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1998 Annual Groundwater Monitoring Report

Reynolds Metals Company
TROUTDALE FACILITY

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Executive Summary

Executive Summary

The 1998 groundwater monitoring program consisted of semiannual sampling at 55 wells during February and August 1998. A subset of 17 wells was also sampled during May 1998 to assess groundwater quality in the bakehouse and river monitoring wells. On the basis of the 1998 groundwater monitoring results, four constituents exceeded primary maximum contaminant levels (MCLs): arsenic (total and dissolved), beryllium, fluoride, and tetrachloroethene (PCE). Three metals exceeded secondary MCLs: aluminum, iron, and manganese. These exceedances are generally consistent with previous monitoring results.

The changes in the fluoride plume configuration were evaluated by comparing the August 1997 fluoride concentration contour maps with updated fluoride concentration maps. The maps were updated using the results of the 1998 groundwater monitoring program and the 1998 Geoprobe investigation. The fluoride data obtained from the monitoring well network and the Geoprobe investigations have provided good delineation of the extent of fluoride at the site. The 1998 Geoprobe investigation focused specifically on a number of soil and debris areas; these data were used to refine the fluoride distribution in those areas. The August 1998 maps indicate that the overall sitewide fluoride distribution remains very similar to the 1997 interpretation.

Groundwater elevation measurements were collected quarterly from all monitoring wells and staff gauges at the site. The November 1998 groundwater elevations and contour maps are presented in this report; refer to the February, May, and August 1998 groundwater monitoring reports [*Technical Memorandum Nos. 14, 17, and 18* (as listed in Section 7 of this report)] for the results of the previous monitoring periods. November 1998 groundwater levels are consistent with the August 1998 data; the groundwater levels reflect dry season conditions and groundwater continues to flow from the site to the rivers. Of note is the increasing influence of the plant production wells on the intermediate and deep zones. Plant water demand increased in 1998 with the startup of potline Nos. 1, 3, and 5. The deep groundwater elevation contour map clearly shows the production well pumping influences. The pumping influences are also reflected in the vertical hydraulic gradient reversals between the intermediate and deep zones.

Four wells were decommissioned in 1998 as part of Reynolds Metals Company's continued review of the effectiveness of the groundwater monitoring network. In addition, 16 piezometers were decommissioned in 1998 to conclude an evaluation of the South Ditch.

SECTION 1

Introduction

SECTION 1

Introduction

This annual report presents the results of the 1998 groundwater monitoring events conducted at the Reynolds Metals Company (RMC) aluminum reduction facility in Troutdale, Oregon. RMC is conducting this groundwater monitoring program in cooperation with the U.S. Environmental Protection Agency's (EPA's) Region 10 Remedial Branch. The purpose of the groundwater monitoring program is to assess changes in constituent concentrations in groundwater that may occur over time. Results of previous groundwater sampling events are summarized in the documents listed in Section 7 of this report.

1998 Monitoring Program

The 1998 groundwater monitoring program is described in *Memorandum WP No. 40: Proposed 1998 Groundwater Monitoring Program* (CH2M HILL, February 4, 1998) and consists of three sampling events conducted in February, May, and August 1998 (see Table 1).[1] Four quarterly groundwater elevation measurement events took place in February, May, August, and November 1998.

Fifty-five monitoring wells (17 shallow silt, 18 shallow upper gray sand, 15 intermediate-sand, and 5 deep-sand wells) were sampled during 1998 (see Figure 1). These wells compose a sitewide monitoring well network consisting of fluoride plume-perimeter wells and selected source area wells. The wells were sampled for fluoride (primarily measured in the field with a field fluoride selective-ion probe), six total metals (aluminum, arsenic, beryllium, chromium, lead, and nickel), and volatile organic compounds (VOCs) as indicated in Table 1.

The 1998 monitoring program was revised on the basis of preliminary screening of groundwater north of the dike as described in Tables 3-5 and 3-11 of the *Draft Surface Water and Sediment Areas Addendum to the RI/FS Work Plan* (CH2M HILL, April 3, 1998). Data needs were identified related to assessing constituent migration to and risk in the Columbia and Sandy Rivers. To address these needs, 12 total and dissolved metals, total cyanide, and chromium VI were added to the analyte list for river wells MW51-069, MW52-045, and MW53-034 (see Table 1). The river wells were sampled for the following constituents in May and August 1998:

- Fluoride (primarily measured in the field with a field fluoride selective-ion probe).
- Twelve total metals (aluminum, arsenic, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and silver).

[1] Note: Because of their number and size, all tables and figures are presented at the end of this report.

- Twelve dissolved metals (aluminum, arsenic, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and silver)—Only samples with detected concentrations of total metals were analyzed for dissolved metals.
- Chromium VI.
- Total cyanide (at wells MW51-069 and MW52-045 only)—Samples with detected concentrations of total cyanide were also analyzed for amenable cyanide.

Three of the original silt wells were decommissioned during June 1998 (see Section 6). In addition, three silt and three upper gray sand (UGS) piezometers were installed in October 1997 around the bakehouse for water level monitoring purposes.

A well construction data summary for each well is indicated in Table 2.

Additional fluoride data were collected during the summer 1998 field effort. Data collection focused on addressing data needs identified at three source areas: south landfill (SLF), scrap yard (SY), and east potliner (EPL). Separate boreholes, co-located with soil Geoprobe locations, were advanced to collect groundwater samples in each of the source areas. Three groundwater Geoprobes were completed in the SLF, two in the EPL, and three in the SY. Note that one of the three Geoprobes in the SY (GP56) was actually located north of the SY to confirm fluoride concentrations observed at MW33-095 since August 1997. Total depth of groundwater Geoprobe borings ranged from 40 to 80 feet below ground surface (bgs). A detailed discussion of the 1998 field effort is contained in the 1998 Data Collection Field Effort Summary, which will be an appendix to the upcoming groundwater remedial investigation (RI) report (CH2M HILL, in progress).

Report Organization

This annual report is based on the February, May, and August 1998 groundwater monitoring reports (see *Technical Memorandum Nos. 14, 17, and 18,* as listed in Section 7 of this report). It is organized as follows:

- **Section 1** introduces the monitoring program, describes the site, and explains the sampling methods.
- **Section 2** presents the 1998 analytical results.
- **Section 3** evaluates changes in the fluoride plume configuration across the site by comparing 1997 fluoride contour maps with revised maps. The revised maps include the results of the 1998 sampling program and the 1998 Geoprobe investigation.
- **Section 4** presents the 1998 horizontal groundwater elevation data and contour maps.
- **Section 5** presents estimates of the vertical hydraulic gradients (which were not contoured).
- **Section 6** summarizes the well decommissioning work done in 1998.
- **Section 7** lists the documents cited in this report.

Site Description

The site lies within Sections 14 and 22 through 24 of Township 1 North, Range 3 East, Willamette Meridian, approximately 1.25 miles north of the City of Troutdale, Oregon. The Columbia River forms the site's northern border, and the Sandy River forms its eastern border. The site consists primarily of an 80.25-acre industrial area surrounded by approximately 715 acres that are mostly undeveloped.

Groundwater Sampling Methods

Table 1 identifies the wells sampled in 1998 and lists the laboratory analyses performed. Table 2 summarizes well construction information for the monitoring wells and production wells at RMC-Troutdale. Monitoring wells were sampled for analytes consistent with the program presented in *Memorandum WP No. 40* (CH2M HILL, February 4, 1998).

Field parameter data summary tables, previously published, for each sampling event are provided in the corresponding February, May, and August 1998 groundwater monitoring reports (see *Technical Memorandum Nos. 14, 17, and 18*, as listed in Section 7 of this report). The 1998 groundwater sampling methodology was consistent with procedures outlined in *Memorandum WP No. 40* (CH2M HILL, February 4, 1998).

SECTION 2

1998 Groundwater Analytical Results

SECTION 2

1998 Groundwater Analytical Results

Because the 1998 analytical results have been discussed in the individual quarterly sampling reports, the discussions below will focus only on MCL and secondary maximum contaminant level (SMCL) exceedances by unit. For comparison purposes, fluoride and selected metals concentration trends for 1997-98 are considered.

Analytical results for February, May, and August 1998 are provided in Appendix A. 1998 MCL and SMCL exceedances are summarized in Table 3. Time-trend graphs (Figures 2 through 17) were generated using historical (1994-98) groundwater fluoride concentrations (Table B-1, Appendix B) and metals and VOC concentrations in groundwater at selected monitoring well locations (Table B-2).

Groundwater analytical results for 55 site wells are compared with published EPA MCLs for drinking water. These 55 site wells include 35 shallow wells (17 wells screening silt and 18 wells screening the UGS), 15 intermediate-depth wells, and 5 deep wells. The intermediate and deep units are used as sources for drinking water near the RMC site. Risk-based protective concentrations or practicable attainment criteria have not yet been developed for groundwater beneath the RMC site. MCLs may or may not prove to be appropriate or practical criteria for areas beneath some portions of the facility; therefore, they are used here for the purpose of discussion only. If MCLs are not available for a constituent, the results are compared with SMCLs, if available. SMCLs address aesthetic concerns such as taste and odor.

A more detailed discussion of fluoride, using updated concentration contour maps, follows the general summary of data presented below (see Distribution of Fluoride in Groundwater). A more focused evaluation of the horizontal and vertical distribution of fluoride in both groundwater and soils will be presented for the east potliner, south landfill, and scrap yard areas in the upcoming feasibility study (FS) (CH2M HILL, in progress).

Shallow Monitoring Wells

Shallow monitoring wells have been divided into two groups on the basis of the subsurface soil type in which the wells are screened:

- Shallow wells screening silt (typically observed within the southern portion of the site)
- Shallow wells screening the UGS (typically observed beneath the silt in the southern portion of the site and north of the dike, where the silt is thinner or absent)

Shallow Monitoring Wells Screening Silt

Analytical results for 1998 shallow monitoring wells screening silt are summarized below.

Fluoride

The fluoride MCL, 4.0 milligrams per liter (mg/L), was exceeded at 8 of the 17 silt well locations sampled during 1998. Wells that exceeded the fluoride MCL had concentrations that ranged from 5.2 mg/L at bakehouse well MW40-018 (August 1998) to 440 mg/L at east potliner well MW11-017 (August 1998).

Tabulated 1998 MCL exceedances are shown in Table 3, and historical fluoride concentrations from 1994 through 1998 are listed in Table B-1 of Appendix B.

Figures 5 through 9 depict detected fluoride time-concentration trends for the silt unit from June 1994 through August 1998. Areas shown include the east potliner, scrap yard, south landfill, and bakehouse. The following observations are based on these plots. Note that MCL exceedances for fluoride occurred in all four areas discussed below:

- **East Potliner Area.** Figure 5 shows elevated fluoride concentrations in groundwater for shallow silt well MW11-017. Fluoride concentrations appear to fluctuate over time and generally correlate with groundwater elevation changes at this well location. Lower groundwater levels generally correspond to lower fluoride concentrations (August 1995, 1996, and 1997) and higher groundwater levels correspond to higher fluoride concentrations (February 1996 and February 1997). The higher fluoride concentrations are likely related to a greater flushing, or desorbtion, of fluoride from the shallow soils during the winter months when groundwater levels are near ground surface in this area.

- **Scrap Yard Area.** Figure 6 shows the fluoride time-concentration trend for silt wells in the scrap yard area, and Figure 7 shows MW13-022 fluoride concentrations compared with groundwater elevations. Comparisons of available 1997 with 1998 fluoride concentration data indicate consistent fluoride concentrations (94 mg/L up to 130 mg/L) with a possible seasonal correlation. Fluoride concentrations generally appear higher during the dry season (see August 1995, August 1996, August 1997, and August 1998) and lower during the wet season (February 1997 and February 1998). This trend appears opposite to the trend observed at the east potliner area.

- **South Landfill Area.** Figure 8 shows MW19-013 and MW26-012 fluoride concentrations that appear to have stabilized around 70 and 100 mg/L, respectively.

- **Bakehouse Area.** Figure 9 shows fluoride concentrations in groundwater for bakehouse area silt wells installed in June 1997. On the basis of available data from five sampling events, fluoride concentrations appear to exceed the 4.0 mg/L MCL at well locations MW40-018, MW43-015, MW45-017, and MW46-018. Owing to the shallow placement of the well screens, MW42, MW43 (August 1997-98), and MW44 were purged dry during sampling. The lower groundwater levels near the bakehouse area are likely a result of bakehouse dewatering activities. General trends for the available data set indicate the following:

  - **MW40 and MW43**—show increasing concentrations; however, MW43 (only two data points) has insufficient data available to accurately determine any trends

  - **MW46**—exhibits the highest fluoride concentrations in the shallow silt near the bakehouse area; however, concentrations have declined over time

- **MW45**—fluoride concentrations appear to be fluctuating between 9 and 13 mg/L
- **MW41**—fluoride concentrations appear stable, below MCLs

Fluoride plume perimeter wells MW05-025, MW10-023, and MW17-028 did not have any fluoride MCL exceedances.

Metals

In 1998, selected wells were analyzed for six metals: aluminum, arsenic, beryllium, chromium, lead, and nickel. Shallow silt groundwater wells where total metal concentrations exceeded their corresponding MCLs (see Table 3 and Table B-2 for historical data) are discussed below:

- **East Potliner (MW11-017).** The following observations were made based on MW11-017 data:
  - Total arsenic concentrations appear to be declining toward the MCL (0.05 mg/L) in August 1998 (Figure 2).
  - Dissolved arsenic concentrations for February and August 1998 also exceeded the MCL (0.05 mg/L) at 0.087 and 0.078 mg/L, respectively (Table B-2).
  - Lead concentrations (MCL = 0.015 mg/L) show a declining trend below the MCL to 0.006 mg/L in August 1998 (Figure 2).
  - Total and dissolved aluminum (SMCL = 0.05 mg/L) concentrations appear to be fluctuating over time, with an apparent long-term decline from August 1994 (approximately 400 mg/L) through August 1998 (approximately 7 mg/L). (See Figure 10.)
- **Scrap Yard (MW13-022).** This well had primary MCL exceedances for total beryllium (0.0047 mg/L) and dissolved beryllium (0.0045 mg/L) in August 1998, just above the beryllium MCL of 0.004 mg/L.
  - Consistent with groundwater data from August 1995 through August 1997, total and dissolved aluminum SMCLs (SMCL = 0.05 mg/L) were exceeded during February and August 1998 (Table 3 and Figure 4). Aluminum concentrations appear to correlate with groundwater levels, although a time-lag response is evident (Figure 4).
- **South Landfill (MW19-013).** Figure 11 shows MW19-013 long-term trends for beryllium, aluminum, and iron. The only MCL exceedance for the 1998 sampling period appears to be beryllium (MCL = 0.004 mg/L).
  - Beryllium (shown on the secondary "Y" axis in Figure 11) MCL exceedances occurred during the August 1997 (0.0053 mg/L) and August 1998 (0.0046 mg/L) sampling events.
  - Total aluminum, detected at 7.61 mg/L in August 1998, exceeded the SMCL of 0.05 mg/L (see Table 3).

Volatile Organic Compounds (VOCs)

No MCLs were exceeded at the two bakehouse area silt monitoring wells analyzed for VOCs during 1998. MW42-013 was reported "dry" during each of the three sampling events in 1998. MW43-015 (sampled in February and May 1998) had no MCL exceedances for VOCs and was reported dry in August 1998.

Shallow Monitoring Wells Screening the Upper Gray Sand

MCL exceedances for selected source area UGS monitoring wells sampled during the 1998 monitoring period are presented in Table 3 and discussed below.

Cyanide

Total cyanide was not detected at UGS river boundary well MW52-045 during the May and August 1998 sampling events. No other UGS wells were analyzed for cyanide.

Fluoride

The fluoride MCL (4.0 mg/L) was exceeded at 9 of the 18 UGS well locations sampled during 1998. Wells that exceeded the fluoride MCL had concentrations that ranged from 5 mg/L at fluoride plume perimeter well (located near Fairview Farms) MW31-034 (February 1998) to 35 mg/L at EPL well MW34-038 (August 1998). Figures 12 through 17 depict detected fluoride time-concentration trends for the UGS unit from June 1994 through August 1998 for the east potliner, bakehouse, north landfill–Company Lake, and river boundary areas.

- **East Potliner Area.** Well MW34-038 (installed in December 1996) fluoride concentration data has fluctuated between 28 and 36 mg/L (Figure 12) during 1998. This variability is consistent with previous monitoring results. The fluoride concentration trend at well MW35-038 shows a declining trend from values above the MCL in 1997 to below detection limit values.

- **Bakehouse Area.** Fluoride MCL exceedances for shallow UGS wells depicted in Figure 13 generally indicate an upward trend for MW42-027 (from 14 mg/L in November 1997 to 22 mg/L in August 1998), a declining trend at MW44-027 (6 mg/L in August 1997 to 3 mg/L in August 1998), and fairly consistent concentrations at MW43-027 (average of approximately 8 mg/L over five sampling events).

- **North Landfill Area.** Figure 14 shows that fluoride concentrations at MW09-030 have fluctuated over time, ranging from 13 to 32 mg/L. A close correlation between fluoride concentration and groundwater level is not apparent.

  MW22-027 fluoride concentrations appear to be fluctuating over time, but fluoride concentrations appear to have stabilized between August 1997 and August 1998 (approximately 14 mg/L). The fluoride time-concentration trend for MW27-045 indicates an upward trend, from 14 to 23 mg/L, for November 1996 through August 1997. After that time (between November 1997 and August 1998), fluoride concentrations appear stable, approximately 20 mg/L.

- **Columbia River Boundary.** Installed in October 1997, nearshore well MW52-045 had fluoride concentrations above MCLs, averaging about 9 mg/L (Figure 15). MW53-034,

located east of East Lake near the Sandy River boundary, had no MCL exceedances for fluoride; the average concentration was approximately 2.74 mg/L over the four groundwater sampling events at this well location.

Metals

No MCL exceedances for metals occurred in the four UGS wells (MW30-030, MW38-035, MW52-045, and MW53-034) analyzed for six metals during the 1998 monitoring period (Table 3 and Table B-2). Several SMCLs were exceeded for both total and dissolved metals (aluminum, iron, and manganese) in groundwater at river boundary wells MW52-045 and MW53-034.

VOCs

Bakehouse area monitoring wells MW32-040 and MW41-033 were analyzed for VOCs during 1998 (Table 3). Both wells are located near the northwestern corner of the bakehouse. Consistent with 1997 groundwater data, MW32-040 continued to exceed the tetrachloroethene (PCE) MCL (0.005 mg/L) during 1998. The average PCE concentration during 1997 was 0.32 mg/L; during 1998, it was 0.35 mg/L. VOCs were not detected at UGS well MW41-033.

Intermediate-Depth Monitoring Wells

Fluoride was the only constituent that exceeded MCLs in groundwater for the intermediate-depth wells (Table 3). Table B-1 lists historical fluoride concentrations for intermediate-depth site wells. Note that MW33-095 was not sampled for metals in 1998.

Cyanide

Total cyanide was not detected at the only intermediate-depth well (river boundary well MW51-069) that was analyzed for cyanide during May and August 1998.

Fluoride

Consistent with the previous data, the fluoride MCL (4.0 mg/L) was exceeded at 4 of the 15 intermediate-depth well locations sampled during 1998. The fluoride MCL exceedances ranged from 7 mg/L at fluoride plume perimeter (located in Fairview Farms area) well MW31-095 (February 1998) to 141 mg/L at scrap yard well MW33-095 (February 1998).

Fluoride concentration-time trend plots for MW27-081 (Company Lake), MW29-090 (Central Plant –south of dike), MW31-095 (Fairview Farms), and MW33-095 (Central Plant – north of scrap yard) are shown in Figure 16. The following general observations can be made:

- **Scrap yard** well MW33-095 continues to have the highest fluoride concentration of the intermediate-depth groundwater monitoring wells: 56 mg/L in February 1997 increasing to 141 mg/L in February 1998. After the historical high was measured in February 1998, a decline in fluoride concentration (87 mg/L) occurred in August 1998. Fluctuations in fluoride concentration may be related to site production well operations.
- **Company Lake** intermediate-depth well MW27-081 fluoride concentrations appeared to be increasing in 1997, then leveled off in 1998 to approximately 21 mg/L. MW29-090

fluoride concentrations appear to be fairly consistent, ranging from 9 to 15 mg/L. Fairview Farms well MW31-095 fluoride concentrations appeared to be increasing during 1997, from 20 mg/L in February 1997 to 25 mg/L in November 1997, then declined to 6 mg/L in February 1998. Concentrations increased again in August 1998 to approximately 21 mg/L.

Metals

Eleven of the 15 intermediate-depth groundwater well locations were analyzed for six metals in 1998. No MCL exceedances for metals were detected in the intermediate-depth groundwater samples; however, SMCLs were exceeded for aluminum, iron, and manganese at several locations, as shown in Table 3 and Table B-2.

VOCs

Samples from three of the 15 intermediate-depth monitoring wells sampled in February and August 1998 were analyzed for VOCs. No MCLs were exceeded at these well locations (MW29-090, MW33-095, and MW48-055).

Deep Monitoring Wells

Two of the five deep groundwater monitoring wells sampled during 1998 exceeded fluoride MCLs as shown in Table 3. No other MCLs were exceeded.

Fluoride

The fluoride MCL was exceeded at two of the five deep well locations: MW48-165 (located on the north side of the Potlines) and MW33-165 (located just north of the scrap yard). MW48-165 fluoride concentrations were 7 mg/L in February 1998 and 8 mg/L in August 1998. MW33-165 fluoride concentrations were 41 mg/L in February 1998 and 22 mg/L in August 1998 (Table 3 and Table B-1).

Figure 17 presents detected fluoride time-concentration trends for deep wells for which several rounds of data are available. In general:

- **Bakehouse**. Fluoride concentrations at bakehouse well MW48-165 show increasing concentrations from November 1997 through August 1998. Although below the fluoride MCL, concentrations of fluoride at MW29-179 (located north of the bakehouse) generally increased from August 1996 (1.1 mg/L) through August 1998 (3.7 mg/L).
- **Scrap Yard**. Deep monitoring well MW33-165 in the scrap yard area shows increasing fluoride trends, from 17.2 mg/L in February 1997 to 41 mg/L in February 1998, then a decline in August 1998 (22 mg/L), as shown on the right-hand Y axis on Figure 17. This trend, similar to the trend at MW33-095 shown in Figure 16, is likely a result of site production well operations.

Metals

No MCL exceedances for metals were detected in the four deep groundwater samples analyzed for six metals during the 1998 monitoring program. However, SMCLs were

exceeded for aluminum (SMCL = 0.05 mg/L) at MW29-179 and MW49-145, as shown in Table 3 and Table B-2.

VOCs

No MCLs were exceeded at the deep monitoring well (MW48-165) analyzed for VOCs during the 1998 monitoring program.

SECTION 3

Distribution of Fluoride in Groundwater

SECTION 3

Distribution of Fluoride in Groundwater

The purpose of this section is to evaluate changes in the fluoride plume configuration across the site. This evaluation was done by comparing the August 1997 fluoride concentration contour maps with revised fluoride contour maps developed using the results of the 1998 groundwater sampling program and the 1998 Geoprobe investigation. While the 1997 Geoprobe investigation was conducted to develop a better understanding of sitewide fluoride distributions, the 1998 Geoprobe investigation was conducted to provide source-area-specific data for the upcoming feasibility study (CH2M HILL, in progress). The 1998 Geoprobe field investigation will be described in the EE/CA document, scheduled for submittal to EPA in 1999.

The revised 1998 fluoride concentration contour maps were constructed using both 1997 and 1998 fluoride data. Because the 1997 data set was very extensive, a revised map using only the smaller 1998 data set would not provide an adequate distribution picture for comparison. This approach to developing the revised contour maps is considered appropriate because many of the areas of the site do not show significant variation in the groundwater fluoride concentrations. Therefore, using the 1997 data as a base, and expanding or updating where appropriate with the new 1998 data, provides a good approximation of the current fluoride distribution at the site. The conclusions presented in this section are based on the changes observed between the August 1997 fluoride concentration maps and the revised 1997-98 maps (Figures 18 through 25).

For comparison purposes, this section is organized so that the 1997 concentration contour map for each unit is presented prior to the 1998 revised map for each unit. These 1997 and 1998 maps are shown as Figures 18 through 25. At many Geoprobe locations, there were multiple fluoride values within each of the four units (silt, UGS, intermediate-depth sand, and deep sand/gravel). Where this occurred, the maximum value within each unit depth interval was selected for map construction. The unit depth interval criteria were generally as follows:

- Silt = 0 to 32 feet bgs (south of the dike)
- UGS = 42 to 52 feet bgs (south of the dike) and
  0 to 52 feet bgs (north of the dike; little or no silt is present in this area)
- Intermediate-depth sand = approximately 62 to 100 feet bgs
- Deep sand/gravel = generally depths greater than 130 feet bgs

The following observations are based on the differences in fluoride distribution between the August 1997 contour maps and the revised 1998 contour maps.

Silt

Fluoride concentrations for the shallow monitoring wells screened in the silt appear localized to the southern portion of the site. The 1997 fluoride concentration contours for the silt unit are shown in Figure 18 and the revised fluoride map is shown in Figure 19. Shallow fluoride concentrations north of the dike in the vicinity of the north landfill are not presented on these maps because little or no silt is present at this location. During 1998, 10 Geoprobes and 17 groundwater monitoring well locations provided fluoride groundwater data for the silt zone. The revised fluoride contour map for the silt unit indicates similar distribution and extent of fluoride to that depicted in 1997 except for the following areas:

- **East Potliner.** The plume perimeter located near SG02 was shifted northward because of below-MCL concentration data at GP52 (3.6 mg/L).
- **Scrap Yard.** The northern plume configuration is shifted south compared with the August 1997 contour map because of a fluoride concentration of 2 mg/L at GP56. The green contour (delineating 16 to 25 mg/L fluoride) is extended to the east to account for GP50/SB11 fluoride concentration data (21 mg/L).
- **South Landfill.** As shown in Figure 19, the highest fluoride concentration plume configuration (red color) is shifted to the east because of fluoride concentration data for Geoprobes GP59 (1,100 mg/L) and GP60 (542 mg/L). These fluoride concentrations are higher than those measured in 1997, suggesting that the 1998 Geoprobe locations are likely closer to the source area and that the original fluoride concentrations measured in 1997 may actually reflect dispersal downgradient to the west. The fluoride plume boundary is extended toward the southeast because of a fluoride concentration of 30 mg/L at GP63, located southeast of MW16-014.
- **Bakehouse.** Based on August 1998 fluoride concentration groundwater data, the plume perimeter near the bakehouse shifted northward to include MW40-018 (5.2 mg/L). Also, the fluoride concentration at MW46 declined to 19.2 mg/L (August 1998), which resulted in this area being downgraded to green color (16 to 25 mg/L).

The fluoride data obtained from the monitoring well network during August 1997 and August 1998 and Geoprobes installed in 1997 and 1998 have provided good horizontal delineation of the extent of fluoride in the silt.

Upper Gray Sand

1998 groundwater fluoride concentration data from nine Geoprobes and 18 groundwater monitoring locations were used to update the 1997 UGS fluoride concentration contour map. Figure 20 is the 1997 map for the UGS unit. The revised fluoride contour map (Figure 21) indicates a similar distribution and extent of fluoride to that depicted in 1997, except for the following areas:

- **East Potliner:** The central fluoride plume depicted in 1997 (> 46 mg/L) shifted south-southeast-ward based on Geoprobe data for GP65 (343 mg/L) and GP66 (570 mg/L).

- **East Potliner and Scrap Yard:** August 1998 fluoride concentration monitoring well data for MW35-038 (<0.40 mg/L) results in a separation of the plumes situated around the east potliner and scrap yard areas.
- **Scrap Yard:** The central fluoride plume depicted in 1997 (> 46 mg/L) is expanded northward, based on Geoprobe fluoride concentration data from GP56 (131 mg/L) and eastward based on GP50/SB11 data (51 mg/L).
- **Bakehouse.** Based on August 1998 groundwater data at MW44-027 (3.1 mg/L), the southern portion of the fluoride plume (near the eastern boundary of the bakehouse) is reduced in area, or shifted northward.
- **South Landfill:** The elevated fluoride concentration at GP59 (61 mg/L) accounts for a localized plume centered around the south landfill area on Figure 21. Surrounding Geoprobe fluoride concentrations in the area suggest good resolution of the fluoride boundary for UGS in the south landfill area.
- **Fluoride North of the Dike:** The revised fluoride concentration contour map reflects August 1998 groundwater monitoring well data. No Geoprobes were installed north of the dike during 1998. Three differences can be seen between Figures 20 and 21:
  - The addition of a localized area of slightly elevated fluoride around MW09-030. This feature is based on August 1998 monitoring well fluoride concentration data of 31.5 mg/L, compared with 14 mg/L in August 1997.
  - The green color depicting fluoride concentrations between 16 and 25 mg/L is narrowed or shifted south based on MW22-027 (13.8 mg/L) fluoride concentration data.
  - Based on fluoride concentration data at river boundary well MW53-034 (3.04 mg/L in August 1998), the blue color depicting fluoride concentrations between 4 and 15 mg/L is narrowed or shifted northward.

Intermediate-Depth Sand

Compared with the original 1997 contour map (Figure 22) for the intermediate-depth sand, the revised fluoride concentration contours (Figure 23) are similar, except near the scrap yard and Company Lake areas.

- **Scrap Yard Area:** The central fluoride plume is extended farther to the south and southeast than previously depicted. The 1998 Geoprobe fluoride concentration data for GP50/SB11 (31 mg/L) and GP56 (98 mg/L) further refine the plume configuration in the area by extending the plume southeastward. The fluoride distribution suggests a connection between the scrap yard (GP47) and fluoride concentrations detected in MW33-095.
- **North of the Dike.** Based on the fluoride data from MW27-081 (22.3 mg/L in August 1998), the depicted fluoride plume concentration in this area was reduced. Color contours changed from magenta in the 1997 map to green.

Deep Sand/Gravel

No Geoprobes were extended into the deep sand/gravel unit during the 1998 investigation. 1997 fluoride concentration contours are shown in Figure 24. Fluoride concentration data for the five deep wells sampled for fluoride in 1998 were used to update Figure 24. The only change to the 1997 deep unit fluoride concentration contour map occurs near central site well MW 48-165 (located near the Potlines). The fluoride concentration data for MW48-165 (8.0 mg/L in August 1998) resulted in the extension of the plume slightly to the east, near GP23 (see Figure 25). 1998 fluoride data for MW10-165, MW29-179, MW33-165, and MW49-145 remained consistent with previous data.

SECTION 4

Horizontal Groundwater Elevation Data/Contour Maps

SECTION 4

Horizontal Groundwater Elevation Data/Contour Maps

Water elevation data measured on November 3, 1998, are presented in Table 4. Corresponding groundwater elevation contour maps are shown for silt (Figure 26), UGS (Figure 27), intermediate-depth sand (Figure 28), and deep sand/gravel (Figure 29). [Refer to the February, May, and August 1998 quarterly groundwater monitoring reports for elevation data and contour maps corresponding to those events.] Monthly precipitation totals for January 1991 through November 1998 and hydrographs for selected wells are presented in Appendix C. November 1998 horizontal hydraulic gradients across the site are generally flat, especially for the deeper zones. Sitewide groundwater flow directions are to the northwest or northeast toward the Columbia and Sandy Rivers.

Shallow Monitoring Wells

Contours for the silt and UGS units are discussed separately below. The contour maps were prepared using the 28 shallow wells screening silt (not including one "dry" well and three decommissioned silt wells) and 28 shallow wells screening the UGS. During June 1998, three silt wells were decommissioned (MW17-016, MW21-012, and MW36-006), as discussed in Section 6 of this report.

Shallow Monitoring Wells Screening Silt

November 1998 groundwater elevation contours for the shallow wells screening silt are shown on Figure 26. Groundwater elevations measured on November 3, 1998, ranged from approximately 11.5 feet in the western portion of the site (MW15) to 22 feet in the east (MW03). The estimated horizontal hydraulic gradient across the site appears similar to that observed in August 1998 as precipitation rates and Columbia River stage continue to decline. The November 1998 Columbia River water level was approximately 1 foot lower than the August 1998 water level. This is probably a result of continued river stage decline, or measurements obtained at different stages of the tidal cycle.

The November 1998 groundwater levels and flow directions appear consistent with data collected in November 1997 [see *Technical Memorandum No. GW-13: February 1998 Quarterly Groundwater Monitoring Results* (CH2M HILL, May 26, 1998)]. Based on November 1998 shallow groundwater levels, Columbia River stage, and surface water staff gauge data, the groundwater flow directions in the silt are generally from the southeast to the northwest across the site, with the following exceptions:

- **Near the Sandy and Columbia Rivers.** Groundwater levels near the rivers are influenced by river stage fluctuations. Groundwater flow near the rivers is generally toward the rivers. Consistent with November 1995, November 1996, and November 1997 water level data, the water level of background well MW05 was lower than that of

MW03, suggesting that groundwater from the site flows toward the Sandy River near the southeastern portion of the site. This condition likely occurs as water levels continue to decline prior to seasonal increases, which typically occur between January and May.

- **Bakehouse.** Since the installation of the bakehouse silt monitoring wells in June 1998, low groundwater levels (depressions) continue to be observed near the central portion of the site (12-foot contour) and may be a result of bakehouse dewatering activities.

- **Near the South Wetlands.** Consistent with previous water level data, groundwater appears to flow toward the south wetlands area from the east. It is likely that south wetlands is a local groundwater discharge area, particularly during periods of elevated groundwater levels.

Shallow Monitoring Wells Screening the Upper Gray Sand

Groundwater elevation contours for the 28 shallow wells screening the UGS are shown on Figure 27. Groundwater elevations measured on November 3, 1998, ranged from approximately 8.18 feet at MW43 to 6.10 feet at MW08 (contour interval is 0.5 foot). Consistent with 1997 and 1998 groundwater elevation data, the hydraulic gradient in the UGS is much flatter than that observed in the overlying silt. November 1998 groundwater levels were consistent with the August 1998 data; the groundwater flow direction continues to be toward the rivers in response to declining precipitation and Columbia River stage. In the central plant area (south of the dike), water levels in the UGS are approximately 1 to 4 feet lower than water levels in the overlying silt. The November 1998 water level elevations appear to reflect dry season conditions at the site.

The localized groundwater mound observed in the central portion of the site (8-foot contour line) does not appear as pronounced as during August 1998. This observation is based on groundwater levels from the seven monitoring wells (MW40 through MW46) installed in the vicinity of the bakehouse in June 1997. The mound may be related to coarser soils in this area allowing for downward vertical gradients. Bakehouse dewatering may also contribute to this localized mound effect.

North of the dike, the groundwater elevation contours are constructed assuming little influence from Company Lake. This interpretation is based on the low permeability values of the materials collected from the bottom of the lake and the approximately 3-foot difference between the lake elevation (approximately 15.5 feet) and groundwater elevations at nearby monitoring wells.

Intermediate-Depth Monitoring Wells

Groundwater elevation contours for the monitoring wells that screen the intermediate-depth sand are shown on Figure 28. Groundwater elevations measured on November 3, 1998, ranged from approximately 7.94 feet at MW03 to 6.13 feet at MW51 (contour interval is 0.25 foot).

The hydraulic gradient in the intermediate-depth sand (the monitoring wells are generally screened in the gray sand between 80 and 100 feet bgs) is similar to gradients observed in

the UGS. In general, the groundwater flow direction in the intermediate-depth sand is as follows:

- North-northwest across the site toward the Columbia River
- The lower groundwater levels near the central portion of the site indicate a depression, likely resulting from increased production well pumping at the site (see next section).
- Compared with earlier 1998 water level contour maps for this area, the depression appears larger in November 1998 and is likely related to plant operations and seasonally low groundwater levels.
- Northeast toward the Sandy River

The November 1998 water level elevations appear to reflect dry-season conditions.

Deep Monitoring Wells

Groundwater elevation contours for the deep monitoring wells are shown on Figure 29. Water level elevations in the deeper portion of the aquifer ranged from approximately 8 feet at MW03 to 5.8 feet at MW08 and MW21 (contour interval is 0.25 foot). The November 1998 water level elevations appear to reflect dry-season conditions.

In the eastern portion of the site, a well-defined groundwater depression is centered near monitoring well MW33-165. While this depression was observed in 1997, it appears better defined as plant water demand increased in 1998 and production well pumping increased from one well (PW08) to three wells. 1998 production well pumping rates are shown in Figure 30. Flow rates appear to have increased from approximately 1 to 1-1/2 million gallons per day (mgd) during February and March 1998 to 2 to 2-1/2 mgd between July and October 1998.

At the time the November 1998 groundwater elevation data were collected, three production wells were in operation. Approximate discharge rates were 700 gallons per minute (gpm) for 11 hours per day (hr/day) at PW03, 800 gpm for 24 hr/day at PW08, and 400 gpm for 24 hr/day at PW10. Screened intervals for these production wells are shown in Table 2 and include:

- PW03: 253 to 264 ft bgs
- PW08: 158 to 174, 195 to 206, and 210 to 218 ft bgs
- PW10: 144 to 185, 440 to 482, 522 to 530, and 538 to 558 ft bgs

The shallower screened intervals of PW08, and to a lesser extent PW03, appear to significantly influence the intermediate and deep groundwater flow directions. PW10 generally draws water from significantly greater depths.

Plant water demand began to increase in January 1998 with the startup of aluminum reduction. Three potlines went into operation during 1998 as follows:

- January 1998 Startup of potline No. 5

- June 1998 Startup of potline No. 3
- Sept 1998 Startup of potline No. 1

Note that there is not a direct correlation between the number of potlines in operation and increasing water demand. Comparison of 1998 water level data for February, May, August, and November indicate that the cone of influence has expanded outward in response to increasing plant water demand (production well pumping) and/or seasonal declining precipitation rates and Columbia River stage.

The deep monitoring wells (at depths between 150 and 180 feet bgs) located in the southern portion of the site are generally screened in the gray sand unit; deep wells in the northern portion of the site are screened in sand and gravel. The horizontal hydraulic gradient in the deep sand/gravel is similar to the gradient observed in the intermediate-depth sand. In general, the groundwater flow direction in the deep sand/gravel is generally north-northeast away from the site toward the Columbia and Sandy Rivers.

SECTION 5

Vertical Hydraulic Gradient Estimates

SECTION 5

Vertical Hydraulic Gradient Estimates

The vertical hydraulic gradient estimates were not contoured because of the observed variability and lack of obvious trends or patterns. Tables 5 through 8 present vertical hydraulic gradient estimates between (1) the silt and UGS; (2) the silt and UGS in the bakehouse area; (3) the silt/UGS and intermediate-depth sand; and (4) the intermediate-depth sand and deep sand/gravel. Negative values indicate a downward hydraulic gradient and positive values indicate an upward vertical gradient.

Silt to Upper Gray Sand

Table 5 lists the vertical hydraulic gradients between well pairs screened in the silt and the UGS for August 1995 through November 1998. The vertical hydraulic gradient data are generally consistent with prior data. Note the following:

- The average vertical gradient is generally downward; each of the seven well locations exhibits vertical gradients ranging from –0.02 foot/foot (MW17 well group) to –0.46 foot/foot (MW25 well group). The negative sign indicates a downward gradient.
- The maximum vertical hydraulic gradients have been observed at the scrap yard (MW02 and MW25 well groups) and near the north landfill (MW21 well group). The strong downward vertical gradient between the silt and UGS across the site is primarily a result of the differences in lithology. Perched groundwater within and above the silt is generally at a much higher elevation than the groundwater in the UGS; a difference of 10 feet or more in groundwater elevation has been observed between the silt and UGS. In addition, the gradients in the scrap yard may be influenced by the bakehouse dewatering system and the operation of onsite production wells. A localized confining layer that causes perched water table conditions at the MW21-012 location creates the direction and magnitude of the vertical gradient at that location. This well was decommissioned in June 1998.

Silt to Upper Gray Sand—Bakehouse Area

Fourteen groundwater monitoring wells were installed near the bakehouse during summer 1997. Table 6 lists the vertical gradient estimates between these well pairs screened in the silt and UGS. Consistent with August 1997 findings, each of the seven well pairs exhibits a downward vertical hydraulic gradient; the gradient estimates range from –0.097 foot/foot (MW41) to –0.427 foot/foot (MW44).

Available data indicate a slight increase from November 1997 to November 1998 in the downward vertical gradients at MW40 and MW41. These two wells are located near the northwest corner of the bakehouse.

Silt/Upper Gray Sand to Intermediate-Depth Sand

Table 7 lists the vertical gradients between shallow (both silt and UGS wells) and intermediate-depth monitoring wells. Note the following:

- The average vertical hydraulic gradients are generally less than those observed between the silt and the UGS.
- There is a consistent upward hydraulic gradient between the shallow and intermediate-depth wells at the MW08 well group, possibly caused by their proximity to the regional discharge area (the Columbia River).
- During 1998, reversals in vertical hydraulic gradient direction were observed in well groups MW21, MW27, and MW30. The variations can be attributed to river stage changes, tidal influences, production well pumping influences, or a combination of these factors.

Intermediate-Depth Sand to Deep Sand/Gravel

Table 8 lists the vertical hydraulic gradients between intermediate-depth and deep monitoring wells. Note the following:

- Generally, the average vertical hydraulic gradients measured between the intermediate-depth sand and deep sand/gravel are smaller than those measured between the shallow silt/UGS and intermediate-depth sand.
- A consistent downward vertical gradient has been measured at well groups MW08, MW10, MW21, and MW33. These downward gradients can be attributed to stratigraphic influences or proximity to RMC production wells.
- An average upward gradient, ranging from 0.00004 foot/foot to 0.0002 foot/foot, was observed at four well group locations: MW03, MW12, MW15, , and MW32.
- Well group MW27, located north of Company Lake, shows upward vertical gradients between October 1996 and May 1998. Beginning in March 1998, and continuing to the present, a downward gradient is observed. This change in vertical flow direction may coincide with increased production well pumping in 1998 (see Figure 30).

SECTION 6

Well Decommissioning Summary

SECTION 6

Well Decommissioning Summary

Table 9 shows the monitoring wells and temporary piezometers that were decommissioned during summer 1998 and provides the rationale for decommissioning them. These wells were decommissioned in accordance with Oregon Administrative Rules (OAR) Chapter 690, Division 240. Figure 1 shows the locations of the four wells and Figure 6 [in *Memorandum WP No. 40* (CH2M HILL, February 4, 1998)] shows the locations of the South Ditch piezometers decommissioned in 1998. MW08-127 was proposed for decommissioning in 1998; however, this well was not decommissioned because an air rotary rig is needed to perform the decommissioning, owing to the deeper nature of the well. As a cost-competitive measure, this well will be decommissioned in the future when an air rotary rig is scheduled for other work at the site.

SECTION 7

References

SECTION 7

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Tables

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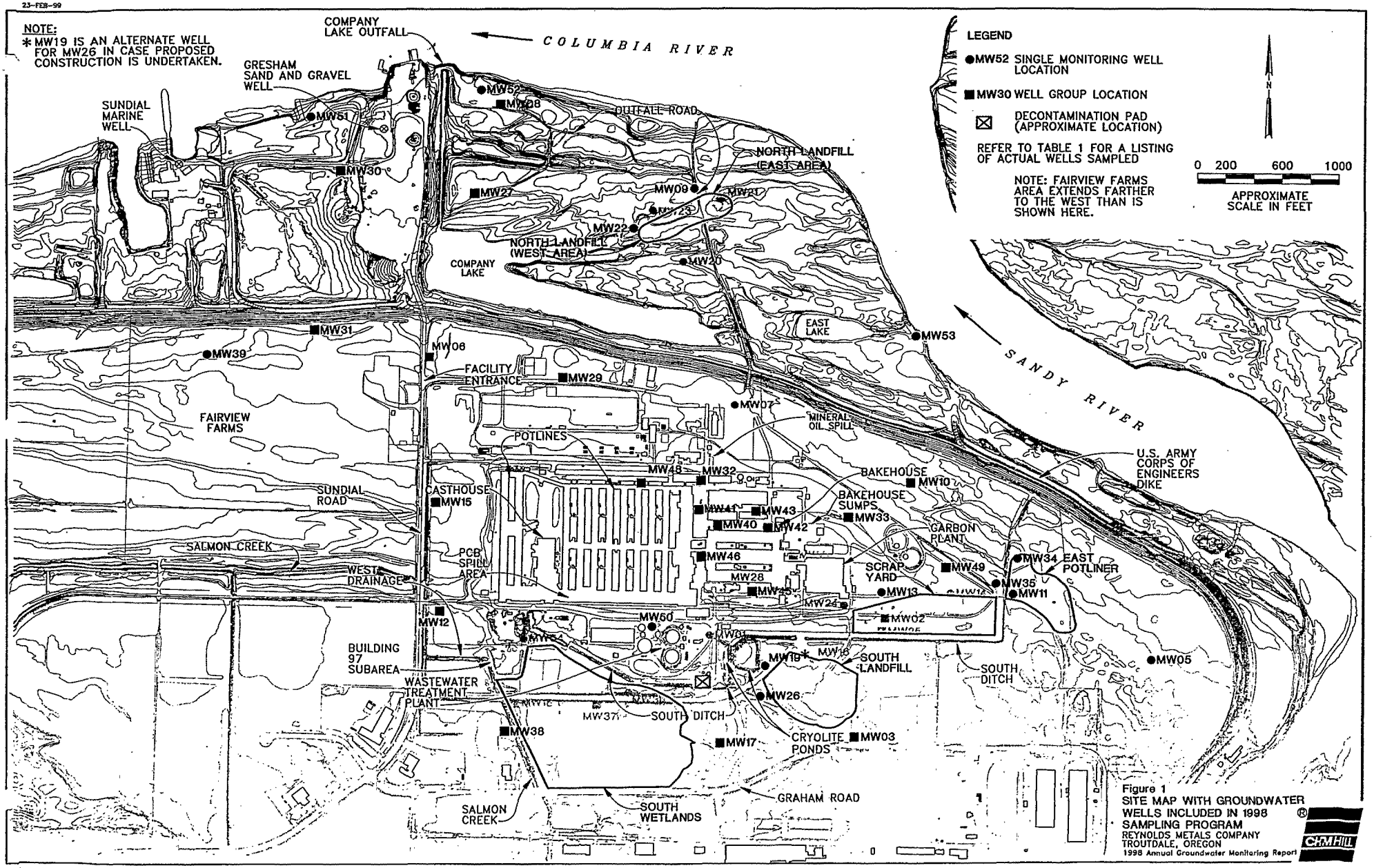

Figure 1
SITE MAP WITH GROUNDWATER WELLS INCLUDED IN 1998 SAMPLING PROGRAM
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

9293W54H.DWG

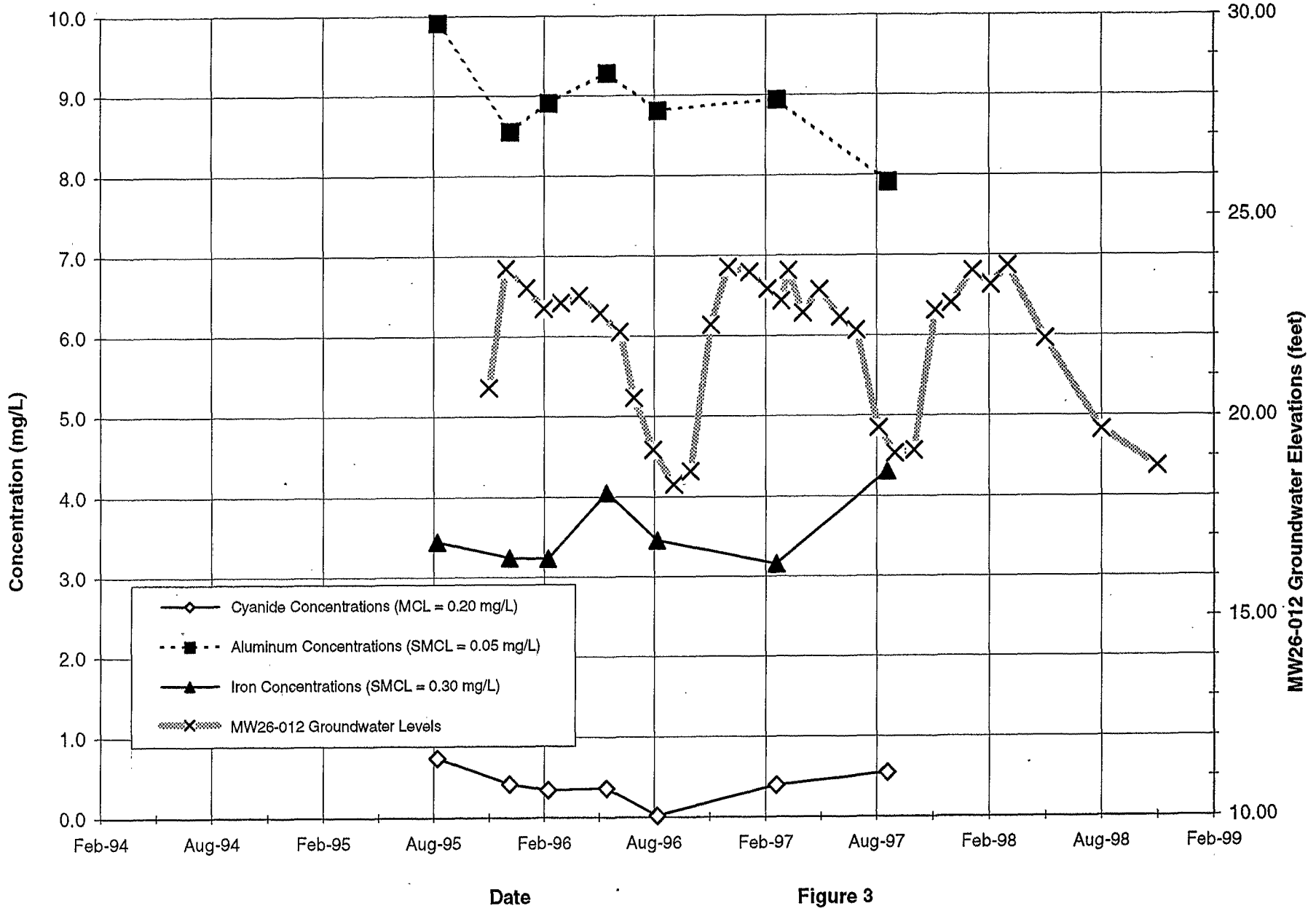

Figure 3

Metals Trends in Silt at MW26-012 (South Landfill)

Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

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Nov98rpt\metalsquery98.xls\Fig 3 Metals SLF MW26-012

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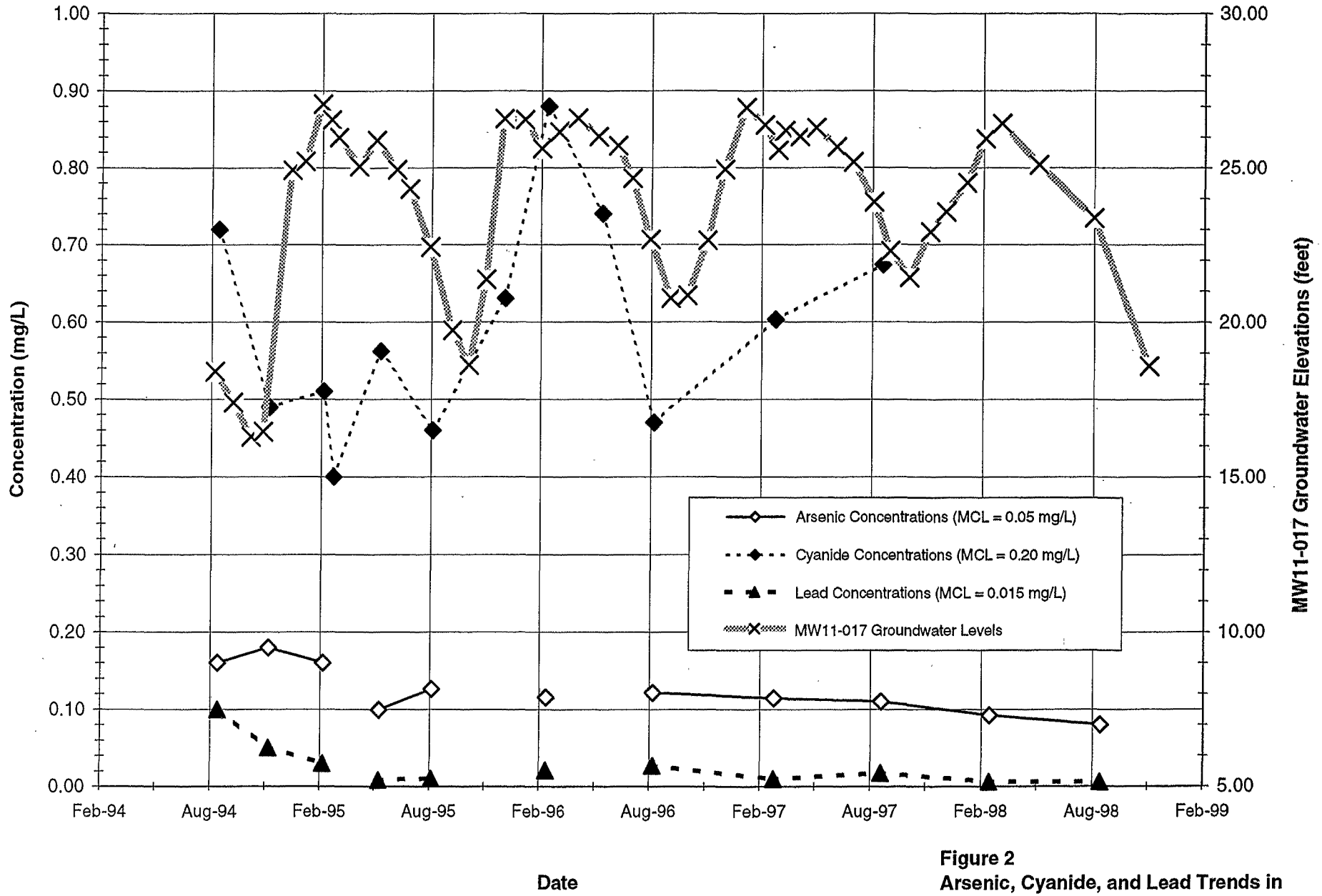

Figure 2
Arsenic, Cyanide, and Lead Trends in Silt at MW11-017 (East Potliner)
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

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RMC\Nov98rpt\metalsquery98.xls\Fig 2 (Metals EPL MW11-017)

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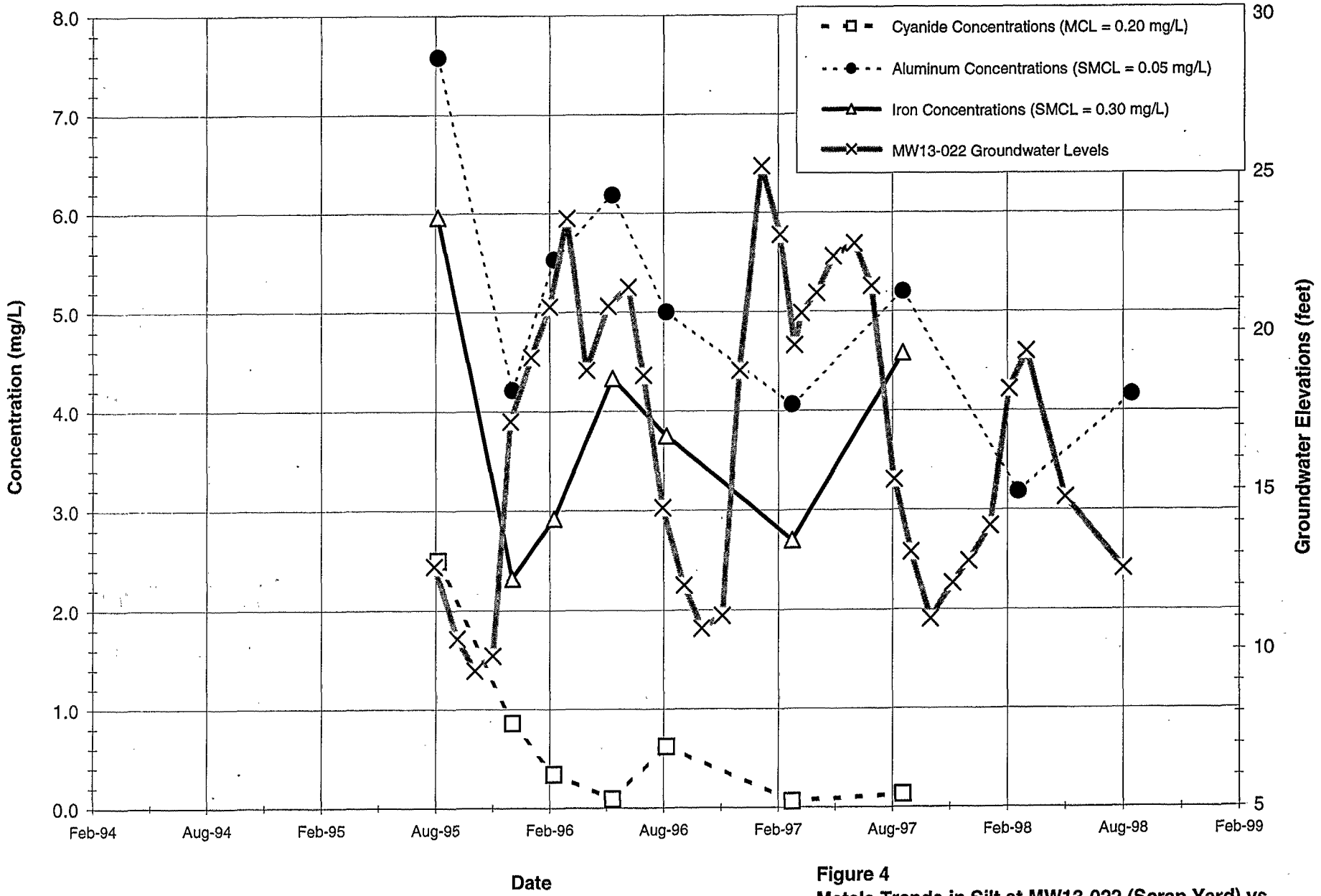

Figure 4
Metals Trends in Silt at MW13-022 (Scrap Yard) vs Groundwater Elevations for 1995-98
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

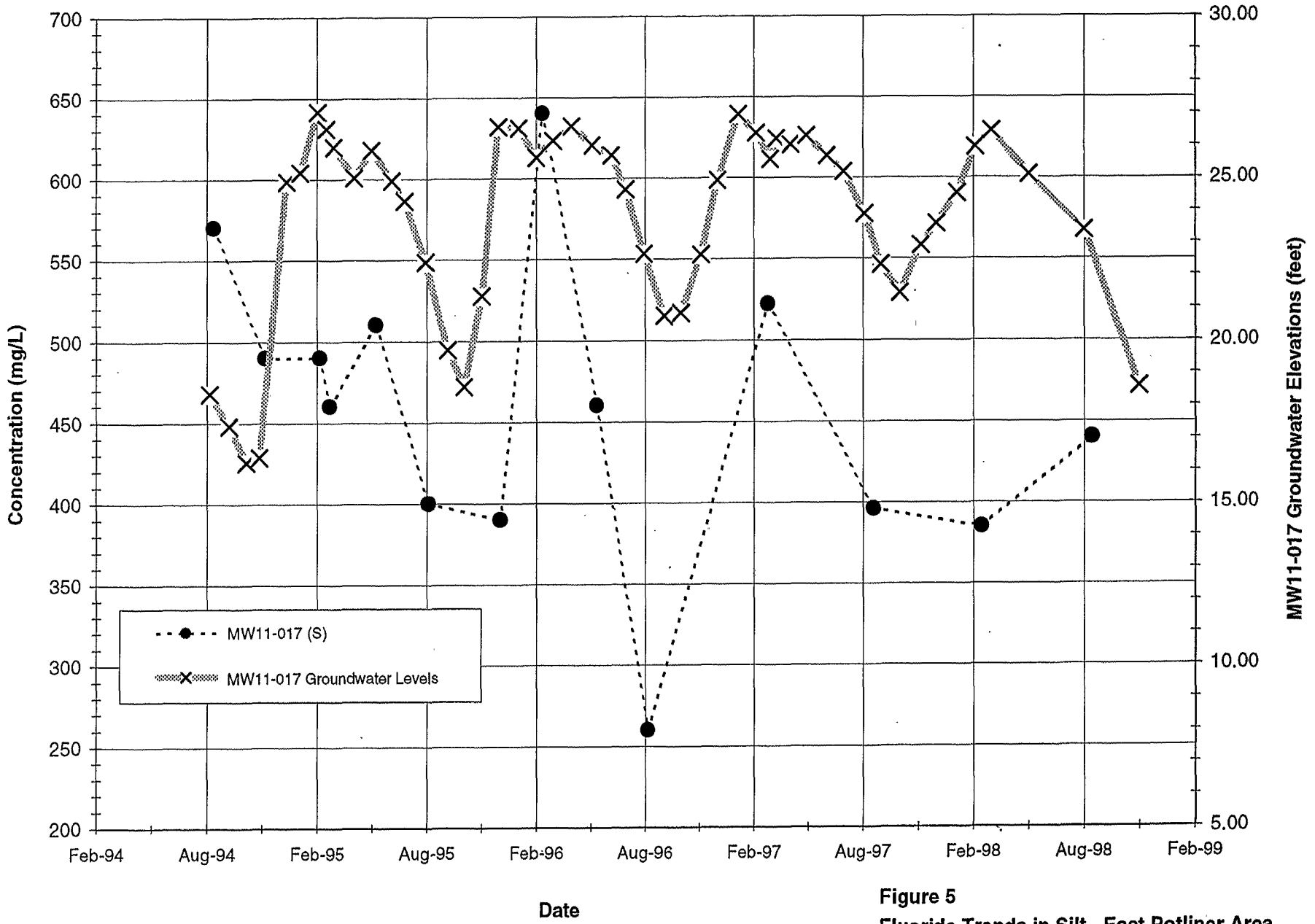

Figure 5
Fluoride Trends in Silt - East Potliner Area
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

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RMC\Nov98rpt\Fluoride.xls\Fig 5 (WLs & Fl EPL MW11-017)

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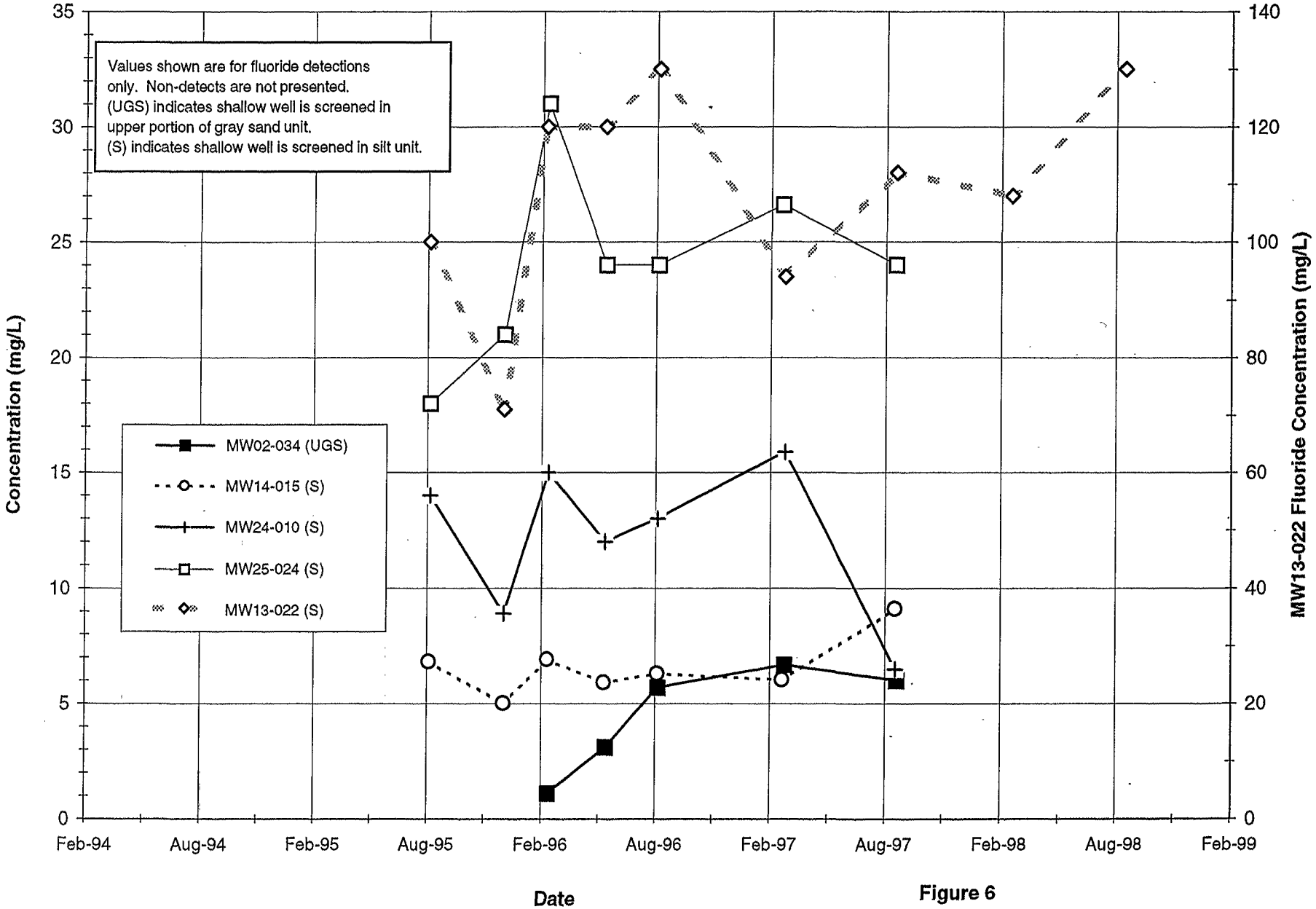

Figure 6

Fluoride Trends in Silt - Scrap Yard Area

Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

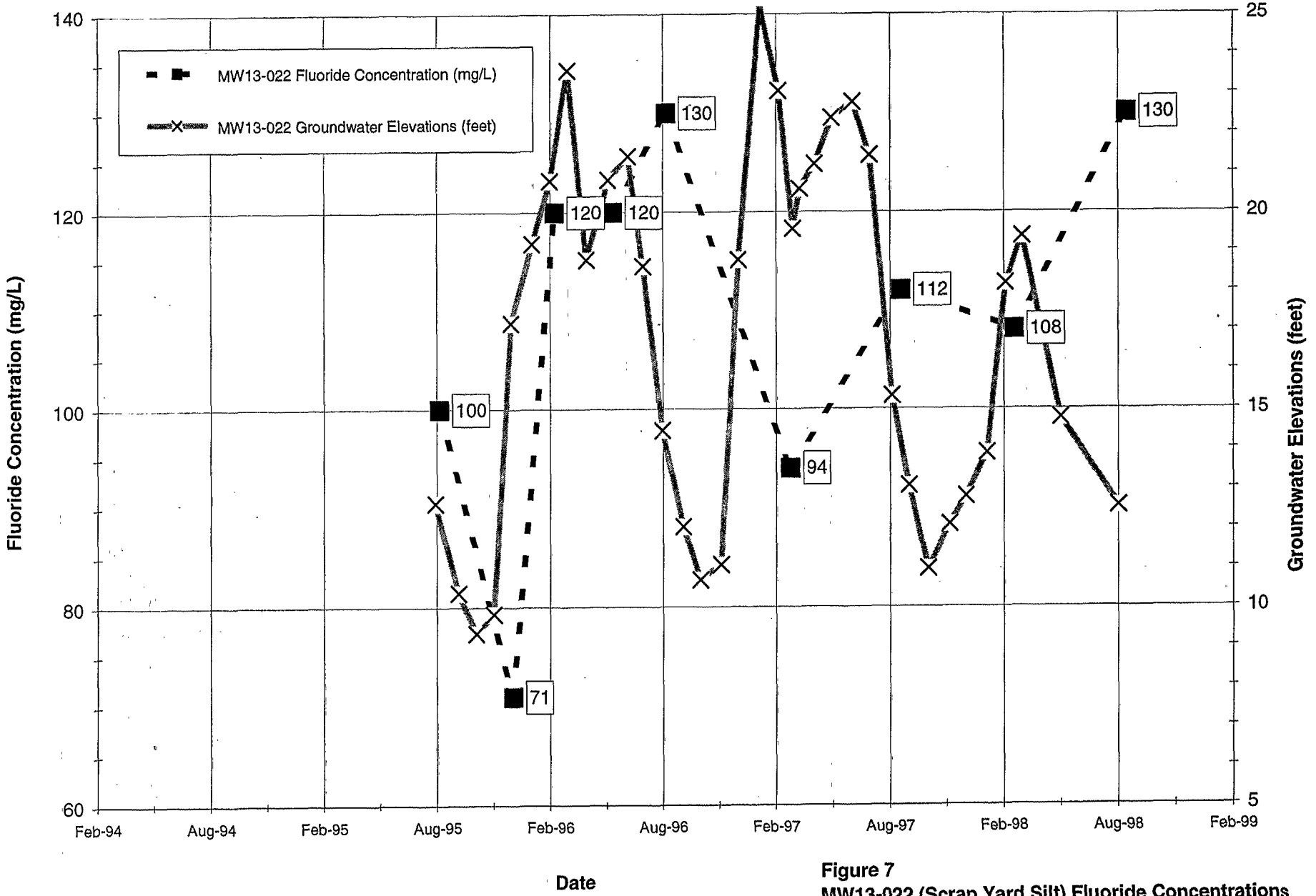

Figure 7
MW13-022 (Scrap Yard Silt) Fluoride Concentrations vs Groundwater Elevations for 1995 - 1998
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

P:\Rose\Reynolds\39293\grnd\Reports\Nov98rpt\Fluoride.xls\Fig 7 (FL- vs wls) MW13-022

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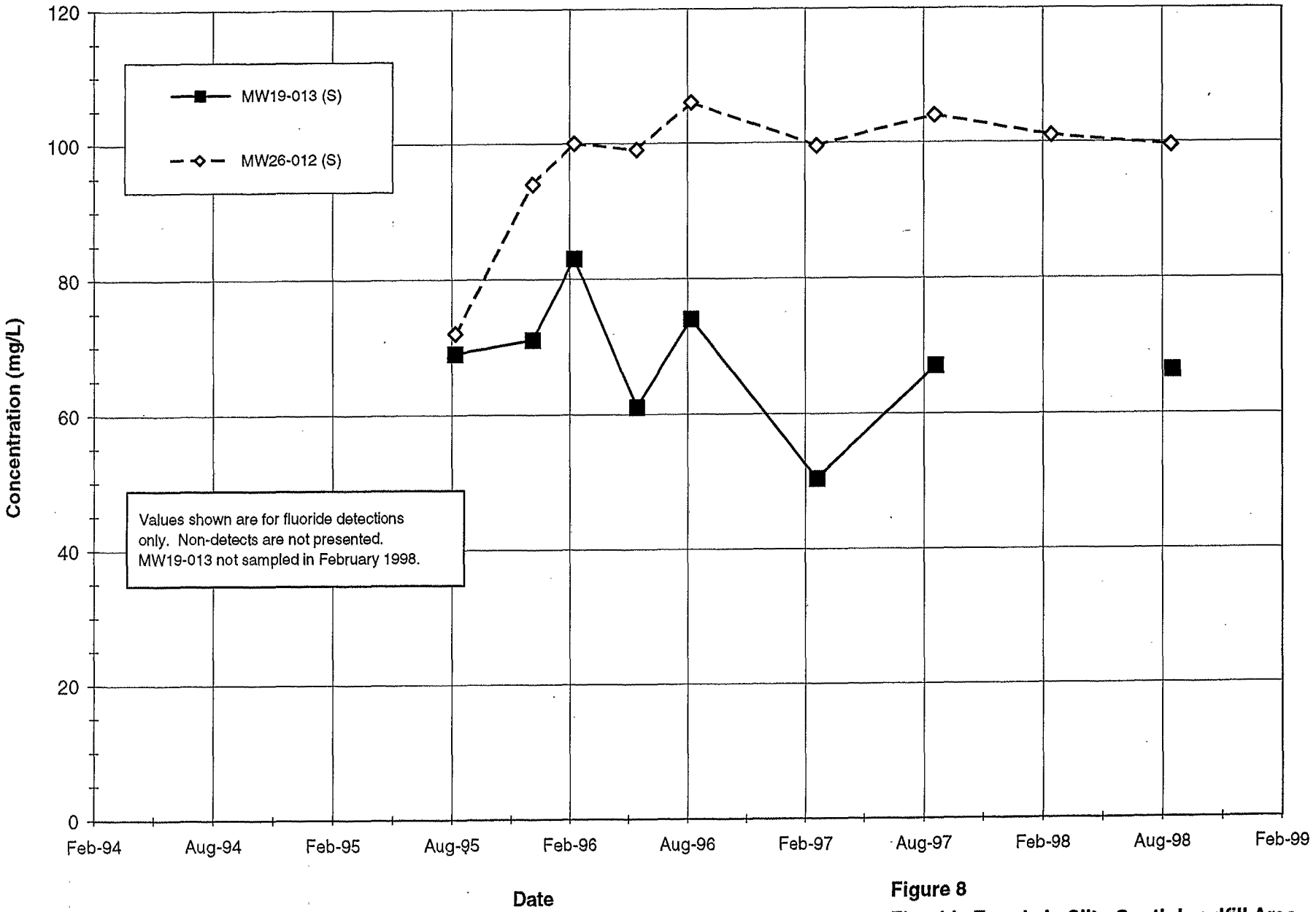

Figure 8
Fluoride Trends in Silt - South Landfill Area
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

J:\Reynolds\39293\grnd\reports\Nov98rpt\Fluoride.xls\Fig 8 SLF Fl graph

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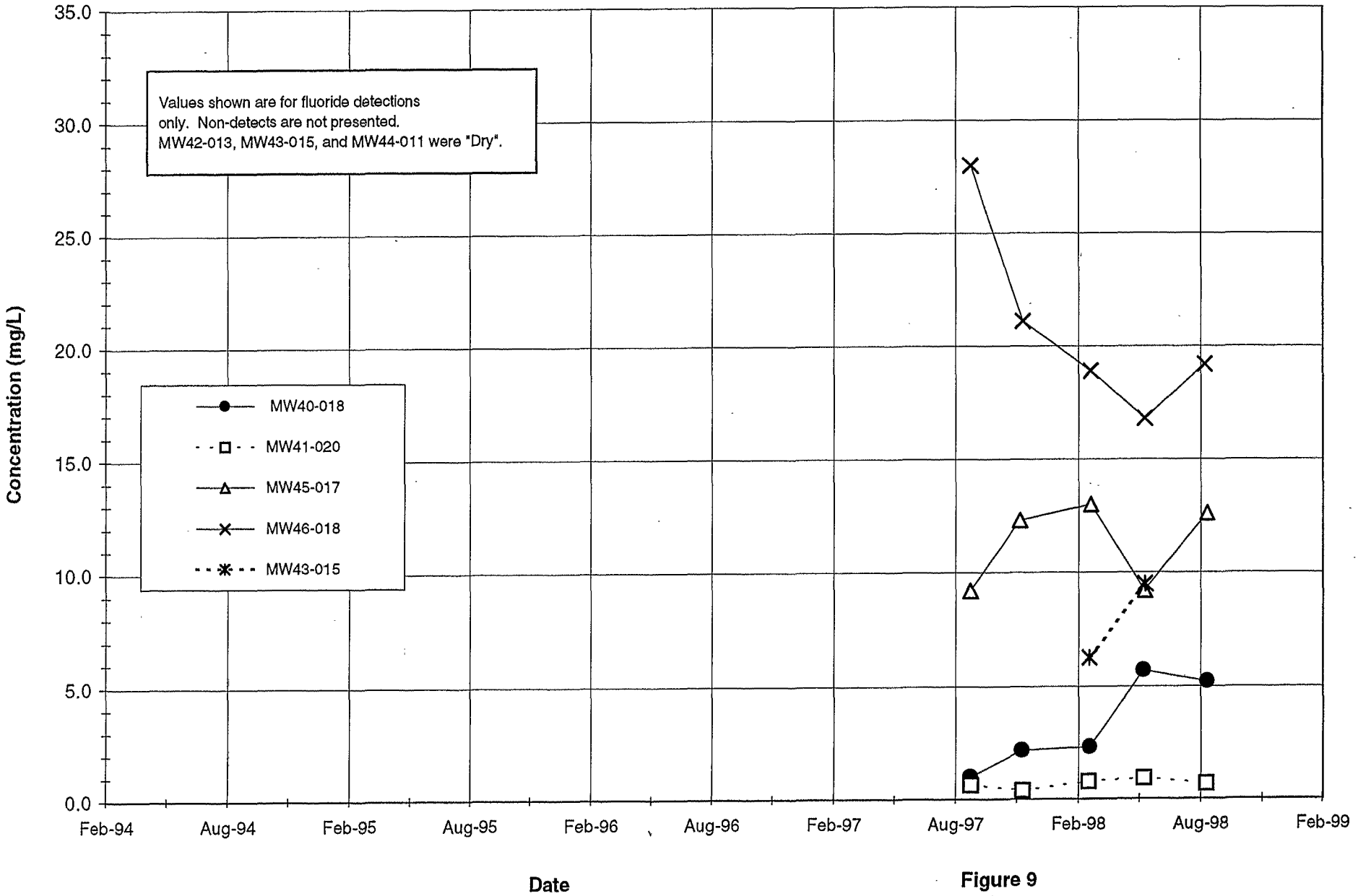

Figure 9
Fluoride Trends in Silt - Bakehouse Area
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

J:\Reynolds\39293\grnd\reports\Nov98pts\Fluoride.xls\Fig 9 Silt BH Fl graph

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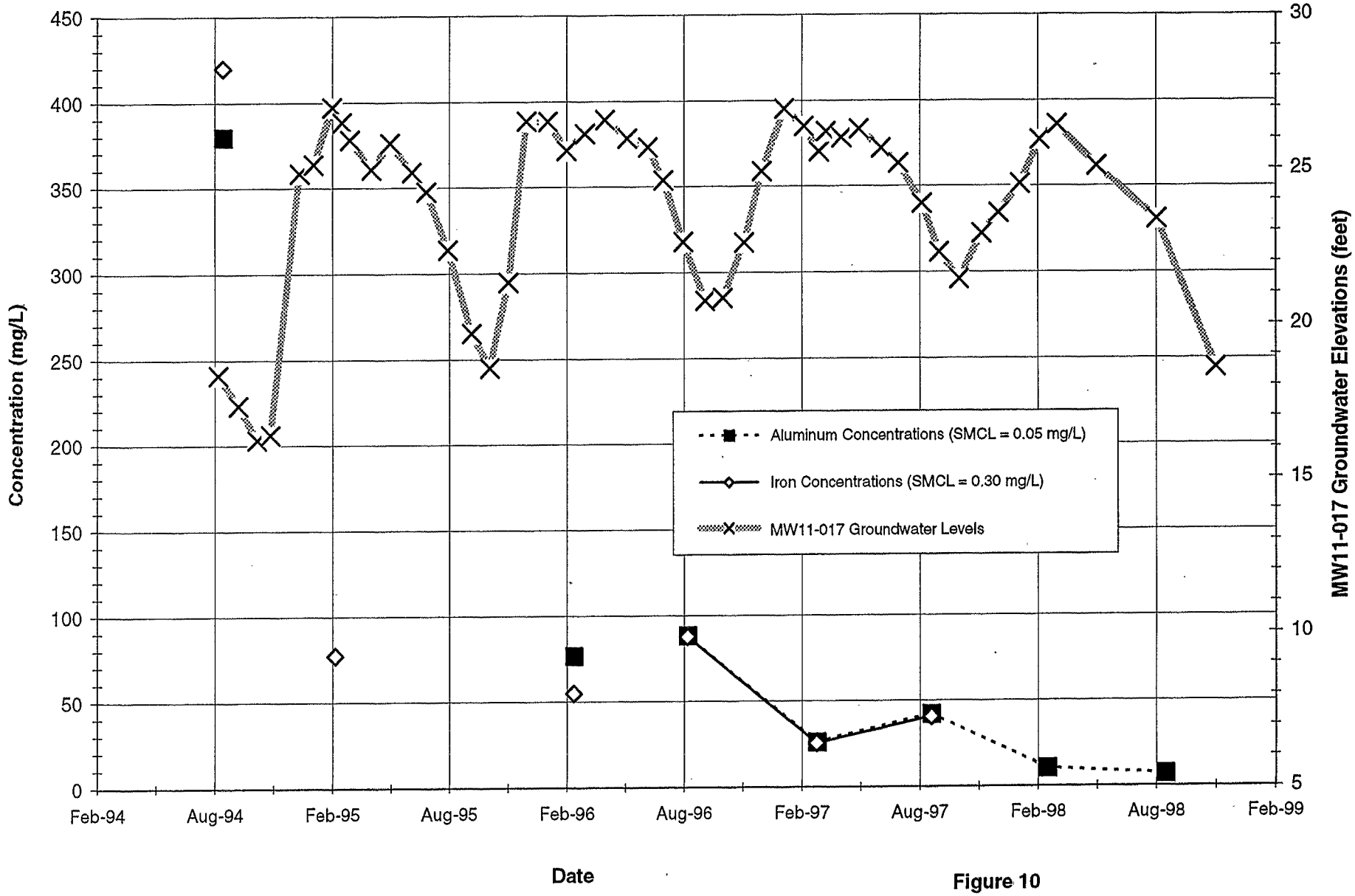

Figure 10
Total Aluminum and Total Iron Trends in Silt at MW11-017 (East Potliner)
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

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RMC\Nov98rpt\metalsquery98.xls\Fig 10 Metals(WLs &SMCLs) MW11

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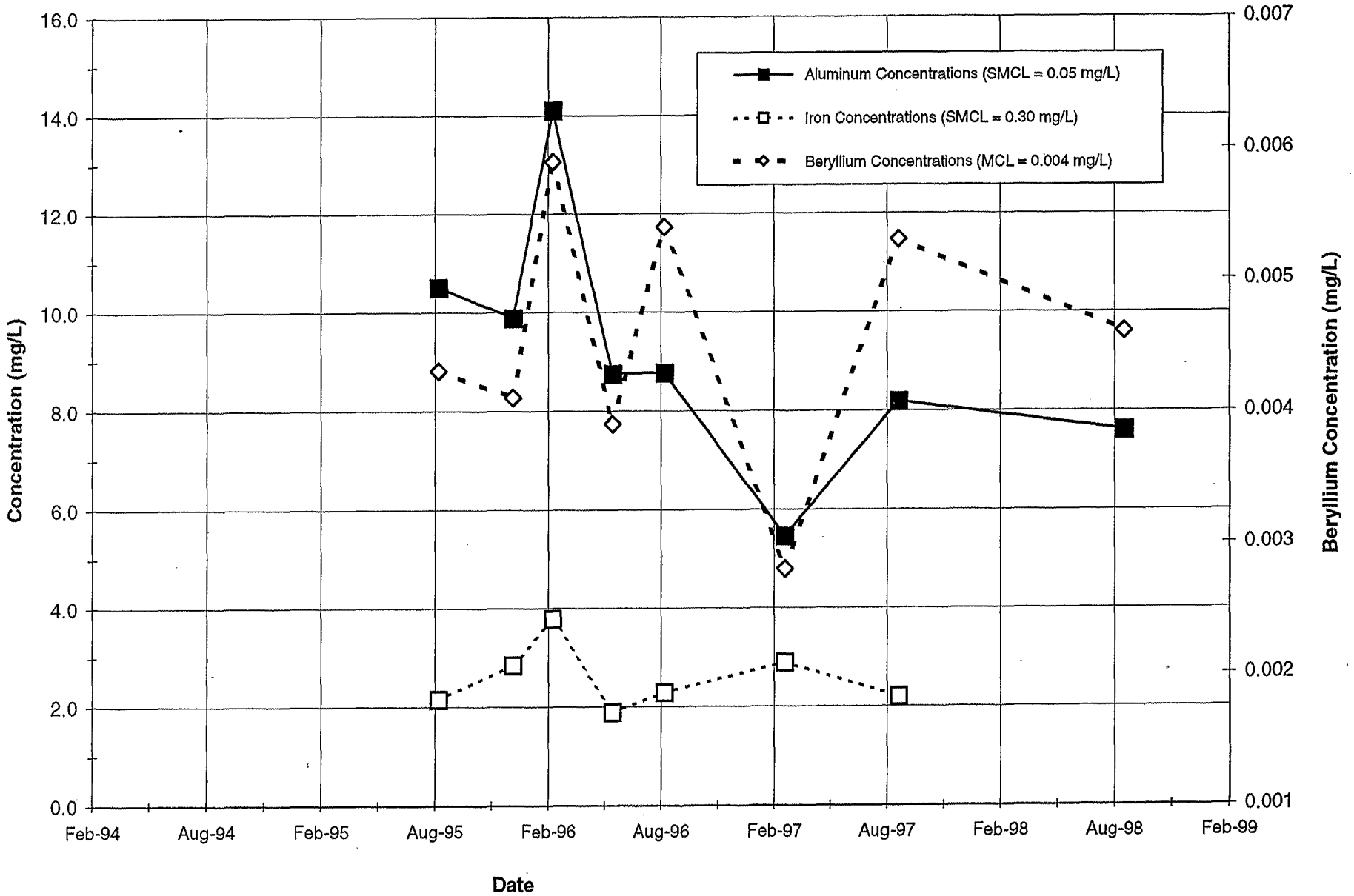

Figure 11

Metals Trends in Silt at MW19-013 (South Landfill)

Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

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Nov98rpt\metalsquery98.xls\Fig 11 SLF Metals 19-013

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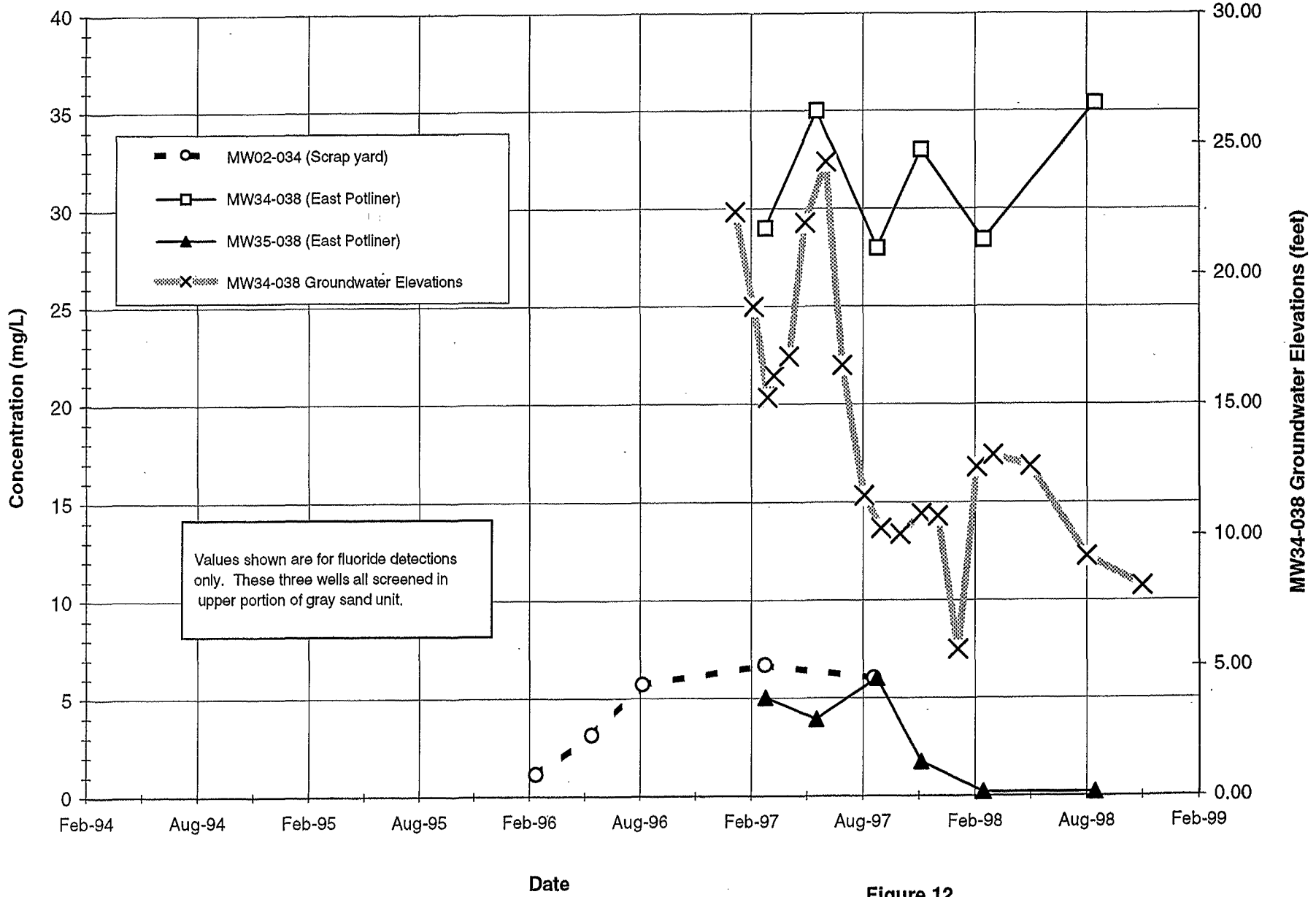

Figure 12
Fluoride Trends in UGS - East Potliner Area
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

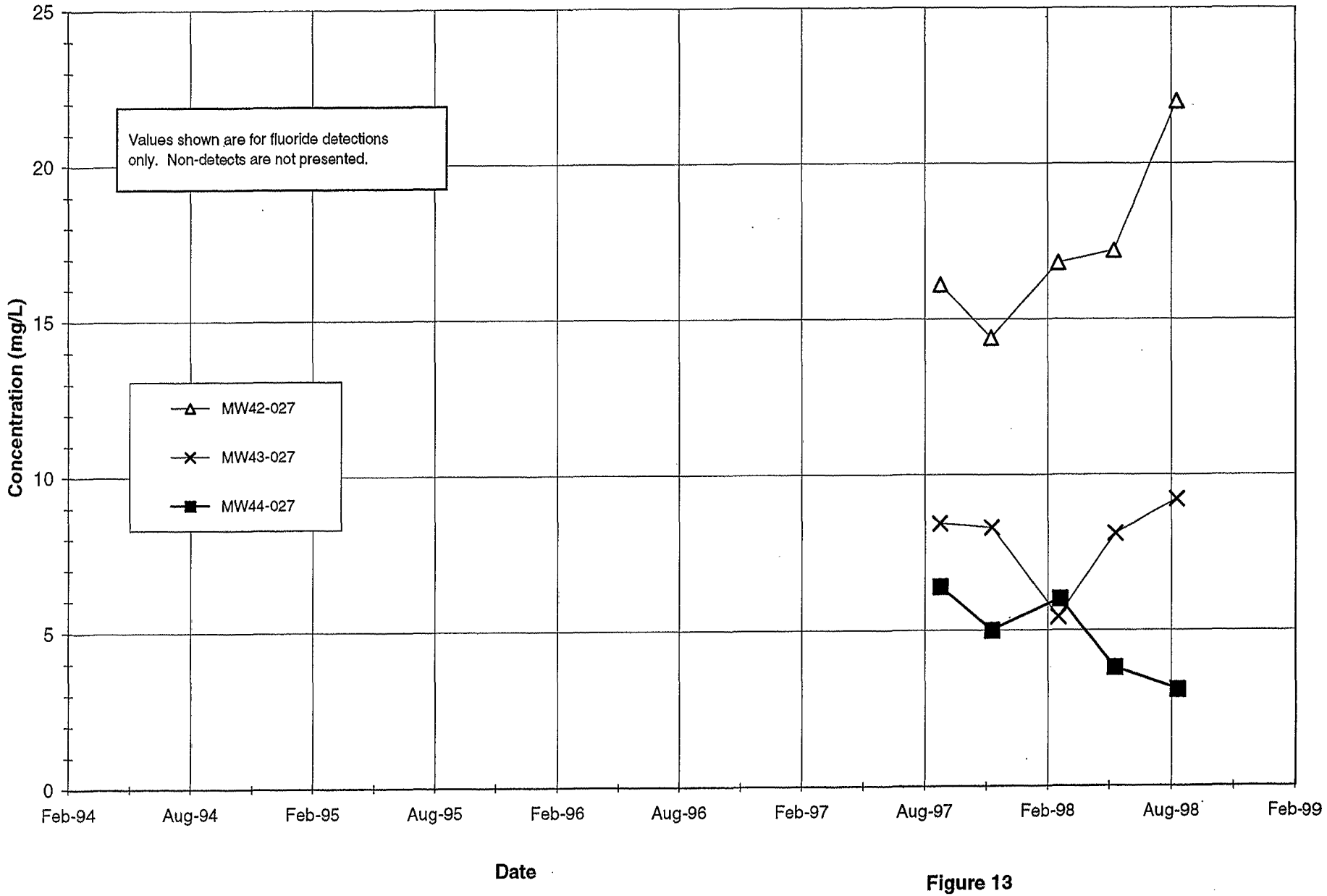

Figure 13
Fluoride Trends in UGS - Bakehouse Area
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

J:\Reynolds\39293\grnd\reports\Nov98pts\Fluoride.xls\Fig 13 UGS BH Fl graph

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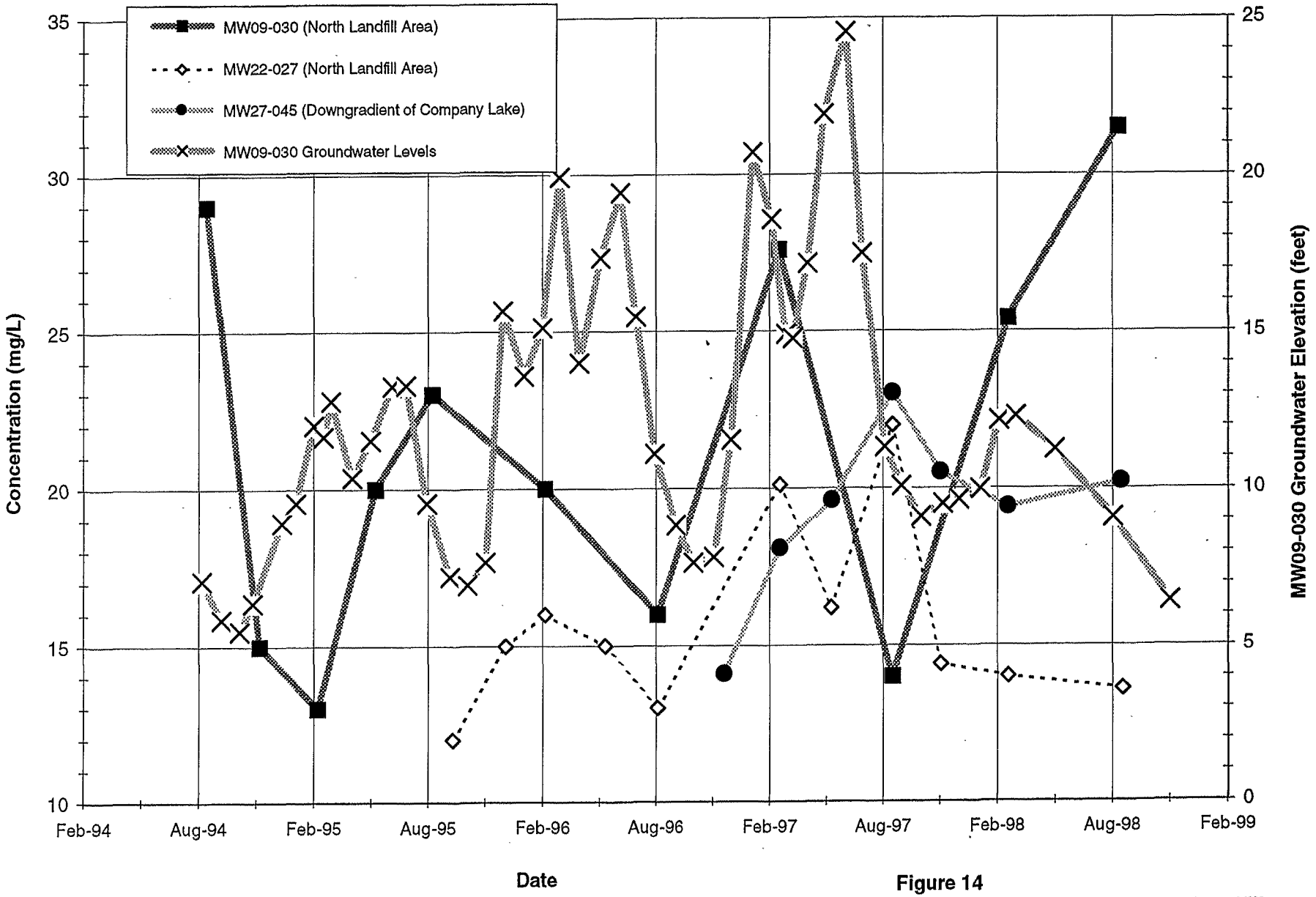

Figure 14
Fluoride Trends in UGS - North Landfill and Company Lake Area
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

Rose:\39293\grnd\reports\Nov98rpts\Fluoride.xls\Fig 14 NLF_ Co. Lake Fl graph

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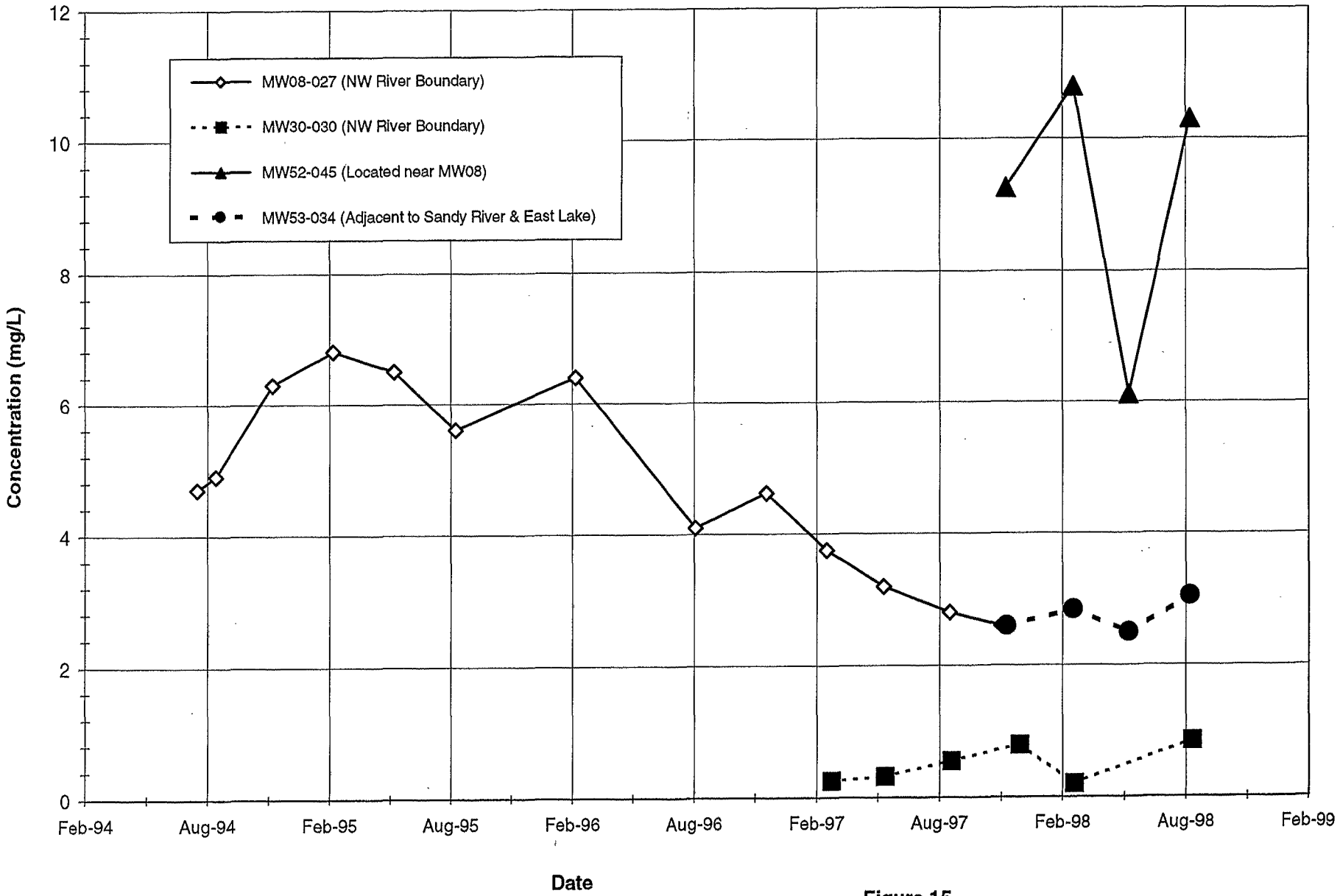

