

SECTION 3

Summary of 1999 Sampling Program and Discussion of Fourth Quarter 1999 Results

3.1 Description of Activities

EPA's RI monitoring wells in the San Fernando Valley Basin (SFVB) were sampled by CH2M HILL once during 1999 (Table 1-1). This event, November 29 through December 15 and January 11 through 13, was an annual event collecting groundwater samples from 74 RI monitoring wells. During this event groundwater samples were collected for VOCs including MTBE, semivolatile organic compounds (SVOCs), perchlorate, dissolved metals, hexavalent chromium, nitrate/nitrite, and general water chemistry analyses. An additional 10 wells were originally included; however, inoperable pumps (CS-C02-62, NH-C01-558, PO-VPB-07, PO-VPB-10, and VD-VPB-07) and inadequate submergence of the pump (NH-VPB-06, NH-VPB-10, NH-VPB-11, NH-VPB-13, and NH-C05-320) prevented samples from being collected at these wells.

Water levels were obtained from LADWP for each of the RI monitoring wells prior to sampling. These data were incorporated into the GIS database and converted to elevations above mean sea level (MSL). Water level elevation (MSL) for the RI monitoring wells at the time of this sample event is provided in Table 2-1.

During each sample event, each well was purged three to five well volumes prior to sampling. During purging, pH, temperature, electric conductivity, and turbidity of the groundwater were measured over time to ensure that these parameters stabilized prior to sampling. Table 2-2 presents a comparison of these parameters at each RI monitoring well during the 1999 sampling event.

Purge water, or investigative derived waste (IDW), from each RI monitoring well where previously observed VOC concentrations exceeded MCLs was collected in a vacuum truck and transported to Baker tanks located at LADWP's Headworks Spreading Grounds staging area. Approximately 21,700 gallons of IDW were collected during this annual sampling event.

3.2 Comparison of Water Levels

Water levels were obtained from transducers previously installed by LADWP. For this sample event, the most recently available measurements were those obtained by LADWP in August 1999 and are presented in Table 2-1. Additionally, these measurements are incorporated into the GIS database, converted to elevations above MSL, and presented as hydrographs (Figure 3-1).

Comparison of water levels from 1999 to 1998 showed water levels generally lower across the San Fernando Superfund Site. In Crystal Springs (Area 2) drops in water levels were on

the order of 4 to 10 feet. Water levels in North Hollywood (Area 1) were also lower, however with more variation across the area. Drops in water levels generally were between 2 to 10 feet, with the exception of monitoring wells in the vicinity of the Rinaldi-Toluca and Tujunga well fields where water level drops of 30 to 40 feet were observed. During the annual sample event, water levels in four monitoring wells (NH-VPB-06, NH-VPB-11, NH-VPB-13, and NH-C05-320) in this area were below the pump intake. In the Los Angeles River Narrows area of the SFVB (Area 4), water level in the northern and southern portions were comparable to the previous year (i.e., within 1 foot); however, in the vicinity of the Pollock Well Treatment Plant, in the central portion of the Area, drops in water levels between 10 to 12 feet were observed.

3.3 Comparison of Analytical Results

With the close-out of the groundwater monitoring WA at the completion of the ARCSWEST contract and the subsequent start-up of a new WA with the issuance of the RAC contract there was only one sample event during 1999. Concentration data from this annual sample event (fourth quarter) were compared to the previous annual event (second quarter 1998). Current data and maximum/minimum data are provided for TCE in Tables 3-1 and 3-2; this data for PCE in Tables 3-3 and 3-4. Flags used in the "Current Value" columns indicate: (1) samples that contain reported TCE or PCE concentrations greater than the MCL of 5 µg/L, or (2) samples that exhibit a marked change in concentration during the current annual sample event from the previous annual sampling.

