

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM ORDER NO. R1-2011-0035

To

Mr. and Mrs. Bromley

FOR

BROMLEY PROPERTY
1500 SANTA ROSA AVENUE
SANTA ROSA, CALIFORNIA

Sonoma County

This Monitoring and Reporting Program (MRP) Order is issued pursuant to California Water Code Section (CWC) 13267(b) to the responsible parties and requires monitoring and reporting for activities associated with the implementation of in-situ Pilot-Scale Reductive Dechlorination (PSRD). The activities include pre and post monitoring and reporting and injection monitoring and reporting. Samples from specific groundwater and vadose zone wells constitute the scope of monitoring and reporting. This MRP also specifies contingency monitoring and reporting requirements for both groundwater and soil gas (vapor), and requires that these contingency requirements be implemented when analytical results exceed specified threshold levels. The objectives of monitoring conducted under this order are to provide the Dischargers, and the Regional Water Board staff with information concerning contaminant trends in groundwater and sub-slab vapor, and to demonstrate compliance with the provision of General Waste Discharge Requirements Order No. R1-2009-0105. The groundwater and sub-slab vapor sampling and analysis requirements specified below are summarized in Appendix 1 of the MRP.

Under the authority of CWC section 13267, the Dischargers named above are required to comply with the following:

GROUNDWATER AND SOIL GAS (VAPOR) MONITORING

General Requirements

1. The depth to groundwater shall be measured to the nearest 0.01-foot prior to monitoring well purging and sampling. Groundwater elevations shall be reported in tabular form indicating the surveyed elevations of each well reference point, depth to groundwater from the reference point, and the actual groundwater elevation. The data generated from the elevation readings must be referenced to mean sea level.
2. All monitoring wells shall be purged of least three casing volumes of water, or until dry, prior to sampling. Monitoring wells shall be allowed to recharge to at least 80% of the initial casing volume prior to sampling. All purge water shall be impounded pending analysis for proper disposal. An alternative well-purging protocol may be used upon the written approval of the Executive Officer.

3. Chemical analyses required by this MRP shall be conducted by laboratories certified by the California Department of Health Services where required and by field testing equipment where applicable.
4. All wells will be monitored for visual and olfactory notations. All notations will be documented on sampling logs.

Pre-Injection Monitoring

5. Groundwater monitoring wells BW-1, BW-5, BW-7, BW-8, BW-9 and BW-10 shall be sampled and analyzed as described above prior to initiating sub-surface chemical injections and tested for chlorinated volatile organic compounds {VOC (USEPA 8260)}, alkalinity, total and dissolved organic carbon, total dissolved solids, total and dissolved sodium, total and dissolved ferrous iron, total and dissolved manganese, dissolved CAM 17 Metals, total and dissolved nitrate and nitrite, total and dissolved sulfate and sulfide, dissolved carbon dioxide, dissolved methane, and dissolved ethane; and for the water quality parameters temperature, pH, specific conductance, dissolved oxygen, and oxidation reduction potential.
6. Extracted groundwater will be sampled and analyzed mid process for VOC (USEPA 8260), alkalinity, total and dissolved organic carbon, total dissolved solids, total and dissolved sodium, total and dissolved ferrous iron, total and dissolved manganese, dissolved CAM 17 Metals, total and dissolved nitrate and nitrite, total and dissolved sulfate and sulfide, dissolved carbon dioxide, dissolved methane, and dissolved ethane; and for the water quality parameters temperature, pH, specific conductance, dissolved oxygen, and oxidation reduction potential.
7. Vapor from groundwater monitoring well BW-1 shall be collected prior to initiating subsurface chemical injections and be sampled and analyzed as described above for chlorinated volatile organic compounds {VOCA (US EPA TO15)} carbon dioxide, methane, hydrogen sulfide, ethane, ethane, oxygen, 2-propanol and for the air quality parameters PID, methane, carbon dioxide, hydrogen sulfide, lower explosive limit, and percent oxygen. All vapor results shall be reported in micrograms per cubic meter.
8. Soil gas (vapor) samples from locations SG1, SG2, and SG3 shall be collected prior to initiating sub-surface chemical injections and analyzed in the laboratory for VOCA (US EPA TO15)}, carbon dioxide, methane, hydrogen sulfide, ethane, ethane, oxygen, and 2-propanol and for the air quality parameters PID, methane, carbon dioxide, hydrogen sulfide, lower explosive limit, and percent oxygen.