Figure 15
Fluoride Trends in UGS - River Boundary Area
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

P:Rose\Reynolds\39293\grnd\reports\Nov98rpt\Fluoride.xls\Fig 15 River Boundary Graph

Printed 2/17/99

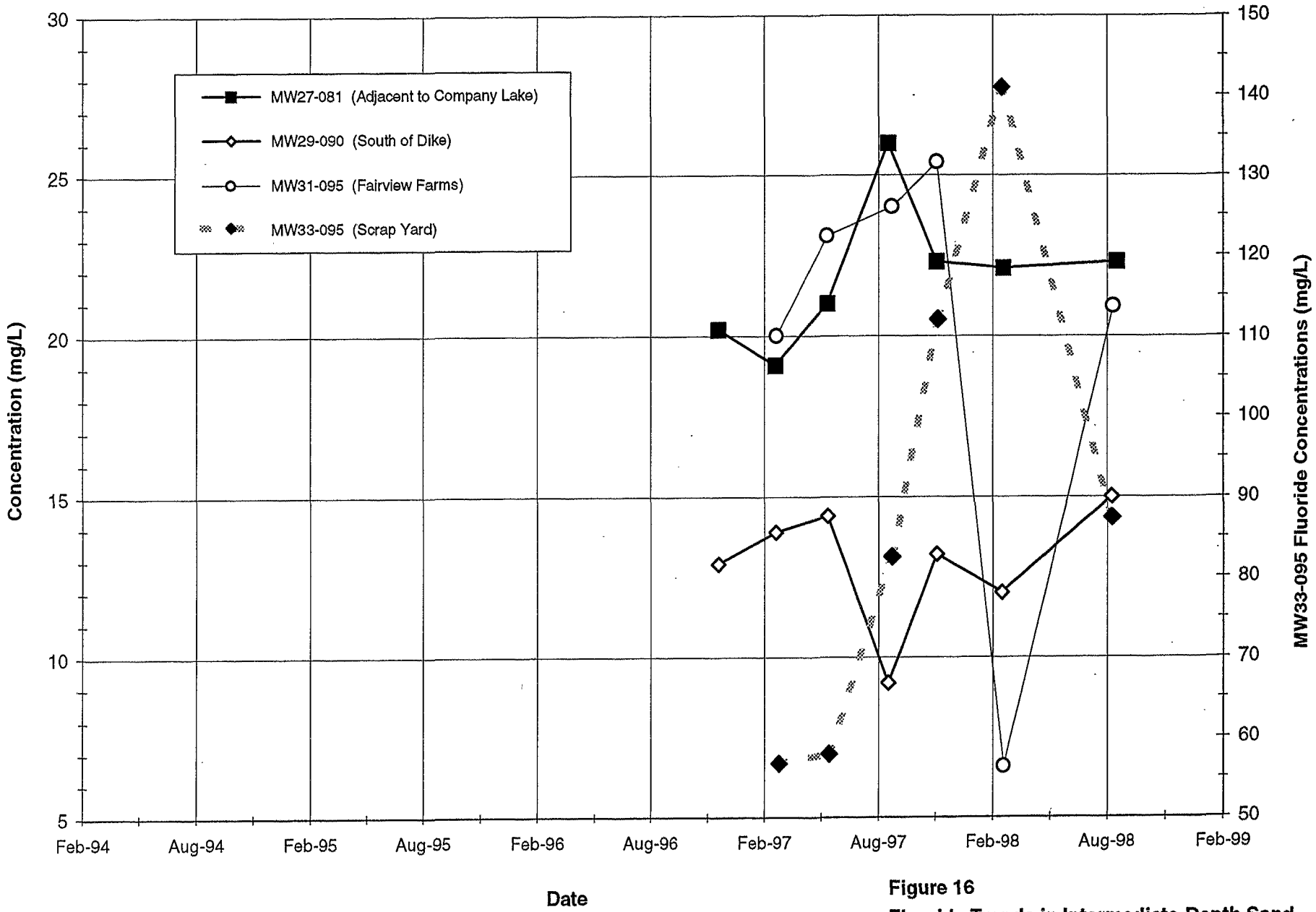

Figure 16
Fluoride Trends in Intermediate-Depth Sand
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

P:Rose\Reynolds\39293\grnd\reports\Nov98rpt\Fluoride.xls\Fig 16 Inter depth Fl graph

Printed 2/17/99

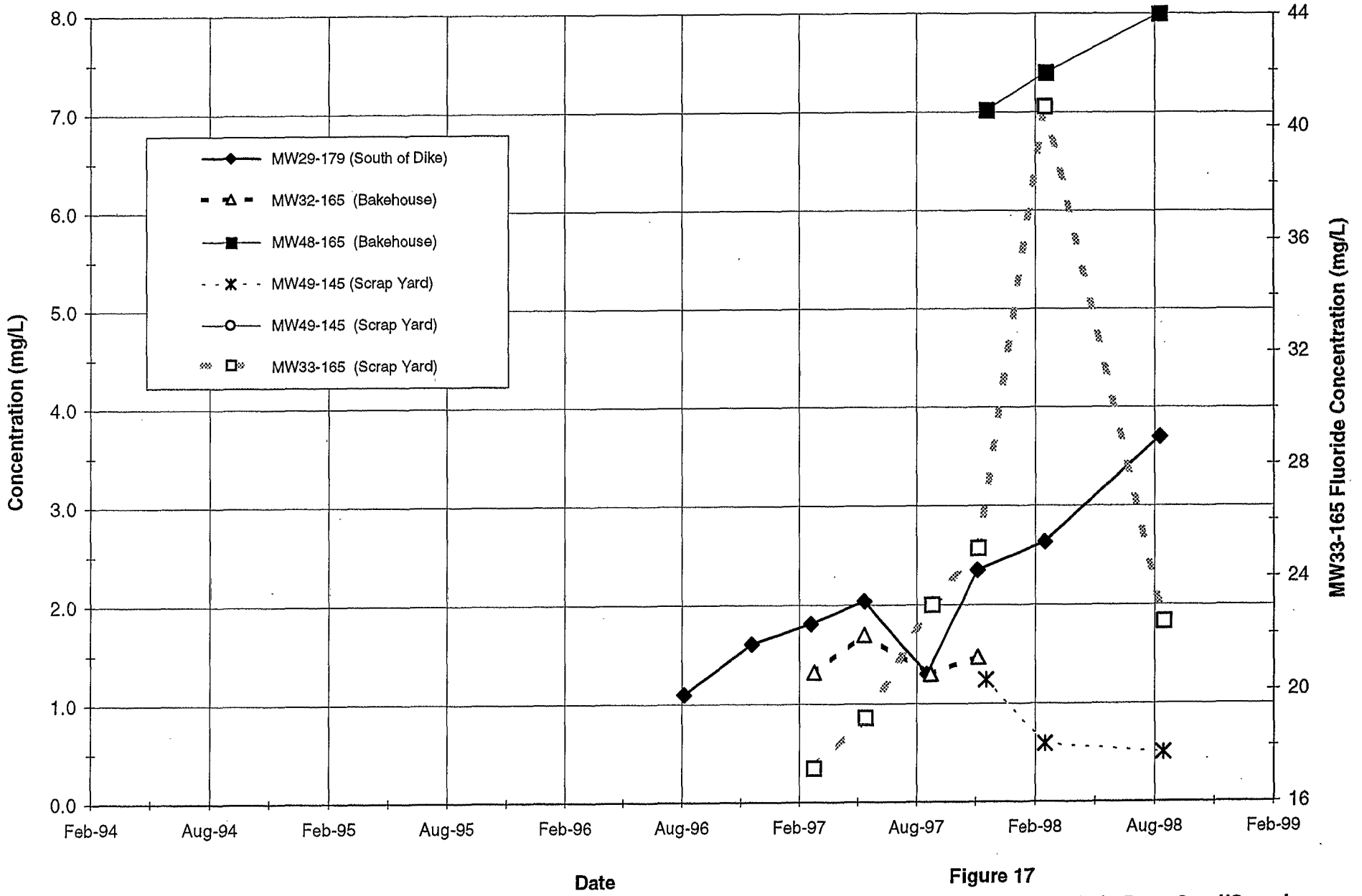

Figure 17
Fluoride Trends in Deep Sand/Gravel
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

P:Rose\Reynolds\39293\gmd\reports\Nov98rpt\Fluoride.xls\Fig 17 Deep Zone Fl graph

Printed 2/17/99

Table 1
1998 Groundwater Monitoring Program
Reynolds Metals Company - Troutdale, Oregon

Area Monitored	Unit	Well ID	Date Installed	1998 Date Sampled	Fluoride[a]	6 Metals[b]	12 Metals[c]	VOCs[d]	Total Cyanide[e]	Chromium VI[f]
Fluoride-Plume Perimeter	S	MW03-017	7/9/94	Feb	x	x				
and Upgradient Area				Aug	x	x				
Fluoride-Plume Perimeter	I	MW03-098	6/26/96	Feb	x	x				
and Upgradient Area				Aug	x	x				
Fluoride-Plume Perimeter	S	MW05-025	7/8/94	Feb	x	x				
and Upgradient Area				Aug	x	x				
North Landfill	UGS	MW09-030	8/4/94	Feb	x					
				Aug	x					
Fluoride-Plume Perimeter	S	MW10-023	8/5/94	Feb	x	x				
				Aug	x	x				
Fluoride-Plume Perimeter	I	MW10-090	9/12/96	Feb	x	x				
				Aug	x	x				
Fluoride-Plume Perimeter	D	MW10-165	7/31/96	Feb	x	x				
				Aug	x	x				
East Potliner	S	MW11-017	8/5/94	Feb	x	x				
				Aug	x	x				
Fluoride-Plume Perimeter	S	MW12-021	8/4/94	Feb	x	x				
				Aug	x	x				
Fluoride-Plume Perimeter	I	MW12-092	9/24/96	Feb	x	x				
				Aug	x	x				
Scrap Yard	S	MW13-022	7/12/95	Feb	x	x				
				Aug	x	x				
Fluoride-Plume Perimeter	I	MW15-086	9/23/96	Feb	x	x				
				Aug	x	x				
South Wetlands and	S	MW17-028	7/21/95	Feb	x	x				
Fluoride-Plume Perimeter				Aug	x	x				
Alternate Well South Landfill	S	MW19-013	7/21/95	Feb	x	x				
				Aug	x	x				
Company Lake	UGS	MW22-027	9/6/95	Feb	x					
				Aug	x					
South Landfill	S	MW26-012	7/24/95	Feb	x					
				Aug	x					
Company Lake	UGS	MW27-045	11/1/96	Feb	x					
				Aug	x					
Company Lake	I	MW27-081	8/28/96	Feb	x					
				Aug	x					
Plant Interior and VOC Area	I	MW29-090	9/18/96	Feb	x			x		
				Aug	x			x		
Fluoride-Plume Perimeter	D	MW29-179	5/9/96	Feb	x	x				
				Aug	x	x				
Fluoride-Plume Perimeter	UGS	MW30-030	12/5/96	Feb	x	x				
				Aug	x	x				
Fluoride-Plume Perimeter	I	MW30-100	12/17/96	Feb	x	x				
				Aug	x	x				
Fairview Farms	UGS	MW31-034	11/26/96	Feb	x					
Fluoride-Plume Perimeter				Aug	x					
Fairview Farms	I	MW31-095	12/9/96	Feb	x					
Fluoride-Plume Perimeter				Aug	x					
Plant Interior and VOC Area	UGS	MW32-040	12/6/96	Feb	x			x		
				Aug	x			x		

Table 1
1998 Groundwater Monitoring Program
Reynolds Metals Company - Troutdale, Oregon

Area Monitored	Unit	Well ID	Date Installed	1998 Date Sampled	Fluoride[a]	6 Metals[b]	12 Metals[c]	VOCs[d]	Total Cyanide[e]	Chromium VI[f]
Fluoride-Plume Perimeter	I	MW32-095	12/6/96	Feb	x	x				
				Aug	x	x				
Plant Interior and VOC Area	I	MW33-095	11/25/96	Feb	x			x		
				Aug	x			x		
Plant Interior and VOC Area	D	MW33-165	12/30/96	Feb	x					
				Aug	x					
East Potliner	UGS	MW34-038	12/3/96	Feb	x					
				Aug	x					
East Potliner	UGS	MW35-038	12/3/96	Feb	x					
				Aug	x					
South Wetlands and Fluoride-Plume Perimeter	S	MW38-007	11/1/96	Feb	x	x				
				Aug	x	x				
South Wetlands and Fluoride-Plume Perimeter	UGS	MW38-035	12/2/96	Feb	x	x				
				Aug	x	x				
Fairview Farms Fluoride-Plume Perimeter	I	MW39-095	6/26/97	Feb	x	x				
				Aug	x	x				
Bakehouse	S	MW40-018	6/11/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	UGS	MW40-030	6/11/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	S	MW41-020	6/13/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	UGS	MW41-033	6/12/97	Feb	x			x		
				May	x			x		
				Aug	x			x		
Bakehouse	S	MW42-013	6/11/97	Feb	x			x		
				May	x			x		
				Aug	x			x		
Bakehouse	UGS	MW42-027	6/11/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	S	MW43-015	6/13/97	Feb	x			x		
				May	x			x		
				Aug	x			x		
Bakehouse	UGS	MW43-027	6/13/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	S	MW44-011	6/12/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	UGS	MW44-027	6/12/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	S	MW45-017	6/17/97	Feb	x					
				May	x					
				Aug	x					

Table 1
1998 Groundwater Monitoring Program
Reynolds Metals Company - Troutdale, Oregon

Area Monitored	Unit	Well ID	Date Installed	1998 Date Sampled	Fluoride[a]	6 Metals[b]	12 Metals[c]	VOCs[d]	Total Cyanide[e]	Chromium VI[f]
Bakehouse	UGS	MW45-042	6/16/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	S	MW46-018	6/16/97	Feb	x					
				May	x					
				Aug	x					
Bakehouse	UGS	MW46-043	6/16/97	Feb	x					
				May	x					
				Aug	x					
Plant Interior and VOC Area	I	MW48-055	9/2/97	Feb	x	x		x		
				Aug	x	x		x		
Plant Interior and VOC Area	D	MW48-165	8/27/97	Feb	x	x		x		
				Aug	x	x		x		
Scrap Yard	I	MW49-095	10/29/97	Feb	x	x				
				Aug	x	x				
Scrap Yard	D	MW49-145	10/24/97	Feb	x	x				
				Aug	x	x				
Plant Interior and VOC Area	I	MW50-094	10/31/97	Feb	x	x				
				Aug	x	x				
Columbia River and Fluoride-Plume Perimeter	I	MW51-069	11/3/97	Feb	x	x				
				May	x		x		x	x
				Aug	x		x		x	x
Columbia River and Fluoride-Plume Perimeter	UGS	MW52-045	10/30/97	Feb	x	x				
				May	x		x		x	x
				Aug	x		x		x	x
Sandy River and Fluoride-Plume Perimeter	UGS	MW53-034	10/31/97	Feb	x	x				
				May	x		x			x
				Aug	x		x			x

Notes:

[a] EPA Method 300.0 or Orion® selective-ion probe. Samples from selected wells (shaded above) were submitted for laboratory fluoride analysis.

[b] EPA CLP Method. Total metals (unfiltered groundwater samples) were analyzed for aluminum, arsenic, beryllium, chromium, lead, and nickel. Groundwater samples were analyzed for total and dissolved metals if field-measured turbidity was greater than 5 nephelometric turbidity units (NTUs).

[c] EPA CLP Method. Both total (unfiltered groundwater samples) and dissolved (field-filtered groundwater samples) were collected. The dissolved metals samples were analyzed if there were detections in the total metals samples. The 12 metals include aluminum, arsenic, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and silver.

[d] EPA Method 524.2/CLP.

[e] SW9010. If total cyanide was detected above the detection limit, the sample was analyzed for amenable cyanide.

[f] SW7196. Chromium VI has a holding time of 24 hours.

Abbreviations:
CLP = Contract Laboratory Program
EPA = U.S. Environmental Protection Agency
ID = identification number
VOCs = volatile organic compounds

Zone or Screened Material:
S = Shallow Silt
UGS = Shallow Upper Gray Sand
I = Intermediate-Depth Gray Sand Unit
D = Deep Zone Gray Sand Unit

Table 2
Construction Summary of Groundwater Monitoring Wells and Other Wells
Reynolds Metals Company - Troutdale, Oregon

Well ID	Unit[a]	Installation Date	Total Depth[b]	Casing Diameter[c]	Borehole Diameter	Screen Length (feet)	Screened Interval[b]	Top of Filter Pack[b]	MPE[d]	GSE[e]	Screened Material[f]	Well Location[g]	Comments
MW01-019	S	7/12/94	20	4-inch	12-inch	10	9 to 19	7	28.25	25.2	Sand (SP), Silt (ML)	Along South Ditch	
MW02-012	S	7/25/95	12.5	2-inch	10-inch	5	7 to 12	6	31.10	28.3	Silt (ML)	Scrap yard	
MW02-034	UGS	1/18/96	34	2-inch	10-inch	5	28 to 33	27	30.64	28.6	Sand (SP, SM)	Scrap yard	
MW03-017	S	7/9/94	18	2-inch	10-inch	8	9 to 17	7	29.69	27.4	Sand (SP, SM)	Perimeter	
MW03-098	I	6/26/96	100	2-inch	6-inch	10	88 to 98	87	30.65	28.7[h]	Sand (SP)	Perimeter	
MW03-175	D	6/17/96	175.5	2-inch	6-inch	10	165 to 175	163.5	30.72	28.7[h]	Sand (SP)	Perimeter	Borehole backfilled from 200 ft bgs
MW04-019	S	7/12/94	20	2-inch	12-inch	10	9 to 19	7	26.91	24.3	Silt (ML), Clay (CL)	South wetlands	
MW05-025	S	7/8/94	25	2-inch	10-inch	10	15 to 25	12	33.99	31.6	Silt (ML), Sand (SM)	Background	
MW06-024	S	7/8/94	25	2-inch	10-inch	10	14 to 24	11.5	26.81	24.1	Silt (ML), Sand (SP, SM)	Perimeter	
MW06-094	I	9/20/96	96	2-inch	6-inch	10	84 to 94	83.5	27.85	25.5	Sand (SW)	South of dike	
MW06-176	D	5/3/96	178	2-inch	6-inch	10	166 to 176	165	27.74	25.4[h]	Sand (SW-SP)	Perimeter	Borehole backfilled from 197 ft bgs
MW07-024	S	7/9/94	25	4-inch	12-inch	10	14 to 24	12	28.38	28.7	Sand (SM), Silt (ML)	South of dike	
MW08-027	UGS	7/7/94	28	2-inch	10-inch	10	17 to 27	14	25.32	22.8	Sand (SP)	Perimeter	
MW08-127	I	7/10/96	129	2-inch	6-inch	10	117 to 127	116.5	25.62	23.5[h]	Sandy gravel (GW)	Perimeter	Borehole backfilled from 134 ft bgs
MW08-169	D	5/23/96	170.5	2-inch	6-inch	10	159 to 169	158	25.88	23.7[h]	Sand (SW) / Gravel (GW)	Perimeter	Borehole backfilled from 200 ft bgs
MW09-030	UGS	8/4/94	32	2-inch	10-inch	10	20 to 30	18	29.27	27.0	Sand (SP)	North landfill	
MW10-023	S	8/5/94	25	4-inch	10-inch	15	8 to 23	7	30.28	27.9	Silt (ML)	South of dike	
MW10-090	I	9/12/96	91	2-inch	6-inch	10	80 to 90	79	31.03	28.4	Sand (SW)	South of dike	
MW10-165	D	7/31/96	166	2-inch	6-inch	10	155 to 165	154	31.24	28.6	Gravel (GW)	South of dike	Borehole backfilled from 199 ft bgs
MW11-017	S	8/5/94	19	2-inch	10-inch	10	7 to 17	6	31.61	29.5	Sand/Silt (SP/ML)	East potliner	
MW12-021	S	8/4/94	23	2-inch	10-inch	5	16 to 21	14	22.53	20.2	Sand (SP) Silt (ML)	Perimeter	Borehole backfilled from 25 ft bgs
MW12-092	I	9/24/96	92	2-inch	6-inch	10	80 to 90	79	22.57	20.6	Sand (SW)	Perimeter	
MW12-184	D	5/21/96	184.5	2-inch	10-inch to 8.5 feet; 6-inch to 200 feet	10	174 to 184	171	23.04	20.7[h]	Sand (SW)	Perimeter	Borehole backfilled from 200 ft bgs
MW13-022	S	7/12/95	23	2-inch	10-inch	5	17 to 22	15.5	30.88	28.3	Sand/silt (SP, SM) Sand (SP)	Scrap yard	
MW14-015	S	7/11/95	16	2-inch	10-inch	10	5 to 15	4	30.88	28.3	Silt (ML) Sand/silt (SP, SM)	Scrap yard	
MW15-024	S	7/13/95	24	2-inch	10-inch	10	14 to 24	11.5	22.75	20.9	Silt (ML) Sand/silt (SP, SM)	Perimeter	Borehole backfilled from 25 ft bgs
MW15-086	I	9/23/96	87	2-inch	6-inch	10	76 to 86	75	23.88	21.5	Sand (SW)	Perimeter	Borehole backfilled from 92 ft bgs

Table 2
Construction Summary of Groundwater Monitoring Wells and Other Wells
Reynolds Metals Company - Troutdale, Oregon

Well ID	Unit[a]	Installation Date	Total Depth[b]	Casing Diameter[c]	Borehole Diameter	Screen Length (feet)	Screened Interval[b]	Top of Filter Pack[b]	MPE[d]	GSE[e]	Screened Material[f]	Well Location[g]	Comments
MW15-175	D	6/4/96	175.8	2-inch	6-inch	10	165 to 175	164	23.88	21.8[h]	Sand (SW)	Perimeter	Borehole backfilled from 200 ft bgs
MW16-014	S	7/13/95	14	2-inch	10-inch	8	6 to 14	4	28.91	26.7	Sand (SP)	South landfill	
MW17-016 **	S	7/21/95	17	2-inch	10-inch	5	11 to 16	10	27.13	24.8	Silt with sand (ML)	South wetlands	
MW17-028	S	7/21/95	28.5	2-inch	10-inch	5	23 to 28	22	27.30	24.8	Sand (SW), Silt (ML)	South wetlands	
MW18-016	S	7/20/95	16.5	2-inch	10-inch	5	11 to 16	9.5	23.98	21.5	Sand (SP)	South wetlands	
MW18-031	UGS	7/20/95	32	2-inch	10-inch	5	27 to 32	25	23.95	21.5	Silt (ML) Sand/silt (SP, SM)	South wetlands	
MW19-013	S	7/21/95	13.5	2-inch	10-inch	5	8 to 13	6.5	27.10	24.8	Sand (SW), Silt (ML)	South landfill	
MW20-026	UGS	9/1/95	26.5	2-inch	10-inch	10	16 to 26	15	28.46	25.8	Sand (SP)	North landfill	
MW21-012 **	S	9/5/95	12	2-inch	10-inch	5	7 to 12	6	24.54	22.4	Silt (ML)	North landfill	
MW21-025	UGS	9/5/95	25	2-inch	10-inch	5	19 to 24	17	24.60	22.0	Sand (SP)	North landfill	
MW21-063	I	10/1/96	65	2-inch	6-inch	10	53 to 63	51	26.76	23.8	Sand (SW)	North landfill	
MW21-176	D	8/14/96	177	2-inch	6-inch	10	166 to 176	165	26.01	23.3	Sand (SW)	North landfill	Borehole backfilled from 364 ft bgs
MW22-027	UGS	9/6/95	27	2-inch	10-inch	10	17 to 27	15	25.35	22.6	Sand (SP)	North landfill	
MW23-025	UGS	9/1/95	25	2-inch	10-inch	10	15 to 25	14	26.43	24.9	Sand (SP)	North landfill	
MW24-010	S	7/12/95	11	2-inch	10-inch	5	5 to 10	4	30.13	27.3	Sand/silt (SP, SM) Sand (SP)	Scrap yard	Borehole backfilled from 12.5 ft bgs
MW25-024	S	7/12/95	24	2-inch	10-inch	10	13 to 23	11.5	31.14	28.5	Silt (ML) Silty sand (SM)	Scrap yard	Borehole backfilled from 30 ft bgs
MW25-035	UGS	7/24/95	35.5	2-inch	10-inch	5	30 to 35	29	30.89	28.4	Sand (SW, SP)	Scrap yard	
MW26-012	S	7/24/95	12.5	2-inch	10-inch	5	7 to 12	6	26.26	23.9	Sand (SP)	South landfill	
MW27-045	UGS	11/1/96	45	2-inch	10-inch	10	35 to 45	32	31.66	29.6	Sand (SW)	Adjacent to Company Lake	
MW27-081	I	8/28/96	80.5	2-inch	6-inch	10	69 to 79	67.5	31.93	29.4	Sand (SW)	Adjacent to Company Lake	Borehole backfilled from 175 ft bgs
MW27-176	D	8/26/96	176.5	2-inch	6-inch	10	164 to 174	163	31.94	29.5	Gravel (GW)	Adjacent to Company Lake	Borehole backfilled from 260 ft bgs
MW28-160	D	10/10/96	161	2-inch	10-inch to 27 feet 6-inch to 161 feet	10	150 to 160	148.7	28.62	28.8	Sand (SW)	Bakehouse	
MW29-033	UGS	10/31/96	33.5	2-inch	10-inch	10	23 to 33	21	29.75	27.9	Sand (SW)	South of dike	Borehole backfilled from 38.5 ft bgs
MW29-090	I	9/18/96	91	2-inch	6-inch	10	80 to 90	78	30.65	28.1	Sand (SW)	South of dike	
MW29-179	D	5/9/96	182	2-inch	10-inch to 18 feet 6-inch to 182 feet	10	168 to 178	168	30.66	28.5[h]	Gravel (GW-GM)	South of dike	Borehole backfilled from 200 ft bgs

Table 2
Construction Summary of Groundwater Monitoring Wells and Other Wells
Reynolds Metals Company - Troutdale, Oregon

Well ID	Unit[a]	Installation Date	Total Depth[b]	Casing Diameter[c]	Borehole Diameter	Screen Length (feet)	Screened Interval[b]	Top of Filter Pack[b]	MPE[d]	GSE[e]	Screened Material[f]	Well Location[g]	Comments
MW30-030	UGS	12/5/96	30	2-inch	10-inch	10	20 to 30	18	34.07	31.9	Sand (SW)	Near Gresham Sand & Gravel	
MW30-100	I	12/17/96	101	2-inch	6-inch	10	90 to 100	87	34.06	31.9	Sand (SW)	Near Gresham Sand & Gravel	
MW31-034	UGS	11/26/96	34	2-inch	10-inch	10	24 to 34	22	25.60	23.8	Sand (SW)	Fairview Farms	
MW31-095	I	12/9/96	96	2-inch	6-inch	10	85 to 95	82	25.00	22.8	Sand (SW)	Fairview Farms	Borehole backfilled from 120 ft bgs
MW32-040	UGS	12/6/96	41	2-inch	10-inch	10	30 to 40	28	28.44	28.4	Sand (SW)	Bakehouse	
MW32-095	I	12/6/96	95	2-inch	6-inch	10	85 to 95	82	28.31	28.4	Sand (SW)	Bakehouse	
MW32-165	D	12/2/96	165	2-inch	6-inch	10	155 to 165	151	28.40	28.4	Sand (SW)	Bakehouse	
MW33-033	UGS	12/4/96	33.5	2-inch	10-inch	10	23 to 33	22	29.92	28.5	Sand (SW)	Scrap yard	
MW33-095	I	11/25/96	95.5	2-inch	6-inch	10	85 to 95	82	30.56	28.5	Sand (SW)	Scrap yard	
MW33-165	D	12/30/96	165.5	2-inch	6-inch	10	155 to 165	152	30.68	28.7	Sand (SW), Gravel (GW)	Scrap yard	
MW34-038	UGS	12/3/96	38	2-inch	10-inch	5	33 to 38	31	32.12	30.3	Sand with silt (SW-SM) Sand (SW)	East potliner	
MW35-038	UGS	12/3/96	38	2-inch	10-inch	5	33 to 38	31	31.56	29.3	Sand (SW)	East potliner	
MW36-006 **	S	10/22/96	6.5	2-inch	9-inch	3	3 to 6	2	21.68	21.2	Silt (ML)	South wetlands	Borehole backfilled from 8 ft bgs
MW37-012	S	10/23/96	12.5	2-inch	9-inch	5	7 to 12	5	21.48	17.8	Silt (ML)	South wetlands	Borehole backfilled from 16 ft bgs
MW37-030	UGS	12/9/96	30.5	2-inch	9-inch	5	25 to 30	23	21.32	17.8	Sand with silt (SW-SM)	South wetlands	
MW38-007	S	11/1/96	7	2-inch	10-inch	4	3 to 7	2	22.56	20.6	Sand (SW)	Along Salmon Creek	
MW38-035	UGS	12/2/96	36	2-inch	10-inch	5	30 to 35	28.5	23.07	20.7	Sand (SW)	Along Salmon Creek	
MW39-095	I	6/26/97	95	2-inch	6.5-inch	10	85 to 95	82	25.18	22.3	Sand (SW)	Fairview Farms	
MW40-018	S	6/11/97	18.3	2-inch	11-inch	5	13 to 18	10	28.42	28.8	Silt (ML)	Bakehouse	
MW40-030	UGS	6/11/97	32	2-inch	11-inch	5	25 to 30	23	28.29	28.7	Sand (SW)	Bakehouse	
MW41-020	S	6/13/97	20.3	2-inch	11-inch	5	15 to 20	12	28.63	29.1	Silt (ML)	Bakehouse	
MW41-033	UGS	6/12/97	35	2-inch	11-inch	5	28 to 33	26	28.71	29.1	Sand (SM)	Bakehouse	
MW42-013	S	6/11/97	13.3	2-inch	11-inch	5	8 to 13	6	30.08	29.1	Silt (ML)	Bakehouse	
MW42-027	UGS	6/11/97	27.5	2-inch	11-inch	5	22 to 27	20	30.17	29.3	Sand (SW)	Bakehouse	
MW43-015	S	6/13/97	15.3	2-inch	11-inch	5	10 to 15	8	30.91	29.7	Silt (ML)	Bakehouse	
MW43-027	UGS	6/13/97	29	2-inch	11-inch	5	22 to 27	20	30.72	29.7	Sand (SW)	Bakehouse	
MW44-011	S	6/12/97	12	2-inch	11-inch	5	6 to 11	4	31.11	29.2	Sand (SW-SM) / Silt (ML)	Bakehouse	
MW44-027	UGS	6/12/97	27.5	2-inch	11-inch	5	22 to 27	20	30.88	29.2	Sand (SW)	Bakehouse	
MW45-017	S	6/17/97	17.8	2-inch	11-inch	5	12 to 17	10	30.61	28.7	Silt (ML)	Bakehouse	
MW45-042	UGS	6/16/97	43	2-inch	11-inch	5	37 to 42	35	30.26	28.9	Sand (SW)	Bakehouse	
MW46-018	S	6/16/97	18.8	2-inch	11-inch	5	14 to 19	11.5	31.48	29.6	Sand (SW) / Silt (ML)	Bakehouse	
MW46-043	UGS	6/16/97	43.3	2-inch	11-inch	5	38 to 43	36	30.99	29.4	Sand (SW)	Bakehouse	
MW47-094	I	7/1/97	95	2-inch	6.5-inch	10	84 to 94	82	29.71	27.0	Sand (SW)	South landfill	

Table 2
Construction Summary of Groundwater Monitoring Wells and Other Wells
Reynolds Metals Company - Troutdale, Oregon

Well ID	Unit[a]	Installation Date	Total Depth[b]	Casing Diameter[c]	Borehole Diameter	Screen Length (feet)	Screened Interval[b]	Top of Filter Pack[b]	MPE[d]	GSE[e]	Screened Material[f]	Well Location[g]	Comments
MW48-055	I	9/2/97	56	2-inch	6-inch	10	45 to 55	42	28.19	28.4	Sand	No. Side Casthouse	
MW48-165	D	8/27/97	199	2-inch	6-inch	10	156 to 166	151	28.12	28.3	Sand	No. Side Casthouse	Backfilled to 165 ft
MW49-095	I	10/29/97	95	2-inch	6-inch	10	84 to 94	81	30.52	28.7	Sand	Scrap Yard	
MW49-145	D	10/24/97	173	2-inch	6-inch	10	135 to 145	131	30.85	28.9	Sand	Scrap Yard	Backfilled to 146 ft
MW50-094	I	10/31/97	95	2-inch	6-inch	10	84 to 94	81	27.06	24.9	Sand	So. Side Casthouse	
MW51-069	I	11/3/97	69	2-inch	6-inch	10	58 to 68	55	26.17	23.4	Sand	Adjacent to River	Near Gresham S & G
MW52-045	UGS	10/30/97	45	2-inch	6-inch	10	35 to 45	31	26.43	23.8	Sand	Adjacent to River	Near MW08
MW53-034	UGS	10/31/97	35	2-inch	6-inch	10	24 to 34	21	23.80	20.6	Sand	Adjacent to River	East of East Lake
Piezometer													
PZ17-019	S	10/29/97	19.3	1/2-inch	2-inch	3	16 to 19	14	28.73	NM	Silt	Bakehouse	
PZ17-039	UGS	10/29/97	40	1/2-inch	2-inch	3	36 to 39	34	28.69	NM	Sand	Bakehouse	
PZ18-023	S	10/31/97	23.3	1/2-inch	2-inch	3	20 to 23	18	27.87	NM	Silt	Bakehouse	
PZ18-040	UGS	10/30/97	42	1/2-inch	2-inch	3	37 to 40	35	27.81	NM	Sand	Bakehouse	
PZ19-014	S	10/31/97	14.3	1/2-inch	2-inch	3	11 to 14	9	29.30	NM	Silt	Bakehouse	
PZ19-040	UGS	10/31/97	40	1/2-inch	2-inch	3	37 to 40	35	29.43	NM	Sand	Bakehouse	
Production Wells													
PW03	Deep	6/42	281	12-inch	12-inch	11	Perforated: 253 to 264	Not Known	NA	28.5	Gravel; coarse gray sand		Production well
PW07	Deep	1948	254	24-inch from 0 to 40 feet; 18-inch from 0 to 203 feet; 12-inch from 190 to 254 feet	12-inch to 24-inch	NA	Perforated: 223 to 230; 232 to 246	Not Known	NA	28.5	Clay; Loose sand & gravel		Production well
PW08	Deep	1948	248	18-inch to 160 feet; 12-inch (152 to 248 feet)	12-inch	NA	158 to 174; 195 to 206; 210 to 218	Not Known	30.50	28.5	Loose sand & gravel; Loose sand & gravel; Loose & cemented sand/gravel		Production well
PW10	Deep	1949	625	20-inch to 140 feet; 12-inch from 0 to 625 feet	12-inch	NA	144 to 185; 440 to 482; 522 to 530; 538 to 558	Not Known	31.18	28.5	Sandy clay & gravel; Sand & gravel; Sand & gravel		Production well
PW18	Deep	1970	300	11-inch to 270 feet	Not Known	NA	148 to 189; 229 to 260	Not Known	30.57	28.0	Sand Sand & gravel		Production well

Table 2
Construction Summary of Groundwater Monitoring Wells and Other Wells
Reynolds Metals Company - Troutdale, Oregon

Well ID	Unit[a]	Installation Date	Total Depth[b]	Casing Diameter[c]	Borehole Diameter	Screen Length (feet)	Screened Interval[b]	Top of Filter Pack[b]	MPE[d]	GSE[e]	Screened Material[f]	Well Location[g]	Comments
Other													
Fairview Farms Well No. 4	Deep	1943 Well use: Irrigation	281	24-inch from 0 to 55 feet; 12-inch from 55 to 230 feet; 8-inch from 209 to 281 feet	Not Known	13	237 to 250	Not Known	22.41	19.1	Sand & gravel	~ 1,300 feet west of Sundial Road	Former irrigation well
Sundial Marine	Deep	12/19/79	233	6-inch from 0 to 227 feet	Not Known	5	228 to 233	Not Known	NA	NA	Sand & gravel	Northwest of Sundial Road, adjacent to Columbia River	Domestic well
Gresham Sand & Gravel	Deep	11/10/67	127	6-inch from 0 to 120 feet	Not Known	10	120 to 130	Not Known	NA	NA	Sand & gravel	Northwest of Sundial Road, adjacent to Columbia River	Domestic well

Notes:

[a] Abbreviations:
S = Shallow well screened in silt.
UGS = Shallow well screened in the upper gray sand.
I = Intermediate-depth well screened in sand.
D = Deep well screened in sand/gravel.

** Well decommissioned in June 1998.
NA = Information not available.

[b] Feet below ground surface (ft bgs).
[c] Casing and screen constructed with flush-threaded Schedule 40 or 80 polyvinyl chloride with 0.010-inch machine-slotted screen.
[d] MPE = Measuring point elevation, feet 1929 National Geodetic Vertical Datum (NGVD).
[e] GSE = Ground surface elevation, feet 1929 NGVD.
[f] For explanation of soil classification codes, refer to ASTM D 2488, Standard Practice for Description and Identification of Soils (American Society for Testing and Materials, August 1990).
[g] Refer to Figures 1-4 for well locations.
[h] Reference point is top of concrete pad (feet 1929 NGVD), not ground surface elevation.

Table 3
MCL Exceedances in Groundwater for Wells Sampled in 1998
Reynolds Metals Company - Troutdale, Oregon

				Primary MCL Exceedances (mg/L)							Secondary MCL Exceedances (mg/L)					
				VOCs	Arsenic		Fluoride		Beryllium		Aluminum		Iron		Manganese	
Well ID	Unit	Area	Date Sampled	PCE 0.005	Total 0.05	Dissolved 0.05	by 300.0 4.0	by Field 4.0	Total 0.004	Dissolved 0.004	Total 0.05	Dissolved 0.05	Total 0.3	Dissolved 0.3	Total 0.05	Dissolved 0.05
MW05-025	Silt	Upgradient /	02/16/98								0.526					
		Background	08/19/98								0.559					
MW09-030	UGS	North Landfill	02/19/98					25.4								
			08/13/98					31.5								
MW10-023	Silt	Fluoride Plume Perimeter	02/18/98								0.18					
		(FPP)	08/18/98								0.165					
MW11-017	Silt	East Potliner	02/16/98		0.092	0.087	385	306			10.7	1.2				
		(EPL)	08/17/98		0.08	0.078	432	440			7.34	8.4				
MW13-022	Silt	Scrap Yard	02/19/98				104	108			3.18	0.804				
		(SY)	08/17/98				119	130	0.0047	0.0045	4.16	1.83				
MW17-028	Silt	South Wetlands (SWL)	02/19/98								0.1					
MW19-013	Silt	South Landfill (SLF)	08/19/98					66.3	0.0046		7.61					
MW22-027	UGS	Company Lake	02/19/98					14								
			08/20/98					13.6								
MW26-012	Silt	SLF	02/16/98				101	87								
			08/17/98				99.5	94								
MW27-045	UGS	Company Lake	02/19/98					19.4								
			08/18/98					20.2								
MW27-081	I	Company Lake	02/19/98					22.1								
			08/18/98					22.3								
MW29-090	I	FPP	02/17/98					12								
			08/11/98					15								
MW29-179	Deep	FPP	02/17/98								0.0562					
			08/12/98								0.111					
MW31-034	UGS	FPP	02/20/98					4.97								
MW31-095	I	FPP	02/20/98					6.58								
			08/13/98					20.9								
MW32-040	UGS	Bakehouse	02/17/98	0.34 D												
			08/12/98	0.37 D												
MW33-095	I	SY	02/17/98				113	141								
			08/11/98					87.4								
MW33-165	Deep	SY	02/17/98					40.7								
			08/18/98					22.4								
MW34-038	UGS	EPL	02/16/98					28.4								
			08/18/98					35.4								
MW40-018	Silt	Bakehouse	05/11/98					5.7								
			08/14/98					5.2								

Table 3
MCL Exceedances in Groundwater for Wells Sampled in 1998
Reynolds Metals Company - Troutdale, Oregon

				Primary MCL Exceedances (mg/L)							Secondary MCL Exceedances (mg/L)					
				VOCs	Arsenic		Fluoride		Beryllium		Aluminum		Iron		Manganese	
Well ID	Unit	Area	Date Sampled	PCE 0.005	Total 0.05	Dissolved 0.05	by 300.0 4.0	by Field 4.0	Total 0.004	Dissolved 0.004	Total 0.05	Dissolved 0.05	Total 0.3	Dissolved 0.3	Total 0.05	Dissolved 0.05
MW42-027	UGS	Bakehouse	02/18/98					16.8								
			05/11/98					17.2								
			08/12/98					22								
MW43-015	Silt	Bakehouse	02/13/98					6.28								
			05/13/98					9.5								
MW43-027	UGS	Bakehouse	02/18/98					5.42								
			05/13/98					8.1								
			08/12/98					9.2								
MW44-027	UGS	Bakehouse	02/20/98					5.8								
MW45-017	Silt	Bakehouse	02/20/98					13.4								
			05/12/98					9.2								
			08/13/98					12.6								
MW46-018	Silt	Bakehouse	02/20/98					18.9								
			05/12/98					16.8								
			08/10/98					19.2								
MW48-165	Deep	No. Side Casthouse	02/18/98					7.4								
			08/11/98					8								
MW49-145	Deep	SY	02/17/98								3.75					
			08/17/98								0.35					
MW51-069	I	River Boundary (near Gresham S & G)	05/11/98										24	24.1	0.923	0.927
			08/10/98										26.8	26.6	0.891	0.888
MW52-045	UGS	River Boundary (near MW08)	02/19/98					10.8								
			05/11/98					6.11			0.0811	0.0739	7.06	7.0	0.427	0.428
			08/10/98					10.3					6.93	7.14	0.396	0.407
MW53-034	UGS	River Boundary (near East Lake)	05/11/98								0.0747		12.2	12	0.666	0.659
			08/10/98										13.1	12.7	0.669	0.666

Notes:
TDS = Total dissolved solids
PCE = Tetrachloroethene
DCE = Dichloroethene

J = Value estimated
mg/L = Milligrams per liter.

Unit:
Silt = Shallow well screened in silt.
UGS = Shallow well screened in the upper gray sand.
I = Intermediate-depth well screened in sand.
Deep = Deep well screened in sand / gravel.

Refer to Table 1 to determine if 1998 samples were analyzed for each constituent.

Table 4
November 3, 1998, Groundwater Elevation Data Summary
Reynolds Metals Company - Troutdale, Oregon

Well ID	Unit	Date	Time	MPE[a]	Depth to Water[b]	Elevation[a]
MW01-019	Silt	11/3/98	9:15	28.25	9.69	18.56
MW02-012	Silt	11/3/98	10:55	31.10	14.61	16.49
MW02-034	UGS	11/3/98	10:55	30.64	22.80	7.84
MW03-017	Silt	11/3/98	11:05	29.69	7.33	22.36
MW03-098	I	11/3/98	11:05	30.65	22.71	7.94
MW03-175	Deep	11/3/98	11:05	30.72	22.75	7.97
MW04-019	Silt	11/3/98	9:25	26.91	14.94	11.97
MW05-025	Silt	11/12/98	16:10	33.99	14.51	19.48
MW06-024	Silt	11/3/98	10:12	26.81	19.44	7.37
MW06-094	I	11/3/98	10:10	27.85	21.99	5.86
MW06-176	Deep	11/3/98	10:11	27.74	20.83	6.91
MW07-024	Silt	11/3/98	10:00	28.38	14.63	13.75
MW08-027	UGS	11/3/98	9:17	25.32	19.20	6.12
MW08-127	I	11/3/98	9:14	25.62	19.19	6.43
MW08-169	Deep	11/3/98	9:16	25.88	20.07	5.81
MW09-030	UGS	11/3/98	9:09	29.27	22.86	6.41
MW10-023	Silt	11/3/98	10:15	30.28	17.17	13.11
MW10-090	I	11/3/98	10:15	31.03	23.56	7.47
MW10-165	Deep	11/3/98	10:15	31.24	25.41	5.83
MW11-017	Silt	11/3/98	10:45	31.61	13.03	18.58
MW12-021	Silt	11/3/98	9:25	22.53	11.49	11.04
MW12-092	I	11/3/98	9:25	22.57	15.35	7.22
MW12-184	Deep	11/3/98	9:25	23.04	15.80	7.24
MW13-022	Silt	11/3/98	12:30	30.88	22.19	8.69
MW14-015	Silt	11/3/98	10:30	30.88	10.21	20.67
MW15-024	Silt	11/3/98	9:30	22.75	11.26	11.49
MW15-086	I	11/3/98	9:30	23.88	16.86	7.02
MW15-175	Deep	11/3/98	9:30	23.88	16.81	7.07
MW16-014	Silt	11/3/98	12:25	28.91	8.16	20.75
MW17-016 [c]	Silt	11/3/98		27.13	NA	NA
MW17-028	Silt	11/3/98	12:10	27.30	13.08	14.22
MW18-016	Silt	11/3/98	12:00	23.98	9.19	14.79
MW18-031	UGS	11/3/98	12:00	23.95	16.37	7.58
MW19-013	Silt	11/3/98	12:55	27.10	7.38	19.72
MW20-026	UGS	11/3/98	9:36	28.46	21.32	7.14
MW21-012 [c]	Silt	11/3/98		24.54	NA	NA
MW21-025	UGS	11/3/98	8:55	24.60	18.04	6.56
MW21-063	I	11/3/98	8:59	26.76	20.10	6.66
MW21-176	Deep	11/3/98	8:57	26.01	20.36	5.65
MW22-027	UGS	11/3/98	9:05	25.35	18.68	6.67
MW23-025	UGS	11/3/98	9:02	26.41	19.88	6.53
MW24-010	Silt	11/3/98	12:41	30.13	11.83	18.30
MW25-024	Silt	11/3/98	10:55	31.14	21.78	9.36
MW25-035	UGS	11/3/98	10:55	30.89	23.06	7.83
MW26-012	Silt	11/3/98	12:20	26.26	7.51	18.75
MW27-045	UGS	11/3/98	9:27	31.66	25.35	6.31
MW27-081	I	11/3/98	9:25	31.93	25.32	6.61
MW27-176	Deep	11/3/98	9:26	31.94	25.46	6.48

Table 4
November 3, 1998, Groundwater Elevation Data Summary
Reynolds Metals Company - Troutdale, Oregon

Well ID	Unit	Date	Time	MPE[a]	Depth to Water[b]	Elevation[a]
MW28-160	Deep	11/3/98	11:47	28.62	21.15	7.47
MW29-033	UGS	11/3/98	10:05	29.75	22.08	7.67
MW29-090	I	11/3/98	10:06	30.65	23.61	7.04
MW29-179	Deep	11/3/98	10:07	30.66	23.79	6.87
MW30-030	UGS	11/3/98	10:21	34.07	27.81	6.26
MW30-100	I	11/3/98	10:20	34.06	27.73	6.33
MW31-034	UGS	11/3/98	10:37	25.60	18.90	6.70
MW31-095	I	11/3/98	10:40	25.00	18.33	6.67
MW32-040	UGS	11/3/98	12:04	28.44	20.66	7.78
MW32-095	I	11/3/98	12:05	28.31	21.12	7.19
MW32-165	Deep	11/3/98	12:07	28.40	21.20	7.20
MW33-033	UGS	11/3/98	10:05	29.92	22.42	7.50
MW33-095	I	11/3/98	10:05	30.56	23.20	7.36
MW33-165	Deep	11/3/98	10:05	30.68	27.65	3.03
MW34-038	UGS	11/3/98	10:50	32.12	24.08	8.04
MW35-038	UGS	11/3/98	10:50	31.56	23.56	8.00
MW36-006 [c]	Silt	11/3/98		21.68	NA	NA
MW37-012	Silt	11/3/98	12:05	21.48	10.02	11.46
MW37-030	UGS	11/3/98	12:05	21.32	13.79	7.53
MW38-007	Silt	11/3/98	11:07	22.56	7.02	15.54
MW38-035	UGS	11/3/98	11:06	23.07	15.35	7.72
MW39-095	I	11/3/98	10:46	25.18	18.57	6.61
MW40-018	Silt	11/3/98	11:16	28.42	17.10	11.32
MW40-030	UGS	11/3/98	11:15	28.29	20.33	7.96
MW41-020	Silt	11/3/98	11:57	28.63	18.03	10.60
MW41-033	UGS	11/3/98	11:56	28.71	20.54	8.17
MW42-013	Silt	11/3/98	11:27	30.08	15.05	15.03
MW42-027	UGS	11/3/98	11:26	30.17	22.13	8.04
MW43-015	Silt	11/3/98	9:40	30.91	Dry	Dry
MW43-027	UGS	11/3/98	9:40	30.72	22.54	8.18
MW44-011	Silt	11/3/98	9:45	31.11	13.26	17.85
MW44-027	UGS	11/3/98	9:45	30.88	22.88	8.00
MW45-017	Silt	11/3/98	9:54	30.61	17.56	13.05
MW45-042	UGS	11/3/98	9:54	30.26	22.73	7.53
MW46-018	Silt	11/3/98	10:00	31.48	19.36	12.12
MW46-043	UGS	11/3/98	10:00	30.99	23.50	7.49
MW47-094	I	11/3/98	11:20	29.71	22.73	6.98
MW48-055	I	11/3/98	12:18	28.19	20.86	7.33
MW48-165	Deep	11/3/98	12:16	28.12	20.89	7.23
MW49-095	I	11/3/98	10:25	30.52	22.79	7.73
MW49-145	Deep	11/3/98	10:25	30.85	23.10	7.75
MW50-094	I	11/3/98	9:20	27.06	19.68	7.38
MW51-069	I	11/3/98	10:28	26.17	20.04	6.13
MW52-045	UGS	11/3/98	9:20	26.43	20.27	6.16
MW53-034	UGS	11/3/98	9:54	23.80	16.43	7.37

Table 4
November 3, 1998, Groundwater Elevation Data Summary
Reynolds Metals Company - Troutdale, Oregon

Well ID	Unit	Date	Time	MPE[a]	Depth to Water[b]	Elevation[a]
Piezometer						
PZ17-019	Silt	11/3/98	11:50	28.73	12.20	16.53
PZ17-039	UGS	11/3/98	11:52	28.70	21.38	7.32
PZ18-023	Silt	11/3/98	11:36	27.87	15.97	11.90
PZ18-040	UGS	11/3/98	11:38	27.81	36.88	-9.07
PZ19-014	Silt	11/3/98	11:30	29.30	12.45	16.85
PZ19-040	UGS	11/3/98	11:32	29.43	36.85	-7.42
Staff Gauge						
SG-CoLake	NA	11/3/98	9:45			15.65
SG-Columbia River	NA	11/3/98			NA	NA
SG01	NA	11/3/98			Dry	Dry
SG02	NA	11/3/98			Dry	Dry
SG03	NA	11/3/98			Dry	Dry
SG04	NA	11/3/98	12:20			19.50
SG05	NA	11/3/98	12:14			19.42
SG06	NA	11/3/98			Dry	Dry
SG07	NA	11/3/98			Dry	Dry
SG08	NA	11/3/98	12:35			6.08
SD Pump Station	NA	11/3/98	12:25	21.87	6.70	15.17
Other						
Columbia River	NA	11/3/98	10:16	30.90	25.20	5.70
FF04	Deep	11/3/98		22.41	NA	NA
FF06	Deep	11/3/98	10:54	24.64	18.08	6.56
FFT0 [c]	Deep	11/3/98			NA	NA
PW18	Deep	11/3/98	12:30	30.67	23.35	7.32

Notes:

[a] MPE = Measuring point elevation in feet 1929 National Geodetic Vertical Datum (NGVD).