A "marked change" in concentration is considered a change in concentration between the following categories:

- 0 to 5 µg/L
- >5 to 50 µg/L
- >50 to 100 µg/L
- >100 to 500 µg/L
- >500 to 1,000 µg/L
- >1,000 to 5,000 µg/L
- 5,000 µg/L

For example, if a sample had a reported concentration of 550 µg/L TCE for the current event, but a reported concentration of 60 µg/L during the previous event, a flag of +2 would be present in the "Current Value" column of Tables 3-2 and 3-4. If the reported sample concentration had decreased to the next lower category, the flag would read -1. These concentration categories are the same as those used during preparation of basinwide TCE and PCE contaminant concentration maps.

Current and minimum/maximum nitrate data for RI monitoring wells sampled during the annual sampling event of 1999 are provided in Tables 3-5 and 3-6. Flags within the "Current Value" column of Table 3-6 indicate: (1) samples that contain reported concentrations of nitrate greater than the MCL of 45 mg/L (as NO₃), and (2) samples that exhibit a marked change in reported nitrate concentration from the current event to the previous event. A marked change in nitrate concentration (as NO₃) is herein defined as a change in concentration between the following categories:

- 0 to 20 mg/L
- >20 to 45 mg/L
- >45 to 65 mg/L
- 65 mg/L

Numerical flags in the "Current Value" column of Table 3-6 follow the same logic as described above: a reported nitrate concentration increase of one category relative to the previous event's sample will read +1; a decrease of two categories will read -2.

3.3.1 TCE Concentrations

A summary of the TCE concentrations observed at RI monitoring wells during this event is presented in Table 3-1. TCE data for the fourth quarter of 1999 compared to the previous annual event showed that a significant number of RI wells had decreased in observed concentrations (Table 3-2). The number of wells with TCE concentrations greater than the MCL of 5 µg/L also decreased by 2 to 25 from 27. At 15 wells, a decrease of one category (62 to 26 µg/L at CS-C02-180, 220 to 100 µg/L at CS-C02-250, 200 to 100 µg/L at CS-C02-335, 4,300 to 930 µg/L at CS-C03-100, 120 to 63 µg/L at CS-C05-160, 140 to 80 µg/L at CS-VPB-05, 8,900 to 3,600 µg/L at CS-VPB-07, 96 to 39 µg/L at CS-VPB-08, 120 to 98 µg/L at NH-C02-520, 8 to 1 µg/L at NH-C04-240, 7 to 3 µg/L at NH-C06-160, 220 to 58 µg/L at NH-VPB-01, 220 to 100 µg/L at NH-VPB-14, 5.1 to 2 µg/L at PO-VPB-01, and 310 to 97 µg/L at PO-VPB-02) was observed. Although fluctuations in TCE concentrations at RI monitoring wells have been observed in the past, the number of wells with decreases of one category in an event is typically not this high. The data from these wells will be closely followed through successive sample events to determine if this is an anomaly or if the data are indicative of changing conditions.

Historic concentration data acquired to date for TCE samples obtained for the RI wells are presented in Figure 3-2. The historic concentration data include the TCE data reported below laboratory detection limits. Concentrations that are reported below laboratory detection limits are plotted and indicated as "nondetected" concentrations in Figure 3-2. Data used to construct these historic graphs were obtained during sampling conducted by CH2M HILL beginning in 1992 and sampling conducted by LADWP and James M. Montgomery, Inc. (JMM) between July 1989 and March 1991.

3.3.2 PCE Concentrations

A summary of the PCE concentrations observed during this event at RI monitoring wells is presented in Table 3-3. Reported PCE concentrations at 66 of the 74 RI monitoring wells sampled during the fourth quarter of 1999 are typically not markedly changed relative to the concentrations from the previous annual event for these wells (Table 3-4). The number of RI monitoring wells exhibiting concentrations of PCE greater than the MCL of 5 µg/L decreased from 29 to 31 wells. However, this apparent decrease may be related to the inability to obtain samples from the inoperable wells. Data from the fourth quarter show that six wells, CS-C01-105, CS-C01-285, CS-VPB-08, NH-VPB-01, NH-VPB-14, and PO-VPB-02 exhibited decreases of one category (140 to 82 µg/L, 150 to 87 µg/L, 80 to 11 µg/L, 97 to 28 µg/L, 48 to 5 µg/L, and 65 to 22 µg/L, respectively). Two wells, NH-C03-580 and NH-VPB-07, exhibited an increase of one category (8 to 9 µg/L and 3 to 7 µg/L, respectively). Four of these wells also had similar decreases for TCE concentrations.