Post-Injection Monitoring

9. Groundwater monitoring well BW-1 shall be sampled as described above immediately after the initial chemical injection and one month and two months after the chemical injection and analyzed for VOC (USEPA 8260)}, alkalinity, total and dissolved organic carbon, total dissolved solids, total and dissolved sodium, total and dissolved ferrous iron, total and dissolved manganese, dissolved CAM 17 Metals, total and dissolved nitrate and nitrite, total and dissolved sulfate and sulfide, dissolved carbon dioxide, dissolved methane, and dissolved ethane; and for the

water quality parameters temperature, pH, specific conductance, dissolved oxygen, and oxidation reduction potential.

10. Vapor samples from locations SG1, SG2, and SG3 shall be collected immediately after the initial sub-surface chemical injection and one month and two months after the chemical injection and analyzed in the laboratory for VOCA (US EPA TO15)}, carbon dioxide, methane, hydrogen sulfide, ethane, ethane, oxygen, and 2-propanol and for the air quality parameters PID, methane, carbon dioxide, hydrogen sulfide, lower explosive limit, and percent oxygen.
11. Groundwater monitoring wells BW-1, BW-5, BW-7, BW-8, BW-9, and BW-10 shall be sampled as described above three, six, and nine months after the chemical injection VOC (USEPA 8260)}, alkalinity, total and dissolved organic carbon, total dissolved solids, total and dissolved sodium, total and dissolved ferrous iron, total and dissolved manganese, dissolved CAM 17 Metals (only at the nine month interval), total and dissolved nitrate and nitrite, total and dissolved sulfate and sulfide, dissolved carbon dioxide, dissolved methane, and dissolved ethane; and for the water quality parameters temperature, pH, specific conductance, dissolved oxygen, and oxidation reduction potential.
12. Vapor samples from locations SG1, SG2, and SG3 shall be collected three, six and nine months after the chemical injection analyzed in the laboratory for VOCA (US EPA TO15)}, carbon dioxide, methane, hydrogen sulfide, ethane, ethane, oxygen, and 2-propanol and for the air quality parameters PID, methane, carbon dioxide, hydrogen sulfide, lower explosive limit, and percent oxygen.
13. The BioTrap shall be collected from monitoring well BW1 at the appropriate interval and analyzed for dechlorinating bacteria enumeration.

VAPOR CONTINGENCY MONITORING AND REPORTING PLAN

14. The Dischargers shall monitor the presence of hydrogen sulfide, methane, and vinyl chloride vapor(s) in monitoring wellheads to prevent inhalation hazards to on-Site workers and hotel occupants. The vapor levels may not exceed the following Action Levels:

Worker Action Levels in Well-Headspace

COCs	Other	Action Level
Methane	Flammable or Explosive Limit 5-15%	5%
Hydrogen Sulfide	0.00047ppm is recognition threshold	5 ppm
Vinyl Chloride	Photoionization Detector (PID) 10 ppb	1 ppm

Room 150 and 151 Action Levels in Wells Headspace and Ambient Air

COCs	Action Level for field test	Action Level laboratory test
Methane	Flammable or Explosive Limit 5-15%	50% of 5% = 2.5%
Hydrogen Sulfide	0.00047ppm is recognition threshold	50% of 100 ppm = 50ppm
Vinyl Chloride	PID 10 ppb	50% of 13.3 ug/m ³ = 6.65 ug/m ³

Notes:

- 1) The Vinyl Chloride (VC) Residential California Human Health Screening Levels for Indoor Air and Soil gas (CHSSLs) =13.3 micrograms per cubic meter (ug/m³).
- 2) VC residential exposure = 0.0311 ug/m³.
- 3) VC No Significant Risk Level (NSRL) = 3 ug/day for 1x 10⁻⁵ risk level.
- 4) PID min concen. = 10 ppb total VOCs.

15. The Discharger shall cease pilot-scale activities and the groundwater and vadose zone monitoring wells will be used to extract and treat these gases in order to mitigate human inhalation exposure potential.

REPORTING

Monitoring reports shall include all field and laboratory documentation. The field and laboratory sample and analyses date shall be summarized and submitted in tabular format. At a minimum, the table need to include sample dates, analyzed constituents(s), person collecting the sample(s), laboratory test method reporting limit, and the constituent concentrations.

Monitoring Reports shall be submitted as set forth on Appendix 2 of this order.

Ordered by _____

Catherine Kuhlman
Executive Officer
February 17, 2011

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- Appendices:
- 1: Site Plan showing Monitoring Locations
 2. Table 1 Monitoring Parameters
 3. Table 2 Reporting Schedule