[b] Depth to water in feet below MPE.

[c] Well decommissioned in summer 1998.

MW05-025 water level reading on 11/03/98 not valid (water level indicator error); replacement water level was measured on 11/12/98.

FF = Fairview Farms.

NA = Not applicable.

Table 5
Silt to Upper Gray Sand - Vertical Hydraulic Gradient Estimates
Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW02-012	Well ID MW02-034	Scrap Yard Elevation Difference (feet)	Scrap Yard Vertical Gradient (foot/foot)	Well ID MW17-016	Well ID MW17-028	South Wetlands Elev. Diff. (feet)	South Wetlands Vertical Gradient (foot/foot)	Well ID MW18-016	Well ID MW18-031	South Wetlands Elev. Diff. (feet)	South Wetlands Vertical Gradient (foot/foot)	Well ID MW21-012	Well ID MW21-025	North Landfill Elev. Diff. (feet)	North Landfill Vertical Gradient (foot/foot)
	Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)			
Vertical Separation	23 feet				12 feet				15.5 feet				13.4 feet			
8/1/95					13.23	13.63	0.40	0.033	13.39	10.20	-3.19	-0.21				
9/7/95					12.44	12.52	0.08	0.007	12.72	8.44	-4.28	-0.28	15.44	7.19	-8.25	-0.62
10/5/95					12.42	12.44	0.02	0.002	13.19	8.70	-4.49	-0.29	15.35	7.01	-8.34	-0.62
11/3/95					13.63	13.63	0.00	0	14.47	9.31	-5.16	-0.33	16.48	7.70	-8.78	-0.66
12/1/95					21.00	20.63	-0.37	-0.031	16.70	18.74	2.04	0.13	17.30	16.10	-1.20	-0.09
1/4/96					19.59	19.14	-0.45	-0.037	15.88	14.66	-1.22	-0.08	17.24	13.60	-3.64	-0.27
2/2/96	23.42	15.64	-7.78	-0.338	19.13	18.74	-0.39	-0.033	15.63	15.12	-0.51	-0.03	17.20	15.06	-2.14	-0.16
3/1/96	24.98	19.72	-5.26	-0.229	19.63	19.29	-0.34	-0.028	15.85	19.20	3.35	0.22	19.79	20.07	0.28	0.02
4/1/96	21.77	14.50	-7.27	-0.316	18.91	18.70	-0.21	-0.018	15.90	14.16	-1.74	-0.11	17.19	13.86	-3.33	-0.25
5/6/96	22.70	17.53	-5.17	-0.225	18.79	18.55	-0.24	-0.020	15.43	17.14	1.71	0.11	17.71	17.30	-0.41	-0.03
6/7/96	22.78	19.56	-3.22	-0.140	18.23	18.15	-0.08	-0.007	15.41	19.12	3.71	0.24	19.38	19.40	0.02	0.00
7/1/96	20.81	15.95	-4.86	-0.211	17.03	16.76	-0.27	-0.023	14.98	15.66	0.68	0.04	17.06	15.45	-1.61	-0.12
8/1/96	18.70	11.89	-6.81	-0.296	14.51	14.43	-0.08	-0.007	13.92	11.53	-2.39	-0.15	16.50	11.12	-5.38	-0.40
9/4/96	17.58	9.91	-7.67	-0.333	13.31	13.32	0.01	0.0008	13.18	9.56	-3.62	-0.23	16.10	8.82	-7.28	-0.54
10/2/96	Dry	9.33			13.08	13.07	-0.01	-0.0008	13.05	8.99	-4.06	-0.26	16.24	7.73	-8.51	-0.64
11/4/96	19.62	9.93	-9.69	-0.421	15.89	15.86	-0.03	-0.003	15.05	9.34	-5.71	-0.37	16.84	7.84	-9.00	-0.67
12/2/96	23.00	14.00	-9.00	-0.391	20.06	19.68	-0.38	-0.032	16.23	13.35	-2.88	-0.19	17.31	11.70	-5.61	-0.42
1/6/97	26.30	21.99	-4.31	-0.187	20.31	20.05	-0.26	-0.022	16.36	21.45	5.09	0.33	21.53	20.66	-0.87	-0.06
2/5/97	24.70	18.99	-5.71	-0.248	19.94	19.58	-0.36	-0.030	16.23	18.37	2.14	0.14	18.82	18.57	-0.25	-0.02
2/28/97	21.99	15.78	-6.21	-0.270	19.47	19.07	-0.40	-0.033	15.94	15.36	-0.58	-0.04	17.26	14.90	-2.36	-0.18
3/11/97	22.81	16.50	-6.31	-0.274	20.62	20.23	-0.39	-0.033	16.57	15.91	-0.66	-0.04	17.61	14.87	-2.74	-0.20
8/6/97	19.16	11.99	-7.17	-0.312	15.44	15.36	-0.08	-0.007	14.08	11.54	-2.54	-0.16	16.57	11.32	-5.25	-0.39
11/7/97	19.13	11.10	-8.03	-0.349	16.89	16.80	-0.09	-0.007	15.34	10.87	-4.47	-0.29	16.86	9.56	-7.30	-0.54
12/3/97	19.60	11.17	-8.43	-0.367	18.28	17.92	-0.36	-0.030	15.25	10.95	-4.30	-0.28	17.09	9.66	-7.43	-0.55
1/6/98	20.17	11.78	-8.39	-0.365	19.99	18.49	-1.50	-0.125	16.10	11.43	-4.67	-0.30	17.42	10.07	-7.35	-0.55
2/5/98	21.81	13.22	-8.59	-0.373	19.46	19.03	-0.43	-0.036	15.87	12.56	-3.31	-0.21	12.09	17.30	5.21	0.39
3/4/98	22.55	13.45	-9.10	-0.396	20.23	19.73	-0.50	-0.042	16.32	12.79	-3.53	-0.23	17.57	12.29	-5.28	-0.39
5/4/98	19.24	12.69	-6.55	-0.285	17.24	17.09	-0.15	-0.012	15.41	12.31	-3.10	-0.20	16.62	11.40	-5.22	-0.39
8/4/98	18.03	9.40	-8.63	-0.375	Aband	--			14.92	8.92	-6.00	-0.39	Aband	--		
11/3/98	16.49	7.84	-8.65	-0.376	Aband	--			14.79	7.58	-7.21	-0.47	Aband	--		
Maximum				-0.42				-0.13				-0.47				-0.67
Minimum				-0.14				0.00				0.33				0.39
Average				-0.31				-0.02				-0.12				-0.28

Notes:

Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).

Aband = well decommissioned in June 1998.

[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells

[b] Vertical gradient (feet/feet) is calculated as the water level elevation difference divided by the vertical separation.

[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient

Table 5
Silt to Upper Gray Sand - Vertical Hydraulic Gradient Estimates
Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW25-024	Well ID MW25-035	Scrap Yard Elevation Difference (feet)	Scrap Yard Vertical Gradient (foot/foot)	Well ID MW37-012	Well ID MW37-030	South Wetlands Elevation Difference (feet)	South Wetlands Vertical Gradient (foot/foot)	Well ID MW38-007	Well ID MW38-035	South Wetlands Elevation Difference (feet)	South Wetlands Vertical Gradient (foot/foot)
	Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)			
Vertical Separation	14.6 feet				18 feet				27.5 feet			
8/1/95	17.87	10.31	-7.56	-0.52								
9/7/95	15.24	8.64	-6.60	-0.45								
10/5/95	13.00	8.77	-4.23	-0.29								
11/3/95	17.89	9.29	-8.60	-0.59								
12/1/95	24.19	19.44	-4.75	-0.33								
1/4/96	22.09	15.02	-7.07	-0.48								
2/2/96	22.66	15.58	-7.08	-0.48								
3/1/96	24.45	19.70	-4.75	-0.33								
4/1/96	21.61	14.48	-7.13	-0.49								
5/6/96	22.75	17.50	-5.25	-0.36								
6/7/96	23.08	19.56	-3.52	-0.24								
7/1/96	21.29	15.95	-5.34	-0.37								
8/1/96	18.99	11.88	-7.11	-0.49								
9/4/96	17.19	9.91	-7.28	-0.50								
10/2/96	15.11	9.34	-5.77	-0.40								
11/4/96	18.37	9.93	-8.44	-0.58								
12/2/96	22.69	13.96	-8.73	-0.60								
1/6/97	26.24	21.97	-4.27	-0.29	18.41	21.32	2.91	0.16	20.91	16.88	-4.03	-0.15
2/5/97	24.43	18.97	-5.46	-0.37	17.44	18.40	0.96	0.05	16.21	18.33	2.12	0.08
2/28/97	22.26	15.77	-6.49	-0.44	16.48	15.38	-1.10	-0.06	16.06	15.39	-0.67	-0.02
3/11/97	23.22	16.49	-6.73	-0.46	16.82	15.94	-0.88	-0.05	16.41	15.96	-0.45	-0.02
8/6/97	19.56	12.00	-7.56	-0.52	13.74	11.55	-2.19	-0.12	15.21	11.63	-3.58	-0.13
11/7/97	19.11	11.12	-7.99	-0.55	15.10	10.90	-4.20	-0.23	15.41	10.96	-4.45	-0.16
12/3/97	19.54	11.18	-8.36	-0.57	15.09	10.86	-4.23	-0.24	15.62	11.01	-4.61	-0.17
1/6/98	20.24	11.78	-8.46	-0.58	15.42	11.40	-4.02	-0.22	16.20	11.55	-4.65	-0.17
2/5/98	21.88	13.20	-8.68	-0.59	15.80	12.56	-3.24	-0.18	16.04	12.63	-3.41	-0.12
3/4/98	22.59	13.53	-9.06	-0.62	16.11	12.73	-3.38	-0.19	16.38	12.80	-3.58	-0.13
5/4/98	19.89	12.69	-7.20	-0.49	15.20	12.24	-2.96	-0.16	15.62	12.42	-3.20	-0.12
8/4/98	18.10	9.42	-8.68	-0.59	13.41	8.90	-4.51	-0.25	15.41	9.05	-6.36	-0.23
11/3/98	9.36	7.83	-1.53	-0.10	11.46	7.53	-3.93	-0.22	15.54	7.72	-7.82	-0.28
Maximum				-0.62				-0.25				-0.28
Minimum				-0.10				0.16				0.08
Average				-0.46				-0.13				-0.13

Notes:

Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).

Aband = well decommissioned in June 1998.

[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells

[b] Vertical gradient (feet/feet) is calculated as the water level elevation difference divided by the vertical separation.

[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient

Table 6
Silt to Upper Gray Sand - Bakehouse Area
Vertical Hydraulic Gradient Estimates

Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW40-018 Groundwater Elevation (feet)	Well ID MW40-030 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW41-020 Groundwater Elevation (feet)	Well ID MW41-033 Groundwater Elevation (feet)	Elev. Diff. (feet)	Vertical Gradient (foot/foot)	Well ID MW42-013 Groundwater Elevation (feet)	Well ID MW42-027 Groundwater Elevation (feet)	Elev. Diff. (feet)	Vertical Gradient (foot/foot)	Well ID MW43-015 Groundwater Elevation (feet)	Well ID MW43-027 Groundwater Elevation (feet)	Elev. Diff. (feet)	Vertical Gradient (foot/foot)
Vertical Separation	12 feet				12 feet				12 feet				12 feet			
8/6/97	14.39	13.17	-1.22	-0.102	14.64	13.53	-1.11	-0.093	15.05	13.49	-1.56	-0.130	14.11	13.71	-0.40	-0.033
11/7/97	12.59	11.44	-1.15	-0.096	12.60	11.59	-1.01	-0.084	DRY	11.61			13.86	11.76	-2.10	-0.175
12/3/97	12.74	11.60	-1.14	-0.095	12.86	11.72	-1.14	-0.095	15.04	11.87	-3.17	-0.264	13.85	11.98	-1.87	-0.156
1/6/98	12.88	11.99	-0.89	-0.074	13.07	12.19	-0.88	-0.073	DRY	12.24			13.85	12.37	-1.48	-0.123
2/5/98	14.58	13.89	-0.69	-0.058	15.09	14.26	-0.83	-0.069	DRY	14.23			15.29	14.49	-0.80	-0.067
3/4/98	15.40	14.33	-1.07	-0.089	15.78	14.88	-0.90	-0.075	15.17	14.95	-0.22	-0.018	15.72	15.16	-0.56	-0.047
5/4/98	13.51	12.82	-0.69	-0.058	13.93	13.27	-0.66	-0.055	DRY	12.82			14.10	13.09	-1.01	-0.084
8/4/98	12.21	10.44	-1.77	-0.148	12.37	10.87	-1.50	-0.125	15.06	10.84	-4.22	-0.352	13.73	11.01	-2.72	-0.227
11/3/98	11.32	7.96	-3.36	-0.280	10.60	8.17	-2.43	-0.203	15.03	8.04	-6.99	-0.583	DRY	8.18		
Maximum				-0.280				-0.203				-0.583				-0.227
Minimum				-0.058				-0.055				-0.018				-0.033
Average				-0.111				-0.097				-0.269				-0.114

Notes:

Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).

[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells

[b] Vertical gradient (feet/feet) is calculated as the water level elevation difference divided by the vertical separation.

[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient

Table 6
Silt to Upper Gray Sand - Bakehouse Area
Vertical Hyraulic Gradient Estimates

Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW44-011 Groundwater Elevation (feet)	Well ID MW44-027 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW45-017 Groundwater Elevation (feet)	Well ID MW45-042 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW46-018 Groundwater Elevation (feet)	Well ID MW46-043 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)
Vertical Separation	16 feet				25 feet				25 feet			
8/6/97	17.89	13.43	-4.46	-0.279	16.48	11.72	-4.76	-0.190	16.28	11.69	-4.59	-0.184
11/7/97	DRY	11.52			15.43	10.89	-4.54	-0.182	14.16	10.85	-3.31	-0.132
12/3/97	17.83	11.86	-5.97	-0.373	16.04	10.98	-5.06	-0.202	15.17	10.99	-4.18	-0.167
1/6/98	DRY	12.28			16.47	11.46	-5.01	-0.200	14.41	11.39	-3.02	-0.121
2/5/98	DRY	14.41			17.18	12.64	-4.54	-0.182	15.80	12.58	-3.22	-0.129
3/4/98	DRY	15.13			17.66	12.86	-4.80	-0.192	16.00	12.77	-3.23	-0.129
5/4/98	DRY	12.75			16.36	12.28	-4.08	-0.163	14.63	12.27	-2.36	-0.094
8/4/98	17.86	10.84	-7.02	-0.439	15.30	8.96	-6.34	-0.254	14.13	8.92	-5.21	-0.208
11/3/98	17.85	8.00	-9.85	-0.616	13.05	7.53	-5.52	-0.221	12.12	7.49	-4.63	-0.185
Maximum				-0.616				-0.254				-0.208
Minimum				-0.279				-0.163				-0.094
Average				-0.427				-0.198				-0.150

Notes:

Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).

[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells

[b] Vertical gradient (feet/feet) is calculated as the water level elevation difference divided by the vertical separation.

[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient

Table 7

Silt/Upper Gray Sand to Intermediate-Depth Sand Vertical Hydraulic Gradient Estimates

Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW03-017 Groundwater Elevation (feet)	Well ID MW03-098 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW06-024 Groundwater Elevation (feet)	Well ID MW06-094 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW08-027 Groundwater Elevation (feet)	Well ID MW08-127 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW10-023 Groundwater Elevation (feet)	Well ID MW10-090 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW12-021 Groundwater Elevation (feet)	Well ID MW12-092 Groundwater Elevation (feet)	Elev Diffe (fe
Vertical Separation	80 feet				70 feet				100 feet				69.5 feet				66.5 feet		
10/2/96	22.65	9.39	-13.26	-0.166	8.69	8.15	-0.54	-0.008	6.97	8.02	1.05	0.011	15.31	8.75	-6.56	-0.094	12.00	8.64	
11/4/96	24.54	10.02	-14.52	-0.182	8.61	7.87	-0.74	-0.011	5.57	7.65	2.08	0.021	15.18	9.26	-5.92	-0.085	12.87	8.65	
12/2/96	27.39	13.70	-13.69	-0.171	13.94	12.63	-1.31	-0.019	11.59	12.15	0.56	0.006	23.86	13.10	-10.76	-0.155	15.37	13.00	
1/6/97	27.67	21.79	-5.88	-0.074	22.48	21.68	-0.80	-0.011	21.57	21.83	0.26	0.003	26.56	21.70	-4.86	-0.070	17.96	21.49	
2/5/97	27.41	18.61	-8.80	-0.110	19.45	18.31	-1.14	-0.016	18.27	18.35	0.08	0.001	25.99	18.61	-7.38	-0.106	16.57	18.28	
2/28/97	26.92	15.52	-11.40	-0.143	16.78	15.12	-1.66	-0.024	14.30	14.87	0.57	0.006	24.11	15.19	-8.92	-0.128	15.29	15.17	
3/11/97	27.71	16.20	-11.51	-0.144	17.40	15.60	-1.80	-0.026	14.82	15.35	0.53	0.005	25.53	15.93	-9.60	-0.138	16.08	15.78	
8/6/97	23.72	11.76	-11.96	-0.150	13.63	11.25	-2.38	-0.034	10.53	11.17	0.64	0.006	20.33	11.54	-8.79	-0.126	13.22	11.37	
11/7/97	24.65	11.16	-13.49	-0.169	11.49	10.16	-1.33	-0.019	9.18	9.90	0.72	0.007	15.72	10.59	-5.13	-0.074	13.25	10.52	
12/3/97	25.03	11.20	-13.83	-0.173	11.62	10.12	-1.50	-0.021	9.04	9.86	0.82	0.008	16.26	10.57	-5.69	-0.082	13.56	10.53	
1/6/98	26.51	11.63	-14.88	-0.186	12.61	10.95	-1.66	-0.024	10.23	10.61	0.38	0.004	21.03	11.28	-9.75	-0.140	14.41	11.17	
2/5/98	26.98	12.86	-14.12	-0.177	13.54	12.08	-1.46	-0.021	11.06	11.82	0.76	0.008	23.46	12.38	-11.08	-0.159	14.56	12.27	
3/4/98	27.66	13.09	-14.57	-0.182	11.20	14.94	3.74	0.053	11.22	11.90	0.68	0.007	24.70	12.72	-11.98	-0.172	15.39	12.40	
5/4/98	25.50	12.38	-13.12	-0.164	13.10	12.20	-0.90	-0.013	12.53	12.01	-0.52	-0.005	20.86	12.38	-8.48	-0.122	13.90	12.32	
8/4/98	23.67	9.20	-14.47	-0.181	9.68	8.52	-1.16	-0.017	7.30	8.19	0.89	0.009	18.45	8.75	-9.70	-0.140	12.44	8.62	
11/3/98	22.36	7.94	-14.42	-0.180	7.37	5.86	-1.51	-0.022	6.12	6.43	0.31	0.003	13.11	7.47	-5.64	-0.081	11.04	7.22	
Maximum				-0.186				-0.034				-0.005				-0.172			
Minimum				-0.074				0.053				0.021				-0.070			
Average				-0.159				-0.014				0.006				-0.117			

Notes:

Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).

[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells.

[b] Vertical gradient (foot/foot) is calculated as the water level elevation difference divided by the vertical separation.

[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient.

Table 7

Silt/Upper Gray Sand to Intermediate-Depth Sand Vertical Hydraulic Gradient Estimates

Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW15-024	Well ID MW15-086	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW21-025	Well ID MW21-063	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW27-045	Well ID MW27-081	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW29-033	Well ID MW29-090	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW30-030	Well ID MW30-100	El Dif
	Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)		
Vertical Separation	62 feet				36.5 feet				34 feet				57 feet				70 feet		
10/2/96	12.43	8.46	-3.97	-0.064															
11/4/96	14.09	8.33	-5.76	-0.093	7.84	7.86	0.02	0.001	7.59	7.32	-0.27	-0.008	10.27	8.52	-1.75	-0.031			
12/2/96	15.55	12.85	-2.70	-0.044	11.70	11.86	0.16	0.004	12.01	12.21	0.20	0.006	13.80	12.78	-1.02	-0.018			
1/6/97	16.28	21.44	5.16	0.083	20.66	22.51	1.85	0.051	22.08	21.76	-0.32	-0.009	22.08	21.82	-0.26	-0.005	22.17	21.56	
2/5/97	15.94	18.28	2.34	0.038	18.57	18.49	-0.08	-0.002	18.36	18.34	-0.02	-0.001	18.90	18.39	-0.51	-0.009	18.44	18.23	
2/28/97	15.63	15.11	-0.52	-0.008	14.90	14.90	0.00	0	15.09	14.95	-0.14	-0.004	15.89	15.19	-0.70	-0.012	15.25	14.68	
3/11/97	16.06	15.76	-0.30	-0.005	14.87	15.05	0.18	0.005	15.05	15.32	0.27	0.008	16.52	15.69	-0.83	-0.015	15.44	15.30	
8/6/97	14.65	11.32	-3.33	-0.054	11.32	11.34	0.02	0.001	11.13	11.18	0.05	0.001	12.28	11.49	-0.79	-0.014	11.38	10.93	
11/7/97	14.55	10.36	-4.19	-0.068	9.56	9.71	0.15	0.004	9.61	9.82	0.21	0.006	11.01	10.37	-0.64	-0.011	9.47	9.56	
12/3/97	14.24	10.35	-3.89	-0.063	9.66	9.76	0.10	0.003	9.75	9.80	0.05	0.001	11.12	10.41	-0.71	-0.012	9.45	9.39	
1/6/98	14.86	11.07	-3.79	-0.061	10.07	10.35	0.28	0.008	10.17	10.62	0.45	0.013	11.82	11.05	-0.77	-0.014	10.33	10.56	
2/5/98	15.20	12.16	-3.04	-0.049	17.30	12.07	-5.23	-0.143	12.11	11.90	-0.21	-0.006	13.20	12.10	-1.10	-0.019	11.91	11.47	
3/4/98	15.62	12.27	-3.35	-0.054	12.29	12.25	-0.04	-0.001	12.28	12.07	-0.21	-0.006	13.52	12.46	-1.06	-0.019	12.14	11.68	
5/4/98	14.93	12.17	-2.76	-0.045	11.40	11.71	0.31	0.008	11.64	12.16	0.52	0.015	12.81	12.15	-0.66	-0.012	11.73	12.34	
8/4/98	13.55	8.51	-5.04	-0.081	9.00	8.83	-0.17	-0.005	8.84	8.43	-0.41	-0.012	9.70	8.79	-0.91	-0.016	8.34	7.80	
11/3/98	11.49	7.02	-4.47	-0.072	6.56	6.66	0.10	0.003	6.31	6.61	0.30	0.009	7.67	7.04	-0.63	-0.011	6.26	6.33	
Maximum				-0.093				-0.143				-0.012				-0.031			
Minimum				0.083				0.051				0.015				-0.005			
Average				-0.040				-0.004				0.001				-0.014			

Notes:

Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).

[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells.

[b] Vertical gradient (foot/foot) is calculated as the water level elevation difference divided by the vertical separation.

[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient.

Table 7
Silt/Upper Gray Sand to Intermediate-Depth Sand Vertical Hydraulic Gradient Estimates
Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW31-034	Well ID MW31-095	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW32-040	Well ID MW32-095	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW33-033	Well ID MW33-095	Elevation Difference (feet)	Vertical Gradient (foot/foot)
	Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)			
Vertical Separation	61 feet				55 feet				62 feet			
10/2/96												
11/4/96												
12/2/96												
1/6/97	21.61	21.53	-0.08	-0.001	21.45	21.58	0.13	0.002	20.69	21.65	0.96	0.015
2/5/97	18.30	18.20	-0.10	-0.002	18.77	18.49	-0.28	-0.005	18.72	18.61	-0.11	-0.002
2/28/97	15.07	14.92	-0.15	-0.002	15.65	15.32	-0.33	-0.006	15.43	15.31	-0.12	-0.002
3/11/97	15.61	15.50	-0.11	-0.002	16.06	15.93	-0.13	-0.002	16.11	15.98	-0.13	-0.002
8/6/97	11.18	11.09	-0.09	-0.001	12.75	11.62	-1.13	-0.021	11.76	11.61	-0.15	-0.002
11/7/97	9.92	9.90	-0.02	-0.0003	11.22	10.67	-0.55	-0.010	10.80	10.73	-0.07	-0.001
12/3/97	9.81	9.80	-0.01	-0.0002	11.32	10.66	-0.66	-0.012	10.79	10.71	-0.08	-0.001
1/6/98	10.90	10.87	-0.03	-0.0005	11.88	11.26	-0.62	-0.011	11.45	11.32	-0.13	-0.002
2/5/98	11.96	11.82	-0.14	-0.002	13.40	12.48	-0.92	-0.017	12.69	12.53	-0.16	-0.003
3/4/98	12.13	11.99	-0.14	-0.002	13.80	12.67	-1.13	-0.021	13.02	12.81	-0.21	-0.003
5/4/98	12.36	12.30	-0.06	-0.001	12.81	12.16	-0.65	-0.012	12.35	12.22	-0.13	-0.002
8/4/98	8.32	8.19	-0.13	-0.002	9.84	8.76	-1.08	-0.020	8.94	8.74	-0.20	-0.003
11/3/98	6.70	6.67	-0.03	0.000	7.78	7.19	-0.59	-0.011	7.50	7.36	-0.14	-0.002
Maximum				-0.002				-0.021				-0.003
Minimum				-0.0002				0.002				0.015
Average				-0.001				-0.011				-0.001

Notes:
Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).
[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells.
[b] Vertical gradient (foot/foot) is calculated as the water level elevation difference divided by the vertical separation.
[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient.

Table 8

Intermediate-Depth Sand to Deep Sand/Gravel Vertical Hydraulic Gradient Estimates

Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW03-098	Well ID MW03-175	Elev. Diff. (feet)	Vertical Gradient (foot/foot)	Well ID MW06-094	Well ID MW06-176	Elev. Diff. (feet)	Vertical Gradient (foot/foot)	Well ID MW08-127	Well ID MW08-169	Elev. Diff. (feet)	Vertical Gradient (foot/foot)	Well ID MW10-090	Well ID MW10-165	Elev. Diff. (feet)	Vertical Gradient (foot/foot)	Well ID MW12-092	Well ID MW12-184	Elev. Diff. (feet)	Vertical Gradient (foot/foot)	Well ID MW15-086	Well ID MW15-175	Elevation Difference (feet)
	Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)				Groundwater Elevation (feet)		
Vertical Separation	77 feet				82 feet				42 feet				75 feet				94 feet				89 feet		
10/2/96	9.39	9.40	0.01	0.0001	8.15	8.18	0.03	0.0004	8.02	7.44	-0.58	-0.0138	8.75	8.34	-0.41	-0.0055	8.64	8.70	0.06	0.0006	8.46	Pumping	
11/4/96	10.02	10.04	0.02	0.0003	7.87	7.90	0.03	0.0004	7.65	6.70	-0.95	-0.0226	9.26	8.33	-0.93	-0.0124	8.65	8.66	0.01	0.0001	8.33	8.34	0.01
12/2/96	13.70	13.70	0.00	0	12.63	12.63	0.00	0	12.15	11.56	-0.59	-0.0140	13.10	12.36	-0.74	-0.0099	13.00	13.00	0.00	0	12.85	12.86	0.01
1/6/97	21.79	21.80	0.01	0.0001	21.68	21.69	0.01	0.0001	21.83	21.40	-0.43	-0.0102	21.70	21.64	-0.06	-0.0008	21.49	21.48	-0.01	-0.0001	21.44	21.44	0.00
2/5/97	18.61	18.61	0.00	0	18.31	18.31	0.00	0	18.35	18.06	-0.29	-0.0069	18.61	18.55	-0.06	-0.0008	18.28	18.32	0.04	0.0004	18.28	18.27	-0.01
2/28/97	15.52	15.53	0.01	0.0001	15.12	15.10	-0.02	-0.0002	14.87	14.21	-0.66	-0.0157	15.19	15.00	-0.19	-0.0025	15.17	15.20	0.03	0.0003	15.11	15.12	0.01
3/11/97	16.20	16.20	0.00	0	15.60	15.62	0.02	0.0002	15.35	14.82	-0.53	-0.0126	15.93	15.69	-0.24	-0.0032	15.78	15.79	0.01	0.0001	15.76	15.73	-0.03
8/6/97	11.76	11.78	0.02	0.0003	11.25	11.29	0.04	0.0005	11.17	10.59	-0.58	-0.0138	11.54	11.41	-0.13	-0.0017	11.37	11.36	-0.01	-0.0001	11.32	11.32	0.00
11/7/97	11.16	11.17	0.01	0.0001	10.16	10.18	0.02	0.0002	9.90	9.41	-0.49	-0.0117	10.59	10.17	-0.42	-0.0056	10.52	10.51	-0.01	-0.0001	10.36	10.36	0.00
12/3/97	11.20	11.23	0.03	0.0004	10.12	10.12	0.00	0	9.86	9.39	-0.47	-0.0112	10.57	10.02	-0.55	-0.0073	10.53	10.54	0.01	0.0001	10.35	10.35	0.00
1/6/98	11.63	11.62	-0.01	-0.0001	10.95	10.95	0.00	0	10.61	10.19	-0.42	-0.0100	11.28	10.77	-0.51	-0.0068	11.17	11.19	0.02	0.0002	11.07	11.08	0.01
2/5/98	12.86	12.88	0.02	0.0003	12.08	12.10	0.02	0.0002	11.82	10.91	-0.91	-0.0217	12.38	11.82	-0.56	-0.0075	12.27	12.27	0.00	0	12.16	12.16	0.00
3/4/98	13.09	13.11	0.02	0.0003	14.94	12.30	-2.64	-0.0322	11.90	10.71	-1.19	-0.0283	12.72	11.85	-0.87	-0.0116	12.40	12.40	0.00	0	12.27	12.27	0.00
5/4/98	12.38	12.38	0.00	0	12.20	12.27	0.07	0.0009	12.01	12.12	0.11	0.0026	12.38	11.35	-1.03	-0.0137	12.32	12.24	-0.08	-0.0009	12.17	12.17	0.00
8/4/98	9.20	9.22	0.02	0.0003	8.52	8.56	0.04	0.0005	8.19	7.15	-1.04	-0.0248	8.75	7.36	-1.39	-0.0185	8.62	8.62	0.00	0	8.51	8.52	0.01
11/3/98	7.94	7.97	0.03	0.0004	5.86	6.91	1.05	0.0128	6.43	5.81	-0.62	-0.0148	7.47	5.83	-1.64	-0.0219	7.22	7.24	0.02	0.0002	7.02	7.07	0.05
Maximum				-0.0001				-0.0322				-0.0283				-0.0219				-0.0009			
Minimum				0.0004				0.0128				0.0026				-0.0008				0.0006			
Average				0.0002				-0.0010				-0.0143				-0.0081				0.0001			

Notes:

Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).

[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells.

[b] Vertical gradient (foot/foot) is calculated as the water level elevation difference divided by the vertical separation.

[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient.

Table 8

Intermediate-Depth Sand to Deep Sand/Gravel Vertical Hydraulic Gradient Estimates

Reynolds Metals Company - Troutdale, Oregon

Date	Well ID MW21-063 Groundwater Elevation (feet)	Well ID MW21-176 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW27-081 Groundwater Elevation (feet)	Well ID MW27-176 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW29-090 Groundwater Elevation (feet)	Well ID MW29-179 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW32-095 Groundwater Elevation (feet)	Well ID MW32-165 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)	Well ID MW33-095 Groundwater Elevation (feet)	Well ID MW33-165 Groundwater Elevation (feet)	Elevation Difference (feet)	Vertical Gradient (foot/foot)
Vertical Separation	113 feet				95 feet				88 feet				70 feet				70 feet			
10/2/96					7.82	8.06	0.24	0.0025	8.49	8.53	0.04	0.0005								
11/4/96	7.86	6.54	-1.32	-0.0117	7.32	7.83	0.51	0.0054	8.52	Pumping										
12/2/96	11.86	11.43	-0.43	-0.0038	12.21	12.27	0.06	0.0006	12.78	12.76	-0.02	-0.0002								
1/6/97	22.51	21.18	-1.33	-0.0118	21.76	21.89	0.13	0.0014	21.82	21.76	-0.06	-0.0007	21.58	21.58	0.00	0	21.65	19.66	-1.99	-0.02
2/5/97	18.49	18.02	-0.47	-0.0042	18.34	18.43	0.09	0.0009	18.39	18.35	-0.04	-0.0005	18.49	18.41	-0.08	-0.0011	18.61	18.37	-0.24	-0.00
2/28/97	14.90	14.11	-0.79	-0.0070	14.95	14.95	0.00	0	15.19	15.11	-0.08	-0.0009	15.32	15.32	0.00	0	15.31	14.84	-0.47	-0.00
3/11/97	15.05	15.11	0.06	0.0005	15.32	15.43	0.11	0.0012	15.69	15.70	0.01	0.0001	15.93	15.98	0.05	0.0007	15.98	15.78	-0.20	-0.00
8/6/97	11.34	10.58	-0.76	-0.0067	11.18	11.29	0.11	0.0012	11.49	11.40	-0.09	-0.0010	11.62	11.64	0.02	0.0003	11.61	10.93	-0.68	-0.00
11/7/97	9.71	9.40	-0.31	-0.0027	9.82	9.98	0.16	0.0017	10.37	10.38	0.01	0.0001	10.67	10.67	0.00	0	10.73	9.99	-0.74	-0.01
12/3/97	9.76	9.43	-0.33	-0.0029	9.80	9.97	0.17	0.0018	10.41	10.45	0.04	0.0005	10.66	10.73	0.07	0.0010	10.71	9.86	-0.85	-0.01
1/6/98	10.35	10.14	-0.21	-0.0019	10.62	10.67	0.05	0.0005	11.05	11.00	-0.05	-0.0006	11.26	11.25	-0.01	-0.0001	11.32	10.38	-0.94	-0.01
2/5/98	12.07	10.77	-1.30	-0.0115	11.90	11.92	0.02	0.0002	12.10	12.21	0.11	0.0013	12.48	12.48	0.00	0	12.53	11.30	-1.23	-0.01
3/4/98	12.25	10.53	-1.72	-0.0152	12.07	11.98	-0.09	-0.0009	12.46	12.27	-0.19	-0.0022	12.67	12.68	0.01	0.0001	12.81	11.14	-1.67	-0.02
5/4/98	11.71	12.03	0.32	0.0028	12.16	12.00	-0.16	-0.0017	12.15	12.01	-0.14	-0.0016	12.16	12.15	-0.01	-0.0001	12.22	9.91	-2.31	-0.03
8/4/98	8.83	6.95	-1.88	-0.0166	8.43	8.28	-0.15	-0.0016	8.79	8.61	-0.18	-0.0020	8.76	8.75	-0.01	-0.0001	8.74	4.79	-3.95	-0.05
11/3/98	6.66	5.65	-1.01	-0.0089	6.61	6.48	-0.13	-0.0014	7.04	6.87	-0.17	-0.0019	7.19	7.20	0.01	0.0001	7.36	3.03	-4.33	-0.06
Maximum				-0.0166				-0.0017				-0.0022				-0.0011				-0.06
Minimum				0.0028				0.0054				0.0013				0.0010				-0.00
Average				-0.0068				0.0007				-0.0006				0.0001				-0.02

Notes:

Elevations are referenced to 1929 National Geodetic Vertical Datum (NGVD).

[a] Vertical separation is the vertical distance (feet) between the midpoints of the screened intervals of the monitoring wells.

[b] Vertical gradient (foot/foot) is calculated as the water level elevation difference divided by the vertical separation.

[c] Positive values of vertical gradient indicate an upward gradient; negative values indicate a downward gradient.

Table 9
Well Decommissioning Summary
Reynolds Metals Company - Troutdale, Oregon

Well ID	Date Decommissioned	Rationale for Decommissioning the Well
MW17-016	Jun-98	Adjacent well MW17-028 (located within 5 to 10 feet) is screened in the same unit and provides the same water quality and groundwater elevation data as MW17-016. Information provided by MW17-016 is redundant.
MW21-012	Jun-98	Well constructed in waste material. MW21-012 has been replaced by MW21-025, which is screened in the upper gray sand.
MW36-006	Sep-98	Well screened in process residue. MW36-006 installed to replace temporary well point WP02 to monitor for PCBs. No PCBs were detected in 1 year of sampling (four consecutive quarters).
FFT-01	Jun-98	Temporary 3/4-inch-diameter polyvinyl chloride (PVC) piezometer installed to monitor changes in groundwater elevation during long-term aquifer test. Aquifer test was completed in September 1997. Piezometer is no longer needed.
South Ditch Piezometers SDGP01 through SDGP16	Jun-98	Temporary 3/4-inch-diameter PVC piezometers were installed to provide wet and dry season water level elevation data for the South Ditch from June through September 1997. Data collection has been completed.

Note:
Refer to Appendix D for decommissioning logs.

Figures

10-OCT-1997

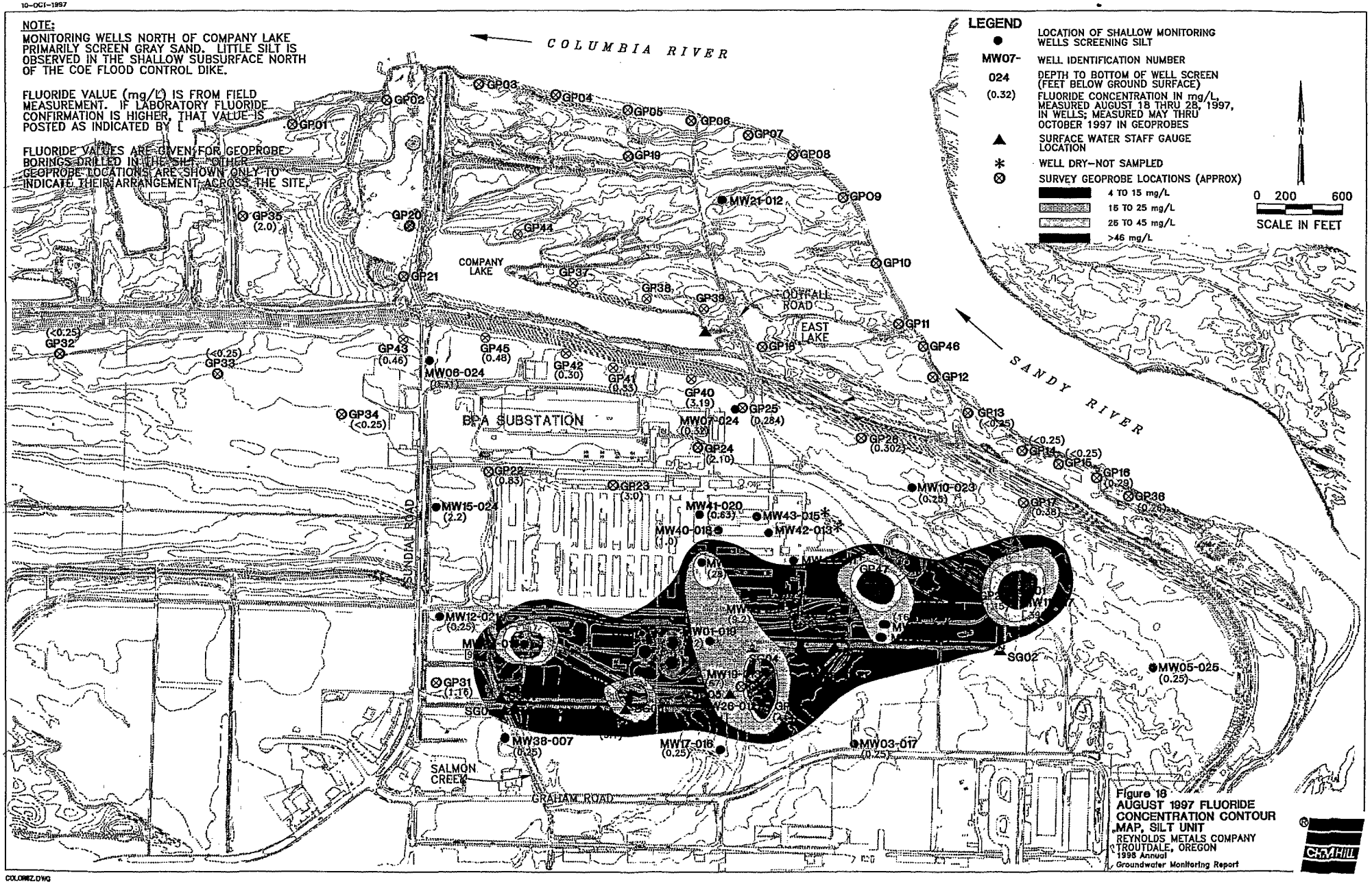

Figure 18
AUGUST 1997 FLUORIDE CONCENTRATION CONTOUR MAP, SILT UNIT
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

COLORBZ.DWG

01-DEC-1998

NOTE:
MONITORING WELLS NORTH OF COMPANY LAKE PRIMARILY SCREEN GRAY SAND. LITTLE SILT IS OBSERVED IN THE SHALLOW SUBSURFACE NORTH OF THE COE FLOOD CONTROL DIKE.

FLUORIDE VALUE (mg/L) IS FROM FIELD MEASUREMENT. IF LABORATORY FLUORIDE CONFIRMATION IS HIGHER, THAT VALUE IS POSTED AS INDICATED BY [ ]

FLUORIDE VALUES ARE GIVEN FOR GEOPROBE BORINGS DRILLED IN THE SILT. OTHER GEOPROBE LOCATIONS ARE SHOWN ONLY TO INDICATE THEIR ARRANGEMENT ACROSS THE SITE.

