

First, Third, and Fourth Quarter 1996 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). 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) 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 storage tanks at 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 laboratory designated by EPA's Contract Laboratory Program (CLP).

During the first and third quarter 1996 sample events, analytical parameters consisted of VOCs and N-nitrate/nitrite. During the fourth quarter (annual) 1996 sample 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]). In addition, samples submitted for 1,4-dioxane analysis were collected from selected RI monitoring wells (predominantly shallow cluster wells and VPBs). Samples collected were analyzed through EPA's CLP. Modifications to the SAP during 1995 eliminated sample collection and analyses for semivolatiles organic compounds (SVOCs) and radionuclides (CH2M HILL, 1995c).

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 third and fourth quarterly sampling events are provided in Appendix D.

2.1.1 First Quarter

During the first quarter, 52 monitoring wells were sampled. These quarterly monitoring wells consisted of 28 VPBs and 24 cluster wells. A total of 65 samples were collected and analyzed, including samples representing quality control (QC) samples (field blanks, laboratory blanks, and field duplicates). Samples collected by CH2M HILL were analyzed for VOCs and NO₃ through EPA's CLP.

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 containerized in Baker tanks for disposal at a later date. Approximately 12,798 gallons of purge water were collected during the first quarter event.

2.1.2 Third Quarter

During the third quarter, 52 monitoring wells were sampled. These quarterly monitoring wells consisted of 28 VPBs and 24 cluster wells. A total of 65 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 VOCs and NO₃ through EPA's CLP.

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 containerized in Baker tanks for disposal at a later date. Approximately 11,767 gallons of purge water were collected during the third quarter event.

2.1.3 Fourth Quarter

The fourth quarter 1996 sample event was designated as an annual event during which 65 RI monitoring wells were scheduled for sampling. A total of 61 monitoring wells were sampled. These monitoring wells consisted of 34 VPBs and 27 cluster wells. A total of 78 samples were collected and analyzed, including 34 samples representing QC samples (field blanks, laboratory blanks, and field duplicates). During the fourth quarter sampling event, approximately 15,947 gallons of purge water were collected and transported by vacuum truck to LADWP's Headworks Spreading Ground staging area.

Four additional monitoring wells, which were scheduled to be included in this event, were not sampled. Monitoring wells NH-VPB-13 and PO-VPB-10 were not sampled because of inoperable pumps. One monitoring well, NH-VPB-10, was not located because repaving operations were being conducted by the City of Los Angeles, and one monitoring well, PO-C02-53, was destroyed by construction of a new sidewalk.

2.2 Analytical Results

2.2.1 First Quarter

Reported concentrations of TCE ranged from not-detected to a high of 8,900 micrograms/liter ($\mu\text{g/L}$) during the first quarter. Thirty-five of the 52 RI monitoring wells exhibited sample concentrations of TCE greater than the MCL of 5 $\mu\text{g/L}$. Fourteen 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 over 1,000 $\mu\text{g/L}$ [8,900 $\mu\text{g/L}$ and 5,300 $\mu\text{g/L}$, respectively]).

Concentrations of PCE during the first quarter sampling event ranged from not-detected to a high of 280 $\mu\text{g/L}$ (CS-C02-335). Of the 52 RI monitoring wells sampled, 26 had concentrations exceeding the MCL of 5 $\mu\text{g/L}$. Five monitoring wells (CS-C01-105, CS-C01-285, CS-C02-250, CS-C02-335, and NH-VPB-01) exhibited concentrations of 100 $\mu\text{g/L}$ or greater.

Nitrate (as NO_3) ranged from 3.8 milligrams per Liter (mg/L) at CS-C03-465 to 82.8 mg/L at NH-VPB-06. Fifteen of the 50 RI monitoring wells sampled during the first quarter exceeded the NO_3 MCL of 45 mg/L (as NO_3).

Table 2-5 presents a summary table of TCE, PCE, and NO_3 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 Third Quarter

Reported concentrations of TCE ranged from not-detected to a high of 8,700 $\mu\text{g/L}$ during the third quarter. Thirty-two of the 52 RI monitoring wells exhibited sample concentrations of TCE greater than the MCL of 5 $\mu\text{g/L}$. Thirteen 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 over 1,000 $\mu\text{g/L}$ (8,700 $\mu\text{g/L}$ and 3,100 $\mu\text{g/L}$, respectively).

Concentrations of PCE during the third quarter sampling event ranged from not-detected to a high of 270 $\mu\text{g/L}$ (CS-C02-335). Of the 52 RI monitoring wells sampled, 25 had concentrations exceeding the MCL of 5 $\mu\text{g/L}$. Five monitoring wells (CS-C01-105, CS-C01-285, CS-C02-250, CS-C02-335, and NH-VPB-01) exhibited concentrations of 100 $\mu\text{g/L}$ or greater.

Nitrate (as NO_3) ranged from 4.0 mg/L at CS-C03-465 to 83.7 mg/L at NH-VPB-06. Eighteen of the 52 RI monitoring wells sampled during the third quarter exceeded the NO_3 MCL of 45 mg/L (as NO_3).

Table 2-6 presents a summary table of TCE, PCE, and NO₃ data from the third quarter sampling event. A complete listing of these data, as well as other VOCs for the third 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.

2.2.3 Fourth Quarter

In the 61 RI monitoring wells sampled during the fourth quarter sampling event, TCE concentrations ranged from not-detected to 8,200 µg/L. Thirty-five of the wells had reported concentrations of TCE exceeding 5 µg/L (the MCL), including 15 with concentrations over 100 µg/L. Of these monitoring wells, two were over 1,000 µg/L (CS-VPB-07 with 8,200 µg/L and CS-C03-100 with 4,000 µg/L).

Reported concentrations of PCE ranged from not-detected at seven monitoring wells to a high of 240 µg/L at CS-C02-335 and CS-C01-105. Twenty-eight wells had concentrations above the detection limit but below the MCL. Concentrations of PCE above the MCL of 5 µg/L were reported in 25 of the 61 monitoring wells sampled during the fourth quarter event. Seven of the wells (CS-C01-105, CS-C01-285, CS-C02-335, NH-VPB-01, and NH-VPB-14) had PCE concentrations above 100 µg/L. All of the monitoring wells exceeding the MCL for PCE also exceeded the MCL for TCE with the exception of CS-VPB-10 and CS-VPB-11.

During the fourth quarter, nitrate (as NO₃) concentrations ranged from 2.2 mg/L at CS-C03-325 to 98.8 mg/L at NH-VPB-06. Nineteen of the 61 wells sampled during this event exhibited concentrations greater than the MCL of 45 mg/L

TCE, PCE, and NO₃ data from the fourth quarter sampling event are presented in Table 2-7. Table 2-8 presents the results of the general water chemistry during the fourth quarter of 1996. 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 fourth quarter. Results of duplicate samples and field blanks for the fourth quarter sampling event are presented in Appendix F.

Dissolved metals exceeding primary and secondary MCLs were observed in ten RI monitoring wells during the fourth quarter of 1996 (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 four wells (PO-CO3-182, PO-CO3-235, PO-VPB-03, and CS-VPB-09) during the fourth quarter of 1996. Three wells (PO-VBB-05, PO-VPB-08, and PO-CO2-205) exceeded the secondary MCL of 50 mg/L for manganese.