

SECTION 2

First, Second, and Third Quarter 1998 Sampling Events

2.1 Description of Activities

Field sampling procedures followed the revised project Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) (EPA, 1995a and 1995b, respectively). During the second and third quarter sampling events, field sampling procedures for the additional parameters described below were included with Addendum No. 1 to the QAPP (CH2M HILL, April 1998). Water levels were measured in each well immediately after accessing the well and prior to sampling. These values are presented in Table 2-1.

Well purging consisted of removing between three and five well volumes of water at a flow rate between 5 and 12 gallons per minute (gpm) and using the dedicated electric pumps. During purging, pH, temperature, electrical conductivity, and turbidity of the groundwater were measured over time (Table 2-2) to ensure that these parameters stabilized prior to sampling. Following purging, flow rates were lowered to approximately 1 gpm to minimize aeration prior to sampling. Purge water was collected in a vacuum truck and transported to a central location.

Samples were collected in appropriate containers from polyethylene tubing attached to an adjustable sampling valve. Samples were stored in coolers packed with ice and were shipped the day of sampling by overnight carrier to a CH2M HILL Quality Assurance Laboratory (QAL).

During the first quarter 1998 sampling event, analytical parameters consisted of VOCs and N-nitrate/nitrite. During the second quarter (triannual) 1998 sampling event, analytical parameters consisted of VOCs, metals, nitrate/nitrite, and additional general water chemistry parameters (chloride, sulfate, hardness, total alkalinity, total dissolved solids [TDS], and total organic carbon [TOC]). Samples were also collected and submitted for the presence of hexavalent chromium, 1,4-dioxane, methyl tertiary butyl ethylene (MTBE), and perchlorate as outlined in Addendum No. 1. Samples collected during the third quarter 1998 sampling event were analyzed for VOCs and N-nitrate/nitrite, in addition to the parameters provided for in Addendum No. 1. Samples collected from these events were analyzed through CH2M HILL's QAL.

State of California and federal MCLs are listed in Table 2-3; Table 2-4 specifies the methods by which the parameters were analyzed and their respective target detection limits. Chain-of-custody procedures and sample documentation were conducted as outlined in the SAP and QAPP. Copies of chain-of-custody documentation for the first, second, and third quarter sampling events are provided in Appendix D.

2.1.1 First Quarter

During the first quarter, 49 monitoring wells were sampled. These quarterly monitoring wells consist of 26 VPBs and 23 cluster wells. A total of 63 samples were collected and analyzed, including samples representing quality control (QC) samples (field blanks, laboratory blanks, and field duplicates). Samples collected were analyzed for VOCs, nitrate, and nitrite at CH2M HILL's QAL. Additional performance evaluation (PE) samples for inorganics, hardness, metals, TOC, 1,4-dioxane, and VOCs were submitted to the laboratory during this event.

Purge water was collected in a vacuum truck at each monitoring well location where historic VOC concentration exceeded the MCL. The purge water was transported to the staging area at Los Angeles Department of Water and Power (LADWP) Headworks Spreading Grounds and containerized in Baker tanks for disposal at a later date. Approximately 12,275 gallons of purge water were collected during the second quarter event.

2.1.2 Second Quarter

The second quarter 1998 sampling event was designated as a triannual event. During this event, 83 monitoring wells were sampled. These quarterly monitoring wells consist of 41 VPBs and 42 cluster wells. A total of 105 samples were collected and analyzed, including samples representing QC samples (field blanks, laboratory blanks, and field duplicates). Samples collected by CH2M HILL were analyzed for Target Compound List (TCL) VOCs, Target Analyte List (TAL) metals, nitrate and nitrite, inorganics (chloride, sulfate, and fluoride), alkalinity, bicarbonate-carbonate, hardness, TDS, TOC, MTBE, 1,4-dioxane, hexavalent chromium, and perchlorate through QAL.

