PES Environmental, Inc.
Engineering & Environmental Services

A Report Prepared for:

Univar USA Inc.
8201 South 212th Street
Kent, Washington 98032

REMEDIAL INVESTIGATION, FOCUSED FEASABILITY STUDY ADDENDUM, AND DRAFT CLEANUP ACTION PLAN

UNIVAR USA INC.
KENT, WASHINGTON

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1.0 INTRODUCTION

PES Environmental, Inc. (PES), has prepared this report for Univar USA Inc. (Univar) in partial fulfillment of the requirements of Agreed Order No. DE 5988 (Order) between Univar and the State of Washington, Department of Ecology (Ecology) effective November 20, 2008 (Ecology, 2008). Specifically, the Order requires Univar to finalize a remedial investigation, feasibility study, and a draft cleanup action plan for Univar's operations located in Kent, Washington.

1.1 Property Description

Univar is an active chemical distribution facility located at 8201 South 212th Street in Kent, Washington (Property). Univar has operated at the Kent location under three corporate names: Van Waters and Rogers Inc. (1974-2001), Vopak USA Inc. (2001-2002) and Univar USA Inc. (2002 to the present).

The 11-acre Property is approximately 3 miles east of Interstate 5, and 2 miles north of downtown Kent and is located in Township 22 North, Range 4 East, Section 12A. The Property is located in an industrial/commercial part of the Kent Valley (Figure 1).

A one-story, concrete warehouse is located in the center of the Property, with an attached office on the northwest corner (Figure 2). The warehouse is bounded by a covered loading dock on the north side, a rail line on the south side, a large, covered storage area on the east side, and a parking lot with a driveway for truck traffic on the west side. A second loading dock is located on the east side of the covered storage area, with a covered work area and two uncovered aboveground storage tank (AST) areas south of that. Additional ASTs are located south of the rail line. Two additional small, one-story buildings are located at the site, one near the south side of the covered storage area and one in the south AST area. Two hazardous waste storage areas are located in the southern portion of the covered storage area. Drums are stored on the eastern part of the site.

Except for the grass north of the office and planters surrounding the office, the entire Univar Kent Property is paved with asphalt or concrete. All utilities are located underground, with storm drain and fire-suppression water lines surrounding the buildings and docks. Sanitary sewer lines run on the north and east sides of the Property (Figure 2).

1.2 Background and Project History

Univar has operated at the Property since 1974. Univar stores, packages, and distributes various chemicals. Historically, Van Waters & Rogers (VW&R) operated one 1,500 gallon and one 6,000 gallon aboveground dangerous waste storage tanks at the Property. The former 1,500 gallon tank was located on top of the elevated dock immediately north of the existing barrel wash pit (Figure 2). This area is currently at ground level and is covered by a concrete pad constructed in approximately 1985. The former 6,000 gallon tank was located in Tank Farm #1, 100 feet south of the southeast corner of the main warehouse. Tank Farm #1 consists of a concrete pad surrounded by a 3-foot-high concrete wall. The waste storage tanks were taken out of service in 1982 (1,500 gallon tank) and in 1985 (6,000 gallon tank). There were no known releases from either tank during their operating history.

In 1995 and 1996, VW&R formally closed the former aboveground dangerous waste storage tanks following the procedures specified in the Ecology-approved closure plan (VW&R, 1993). Subsurface investigations conducted during closure indicated that volatile organic compounds (VOCs) were present in the subsurface above the Model Toxics Control Act (MTCA) cleanup levels applicable at the time. Further investigations were conducted to determine the nature and extent of subsurface VOCs. The results of the additional investigations were ultimately summarized in a Groundwater Investigation Report (EMCON, 1998), which identified two areas at the Property (Figure 3):

- Contaminated soil and shallow groundwater in an area focused around the vicinity of the barrel wash pit and monitoring wells MW-1/MW-4; and

- Contaminated soil and shallow groundwater in an area in the vicinity of monitoring well MW-5.

A number of VOCs present in soil and groundwater near MW-1/MW-4 were never managed in the former hazardous waste storage tanks. However, VW&R historically operated 37 underground storage tanks (USTs) in this area, which were removed in 1985 and 1986. These USTs stored products containing many of the VOCs found in soil and groundwater near MW 1/MW-4. Based on review of historical operations information and the distribution of VOCs, it was determined that the source for the MW-1/MW-4 area was most likely undocumented releases near the 37 USTs. The source of the VOCs in the vicinity of MW-5 is unknown.

A draft focused feasibility study (FFS) report was prepared and submitted to Ecology in September 2000 (IT Corporation, 2000). The FFS evaluated a number of remedial action alternatives to address the soil and shallow groundwater contamination found in the MW-1/MW-4 and MW-5 areas. Based on the FFS recommendations, an in-situ chemical oxidation pilot study was performed in the MW-5 area during 2001. Pilot test monitoring results indicated that in-situ chemical oxidation was not likely to be a cost-effective approach to remediating the VOCs found in the MW-5 area. In addition, during the installation of the pilot study injection wells, additional VOC contamination was discovered in groundwater located within a deeper portion of the saturated zone. This finding initiated multiple rounds of additional investigations conducted in 2002, 2003, and 2004 to determine the nature and extent of subsurface VOCs to the base of the aquifer.

Because of the site investigations conducted in 2002, 2003, and 2004, Ecology requested that Univar prepare a comprehensive site characterization report. A Remedial Investigation Report (RI report) was prepared and submitted to Ecology in 2005 (PES, 2005). The RI report included a description of the investigations, results of testing and sampling performed at the Property, a description of the site hydrogeology, and a summary of the nature and extent of contamination. The RI report also identified exposure pathways and receptors, identified indicator hazardous substances (IHSs), and established cleanup levels for soil and groundwater. The RI report concluded that concentrations of contaminants in the soil exceeded cleanup levels in three areas: in the vicinity of MW-1/MW-4, in the vicinity of MW-5, and near boring SB-10. In addition the report indicated that shallow groundwater in the MW-1/MW-4 and MW-5 areas contained VOCs exceeding cleanup levels, but appeared to be contained within the Property limits. VOCs in the deeper groundwater beneath the MW-1/MW-4 exceeded cleanup levels and the area of deeper groundwater exceeding cleanup levels extended to the north Property boundary. In November 2005, Ecology provided an opinion that the RI Report met the substantial requirements of MTCA (WAC-173-340-350(7)) and that sufficient information has been collected to proceed with the evaluation and selection of remedial action alternatives (Ecology, 2005). However, Ecology also indicated that additional investigation was required to determine the extent of VOCs in the deeper groundwater north of the Property (Ecology, 2005) and that this information should be submitted as an addendum to the RI Report.

Following completion of the RI Report, Univar continued conducting routine groundwater monitoring events and provided the results to Ecology in periodic progress reports. In addition, Univar conducted off-Property investigations to determine the extent of VOCs in deeper groundwater north of the Property. Univar also began evaluating potential remedial alternatives for contaminated groundwater and soil at the Site (Site is defined as the location where contaminants originating at the Property are currently located). During this evaluation, the need for additional characterization of groundwater conditions to select and design an appropriate remediation system was identified. Accordingly, Univar installed additional monitoring wells at the Property to further evaluate the distribution of VOCs in the MW-1/MW-4 and MW-5 source areas.

Univar requested assistance from Ecology under the Voluntary Cleanup Program (VCP) in August 1998 and has been conducting the environmental investigations and pilot studies with Ecology's oversight through the VCP. In 2008, Univar and Ecology entered into negotiations for an agreed order that would cover future remedial action at the Site. The agreed order (Order) was finalized and became effective on November 20, 2008.

1.3 Report Purpose

This report has been prepared consistent with the requirements of the Order to finalize a remedial investigation, feasibility study, and a draft cleanup action plan. More specifically, this report has been prepared to fulfill the requirements of Task 1 of the Scope of Work included as Exhibit B of the Order. Task 1 requires Univar to prepare a Remedial Investigation, Focused Feasibility Study Addendum, and Draft Cleanup Action Plan (RI/FFSA/DCAP).

The purpose of this RI/FFSA/DCAP is to summarize the results of the investigations conducted since the RI report was submitted and to update the FFS to evaluate and select a cleanup action alternative that addresses the current understanding of the extent of soil and groundwater contamination at the Site. In addition, this report presents a DCAP that describes the recommended cleanup action alternative proposed for implementation at the Site including a description of how the proposed cleanup action meets the requirements of the MTCA and its implementing regulations.

1.4 Report Organization

Section 1 – Introduction: Describes the background and project history, the purpose of this report, and the organization of the report.

Section 2 – Remedial Investigation Addendum: Provides a summary of the supplemental investigations conducted at the Site since the RI report was submitted to Ecology. This section also provides a summary of environmental conditions for the Site based on the results obtained from the supplemental investigations and the investigations previously summarized in the RI Report. The areas where soil and/or groundwater exceeds cleanup levels is also described.

Section 3 – Focused Feasibility Study Addendum: This section presents: (1) a summary of the prior FFS completed in September 2000; (2) the results of subsequent pilot and bench scale studies of various remedial technologies, (3) an evaluation of enhanced reductive dechlorination (ERD) technology and its applicability to Site conditions; (4) describes an additional cleanup action alternative not considered in the FFS; (5) an evaluation of the proposed cleanup action alternative with respect to cleanup action criteria; and (6) a recommendation for selection of a cleanup action alternative

Section 4 – Draft Cleanup Action Plan: This section provides a brief summary of the alternatives evaluated, a description of the proposed cleanup action alternative, an explanation of how the proposed alternative meets the MTCA's expectations for cleanup action alternatives and cleanup action selection criteria, and a description of post-cleanup action selection activities necessary to implement, operate, and maintain the selected cleanup action alternative.

Section 5 – References: Lists the sources of information referenced in the document.

2.0 REMEDIAL INVESTIGATION ADDENDUM

The section provides an addendum to the RI report originally submitted in 2005 and provides the information used as the basis for developing and selecting a cleanup action alternative for the Site as described in Section 3.

2.1 Supplemental Investigations

This section describes supplemental investigations that were conducted after the submittal of the RI report (PES, 2005). Supplemental investigations were conducted both in the source area and off-Property. In addition, routine groundwater monitoring was performed to assess temporal trends in groundwater conditions at the Site.

2.1.1 Source Area Investigation

2.1.1.1 Work Performed

Two direct-push borings (SB-44 and SB-45) were drilled August 23, 2006, to investigate the southern extent of the VOCs in deeper groundwater detected at MW-13 (PES, 2007). The direct-push borings were drilled along the dock to the south of the barrel wash pit (Figure 3). Soil samples were collected continuously during drilling to a maximum depth of 45 feet below the top of the dock. Each soil sample was reviewed for lithology and screened for VOCs using a photoionization detector (PID). All PID readings were low, with a maximum reading of less than 1 part per million by volume (ppmv) in SB-44 and 13 ppmv in SB-45. Three groundwater samples were collected from each direct-push boring using temporary screens exposed to the aquifer and a peristaltic pump. The SB-44 groundwater samples were collected from 23 to 25 feet, 33 to 35 feet, and 43 to 45 feet below the surface of the dock. The SB-45 groundwater samples were collected from 20 to 22 feet, 30 to 32 feet, and 40 to 42 feet below the surface of the dock. The direct-push groundwater samples were analyzed for VOCs using EPA Method 8260B. A summary of the lithology and the specific PID readings are presented on the boring logs that are provided in Appendix A. Both direct-push borings were abandoned with bentonite grout, and both borings were subsequently surveyed to the same horizontal datum and vertical datum as the monitoring wells (see Table 1).

Three monitoring wells were installed on September 5 and 6, 2006, to provide source area monitoring points and baseline data used to develop a cleanup action alternative for deeper groundwater. Two deep monitoring wells (MW-21 and MW-22) were installed in the MW-1/MW-4 area deeper groundwater VOC plume (deeper groundwater plume). Since deep soil borings had been drilled previously in the vicinity, soil samples were not collected during drilling. PID readings taken periodically at the top of the augers were in the low to moderate range, with a maximum concentration of 50 ppmv in MW-21 and 6 ppmv in MW-22.

MW-21 and MW-22 were installed with nominal 4-inch inside diameter (i.d.) hollow stem augers. To minimize the potential for heaving sand to affect the completion of the monitoring well, a wood block was used to block the base of the auger during drilling; when the final drilling depth was reached, the auger was filled with potable water, and the wood block was knocked out the bottom of the auger. The deep well completions consisted of 2-inch i.d. Schedule 40 PVC, screened from 32.2 to 42.2 feet below ground surface (bgs) (MW-21) and from 34.1 to 44.1 feet bgs (MW-22). The screen section of the wells was constructed of two concentric screens with the annular space between the screens filled with filter pack prior to installation in the boring (a “pre-pack” screen). The well screen slot width was 0.010 inches, the filter pack between the screens consisted of 20 x 40 sand, and the filter pack outside of the outer screen consisted of 10 x 20 sand. The annular space above the filter pack (see Table 1) consisted of bentonite chips, which were hydrated above the water table. The wells were completed at ground surface using flush-with-grade steel monuments concreted in place.

MW-23 was installed on the downgradient edge of the MW-5 VOC plume. Due to the number of existing borings in the area, soil samples were not collected during drilling. MW-23 was installed with nominal 6-inch i.d. hollow stem augers. The well completion consisted of 2-inch i.d. Schedule 40 PVC, screened from 5 to 15 feet bgs. The well screen slot width was 0.020 inches, and the filter pack outside of the screen consisted of 10 x 20 sand. The annular space above the filter pack (see Table 1) consisted of bentonite chips, which were hydrated above the water table. The well was completed at ground surface with a flush-with-grade steel monument concreted in place.

MW-21, MW-22, and MW-23 were developed on September 11, 2006, using surging and pumping techniques. During well development, approximately 40 gallons of water were removed from the MW-21 and MW-22, and 15 gallons was removed from MW-23. The wells were initially sampled on September 13 and 14, 2006, and twice yearly thereafter, as discussed in Section 2.1.3. Groundwater samples were analyzed for VOCs using EPA Method 8260B.

The well completion forms and well development forms are provided in Appendix A. The locations of the new wells were surveyed, and the horizontal and vertical coordinates are included in Table 1.

2.1.1.2 Results

Similar to other borings in the vicinity of the MW-1/MW-4 area, SB-44 and SB-45 encountered fine sand, silty sand, and silt. The soil types tended to be finer (silty sand and silt) in the upper 20 feet of the borings and coarser (sand) in the lower 25 feet of the borings. Table 2 provides the concentrations of detected VOCs in the groundwater samples collected from SB-44 and SB-45. Thirteen VOCs were detected at least once in the six groundwater samples. The concentrations were low, with most of the detections below the method reporting limit (MRL). Only one detection (0.69 µg/L of vinyl chloride in the shallowest groundwater sample collected from SB-44) exceeded the groundwater cleanup level (0.5 µg/L).

The groundwater VOC concentrations in new deep monitoring wells MW-21 and MW-22 appeared to be consistent with the VOC concentrations in deep monitoring well MW-13, with the highest concentrations of source constituents tetrachloroethene (PCE), trichloroethene (TCE), and 1,1,1-trichloroethane (TCA) in MW-21, and progressively lower concentrations of source constituents in the wells downgradient (MW-13, MW-22, and MW-17).

2.1.2 Off-Property Investigation

One monitoring well and two sets of direct-push borings were drilled north of South 212th Street (Figure 4) to delineate the northern extent of the low-level VOC plume in deeper groundwater.

2.1.2.1 Monitoring Well Installation

A deep groundwater monitoring well (MW-20) was installed in the sidewalk on the north side of South 212th Street on July 18 and 19, 2005. Soil samples were collected by first drilling a 2-inch-diameter boring using the direct-push drilling method. Samples were collected continuously during drilling to a maximum depth of 46 feet bgs. Each soil sample was reviewed for lithology and screened for VOCs using a PID. All PID readings were low, with a maximum reading of 11 ppmv.

The direct-push boring was abandoned with bentonite grout and subsequently overdrilled to a depth of 44.5 feet with a nominal 4-inch i.d. hollow stem auger to allow installation of the monitoring well. To minimize the potential for heaving sand to effect the completion of the monitoring well, a wood block was used to block the base of the auger during drilling; when the final drilling depth was reached, the auger was filled with potable water, and the wood block was knocked out the bottom of the auger. The MW-20 well completion consisted of 2-inch i.d. Schedule 40 PVC, screened from 33.5 to 43.2 feet bgs. The screen section of the well was constructed of a “pre-pack” screen, as previously described for MW-21 and MW-22.

MW-20 was developed on July 28, 2005, using surging and pumping techniques. Approximately 50 gallons of water were removed from the well during development. The wells were initially sampled after development on July 28, 2005, and twice yearly thereafter, as discussed in Section 2.1.3. Groundwater samples were analyzed for VOCs using EPA Method 8260B.

The MW-20 boring log, a well completion form, and a well development form are provided in Appendix A. The location of MW-20 was surveyed in October 2005, and the horizontal and vertical coordinates are included in Table 1.

2.1.2.2 Direct-Push Drilling

Based on the analytical results from MW-20, the first set of off-Property direct-push borings (SB-46 through SB-49) were drilled immediately south of the main Olympic Steamship Company warehouse on November 29 and 30, 2007 (Figure 4). Each of the borings was drilled using a hydraulic push rig, with soil samples collected continuously from the first direct-push boring drilled (SB-46), at 5-foot intervals in the second boring (SB-47), and due to some variability in the lithology between the first two borings, continuously in the subsequent two borings (SB-48 and SB-49).

Soil samples were collected in the four borings to maximum depths ranging from 36 to 44 feet bgs. Each soil sample was reviewed for lithology and screened for VOCs using a PID. No PID readings were detected in any of the borings. Two groundwater samples were collected from each direct-push boring using a temporary direct-push well screen and a peristaltic pump. An upper groundwater sample was collected from 30 to 32 feet bgs in each of the four borings, and a lower groundwater sample was collected in each boring immediately above contact with the silt (aquitard). The lower groundwater samples were collected at the following depths: SB-46 (38-40 feet bgs), SB-47 (37-39 feet bgs), SB-48 (37-39 feet bgs), and SB-49 (38-40 feet bgs). The direct-push groundwater samples were analyzed for VOCs using EPA Method 8260B.

Based on the VOC results for groundwater samples collected from the SB-46 through SB-49 samples, a second set of direct-push borings (SB-50, SB-51, and SB-52) were drilled immediately west of the Olympic Steamship Company west warehouse on February 13 and 14, 2008 (Figure 4). SB-50, SB-51, and SB-52 were each drilled using a hydraulic push rig. Soil samples were collected continuously from the first direct-push boring drilled (SB-50), except in the groundwater sampling intervals. In SB-51 and SP-52, soil samples were collected at 5-foot intervals in the upper 25 feet of the borings and continuous soil samples collected thereafter. Second direct push borings were pushed next to SB-51 and SB-52 to collect groundwater samples.

Each soil sample was reviewed for lithology and screened for VOCs using a PID. No PID readings were detected in any of the borings. Two groundwater samples were collected from SB-50 (30-32 and 38-40 feet bgs) and SB-52 (30-32 and 36.5-38.5 feet bgs) using a temporary direct-push well screen and a peristaltic pump. Due to the silty nature of the soil below a depth of 35 feet in SB-51, only one groundwater sample was collected, at a depth of 32 to 34 feet bgs. Direct-push groundwater samples were analyzed for VOCs using EPA Method 8260B.

A summary of the lithology and the specific PID readings are presented on the boring logs that are provided in Appendix A. All of the direct-push borings were abandoned with bentonite grout.

<u>2.1.2.3 Results</u>

The lithology of soil boring SB-46 was similar to that at the MW-20 location, with fine sand and silty sand encountered to an approximate depth of 39 feet bgs where the silt aquitard was encountered. Borings SB-47 through SB-52 were similar to SB-46 but also penetrated a shallower silt somewhere in the range of 6 to 22 feet bgs. The basal silt aquitard was encountered in MW-20, SB-46, SB-48, SB-49, SB-51, and SB-52 at depths of ranging from 35 to 43.5 feet bgs. The silt aquitard was not encountered in SB-47 or SB-50. SB-47 was only drilled to a depth of 39 feet, which was potentially not deep enough to encounter the silt. SB-50 was not sampled between 36 and 40 feet bgs due to groundwater sampling at that interval; the driller noted, however, that the drill rig handled like it was penetrating silt in that interval.

The detected groundwater VOC concentrations at MW-20 were generally quite low, between the method detection limit (MDL) and MRL, and with the exception of benzene, total xylenes, and chloroethane, up to two orders of magnitude lower than the MW-19 VOC concentrations. The concentrations of benzene, total xylenes, and chloroethane in MW-20 groundwater were one to two orders of magnitude higher than the concentrations of those compounds in MW-19 and closer to the VOC concentrations found in MW-17.

Table 2 provides the concentrations of detected VOCs in the groundwater samples collected from SB-46 through SB-52. Thirteen VOCs were detected at least once in the 13 direct-push groundwater samples. The concentrations were predominantly low, with most of the detections below their respective MRLs. None of the VOCs detected in SB-49, SB-50, SB-51, and SB-52 were above the groundwater cleanup levels. Benzene was detected above the groundwater cleanup level (0.8 µg/L) in the upper SB-46 sample (0.95 µg/L) and in both SB-47 samples (18 and 5.5 µg/L). Chloroethane was detected above the groundwater cleanup level (15 µg/L) in three groundwater samples: both SB-47 samples (290 and 190 µg/L) and the upper SB-48 sample (64 µg/L).

Based on the results of the off-site direct-push groundwater samples, the northern extent of the VOC plume exceeding cleanup levels in deeper groundwater appears to end prior to the western boundary of the Olympic Steamship Company warehouse.

2.1.3 On-Going Groundwater Monitoring

<u>2.1.3.1 Work Performed</u>

Since the RI report was submitted, groundwater levels have been measured and groundwater samples collected from on-Property and off-Property monitoring wells and piezometers twice yearly. Samples were collected in the spring and fall to monitor during high and low water level conditions. After their installation in September 2006, monitoring wells MW-21, MW-22, and MW-23 were added to the groundwater monitoring network.

Groundwater sampling was conducted using the low-flow sampling techniques used at the Site since June 1999 (PES, 2005). All groundwater samples were analyzed for VOCs including acetone, hexane, MIBK, ethyl acetate, and 2-nitropropane using EPA Method 8260B.

The groundwater sample collected from deeper well MW-20 on September 20, 2005, was also submitted for laboratory analysis of chloride, nitrate (as nitrogen), and sulfate by EPA Method 300.0; total organic carbon (TOC) by EPA Method 415.1; iron and manganese by EPA Method 6010; and dissolved organic gases (methane, ethene, and ethane) by modified RSK Method 175. The July 2005 MW-20 groundwater sample was also tested in the field for sulfide, total alkalinity, and ferrous iron using Hach® test kits. Groundwater samples collected in September 2006 from deeper monitoring wells located along a flowpath (MW-13, MW-15, MW-17, MW-21, and MW-22) and two shallow source area monitoring wells (MW-5 and MW-23) were also analyzed for nitrate as nitrogen and sulfate using EPA Method 300.0.

<u>2.1.3.2 Results</u>

Tables 3 through 7 present on-going monitoring data collected through May 2008. Table 3 provides the groundwater level measurements, and Tables 4, 5, 6, and 7 present the field measurements, laboratory VOC data, laboratory general chemistry data, and dissolved gas data, respectively. Figures 5 and 6 present recent groundwater contour maps for the shallow and deeper groundwater zones.

The shallow and deep groundwater contours in Figures 5 and 6 are similar to those presented in the RI report. The shallow groundwater mound centered near MW-1 and MW-4 was still present, locally altering the regionally shallow groundwater flow direction that is to the northwest. The deeper piezometric surface continued to be flat, with groundwater flow toward the northwest to north-northwest. The effects of the shallow groundwater mound are still not evident in the deeper groundwater zone.

The field measurements and laboratory analyses results since the RI report was issued (Tables 4 and 5) have generally been consistent with previous results. The VOC concentrations have generally been trending downward, except in MW-13. VOC concentrations in deep monitoring well MW-13 decreased by one to two orders of magnitude in April 2005 and then increased through April 2007. VOC concentrations have been relatively stable since then and concentrations are below the highest VOC concentrations detected in 2004with the following exceptions. As stated in Section 2.1.1, the VOC concentrations in new deep monitoring wells MW-21 and MW-22 have been consistent with the VOC concentrations in deep monitoring well MW-13.

The September 2005 general chemistry and dissolved organic gases data from deep zone monitoring well MW-20 (Tables 6 and 7) were more similar to the deeper MW-1/MW-4 plume data than the MW-5 plume data. Chloride, TOC, and the dissolved organic gases concentrations were generally elevated relative to background; nitrate and sulfate concentrations were both low.

2.2 Summary of Environmental Conditions

This section provides a summary of environmental conditions present at the Site based on the results of the supplemental investigations and the results of the investigations previously summarized in the RI report. The following discussion is presented in sufficient detail to enable the reader to understand the current environmental conditions present at the Site, notable changes since the RI report was issued, and the basis for developing the cleanup action alternatives in Section 3. Additional details are provided in the RI Report.

2.2.1 Geology and Hydrogeology

2.2.1.1 Geology

Based on the subsurface investigations performed to date, the geologic materials at the Site consist primarily of sand, silty sand, silt, and organic silt. The upper 10 to 30 feet of soil consists of laterally discontinuous interbeds of sand, silty sand, sandy silt, and silt, with local organic soil, peat layers, and wood debris. The sand is fine to medium, and the silt is of low to medium plasticity. The uppermost soil has likely been reworked during site construction and may include fill. The fill, however, is similar in composition to the underlying native soil, and the transition between fill and native soil is indistinct. In the area of the former USTs (Figure 2), debris that could not be penetrated (likely concrete) was encountered. Soil beneath the Site is wet below a depth of approximately 4 to 8 feet bgs.

The uppermost interbedded unit is underlain by gray to black, fine to medium sand, with trace to few silt, scattered wood fragments, and laminations to thin lenses of silt, sandy silt, or silty sand. This unit ranges from approximately 14 to 35 feet thick. Under the north-central part of the covered storage area east of the warehouse, the upper portion of this unit is finer, consisting of silty sand.

The intermediate sand unit is underlain by silt. Low to medium plasticity, with scattered organic matter, this unit is first encountered at approximate depths ranging from 35 to 48 feet bgs. About 2 to 4 feet of the unit was encountered in each deep temporary boring. The entire thickness of this unit was not penetrated by any of the deep explorations.

2.2.1.2 Hydrostratigraphy

Two hydrostratigraphic units have been identified at the site: (1) the shallow water-table aquifer and (2) the underlying aquitard. The upper interbedded unit and the underlying sand unit represent the shallow aquifer. Although fine-grained soil that is likely less permeable to groundwater flow is encountered in the upper interbedded unit, the finer interbeds are laterally discontinuous and are less commonly encountered than the sand and silty sand that dominate the unit. The shallow monitoring wells (MW-1 through MW-12 and MW-23) are installed in the upper interbedded unit and at the top of the intermediate sand. The deep piezometer (P-1) and wells (MW-13 through MW-22) are installed at the base of the shallow aquifer (intermediate sand). Depth to groundwater in both the shallow and deep installations ranges from approximately 4 to 8 feet bgs.

The silt underneath the intermediate sand represents the aquitard. The aquitard is continuous beneath the site and, based on the low hydraulic conductivity, represents a significant barrier to downward movement of groundwater.

2.2.1.3 Groundwater Flow

Table 3 presents the measured groundwater levels and calculated groundwater elevations. Groundwater elevations in the shallow monitoring wells range from approximately 24.5 to 30 feet (relative to the NAVD 88 datum), and groundwater elevations in the deeper monitoring wells vary from approximately 25 to 28.5 feet. Groundwater elevations vary up to approximately 3.5 feet seasonally and are highest in the spring and lowest in the fall.

Groundwater flow in the shallow wells at the site is generally toward the northwest, with radial flow away from a groundwater high located near MW-1 and MW-4 (Figure 5). Groundwater flow in the deep piezometer and wells is to the northwest, consistent with groundwater flow in the vicinity of the Univar Kent facility (Figure 6).

The shallow groundwater mound varies seasonally from less than 0.5 foot high to approximately 1.5 feet high and is most pronounced in the summer. There is a downward vertical gradient (less than approximately 0.036 feet/foot) near the center of the mound and a variable but generally neutral vertical gradient beyond the groundwater mound. The mound likely exists only in the shallow part of the water table aquifer due to a surficial water source and a higher horizontal hydraulic conductivity than vertical hydraulic conductivity in the aquifer. The source of the shallow groundwater mound is not known. Based on the subsurface investigations conducted to date and the assessment of potential surficial sources, it appears that the source must be functioning year-round and be located in the area near MW-1.

The average horizontal hydraulic gradient in the shallow part of the aquifer, away from the shallow groundwater mound is less than about 0.004 feet/foot. Based on mid-range aquifer parameters and a horizontal gradient of 0.004, the horizontal groundwater flow rate in the shallow part of the aquifer ranges from approximately 30 to 300 feet per year. Higher shallow aquifer flow rates than those may be found near the groundwater mound. The average horizontal hydraulic gradient in the deep part of the aquifer is less than about 0.0014 feet/foot. Assuming the same aquifer parameters as in the shallow part of the aquifer, the horizontal groundwater flow rate at the base of the aquifer ranges from approximately 10 to 100 feet per year. Given the lack of influence of the groundwater mound at the base of the aquifer, the horizontal groundwater flow rate in the deeper part of the aquifer may be a better estimate of the overall groundwater flow rate in the aquifer.