Historic data obtained by CH2M HILL and JMM to date for PCE concentrations in the RI wells are presented in Figure 3-3. Concentrations of PCE that are reported below laboratory detection limits are plotted and indicated as "nondetected" concentrations in Figure 3-3.

3.3.3 Nitrate

A summary of the nitrate concentrations observed during this event at RI monitoring wells is presented in Table 3-5. Of the 74 RI monitoring wells sampled during the fourth quarter of 1999, 24 exhibited concentrations exceeding the nitrate MCL of 45 mg/L (as NO₃) compared to the previous annual event (Table 3-6). Five wells (CS-VPB-04, CS-VPB-08, NH-C01-325, NH-VPB-08, and PO-VPB-01) showing increases of one category and one well (NH-VPB-05) showing an increase of two categories. Two RI monitoring wells (PO-VPB-05 and VD-VPB-03) exhibited a decrease of one category and one well, CS-VPB-011, decreased two categories

Figure 3-4 presents the historic data obtained for nitrate concentrations for the RI wells. Concentrations of nitrate that are reported below laboratory detection limits are plotted and indicated as "nondetected" concentrations in Figure 3-4.

3.3.4 Other VOCs

Observations of VOCs other than TCE and PCE were similar to those observed during the pervious annual event in 1998. During the fourth quarter 1999 sample event, five wells (CS-VPB-04, CS-VPB-06, CS-VPB-07, NH-C02-520, and PO-VPB-08) exceeded the MCL for VOCs other than TCE and PCE (Table 3-7). Compounds detected in these wells include carbon tetrachloride, 1,1-dichloroethene, and 1,1-dichloroethane at CS-VPB-04 and CS-VPB-07; carbon tetrachloride and 1,1-dichloroethene at CS-VPB-06 and NH-C02-520; and, 1,1-dichloroethene at PO-VPB-08. Two wells, CS-C03-100 and PO-VPB-02, in which VOCs other than TCE and PCE have historically been observed to exceed the MCLs were not included due to the dilution of samples from these wells to obtain accurate concentrations for TCE or PCE.

MTBE at concentrations over 1 µg/L was detected at six monitoring wells with a maximum concentration of 32 µg/L at NH-VPB-01.

3.3.5 Perchlorate

Samples were collected for perchlorate during the 1999 annual sample event. Perchlorate was observed above the detection limit at 26 of the 74 RI monitoring included in this event. However, all concentrations were below the maximum of 5.4 µg/L observed at CS-VPB-04. Analytical results for the wells with detectable perchlorate concentrations are summarized in Appendix E.

3.3.6 Metals

Analysis of dissolved metals was conducted during the fourth quarter 1999 sampling event. Metals that were reported above primary and secondary MCLs included dissolved iron, dissolved manganese, dissolved thallium, dissolved chromium and hexavalent chromium (Table 2-6). The presence of dissolved chromium and hexavalent chromium in monitoring wells CS-VPB-04 and PO-VPB-02 remained comparable to the concentrations previously observed. The three monitoring wells with the presence of dissolved manganese (PO-C02-

205, PO-VPB-05, and PO-VPB-08) were comparable to those from the previous annual event, as was PO-C03-235 for dissolved iron.