Purge water was collected in a vacuum truck at each monitoring well location where historic VOC concentration exceeded the MCL. The purge water was transported to the staging area at LADWP's Headworks Spreading Grounds, and contained in Baker tanks for disposal at a later date. Approximately 28,760 gallons of purge water were collected during the second quarter event.

2.1.3 Third Quarter

The third quarter 1998 sampling event was a quarterly event during which 52 RI monitoring wells were sampled. These monitoring wells consist of 28 VPBs and 24 cluster wells. A total of 67 samples were collected and analyzed, including QC samples (field blanks, laboratory blanks, and field duplicates). Samples collected were analyzed for VOCs, nitrate and nitrite, MTBE, 1,4-dioxane, hexavalent chromium, and perchlorate through QAL. During the third quarter sampling event, approximately 14,218 gallons of purge water were collected and transported by vacuum truck to LADWP's Headworks Spreading Ground staging area.

2.2 Analytical Results

2.2.1 First Quarter

Reported concentrations of TCE at RI monitoring wells ranged from not detected to a high of 7,800 micrograms per liter ($\mu\text{g/L}$) during the first quarter. Thirty-one of the 49 RI monitoring wells exhibited sample concentrations of TCE greater than the MCL of 5 $\mu\text{g/L}$. Twelve of the wells had TCE concentrations greater than 100 $\mu\text{g/L}$, including two wells (CS-VPB-07 and CS-C03-100) with a concentration greater than 1,000 $\mu\text{g/L}$ (7,800 $\mu\text{g/L}$ and 4,300 $\mu\text{g/L}$, respectively).

Concentrations of PCE in RI monitoring wells during the first quarter sampling event ranged from not detected to a high of 250 $\mu\text{g/L}$ (NH-VPB-14). Of the 49 RI monitoring wells sampled, 27 had concentrations exceeding the MCL of 5 $\mu\text{g/L}$. Six monitoring wells exhibited concentrations of 100 $\mu\text{g/L}$ or greater.

Nitrate (as NO_3) ranged from 2.0 milligrams per liter (mg/L) at CS-VPB-04 to 61.4 mg/L at NH-VPB-14. Twelve of the 49 RI monitoring wells sampled during the second quarter exceeded the nitrate MCL of 45 mg/L (as NO_3).

During the first quarter sampling event, samples were collected for dissolved metals analysis at two monitoring wells, PO-C01-195 and PO-VPB-01. Both monitoring wells were above the MCL for

antimony with levels of 9.8 µg/L and 10.1 µg/L, respectively. Hexavalent chromium at a concentration of 435 µg/L was observed in PO-VPB-01. This value is consistent with previously observed concentrations at this monitoring well.

Table 2-5 presents a summary table of TCE, PCE, and nitrate data from the first quarter sampling event. A complete listing of these data, as well as other VOCs for the first quarter sampling event, is located in Appendix E. Results of analyses of duplicates and field blanks for this sampling event are found in Appendix F.

2.2.2 Second Quarter

Reported concentrations of TCE at RI monitoring wells ranged from not detected to a high of 1,400 µg/L during the third quarter. Thirty-two of the 83 RI monitoring wells exhibited sample concentrations of TCE exceeding the MCL of 5 µg/L. Ten of the wells had TCE concentrations greater than 100 µg/L, including one well (CS-VPB-07) with a concentration greater than 1,000 µg/L (1,400 µg/L).

Concentrations of PCE during the second quarter sampling event ranged from not detected to a high of 97 µg/L (CS-C02-335). Of the 83 RI monitoring wells sampled, 25 had concentrations exceeding the MCL of 5 µg/L.

Nitrate (as NO₃) ranged from less than 1.0 mg/L at CS-C06-278 and NH-CO4-560 to 68.9 mg/L at PO-VPB-10. Twenty-three of the 83 RI monitoring wells sampled during the third quarter exceeded the nitrate MCL of 45 mg/L (as NO₃). The lower concentrations of nitrate are expected with the inclusion of many of the deeper cluster wells during this event.