2.2.2 Nature and Extent of Contamination

2.2.2.1 Soil

Eighty-one soil samples collected during site investigations were analyzed for VOCs: 66 from direct-push and auger temporary borings and 15 from monitoring well and injection well borings. Of the 67 compounds quantitated in the VOC analyses, 35 were detected in at least one soil sample. VOCs were primarily detected in soil samples collected from two areas of the site: in the area of the former USTs (MW-1/MW-4 area) and near MW-5.

Compounds stored in the former USTs or the former aboveground hazardous waste storage tank that were detected in a significant percentage (i.e., greater than 10 percent) of the analyzed soil samples included PCE, TCE, TCA, methylene chloride, xylenes, toluene, ethylbenzene, methyl ethyl ketone (2-butanone or MEK), and acetone. Other frequently detected VOCs included breakdown products of PCE, TCE, and TCA: cis-1,2-dichloroethene (cis-1,2-DCE), chloroethane, 1,1-dichloroethane (1,1-DCA), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride. Some potential constituents in the petroleum naphtha or mineral spirits that were stored in the former USTs were also detected in a significant percentage of the analyzed soil samples, including 1,2,4-trimethylbenzene (1,2,4-TMB), n-propylbenzene, 1,3,5-trimethylbenzene (1,3,5-TMB), and isopropylbenzene.

Of the 35 detected compounds, the maximum detected concentrations were in the following ranges:

- Less than 100 µg/kg: 1,1,2-TCA, 1,2-dichloroethane, 4-chlorotoluene, benzene, bromodichloromethane, carbon disulfide, chloroethane, chloroform, hexachlorobutadiene, naphthalene, n-hexane, styrene, and trans-1,2-DCE;
- Between 100 and 500 µg/kg: 1,1-DCA, 1,1-dichloroethene (1,1-DCE), 1,1,1-TCA, 2-butanone (MEK), 4-isopropyltoluene, cis-1,2-DCE, dibromochloromethane, isopropylbenzene, n-butylbenzene, o-xylene, sec-butylbenzene, and vinyl chloride;
- Between 500 and 1,000 µg/kg: ethylbenzene, n-propylbenzene, TCE, and toluene; and
- Greater than 1,000 µg/kg: 1,2,4-TMB, 1,3,5-TMB, acetone, m- and p-xylenes, methylene chloride, and PCE.

2.2.2.2 Groundwater

Over 500 groundwater samples have been collected for chemical analysis during site investigations and on-going monitoring, including samples from temporary borings and permanent monitoring wells. Groundwater samples were collected from temporary borings to give an indication of subsurface contamination at a single point in time and at specific depth intervals, to provide information for subsequent siting of monitoring wells, and to help determine the extent of impacts at the site. Of the 67 compounds quantitated in the VOC analyses, 33 were detected in at least one temporary boring groundwater sample. The most commonly detected VOCs in temporary boring groundwater samples were PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, 1,1-DCA, chloroethane, methylene chloride, benzene, toluene, ethylbenzene, and total xylenes.

Of the 67 compounds quantitated in the VOC analyses, 40 were detected in at least one groundwater sample collected from monitoring wells. Compounds stored in the former USTs or former aboveground hazardous waste storage tank that were detected in a significant percentage of the analyzed well samples included PCE, TCE, TCA, methylene chloride, chloroform, trichlorotrifluoroethane, benzene, toluene, ethylbenzene, total xylenes, acetone, and hexane. Other frequently detected VOCs in well samples included the breakdown products of PCE, TCE, and TCA: cis-1,2-DCE, trans-1,2-DCE, vinyl chloride 1,1-DCE, 1,1-DCA, and chloroethane. Some potential constituents in the petroleum naphtha or mineral spirits that were stored in the former USTs were also detected in a significant percentage of the analyzed well samples, including 1,2,4-TMB, 1,3,5-TMB, n-propylbenzene, isopropylbenzene, and 4-isopropyltoluene.

Of the 40 VOCs detected in monitoring well water samples, the maximum detected concentrations were in the following ranges:

- Less than 10 µg/L: 1,2-dichloroethane, 1,2-dichloropropane, 1,2,3-tri-chloropropane, 2-chlorotoluene, 4-chlorotoluene, 4-isopropyltoluene, chlorobenzene, dichlorodifluoromethane, hexachlorobutadiene, naphthalene, and sec-butylbenzene;
- Between 10 and 100 µg/L: 2-nitropropane, carbon disulfide, chloroform, hexane, methylene chloride, MIBK, n-butylbenzene, styrene, trans-1,2-DCE, and trichlorotrifluoroethane;

- Between 100 and 1,000 µg/L: 1,1-DCE, 1,2,4 trichlorobenzene, 1,2,4-TMB, 1,3,5-TMB, benzene, isopropylbenzene, n-propylbenzene, and MEK; and
- Greater than 1,000 µg/L: 1,1-DCA, cis-1,2-DCE, acetone, chloroethane, ethylbenzene, PCE, TCA, TCE, toluene, total xylenes, and vinyl chloride.

The RI established the presence of two apparent source areas, or areas of elevated groundwater concentrations relative to the rest of the Property. The first source area is near the former aboveground storage tank and 37 former USTs, in the general vicinity of wells MW-1 and MW-4 (Figures 2 and 3). In the MW-1/MW-4 area, the dominant VOCs are toluene, ethylbenzene, total xylenes, TCA and its degradation products of 1,1-DCA and chloroethane. PCE, with its degradation products of TCE, cis-1,2-DCE, and vinyl chloride have also been detected here, but at lower concentrations. The groundwater in this area is impacted in both the shallow (4 to 30 feet bgs zone) as well as the deeper zone (30 to 45 feet bgs zone), with higher concentrations in the deep zone. Groundwater concentration trends and the results of geochemical monitoring indicate that biological degradation is already occurring in this area. The competing electron donor concentrations (oxygen, nitrate, and sulfate) are low relative to other site locations, the oxidation-reduction potential (ORP) is negative, and daughter products are present.

The second source area is in the northeast corner of the property near well MW-5. The primary VOCs in the MW-5 area are PCE and TCE. BTEX and TCA (and its breakdown products) have not been detected in well MW-5. VOC impacts have only been identified in the shallow zone (5 to 20 feet bgs) near MW-5.

In 2005, a deep off-Propety monitoring well (MW-20) was installed on the north side of South 212th Street. The MW-20 geochemical parameters were similar to the deeper MW-1/MW-4 plume (referred to as the deeper groundwater plume) data rather than the MW-5 plume data, with strong evidence of biological degradation.

2.2.3 Conceptual Site Model and Cleanup Standards

2.2.3.1 Contaminant Sources

The RI report indicated that the sources of contamination at the site were unknown releases in the area of the 37 former product storage USTs (MW-1/MW-4 plume) and near MW-5. Possible release mechanisms for contamination at the MW-1/MW-4 plume include leaks from transfer piping, overfilling of USTs, minor surface spills of raw products, or possibly minor leakage from the USTs. The source of the contamination at MW-5 is unknown, but based on adjacent soil probe data and plume chemistry, the source was likely adjacent to MW-5 and appears to be different from the MW-1/MW-4 plume. The primary contaminants at the site appear to be PCE, TCE, BTEX, methylene chloride, 1,2,4-TMB, 1,3,5-TMB, n-propylbenzene, and isopropylbenzene, and to a lesser extent, TCA and the degradation products of PCE, TCE, and TCA (cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, 1,1-DCE, 1,1-DCA, and chloroethane).

2.2.3.2 Contaminant Fate Processes

Several physical, chemical, and biological processes affect the mobility and behavior of liquid- (or pure-) phase and vapor-phase contaminants in the unsaturated zone and dissolved- or pure-phase contaminants in the saturated zone, including nondestructive processes that affect contaminant mobility and behavior and destructive processes that either destroy the contaminant or change the chemical behavior. Both processes can result in effective decreases in contaminant concentration.

Nondestructive Processes. The following nondestructive processes are generally active at the property: sorption, dispersion, volatilization, dissolution, and dilution. They do not appear to significantly retard or attenuate contaminants except in siltier parts of the aquifer. Dissolution of adsorbed VOCs likely generates most of the dissolved VOCs in the subsurface.

Destructive Processes. Destructive processes are either biotic (biodegradation) or abiotic. Although abiotic chemical reactions destroy contaminants, the microbial activity occurring in the subsurface that permanently destroys contaminants (biodegradation) is generally much more significant. Microbial metabolic degradation of chlorinated VOCs (CVOCs) PCE, TCE, and TCA occurs under both aerobic and anaerobic conditions. Aerobic metabolism includes direct oxidation of CVOCs as an energy source, and fortuitous degradation of CVOCs (cometabolism) during metabolism of other organic compounds. Under anaerobic conditions, CVOCs are degraded by reductive dechlorination (the sequential removal of chlorine atoms from a CVOC molecule), which is primarily a cometabolic process as shown in Figure 7. As discussed in the RI report, the geochemical conditions of the shallow and deeper portions of the MW-1/MW-4 plume provide strong evidence for biodegradation occurring in this area. This evidence includes low dissolved oxygen, nitrate, sulfate, ferric iron, and carbon dioxide concentrations, and high TOC, ammonia, sulfide, ferrous iron, methane, and degradation daughter product concentrations (DCE, vinyl chloride, and ethene). The MW-5 data, however, provide insufficient evidence for biodegradation occurring in this area.

2.2.3.3 Migration Mechanisms and Pathways

Residual contaminants residing in saturated and unsaturated soil may be further mobilized by flow of water or air in the subsurface. Several migration processes are likely to occur, and are described below.

Unsaturated Soil. Contaminants occur in unsaturated soil primarily in and around the source areas. All of this soil lies beneath existing buildings or pavement. Leaching of contaminants to groundwater is not considered a significant migration pathway at the facility because all unsaturated soil in the source areas is located beneath loading docks or pavement. Pure phase flow of contaminants through the vadose zone is not considered an active migration pathway due to the length of time since the USTS were in use in the MW-1/MW-4 area and the low to moderate PCE concentrations in soil in the MW-5 area. Diffusion is not considered an active migration pathway due to the low PID readings observed in the unsaturated zone during drilling.

Saturated Soil and Groundwater. VOCs were originally released into the subsurface either during UST operations or from near-surface spills of pure-phase VOCs that subsequently migrated downward to the water table. VOCs may be currently adsorbed to soil surfaces or contained within the saturated soil matrix in the form of isolated or interconnected, residual droplets (ganglia). Based on the moderate concentrations of VOCs detected in saturated soil (i.e., PCE concentrations less than 10 mg/kg), low concentrations of dissolved VOCs in groundwater relative to their solubility limits, and no visual or PID evidence of VOC residual droplets detected during drilling, it is likely that VOCs are primarily found adsorbed to soil surfaces in the saturated zone with little if any VOCs present as residual droplets. Dissolution of VOCs sorbed to the soil matrix in groundwater and migration by advective flow of groundwater is considered the principal active migration method and pathway in the saturated zone at the facility.

2.2.3.4 Soil Exposure Pathways and Receptors

Currently, buildings, covered docks, or asphalt pavement covers the vast majority of the site. Site characterization data indicates that contaminants are present in unsaturated and saturated soil to depths of 10 feet bgs beneath the east loading dock/pavement area where the former USTs were located (MW-1/MW-4) and beneath the paved area near MW-5. Current and potential future exposure pathways and receptors for contaminants in soil include the following:

- Exposure to site workers through direct contact with contaminated soil during site maintenance activities that disturb the existing structures or pavement is a current pathway;

- Exposure to site office workers through inhalation of vapors originating from contaminated soil and migrating up through the building floor is an incomplete pathway as there is currently no contaminated soil beneath the office occupied portions of the site structures; and

- Exposure to site workers or off-site residents/workers through consumption of groundwater that is impacted by leaching of contaminants in site soil is currently an incomplete pathway because there are currently no groundwater supply wells at or within 1-mile downgradient of the facility, and contaminated groundwater is primarily contained within the site boundaries. This is a potential future pathway of concern.

Because the contaminated soil is located entirely beneath the covered dock and pavement areas of the site, there is no potential for exposure to terrestrial ecological receptors. Furthermore, the site qualifies for an exclusion from a terrestrial ecological evaluation in accordance with the requirements of WAC 173-340-7491(c).

2.2.3.5 Groundwater Exposure Pathways and Receptors

The RI report identified 16 water supply wells in Ecology's database that may be located within a 1-mile radius of the Univar Kent property. Although a number of the wells are reportedly used for domestic supply, none of the wells are located downgradient of the Site, all are deeper wells, and the closest well to the Site is located 1,100 feet to the south-southeast (upgradient). Groundwater flow eventually discharges into Mill Creek, approximately 2,000 feet downgradient to the northwest. However, based on the low VOC concentrations in MW-3 and the distance to the creek, Mill Creek is not a likely potential receptor. Although the closest groundwater wells are located nearly ½ mile either cross gradient or upgradient of the Site and likely in a deeper aquifer than the shallow aquifer beneath the site, a drinking water scenario was identified as the reasonable maximum exposure (RME) scenario for groundwater. Current and potential future exposure pathways and receptors for contaminants in groundwater include the following:

- Exposure to site workers or off-site residents/workers through consumption of contaminated groundwater originating from the site is currently an incomplete pathway because there are currently no groundwater supply wells on the site or within 1-mile downgradient of the site, and contaminated groundwater is primarily contained within the site boundaries. This is a potential future pathway of concern; and

- Exposure to site office workers through inhalation of vapors originating from contaminated shallow groundwater and migrating up through the building floor is an incomplete pathway as there is currently no contaminated groundwater beneath the office occupied portions of the site structures, including the small office located in the northeast corner of the warehouse.

2.2.3.6 Media Cleanup Standards

MTCA defined cleanup standards (WAC 173-340-700(2)) are composed of three separate components: cleanup levels, points of compliance, and additional regulatory requirements. Cleanup levels and points of compliance are the two primary components and are described below. The additional regulatory requirements that may apply to specific cleanup actions are addressed in Section 4.

Selection of Indicator Hazardous Substances. The RI report screened the list of individual VOCs detected in soil and groundwater to identify potential indicator hazardous substances (IHSs) and to eliminate those constituents that do not contribute significantly to the risk associated with the site from further consideration. The potential IHSs were identified in several steps consistent with the requirements provided in WAC 173-340-703. Total petroleum hydrocarbons were eliminated as IHSs since the detections in those analyses appeared to be related to the presence of other lighter weight VOCs. Table 8 lists the 6 soil and 17 groundwater IHSs.

Calculation of Groundwater Cleanup Levels. Because active water wells exist within a 1-mile radius of the site, the highest beneficial use of groundwater in the vicinity of the site is as drinking water. Therefore, groundwater cleanup levels were calculated for the RI report using the Method B risk assessment equations in WAC 173-340-720(4) and Ecology's "*Workbook for Calculating Cleanup Levels for Individual Hazardous Substances*" (version MTCASGL10). The toxicological, physical, and chemical input parameters used in the workbook were updated from those provided in Ecology's CLARC Version 3.1 (Publication No 94-145, updated November 2001) by reviewing the current information source cited in CLARC as of

August 2004. In addition, the USEPA's Region 9 2002 table of preliminary remediation goals was used to obtain toxicological data that was not available in the other sources. The calculated Method B groundwater cleanup levels were compared to the available Federal Maximum Contaminant Levels (MCL; 40 Code of Federal Regulation 141). The lower of the Method B cleanup level and the MCL was selected as the final groundwater cleanup level unless the cleanup level was lower than the lowest MRL (i.e., PQL) reported by the analytical laboratory. Since the Method B cleanup level for vinyl chloride (0.0291 µg/L) is well below the lowest MRL reported by the laboratory (0.5 µg/L), the final cleanup level for vinyl chloride has been set at a PQL of 0.5 µg/L (Table 8). This PQL is approximately two times the MDL and well below the EPA PQL of 5 µg/L, consistent with the requirements of WAC 173-340-707(2). Table 8 provides the final groundwater cleanup levels. A cleanup level was not determined for the IHS 4-isopropyltoluene because no toxicological parameters were available. Groundwater cleanup levels protective of indoor air were not calculated because this pathway is not complete at the site. The extent of VOCs in groundwater at the site extends beneath paved parking areas and open concrete dock areas where there are typically no indoor workers. There is an office located in the northeast corner of the warehouse, however, but the VOC plume does not appear to extend beneath this area to any significant degree.

Calculation of Soil Cleanup Levels. Soil cleanup levels were calculated to protect site workers based on direct contact (ingestion and dermal contact) and to protect groundwater. The direct contact cleanup levels were calculated for the RI report using the Method C risk assessment equations in WAC 173-340-745 and Ecology's workbook for calculating cleanup levels (MTCASGL10). Soil cleanup levels protective of groundwater were calculated using the procedures identified in WAC 173-345-747, the MTCASGL10 workbook, and the final groundwater cleanup levels identified in Table 8. The soil saturation limit was also calculated using Ecology's MTCASGL10 workbook. The lowest concentration for the Method C (direct contact), soil leaching, and soil saturation limits was selected as the final soil cleanup level, unless the cleanup level was lower than the lowest MRL reported by the analytical laboratory. Except for four compounds, the final cleanup level was based on the soil-leaching pathway. The final soil cleanup levels for 1,2-dichloropropane (1,2-DCP), 1,2-DCA, benzene, and vinyl chloride are based on the lowest MRL (PQL) reported by the analytical laboratory. The soil cleanup levels are summarized in Table 8 for each VOC in the soil identified as an IHS.

Points of Compliance. The point of compliance refers to the point or points where cleanup levels will be attained. For soil, the point of compliance is throughout the Site at depths of 0 to 15 feet bgs. For groundwater, the point of compliance is generally the affected portion of the aquifer throughout the Site. However, it is very likely that attaining cleanup levels throughout the Site will be impracticable. Therefore, a conditional point of compliance for groundwater at the downgradient edge of the Property is proposed (WAC 173-340-720(8)(c)).

2.3 Areas Exceeding Cleanup Levels

2.3.1 Soil

As outlined in Table 8, the final soil IHSs for the Site are PCE, TCE, vinyl chloride, 1,1-DCE, methylene chloride, and benzene. Figures 8 and 9 present the areas of the Site above the soil cleanup levels for the vadose zone (0 to 8 feet bgs) and saturated zone (>8 feet bgs), respectively. Included on the figures are tables of soil data for the six soil IHSs; on the tables, detections above the site soil cleanup levels are shown in bold numbers. To be conservative, the maximum thickness of the vadose zone was used. The noted areas above the soil cleanup levels encompass temporary borings and monitoring wells with at least one detection above a cleanup level for one of the six soil IHSs. Three areas of the property were above the site soil cleanup levels:

2.3.1.1 MW-1/MW-4 Area

IHSs detected above the soil cleanup levels were limited to the vadose zone and the saturated zone below a depth of 25 feet bgs. In the vadose zone, VOCs were detected above soil cleanup levels in SB-8, SB-28, SB-29, SB-38, and MW-1. In the saturated zone, VOCs were detected above soil cleanup levels only in SB-38. At least one of the soil cleanup levels was exceeded by an order of magnitude or more in SB-8, SB-29, and SB-38. The boundary of the vadose zone VOC plume above the cleanup levels in the MW-1/MW-4 area is likely limited to the area around the former USTs and former aboveground dangerous waste storage tanks based on (1) the historical UST storage of pure or blended products containing the IHSs or parent products of the IHSs or (2) the likelihood that the IHSs or parent products of the IHSs were components of the waste stored in the aboveground dangerous waste storage tanks.

2.3.1.2 MW-5 Area

IHSs detected above the site soil cleanup levels were limited to the vadose zone and the saturated zone above a depth of 19 feet bgs. In the vadose zone, VOCs were detected above soil cleanup levels in GP-7, GP-10, SB-21, and MW-5. In the saturated zone, VOCs were detected above soil cleanup levels in SB-21, SB-22, SB-24, SB-25, SB-27, SB-33, MW-11, and INJ-2. At least one of the soil cleanup levels was exceeded by an order of magnitude or more in GP-7, GP-10, SB-21, SB-23, SB-24, SB-25, SB-33, MW-5, MW-11, and INJ-2.

2.3.1.3 SB-10

Only one VOC was detected above a soil cleanup level in SB-10. PCE was detected at 23 µg/kg in a sample collected 1 foot bgs. Given that (1) the PCE cleanup level was not exceeded by a great amount in SB-10, (2) none of the six soil IHSs were detected in the SB-10 sample collected at a depth of 3.5 feet bgs, (3) PID readings in SB-10 and the adjacent SB-39 boring were low, and (4) groundwater VOC concentrations in SB-10 and in multiple samples collected in SB-39 were low, the area exceeding cleanup levels near SB-10 is likely very localized.

2.3.2 Groundwater

There are 17 groundwater IHSs for the Univar Kent Site: PCE, TCE, cis-1,2-DCE, vinyl chloride, TCA, 1,1-DCE, 1,1-DCA, 1,2-DCA, chloroethane, 1,2-DCP, chloroform, methylene chloride, benzene, toluene, ethylbenzene, total xylenes, and 1,2,4-TMB. Most of the VOCs were detected multiple times above their respective cleanup levels in groundwater samples collected from monitoring wells in the most recent full year of data (2007). Vinyl chloride was detected most often above its cleanup level in 2007; 1,2,4-TMB and 1,2-DCP were not detected above their respective cleanup levels in 2007.

Figures 10 and 11 show areas of the Site above the groundwater cleanup levels in the shallow and deeper portions of the aquifer, respectively, using the 2007 data. In shallow groundwater, the approximate extent of VOCs above cleanup levels, which is contained within the Univar property boundaries, was smaller in 2007 than in 2003 since VOCs were not detected above cleanup levels in MW-3 during 2007. In deeper groundwater, the approximate extent of VOCs above cleanup levels was larger in 2007 than in 2003 due to detection of VOCs above a cleanup levels in off-property well MW-20. The extent of VOCs in deeper groundwater exceeding cleanup levels extends north of the Univar Property and appears to end beneath the Olympic Steamship Company west warehouse. A more detailed discussion by source area is presented below.

2.3.2.1 MW-1/MW-4 Area Shallow and Deeper Groundwater

Fourteen IHSs were detected at least once above their respective cleanup levels in 2007: 10 IHSs in MW-1, 3 IHSs in MW-4, 9 IHSs in MW-13, 13 IHSs in MW-21, and 9 IHSs in MW-22. The PCE and TCE cleanup levels were moderately exceeded in MW-1 and MW-21; the cis-1,2-DCE cleanup level was exceeded in MW-21 and MW-22; and the vinyl chloride cleanup level was exceeded in all of the wells in this area. Similarly, the TCA cleanup level was exceeded in MW-1 and MW-21; the 1,1-DCE and 1,1-DCA cleanup levels were exceeded in MW-13, MW-21, and MW-22; and the chloroethane cleanup levels were exceeded in all wells in this area. These results are consistent with a shallow release of parent chlorinated solvents (PCE, TCE, and TCA), vertical movement downward of the relatively heavy parent and daughter (DCE, DCA, vinyl chloride, and chloroethane) products, and horizontal transport of daughter products with groundwater flow. The presence of vinyl chloride, 1,2-DCA, and chloroethane at concentrations above the cleanup levels in deeper wells to the northwest of the MW-1/MW-4 area indicates that the mass of parent chlorinated ethenes is greater at the base of the aquifer than at the top of the aquifer. Periodic low level detections of chlorinated ethenes above cleanup levels in MW-2 reflect the influence of the shallow groundwater mound.

Aromatic VOCs (benzene, toluene, ethylbenzene, and/or total xylenes) were detected above cleanup levels in all wells in this area. Although the BTEX constituents are lighter than water, it is likely that their presence in significant concentrations at the base of the aquifer is a result of co-solvent transport with the relatively dense chlorinated VOCs to the base of the aquifer.

2.3.2.2 MW-5 Shallow Groundwater Area

Five IHSs (PCE, TCE, cis-1,2-DCE, vinyl chloride, and benzene) were detected at least once above their respective cleanup levels in 2007, four in MW-12, three in MW-9, two in MW-5 and MW-11, and one in MW-7, MW-8, and MW-23. The PCE cleanup level was exceeded by three orders of magnitude in MW-5, MW-11, and MW-12. The TCE cleanup level was exceeded by two orders of magnitude in MW-12 and one order of magnitude in MW-5 and MW-11. The TCE cleanup level was also exceeded in MW-8 and MW-9. The cis-1,2-DCE cleanup level was exceeded by two orders of magnitude in MW-12. The vinyl chloride cleanup level was exceeded by one order of magnitude in MW-12; it was also exceeded in MW-9. The benzene cleanup level was only exceeded in MW-9 and likely reflects groundwater flow from the MW-1/MW-4 area. VOC detections in samples collected in vertical profiles in the MW-5 area show a significant decrease in VOC concentrations between depths of 15 and 25 feet bgs.

3.0 FOCUSED FEASIBILITY STUDY ADDENDUM

The FFS prepared in 2000 presented a summary of site conditions, a site conceptual model, media cleanup standards, the development of cleanup action alternatives for the MW-1/MW-4, and MW-5 shallow groundwater plumes, and an evaluation of the cleanup action alternatives with respect to MTCA criteria. The FFS culminated in the recommendation of cleanup action alternatives for the MW-1/MW-4 and MW-5 shallow groundwater plumes. For the MW-5 plume, the FFS recommended that in-situ chemical oxidation using Fenton's reagent be implemented, beginning with a pilot study. The FFS concluded that air sparging appeared to be the most appropriate cleanup action alternative for the MW-1/MW-4 plume, with the condition that implementation of air sparging be delayed until the pilot test at MW-5 was implemented, since in-situ chemical oxidation was likely to be an appropriate cleanup action alternative for the MW-1 plume as well.

Since the FFS was finalized, a number of additional studies have been performed, including a pilot test of in-situ chemical oxidation in the MW-5 plume area and investigation of the deeper groundwater in both the MW-1/MW-4 and MW-5 plumes (see Section 2.1.1). Based on the results of these investigations, neither in-situ chemical oxidation nor air sparging have been implemented. In addition, the supplemental investigations identified that the deeper groundwater beneath the MW-1/MW-4 plume contained IHSs at concentrations exceeding cleanup levels (referred to as the deeper groundwater plume). None of the alternatives evaluated in the 2000 FFS included cleanup actions to address impacts discovered in deeper groundwater. In addition, the cleanup levels used in the FFS were revised in the RI Report prepared in 2005 to reflect the current MTCA regulations in effect today. This revision resulted in the lower soil and groundwater cleanup levels for a number of the VOCs.

This section has been prepared as an addendum to the 2000 FFS to describe the remedial planning activities conducted since the FFS was prepared, and update the evaluation and recommendation of cleanup action alternatives to address the contaminated groundwater in the MW-1/MW-4, MW-5, and deeper groundwater plume areas. Specifically, the following sections of this FFSA present: (1) a summary of the prior FFS; (2) results of subsequent studies of various remedial technologies; (3) an overview of enhanced reductive dechlorination (ERD); (4) an additional cleanup action alternative not considered in the FFS; and (5) an evaluation of the proposed cleanup action alternative with respect to cleanup action criteria.

3.1 <u>Summary of 2000 Focused Feasibility Study</u>

The feasibility study portion of the prior FFS is summarized in this section, which includes a description of the evaluation criteria for the cleanup action alternatives (CAAs), a summary of the CAAs considered in the FFS, and a description of the CAA recommended in the FFS.

3.1.1 Evaluation Criteria

MTCA is the primary regulation that outlines the procedure for conducting feasibility studies. The criteria used to evaluate cleanup actions under MTCA include threshold and balancing criteria, as well as a series of expectations which were included to provide additional guidance on selection of a cleanup action. These criteria are described in detail in the FFS and summarized below.

3.1.1.1 MTCA Cleanup Action Selection

With respect to the criteria and procedure for evaluating CAAs, WAC 173-340-360 establishes the following requirements:

Threshold Requirements:

- Protect human health and the environment;
- Comply with cleanup standards;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring.

Other Requirements (Balancing Criteria):

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns.

3.1.1.2 Expectations for Cleanup Actions

In addition to the MTCA selection criteria, Ecology's eight expectations for cleanup actions listed in WAC 173-340-370 are also to be considered. These expectations outline general Ecology policies regarding certain kinds of contaminated sites and types of actions. Ecology recognizes there are sites where the expectations are not appropriate.

3.1.2 Summary of Previously Evaluated Cleanup Action Alternatives

The FFS described a number of potential remedial technologies, including: (1) institutional controls; (2) groundwater monitoring; (3) deed restrictions; (4) in situ treatment technologies including monitored natural attenuation, biodegradation treatment utilizing Hydrogen Release Compound (HRC®) or Oxygen Release Compound (ORC®), chemical oxidation, air sparging, and soil vapor extraction; and (5) ex situ technologies such as groundwater extraction and treatment of extracted groundwater via air stripping. These remediation technologies were combined into several cleanup action alternatives for each of the two affected shallow groundwater areas, the MW-1/MW-4 plume and the MW-5 plume.

The cleanup action alternatives evaluated for the MW-1/MW-4 area were:

- Alternative 1-1: Monitored Natural Attenuation and Institutional/Engineering Controls;
- Alternative 1-2: Monitored Natural Attenuation, Biological Treatment using ORC® , and Institutional/Engineering Controls;
- Alternative 1-3: Groundwater Extraction and Air Stripping; and
- Alternative 1-4: Air Sparging with Soil Vapor Extraction.

The cleanup action alternatives proposed for the MW-5 area included:

- Alternative 2-1: Biological Treatment with HRC® and ORC® and Institutional/Engineering Controls;
- Alternative 2-2: Air Sparging and Soil Vapor Extraction; and
- Alternative 2-3: In Situ Chemical Oxidation Using the ISOTEC Process.