3.3.7 Other Analytical Parameters

During the annual sampling event, groundwater was analyzed for general water chemistry parameters including chloride, sulfate, total alkalinity, hardness, TDS, and TOC (Table 3-8). Concentrations of all parameters were comparable to the results observed in the previous annual sample event during 1998. TDS values ranged from 246 (CS-C03-325) to 1,100 mg/L (CS-VPB-09). The secondary MCL (500 mg/L) for TDS was exceeded in 43 of the 74 RI monitoring wells during the fourth quarter (Table 3-8). Total alkalinity ranged from 112 mg/L (VD-VPB-06) to a high of 504 mg/L (CS-VPB-09). All RI monitoring wells were below the secondary MCL for sulfate (250 mg/L), with the exception of NH-C06-425, which had a concentration of 380 mg/L.

3.4 Concentration Contour Maps

TCE and PCE are common and widespread contaminants in the San Fernando Valley Basin, and may at least roughly reflect the distribution of other contaminants. To evaluate the lateral and vertical distribution of TCE, PCE, and nitrate in the SFV, depth-specific concentration contour maps were created using current data from CH2M HILL's GIS database (Figure 3-5). This database includes water quality and water level data for the RI wells and also data from local facilities in the SFV, transmitted by the California RWQCB and LASC. Data from local groundwater purveyors (LADWP, the Cities of Glendale and Burbank, and Crescenta Valley County Water District) were also incorporated into the GIS database.

3.4.1 Interval Selection

The depth intervals for the 1999 concentration contour maps are based on: (1) water level data from RI monitoring wells, facility wells, and production wells; (2) screened intervals in monitoring wells, facility wells, and production wells; and (3) concentration values for TCE, PCE, and nitrate from the most recent sampling event. The concentration of TCE, PCE, and nitrate is typically greater in wells with screens at or near the water table, with groundwater contamination apparently attenuating with depth. Based on these data, two sets of depth-specific concentration contour maps were developed based upon wells that are screened: (1) within 50 feet of the water table and (2) more than 50 feet below the water table.

Data from production wells, facility wells, and landfill monitoring wells are categorized in the same manner as the RI monitoring wells. Production wells with the top of their screened interval within 50 feet of the water table are in the upper interval, and wells with the top of their screen greater than 50 feet below the water table are in the lower zone. Production well data are posted on the concentration contour maps; however, the concentration of the contaminant within the well is considered only as an indicator on the upper zone maps because the contaminants may be diluted with production of water from deeper, cleaner intervals.

3.4.2 Estimated Aerial Extent

The depth-specific concentration contour maps combine available water quality data with professional judgment to present a simplified, "smoothed" depiction of TCE, PCE, and nitrate contaminants in the eastern SFV (Figures 3-6 through 3-11). TCE and PCE contaminant data from production wells in the LADWP's well-fields were incorporated to estimate the western and northern extent of the "area of detectable concentration." However, due to lack of available data, areas outside the colored zones may also be contaminated. The figures were prepared by hand contouring the relative concentration contours onto GIS-generated maps depicting available TCE, PCE, and nitrate values. Several assumptions and simplifications were made in preparation of the figures.

For EPA RI monitoring wells, facility wells, and production wells incorporated in the SFV GIS, the areas of contamination are based on time-specific rationale for selection of the representative data. This rationale incorporates all available data while eliminating "old" data that may not be representative of current conditions. The criteria for this rationale are presented in Appendix B.

The figures do not show the maximum contaminant concentrations known to have occurred at the wells. Using the most recent value, not the maximum or average value, does not significantly affect the interpretations shown in the concentration contour maps. This method, however, could potentially affect the locations of contours in areas where contaminant concentrations are near one of the dividing levels between concentrations.

Because the data incorporated into the GIS are obtained from various sources with varying schedules of sampling, the figures are not a "snapshot in time," but, rather, a representation of the most recently available contamination data observed at each location over several months.

The estimated direction and magnitude of groundwater flow are used to assist in estimating the shape and size of the downgradient extent of individual zones of contamination. These parameters are also used for approximating the lateral boundaries, although these boundaries are more readily determined from reported concentration values. The groundwater flow directions are fairly well understood but the downgradient margins of contamination are not as well understood.