Table 2-6 presents a summary table of TCE, PCE, and nitrate data from the second quarter sampling event. Results of the general water chemistry observed during the second quarter 1998 are presented in Table 2-8. A complete listing of these data, as well as other VOCs for the second quarter sampling event, is located in Appendix E. Results of analyses of duplicates and field blanks for this sampling event are found in Appendix F.

During the second quarter, MTBE was detected at two monitoring wells (PO-C03-182 and PO-C03-235) with concentrations of 7 µg/L and 2 µg/L, respectively. The compound 1,4-dioxane was detected at six monitoring wells with a maximum concentration of 29 µg/L at CS-C03-100. The remaining five wells exhibited concentrations less than 2 µg/L.

Dissolved metals exceeding primary and secondary MCLs were observed in 28 RI monitoring wells during the second quarter of 1998 (Table 2-9). Chromium exceeding the MCL was observed in two wells (CS-VPB-04 and PO-VPB-02), consistent with previous annual events. Iron exceeded the secondary MCL of 300 mg/L in two wells (CS-VPB-09 and PO-C03-325) during the second quarter of 1998. Four wells (CS-C02-180, PO-C02-205, PO-VPB-05, and PO-VPB-08) exceeded the secondary MCL of 50 mg/L for manganese. The concentrations of iron and manganese observed in these wells are also consistent with previous events. A total of 24 RI monitoring wells exceeded the MCL of 6 µg/L for antimony, with a maximum of 19.1 µg/L at VD-VPB-04 (Table 2-9).

2.2.3 Third Quarter

In the 52 RI monitoring wells sampled during the third quarter sampling event, TCE concentrations ranged from not detected to 8,900 µg/L at CS-VPB-07. Thirty-three of the wells had reported concentrations of TCE exceeding 5 µg/L (the MCL), including 15 with concentrations greater than 100 µg/L. Of these monitoring wells, two were greater than 1,000 µg/L (CS-VPB-07 with 8,900 µg/L and CS-C03-100 with 4,300 µg/L).

Reported concentrations of PCE ranged from concentrations between the detection limit and the MCL at 27 monitoring wells to a high of 170 µg/L at CS-VPB-01. Concentrations of PCE above the MCL of 5 µg/L were reported in 25 of the 52 monitoring wells sampled during the third quarter event. Four of the wells (CS-C01-105, CS-C01-285, CS-C02-335, and CS-VPB-01) had PCE concentrations above 100 µg/L. All of the monitoring wells exceeding the MCL for PCE also exceed the MCL for TCE with the exception of CS-VPB-10, CS-VPB-11, and NH-C01-325.

During the third quarter, nitrate (as NO₃) concentrations ranged from 3.5 mg/L at CS-C03465 to 63.6 mg/L at NH-VPB-06. Seventeen of the 52 wells sampled during this event exhibited concentrations greater than the MCL of 45 mg/L.

TCE, PCE, and nitrate data from the third quarter sampling event are presented in Table 2-7. Additional VOCs detected at RI monitoring wells are reported in Section 4. Appendix E summarizes the complete analytical results for the wells sampled during the third quarter. Results of duplicate samples and field blanks for the third quarter sampling event are presented in Appendix F.

During the third quarter, MTBE was detected at 11 monitoring wells. Six of these wells had concentrations at or below the reported detection limit of 1 µg/L. The remaining five monitoring wells (PO-C03-182, PO-C03-235, PO-VPB-08, CS-VPB-11, and NH-VPB-01) had concentrations of 4 µg/L, 6 µg/L, 2 µg/L, 6 µg/L, and 26 µg/L, respectively.

Hexavalent chromium analysis was included for samples collected during this event. Consistent with previous events, hexavalent chromium exceeded the MCL at two monitoring wells, CS-VPB-04 and PO-VPB-02, with concentrations of 940 µg/L and 366 µg/L, respectively.