Each of these alternatives was described in detail, including the design, control and operation, and cost of the alternatives.

3.1.3 Selected Cleanup Action Alternative

The FFS included an evaluation of each alternative with respect to the MTCA criteria outlined in Section 3.1.1. For the MW-5 shallow groundwater plume, Alternative 2-3, in situ chemical oxidation using the ISOTEC process, was the recommended cleanup action alternative. This alternative was recommended because it was expected to meet the evaluation criteria as well as or better than the other alternatives, with the shortest restoration time frame. Although the treatment technology was anticipated to be relatively expensive, the overall costs were expected to be low relative to other alternatives because of the shorter time frame for implementation. This alternative was to include a bench scale study and a field pilot test, followed by full-scale design and implementation.

For the MW-1/MW-4 shallow groundwater plume, the evaluation indicated all four alternatives would satisfy the MTCA criteria, with Alternative 1-4, Air Sparging with Soil Vapor Extraction, ranking slightly higher than Alternatives 1-2 and 1-3. Alternative 1-1 had the lowest cost by far, with Alternative 1-2 having the highest cost. Based on the evaluation, Alternative 1-4 appeared to be the preferred alternative, capable of meeting the evaluation criteria within a reasonable time frame and at a reasonable cost. However, the FFS report recommended that the selected cleanup action alternative not be implemented until after the pilot test of in situ chemical oxidation at the

MW-5 plume, due to the potential applicability of in situ chemical oxidation in the MW-1 plume area.

3.2 Pilot Test of Selected Cleanup Action Alternative

Following selection of in situ chemical oxidation as the remedial alternative to be implemented at the MW-5 area, a pilot test of the proposed technology was conducted in accordance with the FFS. Based on the initial pilot test, additional bench-scale testing of soil oxidant demand was conducted. Results of these studies are summarized below. Copies of the laboratory studies and pilot test reports are included in Appendix B.

3.2.1 Pilot Test of Chemical Oxidation

The in situ chemical oxidation pilot testing consisted of an initial laboratory treatability study followed by a field test.

3.2.1.1 Laboratory Treatability Study

In 2001, In-Situ Oxidative Technologies, Inc. (ISOTEC) conducted a laboratory treatability study on soil and groundwater samples collected from the Site (Appendix B). The study was designed to determine the potential effectiveness of ISOTEC's Fenton's chemistry-based oxidative technology, which utilized hydrogen peroxide and a proprietary catalyst. The objectives of the study were to determine the appropriate dose of reagent required to oxidize site contaminants, evaluate the effectiveness of ISOTEC's Fenton-based chemical oxidation on samples of Site groundwater and soil slurry, and determine the most effective reagent for future pilot testing. Two sets of laboratory experiments were conducted, one using Site groundwater and the other using a Site soil-slurry mix consisting of a 1:1 ratio of Site soil and groundwater.

Four pairs of groundwater reactors were prepared, and six pairs of soil-slurry reactors were prepared. For each pair, both reactors were injected with reagent. One reactor was periodically sampled for residual hydrogen peroxide during the experiment, and the other was not opened until the end of the experiment. Control reactors were also utilized. The results of the treatability study indicated a 99.9 percent reduction in target VOCs in groundwater for all 3 reagents when 2 applications were performed. For the soil-slurry mix, target VOC reductions ranged from 84.1 percent to 93.4 percent for the 3 reagents when applied 3 times during the experiment. The treatability study results were used to design a pilot test of ISOTEC's oxidative process.

3.2.1.2 Field Test

Between August 2001 and October 2001, a field test of the Fenton-based chemical oxidation program was conducted. The field test was conducted in the vicinity of well MW-5. Three injection wells (INJ-1 through INJ-3) were installed in a triangular pattern in this vicinity, and two monitoring wells, MW-11 and MW-12 were also installed (Figure 3). Reagent was injected during three events in mid-August, mid-September, and mid-October 2001. A total of 8,180 gallons of ISOTEC reagents were injected. During the first injection event, surfacing of the reagents was observed in the well vault of well INJ-3, and a replacement well was constructed prior to the second injection event.

A baseline groundwater monitoring event was conducted, along with monitoring events after every injection event. Four additional monitoring events were conducted through January 2002. The final groundwater concentrations for wells MW-11 and MW-12 indicated a post-injection PCE concentration reduction, relative to the baseline concentrations, of 5 percent and 93 percent, respectively. PCE concentration changes for the injection wells ranged from an increase of 29 percent at well INJ-3 to a decrease of 97 percent for INJ-2. The PCE concentration changes were accompanied by a marked increase in acetone concentrations, detected at up to 9,300 µg/L in well MW-12 in October 2001 (compared to a September 2001 analysis in which acetone was not detected above the laboratory MRL of 200 µg/L). The acetone concentrations decreased over time during the post-injection monitoring, down to non-detect levels in March 2002. Based on the concentrations of hydrogen peroxide and iron measured in the injection and monitoring wells, the injection radius around the injection points appeared to be between 5 and 15 feet.

Although the pilot test was somewhat effective in reducing VOC concentrations, the process was not effective in reducing concentrations to the cleanup levels. ISOTEC hypothesized that factors limiting effectiveness of their process at the Site may include higher than anticipated contaminant mass and higher than expected organic content in soil. Based on these results, ISOTEC recommended a full-scale remediation approach consisting of two phases: an initial phase of Fenton-based treatment to desorb contamination adsorbed to soil and treat the majority of mass in groundwater, and a potassium permanganate ($KMnO_4$) polish to treat the remaining dissolved-phase mass.

3.2.2 Soil Oxidant Demand Bench Test

Based on this recommendation, a laboratory study of oxidation using potassium permanganate ($KMnO_4$ was performed by PRIMA Environmental (PRIMA). The objectives of the study were to: (1) estimate soil demand for $KMnO_4$ and confirm that VOCs can be removed from groundwater in the presence of Site soil; and (2) determine whether hexavalent chromium Cr(VI) is formed during $KMnO_4$ treatment and if so, whether it could naturally attenuate. Two doses of $KMnO_4$ were evaluated in a mixture of Site soil and groundwater, and PCE and TCE were completely removed from the samples at the higher dose. A separate soil oxidant demand test was conducted by dosing Site soil samples with various concentrations of $KMnO_4$. For all but the highest dose, the KMnO4 was consumed by soil demand within approximately 2 days. Buildup of hexavalent chromium was not observed, indicating the Cr(VI) impurities in the $KMnO_4$ were naturally attenuated. PRIMA concluded that $KMnO_4$ should be considered to remediate soil and groundwater at the Site, and if the high soil oxidant demand made use of $KMnO_4$ cost-prohibitive, a less expensive pre-oxidant could be used to lower the soil oxidant demand prior to use of $KMnO_4$. A copy of PRIMA's report is provided in Appendix C.

3.2.3 Summary of Pilot Test Results

Based on the limited success of these laboratory and pilot tests, and the excessive cost associated with injecting sufficient quantities of oxidants to overcome soil oxidant demand, Univar decided to forego chemical oxidation in the MW-5 plume and evaluate other remedial technologies. Additionally, the implementation of the recommended alternative for the MW-1/MW-4 was postponed to further evaluate options for both the MW-5 and MW-1/MW-4 shallow groundwater plumes and to evaluate options for the deeper groundwater plume identified during the course of the pilot test.

3.3 Evaluation of Enhanced Reductive Dechlorination Technology

Following the chemical oxidation pilot test, additional evaluation of enhanced reductive dechlorination (ERD) was conducted. ERD is a remedial technology that was described in the FFS as biodegradation treatment using HRC® or ORC® as amendments to enhance the reductive dechlorination process. In the years since the development of the FFS, ERD technology has evolved. Additional enhancing agents have been developed and ERD has been proven effective at numerous sites. These advances in the technologies available to implement ERD, as well as increased evidence of successful groundwater remediation at other Univar facilities with similar groundwater conditions, have led to the reconsideration of ERD as a possible remedial technology for this Site. The following sections provide an update on the current status of ERD technology and present a discussion of the applicability of ERD at this Site.

3.3.1 Overview of ERD Technology

VOCs are known to naturally degrade in the subsurface via a number of mechanisms, under both aerobic and anaerobic conditions. Oxidation and cometabolism can occur under aerobic or anaerobic conditions, while reductive dechlorination occurs only under anaerobic conditions. Not all VOCs are amenable to degradation via each of the above processes. However, reductive dechlorination of the primary VOCs detected in groundwater at the site (PCE, TCE, and TCA) has been documented in the literature (AFCEE, 2004).

ERD is a process by which a source of biodegradable organic substrate is introduced into the aquifer to stimulate reductive dechlorination of CVOCs. The substrate biodegrades in an anaerobic environment, releasing molecular hydrogen and fatty acids, which in turn provide carbon and energy to microorganisms that metabolize CVOCs via reductive dechlorination (AFCEE, 2004). If the appropriate microbes are present, highly chlorinated compounds such as PCE and TCA can be fully dechlorinated to the relatively innocuous breakdown products ethene and ethane, respectively. Reductive dechlorination generally occurs via sequential dechlorination from PCE to TCE to DCE (typically the cis- isomer) to vinyl chloride to ethene (in the case of chlorinated ethenes), or from TCA to DCA to chloroethane (CA) to ethane (in the case of chlorinated ethanes). In some cases, it is necessary to augment the existing microbial population, but only if the naturally occurring microbial population is incapable of completing the desired transformations (complete degradation of CVOCs to ethene and/or ethane). A depiction of the biological degradation pathways for TCA and PCE is provided as Figure 7.

During the reductive dechlorination reactions, the CVOCs act as electron acceptors. Other electron acceptors must first be depleted in order for the CVOCs to be utilized (degraded). The most easily depleted electron acceptor is oxygen, followed by nitrate, manganese (IV), iron (III), and then sulfate. ERD is more easily achieved when the presence of competing electron acceptors (oxygen, nitrate, and sulfate) are low. Additionally, ERD is generally more likely to succeed when indicators of reductive dechlorination are already present (e.g., daughter products, presence of dissolved gases such as ethene and ethane, and low DO and ORP).

In the anaerobic environment in which reductive dechlorination occurs, methanogenic bacteria are frequently present and active. These bacteria use carbon dioxide as an electron acceptor to produce methane in a process known as methanogenesis. The microbes that make reductive dechlorination possible compete with sulfate-reducers and methanogens for available hydrogen. Complete dechlorination is generally favored in environments where a steady, low-concentration supply of hydrogen is produced through microbial degradation of a primary substrate, such as lactate, vegetable oil, HRC® or other amendment. Alternatively, if hydrocarbons (i.e., toluene, elthylbenzene, xylenes (TEX)) are present in groundwater in addition to CVOCs, degradation of the hydrocarbons can serve as the organic donor, resulting in concurrent reductions in CVOC and fuel hydrocarbon concentrations.

3.3.2 Microcosm Study

Based on the limited effectiveness of chemical oxidation at the Site, and the success of ERD at other Univar facilities, a microcosm study was performed in 2003 to: (1) determine whether soil and groundwater at the Site contain the microbes necessary to degrade the VOCs in groundwater; and (2) evaluate various amendments to stimulate reductive dechlorination, including nutrients, electron donors, and bioaugmentation. Specifically, the study was conducted to assess whether PCE detected in groundwater in well MW-5 could be degraded using ERD and to assess whether the TCA detected in deeper groundwater in well MW-13 (located within the MW-1/MW-4 area) could be degraded using ERD. It should be noted that recent guidance on ERD implementation indicates that microcosm test results should be used with caution when evaluating what will occur during field implementation due to the inherent limitations of: (1) small sample volumes that in most cases do not contain soil and sediments which are usually the most prevalent source of nutrients and bacteria; and (2) the disturbed nature of the sample. Often, microcosm and field test results will differ (AFCEE, 2004). A copy of the microcosm study report is attached as Appendix D.

The microcosm test results for the groundwater sample from well MW-5 indicated that sulfate was depleted after 14 days using a glucose/lactate donor, albeit after 110 days (when the test ended) the PCE had not yet degraded. Additional donor was not added during the test. However, when groundwater samples from well MW-5 were bioaugmented in one study with deeper groundwater from the well MW-13 microcosm study and in another study with laboratory-supplied bacteria, PCE was degraded to cis-1,2-DCE and vinyl chloride, and vinyl chloride to ethene, respectively. The ERD reactions were most complete (generating ethene as the final product) using bioagumentation with the laboratory-supplied bacteria. These results suggest that bioaugmentation may be needed to facilitate PCE degradation in the area of well MW-5. However, the microcosm results may not be replicated in the field. In most field cases, PCE degradation will occur to completion if the aquifer conditions are sufficiently anaerobic. Bioaugmentation is usually only conducted if VOC degradation is not complete and results in a "stuck" reaction, with the long-term accumulation of cis-1,2-DCE and/or vinyl chloride. Because daughter products degrade more slowly than the parent compounds, additional treatment/monitoring time may be needed to achieve cis-1,2-DCE and vinyl chloride degradation. In the microcosm test, this additional "lag time" was not allowed.

The microcosm test results for well MW-13 were very favorable and indicated that both TCA and cis-1,2-DCE could be degraded to the end products of ethene and CA within the test period of 110 days, without bioaugmentation. The test did not indicate that CA was further degraded to the final end product of ethane during the microcosm test. It is unclear whether this was due to the limited timeframe of the microcosm study, or other factors such as the inability of CA to completely degrade under conditions studied in the microcosm test. This potential limitation of the ERD technology will be addressed in subsequent sections of this report.

3.3.3 Applicability of ERD to Site Groundwater Conditions

In addition to the extensive field parameter and VOC data presented in Tables 4 and 5, respectively, more limited data have been generated for other constituents that provide evidence of the suitability of the Site for implementation of ERD. These constituents include various electron acceptors presented with the general chemistry parameters in Table 6 and dissolved organic gases such as ethene and ethane presented in Table 7. These data are utilized in the following sections to discuss the suitability of the Site for implementation of ERD.

3.3.3.1 MW-1/MW-4 Shallow Groundwater

In the vicinity of shallow zone monitoring wells MW-1/MW-4, the following lines of evidence demonstrate that the CVOCs in shallow zone groundwater have already naturally degraded or attenuated via reductive dechlorination processes: (1) degradation products of TCA and PCE are present; (2) the concentration of competing electron donors (oxygen, nitrate, and sulfate) are low relative to the rest of the aquifer; (3) the aquifer already appears to be anaerobic as evidenced by the low dissolved oxygen and negative ORP readings; and (4) dissolved gases (the end product of ERD) are already present. Current PCE groundwater concentrations are low compared to historical data. Thus, it is likely that the existing hydrocarbons (TEX) present in groundwater in the area have acted as an organic donor to drive these reactions and/or facilitated co-metabolic degradation of the CVOCs. Based on these data, it appears that the shallow MW-1/MW-4 groundwater plume is amenable to ERD.

However, as discussed in Section 2.1.3, the recent VOC results continue to demonstrate that the VOCs in the MW-1/MW-4 shallow groundwater plume are not migrating off-Site, and the plume appears to be retracting (as evidence by the lack of IHSs exceeding cleanup levels in MW-3). Based on the data from the ongoing monitoring, it is likely that the concentrations will continue to decrease due to natural attenuation processes and CULs can be achieved within a reasonable time frame. Because the VOCs attenuate before the plume moves off-Site, active remedial efforts such as ERD do not appear to be necessary at this time for this portion of the plume (shallow zone in vicinity of MW-1 and MW-4). Continued monitoring of the groundwater conditions in this area is recommended to ensure natural attenuation processes continue to degrade the VOCs and reduce their concentrations.

3.3.3.2 MW-1/MW-4 Deeper Groundwater Plume

In the vicinity of wells MW-13, MW-21 and MW-22, conditions indicate natural attenuation is occurring to some extent. The multiple lines of evidence of natural attenuation via reductive dechlorination include the presence of daughter products (Table 5), the presence of dissolved ethene and ethane (Table7), and low DO and negative ORP measurements (Table 4), which indicate the plume is anaerobic. The presence of petroleum hydrocarbons may be facilitating decreases in both CVOC and TEX concentrations due to cometabolism.

The microcosm test results for well MW-13 (Section 3.3.2) were generally very favorable and indicated that TCA and cis-1,2-DCE could be degraded to CA and ethene, respectively, within the test period of 110 days, and without bioaugmentation. Downgradient concentrations of CA do not appear to be attenuating sufficiently under current site conditions to meet CULs at the downgradient Property boundary. It is not known whether the lack of reduction of CA to ethane resulted from not allowing enough time to elapse, or due to a lack of the appropriate microorganisms, and/or other conditions which precluded the reductive dechlorination process.

Despite these generally favorable conditions, the results of VOC monitoring indicate that although concentrations are attenuating, the rate of degradation is not sufficient to control migration of the IHSs off-Property. Application of an electron donor to further accelerate reductive dechlorination is warranted near the areas of well MW-13, MW-21 and MW-22, as the concentrations in these wells are higher than in the overlying shallow zone and will take longer to attenuate naturally. Once the ERD program has successfully reduced the high concentrations of IHSs, it may be appropriate to discontinue the ERD program and let the remaining lower concentrations attenuate naturally, as in the shallower portion of the plume. Implementation of ERD in the MW-1/MW-4 deeper groundwater plume will require close monitoring of CA concentrations to ensure concentrations decrease sufficiently to meet cleanup levels at the point of compliance.

3.3.3.2 MW-5 Shallow Groundwater Plume

In the area of well MW-5, there is more limited evidence of reductive dechlorination of CVOCs in groundwater. PCE is the predominant CVOC present, although some daughter products are present at concentrations two to three orders of magnitude lower than the PCE. For instance, in September 2007, PCE was detected in well MW-5 at a concentration of 1,500 micrograms per liter (µg/L) with TCE and cis-1,2-DCE (daughter product) concentrations of 57 µg/L and 7.6 µg/L, respectively. Vinyl chloride has not been detected in well MW-5. TCA and breakdown products have been detected only sporadically in well MW-5, and at concentrations below CULs.

As discussed in Section 3.3.2, the microcosm test results for the groundwater sample from well MW-5 indicated that the PCE in the sample only degraded when the sample was bioaugmented with water from well MW-13 or laboratory-supplied bacteria. These results suggest that although CVOCs in groundwater may be amenable to ERD, bioaugmentation may be needed to facilitate PCE degradation.

This evidence of reductive dechlorination at well MW-5 is much more limited (i.e., the evidence is generally limited to the presence of daughter products in select wells only). However, there are some trends that suggest that reductive dechlorination may be occurring, albeit slowly. In samples from well MW-12, PCE concentrations in May 2008 were significantly lower than in December 2002 (390 in May 2008 versus 1,300 µg/L in December 2002), TCE concentrations have consistently been detected at concentrations above 1,000 µg/L, and the presence of VC has been detected since 2003 suggesting some reductive dechlorination is occurring around well MW-12.

The above data indicate that remedial efforts are required to reduce the source concentrations and control the migration of IHSs in the MW-5 plume area. The results of the microcosm test indicate that application of ERD in the area of MW-5, MW-11, and MW-12 could accelerate the reductive dechlorination processes that already appear to be occurring in some form in MW-12.

3.3.4 Factors Affecting Implementation of ERD

There are a number of factors to be considered in designing the ERD program for this Site. They include: (1) the presence/absence of indigenous microorganisms capable of biodegrading the contaminants; (2) the type of organic substrate to be utilized; and (3) the delivery method. Each of these factors is discussed in the following sections.

3.3.4.1 Presence of Indigenous Microorganisms

As discussed above, the existing Site data provides a number of indicators of the presence/absence of microorganisms capable of reductive dechlorination of the Site contaminants. In the case of the shallow and deeper portions of the MW-1/MW-4 plume, the anaerobic conditions and presence of daughter products indicate that reductive dechlorination is occurring. In the case of the shallow portion of the aquifer, the limited extent of the plume indicates the probable presence of the microorganisms necessary to facilitate complete reductive dechlorination of contaminants. For the deeper plume, data indicate that although reductive dechlorination is occurring, including complete dechlorination of PCE to ethene, it is not occurring at a rate sufficient to prevent off-Property migration of the plume. If injection of organic substrate does not result in significant increase in attenuation rates, it may be necessary to bioaugment the MW-1/MW-4 deeper groundwater plume area.

The elevated CA concentrations in the downgradient portion of the plume, as well as the fact that production of ethane was not observed during the microcosm study, indicate that Site microorganisms may not be able to completely reduce TCA to ethane. Some manufacturers are producing bioaugmentation cultures that target TCA and DCA in addition to chlorinated ethenes;

however, to our knowledge a bioaugmentation culture that targets CA has not yet been brought to market. Therefore, elevated CA concentrations may need to be addressed through a contingency plan, if substrate injection and bioaugmentation do not achieve the desired results.

In contrast to the source area in the vicinity of MW-1/MW-4, limited quantities of breakdown products are observed in the plume in the vicinity of MW-5. Furthermore, the microcosm study indicated that without bioaugmentation with a bacteria culture or groundwater from well MW-13, the water from well MW-5 did not exhibit a decrease in concentration upon addition of the organic substrate. This indicates that the microbial populations necessary for reductive dechlorination of chlorinated ethenes may not be present in this plume area. Based on the observed groundwater conditions and microcosm study results, bioaugmentation to introduce dechlorinating microorganisms in addition to introduction of a substrate to enhance microbial populations is recommended during implementation of ERD in the MW-5 area.

3.3.4.2 Selection of Organic Substrate

A variety of substrates are available for ERD. Commonly used substrates include more soluble substrates such as sodium lactate and molasses (shorter-life of approximately 4 to 6 months), and longer-lasting substrates such as hydrogen release compound (HRC®) and edible oil (longer life of approximately 1 to 2 years). The advantage to more soluble substrates such as lactate is that they are more easily dispersed throughout the aquifer, and are readily biodegradable resulting in a more immediate increase in the energy available to microbial populations. The downside of more soluble substrates is that they typically contain less available hydrogen by volume, and require frequent additions during the treatment program. Longer-lasting substrates such as HRC® and edible oil, typically either pure soybean oil or soybean oil emulsified with water, generally persist for longer in the subsurface. Edible oil substrates, particularly emulsified oil products, are less viscous than HRC® and are typically easier to inject and disperse throughout the subsurface, although significant quantities of dilution or chase water may be required to disperse edible oil products. Given the difficulties associated with injection and distribution of HRC®, in addition to higher anticipated costs for HRC® based on manufacturer estimates, edible oil was selected as the preferred substrate for the purposes of CAA development.

As noted above, edible oil products for ERD can consist of pure oil or emulsified oil. Pure edible oil is typically used for high-concentration source areas in which dense non-aqueous phase liquids (DNAPL) may be present (AFCEE, 2007). Pure edible oil is typically more difficult to distribute evenly and may result in a loss of permeability in the aquifer. The pure oil is thought to both sequester the CVOCs, reducing their mobility and rates of desorption into the aquifer, and enhance reductive dechlorination of the CVOCs that are not sequestered. However, it is unclear the degree to which reductions in concentrations in these areas are due to sequestration versus reductive dechlorination. Emulsified oils contain much smaller oil droplets relative to pure edible oil and are thought to better infiltrate soil pores in aquifers. They are also typically more easily and evenly dispersed in the aquifer and are less likely to float to the aquifer surface than pure oil. For this site, given the lack of evidence of DNAPL conditions, use of an emulsified oil substrate is recommended.

A variety of emulsified oil options are available for ERD. A high-speed shear mixer can be used at the site to create oil/water emulsions on-site. However, these mixtures typically contain a larger droplet size and may be less stable than commercially prepared emulsions, and field quality controls may be difficult to implement. Commercially-prepared emulsions are available for ERD projects. These emulsions typically have droplet sizes of less than 2 microns, and may contain additives such as lactate, nutrients (yeast, vitamin B12), and surfactants. The more soluble lactate may be included to help with initial stimulation of microbial activity while the edible oils begin to degrade. The formulations with lactate may also contribute to more microbial growth and possibly biofouling of wells, depending on the delivery method. Commercially available emulsified oil preparations typically consist of up to 60 percent soybean oil by weight, up to 10 percent emulsifiers, up to 5 percent lactate, with the remaining weight percentage consisting of water. For this site, use of a commercially prepared emulsified oil substrate is recommended. Depending on the delivery method, an emulsion containing lactate may or may not be recommended, as described below.

3.3.4.3 Substrate Delivery Method

The three most common methods for delivering emulsified oil to the subsurface are: (1) groundwater recirculation; (2) direct-push injection (i.e. Geoprobes or similar); and (3) injection through injection wells. A brief site-specific evaluation of the advantages and disadvantages of each delivery method with respect to implementability, expected effectiveness, and relative cost is presented below, culminating in a recommendation for the substrate delivery method for this site.

Groundwater Recirculation. Recirculation systems are designed to extract groundwater, add emulsified oil to the groundwater and re-inject the solution into Site wells. Typically the injection wells are centrally located and surrounded by extraction wells, at distances designed to allow distribution throughout the treatment areas within approximately one week of addition of the emulsified oil. After the emulsified oil is distributed through the treatment area, the system is turned off while the emulsified oil degrades and ERD occurs. The system can be reactivated periodically (pulsed) to distribute additional emulsified oil throughout the treatment area.

Advantages of Recirculation System

- Site groundwater is used to disperse emulsified oil, as opposed to using discrete injection locations where significant quantities of potable dilution or chase water are required to disperse emulsified oil throughout formation;
- Additional emulsified oil can be added without additional drilling or equipment;
- The injection/extraction well drilling and system installation time is expected to be shorter than the time required to inject into individual locations throughout the treatment areas, so the duration of site disruption would be shorter; and
- Wells may be sited in order to distribute emulsified oil beneath Site features, through which well installation would be otherwise infeasible.

Disadvantages of Recirculation System

- The well installation and trenching activities would result in more solid waste disposal than either of the other delivery options;
- The emulsified oil distribution may be more subject to channelization and preferential pathways based on the longer flow path and pump-induced hydraulic gradient;
- Although pre-design testing may provide a better indication of attainable flow rates and distribution, it would be difficult to add additional injection or extraction wells if monitoring data indicate the distribution is inadequate;
- Attainable extraction rates may exceed injection rates, resulting in accumulation of excess groundwater that would require disposal;
- The injection well seal could fail if pumping rates and pressures exceed the aquifer capacity, resulting in costly well repair or replacement;
- There is a potential for fouling of well screens with biological growth that may require significant well screen and system piping cleaning before additional recirculation can be performed. However, the potential for biofouling may be lessened by using a lactate-free emulsified oil formulation;
- Potential extraction/injection well and trench locations are limited by the presence of the drum rinse area and tanks farms;
- A separate direct-push drill rig would need to be mobilized to perform bioaugmentation; and
- The costs to deliver emulsified oil by a recirculation system are expected to be higher than via the other two delivery options.

Injection via Direct Push Borings. Another method for delivering emulsified oil to the subsurface is to inject it via a series of direct-push borings. This method utilizes direct-push drill rigs to advance multiple injection points, with an injection rig, pump and manifold system to deliver the emulsified oil/water mixture to multiple borings. The direct-push drilling equipment is used to advance hollow rods fitted with a specialized injection screen to the desired injection depth. During injection, the rods are periodically retracted so that the desired volume of emulsified oil is injected across the entire treatment interval. Because permanent wells would not be installed, and biofouling is not a concern, an emulsion containing lactate could be used.

Advantages of Direct Push Injection

- Conducting injections with a direct-push rig allows for more flexible and responsive injections. For instance, if surfacing (migration of emulsified oil mixture up the edges of the borehole to ground surface) occurs, a replacement boring can easily be advanced;
- Can advance two or more boreholes adjacent to each other to create multiple shorter intervals at each location based on site lithology, facilitating more even distribution across the injection interval;

- Lower capital cost relative to installation of wells, resulting in lower total cost if additional injection turns out not to be required;
- Less wastes generated than methods which involve drilling wells; and
- Less time required as compared to injection wells because drilling and injection are performed concurrently.

Disadvantages of Direct Push Injection

- Drilling permit variance required for direct-push injection at deeper intervals;
- Likely higher total cost than injection wells if more than one injection event is required; and
- Significant quantities of potable dilution/chase water are required to disperse emulsified oil throughout the formation, as compared to the recirculation option.

Injection via Injection Wells. Another method for delivering emulsified oil to the subsurface is to inject it via a series of wells. This method utilizes direct-push drill rigs to displace soil around the drilling rods in order to install narrow-diameter injection well. The injection wells would be installed at the same frequency and spacing as the direct-push injection locations. The wells would be equipped with specialized fittings to connect to the injection system. It is anticipated that the wells could be installed and developed over a period of several weeks, after which injection would proceed. The volume of substrate and dilution/chase water injected at each point would be the same as for the direct-push locations. To provide an initial boost to the microbial populations as the emulsified oil begins to biodegrade, an emulsion containing lactate would be used. To reduce the potential for biofouling of the wells, chase water will be injected after the dilute emulsified oil, in order to disperse the emulsion away from the immediate vicinity of the injection well.

Advantages of Injection via Wells

- If additional injection is required, the existing wells can be re-used and no additional drilling costs would be incurred.
- Less waste would be generated relative to the recirculation option;
- For areas where bioaugmentation is required, microbial populations can be introduced via the wells, eliminating the need for additional drilling;
- As with the direct-push option, the closely spaced injection well grid will allow for good lateral distribution of substrate, and may be less susceptible to preferential pathways than the recirculation system; and
- If groundwater monitoring results indicate additional injection locations are required, injection via wells offers more flexibility than the recirculation system to add injection points.