3.4.3 Upper Interval

Concentration contours throughout the shallow interval are based on available TCE and PCE data (Figures 3-6, 3-7, and 3-8). The 5- $\mu\text{g}/\text{L}$ concentration contour for both TCE and PCE is similar to previous maps. Water quality data from 1999 was incorporated for RI monitoring wells, LASC facility wells, facility wells in the Taylor Yard, and LADWP production wells; however, recent data for many facility wells has not been received from RWQCB. The recent data have allowed refinement of the 5- $\mu\text{g}/\text{L}$ concentration contour in the western and southern portions of the SFV site. These areas cover the portions of the North Hollywood NPL site and the Pollock NPL sites. Revisions to the contours in the Crystal Springs NPL site were generally limited because of the lack of new data. Based on available data, an estimate of the concentration contour enclosing an area above the laboratory detection limit of 2 $\mu\text{g}/\text{L}$ for TCE and PCE is drawn. This contour generally conforms to the shape of the 5- $\mu\text{g}/\text{L}$ concentration

contour line. Using the most recently available water quality data from 1999, the apparent highest concentrations of TCE and PCE in the upper interval occur in:

- An elongated area extending in a southeasterly direction beginning east of the Burbank Airport. For TCE, this elongated area is approximately 2 miles long and 1 mile wide; while for PCE, it is approximately 3½ miles long and 1½ miles wide. Within this area, TCE concentrations as high as 3,600 µg/L (CS-VPB-07) and PCE concentrations as high as 4,900 µg/L (LASC B1-CW-13) are observed.
- For TCE, two southeasterly trending areas are observed at facility monitoring wells in the vicinity of the North Hollywood Extraction wells with isolated concentrations of TCE as high as 6,000 µg/L (1996 data from BX1-W10). The highest current concentrations of 417 µg/L and 413 µg/L were observed at NHE-2 and NHE-1, respectively. TCE concentrations, ranging between 5 and 100 µg/L, are also observed at facility and LADWP production wells in this area. Not detectable concentrations for TCE and PCE were observed at LADWP production wells NH-33, NH-25, and NH-26, defining the western extent of the plume. In the area of the North Hollywood Extraction wells, the highest observed concentration for PCE was 51.9 µg/L at LADWP production well NH-27 (1998 data). Several wells had concentrations between 5 and 50 µg/L are also observed in this area.
- For TCE, a southeasterly trending area, approximately 1½ miles long by ½-mile wide, was observed beginning north of the North Glendale Operable Unit (OU). The highest observed concentration of TCE in this area was 5,000 µg/L at facility monitoring well ZEC-MW1 (1997 data). Also, within this area are several small, isolated areas in the vicinity of facility wells that exceed 100 µg/L. A smaller area of TCE contamination above 1,000 µg/L, less than ½-mile long and ¼-mile wide, was observed slightly south of this area. PCE concentrations exceeding 100 µg/L appear to be isolated in the vicinity of facility monitoring wells in this area. Limited revisions to this area were possible due to the lack of more current TCE and PCE data for many of the facility wells located in the vicinity.
- Beginning in the South Glendale OU, a southeasterly trending area of TCE contamination extends approximately 1½ miles. TCE concentrations of 11,000 µg/L (1996 data) in facility monitoring wells are reported in this area. Smaller areas of TCE contamination above 100 µg/L are also observed in this area. Similar areas exist for PCE contamination exceeding 100 µg/L. Limited revisions to this area were possible due to the lack of more current TCE and PCE data for many of the facility wells located in the vicinity.
- Two areas in the vicinity of LADWP's Pollock production wells and the Taylor Yard south of the Pollock OU indicated TCE and PCE in excess of the MCLs. One area in the vicinity of LADWP's Pollock Wells Treatment Plant is approximately ½-mile long and ¾-mile wide. The second area, located in the Taylor Yard, contains two isolated areas with the highest observed PCE concentrations of 540 µg/L at TY-W9, located in the northern portion of the area; and the highest observed TCE concentration of 46 µg/L at TY-W33, near the Pollock Wells Treatment Plant.

