California Regional Water Quality Control Board
North Coast Region

Monitoring and Reporting Program No. R1-2012-0089
[Revised September 21, 2012]

WDID No. 1B86006NSON

FOR

HEWLETT PACKARD COMPANY

For

HEWLETT PACKARD VALLEY SITE
1201 Piner Road
Santa Rosa, California

Case No. 1NSO039

Sonoma County

This Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code Section 13267(b) to the Discharger and requires monitoring and reporting for activities associated with the continued implementation of remedial activities under General Waste Discharge Requirements Order No. R1-2009-0105 (Order 0105). This MRP also specifies contingency monitoring and reporting requirements and identifies the threshold conditions for their implementation. The objectives of monitoring conducted under this MRP are to provide the Discharger and Regional Water Board staff with information concerning the effectiveness of the treatment method, the protection of human health and the environment, and groundwater quality; and to demonstrate compliance with the provisions of Order 0105. The groundwater and soil vapor monitoring requirements specified below are also summarized in Appendix 1 of this MRP.

Under the authority of the California Water Code Section 13267, the Discharger named above 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 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 at 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. The procedures used for soil vapor and indoor air sampling shall be consistent with current and subsequent revisions of sampling guidance for active soil gas investigations issued by the California Department of Toxic Substances Control. Vapor samples shall be collected from vapor extraction well VE-1 in a manner consistent with the April 1, 2010 "Revised Soil Vapor Extraction System Operations Plan" submitted for the Site. Vapor sampling procedures for vapor probes SV-A1 and SV-A-2 shall include leak detection testing and the use of a tracer gas and containment shroud during the sample collection. The presence and concentration of the tracer gas inside the containment shroud shall be confirmed by laboratory analysis or field monitoring. Analytical results for volatile organic compounds (VOCs) in vapor samples shall be reported in micrograms per cubic meter.

4. Chemical analyses required by this MRP shall be conducted by laboratories certified for those analyses by the California Department of Health Services.

5. Groundwater sample analyses for VOCs shall include the compounds identified in the "Volatile Organic Compounds of Potential of Concern" table, which is incorporated as Appendix 2 of this MRP.

6. Vapor sample analyses shall include the compounds identified in the "Volatile Organic Compound List for Vapor Analysis," which is incorporated as Appendix 3 of this MRP.

7. Following assessment of the baseline sample results, the Discharger may use a modified list of VOCs for subsequent analyses with the prior written concurrence of the Regional Water Board Executive Officer.

Baseline Monitoring Requirements

8. Prior to sub-surface chemical injections, samples from groundwater monitoring wells 5B-U, 62U, 66U, and 67U; property boundary wells 5U, 8U, 10U and 61U; and treatment zone wells A and B shall be analyzed for alkalinity, ethane, ethene, methane, nitrate, sulfate, and total organic carbon; the dissolved metals arsenic, iron, manganese, mercury, and vanadium; and for VOCs.

9. Prior to sub-surface chemical injections, samples from groundwater monitoring wells 5B-U, 62U, 66U, 67U; property boundary wells 5U, 8U, 10U and 61U; and treatment zone Wells A and B shall be tested for the water quality parameters:

conductivity, dissolved oxygen, ferrous iron, oxidation-reduction potential, pH, and temperature.

10. Prior to the sub-surface chemical injections, vapor samples from extraction well VE-1 and monitoring probes SV-A-1 and SV-A-2 shall be collected, field tested for percentage of the lower explosive limit for combustible gases (LEL), and analyzed for VOCs and hydrogen sulfide.

Post-Injection Monitoring Requirements

11. Treatment zone wells A and B shall be sampled one month following the initial injection of chemicals. The samples shall be analyzed for total organic carbon and field tested for dissolved oxygen, electrical conductivity, ferrous iron, oxidation-reduction potential, pH, and temperature.

12. Groundwater monitoring wells 66U, 67U, 5U, 8U, 10U and 61U and treatment zone wells A and B shall be sampled quarterly for one year following the initial injection of chemicals, and semi-annually thereafter. The samples shall be analyzed for alkalinity, ethane, ethene, methane, nitrate, sulfate, total organic carbon; the dissolved metals arsenic, iron, manganese, mercury, and vanadium; and VOCs. The samples shall also be field tested for dissolved oxygen, electrical conductivity, ferrous iron, oxidation-reduction potential, pH, and temperature.