Disadvantages of Injection via Wells

- Higher cost for initial injection event and decommissioning of injection wells;
- Initial injection event will require slightly more time and site disruption than the other two options;
- If the well seal fails and surfacing occurs, and reduction of injection rate and pressure are not sufficient to restore well seal integrity, a drilling rig would need to be re-mobilized to advance a replacement injection well;
- Like the recirculation system wells, the injection wells may be subject to biofouling, resulting in increased costs for redevelopment, though the potential for biofouling will be lower if sufficient quantities of chase water are injection to disperse the emulsified oil away from the injection well;
- Significant quantities of potable dilution/chase water are required to disperse emulsified oil throughout formation, as compared to the recirculation option; and
- Injection wells cannot be installed in drum rinse area, so that area would require injection via direct-push.

Selected Delivery Method

As detailed above, there are many factors to consider in choosing the method for delivering emulsified oil to the subsurface. The cost, level and duration of site disruption, and anticipated effectiveness of each delivery method should be considered. Based on the evaluation presented above, injection via wells was selected as the preferred delivery method. This method was selected based on the anticipated similar effectiveness and lower cost relative to direct-push injection and due to the uncertainties associated with the effectiveness of a recirculation system and the higher relative cost.

3.4 Alternative 3 – Enhanced Reductive Dechlorination, Natural Attenuation, and Institutional Controls

The original FFS evaluated a number of cleanup action alternatives to address CVOCs in groundwater. This section presents an additional cleanup action alternative to be considered for this Site.

3.4.1 Overview

Alternative 3 consists of a combination of enhanced reductive dechlorination, natural attenuation, and institutional controls to address elevated concentrations of CVOCs in soil and groundwater. A brief summary of the Alternative 3 cleanup approach for soil and groundwater is discussed below.

3.4.1.1 Soil

Three areas have been identified where concentrations of IHSs in soil exceeded CULs in either the vadose zone and/or the saturated zone (Figures 8 and 9). Two of the areas are located within the MW-1/MW-4 and MW-5 groundwater plumes and the third area (SB-10) appears to be of limited extent, located southwest of the MW-1/MW-4 area. As described previously, none of the soil concentrations exceeded Method C CULs for protection of human health for direct contact, and the CULs that were exceeded are based on protection of groundwater from leaching of IHSs from soil. All of the areas are currently covered by asphalt or concrete pavement, making leaching of IHSs in the vadose zone to groundwater highly unlikely. Alternative 3 addresses the IHSs in the vadose zone soil by implementing institutional controls that require maintenance of the asphalt pavement to minimize infiltration of precipitation, and that require the use of standard health and safety equipment when conducting intrusive activities (i.e., excavation) in areas of contaminated soil to prevent exposures to site workers. Alternative 3 addresses IHSs in saturated soil concurrent with the cleanup actions proposed for groundwater, described in the next section.

3.4.1.1 Groundwater

The primary groundwater exposure pathways of concern are the inhalation of vapors originating from shallow groundwater and migrating into occupied spaces, and the consumption of contaminated groundwater (shallow and/or deeper groundwater) originating from the Site. The inhalation of vapors is currently an incomplete pathway because there are no occupied spaces located over shallow groundwater containing IHSs exceeding cleanup levels, and it is very unlikely to occur in the future. The consumption of contaminated groundwater is currently an incomplete pathway because there are no groundwater supply wells located within a 1-mile radius of the Property, well beyond the area exceeding cleanup levels. However, the consumption of groundwater is a future pathway of concern.

Alternative 3 addresses the IHSs in groundwater using the following approach:

- Implementing institutional controls to prohibit the use of Site groundwater for potable purposes;
- Using ERD in the source areas to accelerate the degradation of CVOCs and reduce contaminant mass flux from those areas of the plume where concentrations are highest, thus accelerating clean-up of the remainder of the plume. ERD would be implemented in the deeper MW-1/MW-4 plume area and the MW-5 plume area.
- Implementing natural attenuation for both the shallow MW-1/MW-4 plume, in which the IHSs are attenuating naturally, for the downgradient non-source areas of the plume, and as a polishing measure once ERD has reduced source area concentrations; and
- Conducting performance groundwater monitoring to evaluate the progress of cleanup actions at the Site and compliance monitoring to verify the cleanup levels are met at the point of compliance.

Implementation of ERD in the source areas can be achieved using a variety of substrates and delivery methods, as discussed earlier in this report. Based on the various advantages and disadvantages associated with each of the options, injection of a commercially-prepared emulsified oil solution with lactate via injection wells was selected as the best course of action. Injection via wells was selected because it is expected to offer the optimal combination of minimized site disruption, emulsified oil distribution, and cost-effectiveness.

Prior to implementing the ERD program, a test injection program will be conducted to provide data utilized to fine-tune the final design of the injection program. Bioaugmentation will be performed with the initial emulsified oil injections in the MW-5 plume area. Bioaugmentation will not be performed with the initial injections in the MW-1/MW-4 deeper groundwater plume area; however, bioaugmentation may be conducted in this area later, if deemed necessary based on performance monitoring results. The final element of the ERD program consists of a contingency plan to address residual concentrations of CA in the event that ERD and MNA are not effective in reducing CA concentrations to CULs at the point of compliance. The contingency plan includes further evaluation of additional remedial technologies that may be implemented to ensure CA concentrations do not exceed the CUL at the point of compliance.

Alternative 3 is expected to be effective in eliminating exposure pathways to the CVOCs underlying the Site by increasing rates of natural attenuation of CVOCs in groundwater and preventing additional off-site migration of groundwater containing CVOCs in excess of CULs. The CVOCs will be broken down into the relatively non-toxic breakdown products of ethane and ethene, which are not expected to present an environmental concern to the Site or neighboring properties. The performance and compliance monitoring program will be used to fine-tune the ERD and natural attenuation program, as necessary, and verify that CULs are achieved.

3.4.2 Detailed Description of Alternative 3

The following sections present a detailed description of Alternative 3, including: (1) pre-implementation injection testing; (2) conceptual design of the ERD program; (3) a description of the institutional controls; (4) operation and maintenance requirements; (5) performance and compliance monitoring; and (6) estimated cost.

3.4.2.1 Pre-Implementation Injection Testing

Prior to proceeding with full-scale design of the ERD program, injection testing is recommended to determine site-specific injection parameters. To better determine injection parameters for both source areas, tests of the MW-5 shallow groundwater source area and the MW-1/MW-4 deeper groundwater source area will be conducted. At each area, two or more injection wells would be installed with the recommended spacing and construction (see Section 3.4.2.2) in close proximity to existing monitoring wells. Emulsified oil would be injected into one of the wells at the specified rate and dosage. An oil-soluble non-toxic dye would be added to the emulsified oil to facilitate evaluation of the distribution of the emulsified oil. The injection flow rate and pressure will be monitored, as well as the total volume of fluid injected.

Pre-injection and post injection groundwater sampling will be conducted at the injection and nearby monitoring wells to evaluate the radius of influence of the injection. Groundwater samples will be collected using low flow sampling techniques. The groundwater samples will be analyzed for TOC and will be observed for the presence of the injected dye (post injection samples). The presence of the dye or a significant increase in TOC would indicate the presence of emulsified oil at the sampling location.

The data from the injection test will permit the design basis parameters discussed in the following section to be refined, and provide valuable information for finalizing the full-scale design of the ERD program.

3.4.2.2 Conceptual Design

Although the injection testing will provide data to fine-tune the final design of the full-scale ERD program, a conceptual design is presented in the following sections. The conceptual design is based on the design-basis parameters presented in Table 9.

ERD Implementation Areas. The proposed source areas to be treated using ERD are shown on Figure 12. These areas were selected based on the soil and groundwater characterization data presented in Section 2, including groundwater data collected from both the direct push borings and the monitoring wells. The source areas and targeted zones to be treated with ERD will include:

- **MW-1/MW-4 Deeper Groundwater Area:** An area of approximately 80 feet by 120 feet within the deeper groundwater zone (depths of approximately 22 to 42 feet bgs) in the vicinity of wells MW-13, MW-21, and MW-23 in the location of the former USTs and current barrel wash area. This area and depth interval was selected because it contained the highest concentrations of IHSs, and groundwater monitoring data indicate concentrations decrease significantly downgradient of this area; and

- **MW-5 Area:** An area of approximately 60 feet by 60 feet within the shallow groundwater (depths of approximately 5 to 20 feet bgs) near wells MW-5, MW-11, and MW-12. This area was selected because groundwater monitoring results and saturated soil sample results indicate this to be the primary location of the source of PCE in this area.

Organic Substrate Formulation. As discussed in Section 3.3.4.2, a number of emulsified oil substrates are commercially available. They typically consist of 40 to 50 percent vegetable oil by weight, and may contain small percentages of fast-acting substrates such as lactate, as well as nutrients and/or buffers added with the intent of additionally enhancing the reductive dechlorination process.

Although the emulsified oil formulations typically contain 40 to 50 percent vegetable oil as delivered to the site, dilution is required prior to injecting. The dilution will increase the amount of solution injected, thereby displacing more groundwater volume and increasing the radius of influence of the injections. For this site, it recommended to dilute the emulsified oil to a minimum of 1 percent vegetable oil by volume.

Use of an emulsified oil substrate with a fast-acting substrate such as lactate is recommended. In the MW-5 area, the lactate will assist in driving the aquifer anaerobic, as necessary, and provide an initial source of nutrients to the dechlorinating bacteria introduced at the time of injection. The risks of biofouling due to the lactate can be reduced by injecting potable chase water after the emulsified oil, in order to disperse the emulsified oil away from the well screen.

The microcosm study performed on samples from well MW-13 indicated that for samples to which a dechlorinating culture was added, the presence or absence of added nutrients such as yeast and vitamin B12 had no effect on the outcome of the experiments. For samples in which no dechlorinating culture was added, the sample with added yeast and vitamin B12 exhibited more complete breakdown of VOCs during the test period. However, complete dechlorination may have occurred if the test period had been extended. Based on the microcosm study, it does not appear that adding yeast or vitamin B12 is necessary.

To enhance distribution of the emulsified oil throughout the aquifer, use of a buffered solution is recommended. Due to the relatively fine formation, a nonionic buffer is recommended to reduce the potential for adsorption of the emulsified oil droplets to soil particles, which would make it difficult to distribute the emulsion throughout the aquifer. Based on these criteria, use of Buffered Nonionic Newman Zone emulsion developed by Remediation and Natural Attenuation Services, Inc. (RNAS) is recommended. This formulation contains 46 percent soybean oil and 4 percent lactate by weight.

Volume of Organic Substrate. The amount of emulsified oil required is determined based on the stochiometric hydrogen demand of groundwater as well as the dosage required to obtain effective distribution of the emulsified oil within the treatment area. Table 9 presents a summary of the Site-specific parameters used for developing the conceptual design of Alternative 3. It includes concentrations of CVOCs and other site groundwater constituents with hydrogen demand, including nitrate, dissolved oxygen, and sulfate. Appendix E presents stochiometric calculations prepared by RNAS for the hydrogen demand in the deeper MW-1/MW-4 area and in the MW-5 area. For the deeper MW-1/MW-4 area, the hydrogen demand was estimated at 4.15 pounds, and for the MW-5 area the estimated hydrogen demand was 1.61 pounds. This is equivalent to 36 pounds and 14 pounds of vegetable oil, or approximately 80 and 30 pounds of Newman Zone emulsion, respectively. Even assuming a safety factor of 20 times the amount of vegetable oil, and dilution of the emulsion to a 1 percent vegetable oil solution, the quantity of injectate would be insufficient to distribute throughout the treatment areas given the adsorptive capacity of the soil.

Therefore, the amount of emulsion to be injected was calculated based on displacement of the pore volume within the treatment area. For calculation purposes, 20 percent effective porosity and 100 percent displacement of the pore volume within a 3-feet radius of the injection location was assumed. In actuality, displacement of a lesser percentage of the pore volume over a wider radius will occur. For the deeper MW-1/MW-4 area, this equates to 931 gallons of dilute emulsified oil solution per injection well, over a 20 foot screened interval as calculated by RNAS. For the MW-5 area, this equates to 635 gallons of dilute emulsified oil solution per injection well over a 15-foot thick treatment zone.

Bioaugmentation Culture. Based on review of available literature, it appears that most commercially available bioaugmentation cultures are targeted to address the more commonly encountered chlorinated ethenes. These formulations typically include a microbial consortium consisting of *Dehalococcoides* sp. However, it appears some suppliers are beginning to developed broader-based bioaugmentation cultures that include microbes capable of degrading TCA and DCA. Based on a review of commercially available bioaugmentation cultures, the Bio-Dechlor INOCULUM® PLUS(+) microbial consortium developed by Regenesis was selected as a representative bioaugmentation culture for use in Alternative 3. This culture contains microbes capable of degrading multiple CVOCs, including chlorinated ethenes, as well as chlorinated ethane (e.g., TCA and DCA). The culture is delivered to the site in liquid form via injection into direct-push borings or injection wells.

Bioaugmentation of groundwater in the vicinity of MW-5 will be conducted following the initial organic substrate injection, once the substrate has begun to degrade and aquifer conditions appear to be amenable to reductive dechlorination (e.g. low DO and ORP concentrations and increasing TOC concentrations). It is anticipated that these conditions will be observed within three months of the initial injections. Approximately 4.5 liters of the Bio-Dechlor INOCULUM® PLUS(+) (or similar) will be injected into each injection well to allow the microbial populations to establish throughout the treatment area.

Injection Well Installation. Emulsified oil will be injected into the subsurface via a system of injection wells. Wells will be installed consistent with the requirements for Class V injection wells specified in the Underground Injection Control Program (Chapter 173-218-WAC). Boreholes will be advanced using direct-push drilling equipment fitted with stainless steel core barrel with an outer diameter of 3.5 inches. The direct-push rods will be advanced to remove the soil from within the 3.5 inch core barrel and the injection well screen and casing will be installed through the rods to the design depths outlined above. Injection wells will be constructed of pre-packed 1.5-inch diameter well points. For injection wells in the MW-1/MW-4 deeper groundwater area, the injection wells will be screened from approximately 22 to 42 feet bgs. Injection wells in the MW-5 area will be screened from approximately 5 to 20 feet bgs. The annular space adjacent to the screened interval will be backfilled with sand to one foot above the screened interval. A sanitary seal consisting of a minimum of two feet of hydrated granular bentonite will be installed above the sand pack. The remaining annular space will be sealed with a bentonite/cement grout to approximately 6 inches below ground surface. The injection wells will be completed flush with steel well monuments mounted in concrete flush with the adjacent ground surface.

Within the drum wash area and hazardous materials tank farms, temporary direct-push borings will be used for a one-time only injection. Temporary direct push borings are being used within the drum wash area to prevent drum wash liquids from entering injections wells during drum wash operation over the extended period of time the injection wells would be in use. At these locations, direct-push rods fitted with a perforated injection tool will be advanced to the maximum desired injection depth. The rods will slowly be retracted as emulsion is injected, in order to deliver the desired emulsion volume across the desired thickness.

Substrate Injection. Based on the dosages recommended by RNAS, PES developed the following conceptual design for the injection of emulsified oil into the two source areas. Newman Zone emulsion will be injected as follows:

- In the MW-1/MW-4 deeper groundwater area, the emulsified oil will be injected at 48 locations at depths from approximately 22 to 42 feet bgs (Figure 13). Injection location spacing and configuration will generally consist of multiple rows of injection wells oriented perpendicular to the approximate groundwater flow and adjacent well rows will be off-set from one another (Figure 13). The spacing between wells in a row will be approximately 15 feet and the spacing between injection rows will be approximately 20 feet. The well spacing and alignment will be modified as necessary to accommodate adjacent operational features that limit access. The Newman Zone application rate will be approximately 930 gallons of dilute injection fluid (1 percent vegetable oil by volume).

  For those locations within the drum wash area where installation of injection wells is inappropriate based on the operational use, direct-push injection points will be utilized in lieu of injection wells (Figure 13). Due to the impracticality of further disrupting site operations to conduct additional injection events in those areas, the dosage of Newman Zone may be increased in an attempt to lengthen the effectiveness of the substrate. To accomplish this, the volume of 1 percent solution may be increased and/or the concentration of the dilute solution may be increased to 2 percent vegetable oil by volume. This determination will be made based on the results of the injection pilot test.

- In the MW-5 area, the Newman Zone will be injected at 18 locations at depths from approximately 5 feet to 20 feet bgs (Figure 13). The spacing between rows will be 20 feet and the spacing within a row will be 15 feet on center. The Newman Zone application rate is approximately 635 gallons of 1 percent dilute emulsion.

One or more reapplications of substrate may be necessary. For costing purposes, it is assumed that one reapplication event will be performed consisting of injection of the same amount of dilute emulsified oil solution at each of the injection wells. However, reapplication(s) would most likely be done over a smaller area, and the dose amount would be less than the initial application assuming that there is not an on-going source present. The need for reapplication will be based on an assessment of the performance monitoring data collected after the initial application. For purposes of developing the cost estimate, we have assumed that reapplication of substrate will be performed 18 months after the initial application.

The substrate will be injected via a centralized dosing pump and manifold system, connected to individual wells via specialized fittings and hoses. The pump will be connected to a bulk container of emulsifier oil and a potable water supply, and will be capable of providing a dilute emulsion at the desired formulation (1 percent). The pump will be capable of operating at up to 60 gallons per minute (gpm) and the manifold will permit the pump to inject into as many as 10 wells at one time. The manifold will include the necessary flow meters, pressure gauges, sight tubes and throttling valves to allow for precise control of injection volumes and rates at each injection point. Preliminary injection rates are estimated to be approximately 2 gpm per well. The actual injection rate will be determined during the pilot injection test.

3.4.2.3 Institutional Controls

Institutional controls in the form of an environmental covenant recorded on the property deed will restrict Site use, including prohibiting the development of occupied spaces over areas of the Site where vadose zone soil and/or shallow groundwater exceed CULs and there is a risk for vapor intrusion (this is not a current exposure pathway at the Site). The environmental covenant will also prohibit the domestic or agricultural use of Site groundwater and will require workers to use appropriate protective equipment if their activities will involve disturbance of contaminated soil exceeding cleanup levels. The environmental covenant will also restrict any activities on the Property that could impair the function of the cleanup actions, including the operation of the injection wells and the integrity of the existing asphalt and concrete surfaces overlying the areas where vadose zone soil exceed cleanup levels.

The environmental covenant will remain in place until compliance monitoring results demonstrate that cleanup levels have been achieved for the media of concern and Ecology has indicated the covenant is no longer required.

3.4.2.4 Operation and Maintenance

There is very little operation and maintenance anticipated to be associated with the ERD program. As noted above, the injection wells should be flushed with potable water after injection, to minimize the potential for biofouling of the wells. Prior to conducting subsequent injection events, the wells should be checked for the presence of biofouling, and redeveloped if necessary. Redevelopment would include surging and bailing the screened interval, and swabbing the well screen if necessary.

Additionally, injection equipment and hoses should be maintained in good working order. The pumps should be maintained in accordance with manufacturer recommendations, and the pressure gauges and valves on the injection manifold should be maintained in good working order. Hoses should be inspected for the presence of leaks hourly during the injection events. If leaks are noted, use of the hose should be discontinued until the leaking hose or fitting is repaired or replaced.

3.4.2.5 Performance and Compliance Monitoring

The existing well network will be used for performance and compliance monitoring; no additional wells are anticipated to be required. A detailed groundwater monitoring plan will be prepared and submitted to Ecology for approval consistent with the requirements of the Order.

Table 10 presents a tabular summary of a preliminary monitoring program for purposes of developing a cost estimate. The preliminary performance and compliance monitoring program is described in the following sections.

Monitoring Well Network. The monitoring well network will consist of performance and compliance monitoring wells.

Performance Monitoring Wells

The performance monitoring program is designed to monitor the progress of the ERD and natural attenuation programs. For each plume area, the performance monitoring wells are described below:

- MW-1/MW-4 Shallow Plume – The progress of natural attenuation in the MW-1/MW-4 shallow plume will be monitored via wells MW-1 and MW-4.

- MW-1/MW-4 Deeper Plume – The progress of ERD in the deeper source area will be monitored via wells MW-13, MW-17, MW-18, MW-21 and MW-22. These wells are in or near the treatment area for the deeper portion of the plume.

- MW-5 Plume – The progress of ERD in the MW-5 area will be monitored via wells MW-5, MW-12, and MW-23.

Compliance Monitoring Wells

The compliance monitoring program is designed to assess how the cleanup action is affecting the overall groundwater conditions at the site and to determine whether groundwater cleanup levels are being achieved to the point of compliance (defined as the downgradient property boundary). The proposed compliance monitoring well network includes all existing shallow and deeper monitoring wells on and off the Property as described below:

- Shallow Monitoring Wells: MW-2, MW-3, and MW-6 through MW-10. Well MW-11 is not included because of its close proximity to well MW-12, and previous pilot injection wells INJ-1 through INJ-3 are not included because they are not suitable for long term monitoring.

- Deeper Monitoring Wells – MW-14 through MW-16, and MW-19 through MW-20.

Sampling Frequency and Analytical Program. Table 10 presents a summary of the preliminary performance and compliance monitoring program. The groundwater level in all wells will continue to be measured on a semiannual basis.

Performance monitoring will consist of baseline monitoring prior to the substrate injection events, and quarterly monitoring for up to two years following the final injection event. The selected source area wells are MW-5, MW-12, MW-13, MW-21, MW-22, and MW-23. The remaining performance monitoring wells (wells MW-1, MW-4, MW-17 and MW-18) will be sampled on a semiannual basis. Compliance monitoring will consist of semiannual sampling of all on-Property and off-Property monitoring wells.

The analytical program for baseline and performance monitoring will consist of collection of low-flow purging field parameters, and laboratory analysis of VOCs, attenuation parameters, and substrate distribution parameters. The analytical program for compliance monitoring will consist of collection of field parameters during low-flow purging and laboratory analysis of VOCs. Field parameters will consist of temperature, pH, specific conductance, DO, and ORP. VOC analyses will consist of chlorinated and aromatic hydrocarbons. Substrate distribution monitoring will consist of laboratory analysis of TOC, as well as visual inspections for the presence of emulsified oil. The suite of attenuation parameters will consist of dissolved gases (ethene, ethane, and methane), chloride, sulfate, nitrate, manganese, alkalinity, and ferrous iron.

Performance monitoring may also include biological testing to quantify the number and extent of dechlorinating organisms in the subsurface. This testing uses the polymerase chain reaction (PCR) technique to identify and quantify strands of DNA specific to known dechlorinating microorganisms. Baseline PCR analyses will be obtained from several wells in the MW-5 area prior to bioaugmentation, and again one year later to monitor the performance of the bioaugmentation process. If results of the ERD program implemented in the deeper MW-1/MW-4 area indicate bioaugmentation may be necessary, PCR analyses may be performed in select wells in that vicinity to further evaluate the need for bioaugmentation in that area.

Periodic evaluations of the progress of the ERD and natural attenuation program will be performed to determine whether additional injections may or may not be required. Injection activities may be discontinued once VOC concentrations exhibit a significant reduction in the source area and data indicates that reductive dechlorination is continuing to completion (e.g. decreased concentrations of parent compounds and intermediate breakdown products, and increased concentrations of final breakdown products of chloride, ethene and/or ethane). It is anticipated that a second and final injection event will be implemented approximately 1.5 years following the initial injection event. Two years of quarterly performance monitoring are recommended following the final injection event, to confirm that CVOC concentration trends continue to decrease and that reductive dechlorination is continuing to the final daughter products of chlorine, ethane, and ethane. When termination of the injection and performance monitoring program is recommended, a revised monitoring program will be implemented, consistent with natural attenuation as the final phase of clean-up. This monitoring program will consist of continued semiannual monitoring of all wells for chlorinated and aromatic VOCs, as well as analysis of methane, ethane, and ethane for the prior performance monitoring wells.

Reporting. Documentation on the results of the baseline monitoring, injection activities, and post injection monitoring will be provided as a section of the annual and semiannual progress reports. The information reported will include evaluation of the effectiveness of the injection activities based on whether anaerobic conditions have been achieved in the subsurface and the resulting effects on VOC dechlorination. The post-injection monitoring of the ERD program is expected to require approximately 2 years, after which the monitoring program will be modified to reflect a less intensive monitoring program for evaluation of MNA.

3.4.2.6 Cost

For costing purposes, it is assumed that the injection testing for Alternative 3 will be conducted in mid 2009 and full-scale design and implementation will be implemented in late 2009. The existing monitoring program will continue until implementation of the full-scale ERD program.

The capital costs would include the cost of designing, permitting, and constructing the injection systems and preparation of the associated documents. Capital costs for Alternative 3 will be incurred in 2009 and will include the following:

- Preparation and implementation of performance and compliance monitoring plan;
- Preparation and implementation of injection test plan;
- Preparation of full-scale design for ERD program;
- Installation of injection wells;
- Obtaining injection equipment;
- Conducting baseline monitoring event;
- Performing initial injection event; and
- Reporting.

It is anticipated that one additional round of injections will be required. Performance monitoring is estimated to occur for 2 years after the last injection of substrate (approximately 4 years total), and compliance monitoring will continue for 16 years after performance monitoring. Future and recurring costs include the following costs starting in 2010:

- Ongoing operations and maintenance of the injection wells;
- Groundwater monitoring and reporting; and
- Maintenance of the asphalt pavement as needed.

Total capital costs for this Alternative 3 would be approximately $322,000. The NPV of recurring and future costs over the 20-year project life would be approximately $763,000. The total estimated NPV for this alternative is $1,085,000. Refer to Table 11 for a breakdown of capital and projected recurring and future costs for Alternative 3.

3.4.3 Anticipated Performance of Alternative 3

Alternative 3 is expected to reduce both the magnitude and extent of VOC-affected groundwater, and reduce the potential for adverse human health affects by restricting contact with affected soil and groundwater and prohibiting more sensitive site uses. Concentrations of contaminants in the source area are expected to be reduced by 50 percent or more during the injection program, for both CVOCs (via reductive dechlorination) and TEX compounds (via cometabolism). As treated groundwater flows from the treatment zone to the downgradient wells, increasing the effective treatment zone, concentrations are expected to further decline to below CULs at the points of compliance. Given the wide range of groundwater velocities calculated for this site (30 to 300 feet/year for shallower groundwater, 10 to 100 feet/year for deeper groundwater), it is difficult to estimate the timeframe to achieve CULs at the points of compliance. It may be as little as 5 years or as much as 20 years after the initial injection of substrate into the source areas. Evaluation of concentrations in monitoring wells in the interim will permit more accurate estimation of restoration timeframes during implementation of the cleanup action.

The injection program and performance monitoring program are expected to be conducted over an approximately 4-year span, with an initial injection event, a second injection event at approximately 1.5 years after the first, and performance monitoring continuing for approximately two years after the final injection event. This will allow for the collection of data to demonstrate that source area concentrations have been significantly reduced, and verify that impacts of the ERD program are beginning to be seen in downgradient wells. The timeframe and/or need for additional injections will be evaluated during the implementation of the ERD programs and recommendations made as deemed necessary to optimize the ERD program.

Once source area concentrations have been reduced, the VOCs are expected to continue to naturally attenuate. This natural attenuation process may require an additional 16 years (total of 20 years after the initial injection) of monitoring to verify that CULs have been achieved at the source area and downgradient point of compliance wells.

3.5 Evaluation of Cleanup Action Alternative 3 – Enhanced Reductive Dechlorination, Natural Attenuation, and Institutional Controls

The following sections provide an evaluation of the proposed cleanup action with respect to: (1) MTCA cleanup action selection criteria; (2) Ecology expectations for cleanup actions; and (3) the previous CAAs presented in the original FFS.

3.5.1 MTCA Cleanup Action Selection Criteria

The following sections provide an evaluation of Alternative 3 with respect to each of the seven MTCA criteria.

3.5.1.1 Protectiveness

Alternative 3 achieves protection of human health and the environment in the short term by implementing institutional controls to: (1) prohibit the use of impacted groundwater on the Property; (2) require site workers that may contact impacted soil to the use appropriate health and safety equipment to prevent exposures; and (3) require maintenance of the existing paved surfaces overlying areas where soil exceeds cleanup levels to minimize the potential for leaching of contaminants in soil to shallow groundwater. Exposure of site workers to vapors originating from soil and/or groundwater is prevented because the areas exceeding cleanup levels are not located beneath occupied spaces. There are no current exposures to off-Property receptors of contaminated groundwater because impacts to shallow groundwater are contained within the Property boundaries and there are no water supply wells located within the area where deeper groundwater exceeds cleanup levels.

In the longer term, Alternative 3 achieves protection of human health and the environment using the methods described above and by: (1) implementing source area treatment in the MW-1/MW-4 deeper groundwater and MW-5 shallow groundwater plumes using ERD and (2) using natural attenuation to address the shallow MW-1/MW-4 groundwater plume (where IHSs are attenuating naturally) and as a polishing measure downgradient of the source treatment areas once ERD has reduced source area concentrations. The source area treatment and natural attenuation will reduce the concentrations of IHSs such that the concentrations of IHSs will eventually meet cleanup levels at the point of compliance (i.e. downgradient property boundary). Performance and compliance monitoring will provide sufficient information to assess the effectiveness of Alternative 3, implement additional measures as needed, and ensure the cleanup action is protective over the longer term.

3.5.1.2 Compliance With Cleanup Standards

Alternative 3 would ultimately achieve compliance with the groundwater cleanup levels at the point of compliance over the long term. In the short term, groundwater concentrations in the deeper groundwater at the point of compliance may exceed the cleanup levels until the source area treatment and natural attenuation have had sufficient time to reduce the concentrations to cleanup levels. The concentrations of IHSs in shallow groundwater at the point of compliance currently meet cleanup levels and implementation of Alternative 3 will insure that cleanup levels are attained over the long term.