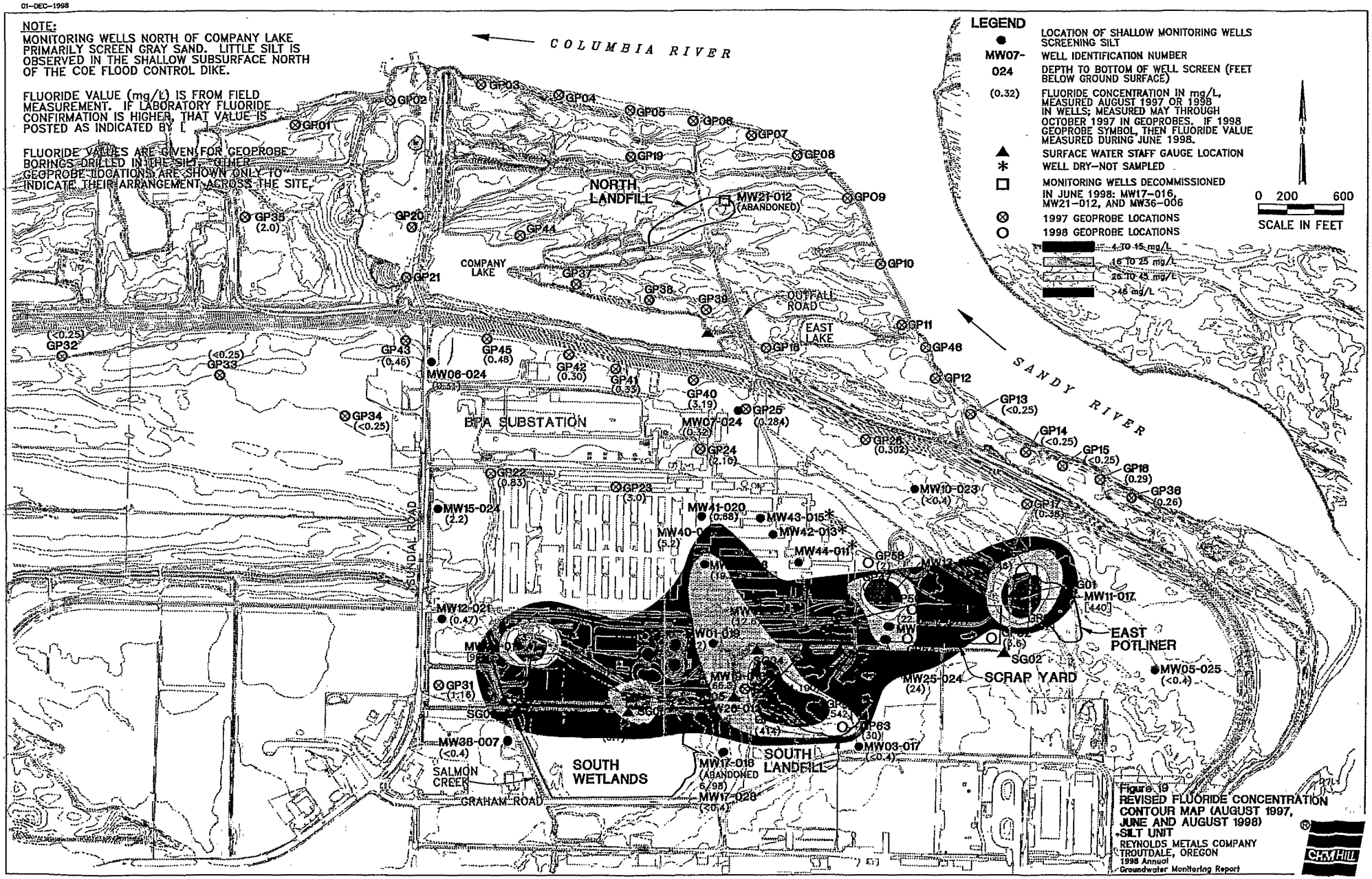

Figure 19
REVISED FLUORIDE CONCENTRATION CONTOUR MAP (AUGUST 1997, JUNE AND AUGUST 1998)
*SILT UNIT
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

COLOR6.DWG

01-JAN-1999

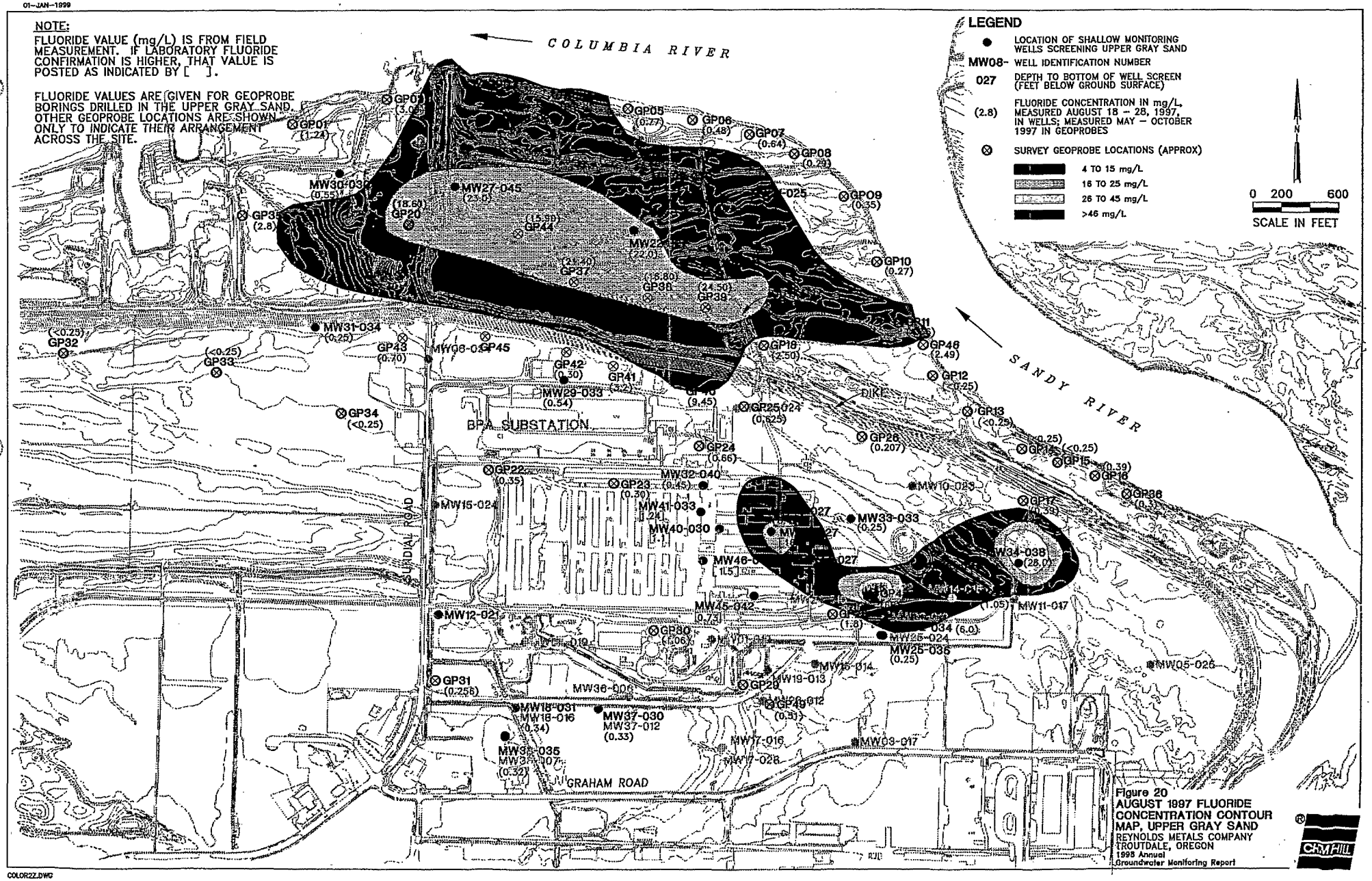

Figure 20
AUGUST 1997 FLUORIDE CONCENTRATION CONTOUR MAP, UPPER GRAY SAND
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

COLOR2Z.DWG

01-DEC-1998

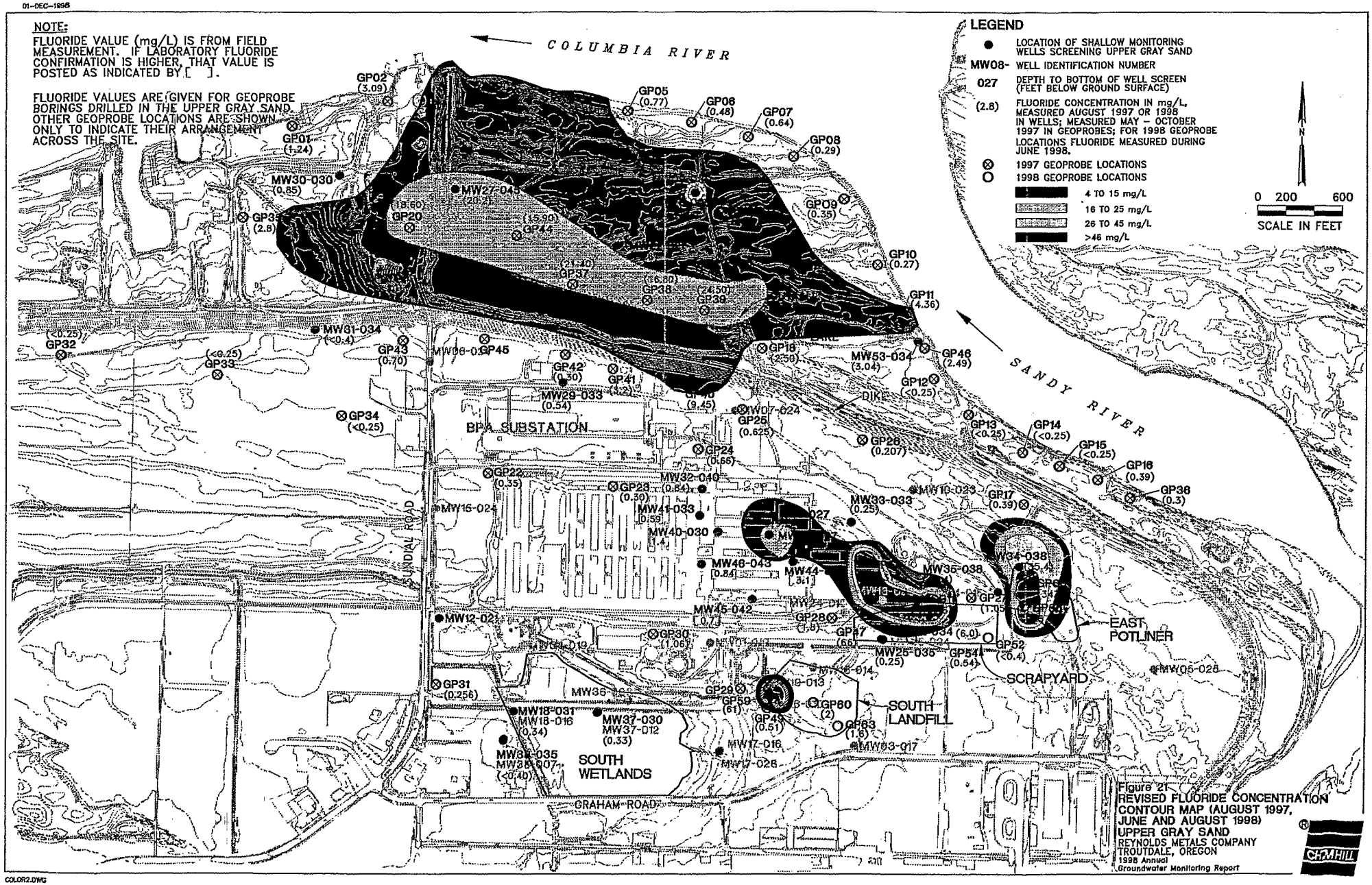

Figure 21
REVISED FLUORIDE CONCENTRATION CONTOUR MAP (AUGUST 1997, JUNE AND AUGUST 1998)
UPPER GRAY SAND
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

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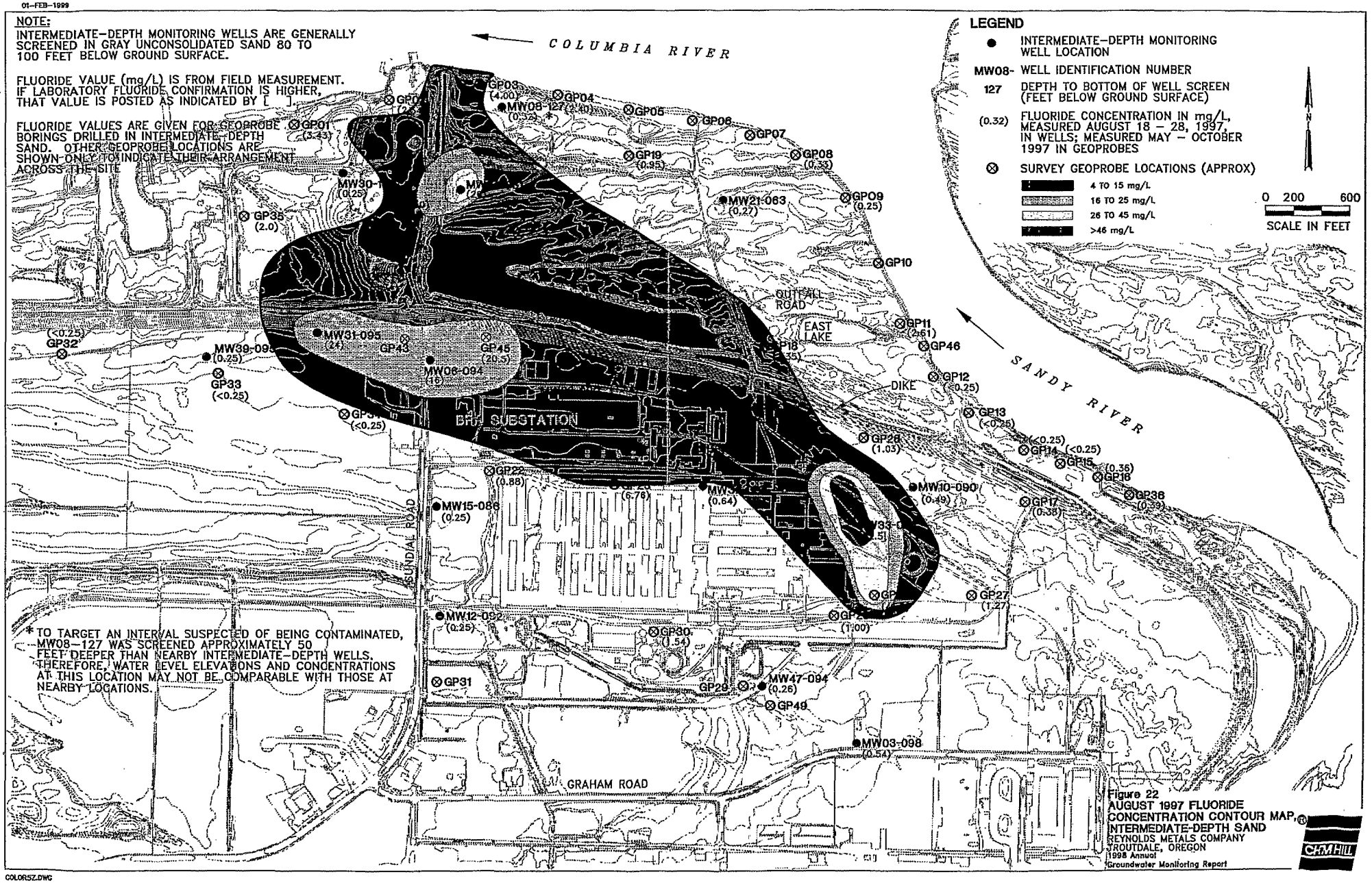


Figure 22
AUGUST 1997 FLUORIDE CONCENTRATION CONTOUR MAP, INTERMEDIATE-DEPTH SAND
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

COLOR5Z.DWG

SRB COLORD.DWG
02-SEPT-1997

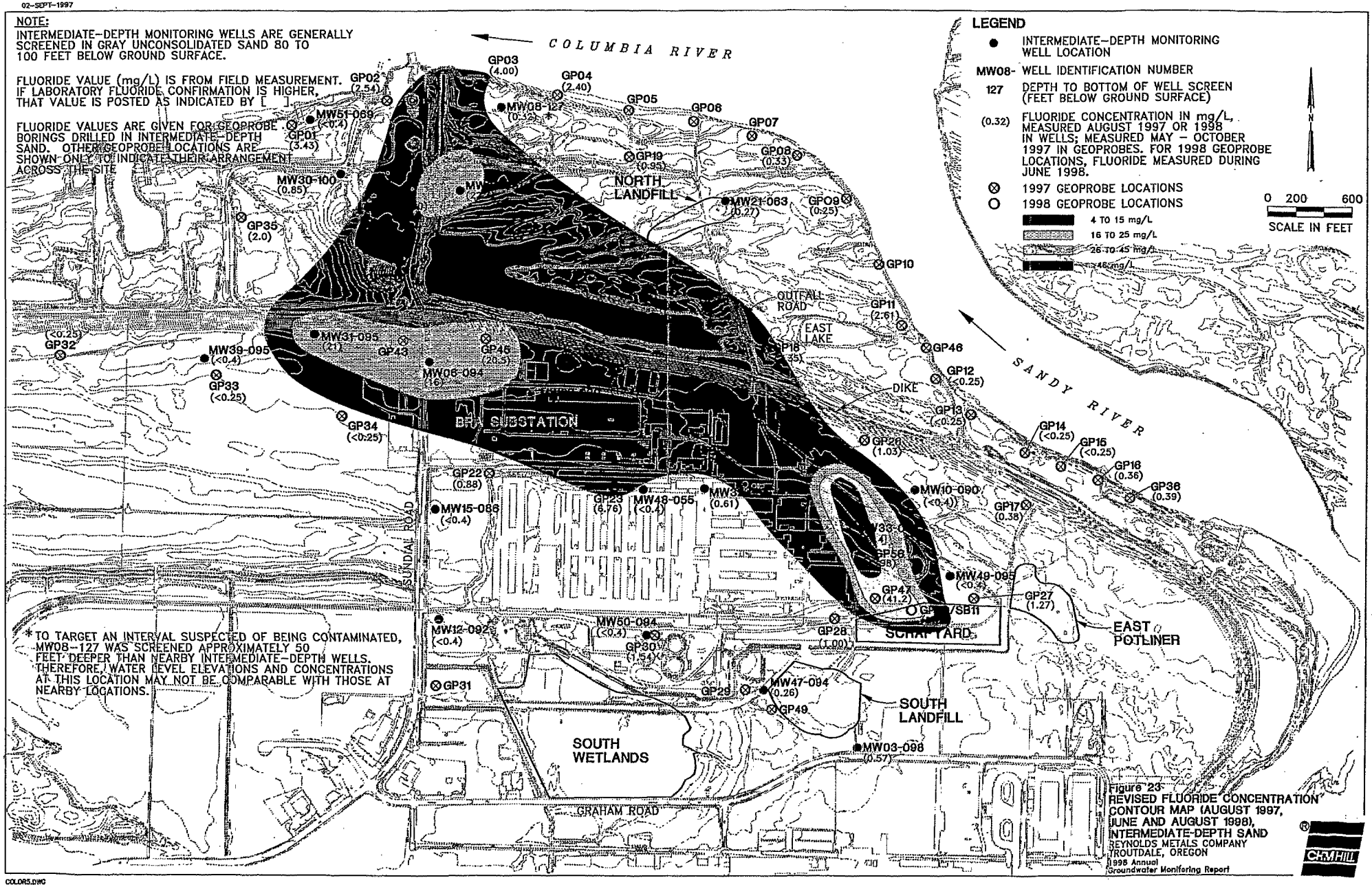


Figure 23
REVISED FLUORIDE CONCENTRATION CONTOUR MAP (AUGUST 1997, JUNE AND AUGUST 1998), INTERMEDIATE-DEPTH SAND
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

COLOR5.DWG

1-JAN-1999

NOTE:
DEEP MONITORING WELLS ARE SCREENED 150 TO 180 FEET BELOW GROUND SURFACE. SCREENED MATERIALS ARE PRIMARILY GRAY SAND TO THE SOUTH, SAND AND GRAVEL TO THE NORTH.

FLUORIDE VALUE (mg/L) IS FROM FIELD MEASUREMENT. IF LABORATORY FLUORIDE CONFIRMATION IS HIGHER, THAT VALUE IS POSTED AS INDICATED BY

FLUORIDE VALUES ARE GIVEN FOR GEOPROBE BORINGS DRILLED IN THE DEEP SAND. OTHER GEOPROBE LOCATIONS ARE SHOWN ONLY TO INDICATE THEIR ARRANGEMENT ACROSS THE SITE.

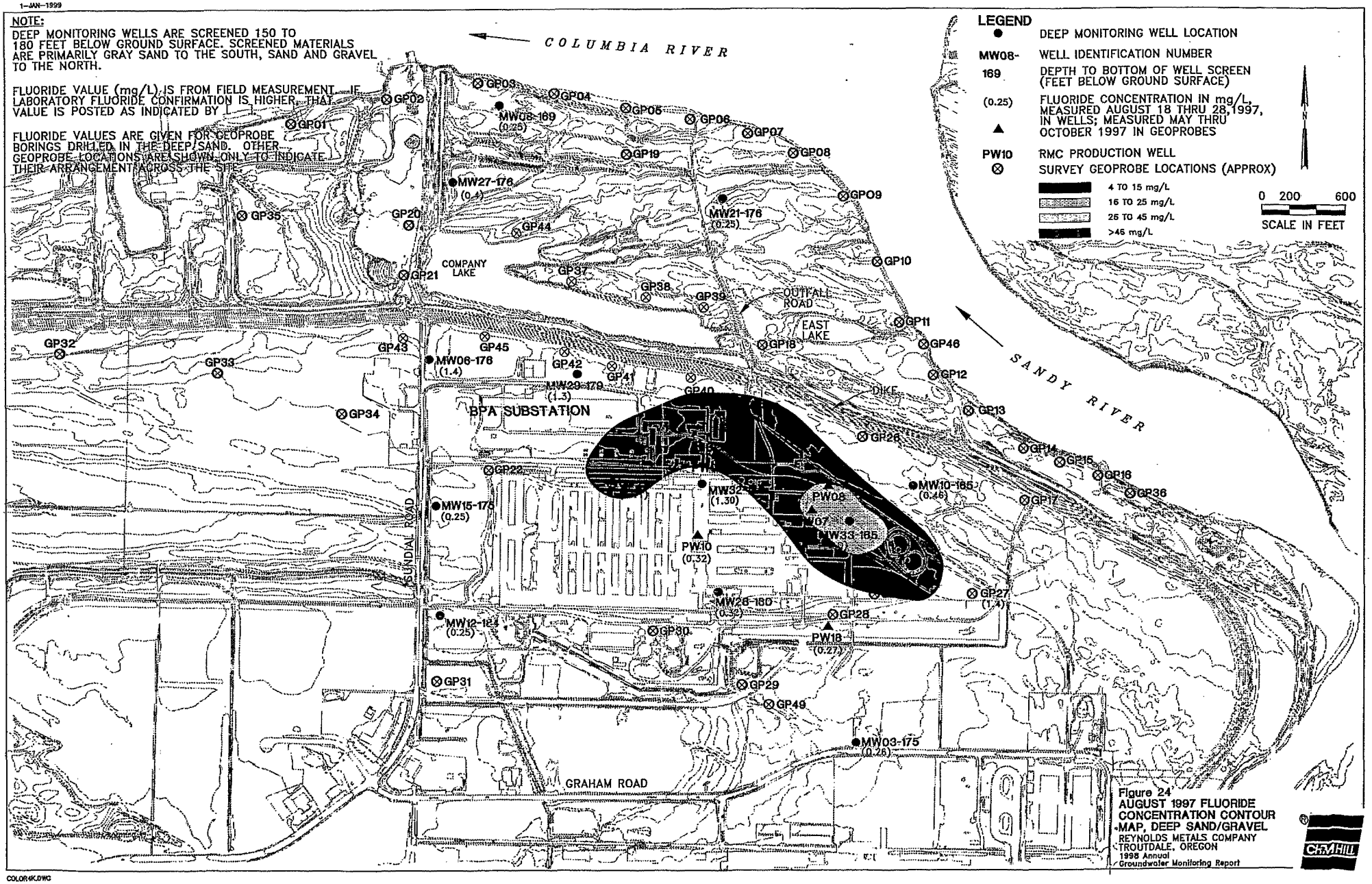


Figure 24
AUGUST 1997 FLUORIDE CONCENTRATION CONTOUR MAP, DEEP SAND/GRAVEL
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2MHILL

COLOR4K.DWG

SRB COLOR4.DWG

01-FEB-1999

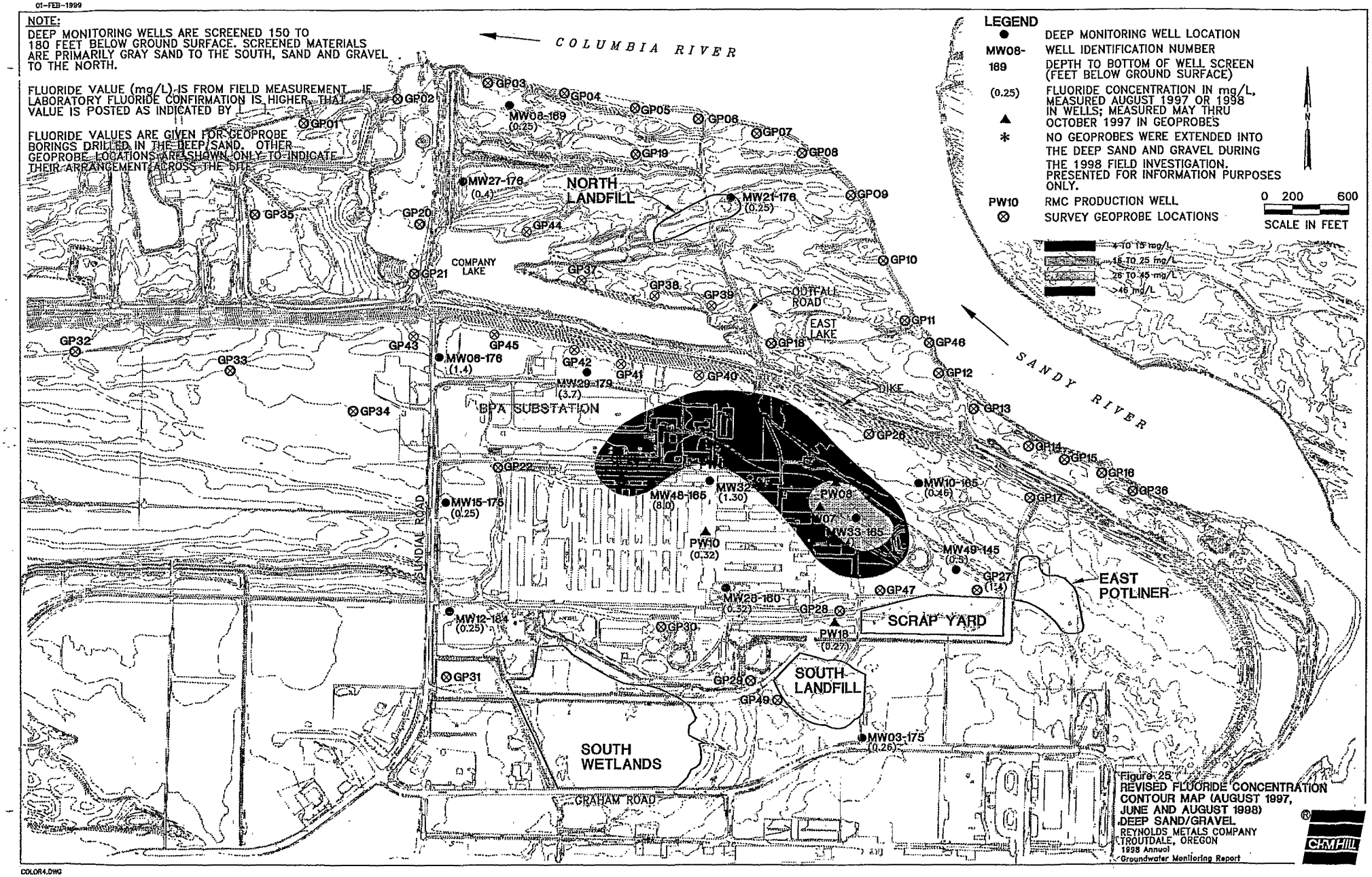
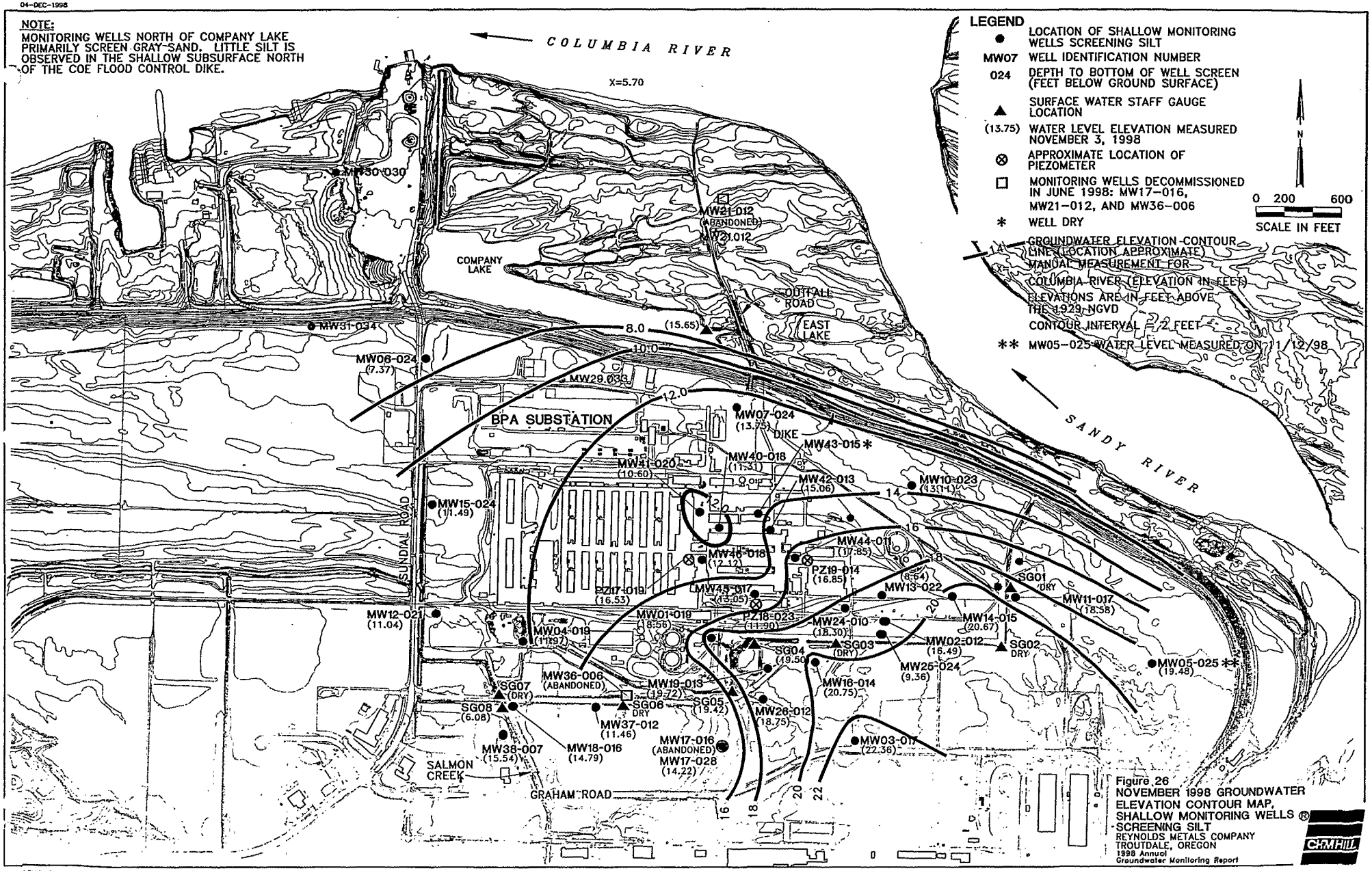


Figure 25
REVISED FLUORIDE CONCENTRATION CONTOUR MAP (AUGUST 1997, JUNE AND AUGUST 1998) DEEP SAND/GRAVEL
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

COLOR4.DWG

SKB 9293WL5M.DWG
04-DEC-1998



9293WL5M.DWG

SRB 9293WL6M.DWG
04-DEC-1998

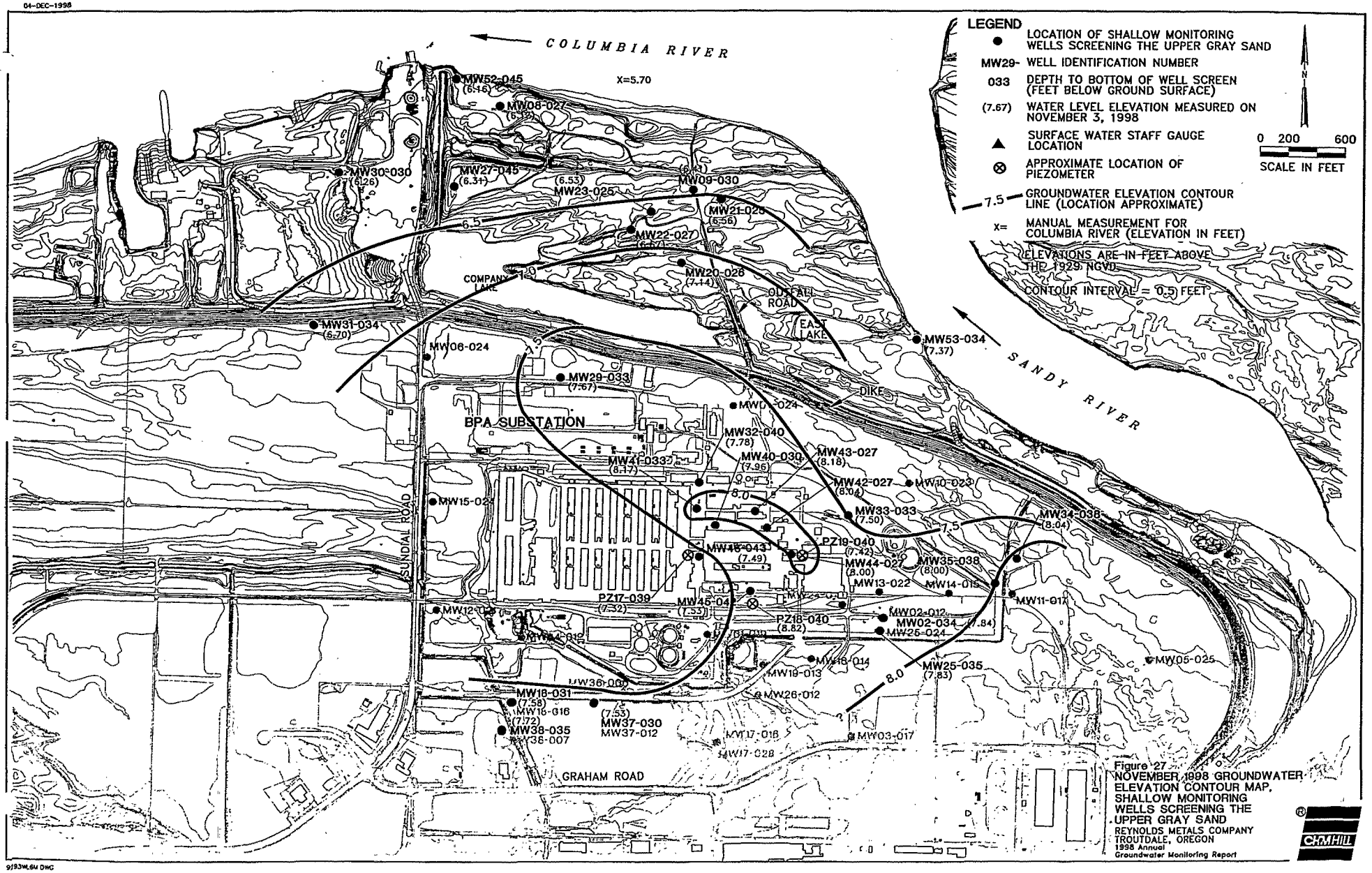


Figure 27
NOVEMBER 1998 GROUNDWATER ELEVATION CONTOUR MAP, SHALLOW MONITORING WELLS SCREENING THE UPPER GRAY SAND
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

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SRB 9293WL7M.DWG
04-DEC-1998

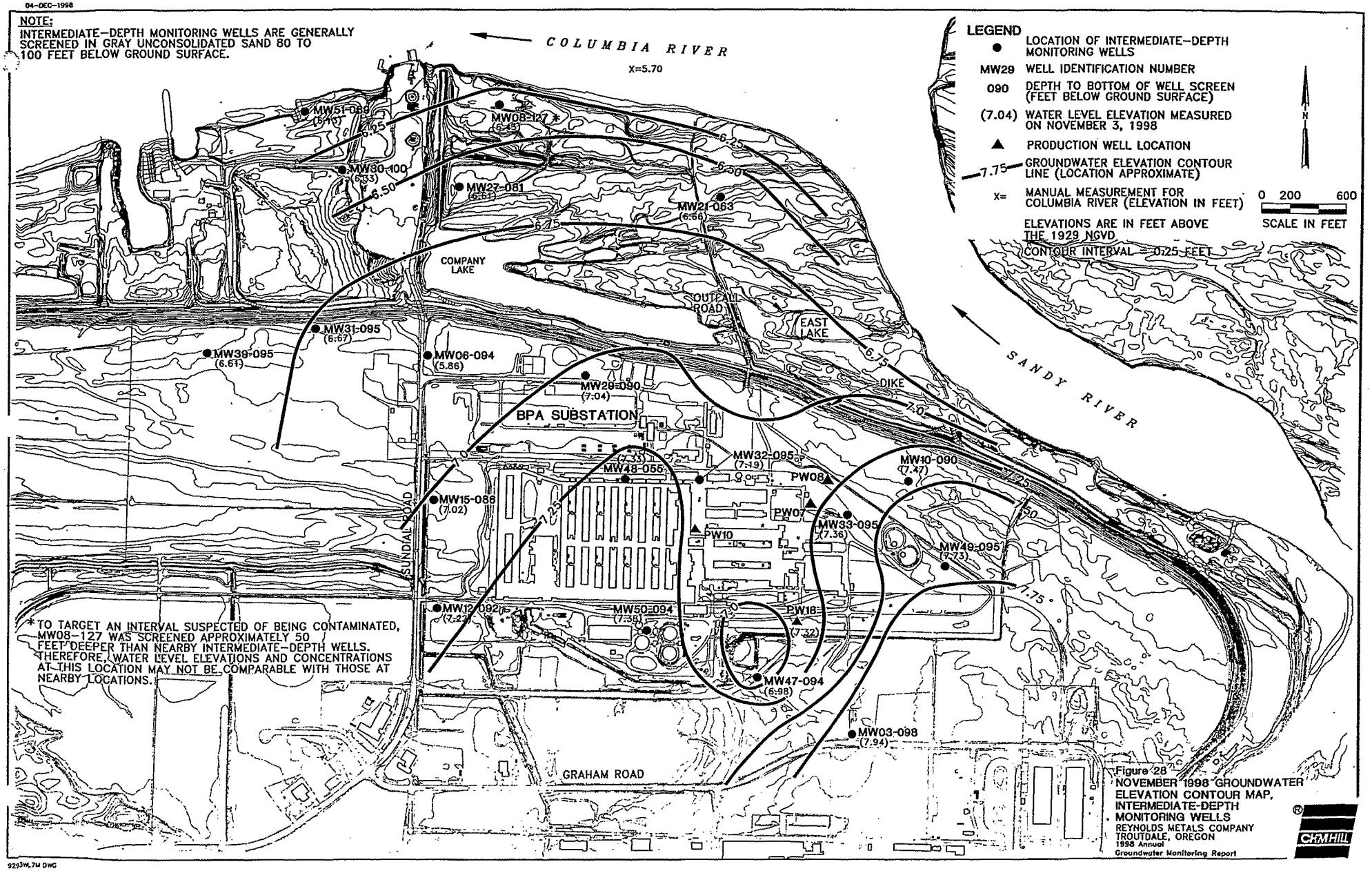

Figure 28
NOVEMBER 1998 GROUNDWATER ELEVATION CONTOUR MAP, INTERMEDIATE-DEPTH MONITORING WELLS
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

9293WL7M.DWG

9293MLBM.DWG
09-DEC-1998

NOTE:
DEEP MONITORING WELLS ARE SCREENED 150 TO 180 FEET BELOW GROUND SURFACE. SCREENED MATERIALS ARE PRIMARILY GRAY SAND TO THE SOUTH, SAND AND GRAVEL TO THE NORTH.

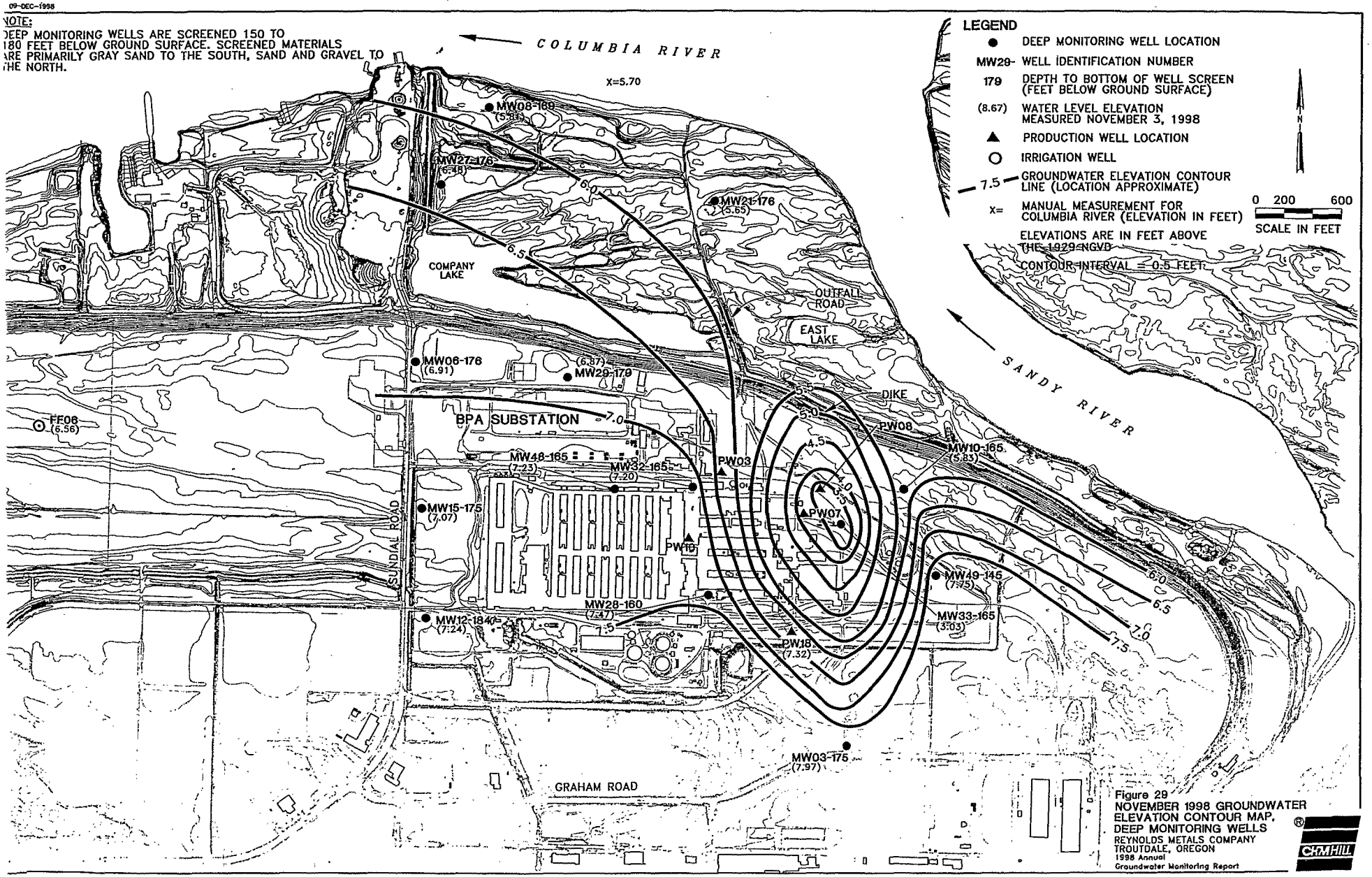

Figure 29
NOVEMBER 1998 GROUNDWATER ELEVATION CONTOUR MAP, DEEP MONITORING WELLS
REYNOLDS METALS COMPANY
TROUTDALE, OREGON
1998 Annual Groundwater Monitoring Report

CH2M HILL

9MLBM.DWG

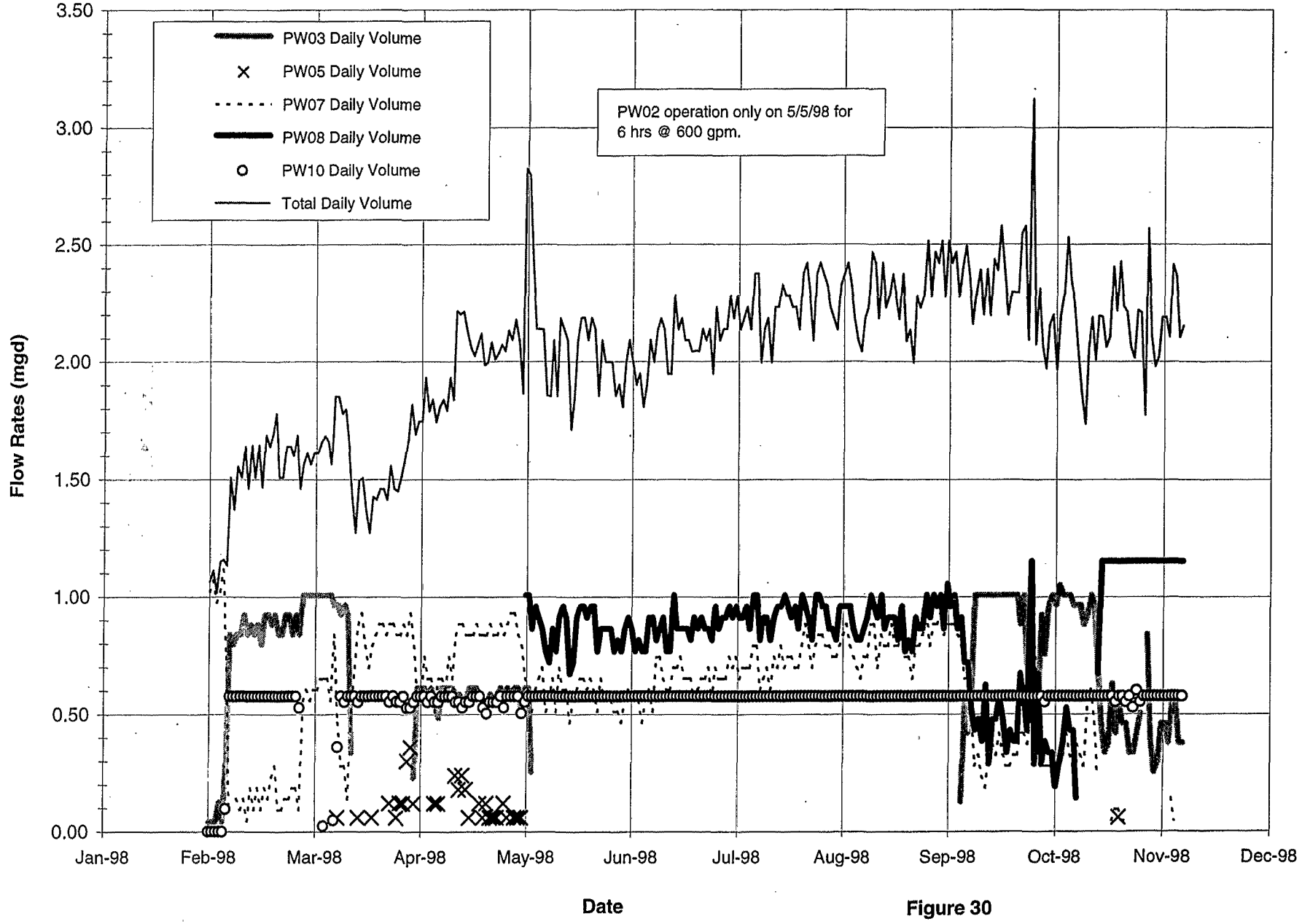

Figure 30

1998 Production Well Pumping Rates

Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

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Nov98rpt\fix0298_1198Pwrates.xls\PW Rates Figure

Printed 2/17/99

APPENDIX A

Silt, Upper Gray Sand, Intermediate-Depth, and Deep Monitoring Well Analytical Data for February, May, and August 1998

Table A-1
Shallow Silt Monitoring Well Analytical Results for February 1998
Reynolds Metals Company - Troutdale, Oregon

Station ID:	MW03-017	MW05-025	MW10-023	MW11-017	MW12-021	MW13-022	MW17-028	MW26-012	MW38-007	MW40-018	MW41-020	MW42-013	MW43-015	MW44-011	MW45-017	MW46-018
Date Sampled:	2/16/98	2/16/98	2/18/98	2/16/98	2/19/98	2/19/98	2/19/98	2/16/98	2/16/98	2/19/98	2/17/98	2/18/98	2/18/98	2/20/98	2/20/98	2/20/98
Conventional Parameters (mg/L) [a]																
Fluoride by 300.0				**385**		**104**		**101**								
Field Fluoride	0.40 U	0.40 U	0.40 U	**306**	0.40 U	**108**	0.40 U	**87**	0.40 U	2.32	0.78	well is dry	**6.28**	well is dry	**13.00**	**18.90**
Metals (mg/L) [b]																
Aluminum (dissolved) [c]				**1.20**		**0.80**										
Arsenic (dissolved)				**0.09**		0.0067										
Beryllium (dissolved)				.0003 U		0.0025										
Chromium (dissolved)				0.01 U		0.01 U										
Lead (dissolved)				0.001		0.001										
Nickel (dissolved				0.04 U		0.04 U										
Aluminum (total) [c]	0.05 U	**0.526**	**0.18**	**10.70**	0.05 U	**3.18**	**0.10**		0.05 U							
Arsenic (total)	0.004 U	0.004 U	0.004 U	**0.09**	0.004 U	0.0075	0.004 U		0.004 U							
Beryllium (total)	0.0003 U	0.0003 U	0.0003 U	0.00083	0.0003 U	0.0026	0.0003 U		0.0003 U							
Chromium (total)	0.01 U	0.01 U	0.0141	0.0121	0.01 U	0.01 U	0.01 U		0.01 U							
Lead (total)	0.001 U	0.001 U	0.001 U	0.0061	0.001 U	0.001 U	0.001 U		0.001 U							
Nickel (total)	0.04 U	0.04 U	0.04 U	0.04	0.04 U	0.04 U	0.04 U		0.04 U							
Volatile Organic Compounds (mg/L)																
1,1,1,2-Tetrachloroethane													0.001 U			
1,1,1-Trichloroethane													0.001 U			
1,1,2,2-Tetrachloroethane													0.001 U			
1,1,2-Trichloroethane													0.001 U			
1,1-Dichloroethane													0.001 U			
1,1-Dichloroethene													0.001 U			
1,1-Dichloropropene													0.001 U			
1,2,3-Trichlorobenzene													0.001 U			
1,2,3-Trichloropropane													0.001 U			
1,2,4-Trichlorobenzene													0.001 U			
1,2,4-Trimethylbenzene													0.001 U			
1,2-Dibromo-3-Chloropropane													0.001 U			
1,2-Dibromoethane													0.001 U			
1,2-Dichlorobenzene													0.001 U			
1,2-Dichloroethane													0.001 U			
1,2-Dichloropropane													0.001 U			
1,3,5-Trimethylbenzene													0.001 U			
1,3-Dichlorobenzene													0.001 U			
1,3-Dichloropropane													0.001 U			
1,4-Dichlorobenzene													0.001 U			
2,2-Dichloropropane													0.001 U			
2-Chlorotoluene													0.001 U			
4-Chlorotoluene													0.001 U			
Benzene													0.001 U			
Bromobenzene													0.001 U			

Table A-1
Shallow Silt Monitoring Well Analytical Results for February 1998
Reynolds Metals Company - Troutdale, Oregon

Station ID:	MW03-017	MW05-025	MW10-023	MW11-017	MW12-021	MW13-022	MW17-028	MW26-012	MW38-007	MW40-018	MW41-020	MW42-013	MW43-015	MW44-011	MW45-017	MW46-018
Date Sampled:	2/16/98	2/16/98	2/18/98	2/16/98	2/19/98	2/19/98	2/19/98	2/16/98	2/16/98	2/19/98	2/17/98	2/18/98	2/18/98	2/20/98	2/20/98	2/20/98
Bromochloromethane													0.001 U			
Bromodichloromethane													0.001 U			
Bromoform													0.001 U			
Bromomethane													0.001 U			
Carbon Tetrachloride													0.001 U			
Chlorobenzene													0.001 U			
Chlorodibromomethane													0.001 U			
Chloroethane													0.001 U			
Chloroform													0.001 U			
Chloromethane													0.001 U			
Cis-1,2-Dichloroethene													0.001 U			
Cis-1,3-Dichloropropene													0.001 U			
Dibromomethane													0.001 U			
Dichlorodifluoromethane													0.001 U			
Ethylbenzene													0.001 U			
Hexachlorobutadiene													0.001 U			
Isopropylbenzene													0.001 U			
Methylene Chloride													0.0001 U			
n-Butylbenzene													0.001 U			
n-Propylbenzene													0.001 U			
Naphthalene													0.001 U			
p-Isopropyltoluene													0.001 U			
Sec-Butylbenzene													0.001 U			
Styrene													0.001 U			
Tert-Butylbenzene													0.001 U			
Tetrachloroethene													0.001 U			
Toluene													0.001 U			
Trans-1,2-Dichloroethene													0.001 U			
Trans-1,3-Dichloropropene													0.001 U			
Trichloroethene													0.001 U			
Trichlorofluoromethane													0.001 U			
Vinyl Chloride													0.001 U			
Xylenes, Total													0.001 U			

Notes:
Bold text indicates maximum contaminant level (MCL) exceedance (see footnote c, below).
U = compound not detected
mg/L = milligrams per liter

[a] The detection limit of the field fluoride probe is 0.40 mg/L. Values below 0.40 mg/L are reported as nondetects, 0.40 U mg/L.