13. Vapor samples from vapor extraction well VE-1 and from monitoring probes SV-A1 and SV-A2 shall be collected one month following the initial chemical injections, then quarterly for two sampling events, and semi-annually thereafter. The vapor samples shall be field tested for LEL, and analyzed for VOCs and hydrogen sulfide.

CONTINGENCY MONITORING AND REPORTING FOR GROUNDWATER

Contingency groundwater monitoring and reporting shall be implemented at the direction of Regional Water Board staff in response to the conditions identified below:

14. Following the third post injection sampling event, if the analytical result for any dissolved metal in down-gradient wells 66U and 67U or property boundary wells 5U, 8U, 10U, or 61U exceeds the 95% Upper Confidence Limit for that metal based on the previous samples from that well, then quarterly sampling and analysis for wells 5U, 8U, 10U, and 61U for the dissolved metals arsenic, iron, manganese, mercury, and vanadium shall be continued.

15. Following the third post injection sampling event, if the analytical result for TOC in down-gradient wells 66U and 67U or property boundary wells 5U, 8U, 10U, or 61U exceeds the 95% Upper Confidence Limit for TOC based on the previous samples

from that well, then quarterly sampling of wells 5U, 8U, 10U, and 61U and analyses for TOC shall be continued.

16. Following the third post injection sampling event, if analytical results for well 5U, 8U, 10U, 61U, 66U, or 67U do not exceed the 95% Upper Confidence Limit for TOC or dissolved metals, then wells 66U and 67U shall be sampled semi-annually thereafter and analyzed for TOC and the dissolved metals arsenic, iron, and manganese; and analysis of TOC and dissolved metals for wells 5U, 8U, 10U, and 61U may be discontinued.

17. Following the third post injection sampling event, if analytical results for well 5U, 8U, 10U, or 61U exceed the 95% Upper Confidence Limit for TOC or the dissolved metals, then an evaluation of alternatives for mitigating the mobilization of the constituents of concern shall be submitted within sixty days of receipt of the laboratory data.

CONTINGENCY MONITORING AND REPORTING FOR SOIL VAPOR

18. Analytical results for soil vapor samples from probes SV-A1 and SV-A2 shall be compared to the screening levels for indoor air identified in *Table 2. California Human Health Screening Levels for Indoor Air and Soil Gas* in the guidance document: *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties* (CalEPA Office of Environmental Health Hazard Assessment. January 2005). A default attenuation factor of 0.001 shall be applied to the constituent levels in the soil vapor sample, as specified in the October 2011 *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (Vapor Intrusion Guidance) by the California Department of Toxic Substances Control. The Discharger shall submit written notification to Regional Water Board staff within ten days of receipt of the laboratory results if a VOC in vapor samples from SV-A1 or SV-A2 exceeds the indoor air CHHSL for that constituent after application of the 0.001 attenuation factor. The Discharger shall also notify Regional Water Board staff if hydrogen sulfide levels in soil vapor sample exceed the 2.1 microgram per cubic meter ($\mu g/m^3$) US EPA Regional Screening Level for indoor air after application of the 0.001 attenuation factor. If soil vapor samples from probes SV-A1 or SV-A2 show VOC levels that exceed the CHHSLs or hydrogen sulfide levels greater than 2.1 $\mu g/m^3$ after application of the above-specified attenuation factor, the sampling point shall be re-sampled and tested within three months of receipt of the analytical results, and quarterly thereafter. Sampling frequency for vapor monitoring may return to semi-annual if the results from the latest two consecutive quarterly analyses show that the constituents of concern are below screening levels.

19. If the soil vapor analytical results for SV-A1 or SV-A2 exceed the above-specified screening levels for any constituent one year after the initial subsurface chemical

injections, then the Discharger shall submit a site specific Screening Evaluation consistent with the October 2011 Vapor Intrusion Guidance, as specified in the Discharger's January 6, 2012 "NOI Submittal Package for Building 1T EISB Treatment Approval".

20. If the combustible gas levels in vapor samples from VE-1, SV-A1, or SV-A2 exceed 25 % of the LEL as measured on a combustible gas meter, then the LEL for indoor air in Building 1T and the former Cafeteria Building shall be measured in all tenant areas within 24 hours. If the results of indoor air monitoring exceed 25 % of the LEL, than the Discharger shall immediately notify the building owner, Regional Water Board staff, and the City of Santa Rosa Fire Department.