3.5.1.3 Compliance with Regulatory Requirements

Implementation of Alternative 3 is subject to few applicable state and/or federal laws. The injection of emulsified oil into the subsurface would require registration with Ecology's Underground Injection Control program, which is reasonably easy to obtain as this technique has been applied at other sites in Washington. In addition, the management and disposal of contaminated soil cuttings, purge water, decontamination water, and other investigation and cleanup action derived wastes must be managed pursuant to the applicable Washington State solid and dangerous waste regulations.

3.5.1.4 Compliance Monitoring

Alternative 3 includes both performance and compliance monitoring to be conducted during the implementation. Performance monitoring will be conducted to ensure the source area treatment using ERD is performing as expected and to determine if additional applications of substrate are required. Compliance monitoring will be conducted during the ERD program and then during the ensuing natural attenuation process, until there is a statistical basis for determining that contaminant concentrations are below cleanup levels at the point of compliance.

3.5.1.5 Use of Permanent Solutions

Permanent solutions are defined in WAC 173-340-200 as cleanup actions "in which cleanup standards of WAC 173-340-700 through WAC 173-340-760 can be met without further action being required at the site being cleaned up or any other site involved with the cleanup action, other than the approved disposal of any residue from the treatment of hazardous substances." As described above, Alternative 3 is protective of human health and the environment. In the short term, risks to on-and off-Property receptors will be managed using the institutional controls to prohibit the use of groundwater containing IHSs at concentrations exceeding cleanup levels. In the longer term, implementation of ERD in the source areas followed by natural attenuation will result in the anaerobic reductive dechlorination of chlorinated VOCs, permanently removing VOCs from groundwater leaving ethene and ethane as substantially less toxic residual components. Ultimately, the cleanup action will result in the achievement of cleanup levels at the point of compliance without further actions as documented by the performance of compliance monitoring. As such, Alternative 3 constitutes a permanent solution.

3.5.1.6 Restoration Time Frame

Alternative 3 relies on a combination of active cleanup actions (ERD) to facilitate the degradation of source area concentrations, natural attenuation processes to further reduce concentrations to cleanup levels, and institutional controls to prevent exposure to Site related contamination during implementation of the cleanup action. Contaminant destruction via reductive dechlorination is a process for which all timeframes are difficult to accurately project. Based on the nature and extent of contamination present at the Site, it is likely that the remedial action could require up to 10 to 20 years before cleanup levels are achieved at the point of compliance. Given that the original source of the contamination is no longer present (i.e., the former USTs), the relatively small area of soil exceeding cleanup levels, the active treatment of the source areas will significantly reduce source concentrations (50 percent or more reduction) within the first 4 years, and the lack of existing use of groundwater for potable purposes within 1 mile of the Site, the restoration time frame of 10 to 20 years is reasonable.

3.5.1.7 Public Acceptance

Public concerns will occur in the context of the public review and comment period required by the Order for the RI/FFSA/DCAP. However, it is anticipated that the public will find Alternative 3 acceptable.

3.5.2 Expectations for Cleanup Actions

WAC 173-340-370, summarized in Section 4.3 of this document, outlines a series of eight expectations that Ecology has regarding selection and implementation of cleanup actions. Alternative 3 is consistent with these expectations in that it:

- Utilizes treatment technologies to address areas contaminated with high concentrations of hazardous substances and highly mobile materials (WAC 173-340-370(1));

- Utilizes the existing pavement to minimize the potential for migration of hazardous substances, by preventing precipitation and subsequent runoff from infiltrating the affected area (WAC 173-340-370(4));

- Follows Ecology guidance regarding the appropriateness of natural attenuation in that: (a) source control is conducted by implementing ERD in high-concentration areas; (2) leaving contaminants on-site during the restoration time frame does not pose an unacceptable threat to human health or the environment; (3) there is evidence that natural biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate; and (4) appropriate monitoring will be conducted to ensure that the natural attenuation process is taking place and that human health and the environment are protected(WAC 173-340-370(7)); and

- Is not expected to result in significantly greater risk than other cleanup action alternatives (WAC 173-340-370(8)).

Four of the expectations described in WAC 173-340-370(2), (3), (5), and (6) are not applicable to Alternative 3 because either the requisite site conditions are not present (i.e., location adjacent to surface water bodies or only small volumes of hazardous substances are present) or the alternative does not include the specific type of action (i.e., use of engineering controls such as containment).

3.5.3 Comparison to Previous Cleanup Action Alternatives

The FFS presented four alternatives for addressing VOCs in shallow groundwater in the MW-1/MW-4 plume area and three alternatives for addressing the MW-5 plume. None of the previous FFS alternatives included measures to address VOCs in the MW-1/MW-4 deeper groundwater plume as it was discovered after the FFS was conducted.

The evaluation of these alternatives concluded that as with Alternative 3 presented in this FFSA, all alternatives presented in the FFS for shallow groundwater would satisfy the MTCA criteria. Alternative 3 does not provide for as short a restoration time frame as the previously selected in-situ chemical oxidation alternative. However, pilot testing showed that in situ chemical oxidation was not feasible for the cost estimated in the FFS, thereby necessitating additional investigation and development of this FFSA. Industry-wide implementation of ERD and natural attenuation since the FFS was prepared has demonstrated that the proposed technologies in

Alternative 3 can provide a permanent solution to address groundwater contaminated with VOCs and can be equally as protective of human health and the environment as the previously evaluated alternatives. None of the previous alternatives addressed the deeper groundwater plume.

The total cost of the alternatives selected for the two areas in the FFS was expected to be $840,000 in 2000 dollars, which would equate to approximately $1,040,000 in 2009 dollars (based on the change in the consumer price index for the Seattle area from October 2000 to October 2008). The cost to implement Alternative 3, which includes the deeper groundwater plume, is expected to be approximately $1,085,000, as detailed in Section 3.4.2.6.

3.5.4 Recommended Cleanup Action Alternative

Alternative 3 is recommended for implementation at the Site. Alternative 3 provides equivalent protection of human health and the environment relative to potential exposures to contaminated shallow groundwater than the previously evaluated alternatives. In addition, Alternative 3 addresses the deeper groundwater plume, which is not addressed by the previous alternatives. The costs for implementing Alternative 3 are generally comparable to estimated costs for implementing the previously selected alternatives.

4.0 DRAFT CLEANUP ACTION PLAN

This section present the draft cleanup action plan (DCAP) for the Univar Kent facility based on the supporting information presented in Sections 2 and 3. The DCAP has been prepared consistent with the requirements of WAC 173-340-380(1)(a).

4.1 Summary of Alternatives Evaluated

A total of eight alternatives were evaluated between the 2000 FFS and the FFSA presented in Section 3 of this report. All of the alternatives evaluated included cleanup actions to remediate IHSs exceeding cleanup levels in the shallow groundwater in the MW-1/MW-4 and MW-5 plumes. Alternative 3, described in Section 3, included cleanup actions to remediate the MW-1/MW-4 deeper groundwater plume that was discovered after the FFS was prepared. A summary of the alternatives evaluated is provided below and the alternatives are described in detail in the FFS, or Section 3 of this report:

MW-1/MW-4 Shallow Groundwater:

- Alternative 1-1: Monitored Natural Attenuation and Institutional/Engineering Controls;
- Alternative 1-2: Monitored Natural Attenuation, Biological Treatment using ORC® and Institutional/Engineering Controls;
- Alternative 1-3 Groundwater Extraction and Air Stripping; and
- Alternative 1-4: Air Sparging with Soil Vapor Extraction.

MW-5 Shallow Groundwater:

- Alternative 2-1: Biological Treatment with HRC® and ORC® and Institutional/Engineering Controls;
- Alternative 2-2: Air Sparging and Soil Vapor Extraction; and
- Alternative 2-3: In Situ Chemical Oxidation Using the ISOTEC Process.

MW-1/MW-4 Shallow Groundwater , MW-5 Shallow Groundwater, and MW-1/MW-4 Deeper Groundwater:

- Alternative 3: Enhanced Reductive Dechlorination, Natural Attenuation, and Institutional Controls.

4.2 Proposed Cleanup Action

Alternative 3 is the proposed cleanup action for the Site and is described in detail in Section 3 of this report. The following provides a summary of the proposed cleanup action.

4.2.1 Cleanup Standards

Cleanup levels were developed for the 6 soil and 17 groundwater IHSs identified for the Site. Soil cleanup levels were developed by selecting the lower cleanup level value based on the protection of site workers from direct contact and the protection of groundwater quality. The groundwater cleanup levels were developed assuming the consumptive use of groundwater, although there are no water supply wells within a mile of the Property. The final soil and groundwater cleanup levels are presented in Table 8.

The soil point of compliance is established as throughout the Site from the ground surface to a depth of 15 feet bgs. As described previously in Section 2.2.3, a conditional point of compliance established as the downgradient Property boundary is proposed for use in the DCAP.

4.2.2 Description of Proposed Cleanup Action

Based on the environmental conditions described in Section 2 and the cleanup action alternatives described in Section 3, Univar proposes to implement Alternative 3 to remediate the areas where soil and groundwater exceed their applicable cleanup levels. The proposed cleanup action utilizes a combination of enhanced reductive dechlorination to treat the source areas, natural attenuation for treatment of downgradient non-source areas of the shallow and deeper groundwater plumes, and institutional controls to protect human health and the environment. A summary of the proposed cleanup action is provided below and a detailed description is provided in Section 3 includes the following:

Soil Actions:

- Maintaining the existing asphalt and concrete pavement over the areas where vadose zone soil exceeds cleanup levels (Figure 8) to minimize the potential for IHSs to leach into groundwater and cause groundwater cleanup levels;
- Implementing institutional controls that require the use of standard health and safety equipment when conducting intrusive activities (i.e., excavation) in areas of contaminated soil to prevent unacceptable exposures to site workers; and
- Treating areas where saturated soil exceeds cleanup levels (Figure 9) concurrent with the cleanup actions proposed for groundwater as described below.

Groundwater Actions:

- Treating the MW-5 shallow groundwater source area and the MW-1/MW-4 deeper groundwater source area using ERD to accelerate the degradation of CVOCs and reduce contaminant mass flux from those areas and thus, accelerate clean-up of the remainder of the plume. ERD will be accomplished by injecting emulsified oil as a carbon substrate into the subsurface using injection wells and direct push injection points at 48 locations in the MW-1/MW-4 source area and at 18 locations in the MW-5 source area. The MW-5 source area will also be injected with a commercially available bioaugementation formulation containing microbial consortium consisting of *Dehalococcoides* sp to stimulate the ERD;

- Implementing natural attenuation for both the shallow MW-1/MW-4 plume, in which the IHSs are attenuating naturally, for the downgradient non-source areas of the plume, and as a polishing measure once ERD has reduced source area concentrations;
- Implementing institutional controls that prohibit the use of Site groundwater for potable purposes; and
- Conducting performance groundwater monitoring to evaluate the progress of cleanup actions at the Site and compliance monitoring to verify the cleanup levels are met at the point of compliance.

The proposed cleanup action was selected because is protective of human health and the environment and provided an equivalent level of protection as the other alternatives considered. In addition, the proposed cleanup action utilizes demonstrated technologies capable of remediating contamination at the Site, is technically implementable, has minimal impacts on facility operations, and is cost effective. The proposed cleanup action is subjective relative to few applicable state and federal laws (UIC and, solid and dangerous waste management) and compliance is easily achieved. The action includes a comprehensive performance and compliance monitoring program that will allow the cleanup action progress/effectiveness to be evaluated and modified as needed to insure cleanup levels are ultimately achieved at the point of compliance.

4.3 <u>Consistency with Cleanup Action Selection Criteria and Expectations</u>

4.3.1 Cleanup Action Selection Criteria

The proposed cleanup action complies with the cleanup action selection criteria contained in WAC 173-340-360. A brief summary is provided below and further detail is provided in Section 3.5.

<u>Protectiveness.</u> The proposed cleanup action is protective of human health and the environment. In the short term, protection of human health and the environment is achieved by implementing institutional controls to prevent exposures to contaminated soil and groundwater and require maintenance of the pavement to minimize leaching of contaminants into soil. In the longer term, the proposed cleanup action achieves protection of human health and the environment (1) treating contaminated soil and groundwater in the ERD to reduce concentrations, and (2) using natural attenuation to address the shallow groundwater plume where IHSs are attenuating naturally and as a polishing measure downgradient of the source treatment areas once ERD has reduced source area concentrations. The source area treatment and natural attenuation will reduce the concentrations of IHSs such that the concentrations of IHSs will eventually meet cleanup levels at the point of compliance (i.e. downgradient property boundary).

Compliance with Cleanup Standards. The proposed cleanup action would ultimately achieve compliance with the groundwater cleanup levels at the point of compliance over the long term. In the short term, groundwater concentrations in the deeper groundwater at the point of compliance may exceed the cleanup levels until the source area treatment and natural attenuation have had sufficient time to reduce the concentrations to cleanup levels. The concentrations of IHSs in shallow groundwater at the point of compliance currently meet cleanup levels and implementation of Alternative 3 will ensure that cleanup levels are attained over the long term.

Compliance with Regulatory Requirements. The proposed cleanup action is subject to the UIC program for the injection of the emulsified oil and to state solid and dangerous waste management regulations for handling of remediation-derived wastes. Compliance with these requirements is easily accomplished.

Compliance Monitoring. The proposed cleanup action includes a comprehensive monitoring program to assess the performance of the action and to assess compliance with cleanup levels.

Use of Permanent Solutions to Extent Practicable. The proposed cleanup action would be considered a permanent solutions because it is expected that the cleanup standards will be achieve at the Site without further action being required. The cleanup action utilizes technologies (ERD and natural attenuation) that permanently destroys the IHSs in the groundwater, leaving ethene and ethane as non toxic residual components. Ultimately, the cleanup action will result in the achievement of cleanup levels at the point of compliance without further actions as documented by the performance of compliance monitoring. As such, Alternative 3 constitutes a permanent solution.

Restoration Time Frame. The cleanup action utilizes contaminant destruction methods for which timeframes are difficult to accurately predict. Based on the nature and extent of contamination present at the Site, it is likely that the remedial action could require up to 10 to 20 years before cleanup levels are achieved at the point of compliance. Given that the original likely source of the contamination is no longer present (i.e., the former USTs), the relatively small area of soil exceeding cleanup levels, the active treatment of the sources areas will significantly reduce source concentrations within the first 4 years, and the lack of existing use of groundwater for potable purposes within 1 mile of the Site, the restoration time frame of 10 to 20 years is reasonable.

Public Concerns. Public concerns will occur in the context of the public review and comment period required by the Order for the RI/FFSA/DCAP. However, it is anticipated that the public will find Alternative 3 acceptable.

4.3.2 Expectations for Cleanup Action Alternatives

The proposed cleanup action is consistent with the applicable expectations for cleanup action contained in WAC 173-340-370 in that the proposed action:

- Utilizes treatment technologies to address areas contaminated with high concentrations of hazardous substances and highly mobile materials (WAC 173-340-370(1));

- Utilizes the existing pavement to minimize the potential for migration of hazardous substances, by preventing precipitation and subsequent runoff from infiltrating the affected area (WAC 173-340-370(4));

- Follows Ecology guidance regarding the appropriateness of natural attenuation in that: (a) source control is conducted by implementing ERD in high-concentration areas; (2) leaving contaminants on-site during the restoration time frame does not pose an unacceptable threat to human health or the environment; (3) there is evidence that natural biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate; and (4) appropriate monitoring will be conducted to ensure that the natural attenuation process is taking place and that human health and the environment are protected(WAC 173-340-370(7)); and

- Is not expected to result in significantly greater risk than other cleanup action alternatives (WAC 173-340-370(8)).

4.4 Cleanup Action Implementation

The following sections describe the activities that will be required to implement the cleanup after a final CAP has been prepared.

4.4.1 Public Involvement

Ecology will prepare a Public Participation Plan (PPP) that will describe the activities that will be implemented to inform the public regarding the cleanup actions being conducted at the Site. Univar will assist Ecology in the implementation of the PPP as requested, which may include the preparation of mailing lists, fact sheets, and public notices.

4.4.2 Cleanup Action Design, Permitting, and Construction

Once the final CAP has been issued for the proposed cleanup action, the following documents will be prepared to describe the activities necessary to either implement the cleanup action or to document the actions completed:

- A performance and compliance groundwater monitoring plan;

- An injection test work plan including UIC Program approval for injection of emulsified oil into the groundwater;

- A cleanup action engineering and design report, which will include the operation and maintenance requirements for injection well and pavement maintenance; and

- A cleanup action construction report to document the installation of the source area treatment injection wells and initial application of emulsified oil.

All of the documents will be submitted to Ecology for review and comment consistent with the Order. The documents will be revised to address Ecology's comments and resubmitted for approval. Upon approval, the work described in the associated plans and/or engineering report will be conducted.

4.4.3 Reporting

Reporting will include the preparation of progress reports and an annual groundwater monitoring report consistent with the requirements of the Order. Progress reports will be prepared on a quarterly basis during the first 4 years of the cleanup action implementation and will be reduced to semiannual thereafter to coincide with the planned change in the schedule for cleanup action activities. Progress reports will include:

- A summary of work conducted pursuant to the Order during the calendar quarter since the last progress report;
- Summary of any problems, how problems were rectified, deviations from the work plans and an explanation for all deviations;
- Summary of significant findings, changes in personnel, and summaries of contacts with all federal, state, and local community, and public interest groups.
- Projected work to occur in the upcoming quarter.

An annual groundwater monitoring report will be prepared and submitted to Ecology. The groundwater monitoring reports shall include, at a minimum:

- An overview of current cleanup status, identifying significant results and data trends;
- Water level contour maps using data from all groundwater monitoring wells sampled during each sampling event;
- Tabulated concentrations of IHSs and water table elevation data from the previous year's sample events, as well as historical contaminant concentrations and water table elevations for all previous sampling events. Tables will note groundwater cleanup levels;
- Iso-concentration maps for selected IHSs including an isopleth of the appropriate cleanup level;
- Copies of all laboratory analytical data sheets, chain of custody forms, and field activity logs; and
- A narrative discussion of data validation and a description of all data qualified or rejected.

4.4.4 Preliminary Schedule

The preliminary schedule for implementing the proposed cleanup action is shown in Figure 14. The schedule start is assumed to be the date that the CAP and the amendments to the Order for implementing the cleanup action have been finalized. The schedule also includes estimated time for Ecology's review of work plans and reports. A more detailed schedule will be prepared in the engineering and design report.

5.0 REFERENCES

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TABLES

Table 1

Well Completion Data
Univar USA Inc. Facility, Kent, Washington

Well	Northing	Easting	Monitoring Point Elevation	Surface Casing Rim Elevation	Boring Depth	Well Diameter	Screen Depth	Filter Pack Depth	Seal Depth
Shallow Monitoring Wells									
MW-1	153,067.16	1,654,570.34	33.15	33.42	21	2	4 - 19	3 - 21	0 - 3
MW-2	152,856.32	1,654,684.28	33.79	34.12	21	2	4 - 19	3 - 21	0 - 3
MW-3	153,315.66	1,654,344.26	32.94	33.23	21	2	4 - 19	3 - 21	0 - 3
MW-4	153,142.72	1,654,552.77	32.86	33.45	15	2	4.5 - 14.5	3 - 15	0 - 3
MW-5	153,239.21	1,654,654.19	32.60	33.06	15	2	4.5 - 14.5	3 - 15	0 - 3
MW-6	153,087.14	1,654,718.33	33.05	33.94	15	2	4.5 - 14.5	3 - 15	0 - 3
MW-7	153,300.59	1,654,656.24	32.96	33.34	15	2	4.5 - 14.5	3 - 15	0 - 3
MW-8	153,264.46	1,654,715.62	33.57	34.02	15	2	4.5 - 14.5	3 - 15	0 - 3
MW-9	153,229.88	1,654,722.90	33.77	34.18	15	2	5 - 15	4 - 15	0 - 4
MW-10	153,287.96	1,654,538.92	32.89	33.23	15	2	5 - 15	4 - 15	0 - 4
MW-11	153,234.78	1,654,648.47	32.79	33.03	20	2	5 - 20	4 - 20	0 - 4
MW-12	153,231.74	1,654,637.88	32.81	33.06	20	2	5 - 20	4 - 20	0 - 4
EMW-7	153,440.13	1,654,695.01	33.10	33.65	20	4	5 - 19.5	3.5 - 20	0 - 3.5
Deep Monitoring Wells and Piezometer									
MW-13	153,109.13	1,654,571.51	32.81	33.17	45.3	2	39.6 - 44.1	37 - 44.6	0 - 37
MW-14	153,086.60	1,654,671.42	32.60	33.11	43	2	32.7 - 42.2	30 - 43	0 - 30
MW-15	152,979.86	1,654,652.03	32.57	32.90	44	2	33.7 - 43.5	31 - 44	0 - 31
MW-16	153,133.76	1,654,408.04	36.92	37.35	48	2	37.2 - 47.2	35 - 48	0 - 35
MW-17	153,293.66	1,654,405.47	32.60	33.17	44.3	2	34.3 - 43.8	32 - 44.3	0 - 32
MW-18	153,291.64	1,654,531.24	32.73	33.21	44	2	34.0 - 43.5	31 - 44	0 - 31
MW-19	153,414.15	1,654,432.23	33.52	33.83	50	2	39.4 - 49.4	37 - 50	0 - 37
MW-20	153,534.98	1,654,292.89	33.15	33.45	44.5	2	33.5 - 43.2	31 - 43..2	0 - 31
MW-21	153,067.03	1,654,586.65	32.86	33.22	43	2	34.1 - 44.1	29 - 40	0 - 29
MW-22	153,165.68	1,654,540.55	33.18	33.63	45	2	32.2 - 42.2	32 - 41	0 - 32
MW-23	153,302.15	1,654,623.57	32.78	33.14	15	2	5 - 15	3 - 15	0 - 3
P-1	153,262.87	1,654,705.45	33.62	33.99	46.5	2	39.0 - 44.0	37 - 44.5	0 - 37
Pilot Test Injection Wells									
INJ-1	153,242.89	1,654,659.98	32.77	33.09	20.5	2	10 - 20	9 - 20.5	0 - 9
INJ-2	153,229.56	1,654,633.50	32.81	33.03	20.5	2	10 - 20	9 - 20.5	0 - 9
INJ-3A	153,259.06	1,654,632.92	33.01	33.25	20	2	9 - 19	8 - 20	0 - 8
Source Area Direct-Push Borings									
SB-44	153,010.38	1,654,557.48	–	36.68	45	–	–	–	0 - 45
SB-45	153,010.59	1,654,599.59	–	33.03	45	–	–	–	0 - 45

Notes:
1. Northing and easting in feet relative to the Washington State Plane System North Zone (NAD 27).
2. Elevations in feet relative to the North American Vertical Datum (NAVD 88).
3. Monitoring point = top of the PVC well casing.
4. All wells but EMW-7 and MW-20 located on Univar property; EMW-7 and MW-20 located on city of Kent right-of-way.
5. All depths shown in feet below ground surface.
6. All wells completed with Schedule 40 PVC.
7. Well diameters in inches.

Table 2

VOCs Detected in Groundwater Samples from Borings SB-44 through SB-52
Univar USA Inc. Facility, Kent, Washington

		Boring, Groundwater Sampling Depth, and Sampling Date																			
		Source Area Investigation Borings						Off-Site Investigation Borings													
		SB-44			SB-45			SB-46		SB-47		SB-48		SB-49		SB-50		SB-51		SB-52	
	Cleanup	23-25	33-35	43-45	20-22	30-32	40-42	30-32	38-40	30-32	37-39	30-32	37-39	30-32	38-40	30-32	38-40	32-34	32-34 (dup)	30-32	36.5-38.5
Analyte	Level	08/23/06	08/23/06	08/23/06	08/23/06	08/23/06	08/23/06	11/29/07	11/29/07	11/29/07	11/29/07	11/29/07	11/29/07	11/29/07	11/29/07	2/13/08	2/13/08	2/13/08	2/13/08	2/14/08	2/14/08
chloromethane	–	**0.20 J**	< 0.14	< 0.14	< 0.14	**0.30 J**	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14
vinyl chloride	0.5	**0.69**	< 0.042	< 0.042	< 0.042	< 0.042	< 0.042	< 0.042	< 0.042	**0.32 J**	< 0.042	**0.10 J**	< 0.042	**0.30 J**	< 0.042	< 0.042	< 0.042	< 0.042	< 0.042	< 0.042	< 0.042
chloroethane	15	**14**	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	**0.87**	**1.6**	**290**	**190**	**64**	**3.6**	**12**	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23
acetone	7,200	**4.6 J**	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1
carbon disulfide	–	**0.19 J**	< 0.16	< 0.16	< 0.16	**0.16 J**	< 0.16	< 0.16	< 0.16	< 0.16	**0.17 J**	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	**0.40 J**	< 0.16	< 0.16	**0.26 J**	**0.60**
methylene chloride	5	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	**1.5 J**	**1.3 J**	**0.35 J**	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
trans-1,2-dichloroethene	100	**0.68**	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	**0.22 J**	< 0.15	**0.26 J**	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
1,1-dichloroethane	800	**29**	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	**0.76**	**0.53**	< 0.11	**2.9**	**0.54**	**0.17 J**	**1.3**	< 0.091	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
cis-1,2-dichloroethene	70	**4.9**	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	**0.33 J**	**0.29 J**	**0.21 J**	< 0.12	**0.14 J**	< 0.12	**0.17 J**	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
1,2-dichloroethane (EDC)	0.5	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	**0.14 J**	**0.14 J**	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
benzene	0.8	**0.14 J**	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	**0.95**	**0.57**	**18**	**5.5**	**0.48 J**	< 0.14	< 0.11	**0.14 J**	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14
toluene	1,000	**0.97**	**0.16 J**	< 0.11	< 0.11	**0.16 J**	**0.12 J**	**0.25 J**	**0.22 J**	**0.44 J**	**0.25 J**	**0.17 J**	**0.19 J**	**0.21 J**	**0.30 J**	**0.49 J**	**0.36 J**	**0.62**	**0.51**	**0.22 J**	**0.37 J**
tetrachloroethene (PCE)	0.86	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	**0.33 J,R**	**0.26 J,R**	**0.24 J,R**	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
m- & p-xylenes	1,600	**0.40 J**	**0.26 J**	< 0.22	**0.35 J**	**0.25 J**	< 0.22	< 0.22	< 0.22	**0.36 J**	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22
o-xylene	1,600	**0.12 J**	< 0.11	< 0.11	**0.12 J**	< 0.11	< 0.11	< 0.11	**0.57**	**0.51**	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
1,2,4-trimethylbenzene	400	< 0.15	< 0.15	< 0.15	**0.15 J**	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15

Notes:
1. Results in µg/L.
2. Depths in feet below ground surface.
3. Only detected compounds shown.
4. Detections shown in bold.
5. Highlighted results detected above cleanup levels.
6. < = not detected at the method detection limit shown.
7. J = laboratory-assigned data qualifier indicating that the result is an estimated concentration less than the method reporting limit but greater than or equal to the method detection limit.
8. R = data validation-assigned qualifier indicating that the result is rejected and not acceptable for any use based on data validation guidelines.
9. – = not available.