[b] Groundwater samples were analyzed for total and dissolved metals because field-measured turbidity was greater than 5 nephelometric turbidity units (NTUs)

[c] *No primary MCL established for aluminum. In this case, bold numbers indicate secondary MCL exceedance.*

Table A-2
Shallow Upper Gray Sand Monitoring Well Analytical Results for February 1998
Reynolds Metals Company - Troutdale, Oregon

Station ID:	MW09-030	MW22-027	MW27-045	MW30-030	MW31-034	MW32-040	MW34-038	MW35-038	MW38-035	MW40-030	MW41-033	MW42-027	MW43-027	MW44-027	MW45-042	MW46-043	MW52-045	MW53-034
Date Sampled:	2/19/98	2/19/98	2/19/98	2/19/98	2/20/98	2/17/98	2/16/98	2/16/98	2/16/98	2/19/98	2/17/98	2/18/98	2/18/98	2/20/98	2/20/98	2/20/98	2/19/98	2/19/98
Conventional Parameters (mg/L) [a]																		
Field Fluoride	25.40	14.00	19.40	0.40 U	4.97	0.40 U	28.40	0.40 U	0.40 U	1.57	0.94	16.80	5.42	6.00	0.89	0.90	10.80	2.84
Total Metals (mg/L) [b]																		
Aluminum				0.05 U					0.05 U								0.05 U	0.05 U
Arsenic				0.004 U					0.004 U								0.004 U	0.004 U
Beryllium				0.0003 U					0.0003 U								0.0003 U	0.0003 U
Chromium				0.01 U					0.01 U								0.01 U	0.01 U
Lead				0.001 U					0.001 U								0.001 U	0.001 U
Nickel				0.04 U					0.04 U								0.04 U	0.04 U
Volatile Organic Compounds (mg/L)																		
1,1,1,2-Tetrachloroethane						0.001 U					0.001 U							
1,1,1-Trichloroethane						0.042 D					0.002							
1,1,2,2-Tetrachloroethane						0.001 U					0.001 U							
1,1,2-Trichloroethane						0.001 U					0.001 U							
1,1-Dichloroethane						0.001					0.001 U							
1,1-Dichloroethene						0.003					0.001 U							
1,1-Dichloropropene						0.001 U					0.001 U							
1,2,3-Trichlorobenzene						0.001 U					0.001 U							
1,2,3-Trichloropropane						0.001 U					0.001 U							
1,2,4-Trichlorobenzene						0.001 U					0.001 U							
1,2,4-Trimethylbenzene						0.001 U					0.001 U							
1,2-Dibromo-3-Chloropropane						0.001 U					0.001 U							
1,2-Dibromoethane						0.001 U					0.001 U							
1,2-Dichlorobenzene						0.001 U					0.001 U							
1,2-Dichloroethane						0.001 U					0.001 U							
1,2-Dichloropropane						0.001 U					0.001 U							
1,3,5-Trimethylbenzene						0.001 U					0.001 U							
1,3-Dichlorobenzene						0.001 U					0.001 U							
1,3-Dichloropropane						0.001 U					0.001 U							
1,4-Dichlorobenzene						0.001 U					0.001 U							
2,2-Dichloropropane						0.001 U					0.001 U							
2-Chlorotoluene						0.001 U					0.001 U							
4-Chlorotoluene						0.001 U					0.001 U							
Benzene						0.001 U					0.001 U							
Bromobenzene						0.001 U					0.001 U							
Bromochloromethane						0.001 U					0.001 U							
Bromodichloromethane						0.001 U					0.001 U							
Bromoform						0.001 U					0.001 U							
Bromomethane						0.001 U					0.001 U							
Carbon Tetrachloride						0.001 U					0.001 U							
Chlorobenzene						0.001 U					0.001 U							
Chlorodibromomethane						0.001 U					0.001 U							
Chloroethane						0.001 U					0.001 U							
Chloroform						0.001 U					0.001 U							
Chloromethane						0.001 U					0.001 U							
Cis-1,2-Dichloroethene						0.001 U					0.001 U							
Cis-1,3-Dichloropropene						0.001 U					0.001 U							
Dibromomethane						0.001 U					0.001 U							
Dichlorodifluoromethane						0.001 U					0.001 U							
Ethylbenzene						0.001 U					0.001 U							
Hexachlorobutadiene						0.001 U					0.001 U							
Isopropylbenzene						0.001 U					0.001 U							
Methylene Chloride						0.0002 U					0.0003 U							
n-Butylbenzene						0.001 U					0.001 U							
n-Propylbenzene						0.001 U					0.001 U							

Table A-2
Shallow Upper Gray Sand Monitoring Well Analytical Results for February 1998
Reynolds Metals Company - Troutdale, Oregon

Station ID:	MW09-030	MW22-027	MW27-045	MW30-030	MW31-034	MW32-040	MW34-038	MW35-038	MW38-035	MW40-030	MW41-033	MW42-027	MW43-027	MW44-027	MW45-042	MW46-043	MW52-045	MW53-034
Date Sampled:	2/19/98	2/19/98	2/19/98	2/19/98	2/20/98	2/17/98	2/16/98	2/16/98	2/16/98	2/19/98	2/17/98	2/18/98	2/18/98	2/20/98	2/20/98	2/20/98	2/19/98	2/19/98
Naphthalene						0.001 U					0.001 U							
p-Isopropyltoluene						0.001 U					0.001 U							
Sec-Butylbenzene						0.001 U					0.001 U							
Styrene						0.001 U					0.001 U							
Tert-Butylbenzene						0.001 U					0.001 U							
Tetrachloroethene						0.34 D					0.002							
Toluene						0.001 U					0.001 U							
Trans-1,2-Dichloroethene						0.001 U					0.001 U							
Trans-1,3-Dichloropropene						0.001 U					0.001 U							
Trichloroethene						0.0006 J					0.001 U							
Trichlorofluoromethane						0.001 U					0.001 U							
Vinyl Chloride						0.001 U					0.001 U							
Xylenes, Total						0.001 U					0.001 U							

Notes:
Bold text indicates maximum contaminant level (MCL) exceedance.
D = Sample run at dilution
J = Estimated (protocol)
U = Compound not detected
mg/L = milligrams per liter

[a] The detection limit of the field fluoride probe is 0.40 mg/L. Values below 0.40 mg/L are reported as nondetects, 0.40 U mg/L.
[b] No dissolved metals analysis were run because field-measured turbidity was less than 5 nephelometric turbidy units (NTUs).

Table A-3
Intermediate-Depth Monitoring Well Analytical Results for February 1998
Reynolds Metals Company - Troutdale, Oregon

Station ID:	MW03-098	MW10-090	MW12-092	MW15-086	MW27-081	MW29-090	MW30-100	MW31-095	MW32-095	MW33-095	MW39-09	MW48-055	MW49-095	MW58-094	MW51-069
Date Sampled:	2/16/98	2/18/98	2/19/98	2/16/98	2/19/98	2/17/98	2/19/98	2/20/98	2/17/98	2/17/98	2/19/98	2/18/98	2/17/98	2/17/98	2/17/98
Conventional Parameters (mg/L) [a]															
Fluoride by 300.0										113					
Field Fluoride	0.48	0.40 U	0.40 U	0.40 U	22.10	12.00	0.40 U	6.58	0.40 U	141	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
Total Metals (mg/L) [b]															
Aluminum	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U		0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Arsenic	0.01	0.004 U	0.004	0.004			0.004		0.004		0.0044	0.004 U	0.004 U	0.004 U	0.004 U
Beryllium	0.0003 U	0.0003 U	0.0003 U	0.0003 U			0.0003 U		0.0003 U		0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Chromium	0.01 U	0.01 U	0.01 U	0.01 U			0.01 U		0.01 U		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	0.001 U	0.001 U	0.0022	0.001 U			0.001 U		0.001 U		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Nickel	0.04 U	0.04 U	0.04 U	0.04 U			0.04 U		0.04 U		0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Volatile Organic Compounds (mg/L)															
1,1,1,2-Tetrachloroethane						0.001 U				0.001 U		0.001 U			
1,1,1-Trichloroethane						0.001 U				0.001 U		0.001 U			
1,1,2,2-Tetrachloroethane						0.001 U				0.001 U		0.001 U			
1,1,2-Trichloroethane						0.001 U				0.001 U		0.001 U			
1,1-Dichloroethane						0.004				0.0005 J		0.0007 J			
1,1-Dichloroethene						0.001 U				0.0008 J		0.001			
1,1-Dichloropropene						0.001 U				0.001 U		0.001 U			
1,2,3-Trichlorobenzene						0.001 U				0.001 U		0.001 U			
1,2,3-Trichloropropane						0.001 U				0.001 U		0.001 U			
1,2,4-Trichlorobenzene						0.001 U				0.001 U		0.001 U			
1,2,4-Trimethylbenzene						0.001 U				0.001 U		0.001 U			
1,2-Dibromo-3-Chloropropane						0.001 U				0.001 U		0.001 U			
1,2-Dibromoethane						0.001 U				0.001 U		0.001 U			
1,2-Dichlorobenzene						0.001 U				0.001 U		0.001 U			
1,2-Dichloroethane						0.001 U				0.001 U		0.001 U			
1,2-Dichloropropane						0.001 U				0.001 U		0.001 U			
1,3,5-Trimethylbenzene						0.001 U				0.001 U		0.001 U			
1,3-Dichlorobenzene						0.001 U				0.001 U		0.001 U			
1,3-Dichloropropane						0.001 U				0.001 U		0.001 U			
1,4-Dichlorobenzene						0.001 U				0.001 U		0.001 U			
2,2-Dichloropropane						0.001 U				0.001 U		0.001 U			
2-Chlorotoluene						0.001 U				0.001 U		0.001 U			
4-Chlorotoluene						0.001 U				0.001 U		0.001 U			
Benzene						0.001 U				0.001 U		0.001 U			
Bromobenzene						0.001 U				0.001 U		0.001 U			
Bromochloromethane						0.001 U				0.001 U		0.001 U			
Bromodichloromethane						0.001 U				0.001 U		0.001 U			
Bromoform						0.001 U				0.001 U		0.001 U			
Bromomethane						0.001 U				0.001 U		0.001 U			
Carbon Tetrachloride						0.001 U				0.001 U		0.001 U			
Chlorobenzene						0.001 U				0.001 U		0.001 U			
Chlorodibromomethane						0.001 U				0.001 U		0.001 U			
Chloroethane						0.001 U				0.001 U		0.001 U			
Chloroform						0.001 U				0.001 U		0.001 U			
Chloromethane						0.001 U				0.001 U		0.001 U			
Cis-1,2-Dichloroethene						0.001 U				0.001 U		0.001 U			
Cis-1,3-Dichloropropene						0.001 U				0.001 U		0.001 U			
Dibromomethane						0.001 U				0.001 U		0.001 U			
Dichlorodifluoromethane						0.001 U				0.001 U		0.001 U			
Ethylbenzene						0.001 U				0.001 U		0.001 U			
Hexachlorobutadiene						0.001 U				0.001 U		0.001 U			
Isopropylbenzene						0.001 U				0.001 U		0.001 U			
Methylene Chloride						0.0002 U				0.0002 U		0.001 U			
n-Butylbenzene						0.001 U				0.001 U		0.001 U			
n-Propylbenzene						0.001 U				0.001 U		0.001 U			
Naphthalene						0.001 U				0.001 U		0.001 U			
p-Isopropyltoluene						0.001 U				0.001 U		0.001 U			
Sec-Butylbenzene						0.001 U				0.001 U		0.001 U			
Styrene						0.001 U				0.001 U		0.001 U			
Tert-Butylbenzene						0.001 U				0.001 U		0.001 U			
Tetrachloroethene						0.001 U				0.0002 J		0.0004 J			
Toluene						0.001 U				0.001 U		0.001 U			
Trans-1,2-Dichloroethene						0.001 U				0.001 U		0.001 U			
Trans-1,3-Dichloropropene						0.001 U				0.001 U		0.001 U			
Trichloroethene						0.001 U				0.001 U		0.001 U			
Trichlorofluoromethane						0.001 U				0.001 U		0.001 U			
Vinyl Chloride						0.001 U				0.001 U		0.001 U			
Xylenes, Total						0.001 U				0.001 U		0.001 U			

Notes:
Bold text indicates maximum contaminant level (MCL) exceedance.
J = Estimated (protocol)
U = compound not detected
mg/L = milligrams per liter

[a] The detection limit of the field fluoride probe is 0.40 mg/L. Values below 0.40 mg/L are reported as nondetects, 0.40 U mg/L.
[b] No dissolved metals analysis were run because field-measured turbidity was less than 5 nephelometric turbidity units (NTUs)

Table A-4
Deep Monitoring Well Analytical Results for February 1998
Reynolds Metals - Troutdale, Oregon

Station ID:	MW10-165	MW29-179	MW33-165	MW48-165	MW49-145
Date Sampled:	2/19/98	2/17/98	2/17/98	2/18/98	2/17/98
Conventional Parameters (mg/L) [a]					
Field Fluoride	0.40 U	2.63	**40.70**	**7.40**	0.59
Total Metals (mg/L) [b]					
Aluminum (dissolved)					0.05 U
Arsenic (dissolved)					0.004 U
Beryllium (dissolved)					0.0003 U
Chromium (dissolved)					0.01 U
Lead (dissolved)					0.01 U
Nickel (dissolved)					0.04 U
Aluminum (total) [c]	0.05 U	**0.0562**		0.05 U	**3.75**
Arsenic (total)	0.004 U	0.004 U		0.005	0.004 U
Beryllium (total)	0.0003 U	0.0003 U		0.0003 U	0.0003 U
Chromium (total)	0.01 U	0.01 U		0.01 U	0.0113
Lead (total)	0.001 U	0.001 U		0.001 U	0.0014
Nickel (total)	0.04 U	0.04 U		0.04 U	0.04 U
Volatile Organic Compounds (mg/L)					
1,1,1,2-Tetrachloroethane				0.001 U	
1,1,1-Trichloroethane				0.001 U	
1,1,2,2-Tetrachloroethane				0.001 U	
1,1,2-Trichloroethane				0.001 U	
1,1-Dichloroethane				0.001 U	
1,1-Dichloroethene				0.001 U	
1,1-Dichloropropene				0.001 U	
1,2,3-Trichlorobenzene				0.001 U	
1,2,3-Trichloropropane				0.001 U	
1,2,4-Trichlorobenzene				0.001 U	
1,2,4-Trimethylbenzene				0.001 U	
1,2-Dibromo-3-Chloropropane				0.001 U	
1,2-Dibromoethane				0.001 U	
1,2-Dichlorobenzene				0.001 U	
1,2-Dichloroethane				0.001 U	
1,2-Dichloropropane				0.001 U	
1,3,5-Trimethylbenzene				0.001 U	
1,3-Dichlorobenzene				0.001 U	
1,3-Dichloropropane				0.001 U	
1,4-Dichlorobenzene				0.001 U	
2,2-Dichloropropane				0.001 U	
2-Chlorotoluene				0.001 U	
4-Chlorotoluene				0.001 U	
Benzene				0.001 U	
Bromobenzene				0.001 U	
Bromochloromethane				0.001 U	
Bromodichloromethane				0.001 U	
Bromoform				0.001 U	
Bromomethane				0.001 U	
Carbon Tetrachloride				0.001 U	
Chlorobenzene				0.001 U	
Chlorodibromomethane				0.001 U	
Chloroethane				0.001 U	
Chloroform				0.001 U	
Chloromethane				0.001 U	
Cis-1,2-Dichloroethene				0.001 U	
Cis-1,3-Dichloropropene				0.001 U	
Dibromomethane				0.001 U	
Dichlorodifluoromethane				0.001 U	

Table A-4
Deep Monitoring Well Analytical Results for February 1998
Reynolds Metals - Troutdale, Oregon

Station ID:	MW10-165	MW29-179	MW33-165	MW48-165	MW49-145
Date Sampled:	2/19/98	2/17/98	2/17/98	2/18/98	2/17/98
Ethylbenzene				0.001 U	
Hexachlorobutadiene				0.001 U	
Isopropylbenzene				0.001 U	
Methylene Chloride				0.0003 U	
n-Butylbenzene				0.001 U	
n-Propylbenzene				0.001 U	
Naphthalene				0.001 U	
p-Isopropyltoluene				0.001 U	
Sec-Butylbenzene				0.001 U	
Styrene				0.001 U	
Tert-Butylbenzene				0.001 U	
Tetrachloroethene				0.001 U	
Toluene				0.001 U	
Trans-1,2-Dichloroethene				0.001 U	
Trans-1,3-Dichloropropene				0.001 U	
Trichloroethene				0.001 U	
Trichlorofluoromethane				0.001 U	
Vinyl Chloride				0.001 U	
Xylenes, Total				0.001 U	

Notes:
Bold text indicates maximum contaminant level (MCL) exceedance (see footnote c, below).
U = compound not detected
mg/L = milligrams per liter

[a] The detection limit of the field fluoride probe is 0.40 mg/L. Values below 0.40 mg/L are reported as nondetects, 0.40 U mg/L.
[b] Groundwater samples were analyzed for total and dissolved metals because field-measured turbidity was greater than 5 nephelometric turbidity units (NTUs)
[c] No primary MCL established for aluminum. In this case, bold numbers indicate secondary MCL exceedance.

Table A-5
Monitoring Well Analytical Results for May 1998
Reynolds Metals Company—Troutdale, Oregon

Station ID:	MW40-018	MW41-020	MW43-015	MW45-017	MW46-018	MW40-030	MW41-033	MW42-027	MW43-027	MW44-027	MW45-042	MW46-043	MW52-045	MW53-034	MW51-069
Date Sampled:	5/11/98	5/12/98	5/13/98	5/12/98	5/12/98	5/11/98	5/13/98	5/11/98	5/13/98	5/12/98	5/12/98	5/12/98	5/11/98	5/11/98	5/11/98
Screened Material:	Shallow Silt					Shallow, Upper Gray Sand									Intermed
1,2,4-Trichlorobenzene			0.001 U				0.001 U								
1,2,4-Trimethylbenzene			0.001 U				0.001 U								
1,2-Dibromo-3-Chloropropane			0.001 U				0.001 U								
1,2-Dibromoethane			0.001 U				0.001 U								
1,2-Dichlorobenzene			0.001 U				0.001 U								
1,2-Dichloroethane			0.001 U				0.001 U								
1,2-Dichloropropane			0.001 U				0.001 U								
1,3,5-Trimethylbenzene			0.001 U				0.001 U								
1,3-Dichlorobenzene			0.001 U				0.001 U								
1,3-Dichloropropane			0.001 U				0.001 U								
1,4-Dichlorobenzene			0.001 U				0.001 U								
2,2-Dichloropropane			0.001 U				0.001 U								
2-Chlorotoluene			0.001 U				0.001 U								
4-Chlorotoluene			0.001 U				0.001 U								
Benzene			0.001 U				0.001 U								
Bromobenzene			0.001 U				0.001 U								
Bromochloromethane			0.001 U				0.001 U								
Bromodichloromethane			0.001 U				0.001 U								
Bromoform			0.001 U				0.001 U								
Bromomethane			0.001 U				0.001 U								
Carbon Tetrachloride			0.001 U				0.001 U								
Chlorobenzene			0.001 U				0.001 U								
Chlorodibromomethane			0.001 U				0.001 U								
Chloroethane			0.001 U				0.001 U								
Chloroform			0.001 U				0.001 U								
Chloromethane			0.001 U				0.001 U								
Cis-1,3-Dichloropropene			0.001 U				0.001 U								
Dibromomethane			0.001 U				0.001 U								
Dichlorodifluoromethane			0.001 U				0.001 U								
Ethylbenzene			0.001 U				0.001 U								
Hexachlorobutadiene			0.001 U				0.001 U								
Isopropylbenzene			0.001 U				0.001 U								
Methylene Chloride			0.002 U				0.002 U								
n-Butylbenzene			0.001 U				0.001 U								

Table A-5
Monitoring Well Analytical Results for May 1998
Reynolds Metals Company—Troutdale, Oregon

Station ID:	MW40-018	MW41-020	MW43-015	MW45-017	MW46-018	MW40-030	MW41-033	MW42-027	MW43-027	MW44-027	MW45-042	MW46-043	MW52-045	MW53-034	MW51-069
Date Sampled:	5/11/98	5/12/98	5/13/98	5/12/98	5/12/98	5/11/98	5/13/98	5/11/98	5/13/98	5/12/98	5/12/98	5/12/98	5/11/98	5/11/98	5/11/98
Screened Material:	Shallow Silt					Shallow, Upper Gray Sand									Intermed
n-Propylbenzene			0.001 U				0.001 U								
Naphthalene			0.001 U				0.001 U								
p-Isopropyltoluene			0.001 U				0.001 U								
Sec-Butylbenzene			0.001 U				0.001 U								
Styrene			0.001 U				0.001 U								
Tert-Butylbenzene			0.001 U				0.001 U								
Tetrachloroethene			0.001 U				0.0012								
Toluene			0.001 U				0.0002 J								
Trans-1,3-Dichloropropene			0.001 U				0.001 U								
Trichloroethene			0.001 U				0.001 U								
Trichlorofluoromethane			0.001 U				0.001 U								
Vinyl Chloride			0.001 U				0.001 U								
Xylenes, Total			0.001 U				0.001 U								

Notes:
Bold text indicates maximum contaminant level (MCL) exceedance (See footnote C, below).
U = compound not detected
J = estimated
mg/L = milligrams per liter

[a] The detection limit of the field fluoride probe is 0.40 mg/L. Values below 0.40 mg/L are reported as nondetects, 0.40 U.

[b] No primary MCL established for this constituent. In this case, bold numbers indicate secondary MCL exceedence.

[c] Groundwater samples were analyzed for dissolved metals because total metals were reported above the laboratory method reporting limit.

Table A-6
August 1998 Shallow Monitoring Well Analytical Results (Silt)
Reynolds Metals Company
Troutdale, Oregon

Station ID:	MW03-017	MW05-025	MW10-023	MW11-017	MW12-021	MW13-022	MW17-028	MW19-013	MW26-012	MW38-007	MW40-018	MW41-020	MW45-017	MW46-018
Date Sampled:	8/14/98	8/19/98	8/18/98	8/17/98	8/18/98	8/17/98	8/19/98	8/19/98	8/17/98	8/19/98	8/14/98	8/12/98	8/13/98	8/10/98
Screened Material:	Shallow Silt													
Conventional Parameters (mg/L)														
Fluoride by 300.0				**432**		**119**			**99.5**					
Fluoride by Field [a]	0.4 U	0.4 U	0.4 U	**440**	0.47	**130**	0.4 U	**66.3**	**94**	0.4 U	**5.2**	0.68	**12.6**	**19.2**
Metals, Total (mg/L)														
Aluminum [b]	0.05 U	**0.559**	**0.165**	**7.34**	0.05 U	**4.16**	0.05 U	**7.61**		0.05 U				
Arsenic	0.004 U	0.004 U	0.004 U	**0.08**	0.004 U	0.0093	0.004 U	0.004 U		0.004 U				
Beryllium	0.0003 U	0.0003 U	0.0003 U	0.0017	0.0003 U	**0.0047**	0.0003 U	**0.0046**		0.0003 U				
Chromium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U		0.01 U				
Lead	0.001 U	0.001 U	0.001 U	0.0058	0.001 U	0.001 U	0.001 U	0.001 U		0.001 U				
Nickel	0.04 U	0.04 U	0.04 U	0.0506	0.04 U	0.04 U	0.04 U	0.04 U		0.04 U				
Metals, Dissolved (mg/L) [c]														
Aluminum [b]		0.05 U		**8.4**		**1.83**								
Arsenic				**0.078**										
Beryllium				0.0013		**0.0045**								
Chromium				0.0112		0.01 U								
Lead				0.0047										
Nickel				0.0462		0.04 U								

Notes:
Bold text indicates maximum contaminant level (MCL) exceedance (see footnote c, below)

[a] The detection limit of the field fluoride probe is 0.40 mg/L. Values below 0.40 mg/L are reported as nondetects, 0.40 U.
[b] No primary MCL established for this constituent. In this case, bold number indicated secondary MCL exceedance.
[c] Groundwater samples were analyzed for dissolved metals because total metals were reported above the laboratory method reporting limit.

Abbreviations:
U - compound not detected
J = estimated
mg/L - milligrams per liter

Table A-5
Monitoring Well Analytical Results for May 1998
Reynolds Metals Company—Troutdale, Oregon

Station ID:	MW40-018	MW41-020	MW43-015	MW45-017	MW46-018	MW40-030	MW41-033	MW42-027	MW43-027	MW44-027	MW45-042	MW46-043	MW52-045	MW53-034	MW51-069
Date Sampled:	5/11/98	5/12/98	5/13/98	5/12/98	5/12/98	5/11/98	5/13/98	5/11/98	5/13/98	5/12/98	5/12/98	5/12/98	5/11/98	5/11/98	5/11/98
Screened Material:	Shallow Silt					Shallow, Upper Gray Sand									Intermed
Conventional Parameters (mg/L)															
Chromium (VI)													0.4 U	0.4 U	0.4 U
Cyanide, Total													0.004 U		0.004 U
Fluoride by Field [a]	**5.7**	0.93	**9.5**	**9.2**	**16.8**	1.49	0.91	**17.2**	**8.1**	3.8	0.91	0.86	**6.11**	2.49	0.40 U
Metals, Total (mg/L)															
Aluminum [b]													**0.0811**	**0.0747**	0.015 U
Arsenic													0.0007 U	0.0007 U	0.0009
Beryllium													0.001 U	0.001 U	0.001 U
Cadmium													0.0001 U	0.0001 U	0.0001 U
Chromium													0.004 U	0.004 U	0.004 U
Copper													0.001 U	0.0014	0.001 U
Iron [b]													**7.06**	**12.2**	**24**
Lead													0.0008 U	0.0008 U	0.0008 U
Manganese [b]													**0.427**	**0.666**	**0.923**
Mercury													0.0001 U	0.0001 U	0.0001 U
Nickel													0.006 U	0.006 U	0.006 U
Silver													0.002 U	0.0021 U	0.002 U
Metals, Dissolved (mg/L)															
Aluminum [b]													**0.0739**	0.0163	
Arsenic															0.0007 U
Copper														0.001 U	
Iron [b]													**7**	**12**	**24.1**
Manganese [b]													**0.428**	**0.659**	**0.927**
Silver														0.002 U	
Volatile Organic Compounds (mg/L)															
1,1,1,2-Tetrachloroethane			0.001 U				0.001 U								
1,1,1-Trichloroethane			0.001 U				0.001 U								
1,1,2,2-Tetrachloroethane			0.001 U				0.001 U								
1,1,2-Trichloroethane			0.001 U				0.001 U								
1,1-Dichloroethane			0.001 U				0.001 U								
1,1-Dichloroethene			0.001 U				0.001 U								
1,1-Dichloropropene			0.001 U				0.001 U								
1,2,3-Trichlorobenzene			0.001 U				0.001 U								
1,2,3-Trichloropropane			0.001 U				0.001 U								

Table A-7
August 1998 Shallow Upper Gray Sand Monitoring Well Analytical Results
Reynolds Metals Company
Troutdale, Oregon

Station ID:	MW09-030	MW22-027	MW27-045	MW30-030	MW31-034	MW32-040	MW34-038	MW35-038	MW38-035	MW40-030	MW41-033	MW42-027	MW43-027	MW44-027	MW45-042	MW46-043	MW52-045	MW53-034
Date Sampled:	8/13/98	8/20/98	8/18/98	8/13/98	8/13/98	8/12/98	8/18/98	8/18/98	8/19/98	8/14/98	8/11/98	8/12/98	8/12/98	8/12/98	8/13/98	8/10/98	8/10/98	8/10/98
Screened Material:	Shallow Upper Gray Sand																	
Conventional Parameters (mg/L)																		
Chromium (VI)																	0.1 U	0.5 U
Cyanide, Total																	0.02 U	
Fluoride by 300.0						0.62												
Fluoride by Field [a]	31.5	13.6	20.2	0.85	0.4 U	0.84	35.4	0.4 U	0.4 U	1.4	0.59	22	9.2	3.1	0.7	0.84	10.3	3.04
Metals, Total (mg/L)																		
Aluminum [b]				0.05 U					0.05 U								0.05 U	0.05 U
Arsenic				0.004 U					0.004 U								0.004 U	0.004 U
Beryllium				0.0003 U					0.0003 U								0.00037	0.0003 U
Cadmium																	0.002 U	0.002 U
Chromium				0.01 U					0.01 U								0.01 U	0.01 U
Copper																	0.002 U	0.002 U
Iron [b]																	6.93	13.1
Lead				0.001 U					0.001 U								0.001 U	0.001 U
Manganese [b]																	0.396	0.669
Mercury																	0.0002 U	0.0002 U
Nickel				0.04 U					0.04 U								0.04 U	0.04 U
Silver																	0.003 U	0.003 U
Metals, Dissolved (mg/L) [c]																		
Iron [b]																	7.14	12.7
Manganese [b]																	0.407	0.666
Volatile Organic Compounds (mg/L)																		
1,1,1-Trichloroethane						0.024					0.0002 J							
1,1,2,2-Tetrachloroethane						0.001 U					0.001 U							
1,1,2-Trichloroethane						0.001 U					0.001 U							
1,1-Dichloroethane						0.0008 J					0.001 U							
1,1-Dichloroethene						0.001					0.001 U							
1,1-Dichloropropene						0.001 U					0.001 U							
1,2,3-Trichlorobenzene						0.001 U					0.001 U							
1,2,3-Trichloropropane						0.001 U					0.001 U							
1,2,4-Trichlorobenzene						0.001 U					0.001 U							
1,2,4-Trimethylbenzene						0.001 U					0.001 U							
1,2-Dibromo-3-chloropropane						0.001 U					0.001 U							
1,2-Dibromoethane						0.001 U					0.001 U							
1,2-Dichlorobenzene						0.0002 J					0.001 U							
1,2-Dichloroethane						0.001 U					0.001 U							
1,2-Dichloropropane						0.001 U					0.001 U							
1,3,5-Trimethylbenzene						0.001 U					0.001 U							
1,3-Dichlorobenzene						0.001 U					0.001 U							
1,3-Dichloropropane						0.001 U					0.001 U							
1,4-Dichlorobenzene						0.001 U					0.001 U							
2,2-Dichloropropane						0.001 U					0.001 U							
2-Chlorotoluene						0.001 U					0.001 U							
4-Chlorotoluene						0.001 U					0.001 U							
Benzene						0.001 U					0.001 U							
Bromobenzene						0.001 U					0.001 U							
Bromochloromethane						0.001 U					0.001 U							

Table A-7
August 1998 Shallow Upper Gray Sand Monitoring Well Analytical Results
Reynolds Metals Company
Troutdale, Oregon

Station ID:	MW09-030	MW22-027	MW27-045	MW30-030	MW31-034	MW32-040	MW34-038	MW35-038	MW38-035	MW40-030	MW41-033	MW42-027	MW43-027	MW44-027	MW45-042	MW46-043	MW52-045	MW53-034
Date Sampled:	8/13/98	8/20/98	8/18/98	8/13/98	8/13/98	8/12/98	8/18/98	8/18/98	8/19/98	8/14/98	8/11/98	8/12/98	8/12/98	8/12/98	8/13/98	8/10/98	8/10/98	8/10/98
Screened Material:	Shallow Upper Gray Sand																	
Bromodichloromethane						0.001 U					0.001 U							
Bromoform						0.001 U					0.001 U							
Bromomethane						0.001 U					0.001 U							
Carbon tetrachloride						0.001 U					0.001 U							
Chlorobenzene						0.001 U					0.001 U							
Chlorodibromomethane						0.001 U					0.001 U							
Chloroethane						0.001 U					0.001 U							
Chloroform						0.001 U					0.001 U							
Chloromethane						0.0001 J					0.001 U							
Cis-1,2-dichloroethene						0.001 U					0.001 U							
Cis-1,3-dichloropropene						0.001 U					0.001 U							
Dibromomethane						0.001 U					0.001 U							
Dichlorodifluoromethane						0.001 U					0.001 U							
Ethylbenzene						0.001 U					0.001 U							
Hexachlorobutadiene						0.001 U					0.001 U							
Isopropylbenzene						0.001 U					0.001 U							
Methylene chloride						0.0001 J					0.002 U							
n-Butylbenzene						0.001 U					0.001 U							
n-Propylbenzene						0.001 U					0.001 U							
Naphthalene						0.001 U					0.001 U							
p-Isopropyltoluene						0.001 U					0.001 U							
Sec-Butylbenzene						0.001 U					0.001 U							
Styrene						0.001 U					0.001 U							
Tert-Butylbenzene						0.001 U					0.001 U							
Tetrachloroethene						**0.37 D**					0.0007 J							
Toluene						0.001 U					0.001 U							
Trans-1,2-dichloroethene						0.001 U					0.001 U							
Trans-1,3-dichloropropene						0.001 U					0.001 U							
Trichloroethene						0.0005 J					0.001 U							
Trichlorofluoromethane						0.001 U					0.001 U							
Vinyl chloride						0.001 U					0.001 U							
Xylenes, Total						0.001 U					0.001 U							

Notes:
Bold text indicates maximum contaminant level (MCL) exceedance (see footnote c, below)
[a] The detection limit of the field fluoride probe is 0.40 mg/L. Values below 0.40 mg/L are reported as nondetects, 0.40 U.
[b] No primary MCL established for this constituent. In this case, bold number indicated secondary MCL exceedance.
[c] Groundwater samples were analyzed for dissolved metals because total metals were reported above the laboratory method reporting limit.

Abbreviations:
U = compound not detected
J = estimated
D = sample diluted
mg/L - milligrams per liter

Table A-8
August 1998 Intermediate-Depth and Deep Zone Monitoring Well Analytical Results
Reynolds Metals Company
Troutdale, Oregon

Station ID:	MW03-098	MW10-090	MW12-092	MW15-086	MW27-081	MW29-090	MW30-100	MW31-095	MW32-095	MW33-095	MW39-095	MW48-055	MW49-095	MW50-094	MW51-069	MW10-165	MW29-179	MW33-165	MW48-165	MW49-145
Date Sampled:	8/14/98	8/18/98	8/18/98	8/18/98	8/18/98	8/11/98	8/13/98	8/13/98	8/12/98	8/11/98	8/14/98	8/11/98	8/17/98	8/17/98	8/10/98	8/18/98	8/12/98	8/18/98	8/11/98	8/17/98
Screened Material:	Intermediate															Deep				
Conventional Parameters (mg/L)																				
Chromium (VI)															0.5 U					
Cyanide, Total															0.02 U					
Fluoride by Field [a]	0.57	0.4 U	0.4 U	0.4 U	22.3	15	0.4 U	20.9	0.61	87.4	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	3.7	22.4	8	0.5
Metals, Total (mg/L)																				
Aluminum [b]	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U		0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.111		0.05 U	0.35
Arsenic	0.0069	0.004 U	0.0052	0.004 U			0.004 U		0.004 U		0.0052	0.004 U	0.0042	0.004 U	0.004 U	0.004 U	0.004 U		0.004 U	0.004 U
Beryllium	0.0003 U	0.0003 U	0.0003 U	0.0003 U			0.0003 U		0.0003 U		0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U		0.0003 U	0.0003 U
Cadmium															0.002 U					
Chromium	0.01 U	0.01 U	0.01 U	0.01 U			0.01 U		0.01 U		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U		0.01 U	0.01 U
Copper															0.002 U					
Iron [b]															26.8					
Lead	0.001 U	0.001 U	0.001 U	0.001 U			0.001 U		0.001 U		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		0.001 U	0.0023
Manganese [b]															0.891					
Mercury															0.0002 U					
Nickel	0.04 U	0.04 U	0.04 U	0.04 U			0.04 U		0.04 U		0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U		0.04 U	0.04 U
Silver															0.003 U					
Metals, Dissolved (mg/L) [c]																				
Aluminum [b]																				0.05 U
Beryllium																				0.0003 U
Chromium																				0.01 U
Iron [b]															26.6					
Manganese [b]															0.888					
Nickel																				0.04 U
Volatile Organic Compounds (mg/L)																				
1,1,1-Trichloroethane						0.001 U				0.001 U		0.0002 J							0.001 U	
1,1,2,2-Tetrachloroethane						0.001 U				0.001 U		0.001 U							0.001 U	
1,1,2-Trichloroethane						0.001 U				0.001 U		0.001 U							0.001 U	
1,1-Dichloroethane						0.004				0.0002 J		0.0006 J							0.001 U	
1,1-Dichloroethene						0.001 U				0.0003 J		0.001							0.001 U	
1,1-Dichloropropene						0.001 U				0.001 U		0.001 U							0.001 U	
1,2,3-Trichlorobenzene						0.001 U				0.001 U		0.001 U							0.001 U	
1,2,3-Trichloropropane						0.001 U				0.001 U		0.001 U							0.001 U	
1,2,4-Trichlorobenzene						0.001 U				0.001 U		0.001 U							0.001 U	
1,2,4-Trimethylbenzene						0.001 U				0.001 U		0.001 U							0.001 U	
1,2-Dibromo-3-Chloropropane						0.001 U				0.001 U		0.001 U							0.001 U	
1,2-Dibromoethane						0.001 U				0.001 U		0.001 U							0.001 U	
1,2-Dichlorobenzene						0.001 U				0.001 U		0.001 U							0.001 U	
1,2-Dichloroethane						0.001 U				0.001 U		0.001 U							0.001 U	
1,2-Dichloropropane						0.001 U				0.001 U		0.001 U							0.001 U	
1,3,5-Trimethylbenzene						0.001 U				0.001 U		0.001 U							0.001 U	
1,3-Dichlorobenzene						0.001 U				0.001 U		0.001 U							0.001 U	
1,3-Dichloropropane						0.001 U				0.001 U		0.001 U							0.001 U	
1,4-Dichlorobenzene						0.001 U				0.001 U		0.001 U							0.001 U	
2,2-Dichloropropane						0.001 U				0.001 U		0.001 U							0.001 U	
2-Chlorotoluene						0.001 U				0.001 U		0.001 U							0.001 U	
4-Chlorotoluene						0.001 U				0.001 U		0.001 U							0.001 U	

Table A-8
August 1998 Intermediate-Depth and Deep Zone Monitoring Well Analytical Results
Reynolds Metals Company
Troutdale, Oregon

Station ID:	MW03-098	MW10-090	MW12-092	MW15-086	MW27-081	MW29-090	MW30-100	MW31-095	MW32-095	MW33-095	MW39-095	MW48-055	MW49-095	MW50-094	MW51-069	MW10-165	MW29-179	MW33-165	MW48-165	MW49-145
Date Sampled:	8/14/98	8/18/98	8/18/98	8/18/98	8/18/98	8/11/98	8/13/98	8/13/98	8/12/98	8/11/98	8/14/98	8/11/98	8/17/98	8/17/98	8/10/98	8/18/98	8/12/98	8/18/98	8/11/98	8/17/98
Screened Material:	Intermediate															Deep				
Benzene						0.001 U				0.001 U		0.001 U							0.001 U	
Bromobenzene						0.001 U				0.001 U		0.001 U							0.001 U	
Bromochloromethane						0.001 U				0.001 U		0.001 U							0.001 U	
Bromodichloromethane						0.001 U				0.001 U		0.001 U							0.001 U	
Bromoform						0.001 U				0.001 U		0.001 U							0.001 U	
Bromomethane						0.001 U				0.001 U		0.001 U							0.001 U	
Carbon Tetrachloride						0.001 U				0.001 U		0.001 U							0.001 U	
Chlorobenzene						0.001 U				0.001 U		0.001 U							0.001 U	
Chlorodibromomethane						0.001 U				0.001 U		0.001 U							0.001 U	
Chloroethane						0.001 U				0.001 U		0.001 U							0.001 U	
Chloroform						0.001 U				0.001 U		0.001 U							0.001 U	
Chloromethane						0.001 U				0.001 U		0.001 U							0.001 U	
Cis-1,2-Dichloroethene						0.001 U				0.001 U		0.001 U							0.001 U	
Cis-1,3-Dichloropropene						0.001 U				0.001 U		0.001 U							0.001 U	
Dibromomethane						0.001 U				0.001 U		0.001 U							0.001 U	
Dichlorodifluoromethane						0.001 U				0.001 U		0.001 U							0.001 U	
Ethylbenzene						0.001 U				0.001 U		0.001 U							0.001 U	
Hexachlorobutadiene						0.001 U				0.001 U		0.001 U							0.001 U	
Isopropylbenzene						0.001 U				0.001 U		0.001 U							0.001 U	
Methylene Chloride						0.0001 J				0.0001 J		0.002 U							0.002 U	
n-Butylbenzene						0.001 U				0.001 U		0.001 U							0.001 U	
n-Propylbenzene						0.001 U				0.001 U		0.001 U							0.001 U	
Naphthalene						0.001 U				0.001 U		0.001 U							0.001 U	
p-Isopropyltoluene						0.001 U				0.001 U		0.001 U							0.001 U	
Sec-Butylbenzene						0.001 U				0.001 U		0.001 U							0.001 U	
Styrene						0.001 U				0.001 U		0.001 U							0.001 U	
Tert-Butylbenzene						0.001 U				0.001 U		0.001 U							0.001 U	
Tetrachloroethene						0.001 U				0.001 U		0.0004 J							0.001 U	
Toluene						0.001 U				0.001 U		0.001 U							0.001 U	
Trans-1,2-Dichloroethene						0.001 U				0.001 U		0.001 U							0.001 U	
Trans-1,3-Dichloropropene						0.001 U				0.001 U		0.001 U							0.001 U	
Trichloroethene						0.001 U				0.001 U		0.001 U							0.001 U	
Trichlorofluoromethane						0.001 U				0.001 U		0.001 U							0.001 U	
Vinyl Chloride						0.001 U				0.001 U		0.001 U							0.001 U	
Xylenes, Total						0.001 U				0.001 U		0.001 U							0.001 U	

Notes:
Bold text indicates maximum contaminant level (MCL) exceedance (see footnote c, below)

[a] The detection limit of the field fluoride probe is 0.40 mg/L. Values below 0.40 mg/L are reported as nondetects, 0.40 U
[b] No primary MCL established for this constituent. In this case, bold number indicated secondary MCL exceedance
[c] Groundwater samples were analyzed for dissolved metals because total metals were reported above the laboratory method reporting limit

Abbreviations:
U - compound not detected
J = estimated
mg/L - milligrams per liter

APPENDIX B

Fluoride Concentrations in Groundwater (Table B-1)

Metals and VOC Concentrations in Groundwater for Selected Well Locations (Table B-2)

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
BPAT05		August 16, 1994	0.83	
MW01-019	Silt (S) Along South Ditch	July 18, 1994	24 [a]	
		August 15, 1994	22	
		November 7, 1994	56	
		February 6, 1995	28	
		May 11, 1995	34	
		August 10, 1995	30	
		August 6, 1996	33	
		February 19, 1997	30.7	
		August 21, 1997	22	
MW02-012	Silt Scrap Yard	August 7, 1995	18	
		December 4, 1995	24	
		February 13, 1996	30	
		May 15, 1996	28	
		August 7, 1996	30	
		February 24, 1997	30.3	
		August 20, 1997	16	
MW02-024	Silt Scrap Yard Area	July 18, 1994	22	
		August 15, 1994	21	
		November 7, 1994	18	
		May 11, 1995	27	
		August 7, 1995	22	
		December 4, 1995	14	
MW02-034	Upper Gray Sand (UGS) Scrap Yard Area	February 13, 1996	1.1	
		May 15, 1996	3.1	
		August 7, 1996	5.7	
		February 24, 1997	6.69	
		August 22, 1997	6	
MW03-017	Silt Perimeter Well	July 18, 1994	0.5	
		November 7, 1994	0.5	
		February 7, 1995	0.5	
		May 10, 1995	0.57	
		August 9, 1995	0.25	
		August 8, 1996	0.25	
		November 21, 1996	0.4	
		February 17, 1997	0.25	
		May 16, 1997	0.25	
		August 22, 1997	0.25	
		November 7, 1997	0.4	U
		February 16, 1998	0.4	U
		August 14, 1998	0.4	U
MW03-098	Intermediate-Depth (I) Perimeter Well	August 7, 1996	0.4	
		November 21, 1996	0.4	
		February 17, 1997	0.4	
		May 16, 1997	0.52	
		August 22, 1997	0.54	
		November 7, 1997	0.46	
		February 16, 1998	0.48	
		August 14, 1998	0.57	
MW03-175	Deep Well (D) Perimeter Well	August 7, 1996	0.25	
		November 21, 1996	0.4	
		February 17, 1997	0.25	
		May 16, 1997	0.29	
		August 22, 1997	0.26	
		November 7, 1997	0.4	U

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
MW04-019	(S)	July 18, 1994	11	
		August 15, 1994	110	
		November 7, 1994	78	
	South Wetlands	February 6, 1995	93	
		May 11, 1995	180	
		August 7, 1995	73	
		August 6, 1996	200	
		February 21, 1997	33.2	
		August 21, 1997	90.3	Lab value
MW05-025	(S)	February 25, 1997	0.25	
		July 18, 1994	0.5	
		August 8, 1996	0.25	
	Background	November 21, 1996	0.4	
		May 14, 1997	0.25	
		August 21, 1997	0.25	
		November 5, 1997	0.4	U
		February 16, 1998	0.4	U
		August 18, 1998	0.4	U
MW06-024	(S)	July 18, 1994	0.5	
		November 8, 1994	0.5	
		February 7, 1995	0.5	
	South of the Dike	May 10, 1995	0.25	
		August 10, 1995	0.3	
		August 6, 1996	0.25	
		November 19, 1996	0.4	
		February 20, 1997	0.25	
		May 14, 1997	0.25	
		August 19, 1997	0.31	
		November 5, 1997	0.4	U
MW06-094	(I)	November 19, 1996	13.6	
		February 20, 1997	13.4	
	South of the Dike	May 13, 1997	13	Lab value
		August 20, 1997	16	
		November 5, 1997	15.90	
MW06-176	(D)	August 6, 1996	0.4	
		November 19, 1996	0.4	
	South of the Dike	February 20, 1997	0.25	
		May 14, 1997	0.25	
		August 20, 1997	1.4	
		November 5, 1997	0.4	U
MW07-024	(S)	July 18, 1994	0.5	
		February 7, 1995	0.5	
		August 6, 1996	0.25	
	South of the Dike	February 19, 1997	0.25	
		May 15, 1997	0.25	
		August 19, 1997	0.32	
		November 4, 1997	0.4	U
MW08-027	(UGS)	July 18, 1994	4.7	
		August 15, 1994	4.9	
		November 8, 1994	6.3	
	River Boundary	February 7, 1995	6.8	
		May 10, 1995	6.5	
		August 10, 1995	5.6	
		February 7, 1996	6.4	
		August 5, 1996	4.1	
		November 19, 1996	4.62	

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
		February 17, 1997	3.75	
		May 12, 1997	3.19	
		August 18, 1997	2.8	
		November 3, 1997	2.60	
MW08-127	(I)	August 5, 1996	0.25	
		November 18, 1996	0.4	
	River Boundary	February 17, 1997	0.26	
		May 12, 1997	0.25	
		August 18, 1997	0.32	
		November 3, 1997	0.4	U
MW08-169	(D)	May 24, 1996	0.29	
		August 5, 1996	0.4	
		November 18, 1996	0.4	
	River Boundary	February 17, 1997	0.25	
		May 12, 1997	0.25	
		August 18, 1997	0.25	
		November 4, 1997	0.4	U
MW09-030	(UGS)	August 15, 1994	29	
		November 8, 1994	15	
		February 7, 1995	13	
	North Landfill	May 10, 1995	20	
		August 10, 1995	23	
		February 7, 1996	20	
		August 5, 1996	16	
		February 17, 1997	27.6	
		August 18, 1997	14	
		February 19, 1998	25.40	
		August 13, 1998	31.50	
MW10-023	(S)	August 15, 1994	0.5	no, non-detects
		February 6, 1995	0.5	
		August 7, 1996	0.25	
		November 20, 1996	0.4	
	South of the Dike	February 25, 1997	0.25	
		May 13, 1997	0.25	
		August 25, 1997	0.25	
		November 10, 1997	0.4	U
		February 18, 1998	0.4	U
		August 18, 1998	0.4	U
MW10-090	(I)	November 20, 1996	0.4	
		February 25, 1997	0.25	
		May 13, 1997	0.25	
	South of the Dike	August 20, 1997	0.49	
		November 10, 1997	0.4	U
		February 18, 1998	0.4	U
		August 18, 1998	0.4	U
MW10-165	(D)	August 6, 1996	0.3	
		November 20, 1996	0.4	
	South of the Dike	February 25, 1997	0.25	
		May 13, 1997	0.25	
		August 20, 1997	0.5	
		November 10, 1997	0.4	U
		February 18, 1998	0.4	U
		August 18, 1998	0.4	U

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
MW11-017	(S)	August 15, 1994	570	
		November 7, 1994	490	
		February 6, 1995	490	
		February 23, 1995	460	
	East Potliner	May 11, 1995	510	
		August 7, 1995	400	
		December 4, 1995	390	
		February 13, 1996	640	
		May 14, 1996	460	
		August 8, 1996	260	
		February 25, 1997	522	
		August 21, 1997	396	Lab value
		February 16, 1998	385	Lab value
		August 17, 1998	440	Field value
MW12-021	(S)	August 15, 1994	0.5	
		November 8, 1994	0.5	
		February 7, 1995	0.5	
		May 11, 1995	0.25	
		August 10, 1995	0.45	
	Perimeter Well	August 8, 1996	0.25	
		November 20, 1996	0.4	
		February 21, 1997	0.25	
		May 15, 1997	0.25	
		August 20, 1997	0.25	
		November 6, 1997	0.4	U
		February 19, 1998	0.4	U
		August 18, 1998	0.47	
MW12-092	(I)	November 20, 1996	0.4	
		February 21, 1997	0.25	
		May 15, 1997	0.4	
	Perimeter Well	August 20, 1997	0.25	
		November 6, 1997	0.4	U
		February 19, 1998	0.4	U
		August 18, 1998	0.4	U
MW12-184	(D)	August 7, 1996	0.25	
		September 18, 1996	0.25	
		September 19, 1996	0.25	
	Perimeter Well	November 20, 1996	0.4	
		February 21, 1997	0.25	
		May 15, 1997	0.25	
		August 20, 1997	0.25	
		November 6, 1997	0.4	U
MW13-022	(S)	August 7, 1995	100	
		December 4, 1995	71	
		February 9, 1996	120	
	Scrap Yard	May 13, 1996	120	
		August 7, 1996	130	
		February 24, 1997	94	
		August 20, 1997	112	Lab value
		February 19, 1998	108	Field value
		August 17, 1998	130	Field value
MW14-015	(S)	August 7, 1995	6.8	
		December 5, 1995	5	
	Scrap Yard	February 12, 1996	6.9	
		May 13, 1996	5.9	

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
		August 7, 1996	6.3	
		February 21, 1997	6.03	
		August 20, 1997	9.1	
MW15-024	(S)	August 8, 1995	0.5	
		February 7, 1996	0.55	
		August 9, 1996	2.1	
		November 20, 1996	2.26	
	Perimeter Well	February 21, 1997	1.04	
		May 15, 1997	1.2	
		August 25, 1997	2.2	
		November 10, 1997	2.56	
MW15-086	(I)	November 20, 1996	0.4	
		February 21, 1997	0.25	
	Perimeter Well	May 15, 1997	0.26	
		August 25, 1997	0.25	
		November 10, 1997	0.4	U
		February 16, 1998	0.4	U
		August 18, 1998	0.4	U
MW15-175	(D)	August 7, 1996	0.25	
		November 20, 1996	0.4	
	Perimeter Well	February 21, 1997	0.25	
		May 15, 1997	0.25	
		August 25, 1997	0.25	
		November 10, 1997	0.4	U
MW16-014	(S)	August 9, 1995	8	
		December 7, 1995	9	
	South Landfill	February 8, 1996	20	
		May 16, 1996	14	
		August 8, 1996	17	
		February 18, 1997	22.9	
		May 16, 1997	9.9	Lab value
		August 22, 1997	10.1	
MW17-016	(S)	August 8, 1995	0.4	
		December 8, 1995	0.28	
		February 8, 1996	0.25	
	South Wetlands	May 16, 1996	0.25	
	Well Decommissioned 6/98	August 8, 1996	0.25	
		February 18, 1997	0.25	
		August 22, 1997	0.25	
MW17-028	(S)	August 9, 1995	0.6	
		December 7, 1995	0.25	
		February 8, 1996	0.35	
	South Wetlands	May 16, 1996	0.25	
		August 8, 1996	0.25	
		February 18, 1997	0.25	
		August 22, 1997	0.4	
		February 19, 1998	0.4	U
		August 18, 1998	0.4	U
MW18-016	(S)	August 8, 1995	4.4	
		December 8, 1995	5.4	
		February 8, 1996	6.4	
	South Wetlands	May 16, 1996	7.5	
		August 8, 1996	7.1	
		February 18, 1997	7.54	
		August 22, 1997	7.2	

