency wells. Migration of any chemical constituent with the upward trend beyond the contingency well grid will be prevented by creating oxidizing conditions and thereby reversing the chemical reaction. The injection of dilute hydrogen peroxide shall be conducted within 14 days of a verified upward trend.

9. Mobile Air Monitoring Program

Air monitoring shall be conducted in accordance with the following air monitoring program. Air monitoring will include mobile air monitoring stations using a hand held Jerome Meter, a photoionization detector (PID), and Colortubes® at the locations shown on Figure 4. The Jerome meter is capable of detecting hydrogen sulfide at a concentration of one part per billion (ppb). The PID is capable of detecting volatile organic compounds at 0.5 ppm. Colortubes® are capable of detecting vinyl chloride at 0.1 ppm.

Mobile air monitoring will proceed along the perimeter of the Remco property, the north side of the building in storm drains, and inside the Remco building. The frequency of monitoring will occur as follows:

DURATION OF MONITORING	FREQUENCY
1. Background monitoring shall be conducted prior to the startup of the injection process	Daily for three days to establish background concentrations. Background sampling shall be in the morning, around mid day, and at the end of the day.
2. During injection	In the morning prior to startup of the injection, around mid day, and at the end of the work day.
3. Daily for one week after the completion of the injection process	Once per day
4. Once per week for 3 weeks after completion of No. 3 above	Once per day

If a reading of hydrogen sulfide exceeds 30 ppb/v at an air monitoring station on the perimeter of the property and there is no contribution from background air monitoring, air monitoring will continue until the levels either go down, or are consistent for a five minute period. If the reading stays at or greater than the 30 ppb/v at the property line, the injections will cease. If volatile organic compounds detected on the PID are 1 ppm or greater, Colortubes® will be used to evaluate if vinyl chloride is present. If volatile organic compounds are 1 ppm (or greater) and there is no contribution from the background air monitoring station, air monitoring will continue until the levels either go down, or are consistent for a five minute period. If air monitoring levels of 1 ppm or greater is sustained for a five minute period, the injections will cease until such time as the source of the elevated levels can be identified and corrective measures are taken to address the exceedance.

REPORTING

10. The depth to groundwater shall be determined to at least 0.01 foot increments in all A-zone, B-zone and C-zone groundwater monitoring wells identified above prior to injection, weekly during the injection, weekly in the contingency groundwater monitoring wells, and monthly for three months and quarterly thereafter.

11. The results of the post injection monitoring, monthly sampling, and quarterly sampling shall be submitted 30 days following the quarterly sampling event. The monitoring report shall summarize all monitoring data collected for the in-situ treatment, and include signed laboratory reports.

12. Weekly sampling results of the Contingency Monitoring Wells shall be submitted within 8 days of sample collection.

13. Twenty-four hour notification shall be provided when sampling of monitoring well(s) is planned to evaluate an upward trend in the concentrations of metals, and/or vinyl chloride.

14. Air monitoring results from each required sampling day shall be posted no later than 9:00 a.m. the following day, in a place for public review. The posting location will be on a bulletin board in the parking lot of the Remco facility and at a location at the back entrance to the facility on Franklin Avenue. The air monitoring data for the previous day shall also be faxed by 9:00 a.m. the following day to the Regional Water Board at (707) 523-0135, the Mendocino County Air Pollution Control District Office at (707) 463-5707, and California Department of Health Services, Environmental Health Investigations Branch at (510) 622-4505.

Ordered by _____
Catherine E. Kuhlman
Executive Officer

September 24, 2003

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