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
Shallow On-Site Monitoring and Pilot Test Wells					
MW-1	33.45	04/17/95	12:14	4.70	28.75
		09/07/95	NR	6.24	27.21
		11/10/95	NR	5.86	27.59
		12/07/95	NR	5.13	28.32
		01/29/96	NR	4.57	28.88
		09/04/96	13:50	6.04	27.41
		10/11/96	11:00	6.04	27.41
		11/06/96	9:25	5.53	27.92
		12/10/96	10:55	4.46	28.99
		01/10/97	NR	4.20	29.25
		02/21/97	12:45	4.33	29.12
		03/04/97	9:55	4.33	29.12
		06/27/97	10:57	4.81	28.64
		09/04/97	11:08	5.63	27.82
		12/22/97	8:46	4.82	28.63
		03/06/98	10:03	4.50	28.95
		06/18/98	9:19	5.02	28.43
		09/29/98	9:25	6.52	26.93
		12/15/98	9:45	4.78	28.67
		01/07/99	9:02	4.33	29.12
		01/13/99	9:29	4.35	29.10
		03/02/99	12:43	3.60	29.85
		06/16/99	10:26	4.87	28.58
		09/16/99	10:43	5.72	27.73
		12/08/99	8:43	4.63	28.82
		03/07/00	8:58	4.28	29.17
		06/21/00	9:45	4.80	28.65
		09/12/00	9:30	5.81	27.64
		12/07/00	8:45	5.36	28.09
		03/15/01	9:30	4.91	28.54
		07/12/01	11:00	5.10	28.35
		09/24/01	11:29	5.95	27.50
	33.15	01/02/02	11:07	4.35	28.80
		03/27/02	9:55	4.12	29.03
		06/11/02	10:42	4.75	28.40
		09/17/02	12:36	6.03	27.12
		12/16/02	11:40	5.60	27.55
		03/17/03	11:00	4.91	28.24
		06/10/03	NR	5.11	28.04
		09/11/03	10:05	6.66	26.49
		12/04/03	7:30	4.96	28.19
		01/12/04	11:12	4.70	28.45
		03/16/04	12:20	4.80	28.35
		06/10/04	8:25	5.25	27.90
		09/22/04	11:15	5.88	27.27
		04/04/05	13:40	5.03	28.12
		09/20/05	9:40	6.77	26.38

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-1 (continued)		01/25/06	15:15	4.45	28.70
		03/14/06	10:30	4.60	28.55
		03/15/06	8:25	4.56	28.59
		05/19/06	12:30	4.91	28.24
		06/09/06	14:12	4.70	28.45
		09/12/06	12:32	6.85	26.30
		04/03/07	10:30	4.51	28.64
		04/03/07	12:04	4.40	28.75
		09/24/07	10:55	6.40	26.75
		09/24/07	12:47	6.38	26.77
		05/01/08	11:08	4.85	28.30
MW-2	34.07	04/17/95	12:09	6.26	27.81
		09/07/95	NR	7.72	26.35
		11/10/95	NR	7.21	26.86
		12/07/95	NR	6.01	28.06
		01/29/96	NR	5.37	28.70
		09/04/96	9:00	7.93	26.14
		10/11/96	10:30	7.71	26.36
		11/06/96	8:50	7.02	27.05
		12/10/96	10:50	5.55	28.52
		01/10/97	NR	5.02	29.05
		02/21/97	12:10	5.31	28.76
		03/04/97	9:50	5.29	28.78
		06/27/97	10:53	6.11	27.96
		09/04/97	11:04	7.07	27.00
		12/22/97	8:44	5.92	28.15
		03/06/98	2:20	5.67	28.40
		06/18/98	9:22	6.54	27.53
		09/29/98	9:28	7.95	26.12
		12/15/98	9:52	5.71	28.36
		01/07/99	8:50	5.51	28.56
		01/13/99	9:25	5.62	28.45
		03/02/99	9:29	4.73	29.34
		06/16/99	10:31	6.40	27.67
		09/16/99	10:41	7.39	26.68
		12/08/99	8:40	5.84	28.23
		03/07/00	8:52	5.36	28.71
		06/21/00	9:54	6.43	27.64
		09/12/00	11:25	7.92	26.15
		12/07/00	8:40	7.11	26.96
		03/15/01	9:40	6.44	27.63
		07/12/01	13:00	6.83	27.24
		09/24/01	11:33	7.64	26.43
	33.79	01/02/02	10:30	5.61	28.18
		03/27/02	10:00	5.49	28.30
		06/11/02	10:45	6.28	27.51
		09/17/02	12:33	7.67	26.12
		12/16/02	11:37	7.07	26.72

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-2 (continued)		03/17/03	10:55	5.75	28.04
		06/10/03	NR	6.68	27.11
		09/10/03	9:10	8.16	25.63
		12/04/03	9:30	6.24	27.55
		01/12/04	10:55	5.75	28.04
		03/15/04	11:15	5.90	27.89
		06/10/04	8:10	6.50	27.29
		09/23/04	8:10	7.12	26.67
		04/04/05	13:35	6.00	27.79
		09/20/05	9:35	7.74	26.05
		03/14/06	10:20	5.45	28.34
		03/15/06	7:55	5.45	28.34
		09/12/06	12:26	7.99	25.80
		04/03/07	10:25	5.35	28.44
		04/03/07	11:58	5.38	28.41
		09/24/07	10:44	7.76	26.03
		05/01/08	11:30	6.11	27.68
MW-3	33.21	04/17/95	12:01	6.54	26.67
		09/07/95	NR	7.34	25.87
		11/10/95	NR	6.93	26.28
		12/07/95	NR	6.24	26.97
		01/29/96	NR	5.73	27.48
		09/04/96	14:50	7.17	26.04
		10/11/96	10:20	7.32	25.89
		11/06/96	9:10	6.85	26.36
		12/10/96	10:25	5.75	27.46
		01/10/97	NR	5.30	27.91
		02/21/97	11:55	5.51	27.70
		03/04/97	9:27	5.50	27.71
		06/27/97	10:30	6.24	26.97
		09/04/97	10:47	6.87	26.34
		12/22/97	8:10	6.03	27.18
		03/06/98	9:34	5.90	27.31
		06/18/98	8:57	6.51	26.70
		09/29/98	9:05	5.73	27.48
		12/14/98	9:32	5.92	27.29
		01/07/99	8:44	5.81	27.40
		01/13/99	9:12	5.93	27.28
		03/02/99	9:04	5.21	28.00
		06/16/99	9:55	6.48	26.73
		09/16/99	10:23	7.20	26.01
		12/08/99	8:24	6.08	27.13
		03/07/00	8:23	5.74	27.47
		06/21/00	9:15	6.48	26.73
		09/12/00	10:30	7.40	25.81
		12/07/00	9:25	6.94	26.27
		03/15/01	9:57	6.41	26.80

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-3		07/12/01	15:55	6.77	26.44
(continued)		09/24/01	11:37	7.48	25.73
	32.94	01/02/02	11:12	5.71	27.23
		03/27/02	10:05	5.65	27.29
		06/11/02	10:27	6.28	26.66
		09/17/02	12:00	7.41	25.53
		12/16/02	11:05	6.81	26.13
		03/17/03	10:05	5.84	27.10
		06/10/03	NR	6.60	26.34
		09/11/03	9:50	7.82	25.12
		12/03/03	12:00	6.26	26.68
		01/12/04	11:59	5.80	27.14
		03/15/04	10:00	5.98	26.96
		06/10/04	7:00	6.22	26.72
		09/22/04	10:05	7.87	25.07
		04/04/05	12:10	5.92	27.02
		09/20/05	8:10	7.45	25.49
		01/25/06	15:30	5.24	27.70
		03/14/06	11:40	5.57	27.37
		03/14/06	11:53	5.57	27.37
		09/12/06	11:10	7.70	25.24
		04/03/07	9:35	5.52	27.42
		04/03/07	11:10	5.51	27.43
		09/24/07	11:35	7.43	25.51
		05/01/08	9:24	5.96	26.98
MW-4	33.20	09/04/96	13:00	5.89	27.31
		10/11/96	10:40	6.21	26.99
		11/06/96	9:15	5.75	27.45
		12/10/96	10:40	4.68	28.52
		01/10/97	NR	3.95	29.25
		02/21/97	12:40	4.10	29.10
		03/04/97	11:35	4.16	29.04
		06/27/97	10:44	4.59	28.61
		09/04/97	10:55	5.44	27.76
		12/22/97	8:39	4.78	28.42
		03/06/98	9:51	4.28	28.92
		06/18/98	9:16	5.00	28.20
		09/29/98	9:20	6.44	26.76
		12/14/98	9:43	5.16	28.04
		01/07/99	9:06	4.38	28.82
		01/13/99	9:17	4.38	28.82
		03/02/99	9:26	3.73	29.47
		06/16/99	10:23	4.77	28.43
		09/16/99	10:45	5.78	27.42
		12/08/99	8:45	4.81	28.39
		03/07/00	9:03	4.17	29.03
		06/21/00	9:41	4.85	28.35
		09/12/00	9:40	6.22	26.98

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-4 (continued)		12/07/00	8:50	6.78	26.42
		03/15/01	9:35	5.10	28.10
		07/12/01	10:00	5.14	28.06
		09/24/01	11:41	6.02	27.18
	32.86	01/02/02	11:05	4.41	28.45
		03/27/02	9:53	4.17	28.69
		06/11/02	10:37	4.69	28.17
		09/17/02	12:38	6.25	26.61
		12/16/02	11:45	6.22	26.64
		03/17/03	11:02	4.74	28.12
		06/10/03	NR	5.17	27.69
		09/10/03	9:20	7.02	25.84
		12/04/03	7:25	5.49	27.37
		01/12/04	11:20	4.88	27.98
		03/15/04	11:25	4.83	28.03
		06/10/04	8:35	5.33	27.53
		09/22/04	11:30	6.11	26.75
		04/04/05	13:50	5.28	27.58
		09/20/05	9:55	6.65	26.21
		01/25/06	15:25	4.41	28.45
		03/14/06	10:50	4.58	28.28
		03/15/06	12:05	4.64	28.22
		05/19/06	12:25	5.00	27.86
		06/09/06	14:20	4.80	28.06
		09/12/06	12:45	6.96	25.90
		04/03/07	10:45	4.46	28.40
		04/03/07	12:15	4.40	28.46
		09/24/07	11:05	6.67	26.19
		05/01/08	10:30	5.00	27.86
MW-5	32.77	09/04/96	11:50	6.74	26.03
		10/11/96	10:45	6.82	25.95
		11/06/96	9:05	6.24	26.53
		12/10/96	10:30	5.01	27.76
		01/10/97	NR	4.54	28.23
		02/21/97	12:30	4.79	27.98
		03/04/97	9:40	4.78	27.99
		06/27/97	10:40	5.54	27.23
		09/04/97	10:59	6.29	26.48
		12/22/97	8:32	5.36	27.41
		03/06/98	9:43	5.15	27.62
		06/18/98	9:11	5.89	26.88
		09/29/98	9:39	7.13	25.64
		12/15/98	9:38	5.18	27.59
		01/07/99	9:08	5.04	27.73
		01/13/99	9:00	5.97	26.80
		03/02/99	9:16	4.38	28.39
		06/16/99	10:07	5.81	26.96
		09/16/99	10:36	6.58	26.19

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-5 (continued)		12/08/99	8:34	5.33	27.44
		03/07/00	8:44	4.92	27.85
		06/21/00	9:24	5.31	27.46
		09/12/00	10:05	6.84	25.93
		12/07/00	8:55	6.42	26.35
		03/15/01	9:55	5.82	26.95
		07/09/01	10:08	6.22	26.55
		08/27/01	10:11	6.67	26.10
		09/24/01	11:43	6.98	25.79
		10/22/01	11:37	6.94	25.83
		11/19/01	13:10	6.31	26.46
	32.60	01/02/02	10:57	5.14	27.46
		03/27/02	10:36	5.05	27.55
		06/11/02	10:13	5.75	26.85
		09/17/02	12:15	6.98	25.62
		12/16/02	11:22	6.31	26.29
		03/17/03	10:30	5.31	27.29
		06/10/03	NR	6.08	26.52
		09/11/03	9:55	7.39	25.21
		12/03/03	11:40	5.70	26.90
		01/12/04	10:23	5.24	27.36
		03/15/04	10:45	5.39	27.21
		09/22/04	11:00	6.44	26.16
		04/04/05	12:55	5.34	27.26
		09/20/05	9:00	6.99	25.61
		03/14/06	9:30	5.04	27.56
		03/14/06	13:40	5.03	27.57
		09/12/06	11:52	7.25	25.35
		04/03/07	11:35	5.01	27.59
		09/24/07	10:26	7.01	25.59
		05/01/08	10:05	5.50	27.10
MW-6	33.33	09/04/96	9:50	6.26	27.07
		10/11/96	10:35	6.55	26.78
		11/06/96	8:58	5.98	27.35
		12/10/96	10:45	5.08	28.25
		01/10/97	NR	4.17	29.16
		02/21/97	12:15	4.33	29.00
		03/04/97	9:45	4.42	28.91
		06/27/97	10:49	5.05	28.28
		09/04/97	11:01	5.87	27.46
		12/22/97	8:36	5.11	28.22
		03/06/98	9:49	4.57	28.76
		06/18/98	9:26	5.48	27.85
		09/29/98	9:32	6.87	26.46
		12/15/98	9:50	5.15	28.18
		01/07/99	8:55	4.39	28.94
		01/13/99	9:20	4.44	28.89
		03/02/99	9:24	3.64	29.69

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-6 (continued)		06/16/99	10:19	5.04	28.29
		09/16/99	10:39	6.03	27.30
		12/08/99	8:37	4.82	28.51
		03/07/00	8:48	4.44	28.89
		06/21/00	9:50	5.08	28.25
		09/12/00	11:15	6.24	27.09
		12/07/00	9:05	5.85	27.48
		03/15/01	9:45	5.25	28.08
		07/12/01	15:30	5.61	27.72
		09/24/01	11:46	6.35	26.98
	33.05	01/02/02	10:37	4.52	28.53
		03/27/02	9:50	4.00	29.05
		06/11/02	10:51	4.87	28.18
		06/11/02	12:30	6.39	26.66
		12/16/02	11:35	6.27	26.78
		03/17/03	10:46	4.67	28.38
		06/10/03	NR	5.65	27.40
		09/10/03	8:55	7.90	25.15
		12/04/03	8:00	5.91	27.14
		01/12/04	10:45	5.62	27.43
		03/15/04	11:10	5.33	27.72
		06/10/04	8:05	6.40	26.65
		09/22/04	11:10	7.27	25.78
		04/04/05	13:20	5.74	27.31
		09/20/05	9:20	7.72	25.33
		01/25/06	15:15	4.93	28.12
		03/14/06	10:00	5.20	27.85
		03/14/06	14:40	5.20	27.85
		05/19/06	12:40	5.88	27.17
		06/09/06	14:00	5.75	27.30
		09/12/06	12:12	8.00	25.05
		04/03/07	10:15	4.89	28.16
		04/03/07	11:50	4.89	28.16
		09/24/07	10:42	7.87	25.18
		05/02/08	10:18	5.75	27.30
MW-7	33.24	12/22/97	8:26	5.86	27.38
		03/06/98	9:41	5.66	27.58
		06/18/98	9:04	6.38	26.86
		09/29/98	9:15	7.62	25.62
		12/14/98	9:36	5.66	27.58
		01/07/99	8:34	5.58	27.66
		01/13/99	9:05	5.68	27.56
		03/02/99	9:09	4.89	28.35
		06/16/99	10:03	6.32	26.92
		09/16/99	10:30	7.09	26.15
		12/08/99	8:28	5.89	27.35
		03/07/00	8:38	5.45	27.79
		06/21/00	10:00	6.47	26.77

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-7 (continued)		09/12/00	10:25	7.31	25.93
		12/07/00	9:20	6.91	26.33
		03/15/01	10:00	6.32	26.92
		07/12/01	13:45	6.75	26.49
		08/27/01	10:30	7.09	26.15
		09/24/01	11:49	7.33	25.91
		10/22/01	18:37	7.20	26.04
		11/19/01	12:50	6.33	26.91
	32.96	01/02/02	10:23	5.55	27.41
		03/27/02	10:12	5.45	27.51
		06/11/02	10:23	6.16	26.80
		09/17/02	12:41	7.34	25.62
		12/16/02	11:10	6.71	26.25
		03/17/03	10:15	5.70	27.26
		06/10/03	NR	6.48	26.48
		09/10/03	8:23	7.80	25.16
		12/03/03	11:30	6.17	26.79
		01/12/04	10:07	5.64	27.32
		03/15/04	10:23	5.79	27.17
		06/10/04	7:25	6.22	26.74
		09/22/04	10:35	6.84	26.12
		04/04/05	12:30	5.73	27.23
		09/20/05	8:35	7.38	25.58
		01/25/06	14:55	5.06	27.90
		03/14/06	9:00	5.41	27.55
		03/14/06	12:20	5.44	27.52
		05/19/06	13:00	5.99	26.97
		06/09/06	13:36	5.81	27.15
		09/12/06	11:35	7.62	25.34
		04/03/07	9:45	5.31	27.65
		04/03/07	11:20	5.32	27.64
		09/24/07	10:13	7.36	25.60
		05/01/08	9:46	5.86	27.10
MW-8	33.83	12/22/97	8:30	6.39	27.44
		03/06/98	9:46	6.20	27.63
		06/18/98	9:13	6.94	26.89
		09/29/98	9:42	8.22	25.61
		12/14/98	9:55	6.21	27.62
		01/07/99	9:12	6.10	27.73
		01/13/99	8:55	6.22	27.61
		03/02/99	9:21	5.38	28.45
		06/16/99	10:12	6.88	26.95
		09/16/99	10:33	7.65	26.18
		12/08/99	8:33	6.42	27.41
		03/07/00	8:42	5.97	27.86
		06/21/00	10:06	6.77	27.06
		09/12/00	10:20	7.90	25.93
		12/07/00	9:10	7.46	26.37

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-8 (continued)		03/15/01	9:50	6.95	26.88
		07/12/01	12:00	7.31	26.52
		08/27/01	10:27	7.65	26.18
		09/24/01	11:52	7.98	25.85
		10/22/01	17:50	7.95	25.88
		11/19/01	14:15	6.88	26.95
	33.57	01/02/02	10:48	6.07	27.50
		03/27/02	10:21	5.98	27.59
		06/11/02	10:08	6.71	26.86
		09/17/02	12:26	7.94	25.63
		12/16/02	11:28	7.29	26.28
		03/17/03	10:37	6.58	26.99
		06/10/03	NR	7.05	26.52
		09/10/03	8:44	8.38	25.19
		12/03/03	11:00	6.70	26.87
		01/12/04	10:33	6.19	27.38
		03/15/04	11:00	6.32	27.25
		06/10/04	7:55	6.78	26.79
		09/23/04	8:05	7.40	26.17
		04/04/05	13:10	6.29	27.28
		09/20/05	9:10	7.94	25.63
		03/14/06	9:45	6.03	27.54
		03/15/06	10:55	6.03	27.54
		05/19/06	12:50	6.52	27.05
		06/09/06	13:54	6.37	27.20
		09/12/06	12:04	8.20	25.37
		04/03/07	10:08	5.88	27.69
		04/03/07	11:43	5.89	27.68
		09/24/07	10:34	7.95	25.62
		05/01/08	15:15	6.42	27.15
MW-9	33.77	08/27/01	10:26	7.80	25.97
		10/22/01	16:55	7.95	25.82
		11/19/01	14:23	7.02	26.75
		01/02/02	10:44	6.21	27.56
		03/27/02	10:25	6.06	27.71
		06/11/02	10:05	6.84	26.93
		09/17/02	12:28	8.11	25.66
		12/16/02	11:30	7.51	26.26
		03/17/03	10:41	6.36	27.41
		06/10/03	NR	7.20	26.57
		09/10/03	8:49	8.61	25.16
		12/03/03	11:05	6.90	26.87
		01/12/04	10:40	6.34	27.43
		03/15/04	11:05	6.41	27.36
		06/10/04	8:00	7.00	26.77
		09/22/04	11:05	7.81	25.96
		04/04/05	13:15	6.45	27.32
		09/20/05	9:15	8.15	25.62

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-9 (continued)		01/25/06	15:10	5.74	28.03
		03/14/06	9:50	6.09	27.68
		03/14/06	14:10	6.09	27.68
		05/19/06	12:45	6.71	27.06
		06/09/06	13:58	6.54	27.23
		09/12/06	12:08	8.42	25.35
		04/03/07	10:10	6.00	27.77
		04/03/07	11:47	6.01	27.76
		09/24/07	10:37	8.15	25.62
		05/01/08	12:12	6.57	27.20
MW-10	32.89	01/02/02	10:18	5.48	27.41
		03/27/02	10:08	5.42	27.47
		06/11/02	10:25	6.08	26.81
		09/17/02	12:46	7.25	25.64
		12/16/02	11:07	6.58	26.31
		03/17/03	10:10	5.62	27.27
		06/10/03	NR	6.40	26.49
		09/10/03	8:20	7.72	25.17
		12/03/03	10:30	6.07	26.82
		01/12/04	10:03	5.58	27.31
		03/15/04	10:17	5.73	27.16
		06/10/04	7:15	6.13	26.76
		09/22/04	10:25	6.71	26.18
		04/04/05	12:25	5.66	27.23
		09/20/05	8:30	7.29	25.60
		01/25/06	14:50	5.05	27.84
		03/14/06	11:05	5.35	27.54
		03/15/06	11:25	5.42	27.47
		05/19/06	12:15	5.90	26.99
		06/09/06	13:30	5.74	27.15
		09/12/06	11:28	7.53	25.36
		04/03/07	9:20	5.31	27.58
		04/03/07	11:00	5.27	27.62
		09/24/07	10:08	7.25	25.64
		05/01/08	9:35	5.76	27.13
MW-11	32.79	08/27/01	10:16	6.88	25.91
		10/15/02	11:50	8.20	24.59
		10/22/01	12:20	7.14	25.65
		10/29/01	16:04	6.98	25.81
		11/19/01	12:55	6.27	26.52
		01/02/02	11:00	5.34	27.45
		03/27/02	10:34	5.25	27.54
		06/11/02	10:16	5.95	26.84
		09/17/02	12:14	7.16	25.63
		12/16/02	11:21	6.50	26.29
		03/17/03	10:25	5.48	27.31
		06/10/03	NR	6.28	26.51

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-11 (continued)		09/10/03	8:36	7.61	25.18
		12/03/03	10:44	5.94	26.85
		01/12/04	10:18	5.43	27.36
		03/15/04	10:40	5.57	27.22
		06/10/04	7:45	6.01	26.78
		09/22/04	10:55	6.62	26.17
		04/04/05	12:50	5.57	27.22
		09/20/05	8:55	7.16	25.63
		03/14/06	9:20	5.21	27.58
		03/14/06	13:15	5.21	27.58
		06/09/06	13:45	5.63	27.16
		09/12/06	11:48	7.42	25.37
		04/03/07	9:59	5.13	27.66
		04/03/07	11:33	5.14	27.65
		09/24/07	10:24	7.16	25.63
		05/01/08	10:02	5.65	27.14
MW-12	32.81	08/27/01	10:15	6.89	25.92
		10/15/01	11:40	8.24	24.57
		10/22/01	14:05	7.13	25.68
		10/29/01	14:17	7.12	25.69
		11/19/01	11:07	6.22	26.59
		01/02/02	11:02	5.36	27.45
		03/27/02	10:31	5.28	27.53
		06/11/02	10:18	5.97	26.84
		09/17/02	12:11	7.16	25.65
		12/16/02	11:19	6.51	26.30
		03/17/03	10:23	5.50	27.31
		06/10/03	NR	6.30	26.51
		09/10/03	8:33	7.64	25.17
		12/03/03	10:42	5.98	26.83
		01/12/04	10:16	5.45	27.36
		03/15/04	10:35	5.60	27.21
		06/10/04	7:40	6.03	26.78
		09/22/04	10:50	6.64	26.17
		04/04/05	12:45	5.55	27.26
		09/20/05	8:50	7.19	25.62
		01/25/06	15:00	4.85	27.96
		03/14/06	9:15	5.20	27.61
		03/14/06	12:50	5.23	27.58
		05/19/06	12:20	5.78	27.03
		06/09/06	13:48	5.61	27.20
		09/12/06	11:46	7.45	25.36
		04/03/07	9:57	5.15	27.66
		04/03/07	11:30	5.14	27.67
		09/24/07	10:22	7.18	25.63
		05/01/08	9:57	5.68	27.13

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-23	32.78	09/12/06	11:30	7.44	25.34
		04/03/07	9:40	5.17	27.61
		04/03/07	11:14	5.16	27.62
		09/24/07	10:11	7.17	25.61
		05/01/08	9:42	5.66	27.12
INJ-1	32.77	11/19/01	14:27	6.50	26.27
		03/27/02	10:38	5.23	27.54
		06/11/02	10:11	5.94	26.83
		09/17/02	12:16	7.14	25.63
		12/16/02	11:24	6.48	26.29
		03/17/03	10:32	5.47	27.30
		06/10/03	NR	6.09	26.68
		09/11/03	10:00	7.56	25.21
		01/12/04	10:27	5.44	27.33
		03/15/04	10:50	5.55	27.22
		04/04/05	13:00	5.49	27.28
		09/12/06	11:55	7.41	25.36
		04/03/07	10:03	5.06	27.71
INJ-2	32.81	10/15/01	11:35	8.22	24.59
		10/22/01	15:43	7.12	25.69
		10/29/01	13:10	7.02	25.79
		11/19/01	11:05	6.30	26.51
		03/27/02	10:28	5.29	27.52
		06/11/02	10:20	5.99	26.82
		09/17/02	12:10	7.18	25.63
		12/16/02	11:17	6.52	26.29
		03/17/03	10:20	5.51	27.30
		06/10/03	NR	6.31	26.50
		09/10/03	8:30	7.65	25.16
		12/03/03	10:40	6.00	26.81
		01/12/04	10:14	5.46	27.35
		03/15/04	10:30	5.62	27.19
		06/10/04	7:35	6.05	26.76
		09/22/04	10:45	6.65	26.16
		04/04/05	12:40	5.58	27.23
		09/20/05	NR	7.20	25.61
		03/14/06	9:10	5.25	27.56
		09/12/06	11:44	7.47	25.34
		04/03/07	9:55	5.12	27.69
		09/24/07	10:20	7.19	25.62
		05/01/08	9:53	5.70	27.11

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
INJ-3	33.01	11/19/01	14:40	6.45	26.56
		06/11/02	10:21	6.19	26.82
		09/17/02	12:43	7.38	25.63
		12/16/02	11:15	7.00	26.01
		03/17/03	10:17	5.74	27.27
		06/10/03	NR	6.50	26.51
		09/10/03	8:27	7.73	25.28
		12/03/03	10:50	6.32	26.69
		01/12/03	10:11	5.70	27.31
		03/15/04	10:27	5.81	27.20
		06/10/04	7:30	6.18	26.83
		09/22/04	10:40	6.90	26.11
		04/04/05	12:35	5.58	27.43
		09/20/05	NR	7.32	25.69
		03/14/06	9:05	5.37	27.64
		06/09/06	13:39	5.72	27.29
		09/12/06	11:40	7.65	25.36
		04/03/07	9:50	5.30	27.71
		09/24/07	10:16	7.25	25.76
		05/01/08	9:51	5.78	27.23

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
Shallow Off-Site Monitoring Wells					
EMW-7	33.31	04/17/95	NR	8.19	25.12
		09/07/95	NR	8.04	25.27
		11/10/95	NR	6.99	26.32
		12/07/95	NR	7.18	26.13
		01/29/96	NR	5.61	27.70
		09/04/96	16:00	7.31	26.00
		10/11/96	11:05	7.40	25.91
		11/06/96	9:45	6.85	26.46
		12/10/96	10:20	5.60	27.71
		01/10/97	NR	5.19	28.12
		02/21/97	12:05	7.43	25.88
		03/04/97	NR	5.41	27.90
		06/27/97	10:36	6.15	27.16
		09/04/97	10:52	6.90	26.41
		12/22/97	8:18	5.99	27.32
		03/06/98	9:39	5.77	27.54
		06/18/98	9:08	6.49	26.82
		09/29/98	9:10	7.60	25.71
		12/14/98	9:34	5.77	27.54
		01/07/99	8:39	5.67	27.64
		01/13/99	9:10	5.77	27.54
		03/02/99	9:11	5.04	28.27
		06/16/99	9:59	6.43	26.88
		09/16/99	10:26	7.22	26.09
		12/08/99	8:20	6.04	27.27
		03/07/00	8:30	5.45	27.86
		06/21/00	10:00	6.47	26.84
		09/13/00	12:00	7.30	26.01
		12/07/00	9:30	7.02	26.29
		03/15/01	9:25	6.46	26.85
	33.10	01/02/02	11:15	5.63	27.47
		03/27/02	10:17	5.58	27.52
		06/11/02	10:31	6.27	26.83
EMW-7 (continued)		09/17/02	12:54	7.43	25.67
		03/17/03	10:00	5.78	27.32
		09/10/03	8:00	7.92	25.18
		12/03/03	12:25	6.25	26.85
		01/12/04	12:10	5.78	27.32
		03/15/04	12:00	5.90	27.20
		06/10/04	8:45	6.39	26.71
		09/22/04	10:00	7.01	26.09
		04/04/05	12:00	5.86	27.24
		09/20/05	8:00	7.54	25.56
		03/14/06	11:50	5.55	27.55
		06/09/06	14:50	5.93	27.17

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
Deep On-Site Monitoring Wells and Piezometer					
MW-13	32.81	03/31/03	13:05	5.43	27.38
		06/10/03	NR	6.09	26.72
		09/10/03	9:26	7.65	25.16
		12/03/03	11:20	5.91	26.90
		01/12/04	11:23	5.37	27.44
		03/15/04	11:20	5.55	27.26
		06/10/04	8:30	6.44	26.37
		09/22/04	11:25	6.60	26.21
		04/04/05	13:45	5.50	27.31
		07/28/05	10:35	6.27	26.54
		09/20/05	9:45	7.10	25.71
		03/14/06	10:40	6.20	26.61
		03/15/06	8:55	6.14	26.67
		06/09/06	14:15	5.54	27.27
		09/12/06	12:40	7.44	25.37
		04/03/07	10:43	6.04	26.77
		04/03/07	12:10	4.40	28.41
		09/24/07	11:02	10.60	22.21
		09/24/07	12:42	7.11	25.70
		05/01/08	11:00	5.61	27.20
MW-14	32.60	12/03/03	10:03	5.65	26.95
		01/12/04	11:30	5.07	27.53
		03/16/04	13:00	5.21	27.39
		06/10/04	8:20	5.68	26.92
		09/23/04	8:20	6.30	26.30
		04/04/05	13:25	5.25	27.35
		07/28/05	10:20	6.01	26.59
		09/20/05	9:25	6.86	25.74
		03/14/06	10:05	4.90	27.70
		03/14/06	15:30	4.85	27.75
		06/09/06	14:05	5.27	27.33
		09/12/06	12:16	7.13	25.47
		04/03/07	10:17	4.39	28.21
		04/03/07	11:52	4.75	27.85
MW-14 (continued)		09/24/07	10:51	6.85	25.75
		09/24/07	12:51	6.86	25.74
		05/01/08	10:55	5.34	27.26
MW-15	32.57	12/03/03	10:00	5.46	27.11
		01/12/04	11:09	4.86	27.71
		03/16/04	13:35	4.98	27.59
		06/10/04	8:15	5.50	27.07
		09/23/04	8:15	6.23	26.34
		04/04/05	13:30	5.07	27.50
		07/28/05	10:25	5.84	26.73
		09/20/05	9:30	6.69	25.88
		03/14/06	10:10	4.96	27.61
		03/14/06	15:55	4.65	27.92
		06/09/06	14:09	5.07	27.50
		09/12/06	12:20	6.97	25.60
		04/03/07	10:22	4.82	27.75
		04/03/07	11:55	4.55	28.02
		09/24/07	10:48	6.87	25.70
		09/24/07	12:55	6.70	25.87
		05/01/08	11:20	5.20	27.37