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
MW18-031	(UGS)	August 9, 1995	0.85	
		December 8, 1995	0.28	
		February 8, 1996	0.56	
	South Wetlands	May 16, 1996	0.4	
		August 8, 1996	0.25	
		February 18, 1997	0.25	
		August 22, 1997	0.34	
MW19-013	(S)	August 9, 1995	69	
		December 7, 1995	71	
	South Landfill	February 9, 1996	83	
		May 16, 1996	61	
		August 8, 1996	74	
		February 19, 1997	50.3	
		August 22, 1997	67	
		August 19, 1998	66.3	Field value
MW20-026	(UGS)	September 11, 1995	6.3	
		December 6, 1995	8	
		February 7, 1996	6.7	
	North Landfill	May 13, 1996	5	
		August 6, 1996	4.3	
		February 18, 1997	3.36	
		May 12, 1997	4.2	
		August 19, 1997	5	
		November 4, 1997	6.10	
MW21-012	(S)	September 11, 1995	34	
		December 5, 1995	36	
	North Landfill	February 6, 1996	42	
		May 10, 1996	43	
	Well Decommissioned 6/98	August 5, 1996	37	
		November 20, 1996	60.5	
		February 18, 1997	57.2	
		August 18, 1997	38.3	Lab value
MW21-025	(UGS)	September 11, 1995	11	
		December 5, 1995	6.1	
		February 6, 1996	11	
		May 10, 1996	13	
	North Landfill	August 5, 1996	21	
		November 19, 1996	10.7	
		February 18, 1997	12.6	
		May 12, 1997	13	
		August 18, 1997	12.1	
		November 4, 1997	10.10	
MW21-063	(I)	November 19, 1996	0.4	
		February 18, 1997	0.25	
	North Landfill	May 12, 1997	0.25	
		August 18, 1997	0.27	
		November 4, 1997	0.42	
MW21-176	(D)	November 19, 1996	0.4	
		February 18, 1997	0.25	
	North Landfill	May 12, 1997	0.25	
		August 18, 1997	0.25	
		November 4, 1997	0.4	U

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
MW22-027	(UGS) North Landfill	September 11, 1995	12	
		December 6, 1995	15	
		February 7, 1996	16	
		May 13, 1996	15	
		August 5, 1996	13	
		February 19, 1997	20.1	
		May 12, 1997	16.2	Lab value
		August 19, 1997	22	
		November 4, 1997	14.4	
		February 19, 1998	14.0	field
		August 20, 1998	13.6	field
MW23-025	(UGS) North Landfill	September 11, 1995	19	
		December 6, 1995	14	
		February 6, 1996	16	
		May 13, 1996	14	
		August 5, 1996	9	
		February 19, 1997	18.2	
		August 18, 1997	9.1	
MW24-010	(S) Scrap Yard	August 8, 1995	14	
		December 4, 1995	8.9	
		February 13, 1996	15	
		May 14, 1996	12	
		August 6, 1996	13	
		February 24, 1997	15.9	
		August 20, 1997	6.5	
MW25-024	(S) Scrap Yard	August 8, 1995	18	
		December 5, 1995	21	
		February 12, 1996	31	
		May 15, 1996	24	
		August 7, 1996	24	
		February 20, 1997	26.6	
		August 20, 1997	24	
MW25-035	(UGS) Scrap Yard	August 8, 1995	0.55	
		December 5, 1995	0.4	
		February 12, 1996	0.8	
		May 15, 1996	0.25	
		August 7, 1996	0.25	
		February 20, 1997	0.25	
		August 22, 1997	0.25	
MW26-012	(S) South Landfill	August 9, 1995	72	
		December 7, 1995	94	
		February 9, 1996	100	
		May 16, 1996	99	
		August 8, 1996	106	
		February 19, 1997	99.5	
		August 21, 1997	104	Lab value
		February 16, 1998	101	Lab value
		August 17, 1998	99.5	Lab value
MW27-045	(UGS) West Side North Landfill	November 21, 1996	14.1	
		February 19, 1997	18.1	
		May 13, 1997	19.6	
		August 19, 1997	23	
		November 4, 1997	20.5	
		February 19, 1998	19.4	
		August 18, 1998	20.2	

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
MW27-081	(I) North Landfill	November 19, 1996	20.2	
		February 19, 1997	19.1	
		May 13, 1997	21	
		August 18, 1997	26	
		November 4, 1997	22.3	
		February 19, 1998	22.1	field data
		August 18, 1998	22.3	field data
MW27-176	(D) Adj. to Company Lake	November 19, 1996	0.4	
		February 19, 1997	0.25	
		May 13, 1997	0.3	
		August 19, 1997	0.4	
		November 4, 1997	0.61	
MW28-160	(D) Bakehouse	November 18, 1996	0.4	
		February 19, 1997	0.25	
		May 19, 1997	0.25	
		August 20, 1997	0.32	
		November 6, 1997	0.4	U
MW29-033	(UGS) South of the Dike	November 21, 1996	0.54	
		February 20, 1997	0.72	
		May 14, 1997	0.9	
		August 19, 1997	0.54	
		November 5, 1997	0.68	
MW29-090	(I) South of the Dike	November 19, 1996	12.9	
		February 20, 1997	13.9	
		May 14, 1997	14.4	
		August 19, 1997	9.2	
		November 5, 1997	13.2	
		February 17, 1998	12.0	
		August 11, 1998	15	
MW29-179	(D) South of the Dike	August 6, 1996	1.1	
		November 20, 1996	1.61	
		February 20, 1997	1.81	
		May 14, 1997	2.04	
		August 19, 1997	1.3	
		November 5, 1997	2.35	
		February 17, 1998	2.63	field
		August 12, 1998	3.7	field
MW30-030	(UGS) River Boundary	February 24, 1997	0.25	
		May 14, 1997	0.32	
		August 21, 1997	0.55	
		November 30, 1997	0.79	
		February 19, 1998	0.2	U halved DL (0.4)
		August 13, 1998	0.85	
MW30-100	(I) River Boundary	February 24, 1997	0.4	U
		May 14, 1997	0.4	U
		August 21, 1997	0.4	U
		November 5, 1997	0.4	U
		February 19, 1998	0.4	U
		August 13, 1998	0.85	field
MW31-034	(UGS) Fairview Farms	February 21, 1997	0.25	
		May 13, 1997	0.4	
		August 25, 1997	0.25	
		November 5, 1997	0.4	U
		February 20, 1998	4.97	field
		August 13, 1998	0.4	U (field)

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
MW31-095	(I) Fairview Farms	February 21, 1997	20	
		May 13, 1997	23.1	
		August 25, 1997	24	
		November 5, 1997	25.40	
		February 20, 1998	6.58	field
		August 13, 1998	20.9	field
MW32-040	(UGS) Bakehouse	February 25, 1997	0.28	
		May 15, 1997	0.41	
		August 25, 1997	0.45	
		November 6, 1997	0.49	
		February 17, 1998	0.4	U
		August 12, 1998	0.84	Field
MW32-095	(I) Bakehouse	February 25, 1997	0.42	
		May 14, 1997	0.6	
		August 25, 1997	0.64	
		November 6, 1997	0.50	
		February 17, 1998	0.2	U halved DL
		August 12, 1998	0.61	field
MW32-165	(D) Bakehouse	February 25, 1997	1.32	
		May 14, 1997	1.7	
		August 25, 1997	1.3	
		November 6, 1997	1.47	
MW33-033	(UGS) Scrap Yard	February 25, 1997	0.25	
		May 16, 1997	0.25	
		August 25, 1997	0.25	
		November 6, 1997	0.4	U
MW33-095	(I) Scrap Yard	February 25, 1997	56.8	
		May 16, 1997	58	
		August 25, 1997	82.5	Lab value
		November 6, 1997	112	Lab value
		February 17, 1998	141	field
		August 11, 1998	87.4	field
MW33-165	(D) Scrap Yard	February 25, 1997	17.2	
		May 16, 1997	19	
		August 27, 1997	23	
		November 6, 1997	25	
		February 17, 1998	40.7	
		August 18, 1998	22.4	field
MW34-038	(UGS) East Potliner	February 24, 1997	29	
		May 20, 1997	35	
		August 27, 1997	28	
		November 6, 1997	33	
		February 16, 1998	28.4	field
		August 18, 1998	35.4	field
MW35-038	(UGS) East Potliner	February 24, 1997	5.02	
		May 19, 1997	3.9	
		August 26, 1997	6	
		November 7, 1997	1.74	
		February 16, 1998	0.2	U halved DL
		August 18, 1998	0.2	U halved DL
MW36-006	(S) South Ditch Well Decommissioned 6/98	February 21, 1997	94.9	
		May 16, 1997	96	Lab value
		August 27, 1997	105	Lab value
		November 4, 1997	120	

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
MW37-012	(S)	February 20, 1997	3.57	
		May 20, 1997	3.3	
	South Wetlands	August 25, 1997	5.1	
		November 10, 1997	5.40	
MW37-030	(UGS)	February 20, 1997	0.45	
		May 20, 1997	0.34	
	South Wetlands	August 25, 1997	0.33	
		November 10, 1997	0.4	U
MW38-007	(S)	November 22, 1996	0.4	
		February 19, 1997	0.25	
	South Wetlands	May 15, 1997	0	
	Along Salmon Creek	August 21, 1997	0.25	
		November 7, 1997	0.4	U
		February 16, 1998	0.4	U
		August 19, 1998	0.4	U
MW38-035	(UGS)	February 19, 1997	0.4	U
		May 15, 1997	0.4	U
	South Wetlands	August 21, 1997	0.4	U
	Along Salmon Creek	November 7, 1997	0.4	U
		February 16, 1998	0.4	U
		August 19, 1998	0.4	U
MW39-095	(I)	August 22, 1997	0.4	U
		November 5, 1997	0.4	U
	Fairview Farms	February 19, 1998	0.4	U
		August 14, 1998	0.4	U
MW40-018	(S)	August 26, 1997	1.0	
		November 10, 1997	2.17	
	Bakehouse	February 19, 1998	2.32	
		May 11, 1998	5.70	
		August 14, 1998	5.2	
MW40-030	(UGS)	August 27, 1997	1.1	
		November 11, 1997	1.26	
	Bakehouse	February 19, 1998	1.57	
		May 11, 1998	1.49	
		August 14, 1998	1.4	
MW41-020	(S)	August 26, 1997	0.63	
		November 11, 1997	0.40	
	Bakehouse	February 17, 1998	0.78	
		May 11, 1998	0.93	
		August 12, 1998	0.68	
MW41-033	(UGS)	August 27, 1997	1.1	
		November 11, 1997	1.33	
	Bakehouse	February 17, 1998	0.94	
		May 13, 1998	0.91	
		August 11, 1998	0.59	
MW42-013	(S)	August 28, 1997	Dry	
		November 11, 1997	Dry	
		February 17, 1998	Dry	
	Bakehouse	May 13, 1998	Dry	
		August 18, 1998	Dry	
MW42-027	(UGS)	August 27, 1997	16.1	
		November 10, 1997	14.40	
		February 18, 1998	16.80	

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
	Bakehouse	May 11, 1998	17.20	
		August 12, 1998	22.00	
MW43-015	(S) Bakehouse	August 26, 1997	Dry	
		November 11, 1997	Dry	
		February 18, 1998	6.28	
		May 13, 1998	9.5	
		August 25, 1998	Dry	
MW43-027	(UGS) Bakehouse	August 26, 1997	8.42	
		November 11, 1997	8.29	
		February 18, 1998	5.42	
		May 13, 1998	8.1	
		August 12, 1998	9.2	
MW44-011	(S) Bakehouse	August 28, 1997	Dry	
		November 11, 1997	Dry	
		February 18, 1998	Dry	
		May 12, 1998	Dry	
		August 12, 1998	Dry	
MW44-027	(UGS) Bakehouse	August 26, 1997	6.4	
		November 11, 1997	5	
		February 20, 1998	6	
		May 12, 1998	3.8	
		August 12, 1998	3.1	
MW45-017	(S) Bakehouse	August 25, 1997	9.2	
		November 7, 1997	12.3	
		February 20, 1998	13	
		May 12, 1998	9.2	
		August 13, 1998	12.6	
MW45-042	(UGS) Bakehouse	August 20, 1997	0.73	
		November 7, 1997	1.4	
		February 20, 1998	0.89	
		May 12, 1998	0.91	
		August 13, 1998	0.7	
MW46-018	(S) Bakehouse	August 25, 1997	28	
		November 11, 1997	21.1	
		February 20, 1998	18.9	
		May 12, 1998	16.8	
		August 10, 1998	19.2	
MW46-043	(UGS) Bakehouse	August 21, 1997	1.5	
		November 11, 1997	1.12	
		February 20, 1998	0.90	
		May 12, 1998	0.86	
		August 10, 1998	0.84	
MW47-094	(I) South Landfill	August 21, 1997	0.26	
		November 11, 1997	0.4	U
MW48-055	I North Side of Casthouse	November 19, 1997	0.66	
		February 18, 1998	0.4	U
		August 11, 1998	0.4	U
MW48-165	D Bakehouse Area	November 19, 1997	7.02	
		February 18, 1998	7.4	
		August 11, 1998	8	
MW49-094	I Scrap Yard	November 18, 1997	0.4	U
		February 17, 1998	0.4	U
		August 17, 1998	0.4	U

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)		Notes
MW49-145	D Scrap Yard	November 18, 1997	1.24		
		February 17, 1998	0.59		
		August 17, 1998	0.5		
MW50-094	I South Side of Casthouse	November 19, 1997	0.4	U	
		February 17, 1998	0.4	U	
		August 17, 1998	0.4	U	
MW51-069	I	November 18, 1997	0.27		
		February 17, 1998	0.2	U	halved the DL
		May 11, 1998	0.2	U	halved the DL
	River Boundary	August 10, 1998	0.2	U	halved the DL
MW52-045	UGS	November 10, 1997	9.26		
		February 18, 1998	10.80		
	Near MW08	May 11, 1998	6.11		
	River Boundary	August 10, 1998	10.30		
MW53-034	UGS	November 11, 1997	2.59		
		February 18, 1998	2.84		
	River Boundary	May 11, 1998	2.49		
	(Near East Lake)	August 10, 1998	3.04		
PW03	(D Production Well)	August 16, 1994	0.5		
		October 23, 1995	0.29		
		October 26, 1995	0.31		
		May 19, 1997	0.38		
PW07	(D)	August 16, 1994	0.5		
		October 23, 1995	0.4	U	
		October 26, 1995	0.4	U	
		June 18, 1998	0.4		
		July 16, 1998	0.454		
PW08	(D)	August 16, 1994	1.3		
		November 8, 1994	1.2		
		February 8, 1995	1.5		
		May 10, 1995	1.2		
		August 11, 1995	1.6		
		October 23, 1995	1.1		
		October 26, 1995	1.4		
		December 8, 1995	0.95		
		February 9, 1996	1.3		
		June 19, 1998	2.12		
		July 16, 1998	1.99		
PW10	(D)	August 16, 1994	0.5		
		November 8, 1994	0.5		
		February 8, 1995	1		
		May 10, 1995	0.36		
		August 11, 1995	0.3		
		October 23, 1995	0.25		
		October 26, 1995	0.25		
		December 8, 1995	0.37		
		February 9, 1996	0.37		
		June 19, 1996	0.37		
		July 16, 1996	0.25		
		November 22, 1996	0.4		
		February 26, 1997	0.25		
		May 19, 1997	0.28		
		August 28, 1997	0.32		
		June 18, 1998	0.311		
		July 16, 1998	0.423		

Table B-1
Fluoride Concentrations in Groundwater
Reynolds Metals Company -Troutdale, Oregon

Well ID	Screened Material / Well Depth	Date Sampled	Result (mg/L)	Notes
PW11	Decommissioned	March 29, 1996	0.35	
PW12	Decommissioned	April 1, 1996	0.31	
PW16	Decommissioned	April 2, 1996	1.3	
PW18	(D)	August 16, 1994	0.64	
		November 8, 1994	0.5	
		February 8, 1995	0.61	
		May 10, 1995	0.4	
		August 11, 1995	0.4	
		December 8, 1995	0.38	
		February 8, 1996	0.39	
		May 15, 1996	0.25	
		August 9, 1996	0.25	
		November 22, 1996	0.4	
		February 26, 1997	0.26	
		May 19, 1997	0.33	
		August 28, 1997	0.27	

Notes:
Beginning in 1997, values are from field measurements unless confirmation laboratory value is higher.
[a] Centered fluoride values exceed the 4.0 mg/L EPA Drinking Water Standard.

Table B-2
Metals and VOC Concentrations in Groundwater at Selected Monitoring Well Locations
Reynolds Metals Company - Troutdale, Oregon

			Primary MCLs (mg/L)											Secondary MCLs (mg/L)					
			VOC	Arsenic		Beryllium		Cyanide	Lead		Nickel		TDS	Aluminum		Iron		Manganese	
Well ID	Unit	Date Sampled	PCE 0.005	Total (T) 0.05	Dissolved (D) 0.05	T 0.004	D 0.004	T 0.20	T 0.015	D 0.015	T 0.10	D 0.10	500	T 0.05	D 0.05	T 0.30	D 0.30	T 0.05	D 0.05
MW05-025		07/18/94		.004 U		.02 U		.01 U	.004 U		.05 U			0.34		0.44		.02	
	Silt	08/08/96		.004 U		.0003 U		.02 U	.001 U		.04 U			0.227		0.275			
Background		11/21/96		.0011 U		.0003 U		.061	.0009 U		.0073 U			1.2		1.77			
Well		02/25/97	.001 U	.004 U		.0006		.01 U	.001 U		.04 U		75	0.223		0.223		.02 U	
		05/14/97		.004 U		.0003 U		.02 U	.001 U		.04 U			0.25		0.427			
EPL		08/21/97		.004 U		.00039		.02 U	.0019		.04 U			0.227		0.299			
		11/05/97		.004 U		.0003 U		.02 U	.001 U		.04 U			0.139		0.195			
		02/16/98		.004 U		.0003 U			.001 U		.04 U			0.526					
		08/19/98		.004 U		.0003 U			.001 U		.04 U			0.559	.05 U				
MW11-017		08/15/94	.0001 U	0.16	.083	.02 U	.02 U	0.72	0.10	.056	0.55	.22		380	65	420	6.7	7	1.7
	Silt	11/07/94		0.18	.15	.02 U	.02 U	0.49	0.05	.01	0.24	.07							
		02/06/95		0.16	.14	.02 U	.02 U	0.51	0.03	.0048	0.14	.05 U	1800			77	6.3		
EPL		02/23/95						0.4											
		05/11/95		0.0993	.0999	.0015	.001	0.562	0.0083	.005 U	0.0644	.049							
		08/07/95		0.126	.0956	.0018	.00085	0.46	0.0104	.005 U	0.0661	.05							
		12/04/95						0.63											
		02/13/96		0.115	.104	.0032	.0012	0.88	0.0207	.0026	0.101	.045		76.8	2.29	54.7	3.34		
		05/14/96						0.74											
		08/08/96		0.121	.119	.0034	.0017	0.47	0.0266	.0047	0.104	.0568		88.5	35.1	87.7	35.4		
		02/25/97	.001 U	0.114		.0025		0.603	0.0098		0.0683		1390	26.1		25.3		.773	
		08/21/97		0.11		.0018		0.674	0.0171		0.096			42.2		40.6			
		02/16/98		0.092	.087	.00083	.0003 U		0.0061	.001	0.0425	.04 U		10.7	1.2				
		08/17/98		0.08	.078	.0017	.0013		0.0058	.0047	0.0506	.0462		7.34	8.4				
MW13-022		08/07/95		0.0111		0.0039		2.5	.005 U		.04 U		590	7.58		5.96		.0699	
	Silt	12/04/95		0.0075		0.0063		0.86	.0012		.04 U			4.21		2.32			
EPL		02/09/96		0.0078		0.0058		0.34	.001 U		.04 U			5.53		2.92			
		05/13/96		0.0077		0.0039		0.09	.0013		.04 U			6.18		4.33			
		08/07/96		0.0206	.01	0.0036	.0038	0.62	.0013	.001 U	.04 U	.04 U		5	3.85	3.75	2.79		
		02/24/97	.001 U	0.0083		0.0035		0.06	.0013		.04 U		356	4.06		2.7		.02 U	
		08/20/97		0.0094		0.0024		0.132	.0015		.04 U			5.2		4.58			
		02/19/98		0.0075	.0067	0.0026	.0025		.001 U	.001 U	.04 U	.04 U		3.18	.804				
		08/17/98		0.0093		0.0047	.0045		.001 U		.04 U	.04 U		4.16	1.83				
MW19-013		08/09/95	.001 U	.004 U	.004 U	0.0043	.0043	0.042	.005 U	.005 U	.04 U	.04 U	480	10.5	9.86	2.15	1.61	.146	.141
	Silt	12/07/95		.004 U		0.0041		0.17	.001 U		.04 U			9.88		2.84			
SY		02/09/96		.004 U		0.0059		0.44	.001 U		.04 U			14.1		3.77			
		05/16/96		.004 U		0.0039		0.02	.001 U		.04 U			8.74		1.89			
		08/08/96		.004 U		0.0054		0.56	.001 U		.04 U			8.76		2.29			
		02/19/97	.001 U	.004 U		0.0028		0.028	.001 U		.04 U		521	5.47		2.89		.17	
		08/22/97		.004 U		0.0053		0.01	.001 U		.04 U			8.18		2.2			
		08/19/98		.004 U		0.0046			.001 U		.04 U			7.61					
MW26-012		08/09/95	.001 U	.004 U	.004 U	0.0024	.0023	0.74	.005 U	.005 U	.04 U	.04 U	580	9.92	4.95	3.44	1.5	.108	.0758
	Silt	12/07/95		.004 U		0.0028		0.42	.0014		.04 U			8.56		3.24			
SLF		02/09/96		.004 U		0.0029		0.34	.001 U		.04 U			8.91		3.23			
		05/16/96		.004 U		0.0028		0.36	.0014		.04 U			9.28		4.05			
		08/08/96		.004 U		0.003		0.02	.0028		.04 U			8.81		3.45			
		02/19/97	.001 U	.004 U		0.0032		0.395	.001 U		.04 U		701	8.94		3.15		.0734	
		08/21/97		.004 U		0.0028		0.548	.0016		.113			7.92		4.31			
MW32-040		02/25/97	.29 D	.004 U		.0006		.01 U	.001 U		.04 U		159	0.192		.233		.688	
	UGS	05/15/97	.21 D	.004 U		.0003 U		.02 U	.001 U		.04 U			0.0943		.102			
		08/25/97	.4 D	.004 U		.0003 U		.02 U	.0027		.04 U			.05 U		.1 U			
Bakehouse		11/06/97		.004 U		.0003 U		.02 U	.001 U		.04 U			.05 U		.1 U			
		02/17/98	.34 D																
		08/12/98	.37 D																

Table B-2
Metals and VOC Concentrations in Groundwater at Selected Monitoring Well Locations
Reynolds Metals Company - Troutdale, Oregon

			Primary MCLs (mg/L)										Secondary MCLs (mg/L)						
			VOC	Arsenic		Beryllium		Cyanide	Lead		Nickel		TDS	Aluminum		Iron		Manganese	
Well ID	Unit	Date Sampled	PCE 0.005	Total (T) 0.05	Dissolved (D) 0.05	T 0.004	D 0.004	T 0.20	T 0.015	D 0.015	T 0.10	D 0.10	500	T 0.05	D 0.05	T 0.30	D 0.30	T 0.05	D 0.05
MW33-033	UGS	02/25/97	.001 U	.0062		.00062		.01 U	.001 U		.04 U		154	.05 U		3.38		1.71	
		05/16/97	.001 U	.0059		.0003 U		.02 U	.001 U		.04 U			.05 U		4.33			
No. of SY		08/25/97	.001 U	.0065		.0003 U		.02 U	.001 U		.04 U			.05 U		5.19			
		11/06/97		.0077		.0003 U		.02 U	.001 U		.04 U			.05 U		5.23			
MW33-095	I	02/25/97	.001 U	0.0096		.0017		.379	.0084		.04 U		423	.765		6.45		.232	
		05/16/97	.001 U	0.0077		.0013		.348	.0091		.04 U			.672		5.89			
No. of SY		08/25/97	.001 U	0.0096		.0021		.25	.005		.04 U			.878		6.26			
		11/06/97		0.0095		.003		.402	.0036		.04 U			1.01		6.52			
		02/17/98	.0002 J																
		08/11/98	.001 U																
MW33-165	Deep	02/25/97	.001 U	.004 U		.00061		1.6	.0016		.04 U		243	.0558		4.24		1.09	
		05/16/97	.001 U	.004 U		.00034		.872	.0011		.04 U			.0624		3.7			
No. of SY		08/27/97	.001 U	.004 U		.0006		.816	.001 U		.04 U			.0644		4.31			
		11/06/97		.004 U		.00086		1.17	.001 U		.04 U			.0649		4.28			
MW34-038	UGS	02/24/97	.001 U	.004		.00088		1.11	.001 U		.04 U		1140	.228		.951		1.01	
		05/20/97		.004 U		.00072		0.936	.0011		.04 U			.143		1			
EPL		08/27/97	.001 U	.004 U		.0004		0.932	.001 U		.0719			.12		1.92			
		11/06/97		.004 U		.00043		0.944	.001 U		.04 U			.129		2.15			

Notes:
PCE = Tetrachloroethene.
All analyte concentrations are in mg/L.

APPENDIX C

Precipitation Data (Table C-1), Monthly Groundwater Levels for Selected Well Groups (Table C-2), Total Precipitation for 1994-98 (Figure C-1), and Total Yearly Precipitation (Figure C-2)

Hydrographs for Selected Well Groups and the Columbia River

Includes: Columbia River Hydrograph and Precipitation Data, MW08, MW30, MW21, MW32, MW12, MW03, and MW05 Well Group Hydrographs

Table C-1
Monthly Precipitation Data (in Inches) for Troutdale Vicinity (Water Year)
Reynolds Metals Company - Troutdale, Oregon

1990 / 1991		1991 / 1992		1992 / 1993		1993 / 1994		1994 / 1995		1995 / 1996		1996 / 1997		1997 / 1998	
Oct-90	4.65	Oct-91	1.89	Oct-92	3.86	Oct-93	1.36	Oct-94	9.84	Oct-95	4.69	Oct-96	5.59	Oct-97	7.07
Nov-90	3.68	Nov-91	7.12	Nov-92	5.99	Nov-93	1.54	Nov-94	6.48	Nov-95	11.35	Nov-96	0.36	Nov-97	4.34
Dec-90	2.40	Dec-91	4.60	Dec-92	5.68	Dec-93	6.16	Dec-94	5.42	Dec-95	6.43	Dec-96	0.50	Dec-97	1.52
Jan-91	3.36	Jan-92	4.59	Jan-93	3.57	Jan-94	5.00	Jan-95	4.28	Jan-96	6.93	Jan-97	7.12	Jan-98	7.45
Feb-91	5.11	Feb-92	4.76	Feb-93	0.47	Feb-94	6.70	Feb-95	4.53	Feb-96	10.42	Feb-97	1.53	Feb-98	5.25
Mar-91	3.87	Mar-92	1.44	Mar-93	5.23	Mar-94	2.93	Mar-95	3.84	Mar-96	4.15	Mar-97	6.62	Mar-98	3.68
Apr-91	3.93	Apr-92	4.53	Apr-93	6.40	Apr-94	2.00	Apr-95	4.08	Apr-96	4.71	Apr-97	4.08	Apr-98	1.45
May-91	4.48	May-92	0.46	May-93	6.11	May-94	1.36	May-95	1.74	May-96	4.99	May-97	2.29	May-98	5.21
Jun-91	2.12	Jun-92	0.67	Jun-93	2.44	Jun-94	1.54	Jun-95	2.79	Jun-96	1.06	Jun-97	2.28	Jun-98	2.04
Jul-91	0.29	Jul-92	1.18	Jul-93	3.06	Jul-94	0.09	Jul-95	1.22	Jul-96	0.56	Jul-97	1.15	Jul-98	0.40
Aug-91	0.86	Aug-92	0.97	Aug-93	0.22	Aug-94	0.11	Aug-95	2.50	Aug-96	0.26	Aug-97	1.57	Aug-98	0.00
Sep-91	0.07	Sep-92	1.69	Sep-93		Sep-94	0.82	Sep-95	1.85	Sep-96	2.70	Sep-97	3.09	Sep-98	0.98
WY Total [a]	34.82		33.90		43.03		29.61		48.57		58.25		36.18		39.39
LT Average [b]	40.47		*(1990 through 1998)*												

Notes:

Data Source: City of Portland, Bureau of Environmental Services. Rain gauge No. 1 began data collection in December 1990.

Gauge location: Division Street (north side), west of Fairview Ave., East of Wallula Ave, and South of Burnside in Section 4 T1S, R3E.

October, November, and December 1990 precipitation data from Portland International Airport gauge.

[a] WY = Water year total consists of October through September.

[b] LT = Long-term average for 1991 through 1998 water years.

Table C-2
Monthly Groundwater Levels for Selected Well Groups
Reynolds Metals Company - Troutdale, Oregon

Date	Columbia River	MW03-017	MW03-098	MW03-175	MW05-025	MW08-027	MW08-127	MW08-169	MW12-021	MW12-092	MW12-184	MW21-012[a]	MW21-025	MW21-063	MW21-176	MW30-030	MW30-100	MW32-040	MW32-095	MW32-165
7/20/94	8.18	22.41			21.26	8.00														
8/8/94	6.80	21.93			20.24	5.85			11.31											
9/8/94	4.31	21.56			19.09	4.97			10.37											
10/7/94	5.28	20.90			17.14	4.12			10.11											
10/28/94	6.59	24.45			13.21	6.61			11.64											
12/13/94	7.53	26.49			24.42	7.95			14.11											
1/4/95	7.35	26.17			25.87	8.91			13.86											
2/2/95	14.84	27.78			28.19	14.88			16.04											
2/17/95	12.25	27.85			28.83	11.80			15.69											
3/1/95	10.93	26.69			28.58	11.50			14.74											
4/4/95	7.83	26.08			28.08	8.21			13.85											
5/3/95	12.54	26.84			28.55	12.37			14.81											
6/6/95	12.48	25.69			26.57	12.74			14.45											
6/28/95	12.95	24.40			25.81	12.97			14.28											
8/1/95	8.35	23.31			24.12	8.67			12.82											
9/7/95	4.29	23.09			22.09	5.83			11.95			15.44	7.19							
10/5/95	5.68	22.99			20.79	6.29			11.85			15.35	7.01							
11/3/95	5.56	23.44			19.97	6.73			12.40			16.48	7.70							
12/1/95	21.67	27.65			26.10	20.65			17.27			17.30	16.10							
1/4/96	13.09	27.10			28.18	13.15			15.27			17.24	13.60							
2/2/96	13.63	26.55			28.91	13.83			15.41			17.20	15.06							
3/1/96	18.73	27.11			29.50	19.24			16.61			19.79	20.07							
4/1/96	10.71	27.26			29.51	11.85			15.05			17.19	13.86							
5/6/96	16.28	26.28			28.58	16.68			15.76			17.71	17.30							
6/7/96	19.19	25.75			27.92	19.40			16.21			19.38	19.40							
7/1/96	14.25	24.88	15.81	15.87	26.59	14.48		14.80	15.01		15.59	17.06	15.45							
8/1/96	10.40	23.62	11.70	11.69	24.89	10.03	11.34	10.45	13.33		11.37	16.50	11.12							
9/4/96	6.06	22.73	9.89	9.90	22.96	6.97	8.68	7.33	12.34		9.17	16.10	8.82		7.44					
10/2/96	6.48	22.65	9.39	9.40	21.64	6.97	8.27	7.18	12.00	8.64	8.70	16.24	7.73		7.35					
11/4/96	4.13	24.54	10.02	10.04	21.82	5.57	8.40	6.44	12.87	8.65	8.66	16.84	7.84	7.86	6.54					
12/2/96	11.43	27.39	13.70	13.70	27.15	11.59	12.40	11.30	15.37	13.00	13.00	17.31	11.70	11.86	11.43					
1/6/97	20.89	27.67	21.79	21.80	29.96	21.57	22.08	21.14	17.96	21.49	21.48	21.53	20.66	22.51	21.18	22.17	21.56	21.45	21.58	21.58
2/5/97	18.28	27.41	18.61	18.61	29.69	18.27	18.60	17.80	16.57	18.28	18.32	18.82	18.57	18.49	18.02	18.44	18.23	18.77	18.49	18.41
2/28/97	13.89	26.92	15.52	15.53	29.17	14.30	14.87	13.95	15.29	15.17	15.20	17.26	14.90	14.90	14.11	15.25	14.68	15.85	15.32	15.32
3/11/97	15.03	27.71	16.20	16.20	30.02	14.82	15.35	14.82	16.08	15.78	15.79	17.61	14.87	15.05	15.11	15.44	15.30	16.06	15.93	15.98
4/4/97	15.44	26.50	17.07	17.08	28.92	16.17	16.68	16.33	15.74	16.78	16.79	17.89	17.12	16.91	16.30	16.74	16.22	17.36	17.00	16.97
5/1/97	22.00	26.96	21.48	21.48	29.01	22.10	21.81	21.84	16.94	21.09	21.09	21.87	21.93	21.95	21.83	21.72	21.71	21.06	21.34	21.33
6/4/97	24.80	26.38	23.52	23.53	27.76	24.93	24.37	24.50	17.07	22.57	23.04	23.66	24.38	24.56	24.53	24.16	24.29	22.46	23.42	23.44
7/1/97	13.98	25.92	17.05	17.06	26.79	15.26	16.40	15.59	15.49	16.77	16.77	18.32	17.37	16.94	15.41	16.67	15.67	17.62	16.86	16.86
8/6/97	10.72	23.72	11.76	11.78	25.09	10.53	11.17	10.59	13.22	11.37	11.36	16.57	11.32	11.34	10.58	11.38	10.93	12.75	11.62	11.64
9/2/97	8.17	23.36	10.62	10.60	23.67	8.45	9.57	8.66	12.70	10.06	10.05	16.28	10.00	9.87	8.55	9.38	8.86	11.21	10.26	10.23
11/7/97	10.00	24.65	11.16	11.17	22.48	9.18	9.90	9.41	13.25	10.52	10.51	16.86	9.56	9.71	9.40	9.47	9.56	11.22	10.67	10.67
2/5/98	10.57	26.98	12.86	12.88	27.16	11.06	11.82	10.91	14.56	12.27	12.27	12.09	17.30	12.07	10.77	11.91	11.47	13.40	12.48	12.48
5/4/98	12.81	25.50	12.38	12.38	26.80	12.53	12.01	12.12	13.90	12.32	12.24	16.62	11.40	11.71	12.03	11.73	12.34	12.81	12.16	12.15
8/4/98	6.63	23.67	9.20	9.22	24.46	7.30	8.19	7.15	12.44	8.62	8.62	Aband	9.00	8.83	6.95	8.34	7.80	9.84	8.76	8.75
11/3/98	5.70	22.36	7.94	7.97	19.48	6.12	6.43	5.81	11.04	7.22	7.24	--	6.56	6.66	5.65	6.26	6.33	7.78	7.19	7.20

Notes:
[a] MW21-012 decommissioned on 6/26/98.
Elevations are in feet NGVD, 1929.
MW05-025 water level for November 1998 measured on 11/12/98.
Aband = decommissioned in June 1998.

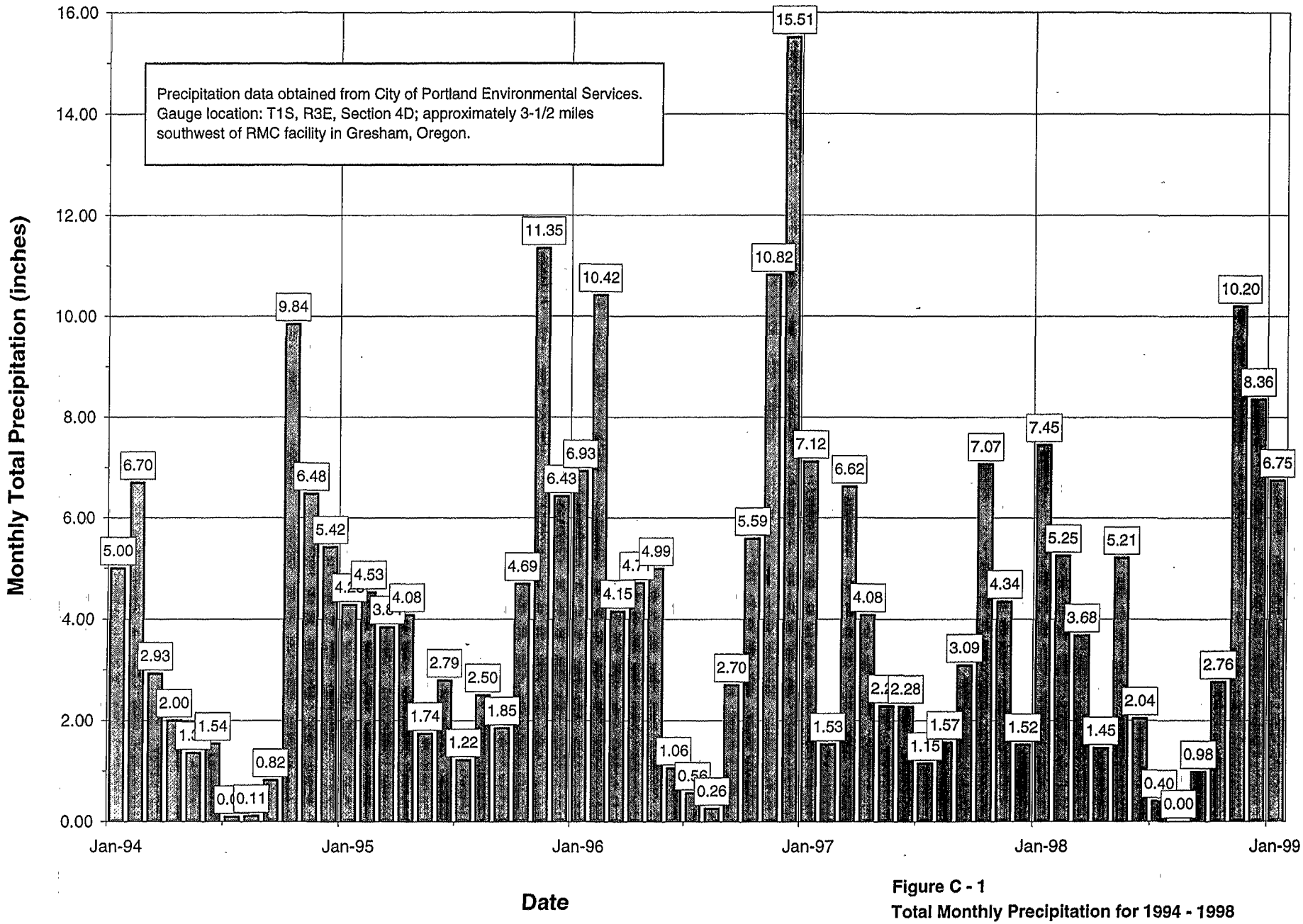

Figure C - 1
Total Monthly Precipitation for 1994 - 1998
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

P:\Rose\Reynolds\93293\grnd\Reports\
nov98rpt\Precipx.xls\Figure C-1 1994-1998

Printed 2/17/99

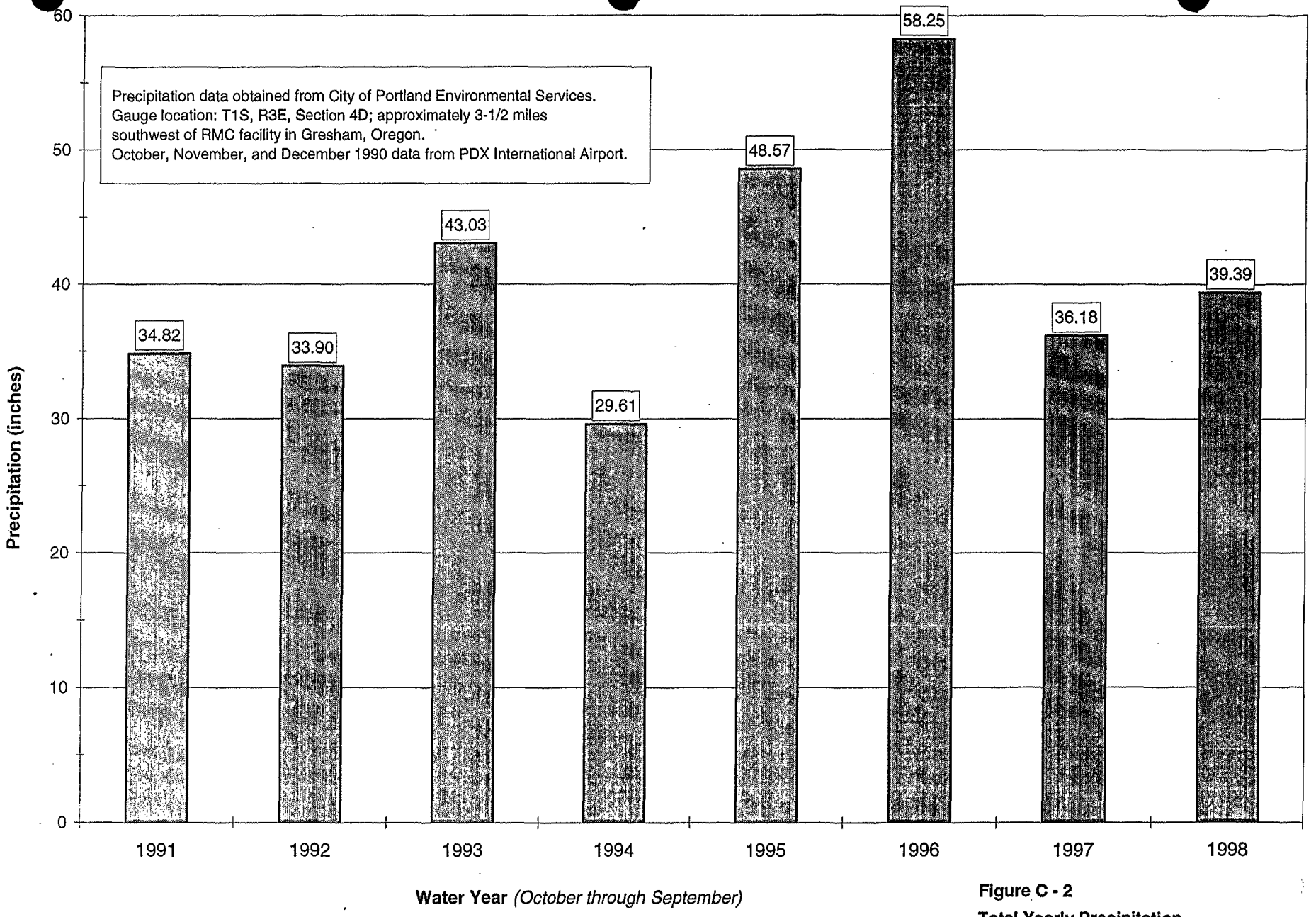

Figure C - 2

Total Yearly Precipitation

Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

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Reports\nov98rpt\\Precipx.xls\C-2 Total Yearly chart 90_98

Printed 2/17/99

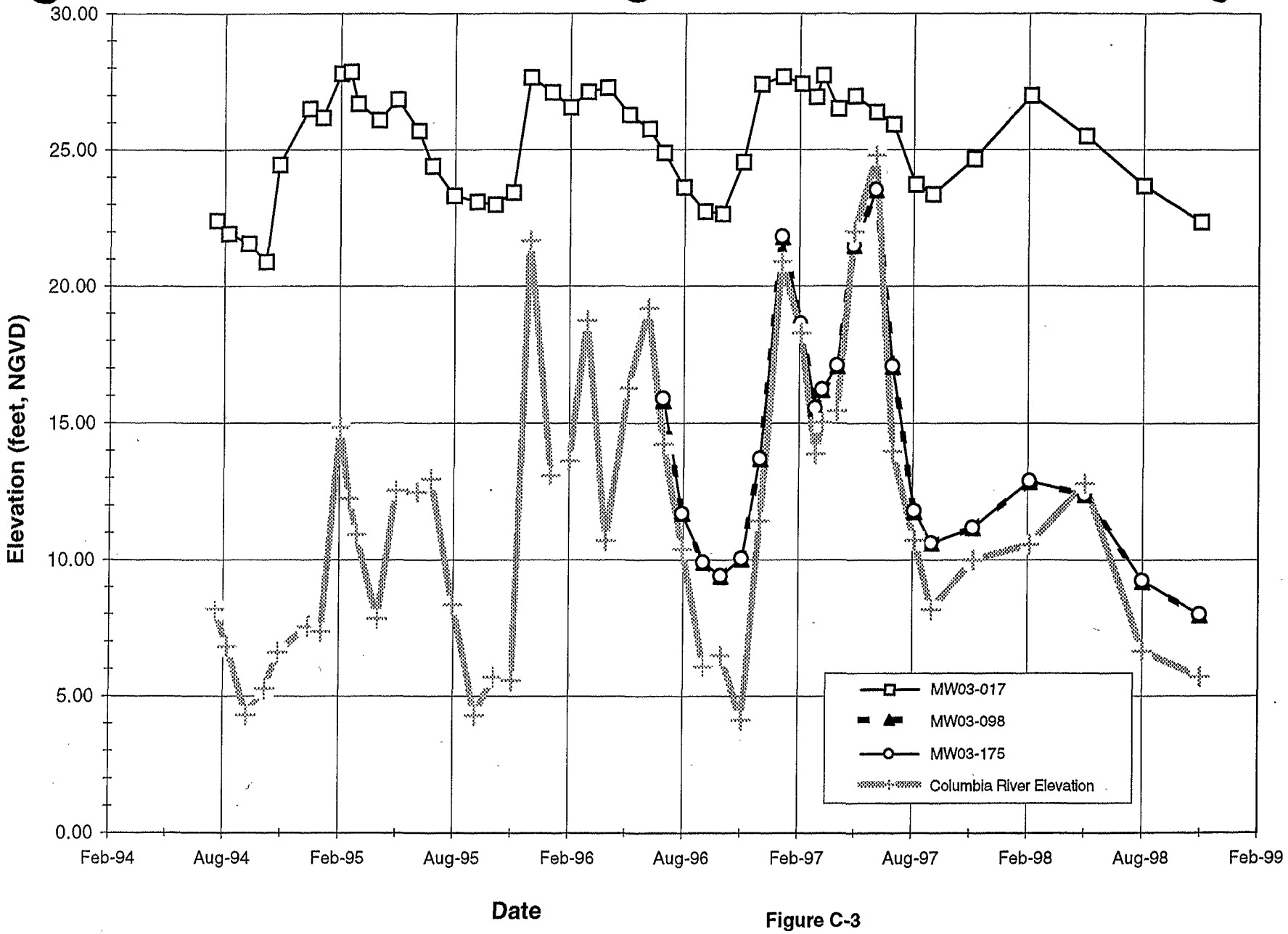


Figure C-3
MW03 Well Group Hydrograph - Background Perimeter
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

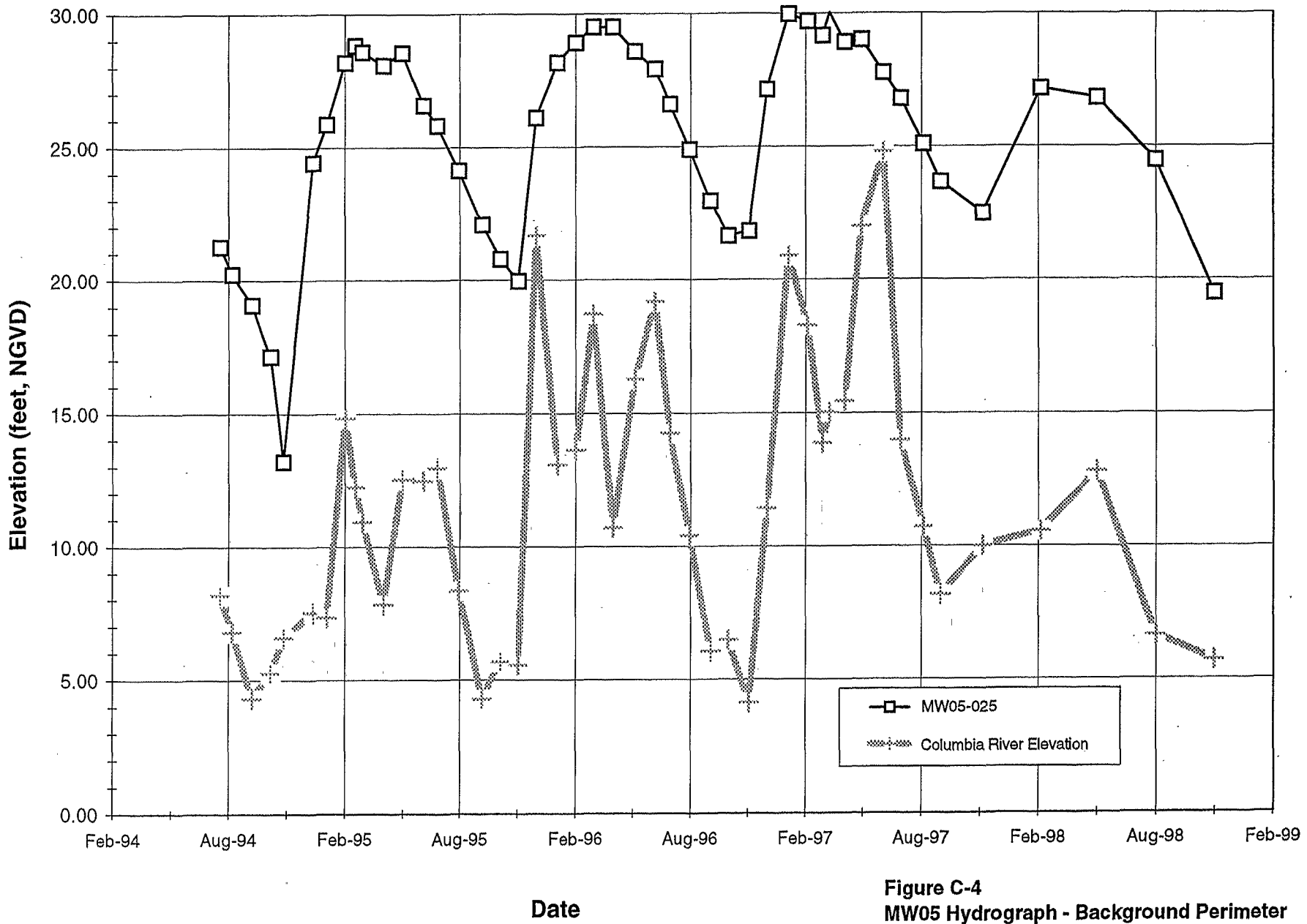


Figure C-4
MW05 Hydrograph - Background Perimeter
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

