California Regional Water Quality Control Board
North Coast Region

Monitoring and Reporting Program No. R1-2011-0058

For

Department of Toxic Substances Control

Peter Pan Cleaners
2231 Mendocino Avenue
Santa Rosa, California

Sonoma County

This Monitoring and Reporting Program (MRP), issued to the Department of Toxic Substances Control (DTSC) pursuant to California Water Code Section 13267(b), provides requirements for groundwater and soil vapor monitoring and reporting under General Waste Discharge Requirements Order No. R1-2009-0105 (General WDR). This MRP also specifies the conditions that may trigger implementation of contingency plans and provides contingency monitoring and reporting requirements for both groundwater and soil vapor. The objectives of monitoring conducted under this MRP are to provide DTSC, as the lead agency, and the Regional Water Board, as the permitting agency, with information on contaminant trends in groundwater and soil vapor during the reductive de-chlorination pilot test and to demonstrate compliance with the provisions of the General WDR. Groundwater and soil vapor monitoring and reporting requirements are identified below and summarized in Table 1 (Attached).

Under the authority of the California Water Code Section 13267, DTSC is required to comply with the following:

GROUNDWATER AND SOIL VAPOR MONITORING

General Requirements

1. The depth to groundwater shall be measured to the nearest 0.01-foot prior to monitoring well purging and/or sampling. The data generated from the elevation readings must be referenced to the same elevation datum used for the electronic GeoTracker survey values.

2. Chemical analyses required by this MRP shall be conducted by laboratories certified by the California Department of Public Health.

3. Activities permitted under General WDR Order No. R1-2009-0105 shall not create conditions that exceed background ambient air concentrations and/or Bay Area Air Quality Management District standards.

Semi-Annual Groundwater and Soil Vapor Monitoring

4. Groundwater samples shall be collected from (ConocoPhillips) monitoring wells MW10S, MW11S, MW12S, MW16 and OB1S semi-annually, during the first and third quarters of each year, up to 18 months after the completion of subsurface injections. Groundwater samples shall be analyzed for halogenated volatile organic compounds (HVOCs) and MTBE by EPA Method 8260B and dissolved metals arsenic, iron and manganese. Field measurements oxygen reduction potential (ORP), pH, and temperature shall be collected during sampling.

5. If HVOC concentrations in groundwater are increasing 18 months post-injection, or for other conditions as warranted, additional groundwater monitoring may be required as directed in writing by the Regional Water Board.

6. A soil vapor sample shall be collected from the soil vapor point located in the alley behind 2231 Mendocino Avenue and analyzed for HVOCs and MTBE semi-annually, during the first and third quarters of each year, and up to 18 months after the completion of subsurface injections. The protocol for sampling of the soil vapor point shall be consistent with current California regulatory guidelines. Soil vapor samples shall be analyzed using EPA Method TO-15 and results shall be reported in micrograms per cubic meter.

7. If HVOC concentrations in soil vapor are increasing 18 months post-injection, or for other conditions as warranted, additional soil vapor monitoring may be required as directed in writing by the Regional Water Board.

Pre-Injection (Baseline) Monitoring

8. No more than one month prior to chemical injections, groundwater samples shall be collected from MW10S, MW11S, MW11D, MW12S, MW13, MW14S, MW14D, MW15, MW16 and OB1S and analyzed for HVOCs and MTBE. Analytical reporting limits shall be comparable to NCRWQCB water quality objectives.

9. Groundwater from monitoring wells MW10S, MW11S, MW12S, MW16 and OB1S shall also be tested for dissolved metals arsenic, iron, manganese, mercury, and vanadium; water quality parameters TOC, sulfate, sulfide, nitrate, volatile fatty acids, and dissolved gases, including dissolved oxygen. Field measurements ORP, pH, and temperature shall be collected during sampling.