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-16	36.92	12/03/03	10:10	10.11	26.81
		01/12/04	11:40	9.56	27.36
		03/15/04	11:30	9.68	27.24
		06/10/04	8:40	10.12	26.80
		09/22/04	11:35	10.72	26.20
		04/04/05	13:55	9.70	27.22
		07/28/05	10:30	10.48	26.44
		09/20/05	9:50	11.31	25.61
		03/14/06	11:00	9.30	27.62
		03/15/06	12:45	9.30	27.62
		06/09/06	14:30	9.70	27.22
		09/12/06	12:50	11.56	25.36
		04/03/07	10:55	9.25	27.67
		04/03/07	12:25	9.28	27.64
		09/24/07	11:17	11.29	25.63
		05/01/08	11:40	9.80	27.12
		09/29/08	NM	10.90	26.02
MW-17	32.60	12/03/03	10:20	5.91	26.69
		01/12/04	12:05	5.43	27.17
		03/15/04	10:05	5.59	27.01
		06/10/04	7:05	5.95	26.65
		09/22/04	10:15	6.50	26.10
		04/04/05	12:15	5.50	27.10
		07/28/05	10:10	6.28	26.32
		09/20/05	8:15	7.18	25.42
		03/14/06	11:30	5.17	27.43
		03/15/06	9:25	5.24	27.36
		06/09/06	14:45	5.53	27.07
		09/12/06	11:15	7.31	25.29
		04/03/07	9:25	5.15	27.45
		04/03/07	11:05	5.13	27.47
		09/24/07	10:03	7.03	25.57
		09/24/07	12:35	7.03	25.57
		05/01/08	9:30	5.57	27.03
		09/29/08	NM	6.71	25.89
MW-18	32.73	12/03/03	11:50	5.94	26.79
		01/12/04	10:00	5.43	27.30
		03/15/04	10:15	5.60	27.13
		06/10/04	7:10	6.00	26.73
		09/22/04	10:20	6.57	26.16
		04/04/05	12:20	5.53	27.20
		07/28/05	10:05	6.31	26.42
		09/20/05	8:25	7.13	25.60
		03/14/06	11:10	5.23	27.50
		03/15/06	10:25	5.29	27.44
		06/09/06	13:32	5.60	27.13
		09/12/06	11:25	7.40	25.33
		04/03/07	11:03	5.15	27.58
		09/24/07	10:06	7.11	25.62
		09/24/07	12:37	7.11	25.62
		05/01/08	9:07	5.61	27.12

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
MW-19	33.52	03/16/04	10:10	6.54	26.98
		06/10/04	7:20	6.87	26.65
		09/22/04	10:30	7.44	26.08
		04/04/05	12:05	6.37	27.15
		07/28/05	10:15	7.20	26.32
		09/20/05	8:20	7.98	25.54
		03/14/06	11:20	6.15	27.37
		03/15/06	9:55	6.21	27.31
		06/09/06	14:36	6.49	27.03
		09/12/06	11:20	8.25	25.27
		04/03/07	9:30	6.10	27.42
		04/03/07	11:07	6.07	27.45
		09/24/07	10:00	7.94	25.58
		09/24/07	12:30	7.95	25.57
		05/01/08	9:20	6.50	27.02
MW-21	32.86	09/12/06	12:35	7.45	25.41
		04/03/07	10:40	5.23	27.63
		04/03/07	12:06	5.06	27.80
		09/24/07	10:58	7.11	25.75
		09/24/07	12:44	7.15	25.71
		05/01/08	11:05	5.62	27.24
MW-22	33.18	09/12/06	12:47	7.85	25.33
		04/03/07	10:50	5.55	27.63
		04/03/07	12:20	5.55	27.63
		09/24/07	11:10	7.58	25.60
		05/01/08	10:24	6.07	27.11
P-1	33.85	01/13/99	8:55	6.25	27.60
		03/02/99	9:19	5.42	28.43
		06/16/99	10:15	6.82	27.03
		09/16/99	10:34	7.57	26.28
		12/08/99	8:32	6.49	27.36
		03/07/00	8:41	6.15	27.70
		06/21/00	9:33	6.96	26.89
		09/12/00	10:15	7.91	25.94
		12/07/00	9:15	7.50	26.35
		03/15/01	9:52	6.10	27.75
	33.62	01/02/02	10:55	6.12	27.50
		09/17/02	12:18	7.94	25.68
		12/16/02	11:26	7.28	26.34
		03/17/03	10:35	6.28	27.34
		09/10/03	8:42	8.40	25.22
		12/03/03	10:53	7.03	26.59
		01/12/04	10:35	6.20	27.42
		03/15/04	10:55	6.35	27.27
		06/10/04	7:50	6.81	26.81
		09/23/04	8:00	7.41	26.21
		04/04/05	13:05	6.30	27.32
		09/20/05	9:05	7.95	25.67
		03/14/06	9:40	5.99	27.63
		06/09/06	13:52	6.37	27.25
		09/12/06	12:00	8.21	25.41
		04/03/07	10:06	5.90	27.72
		04/03/07	11:42	5.90	27.72
		09/24/07	10:30	7.95	25.67
		05/01/08	10:10	6.44	27.18

Table 3
Groundwater Levels
Univar USA Inc. Facility, Kent, Washington

Location	Measuring Point Elevation	Date	Time	Depth to Water	Water Elevation
Deep Off-Site Monitoring Well					
MW-20	33.15	07/28/05	10:00	6.92	26.23
		09/20/05	NR	7.74	25.41
		03/14/06	12:00	5.97	27.18
		03/15/06	13:25	6.03	27.12
		06/09/06	15:00	6.28	26.87
		09/12/06	13:05	7.96	25.19
		04/03/07	9:00	5.98	27.17
		04/03/07	12:35	5.94	27.21
		09/24/07	11:30	7.71	25.44
		05/01/08	11:45	6.23	26.92

NOTE: Depth = depth to water relative to the top of PVC.
Elev. = elevation relative to NAVD 88.
NR = not recorded.
Off-site well EMW-7 was abandoned by Exxon in September 2006.

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-1	04/17/95	6.37	2,310	11.0	NM	NM	NM
	09/04/96	6.49	1,620	18.5	227	1.20	NM
	12/10/96	6.37	1,653	9.8	427	1.18	NM
	03/04/97	6.65	1,359	11.0	37	1.70	NM
	06/27/97	6.62	1,195	15.0	> 1,000	1.00	NM
	09/04/97	6.78	837	18.0	40	1.71	NM
	12/04/97	6.23	1,076	12.0	16	8.9	NM
	03/06/98	6.83	1,284	10.0	16	2.15	NM
	06/18/98	6.85	1,045	15.5	61	2.60	NM
	09/29/98	6.58	851	18.5	46	1.27	NM
	12/14/98	6.50	973	13.1	16	1.14	-147
	03/03/99	6.70	849	10.0	55	3.02	-148
	06/17/99	6.51	790	14.0	6.7	1.30	-176
	09/16/99	6.60	905	17.0	14	0.1	-189
	12/08/99	7.12	408	12.9	10	0.3	-158
	03/07/00	7.51	599	10.0	6	0.2	-126
	06/21/00	7.10	505	16.0	4.6	1.2	7
	09/12/00	6.80	790	14.5	NM	2.6	-69
	12/07/00	7.04	830	12.0	6.9	1.1	-60
	03/15/01	7.06	999	10.0	4.9	2.0	-48
	07/12/01	7.03	925	15.6	7.8	2.65	-141
	09/24/01	6.54	NM	20.2	4.3	1.08	NM
	01/02/02	7.19	1,150	11.8	NM	NM	NM
	03/28/02	7.26	351	10.2	NM	0.20	NM
	06/11/02	7.34	613	15.2	NM	0.22	NM
	09/18/02	6.93	771	18.6	NM	0.04	-200
	12/17/02	7.01	601	12.6	3.5	0.19	NM
	03/20/03	7.19	517	10.9	5.8	0.13	-111
	05/14/03	7.00	493	12.9	NM	0.74	-75
	06/11/03	7.02	405	15.0	8.0	0.23	NM
	09/11/03	7.03	474	18.7	4.0	0.21	NM
	12/04/03	7.00	451	13.7	4.2	0.23	-51
	03/16/04	6.71	391	11.0	4.6	0.32	-63
	09/22/04	6.49	500	16.0	NM	0.21	4
	04/05/05	6.75	465	12.3	NM	1.10	5
	09/21/05	7.26	624	17.8	NM	0.26	5
	03/15/06	6.88	550	11.0	18.8	< 0.01	NM
	09/14/06	6.82	630	16.8	NM	0.22	56
	04/04/07	7.16	737	11.6	5.7	< 0.01	-64
	09/25/07	6.80	687	15.7	6.2	0.18	-240
	05/02/08	6.87	883	12.3	NM	0.19	-66

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-2	04/17/95	6.30	1,000	13.0	NM	NM	NM
	09/04/96	6.11	964	14.8	8.5	1.00	NM
	12/10/96	6.27	704	13.1	1,000	0.92	NM
	03/04/97	6.20	754	13.0	9.39	1.77	NM
	06/27/97	6.54	667	14.0	322	3.00	NM
	09/04/97	6.41	638	15.0	332	1.17	NM
	12/04/97	5.25	612	14.0	74	1.80	NM
	03/06/98	6.48	826	12.0	67	1.12	NM
	06/18/98	6.60	899	14.0	334	3.5	NM
	09/29/98	6.35	705	17.0	17	16.6[a]	NM
	12/14/98	6.20	632	15.1	NM	1.14	-84
	03/02/99	6.29	560	12.0	59	1.3	-91.9
	06/16/99	6.02	663	13.0	NM	0.90	-76
	09/16/99	6.39	734	13.0	12	< 0.1	-475
	12/08/99	6.74	421	14.8	16	1.30	-121
	03/07/00	6.40	491	12.0	19	0.4	-70
	06/21/00	6.55	320	15.0	6.1	1.51	8
	09/12/00	6.10	667	13.0	11	3.9	-57
	12/07/00	6.21	574	13.0	6	1.9	-18
	03/15/01	6.60	556	12.0	39	0.6	-49
	07/12/01	6.53	652	15.1	77	2.54	-116
	09/24/01	6.69	NM	19.5	5.0	1.10	NM
	01/03/02	5.81	531	13.7	12	0.00	NM
	03/28/02	6.28	229	12.6	6.2	0.63	NM
	06/11/02	6.72	526	14.2	7.1	0.43	NM
	09/18/02	6.63	597	17.9	NM	0.08	-11
	12/16/02	6.04	480	15.2	5.1	0.34	NM
	03/20/03	6.63	413	12.5	29	0.12	-57
	06/11/03	6.59	306	13.9	10	0.31	NM
	09/10/03	6.33	416	15.9	4.2	0.34	NM
	12/05/03	6.58	293	14.3	5.3	0.31	-20
	03/16/04	6.54	306	12.8	25.4	0.30	-23
	09/24/04	6.46	376	17.0	NM	0.37	30
	04/05/05	6.39	438	12.5	NM	1.04	24
	09/21/05	6.71	512	17.1	NM	0.26	-3
	03/15/06	6.57	403	12.4	53	< 0.01	NM
	09/13/06	6.33	472	15.5	NM	0.15	68
	04/03/07	6.64	421	13.9	65	0.11	116
	09/26/07	6.44	608	15.8	42	0.21	-178
	05/02/08	6.29	567	12.2	NM	0.25	-23

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-3	04/17/95	6.40	1,580	12.0	NM	NM	NM
	09/04/96	6.33	1,357	14.9	5.1	1.6	NM
	12/11/96	6.48	979	12.4	15	1	NM
	03/04/97	6.44	1,152	13.0	9.4	1.69	NM
	06/27/97	6.64	937	13.0	423	1	NM
	09/04/97	6.47	765	15.0	132	1.81	NM
	12/04/97	6.20	844	13.5	7.5	1.29	NM
	03/06/98	6.53	1,255	12.0	3.4	1.9	NM
	06/18/98	6.55	1,225	13.0	5.3	0.9	NM
	09/29/98	6.41	947	14.0	7.91	1.22	NM
	12/14/98	6.25	1,054	13.5	0.9	1.14	-79
	03/03/99	6.45	765	12.0	4.7	NM	-105
	06/16/99	6.31	837	12.0	NM	1.00	-120
	09/17/99	6.48	964	14.0	4.2	0.1	-129
	12/08/99	6.80	137	13.5	6.7	1.5	-63
	03/07/00	6.62	766	12.0	8.0	0.8	-75
	06/21/00	6.92	452	14.0	7.5	1.25	-81
	09/12/00	6.70	836	10.7	NM	1.4	-36
	12/07/00	6.09	732	12.0	2.7	1.8	-62
	03/15/01	6.80	809	11.0	7.5	0.9	NM
	07/12/01	6.63	746	13.1	8.2	1.36	-42
	09/24/01	6.49	NM	16.9	12	0.16	NM
	01/03/02	6.52	955	13.1	2.0	0.00	NM
	03/28/02	6.74	330	12.3	5.8	0.19	NM
	06/11/02	6.89	786	12.8	14.3	0.4	NM
	09/17/02	6.80	773	15.2	NM	0.10	-135
	12/17/02	6.44	821	13.0	7.5	0.40	NM
	03/20/03	6.85	521	12.1	3.3	0.12	-73
	06/11/03	7.17	411	13.8	3.6	0.24	NM
	09/11/03	6.72	395	16.1	2.5	0.24	NM
	12/04/03	6.69	388	13.2	2.2	0.68	94
	03/15/04	6.61	425	12.3	2.1	0.32	-81
	09/24/04	6.56	448	15.6	NM	NM	2
	04/05/05	6.95	726	13.0	NM	0.33	-4
	09/21/05	7.11	560	15.6	NM	0.42	-6
	03/14/06	7.14	519	11.9	0.98	< 0.01	NM
	09/12/06	6.50	606	15.8	NM	0.19	-21
	04/04/07	6.40	515	12.1	13.3	0.06	-1
	09/25/07	6.43	540	14.2	6.8	0.40	-183
	05/01/08	6.63	688	11.9	NM	0.17	-74

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-4	09/04/96	6.29	1,452	17.9	99	1.5	NM
	12/10/96	6.29	1,690	11.9	427	0.83	NM
	03/04/97	6.75	1,868	10.0	2.6	2.82	NM
	06/27/97	6.78	1,431	11.0	55	1	NM
	09/04/97	6.82	1,120	19.0	51	1.4	NM
	12/04/97	6.33	1,578	13.0	6.5	1.8	NM
	03/06/98	6.88	1,847	10.0	3.6	1.92	NM
	06/18/98	6.79	1,862	15.0	4.5	2.2	NM
	09/29/98	6.63	1,288	18.0	11	1.26	NM
	12/14/98	6.18	1,560	13.9	2.6	1.16	-150
	03/03/99	6.69	1,288	9.0	9.6	NM	155
	06/17/99	6.69	NM	13.0	1.9	0.1	-186
	09/17/99	6.57	1,623	17.0	2.5	1.9	-178
	12/08/99	6.94	394	13.6	4.32	0.5	-109
	03/07/00	6.92	1,344	12.0	5.8	1.1	-68
	06/21/00	6.90	992	15.0	2.4	1.29	-67
	09/12/00	6.58	1,450	14.0	1.6	2.2	-86
	12/07/00	6.60	1,210	13.0	3.6	2.4	15
	03/15/01	6.60	1,361	10.0	5.2	1.5	-24
	07/12/01	6.70	1,594	15.2	6.2	2.73	-108
	09/25/01	6.17	NM	17.7	48	1.04	NM
	01/02/02	6.73	1,840	11.9	74	NM	NM
	03/28/02	6.95	655	10.5	25	0.39	NM
	06/11/02	6.97	817	13.3	NM	0.17	NM
	09/18/02	6.81	1,452	18.1	NM	0.04	-106
	12/17/02	6.54	1,011	12.4	2.7	0.34	NM
	03/20/03	6.74	877	10.8	3.6	0.07	-78
	05/14/03	6.70	864	12.2	NM	0.74	-45
	06/11/03	6.89	776	13.9	4.0	0.21	NM
	09/11/03	6.60	756	17.1	3.7	0.25	NM
	12/04/03	6.68	437	13.1	4.2	0.22	-52
	03/15/04	6.60	518	10.6	1.9	0.46	-58
	09/24/04	6.45	596	15.4	NM	0.62	36
	04/04/05	6.71	945	11.6	NM	1.20	58
	09/21/05	6.56	881	17.5	NM	0.71	-1
	03/15/06	6.82	907	10.1	8.3	0.01	NM
	09/14/06	6.49	907	15.5	NM	0.33	98
	04/04/07	6.85	891	11.2	5.9	< 0.01	-68
	09/26/07	6.51	992	16.7	4.2	< 0.01	-210
	05/02/08	6.46	1,076	11.1	NM	0.19	-39

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-5	09/04/96	6.23	422	15.9	22	2.1	NM
	12/10/96	6.15	463	12.7	984	1.53	NM
	03/04/97	6.22	506	13.0	8.9	2.48	NM
	06/27/97	6.46	329	15.0	245	2	NM
	09/04/97	6.79	285	16.0	51	1.39	NM
	12/04/97	5.90	367	13.0	3.6	1.35	NM
	03/06/98	6.38	425	12.0	4.9	1.97	NM
	06/18/98	6.36	439	14.0	8.5	2.2	NM
	09/29/98	6.29	326	17.0	8.7	1.54	NM
	12/15/98	5.94	394	14.8	3.6	1.72	111
	03/02/99	5.87	301	12.0	8.9	1.47	237
	06/16/99	5.99	375	12.0	< 10	0.2	161
	09/16/99	6.19	449	14.0	2.9	0.4	-159
	12/08/99	6.59	238	14.9	5.1	0.2	72
	03/07/00	6.34	278	12.0	7.9	1.1	67
	06/21/00	6.45	185	14.0	1.6	1.68	-8
	09/12/00	7.24	349	12.4	1.9	1.2	-18
	12/07/00	6.15	314	13.0	14	2.3	-45
	03/15/01	6.55	371	11.0	9.1	3.5	-61
	07/09/01	6.32	352	14.2	4.6	1.01	111
	09/24/01	6.16	256	18.1	64	6.17	NM
	01/02/02	6.09	468	15.3	NM	NM	NM
	03/27/02	6.51	5,000	9.7	5.1	3.84	NM
	06/11/02	6.29	439	13.9	2.38	1.05	NM
	09/18/02	6.28	429	15.6	NM	0.25	-4
	12/16/02	6.18	341	14.2	2.7	0.48	NM
	03/17/03	6.29	350	13.4	3.4	0.36	79
	05/14/03	6.42	286	12.3	NM	0.69	34
	06/10/03	6.35	218	13.8	12	0.3	NM
	09/11/03	6.32	267	16.5	1.4	0.37	NM
	12/05/03	6.40	219	13.8	7.1	0.34	281
	03/16/04	6.40	219	12.7	7.1	0.77	73
	09/22/04	6.27	337	13.9	NM	0.66	60
	04/04/05	6.41	290	13.1	NM	1.55	100
	09/20/05	6.59	324	18.5	NM	0.36	11
	03/14/06	6.45	312	12.4	12.1	0.61	NM
	09/13/06	6.34	296	15.7	NM	0.32	124
	04/05/07	6.47	327	12.2	7.7	0.73	128
	09/26/07	6.22	351	15.1	6.2	0.58	92
	05/01/08	6.10	436	12.9	NM	0.84	74

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (µS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-6	09/04/96	6.30	1,930	14.5	23	4.8	NM
	12/10/96	6.17	1,909	12.0	> 1,000	1.02	NM
	03/04/97	6.32	1,683	11.0	6.1	3.44	NM
	06/27/97	6.41	1,469	14.0	73	1	NM
	09/04/97	6.30	1,157	15.0	98	1.15	NM
	12/04/97	5.92	1,286	14.0	5.7	1.05	NM
	03/06/98	6.33	1,620	11.0	5.7	1.1	NM
	06/18/98	6.33	1,804	14.0	7.0	1.8	NM
	09/29/98	6.25	1,440	17.5	7.9	1.91	NM
	12/15/98	5.93	1,390	14.4	NM	1.26	-89
	03/02/99	6.03	1,107	11.0	7.7	1.38	-85
	06/16/99	6.15	1,441	12.0	< 10	< 0.1	-117
	09/16/99	6.27	1,621	13.0	9.1	0.6	-476
	12/08/99	6.63	315	13.7	3.7	0.7	-91
	03/07/00	6.36	1,147	11.0	5.5	0.6	-54
	06/21/00	6.66	810	14.0	1.0	1.75	-37
	09/12/00	6.50	1,378	12.0	NM	2.3	-43
	12/07/00	5.79	1,270	14.0	3.6	1.6	-15
	03/15/01	6.35	1,079	11.0	16	0.4	-31
	07/12/01	6.39	1,210	14.1	7.6	1.07	-44
	09/25/01	6.63	NM	16.4	19	1.02	NM
	01/03/02	6.19	1,120	12.9	1.5	0	NM
	03/27/02	6.32	NM	9.0	NM	0.45	NM
	06/11/02	6.78	891	13.5	NM	0.34	NM
	09/18/02	6.49	1,312	16.7	NM	0.16	-157
	12/16/02	6.25	1,179	14.2	8.8	0.24	NM
	03/20/03	6.53	721	12.1	5.3	0.17	-70
	06/11/03	6.74	387	14.1	21	0.33	NM
	09/10/03	6.44	601	16.9	4.2	0.31	NM
	12/04/03	6.60	393	14.3	6.2	0.26	-12
	03/16/04	6.75	286	12.9	6.9	0.25	-37
	09/23/04	6.36	635	16.3	NM	0.55	13
	04/05/05	6.61	541	13.3	NM	0.61	-17
	09/21/05	6.47	1,045	15.4	NM	0.66	40
	03/14/06	6.70	445	12.7	12.6	< 0.01	NM
	09/13/06	6.39	868	15.4	NM	0.25	64
	04/05/07	6.50	377	12.6	19.0	0.07	23
	09/26/07	6.39	1,010	15.0	12.2	0.06	-190
	05/02/08	6.39	578	11.9	NM	0.19	-26

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-7	12/22/97	6.56	550	11.0	139	2.15	NM
	03/06/98	6.63	536	12.0	13.4	1.53	NM
	06/18/98	6.36	543	14.0	13	2.4	NM
	09/29/98	6.38	438	17.0	21	1.41	NM
	12/14/98	5.98	409	15.2	3.2	1.23	68
	03/03/99	7.07	288	12.0	5.5	NM	-8.4
	06/17/99	6.07	462	13.0	NM	0.8	1
	09/17/99	6.13	506	16.0	11	< 0.1	-72
	12/08/99	6.71	342	15.3	7.6	1.3	-2
	03/07/00	6.44	362	12.0	6.7	0.8	-11
	06/21/00	6.57	241	14.0	0.7	2.04	24
	09/12/00	6.00	493	13.0	13	1.4	5
	12/07/00	6.46	505	14.0	31	2.6	-39
	03/15/01	6.58	425	12.0	20	1.5	NM
	07/12/01	6.45	493	14.1	11	1.87	54
	09/25/01	6.48	NM	15.6	2.8	1.12	NM
	01/03/02	6.17	628	13.9	4.1	0	NM
	03/28/02	6.37	184	12.3	4.7	2.61	NM
	06/11/02	6.66	383	13.2	5.7	0.70	NM
	09/17/02	6.56	427	16.0	NM	0.15	4
	12/17/02	6.46	351	13.2	2.4	0.32	NM
	03/17/03	6.49	436	13.3	20	0.13	27
	06/10/03	6.88	282	13.8	52	0.18	NM
	09/10/03	6.27	257	16.0	3.0	0.49	NM
	12/04/03	6.68	239	13.4	4.7	0.29	159
	03/16/04	6.62	268	13.9	7.3	0.84	34
	09/22/04	7.00	469	16.0	NM	0.21	103
	04/04/05	6.71	388	13.0	NM	0.86	40
	09/20/05	6.75	404	18.3	NM	0.68	-11
	03/14/06	7.11	312	12.5	3.7	2.78	NM
	09/13/06	6.33	345	16.0	NM	0.26	115
	04/03/07	6.56	220	12.6	15.2	5.06	222
	09/25/07	6.43	313	17.1	8.7	0.59	44
	05/01/08	6.30	337	13.4	NM	1.40	41

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-8	12/22/97	6.37	495	12.0	67	4.06	NM
	03/06/98	6.49	758	12.0	70	2.72	NM
	06/18/98	6.66	662	13.0	243	2.8	NM
	09/29/98	6.33	428	14.5	48	1.7	NM
	12/14/98	6.11	413	13.9	14	1.83	72
	03/02/99	6.10	442	12.0	91	2.11	117
	06/16/99	5.95	534	11.0	< 10	0.1	132
	09/16/99	6.22	588	13.0	11	1.8	-205
	12/08/99	6.50	140	13.9	133	2.4	55
	03/07/00	6.90	455	12.0	25	1.5	38
	06/21/00	6.30	313	14.0	1.2	1.73	37
	09/12/00	6.52	447	11.6	2.6	3.5	52
	12/07/00	6.99	387	14.0	6.5	1.8	-10
	03/15/01	6.45	433	11.0	8.3	2.7	-50
	07/12/01	6.30	427	13.8	5	2.03	53
	09/25/01	6.48	NM	14.4	22	1.02	NM
	01/03/02	5.64	468	13.4	2.8	0	NM
	03/27/02	6.31	NM	8.9	5.1	1.95	NM
	06/11/02	6.41	576	12.9	6.4	0.40	NM
	09/18/02	6.32	415	15.0	NM	0.15	-88
	12/16/02	6.23	294	13.6	12	0.35	NM
	03/17/03	6.31	279	12.4	2.4	0.28	87
	05/14/03	6.36	338	13.6	NM	0.83	35
	06/11/03	6.54	249	13.4	3.5	0.54	NM
	09/10/03	6.12	249	15.5	1.3	0.70	NM
	12/04/03	6.62	165	13.5	4.7	0.17	153
	03/16/04	6.48	292	12.6	6.1	0.72	47
	09/24/04	6.60	309	16.0	NM	0.18	66
	04/05/05	6.48	385	12.9	NM	1.31	-1
	09/20/05	6.52	349	18.1	NM	0.53	31
	03/15/06	6.60	433	12.0	26.5	0.42	NM
	09/13/06	6.41	411	14.9	NM	0.25	52
	04/05/07	6.32	690	12.4	6.7	0.44	176
	09/26/07	6.30	506	14.7	10.3	0.50	-1
	05/01/08	6.07	812	12.8	NM	1.14	94

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (µS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-9	07/09/01	6.24	812	13.9	8.2	2.28	-63
	09/25/01	6.33	NM	14.7	52	1.06	NM
	01/03/02	6.13	763	13.4	1.4	0	NM
	03/27/02	6.37	NM	8.2	NM	0.59	NM
	06/11/02	6.61	700	12.8	NM	0.61	NM
	09/17/02	6.41	728	14.7	NM	0.13	-131
	12/16/02	6.24	614	13.7	28	0.26	NM
	03/17/03	6.52	460	12.7	19	0.08	-47
	06/11/03	6.28	395	13.3	65	0.41	NM
	09/10/03	6.12	494	15.1	22	0.33	NM
	12/04/03	6.49	351	14.5	16	0.18	21
	03/16/04	6.46	269	12.4	5.1	0.44	46
	09/23/04	6.48	488	15.5	NM	0.17	55
	04/05/05	6.53	710	13.2	NM	1.15	-5
	09/20/05	6.25	550	16.7	NM	0.21	24
	03/14/06	6.51	416	12.7	347	< 0.01	NM
	09/13/06	6.43	548	14.7	NM	0.18	59
	04/05/07	6.26	438	12.5	110	0.01	50
	09/26/07	6.18	596	14.2	89	0.35	-166
	05/01/08	6.28	753	13.1	NM	0.24	78
MW-10	07/09/01	6.47	463	14.2	14	2.11	72
	09/25/01	6.53	NM	15.6	184	0.98	NM
	01/03/02	6.33	460	13.6	3.2	0	NM
	03/28/02	6.57	159	12.0	NM	0.32	NM
	06/11/02	6.90	397	13.1	NM	0.22	NM
	09/17/02	6.76	390	15.1	NM	0.10	-97
	12/17/02	6.65	300	13.5	20.2	0.21	NM
	03/20/02	6.82	336	12.9	3.2	0.10	-62
	06/10/03	6.97	222	14.1	15.9	0.18	NM
	09/10/03	6.09	267	16.3	9.0	0.49	NM
	12/04/03	6.61	179	13.4	7.6	0.37	44
	03/16/04	6.51	245	11.7	3.4	0.56	-24
	09/22/04	6.80	282	17.0	NM	0.61	10
	04/05/05	7.68	315	12.1	NM	0.89	-10
	09/20/05	6.62	284	18.1	NM	0.67	1
	03/15/06	6.71	268	11.2	6.7	0.16	NM
	09/12/06	6.59	281	20.3	NM	0.30	-67
	04/03/07	6.95	215	13.7	11.7	< 0.01	46
	09/24/07	6.61	238	16.9	7.7	0.45	-138
	05/01/08	6.56	268	11.8	NM	0.12	-54