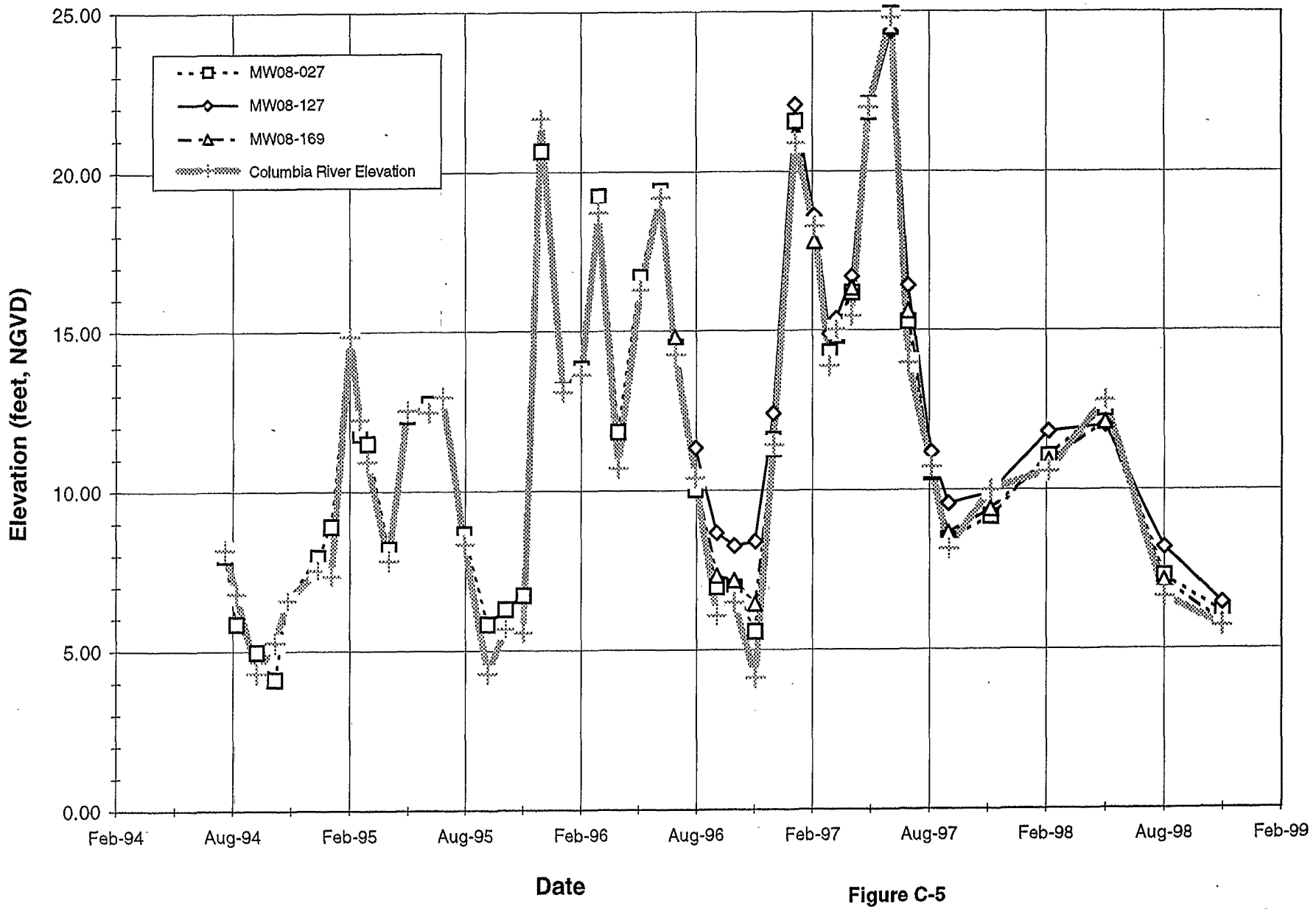


Figure C-5
MW08 Well Group Hydrograph - River Boundary
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

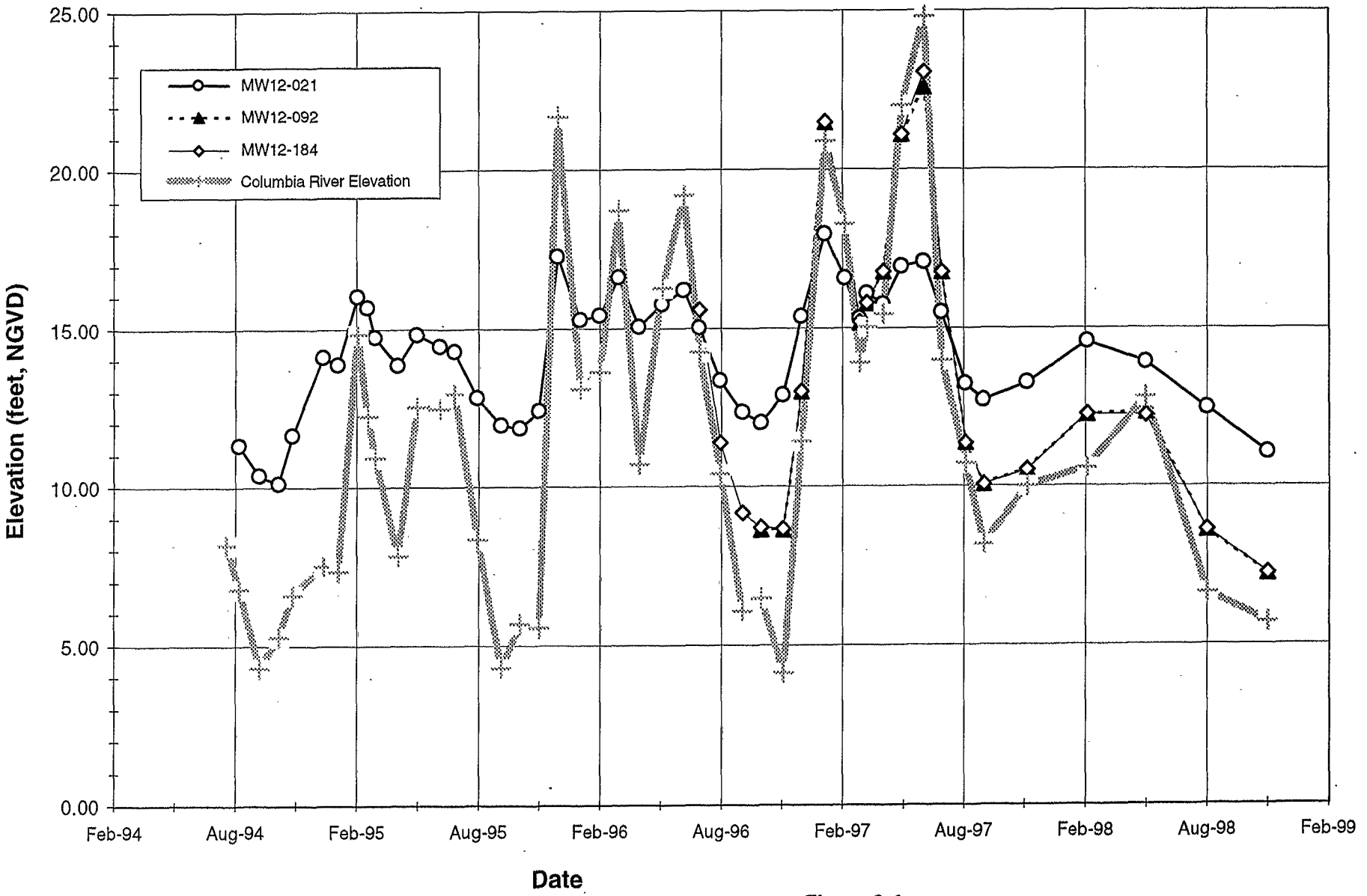


Figure C-6
MW12 Well Group Hydrograph - Southwestern Perimeter
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

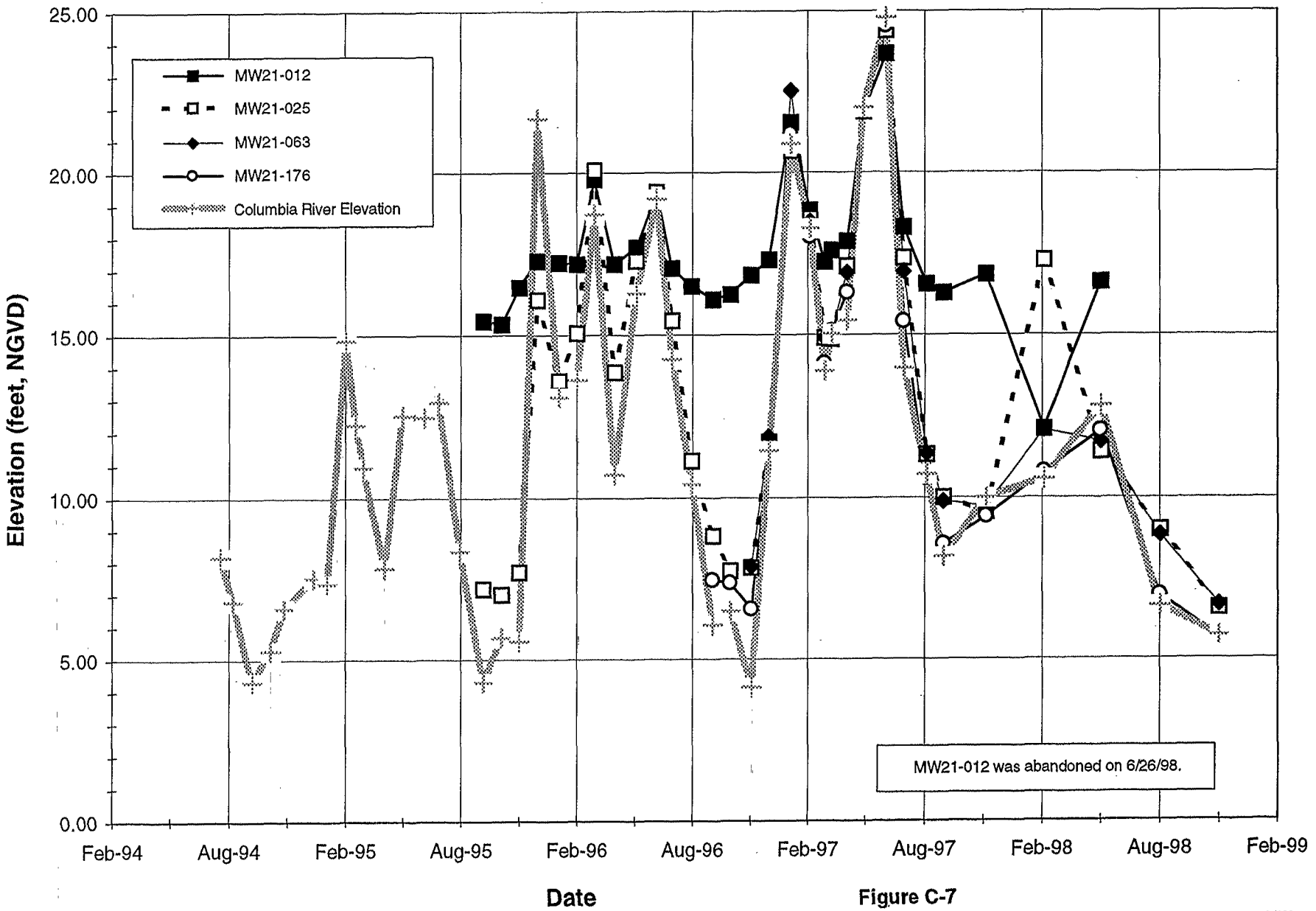


Figure C-7
MW21 Well Group Hydrograph - North Landfill
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

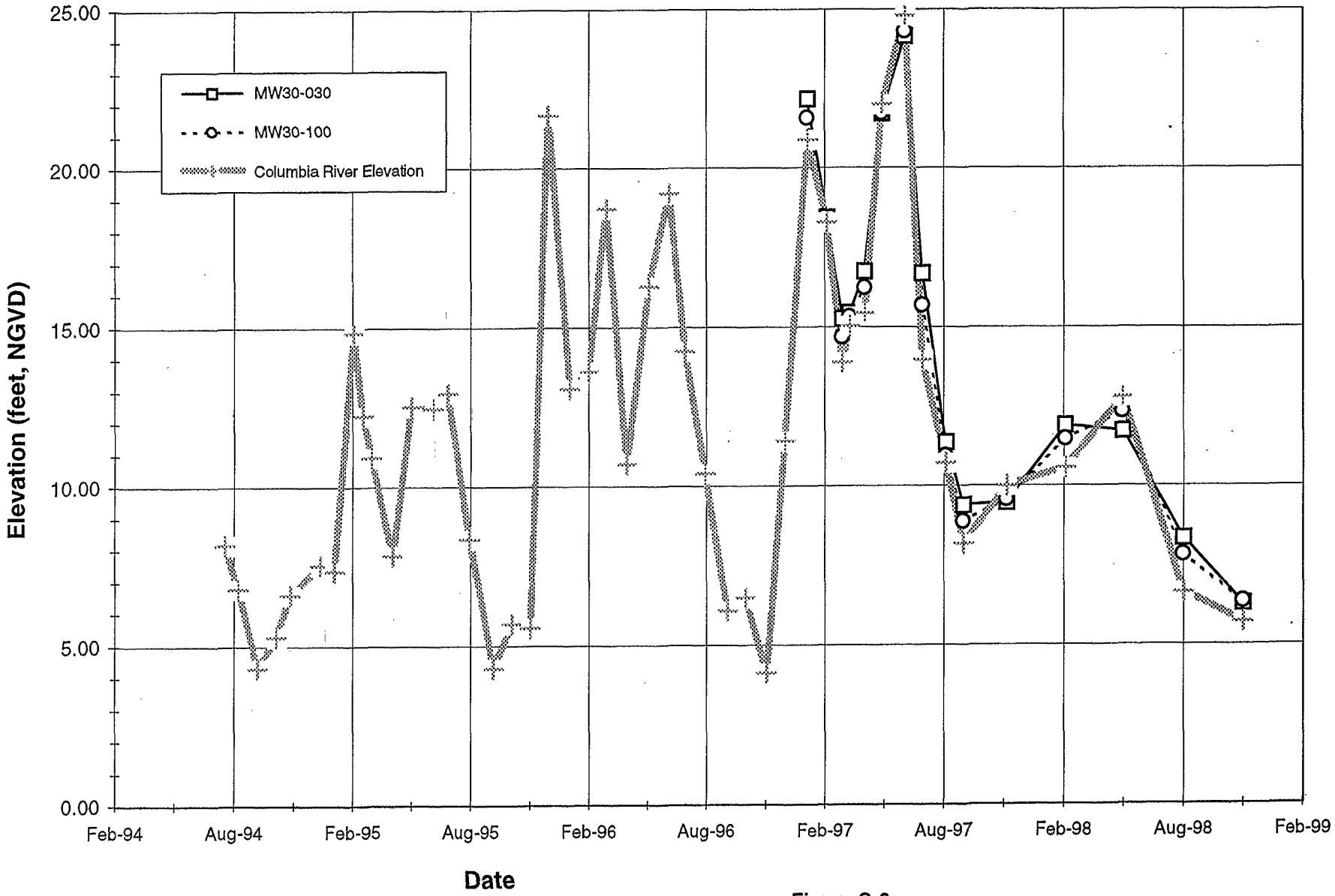


Figure C-8
MW30 Well Group Hydrograph - Northwestern Perimeter
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

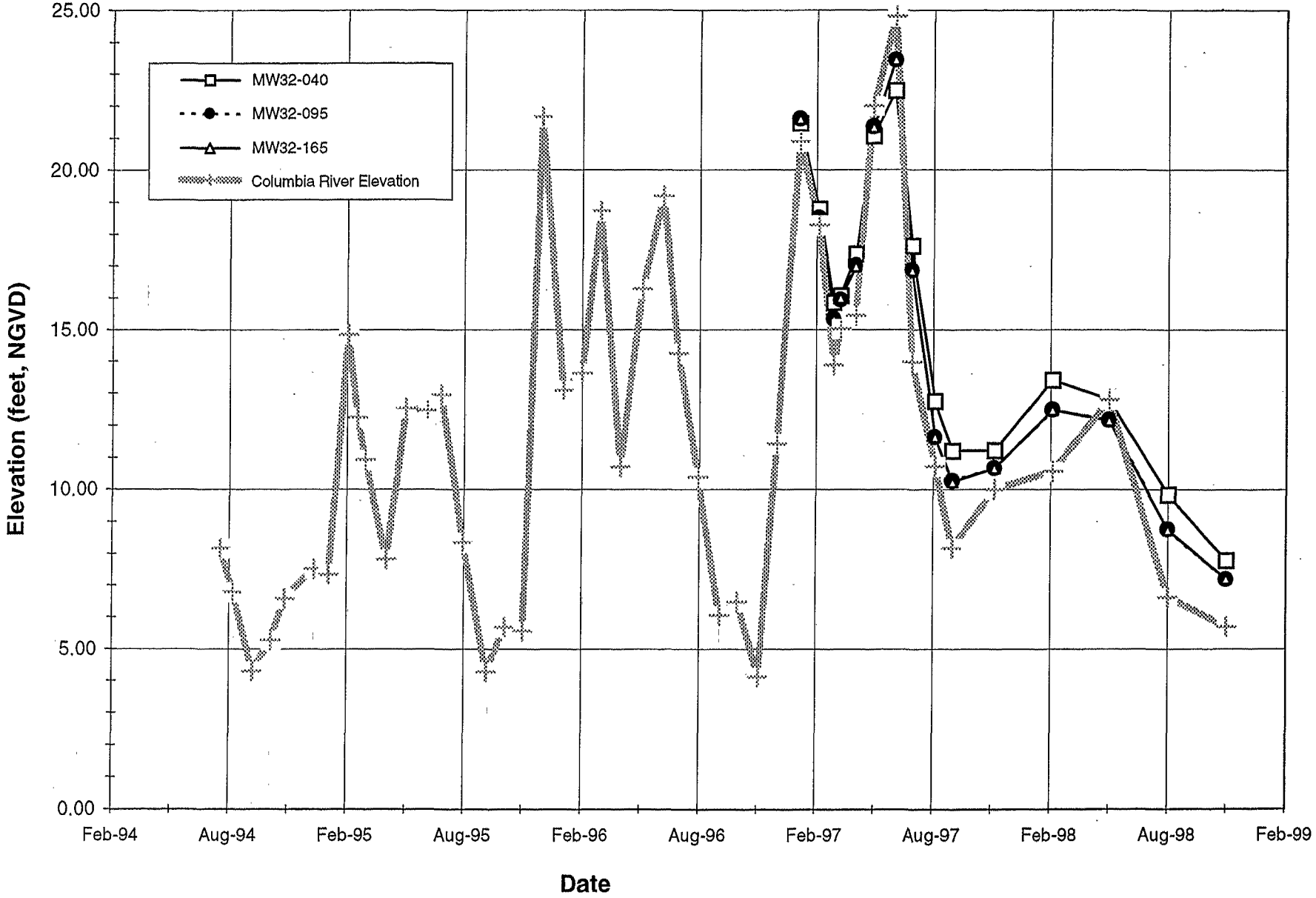


Figure C-9
MW32 Well Group Hydrograph - Plant Interior
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

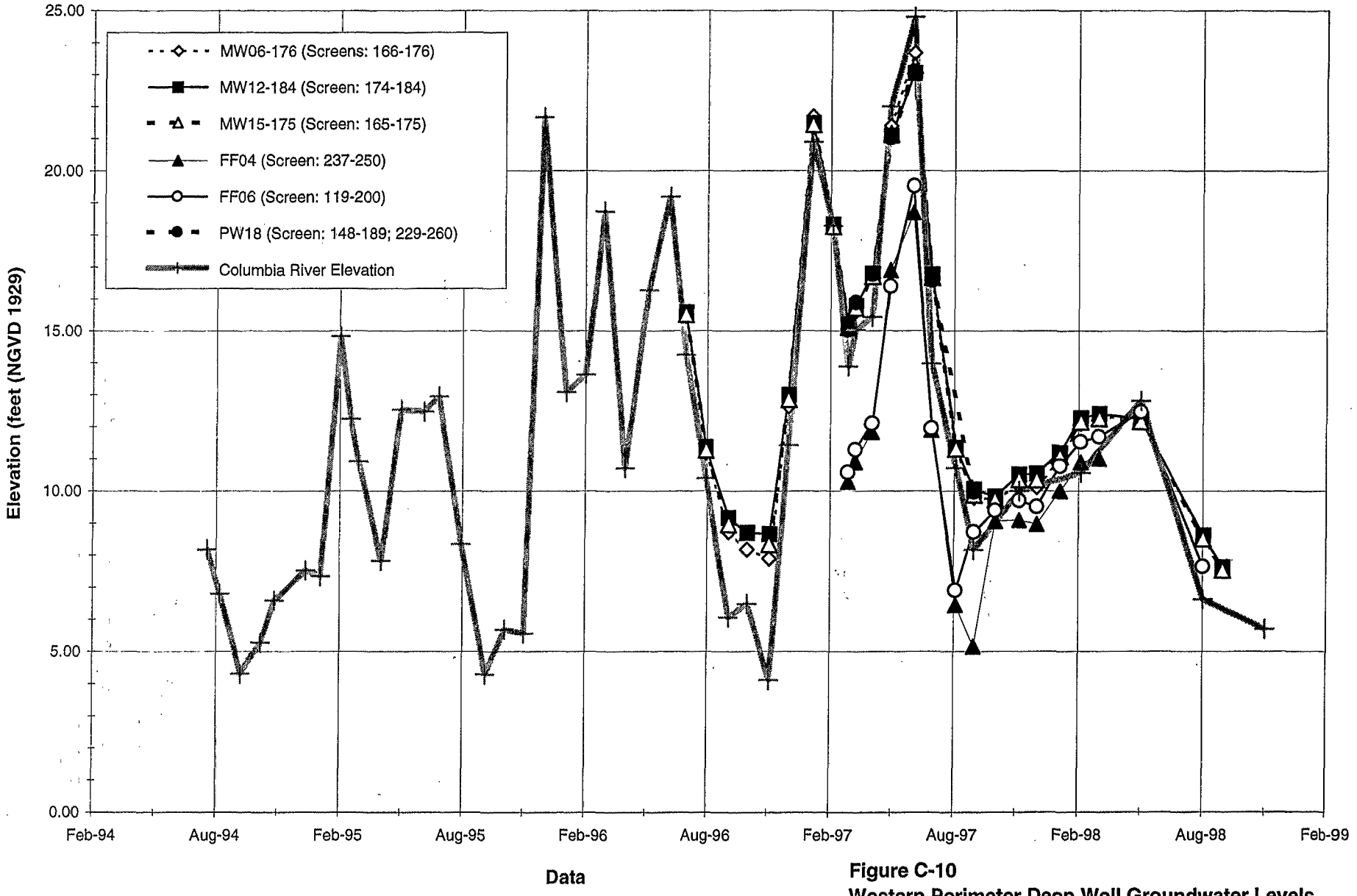


Figure C-10
Western Perimeter Deep Well Groundwater Levels
Reynolds Metals Company - Troutdale, Oregon
1998 Annual Groundwater Monitoring Report

APPENDIX D

Well Decommissioning Logs

Includes MW17-016, MW21-012, MW36-006, FFT-01, and South Ditch Piezometers: SDGP01 through SDGP16

STATE OF OREGON

MONITORING WELL REPORT

MULT 56431

Received Date 10/2/98
Well Tag# L
Start Card # 112494

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB-1

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 9 ft.

Surface Seal
ft.
TO
ft.

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
2.00				PL	☐	☐	☐

Monument

TO

Backfill
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	9	BE	3		S

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By Whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 9/4/1998 Completed 9/4/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10452

Signed By LARRY DONALD INSELMAN Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112494

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: 5100 Sundial Rd

Work Phone: Troutdale, OR 97060

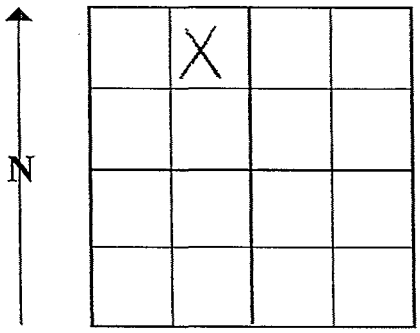
Check type of work: Fee Required: ☒ New Construction ☐ Conversion — No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment — Original Start Card Number _____

Proposed Commencement Date: 9-4-98

Existing or Proposed Well Depth: 8' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Multnomah Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Road
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

CLM — Owner/Agent

G. McInnis — Bonded Water/Monitor Well Constructor — License No. 10011

Date Signed

Geo-Tech — Company — Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

STATE OF OREGON

MONITORING WELL REPORT

MULT 56096

Received Date 7/28/98

Well Tag# L

Start Card # 112317

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No. 1

Co Job No. 1716

Name REYNOLDS METALS

Street 5100 SUNDIAL RD

City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair

☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☒ Hollow Stem Auger Other

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 16 ft.

	Diameter	From	To
Vault			
Casing Diameter	10.00	0	16
Liner ☐			

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
2.00				PL	☐	☒	☐

Monument

Seal

From	To	Material	Amount	Seal Grout Weight	Units
0	16	BE	50	6	G

Screen ☐

Filter Pack

Material

Size in.

(5) WELL TEST

Permeability Yield

Conductivity PH

Temperature of water 54 °F/C Depth artesian flow found ft.

Was water analysis done? ☐

By Whom? CH2M HILL

Depth of strata to be analyzed. From ft. to ft.

Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah

Township 1.00 N Range 3.00 E Section 14

1. NE 1/4 of NW 1/4 of above section.

Legal Desc:

2. Either Street address of well location

SAME

or Tax lot number of well location

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

6.0 Ft. below land surface. Date 6/26/1998

Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found 6 ft.

(9) WELL LOG

Ground elevation 0 ft.

Date started 6/26/1998 Completed 6/26/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10408

Signed By PETER S LARSEN Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

ONITORING WELL REPORT

MULT 56097

Received Date 7/28/98
Well Tag# L
Start Card # 112318

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

OWNER/PROJECT

Well No. 2
Co Job No. 1716

Nar
REYNOLDS METALS
eet 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☒ Hollow Stem Auger Other

(7) STATIC WATER LEVEL

5.0 Ft. below land surface. Date 6/26/1998
Artesian Pressure lb/sq. in. Date

) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 12 ft.

	Diameter	From	To
	10.00	0	12

Vault
ft.
Casing Diameter Liner ☐
TO
ft.

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
2.00				PL	☐	☐	☒

Monument
TO

al

From	To	Material	Amount	Seal Grout Weight	Units
0	12	BE	9		S

ft.
TO
ft.

Screen ☐

ter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(8) WATER BEARING ZONES

Depth at which water was first found 5 ft.

(9) WELL LOG

Ground elevation 0 ft.

Date started 6/26/1998 Completed 6/26/1998

(5) WELL TEST

rmeability Yield
Conductivity PH
mperature of water 54 °F/C Depth artesian flow found ft.
as water analysis done? ☐
By W n? CH2M HILL
pth of strata to be analyzed. From ft. to ft.
Remarks

me of supervising Geologist/Engineer

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10408

Signed By PETER S LARSEN Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112317

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Road

Work Phone: _____ Troutdale, OR 97060

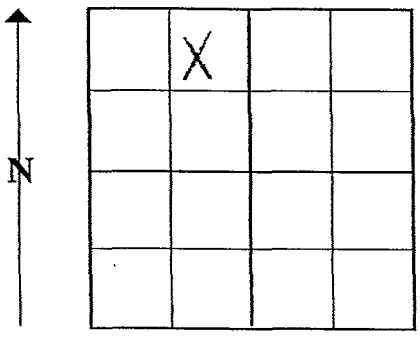
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-23-98

Existing or Proposed Well Depth: 12' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Road
3. Tax-lot number of well location: _____
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

C. H. McHill — Owner/Agent

J. McTonis — Bonded Water/Monitor Well Constructor — License No. 10011

_____ Date Signed

Geo Tech — Company

_____ Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112318

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Road

Work Phone: _____ Troutdale, OR 97060

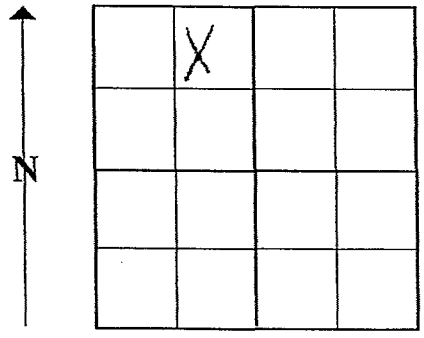
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-23-98

Existing or Proposed Well Depth: 16' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Multn Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Road
3. Tax-lot number of well location: _____
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

[illegible]	J. McTavis	License No. 10011
Owner/Agent	Bonded Water/Monitor Well Constructor	
	[illegible]	
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

STATE OF OREGON

MONITORING WELL REPORT

MULT 56056

Received Date 7/23/98
Well Tag# L
Start Card # 112245

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB1

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 20 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	20	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56057

Received Date 7/23/98
Well Tag# L
Start Card # 112246

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB2

REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 16 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

From	To	Material	Amount	Seal Grout Weight	Units
0	16	BE	3	12	G

ft.
TO
ft.

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By Whom?
of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56058

Received Date 7/23/98
Well Tag# L
Start Card # 112247

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB3

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 18 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	18	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56059

Received Date 7/23/98
Well Tag# L
Start Card # 112248

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB4

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 15 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	15	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56060

Received Date 7/23/98

Well Tag# L

Start Card # 112249

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.

Co Job No. AB5

Name REYNOLDS METALS

Street 5100 SUNDIAL RD

City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair

☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 18 ft.

Vault

ft.

TO

ft.

Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal

ft.

TO

ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	18	BE	3	12	G

Screen ☐

Filter Pack

ft.

TO

ft.

Filter Pack

Material

Size in.

(5) WELL TEST

Permeability Yield

Conductivity PH

Temperature of water °F/C Depth artesian flow found ft.

Was water analysis done? ☐

By whom?

Depth of strata to be analyzed. From ft. to ft.

Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah

Township 1.00 N Range 3.00 E Section 14

1. NE 1/4 of NW 1/4 of above section.

Legal Desc:

2. Either Street address of well location

SAME

or Tax lot number of well location 100

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date

Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56061

Received Date 7/23/98
Well Tag# L
Start Card # 112250

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB6

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 17 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	17	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56062

Received Date 7/23/98
Well Tag# L
Start Card # 112251

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB7

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 16 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	16	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56063

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

Received Date 7/23/98
Well Tag# L
Start Card # 112252

(1) OWNER/PROJECT

Well No.
Co Job No. AB8

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 16 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	16	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56064

Received Date 7/23/98
Well Tag# L
Start Card # 112253

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB9

Name
REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 17 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	17	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56065

Received Date 7/23/98
Well Tag# L
Start Card # 112254

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB10

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 17 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

From	To	Material	Amount	Seal Grout Weight	Units
0	17	BE	3	12	G

ft.
TO
ft.

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56066

Received Date 7/23/98
Well Tag# L
Start Card # 112255

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB11

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97062

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 13 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	13	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56067

Received Date 7/23/98
Well Tag# L
Start Card # 112256

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB12

REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 16 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

From	To	Material	Amount	Seal Grout Weight	Units
0	16	BE	3	12	G

ft.
TO
ft.

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By Whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56068

Received Date 7/23/98
Well Tag# L
Start Card # 112257

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB13

Name REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 16 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	16	BE	3	12	G

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56069

Received Date 7/23/98
Well Tag# L
Start Card # 112258

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB14

REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 16 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

From	To	Material	Amount	Seal Grout Weight	Units
0	16	BE	3	12	G

ft.
TO
ft.

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By/Whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56071

Received Date 7/23/98

Well Tag# L

Start Card # 112259

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.

Co Job No. AB15

REYNOLDS METALS

Street 5100 SUNDIAL RD

City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair

☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 16 ft.

Vault

ft.

TO

ft.

Monument

TO

ft.

TO

ft.

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

From	To	Material	Amount	Seal Grout Weight	Units
0	16	BE	3	12	G

Screen ☐

Filter Pack

ft.

TO

ft.

Filter Pack

Material

Size in.

(5) WELL TEST

Permeability Yield

Conductivity PH

Temperature of water °F/C Depth artesian flow found ft.

Was water analysis done? ☐

By Whom?

of strata to be analyzed. From ft. to ft.

Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah

Township 1.00 N Range 3.00 E Section 14

1. NE 1/4 of NW 1/4 of above section.

Legal Desc:

2. Either Street address of well location

SAME

or Tax lot number of well location 100

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date

Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56070

Received Date 7/23/98
Well Tag# L
Start Card # 112260

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB16

REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 15 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

From	To	Material	Amount	Seal Grout Weight	Units
0	15	BE	3	12	G

ft.
TO
ft.

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By Whom?
of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

MULT 56072

Received Date 7/23/98
Well Tag# L
Start Card # 112261

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No.
Co Job No. AB17

REYNOLDS METALS
Street 5100 SUNDIAL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK

☐ New Construction ☐ Alter (Recondition ☐ Alter (Repair
☐ Conversion ☐ Deepening ☒ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger Other GROUTINPLACE

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 62 ft.

Vault
ft.
TO
ft.
Monument

Casing Diameter Liner ☐

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
0.75				PL	☐	☐	☒

TO

From	To	Material	Amount	Seal Grout Weight	Units
0	62	BE	3	12	G

ft.
TO
ft.

Screen ☐

Filter Pack
ft.
TO
ft.

Filter Pack
Material
Size in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water °F/C Depth artesian flow found ft.
Was water analysis done? ☐
By/Whom?
of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Multnomah
Township 1.00 N Range 3.00 E Section 14
1. NE 1/4 of NW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
SAME
or Tax lot number of well location 100
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation ft.

Date started 6/23/1998 Completed 6/23/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10402

Signed By KEITH D VIDOS Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112245

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: 5100 Sundial Rd

Work Phone: Troutdale, OR 97060

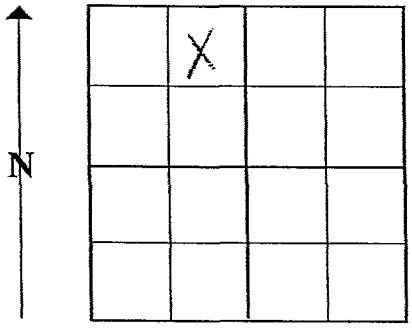
Check type of work: Fee Required: { ☐ New Construction ☐ Conversion } No Fee Required: { ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment } Original Start Card Number _____

Proposed Commencement Date: 6/21/98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Multn Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

Owner/Agent _____ Bonded Water/Monitor Well Constructor _____ License No. _____

Date Signed _____ Company _____ Date Signed _____

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY
Date Postmarked _____ W 112246
Date Hand Delivered _____ WRD Receipt _____
Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION
(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals
Home Phone: 5100 Sundial Rd
Work Phone: Troutdale, Or. 97060

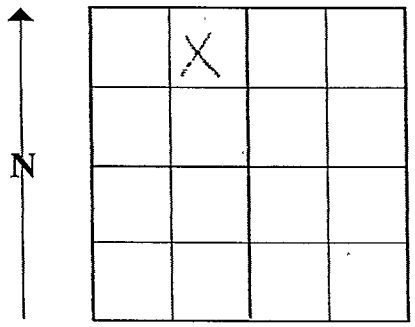
Check type of work: Fee Required: { ☐ New Construction ☐ Conversion } No Fee Required: { ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment }
Original Start Card Number _____

Proposed Commencement Date: 6-26-96

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Multnomah Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned).
   5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

Owner/Agent: [illegible] Bonded Water/Monitor Well Constructor: [illegible] License No. 1001
Date Signed _____ Company: Pro Tech Date Signed _____

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112247

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sunnyside Rd

Work Phone: _____ Troutdale, OR 97060

Check type of work: Fee Required: { ☐ New Construction ☐ Conversion } No Fee Required: { ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment }

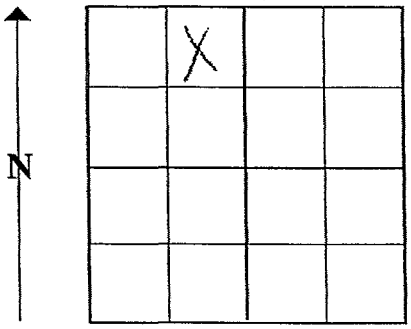
Original Start Card Number _____

Proposed Commencement Date: 6-24-98

Existing or Proposed Well Depth: 70' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sunnyside Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

[illegible]	[illegible]	License No. 1011
Owner/Agent	Bonded Water/Monitor Well Constructor	
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112248

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

Check type of work: Fee Required: { ☐ New Construction ☐ Conversion } No Fee Required: { ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment }

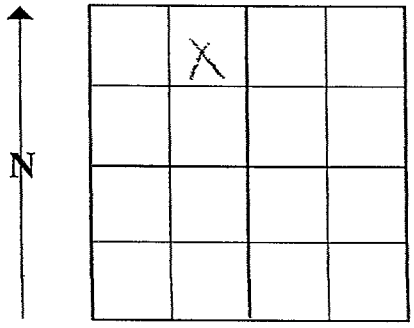
Original Start Card Number _____

Proposed Commencement Date: 10-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.

2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd

3. Tax-lot number of well location: 100

4. Attach map with location identified. (See reverse for approved maps)

5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

[illegible] — Owner/Agent

G. McInnis — Bonded Water/Monitor Well Constructor — License No. 10011

_____ Date Signed

[illegible] — Company — _____ Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112249

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

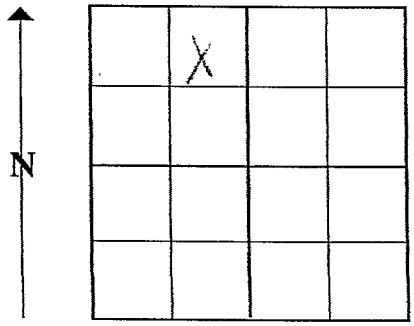
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 4



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

[signature] Owner/Agent — [signature] Bonded Water/Monitor Well Constructor — License No. 10011

_____ Date Signed — Geo Tech Company — _____ Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112250

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: 5100 Sundial Rd

Work Phone: Troutdale, OR 97060

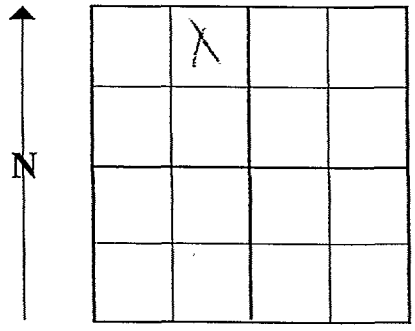
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

CHbM	G. McTrais	License No. 10011
Owner/Agent	Bonded Water/Monitor Well Constructor	
	Geo-Tech	
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112251

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

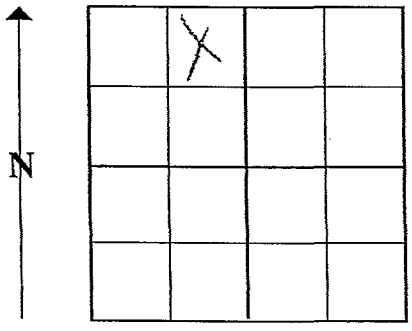
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mu H Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

Owner/Agent	Bonded Water/Monitor Well Constructor	License No. 10011
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112252

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5480 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

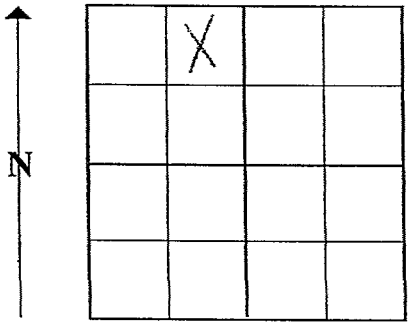
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

C&M	A. McInnis	License No. 1001
Owner/Agent	Bonded Water/Monitor Well Constructor	
	Geo Tech	
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112253

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

Check type of work: Fee Required: { ☐ New Construction ☐ Conversion } No Fee Required: { ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment }

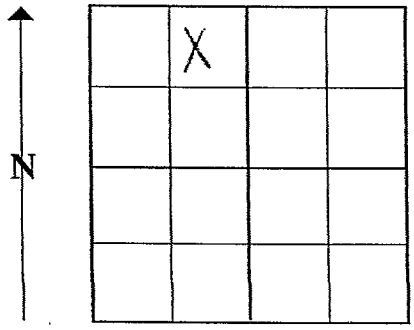
Original Start Card Number _____

Proposed Commencement Date: 6-29-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County N M H Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.

2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd

3. Tax-lot number of well location: 100

4. Attach map with location identified. (See reverse for approved maps)

5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

CHZM — Owner/Agent

G. McTavis — Bonded Water/Monitor Well Constructor — License No. 10011

_____ Date Signed

GRO Tech — Company — _____ Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112254

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

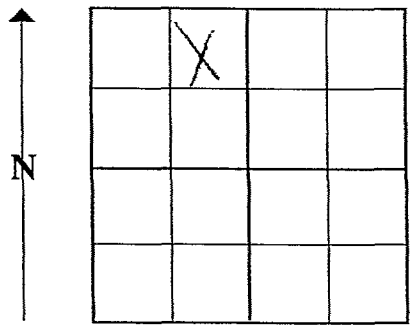
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

C H2M	B. McInnis	License No. 10011
Owner/Agent	Bonded Water/Monitor Well Constructor	
	Geo Tech	
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112255

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

Check type of work: Fee Required: { ☐ New Construction ☐ Conversion } No Fee Required: { ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment }

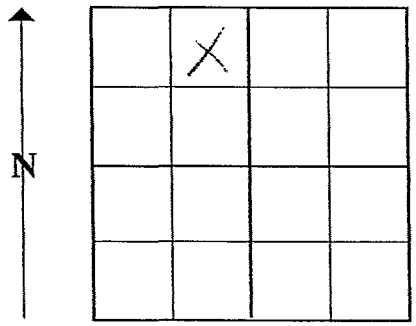
Original Start Card Number _____

Proposed Commencement Date: 6-24-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Multnomah Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.

2. Street Address of well location (or directions if not assigned).
5100 Sundial Rd

3. Tax-lot number of well location: 100

4. Attach map with location identified. (See reverse for approved maps)

5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

Owner/Agent: [signature] Bonded Water/Monitor Well Constructor: [signature] License No. 1001

Date Signed _____ Company: Geotech Date Signed _____

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112256

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: 5100 Sunnyside Rd

Work Phone: Troutdale, OR 97060

Check type of work: Fee Required: { ☐ New Construction ☐ Conversion } No Fee Required: { ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment }

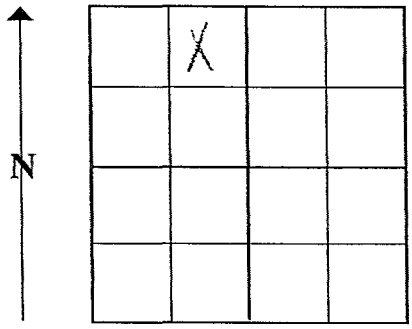
Original Start Card Number _____

Proposed Commencement Date: 10/21/98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.

2. Street Address of well location (or directions if not assigned). 5100 Sunnyside Rd

3. Tax-lot number of well location: 100

4. Attach map with location identified. (See reverse for approved maps)

5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

Owner/Agent _____ Bonded Water/Monitor Well Constructor _____ License No. 10011

Date Signed _____ Company _____ Date Signed _____

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112257

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

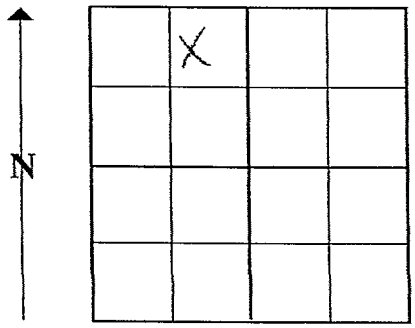
Check type of work: Fee Required: { ☐ New Construction ☐ Conversion } No Fee Required: { ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment } Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Multnomah Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.

2. Street Address of well location (or directions if not assigned).
5100 Sundial Rd

3. Tax-lot number of well location: 100

4. Attach map with location identified. (See reverse for approved maps)

5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

[signature] — Owner/Agent

[signature] — Bonded Water/Monitor Well Constructor — License No. 10011

Date Signed _____ Geo Tech — Company — Date Signed _____

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112258

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

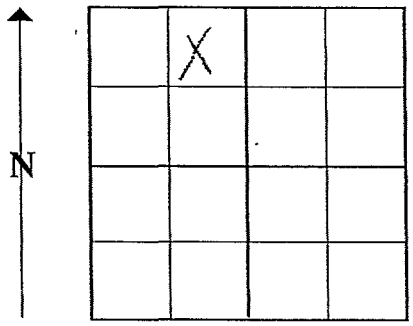
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

CH2M	G. McInnis	License No. 10011
Owner/Agent	Bonded Water/Monitor Well Constructor	
	Geo-Tech	
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112259

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

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Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

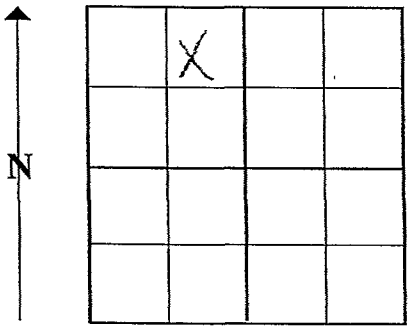
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: ~~E~~ 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

CH2M	B. McInnis	License No. 10011
Owner/Agent	Bonded Water/Monitor Well Constructor	
	Geo Tech	
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112260

Date Hand Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

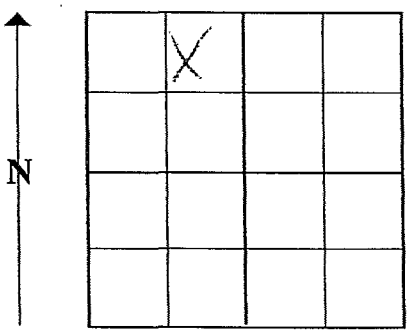
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 20' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

[signature]	G. McInnis	License No. 10011
Owner/Agent	Bonded Water/Monitor Well Constructor	
	Geo Tech	
Date Signed	Company	Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

ADDITIONAL IMPORTANT INFORMATION ON BACK.

THIS COPY TO CUSTOMER.

FOR WATER RESOURCES DEPARTMENT USE ONLY

Date Postmarked _____ W 112261

Date Hand-Delivered _____ WRD Receipt _____

Watermaster Initials _____ Date Fee Received _____

Check No. _____

START CARD

NOTICE OF BEGINNING OF WELL CONSTRUCTION

(as required by ORS 537.762)

This form must be completed and the original copy mailed or delivered to the Water Resources Department, 158 12th St. NE, Salem, OR 97310, for all new well construction, or conversion of an existing hole not previously used to seek water. This original copy must be mailed or delivered no later than the day construction or conversion work begins. A $75 fee shall accompany the original copy for all new well construction and conversion (make checks payable to the Water Resources Department). Notices meeting the submittal requirements but received without the required fee will not be accepted as properly and timely filed. In addition, the constructor shall provide the "Watermaster Copy" of this notice to the office of the district watermaster within which the well is being constructed, altered, converted or abandoned using one of the following options: (a) by regular mail no later than three (3) calendar days (72 hours) prior to commencement of work; or, (b) by hand delivery, during regular office hours, no later than the day work is commenced; or, (c) by FAX no later than the day work is commenced. If method (c) is used, the original "Watermaster Copy" of this notice shall also be mailed or delivered to the office of the district watermaster no later than the day work is commenced. The Water Resources Commission has authority to impose civil penalties for failure to submit the required $75 fee with the start card and for failure to submit cards prior to beginning any construction, alteration, conversion or abandonment work.

Owner's name and mailing address: Reynolds Metals

Home Phone: _____ 5100 Sundial Rd

Work Phone: _____ Troutdale, OR 97060

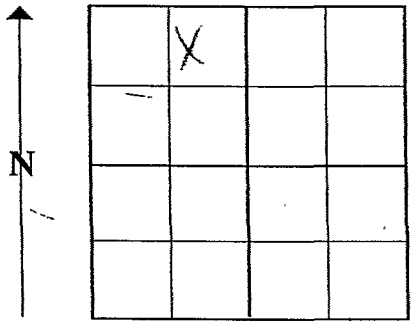
Check type of work: Fee Required: ☐ New Construction ☐ Conversion No Fee Required: ☐ Alteration (Repair/Recondition) ☐ Deepening ☒ Abandonment Original Start Card Number _____

Proposed Commencement Date: 6-26-98

Existing or Proposed Well Depth: 60' Diameter: 2" Original Well I.D. Label Number: _____

Check Use: ☐ Domestic ☐ Public System (Community) ☐ Industrial ☐ Irrigation ☒ Monitoring ☐ Thermal ☐ Injection ☐ Other _____

Proposed Well Location: County Mult Township: 1 (North or South) Range: 3 (East or West) Section: 14



1. NE 1/4 of NW 1/4 of above section.
2. Street Address of well location (or directions if not assigned). 5100 Sundial Rd
3. Tax-lot number of well location: 100
4. Attach map with location identified. (See reverse for approved maps)
5. Show well location within 1/4, 1/4 of section grid at left.

We hereby certify that we have read the back of this form and that the information provided is accurate to the best of our knowledge.

CH2M — Owner/Agent

G. McInnis — Bonded Water/Monitor Well Constructor — License No. 10011

_____ Date Signed

Geo Tech — Company

_____ Date Signed

OWNER PLEASE NOTE: This is not a water right application. The owner is responsible for obtaining a water right through the Water Resources Department, if required. The Oregon Health Division requires plans to be submitted and approved prior to construction if the well is to be used as a public system.

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