10. Prior to chemical injections, a soil vapor sample shall be collected from the permanent soil gas monitoring point in the alley behind 2331 Mendocino Avenue and analyzed for HVOCs and MTBE.

11. Prior to chemical injections, a surface water sample shall be collected from Poppy Creek downgradient of the treatment area and analyzed for HVOCs, MTBE and dissolved metals arsenic, iron, manganese, mercury, and vanadium.

Post-Injection Monitoring

12. Groundwater monitoring wells MW10S, MW11S, MW12S, and OB1S shall be sampled 60 days (2 months) and 180 days (6 months) after completion of the chemical injections. During the 2nd and 6th month sampling events, groundwater shall be analyzed for HVOCs and MTBE; dissolved metals arsenic, iron, and manganese; water quality parameters TOC, sulfate, sulfide, nitrate, volatile fatty acids, and dissolved gases, including dissolved oxygen. Field measurements ORP, pH, and temperature shall be collected during sampling.

13. A soil vapor sample shall be collected and analyzed for HVOCs and MTBE two months and six months after the completion of chemical injections.

GROUNDWATER AND SOIL VAPOR CONTINGENCY PLANS

Groundwater Contingency Plan for HVOCs and MTBE

1. If any HVOC concentration reported in groundwater during post-injection or semi-annual sampling exceeds DTSC's maximum expected concentrations, i.e. 8,100 ppb for TCE, 6,800 ppb for cis-1, 2-DCE and 1,000 ppb for vinyl chloride, an additional groundwater sample shall be collected from the exceeded monitoring well(s) and the nearest downgradient monitoring well within 30 days of receiving the initial results.

2. If the second HVOC result exceeds the maximum expected concentration in groundwater:
   a) A surface water sample shall be collected from Poppy Creek and analyzed for HVOCs and MTBE, and;
   b) A soil vapor sample shall be collected from the soil vapor monitoring point and analyzed for HVOCs and MTBE.

Groundwater Contingency Plan for Metals

3. If any dissolved metal concentration within the treatment area shows an increase by a factor of 10, compared to pre-injection levels, an additional

sample shall be collected from the exceeded monitoring well(s) and the nearest downgradient monitoring well within three months of receiving the results. The three month retest shall include analysis for dissolved metals arsenic, iron, manganese, mercury, and vanadium.

4. If the second dissolved metal result exceeds the pre-injection groundwater concentration by 10 times within the treatment area (i.e. MW10S, MW11S, or MW12S) or by 3 times outside the treatment area, including Poppy Creek, a proposal to mitigate the mobilization of the elevated metal(s) must be submitted within sixty days of receiving the retest results.

Soil Vapor Contingency Plan

5. If, at any time, a HVOC soil vapor concentration is elevated 100 times its baseline (pre-injection) level, an analysis of human health exposure and risk shall be prepared. The health exposure and risk analysis shall include a proposal for contingency actions and shall be submitted within 30 days of receiving the elevated soil vapor results. Contingency measures may include, but are not limited to, re-sampling groundwater and/or soil vapor, injection of additional 3DME^{TM}, DHC bacteria or aerobic treatment material at targeted locations, and/or conducting crawlspace and indoor air sampling at residences within and downgradient of the treatment area.

6. Semi-annual soil vapor monitoring may be resumed if the results from the latest two consecutive soil vapor tests show that constituents of concern are below 100 times pre-injection levels.

SEMIANNUAL MONITORING AND REPORTING

Monitoring reports for groundwater and soil vapor shall be submitted semi-annually in paper format to the Regional Water Board according to the following schedule:

Reporting Period	Report Due Date
January through March	May 1
July through September	November 1

All monitoring reports shall be prepared by or under the supervision of a California Professional Civil Engineer or Geologist. Monitoring reports, laboratory analytical reports, and any other report, document or workplan shall also be submitted electronically to the State Water Resources Control Board's Geographic Environmental Information Management System database (GeoTracker) as required by Title 23, Division 3, Chapter 30, Article 2, Sections 3890-3895 of the California Code of Regulations.