- In the central portion of the Verdugo NPL site, recent production well data and RI monitoring well data indicate two elongated areas in the vicinity of three production wells with PCE concentrations above 5 µg/L exceeding the MCL for PCE. Data from other wells have lower but detectable concentrations of PCE. TCE is reported below the MCL in all monitoring and production wells in this area.

Additional details of the shallow interval TCE and PCE concentration contour maps are located in Appendixes G and H, respectively. These appendixes present each concentration contour map with well locations, shown with a grid network imposed over the area within the 2-µg/L contour line. Each grid square is presented as a separate plate showing greater detail of the larger TCE and PCE concentration contour maps.

The nitrate concentration contour map of the upper interval shows nitrate exceeding the MCL of 45 mg/L based on available nitrate data (as NO₃). Somewhat similar to previous maps, there are several large elongated areas, which cover most of the North Hollywood area and extend through the Crystal Springs North OU. In the North Hollywood area are several apparently isolated areas also exceeding the MCL. Separate elongated areas, exceeding the MCL, begin in the South Glendale OU and extends southward to the Pollock OU. Covering a large portion of the Verdugo area and extending southward is an elongated area of nitrate contamination in excess of the MCL.

3.4.4 Lower Interval

As discussed above, the concentrations of TCE and PCE appear to attenuate with depth (Figures 3-9 and 3-10). However, data for TCE and PCE from the lower interval are more limited. The area in the lower interval exceeding the 5-µg/L concentration contour for both TCE and PCE generally underlies the area of contamination in the upper interval; however, it is less widespread than the contaminated area in the upper interval. A concentration contour for the 2-µg/L laboratory detection limit is also shown for the lower interval. The areas of TCE and PCE concentrations exceeding the 5-µg/L concentration contour in the lower interval are:

- In the northern portion of the area, two isolated areas of TCE concentrations exceeding the MCL are observed in LADWP's Tujunga and Rinaldi-Toluca Wellfields. In the Tujunga wellfield, TCE concentrations of 11.6 and 10.5 µg/L were observed at LADWP production wells TJ-05 and TJ-06, respectively. PCE concentrations between the detection limit and the MCL were also observed at several production wells in this wellfield. Production well RT-11 was observed to have a TCE concentration of 20.4 µg/L and a PCE concentration of 5.1 µg/L in the Rinaldi-Toluca wellfield.
- Along the western boundary of observed TCE concentration, two LADWP production wells had concentrations exceeding the MCL during 1999. NH-36 had a TCE concentration of 9.76 µg/L. NH-2 had observed concentrations of TCE and PCE exceeding the MCL at 58.8 and 7.47 µg/L, respectively.
- In the vicinity of the North Hollywood Extraction wells, several of LADWP's North Hollywood and Whitnall production wells exceeded the MCL for TCE in the most recent sampling, with the highest observed concentration of 95 µg/L at NH-18. PCE concentrations at several production wells in this area also exceed the MCL.

- An elongated area of TCE and PCE contamination extends south of the Burbank Airport to the southeast approximately 4 miles. Three areas of TCE and PCE concentrations exceeding 100 µg/L are located within this area: (1) an area of PCE contamination extending from near the Burbank Airport to the vicinity of LASC monitoring well 3852 along with a small area of TCE contamination in the vicinity of LASC 3862; (2) an elongated area of TCE and PCE contamination extending between CS-C01 and CS-VPB-01; and, (3) an isolated area of TCE and PCE contamination in the vicinity of Burbank production well PSD-15.
- A smaller areas of TCE contamination in the lower interval is located in the vicinity of the Pollock Wells Treatment Plant.

Nitrate contamination in the lower interval is less extensive than observed in the upper interval (Figure 3-11). Several small, isolated areas exceeding the MCL are located in the North Hollywood OU.