REPORTING

Monitoring reports for Order 0105 compliance shall be submitted semi-annually in paper format to the Regional Water Board according to the following schedule:

Report	Monitoring Period	Report Due Date
First Semi-annual	January through June	July 31
Second Semi-annual	July through December	January 31

All reports, workplans, and laboratory analytical data submitted for the site shall also be submitted in electronic format to the State Water Resources Control Board's Geographic Environmental Information Management System database (GeoTracker) as specified in Title 23, Division 3, Chapter 30, Article 2, Sections 3890-3895 of the California Code of Regulations. Laboratory analytical reports shall be submitted in electronic format to GeoTracker within thirty days of receipt.

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

A. Groundwater elevation maps for each monitored water-bearing zone showing groundwater elevations relative to the locations of monitoring wells, vapor monitoring points, former and current underground tanks, and other significant features.

B. Analytical data tables summarizing the current and historical analytical results for all permanent groundwater and vapor monitoring points.

C. Copies of the following: well purging and sampling field logs; chain of custody documentation showing the time and date of collection and person collecting; and signed laboratory reports including quality control data and explanations of analytical anomalies, if any. Monitoring reports shall 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.

D. A discussion of the sub-surface vapor analytical results and the assessment of potential vapor intrusion to indoor air, including recommendations for additional investigation or mitigation measures to address any concerns about indoor air quality.

Ordered by _____
Matthias St. John
Executive Officer

September 21, 2012

Appendix 1

WDR Compliance Sampling and Analysis Plan

SAMPLING POINT ID	MONITORING OBJECTIVE	BASELINE MONITORING [1]	POST-INJECTION MONITORING [2]	CONTINGENCY MONITORING [3]
5B-U	Up-gradient Background	X [1]	Optional	Optional
62U	Up-gradient Background	X [1]	Optional	Optional
Well A	Treatment Zone A	X [1]	X [2]	
Well B	Treatment Zone B	X [1]	X [2]	
66U	On-Site Down-gradient	X [1]	X [2]	
67U	On-Site Down-gradient	X [1]	X [2]	
5U	Property Boundary	X [1]	X [2]	
8U	Property Boundary	X [1]	X [2]	X [3]
10U	Property Boundary	X [1]	X [2]	X [3]
61U	Property Boundary	X [1]	X [2]	X [3]
VE-1	Sub-Slab Vapor	X [1]	X [2]	X [3]
SV-A1	Soil Vapor	X [1]	X [2]	X [3]
SV-A2	Soil Vapor	X [1]	X [2]	X [3]

(1) **Baseline Monitoring** for groundwater shall be conducted prior to the initial sub-surface chemical injections include the following: a) the full list of volatile organic compounds (VOCs) quantified by EPA Method 8260B; b) the dissolved metals: arsenic, iron, manganese, mercury, and vanadium; and c) water quality parameters: alkalinity, total organic carbon, dissolved oxygen, ferrous iron, oxidation-reduction potential, pH, and temperature. Baseline monitoring for sub-slab and soil vapor shall consist of analysis for VOCs and hydrogen sulfide, and field monitoring for percent of the combustible gas explosive limit.

(2) **Post-injection Monitoring** for groundwater shall be conducted quarterly and shall include the following: a) full list of volatile organic compounds quantified by EPA Method 8260B (VOCs); b) the dissolved metals: arsenic, iron, manganese, mercury, and vanadium; and c) Water quality parameters: alkalinity, total organic carbon, dissolved oxygen, ferrous iron, oxidation-reduction potential, pH, and temperature. Post injection monitoring for vapor points includes laboratory analyses for the full list of VOCs, hydrogen sulfide, and field monitoring for percent of the combustible gas explosive limit. .

(3) **Contingency Monitoring** for groundwater shall be implemented if the fourth post injection event analytical results for either down-gradient well 66U or 67U, or property boundary wells 5U, 8U, 10U, or 61U exceed the 95% Upper Confidence Limit for dissolved metals or total organic carbon based on the previous sampling data, and shall include the following: a) the full list of volatile organic compounds (VOCs) quantified by EPA Method 8260B; b) the dissolved metals: arsenic, iron, manganese, mercury, and vanadium; and c) water quality parameters: alkalinity, total organic carbon, dissolved oxygen, oxidation-reduction potential, pH, and temperature. Contingency monitoring for sub-slab vapor shall include the full list of VOCs, hydrogen sulfide and field monitoring for combustible gas concentrations if analytical results exceed specified screening thresholds.