Each semi-annual monitoring report shall include the following elements:

A. A groundwater elevation contour map for each sampling event, showing the site, the treatment area, locations of monitoring wells and the vapor monitoring point, the direction of the groundwater gradient and other significant features.

B. A contamination isogram map for each significant pollutant or pollutants detected during the monitoring events.

C. Constituents, water quality parameters, and analytical results shall be reported in tabular form for groundwater and soil vapor, and include both current and historical analytical results, date of sample collection, analytical methods, quantification limits for non-detect analytical results, and depth to water measurements.

D. Copies of the sampling field logs; chain of custody documents, and signed laboratory reports, including quality control data and explanations of analytical anomalies, if any. Monitoring reports shall also identify the type of instruments that were used for field-measured data, and shall include copies of the pre and post-calibration records or provide other assurance for field data quality. These supporting documents may be included as appendices in the report.

E. A discussion of soil vapor analytical results and assessment of potential vapor intrusion to indoor air, including recommendations for additional investigation or mitigation measures to address any concerns regarding indoor air quality.

Ordered by _____
Catherine Kuhlman
Executive Officer

May 9, 2011

TABLE 1
Sampling and Analysis Plan

MONITORING POINT	PRE-INJECTION MONITORING (1)	POST-INJECTION MONITORING (4)	SEMI-ANNUAL MONITORING (7)
MW10S	X*	X(5)	X
MW11S	X*	X	X
MW11D	X		
MW12S	X*	X	X
MW13	X		
MW14S	X		
MW14D	X		
MW15	X		
MW16	X*		X
OBS1	X*	X	X
SOIL VAPOR PROBE	X (2)	X (6)	X (8)
POPPY CREEK	X (3)		

(1) Pre-injection monitoring of groundwater monitoring wells shall be performed no more than one month before the injection event. Groundwater shall be analyzed for a) HVOCs and MTBE (by EPA Method 8260B) MWs marked with an asterisk * shall also be sampled for dissolved metals: arsenic, iron, manganese, mercury, and vanadium, and water quality parameters TOC, sulfate, sulfide, nitrate, volatile fatty acids, dissolved gases, including dissolved oxygen, ORP, pH, and temperature.,

(2) Pre-injection monitoring of the soil vapor probe shall include HVOCs and MTBE, only.

(3) Pre-injection monitoring of Poppy Creek shall include HVOCs, MTBE and the dissolved metals arsenic, iron, manganese, mercury, and vanadium.

(4) Post-injection monitoring shall be performed two months and six months after completion of the chemical injection event. Groundwater shall be tested for a) HVOCs and MTBE b) Dissolved metals: arsenic, iron, and manganese; and c) Water quality parameters TOC, sulfate, sulfide, nitrate, volatile fatty acids, dissolved gases, including dissolved oxygen, ORP, pH, and temperature.

(5) *Dehalococcoides ethenogenes* (DHC) bacteria shall be sampled for in MW10S two months and six months after injection, in addition to the other analytes listed in (4) above..

(6) Post-injection monitoring of the soil vapor probe shall include HVOCs and MTBE, only.

(7) Semi-annual groundwater monitoring shall commence during the first or third quarter of the year following post-injection monitoring and continue for one year. Groundwater shall be monitored for a) HVOCs and MTBE b) dissolved metals arsenic, iron, and manganese and c) field measurements ORP, pH, and temperature. Water quality parameters and DHC bacteria shall be tested as needed to evaluate remedial or contingency actions. Additional groundwater monitoring may be required after one year of semi-annual monitoring as directed by the Regional Water Board.

(8) Semi-annual soil vapor monitoring for HVOCs and MTBE shall commence during the first or third quarter of the year following post-injection monitoring and continue for one year. Additional soil vapor monitoring may be required after one year of semi-annual monitoring as directed by the Regional Water Board.