APPENDIX 2

Hewlett Packard Valley Site Volatile Organic Compounds of Potential Concern

	Compound Name	CAS No.
1	1,1,1,2-Tetrachloroethane	630-20-6
2	1,1,1-Trichloroethane	71-55-6
3	1,1,2,2-Tetrachloroethane	79-34-5
4	1,1,2-Trichloroethane	79-00-5
5	1,1-Dichloroethane	75-34-3
6	1,1-Dichloroethene	75-35-4
7	1,2,3-Trichlorobenzene	87-61-6
8	1,2,3-Trichloropropane	96-18-4
9	1,2,4-Trichlorobenzene	120-82-1
10	1,2,4-Trimethylbenzene	95-63-6
11	1,2-Dibromo-3-chloropropane	96-12-8
12	1,2-Dibromoethane	106-93-4
13	1,2-Dichlorobenzene	95-50-1
14	1,2-Dichloroethane	107-06-2
15	1,2-Dichloropropane	78-87-5
16	1,3,5-Trimethylbenzene	108-67-8
17	1,3-Dichlorobenzene	541-73-1
18	1,4-Dichlorobenzene	106-46-7
19	2-Butanone (MEK)	78-93-3
20	2-Hexanone	591-78-6
21	4-Isopropultoluene	99-87-6
22	4-Methyl-2-pentanone (MIBK)	108-10-1
23	Acetone	67-64-1
24	Benzene	71-43-2
25	Bromobenzene	108-86-1
26	Bromochloromethane	74-97-5
27	Bromoform	75-25-2
28	Bromomethane	74-83-9
29	Butylbenzene-n	104-51-8
30	Carbon disulfide	75-15-0
31	Carbon tetrachloride	56-23-5
32	Chlorobenzene	108-90-7
33	Chlorodibromomethane	124-48-1
34	Chloroethane	75-00-3
35	Chloroform	67-66-3
36	Chloromethane	74-87-3
37	cis-1,2-Dichloroethene	156-59-2
38	cis-1,3-Dichloropropene	10061-01-5
39	Dibromomethane	74-95-3
40	Dichlorodifluoromethane (Freon 12)	75-71-8
41	Ethylbenzene	100-41-4
42	Hexachlorobutadiene	87-68-3
43	Isopropylbenzene (cumene)	98-82-8
44	Methyl tert-butyl ether	1634-04-4
45	Methylene chloride	75-09-2
46	Naphthalene	91-20-3
47	Propylbenzene-N	103-65-1
48	Styrene	100-42-5
49	Tetrachloroethene	127-18-4
50	Toluene	108-88-3
51	trans-1,2-Dichloroethene	156-60-5
52	trans-1,3-Dichloropropene	10061-02-6
53	Trichloroethene	79-01-6
54	Trichlorofluoromethane (Freon 11)	75-69-4
55	Trichlorotrifluoroethane (Freon 113)	76-13-1
56	Vinyl acetate	108-05-4
57	Vinyl chloride	75-01-4
58	Xylenes (m-,p- and o- isomers)	108-38-3

APPENDIX 3

Volatile Organic Compound List for Vapor Analysis

	Compound Name	CAS No.
1	1,1,1-Trichloroethane	71-55-6
2	1,1,2,2-Tetrachloroethane	79-34-5
3	1,1,2-Trichloroethane	79-00-5
4	1,1-Dichloroethane	75-34-3
5	1,1-Dichloroethene	75-35-4
6	1,2,4-Trichlorobenzene	120-82-1
7	1,2-Dibromoethane	106-93-4
8	1,2-Dichloroethane	107-06-2
9	1,3-Dichlorobenzene	541-73-1
10	1,4-Dichlorobenzene	106-46-7
11	Benzene	71-43-2
12	Carbon tetrachloride	56-23-5
13	Chlorodibromomethane	124-48-1
14	Chloroethane	75-00-3
15	Chloroform	67-66-3
16	Chloromethane	74-87-3
17	cis-1,2-Dichloroethene	156-59-2
18	cis-1,3-Dichloropropene	10061-01-5
19	Ethylbenzene	100-41-4
20	Hexachlorobutadiene	87-68-3
21	Methylene chloride	75-09-2
22	Methyl tert-butyl ether	1634-04-4
23	Tetrachloroethene	127-18-4
24	trans-1,2-Dichloroethene	156-60-5
25	Trichloroethene	79-01-6
26	Trichlorotrifluoroethane (Freon 113)	76-13-1
27	Vinyl chloride	75-01-4