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-11	07/0901	6.69	406	12.8	134	0.89	22
	09/24/01	6.28	418	17.5	112	6.13	NM
	01/02/02	6.24	431	14.8	NM	NM	NM
	03/27/02	6.58	5,000	9.1	12	4.42	NM
	06/11/02	6.35	444	14.2	6.4	2.74	NM
	09/17/02	6.22	530	16.3	NM	0.14	83
	12/16/02	6.00	593	14.0	1.8	0.30	NM
	03/17/03	6.15	539	13.4	4.6	0.16	26
	06/10/03	6.20	321	13.7	8.7	0.35	NM
	09/10/03	6.08	411	15.4	5.0	0.31	NM
	12/05/03	6.25	337	13.5	5.1	0.29	260
	03/16/04	6.36	269	12.7	1.7	0.50	73
	09/22/04	6.44	285	16.6	NM	0.38	85
	04/04/05	6.51	320	13.2	NM	1.84	94
	09/20/05	6.33	352	18.6	NM	0.51	-8
	03/14/06	6.80	345	13.0	41.5	< 0.01	NM
	09/13/06	6.22	397	15.2	NM	0.19	138
	04/04/07	5.85	315	12.1	23.5	0.28	208
	09/26/07	6.27	312	14.9	18.3	0.39	85
	05/01/08	6.11	486	13.5	NM	0.46	69
MW-12	07/09/01	6.67	590	14.5	95	1.4	37
	09/24/01	6.41	NM	19.2	79	1.17	NM
	01/03/02	5.37	1,480	16.2	7.9	NM	NM
	03/27/02	5.59	NM	12.3	16	0.43	NM
	06/11/02	6.33	865	14.6	5.4	0.31	NM
	09/17/02	6.29	737	16.8	NM	0.18	-147
	12/16/02	6.14	475	14.7	2.1	0.12	NM
	03/17/03	6.13	620	14.1	47	0.21	1
	05/14/03	6.21	383	13.7	NM	0.66	31
	06/10/03	6.30	367	13.8	67	0.45	NM
	09/10/03	6.06	419	15.9	28	0.35	NM
	12/05/03	6.18	410	13.4	9.2	0.33	40
	03/16/04	6.40	317	12.5	3.4	0.30	60
	09/22/04	6.58	408	16.5	NM	2.00	59
	04/04/05	6.93	416	13.0	NM	1.39	88
	09/20/05	6.70	460	18.4	NM	0.37	-12
	03/14/06	6.91	410	12.8	36	0.38	NM
	09/13/06	6.31	390	15.6	NM	0.19	132
	04/04/07	5.82	420	12.5	34	0.10	196
	09/26/07	6.42	383	15.3	29	0.20	62
	05/01/08	6.07	592	14.0	NM	0.35	71

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-13	03/31/03	6.41	506	14.3	76	0.22	-37
	05/14/03	6.29	491	13.8	NM	0.84	-53
	06/11/03	6.63	425	14.7	16	0.25	NM
	09/11/03	6.60	470	16.8	23	0.58	NM
	12/04/03	6.86	379	13.1	5.7	0.28	-11
	03/15/04	6.58	458	12.8	10	0.31	-44
	06/10/04	6.55	383	14.4	NM	0.62	-21
	09/23/04	6.38	427	15.6	NM	0.17	18
	04/05/05	7.02	242	12.9	NM	1.43	9
	09/21/05	6.92	367	16.9	NM	0.22	-15
	03/15/06	7.07	301	13.2	4.0	< 0.01	NM
	09/14/06	6.58	490	16.0	NM	0.20	59
	04/04/07	6.76	557	13.6	5.0	0.03	-39
	09/25/07	6.50	617	15.6	4.8	-0.11	-210
	05/02/08	6.29	758	14.0	NM	0.24	-20
MW-14	12/04/03	6.80	207	13.5	8.2	0.22	44
	03/16/04	6.52	294	13.6	1.6	0.57	-9
	06/10/04	6.68	274	14.4	NM	0.55	-3
	09/24/04	6.97	343	14.5	NM	0.21	155
	04/05/05	6.84	369	13.8	NM	0.85	21
	09/21/05	6.71	495	15.1	NM	0.56	11
	03/14/06	6.92	341	13.5	4.9	0.05	NM
	09/13/06	6.81	396	15.7	NM	0.23	33
	04/04/07	6.64	393	14.5	0.82	0.21	-32
	09/26/07	6.56	358	14.8	2.16	0.26	-184
	05/02/08	6.28	412	12.7	NM	0.5	-27
MW-15	12/04/03	7.00	259	13.2	9.1	0.18	48
	03/16/04	6.92	290	13.4	2.8	0.39	-25
	06/10/04	6.66	297	14.1	NM	0.56	-17
	09/24/04	6.68	311	14.9	NM	0.21	74
	04/05/05	6.79	370	13.8	NM	0.70	15
	09/21/05	6.91	682	16.4	NM	0.56	-9
	03/14/06	6.80	334	13.7	NM	< 0.01	NM
	09/13/06	6.77	367	15.3	NM	0.50	55
	04/04/07	6.71	396	14.2	1.2	0.06	-39
	09/26/07	6.51	390	15.4	NM	0.01	-205
	05/02/08	6.30	491	13.7	NM	0.21	-24

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (µS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-16	12/05/03	6.35	385	12.7	6.1	0.59	19
	03/16/04	6.42	370	12.7	7.2	0.39	-14
	06/10/04	6.36	366	14.4	NM	0.54	-5
	09/23/04	6.50	488	14.0	NM	0.24	27
	04/05/05	6.56	645	13.0	NM	1.09	38
	09/21/05	6.48	555	14.6	NM	0.47	21
	03/15/06	6.91	569	12.4	2.1	< 0.01	NM
	09/13/06	6.58	459	14.0	NM	0.19	68
	04/05/07	6.46	659	12.7	1.0	< 0.01	-62
	09/26/07	6.52	621	15.8	1.6	0.43	-202
	05/02/08	6.13	790	12.8	NM	0.18	0
MW-17	12/04/03	6.59	384	12.0	5.7	0.51	93
	03/15/04	6.32	619	12.3	7.1	0.78	-24
	06/10/04	6.41	489	13.1	NM	0.68	-12
	09/23/04	6.42	521	13.4	NM	0.01	10
	04/05/05	6.60	920	12.6	NM	0.97	30
	09/21/05	6.52	882	13.6	NM	0.31	16
	03/15/06	6.92	804	11.4	2.7	0.73	NM
	09/12/06	6.27	908	16.7	NM	0.14	-1
	04/03/07	6.24	766	11.7	1.9	0.65	96
	09/24/07	6.45	922	13.9	2.1	0.40	-175
	05/01/08	6.27	1,286	12.3	NM	0.24	105
MW-18	12/04/03	6.54	308	13.0	8.1	0.33	21
	03/16/04	6.46	363	12.4	19	0.36	-14
	06/10/04	6.41	415	13.8	NM	0.66	-3
	09/23/04	6.31	373	15.3	NM	0.01	7
	04/05/05	6.94	463	12.9	NM	0.83	18
	09/20/05	6.84	183	17.3	NM	0.72	21
	03/15/06	6.68	430	12.3	2.5	0.22	NM
	09/12/06	6.07	519	17.0	NM	0.42	NM
	04/03/07	6.50	464	14.5	2.7	< 0.01	48
	09/24/07	6.57	566	15.5	2.1	0.41	-152
	05/01/08	6.32	637	12.6	NM	0.38	-43
MW-19	03/16/04	6.49	403	13.2	12	0.38	-23
	06/10/04	6.31	379	14.5	NM	0.89	-15
	09/23/04	6.66	368	15.4	NM	0.26	5
	04/05/05	6.87	571	14.2	NM	0.39	-21
	09/21/05	6.80	636	15.7	NM	0.44	31
	03/15/06	6.78	510	12.6	3.7	0.14	NM
	09/12/06	6.40	563	18.1	NM	0.18	-22
	04/03/07	6.05	505	13.9	3.9	0.21	40
	09/24/07	6.31	317	15.6	3.4	0.41	-218
	05/02/08	6.32	698	13.5	NM	0.23	-32

Table 4
Field Parameters in Groundwater from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-20	07/28/05	7.01	1,053	14.7	11	NM	NM
	09/20/05	6.71	957	15.1	NM	0.42	45
	03/15/06	6.82	861	12.7	3.2	< 0.01	NM
	09/12/06	6.32	958	17.1	NM	0.39	-64
	04/05/07	6.54	972	14.1	5.0	< 0.01	-70
	09/26/07	6.34	961	15.1	NM	0.20	-169
	05/02/08	6.27	1,037	13.1	NM	0.21	-42
MW-21	09/14/06	6.65	624	14.9	NM	0.34	85
	04/04/07	6.68	657	13.3	14.9	< 0.01	-47
	09/25/07	6.58	636	14.7	12.2	0.06	-231
	05/02/08	6.28	746	13.8	NM	0.25	-29
MW-22	09/14/06	6.40	581	14.0	NM	0.62	121
	04/04/07	5.92	525	12.4	8.2	0.04	-40
	09/26/07	6.40	621	15.0	9.2	0.07	-178
	05/02/08	6.11	774	12.7	NM	0.19	-7.4
MW-23	09/13/06	6.07	433	16.2	NM	0.52	122
	04/04/07	6.04	414	12.6	63.9	0.65	185
	09/25/07	6.47	432	15.9	31.2	0.49	1
	05/01/08	6.24	552	13.8	NM	0.29	38
	10/01/08	6.40	458	17.7	NM	0.13	46
P-1	09/24/04	6.54	401	15.4	NM	0.24	33
Inj-1	07/09/01	6.39	703	14.2	48	1.55	-18
	06/11/02	6.63	1,541	14.1	19	0.28	NM
Inj-2	07/09/01	6.45	384	15.1	62	1.2	17
	06/11/02	6.49	950	15.6	14	0.23	NM
	06/10/03	6.38	381	14.5	10	0.25	NM
Inj-3	07/09/01	6.37	407	14.2	30	1.51	17
	06/11/02	6.59	1,971	15.1	14	0.11	NM
	12/17/02	6.27	417	13.4	12	0.11	NM
	06/10/03	6.50	634	14.2	24	0.21	NM

NOTE: NM = not measured
[a] Likely meter malfunction

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
Final Cleanup Levels		0.8	1,000	700	1,600	400	0.64	15	7.2	800	0.5	7.0	70	5.0	200	4.0	0.86	0.5
MW-1	04/17/95	< 25	2,900	1,300	3,600	—	< 25	560	< 25	710	< 25	53	1,400	29	540	150	180	120
dup	04/17/95	< 25	3,100	1,500	3,900	—	< 25	610	< 25	770	< 25	65	1,600	31	640	180	230	130
	09/04/96	< 50	1,600	1,300	4,400	< 200	< 50	220	< 50	1,300	< 50	< 50	700	< 100	180	< 50	< 50	82
	12/10/96	7.7 J	3,500 J	1,600 J	6,300 J	210 J	< 0.5	120 J	5.1 J	1,400 J	1.5 J	67 J	2,700 J	9 JB	1,200 J	62 J	31 J	91 J
	03/04/97	5.3 J	4,700 J	1,600 J	7,100 J	210 EJ	< 0.5 J	73 J	2.1 J	640 J	1.2 J	24 J	1,000 J	5 J	420 J	68 J	66 J	80 J
	06/27/97	8	3,000	2,000	7,400	200	< 5	200	< 5	900	< 5	21	860	< 10	290	26	34	120
	09/04/97	7.5	1,500	1,500	4,200	< 2	< 0.5	150	0.9	790	< 0.5	7.6	350	2.9	74	12	12	52
	12/04/97	4.5 J	4,700 J	1,800 J	7,000 J	97 J	< 0.5 J	31 J	2.4 J	540 J	0.8 J	27 J	320 J	3 J	250 J	20 J	22 J	38 J
	03/06/98	8	1,600	1,500	4,400	110	< 5	320	< 5	420	< 5	9	340	< 10	160	7	10	50
dup	03/06/98	8	1,500	1,500	4,300	120	< 5	380	< 5	400	< 5	10	400	< 10	190	8	8	56
	06/18/98	< 10	2,900	1,700	6,700	190	< 10	120	< 10	420	< 10	16	450	< 20	400	10	14	120
	09/29/98	7 J	1,400 J	1,800 J	5,400 J	81 J	< 2 J	300 J	< 2 J	330 J	< 2 J	< 2 J	94 J	< 5 J	46 J	2 J	< 2 J	14 J
	12/15/98	6	2,000	1,600	4,600	110	< 5	190	< 5	330	< 5	14	390	< 10	270	6	6	54
	03/02/99	5	1,600 B	1,700	5,970	94	< 5	390	< 5	320	< 5	11	490	< 10	220	7	6	73
	06/17/99	< 50	2,500	1,400	6,000	< 200	< 50	140	< 50	230	< 50	< 50	400	< 500	270	< 50	< 50	180
	09/17/99	4.3 E	1,500	1,400	4,100	110	< 0.2	200	< 0.2	250	< 0.2	6.4	210	< 0.3	240	8.9	7.8 B	88
	12/08/99	< 12	860 J	1,300 J	5,500 J	130	< 12	79 J	<12	310	< 12	<12	330	< 25	240	<12 J	<12 J	110
	03/07/00	< 2	1,100	970	4,310	220	< 2	22	<2	310	< 2	17	1,100	< 5	300	17	14	450
	06/21/00	< 6	1,300	860	3,700	260	< 7	32	<5	290	< 6	9J	380	50 J	390	10 J	10 J	290
dup	06/21/00	< 3	1,300	860	3,420	170	< 4	58	< 3	210	< 3	7 J	340	20 J	310	10 J	10 J	290
	09/12/00	3	980	1,100	3,730	91	< 1	110	2	190	< 1	5	170	< 5	180	8	4.0	61
	12/07/00	< 6	630	830	3,290	130	< 7	42 J	9 J	310	< 6	20 J	390	< 10	270	10 J	10 J	100
dup	12/07/00	< 6	480	890	3,330	120	< 7	76 J	8 J	260	< 6	10 J	300	< 10	250	9 J	10 J	79
	03/15/01	<2	290	690	2,890	190	< 2	13	31	350 J	< 2	27	500	12	480 J	23	14 J	110 J
dup	03/15/01	<2	320	740	2,830	230	< 2	13	43	450	< 2	35	620	13	610	27	20	150
	07/12/01	< 2.7	130	480	1,930	120	< 3.1	12 J	21	370	< 2.9	16	290	9.5 J	610	31	8.8 J	210
	09/25/01	< 5	320	480	1,970	—	< 5	17	18	790	< 5	23	460	10	480	41	16	240
	01/02/02	< 0.53	270	570	2,300	130	< 0.62	27	22	660	< 0.57	30	690	2.2 J	510	22	9.1	300
	03/28/02	0.75 J	240	690	2,620	160	< 0.62	18	28	540	< 0.57	25	800	2.8 J	510	25	14	390
	06/11/02	<0.53	170	500	1,570	160	< 0.62	12	10	250	< 0.57	5.5	240	1.0 J	230	7.8	6.4	270
	09/18/02	2.0 J	58	880	2,840	70	< 0.62	81	1.7 J	130	< 0.57	2.3 J	100	2.5 J	44	7.2	3.8	35
	12/17/02	< 1.3	80	520	1,030	130	< 1.3	7.8	4.3 B	560	< 1.3	22	340	< 5	600	25	10	100
	03/20/03	< 0.5	69	380	940	110	< 0.5	7.5	3.2	490	< 0.5	16	160	< 2	440	15	7.3	120
	06/11/03	0.35 J	200	330	730	120	< 0.13	4.4	1.3	270	< 0.12	5.4	64	1.0 J	260	6.7	4.2	60
	09/11/03	0.82 JB	1,200	510	1,480	93	< 0.25	19	1.3	610	< 0.23	12	170	2.9 J	290	15	5.0	71
	12/04/03	0.80 J	360	370	1,170	120	< 0.31	38	9.0	1,300	2.0	36	390	8.6	1,200	29	7.6	140
	03/16/04	0.56 J	520	390	1,590	110	< 0.50	14	5.3	410	2.1	11	66	5.4 J	370	13	5.8	50
	09/23/04	0.90 J	850	320	1,440	60	< 0.31	31	1.7	790	1.1 J	15	200	3.7 J	410	16	4.2	60
	04/05/05	0.85 J	1,500	290	900	45	< 0.70	22	50	350	0.85 J	12	120	11	540	23	7.4	26
	09/21/05	0.86	1,100	260	1,100	33	< 0.14	30	3.4	590	0.25 J	6.3	65	2.2	130	8.0	2.1	24
	03/15/06	0.73 J	710	300	1,680	60	< 0.35	44	8.5	580	0.35 J	6.5	55	9.6	240	15	3.9	24
	09/14/06	0.78 J	62	200	1,590	37	< 0.35	71	8.0	830	0.33 J	6.4	49	5.6	160	7.6	3.1	21
	04/04/07	< 0.68	69	400	2,080	47	< 0.70	17	8.9	240	< 0.57	4.9	44	6.6 J	210	9.3	3.6	12
	09/25/07	1.0 J	1,500	290	1,360	34	< 0.70	100	3.3	300	< 0.57	4.4	49	3.5 J	150	8.9	2.7	8.5
	09/25/07	1.0 J	1,500	290	1,360	34	< 0.70	100	3.3	300	< 0.57	4.4	49	3.5 J	150	8.9	2.7	8.5
	05/02/08	0.65	290	180	1,010	29	< 0.04	25	5.3	250	0.11 J	6.3	48	3.5	220	8.7	3.0	12

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-2	04/17/95	< 5	< 5	< 5	< 5	—	< 5	< 10	**9**	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10
	09/04/96	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.8**	< 0.5	< 0.5	**3.2**	2	< 0.5	**0.6**	< 0.5	< 0.5
	12/10/96	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.6**	< 0.5	< 0.5	**4.0**	< 1	< 0.5	**2.5**	**4.3**	< 0.5
	03/04/97	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.8**	< 0.5	< 0.5	**5.4**	< 1	< 0.5	**2.6**	**1.6**	< 0.5
	06/27/97	**2.1**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**1.0**	< 0.5	< 0.5	**7.2**	< 1	< 0.5	**2.1**	**1.9**	< 0.5
	09/04/97	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.8**	< 0.5	< 0.5	**3.1**	< 1	< 0.5	**0.5**	< 0.5	< 0.5
	12/04/97	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.6**	< 0.5	< 0.5	**1.8**	< 1	< 0.5	< 0.5	**0.8**	< 0.5
	03/06/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.8**	< 0.5	< 0.5	**5.9**	< 1	< 0.5	**2.8**	**2.5**	< 0.5
	06/18/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.9**	< 0.5	< 0.5	**3.8**	< 1	< 0.5	**2**	**1.8**	< 0.5
	09/29/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**1.1**	< 0.5	< 0.5	**2.9**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	12/15/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**1.0**	< 0.5	< 0.5	**5.7**	< 1	< 0.5	**1.7**	**0.7**	< 0.5
	03/02/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.9**	< 0.5	< 0.5	**8.5**	< 1	< 0.5	**1.5**	**2.2**	< 0.5
	06/16/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.6**	< 0.5	< 0.5	**3.3**	< 5	< 0.5	**1.5**	**3.4**	< 0.5
dup	06/16/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.7**	< 0.5	< 0.5	**3.4**	< 5	< 0.5	**1.4**	**2.8**	< 0.5
	09/16/99	< 0.2	< 0.2	< 0.2	< 0.4	< 0.2	< 0.2	< 0.2	< 0.2	**0.9**	< 0.2	< 0.2	**2.5**	< 0.3	< 0.3	< 0.3	**0.3 EB**	< 0.3
	12/08/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.2	< 0.5	**0.9**	< 0.5	< 0.5	**4.4**	< 1	< 0.5	**1.1**	< 0.5	< 0.5
	03/07/00	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.2	< 0.5	**0.8**	< 0.5	< 0.5	**3.6**	< 1	< 0.5	**1.2**	**3.7**	< 0.5
	06/21/00	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	**0.67**	< 0.2	< 0.2	**3.3**	< 0.20	< 0.2	**2.4**	**3.2**	< 0.3
	09/12/00	< 1	< 1	< 1	< 3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	<5	< 1	< 1	< 1	< 1
	12/07/00	< 0.2	**0.1 J**	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	**1.1**	< 0.2	< 0.2	**1.5**	< 0.20	< 0.2	< 0.2	< 0.2	**0.4 J**
	03/15/01	< 0.2	**0.2 J**	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	**1.2 J**	< 0.2	< 0.2	**1.3**	0.2 J	< 0.2	**0.5 J**	**1 J**	**0.68**
	07/12/01	< 0.11	**0.13 J**	< 0.098	< 0.19	< 0.15	< 0.13	< 0.18	< 0.096	**1.0**	< 0.12	< 0.12	**2.0**	< 0.20	< 0.12	**0.14 J**	< 0.11	**0.44 J**
	09/25/01	< 0.5	**0.57**	**0.67**	**2.12**	—	< 0.5	< 0.5	< 0.5	**2.1**	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	**0.75**
	01/03/02	< 0.11	**0.35 JB**	< 0.098	< 0.19	< 0.15	< 0.13	< 0.23	< 0.096	**1.1**	< 0.12	< 0.12	**1.7**	< 0.20	< 0.12	**0.57**	**1.5**	**1.0**
	03/28/02	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**1.0**	< 0.12	< 0.12	**1.8**	< 0.20	< 0.12	**1.0**	**1.7**	**0.79**
	06/14/02	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**0.71**	< 0.12	< 0.12	**2.5**	< 0.20	< 0.12	**1.1**	**1.5**	**0.59**
	09/18/02	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**1.2**	< 0.12	< 0.12	**1.3**	< 0.20	< 0.12	< 0.12	< 0.11	**0.79**
	12/16/02	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**1.2**	< 0.5	< 0.5	**1.1**	< 2	< 0.5	< 0.5	< 0.5	**1.4**
	03/20/03	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**0.86**	< 0.5	< 0.5	**1.0**	< 2	< 0.5	< 0.5	**0.57**	**1.0**
	06/11/03	< 0.11	**0.81 B**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**0.88**	< 0.12	< 0.12	**1.1**	< 0.20	< 0.12	**0.22 J**	< 0.11	**1.2**
	09/10/03	< 0.11	**0.32 B**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**1.30**	< 0.12	< 0.12	**0.75**	< 0.20	< 0.12	< 0.12	< 0.11	**0.69**
	12/05/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**1.00**	< 0.12	< 0.12	**1.5**	< 0.20	< 0.12	**0.13 J**	< 0.11	**0.89**
	03/16/04	< 0.11	**0.13 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**0.70**	< 0.12	< 0.12	**1.3**	< 0.20	< 0.12	**0.59**	**2.2**	**0.75**
	09/24/04	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**0.79**	< 0.12	< 0.12	**0.61**	< 0.20	< 0.12	**0.16 J**	< 0.11	**0.80**
	04/05/05	< 0.14	**0.20 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.80**	< 0.12	< 0.13	**0.82**	< 0.20	< 0.12	**0.32 J**	**0.98**	**0.71**
	09/21/05	< 0.14	**0.20 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.79**	< 0.12	< 0.13	**0.57**	< 0.20	< 0.12	**0.24 J**	< 0.13	**0.77**
	03/15/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.27 J**	< 0.12	< 0.13	**0.93**	< 0.20	< 0.12	**0.97**	**4.4**	**0.37 J**
	09/13/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.98**	< 0.12	< 0.13	**1.2**	< 0.20	< 0.12	< 0.14	< 0.13	**0.60**
	04/04/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.20 J**	< 0.12	< 0.13	**1.1**	< 0.20	< 0.12	**0.77**	**3.9**	**0.22 J**
	09/26/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.86**	< 0.12	< 0.13	**0.80**	< 0.20	< 0.12	< 0.14	< 0.13	**0.37 J**
	05/02/08	**0.06 J**	**0.16 J**	< 0.04	**0.16 J**	< 0.04	< 0.04	< 0.13	< 0.04	**0.65**	< 0.07	< 0.10	**0.55**	< 0.23	< 0.05	**0.18 J**	**0.36 J**	**0.5**

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-3	04/17/95	< 5	< 5	< 5	< 5	—	< 5	**30**	< 5	**230**	< 5	< 5	**42**	< 5	< 5	< 5	< 5	< 10
	09/04/96	< 5	**5**	< 5	< 5	< 20	< 5	**9**	< 5	**330**	< 5	< 5	**56**	< 10	< 5	**5**	< 5	< 5
dup	09/04/96	< 5	< 5	< 5	< 5	< 20	< 5	**13**	< 5	**460**	< 5	< 5	**7.2**	< 10	< 5	< 5	< 5	< 5
	12/11/96	**0.5**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**4.0**	< 0.5	**120**	< 0.5	< 0.5	**9.7**	**2 B**	< 0.5	< 0.5	< 0.5	**0.7**
	03/04/97	**0.5**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**4.5**	< 0.5	**73**	< 0.5	< 0.5	**5.8**	< 1	< 0.5	< 0.5	< 0.5	**0.8**
	06/27/97	**0.5**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**18**	< 0.5	**140 J**	< 0.5	< 0.5	**17**	< 1	< 0.5	< 0.5	< 0.5	**2.0**
	09/04/97	**0.6**	< 0.5	**0.6**	**1.7**	< 2	< 0.5	**1**	< 0.5	**190**	< 0.5	< 0.5	**25**	< 1	< 0.5	< 0.5	< 0.5	**2.5**
	12/04/97	**0.5**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**2**	< 0.5	**48**	< 0.5	< 0.5	**2.1**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	03/06/98	**0.6**	**0.6**	< 0.5	< 0.5	< 2	< 0.5	**4**	< 0.5	**100**	< 0.5	< 0.5	**8.6**	< 1	< 0.5	< 0.5	< 0.5	**0.9**
	06/18/98	**0.7 B**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**3**	< 0.5	**38**	< 0.5	< 0.5	**1.8**	< 1	< 0.5	< 0.5	< 0.5	**0.6**
	09/29/98	**0.5**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**0.7**	< 0.5	**160**	< 0.5	< 0.5	**14**	< 1	< 0.5	< 0.5	< 0.5	**1.1**
dup	09/29/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**1.6**	< 0.5	**200**	< 0.5	< 0.5	**18**	< 1	< 0.5	< 0.5	< 0.5	**1.5**
	12/14/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**5.8**	< 0.5	**37**	< 0.5	< 0.5	**1.5**	< 1	< 0.5	< 0.5	< 0.5	**1.5**
	03/03/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**11**	< 0.5	**47**	< 0.5	< 0.5	**4.1**	< 1	< 0.5	< 0.5	< 0.5	**1.0**
	06/17/99	< 1	< 1	< 1	< 1	< 4	< 1	< 1	< 1	**66**	< 1	< 1	**3.0**	< 10	< 1	< 1	< 1	< 1
	09/17/99	**0.4 E**	< 0.2	< 0.2	< 0.4	< 0.2	< 0.2	**0.8**	< 0.2	**97 J**	< 0.2	< 0.2	**6.5**	< 0.3	< 0.3	< 0.3	< 0.2	**0.6**
	12/08/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**7.9**	< 0.5	**26**	< 0.5	< 0.5	**1.1**	< 1	< 0.5	< 0.5	0.6	**0.5**
	03/07/00	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**17**	< 0.5	**33**	< 0.5	< 0.5	**1.7**	< 1	< 0.5	< 0.5	< 0.5	**0.6**
	06/21/00	**0.5 J**	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	**24**	< 0.2	< 0.2	**1.3**	< 0.20	< 0.2	< 0.2	< 0.2	**0.4 J**
	09/12/00	< 1	< 1	< 1	< 2	< 1	< 1	**2**	< 1	**54**	< 1	< 1	**3.0**	< 5	< 1	< 1	< 1	< 1
dup	09/12/00	< 1	< 1	< 1	< 3	< 1	< 1	**2**	< 1	**61**	< 1	< 1	**3.0**	< 5	< 1	< 1	< 1	< 1
	12/07/00	**0.4 J**	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	**26**	< 0.2	< 0.2	**1.7**	< 0.20	< 0.2	< 0.2	< 0.2	**0.3 J**
	03/15/01	**0.4 J**	**0.1J**	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	**46 J**	< 0.2	< 0.2	**2.3**	**0.2 J**	< 0.2	< 0.2	< 0.2	**0.6**
	07/12/01	**0.43 J**	**0.31 J**	< 0.098	< 0.19	< 0.15	< 0.13	< 0.18	< 0.096	**27**	< 0.12	< 0.12	**1.9**	< 0.20	< 0.12	< 0.12	< 0.11	**0.31 J**
	09/24/01	**0.51**	**< 0.5**	< 0.5	0.59	—	< 0.5	< 0.5	< 0.5	**37**	< 0.5	< 0.5	**3.0**	< 1	< 0.5	< 0.5	< 0.5	**< 0.5**
	01/03/02	< 0.11	**0.46 JB**	< 0.098	< 0.19	< 0.15	< 0.13	**0.47 J**	< 0.096	**16**	< 0.12	< 0.12	**1.0**	< 0.20	< 0.12	< 0.12	< 0.11	**0.25 J**
	03/28/02	**0.41 J**	**0.16 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**22**	< 0.12	< 0.12	**1.4**	< 0.20	< 0.12	< 0.12	< 0.11	**0.26 J**
	06/14/02	**0.35 J**	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**19**	< 0.12	< 0.12	**1.3**	< 0.20	< 0.12	< 0.12	< 0.11	**0.25 J**
	09/17/02	**0.43 J**	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**27**	< 0.12	< 0.12	**2.1**	< 0.20	< 0.12	< 0.12	< 0.11	**0.32 J**
	12/17/02	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	**18**	< 0.5	**38**	< 0.5	< 0.5	**0.93**	< 2	< 0.5	< 0.5	< 0.5	**0.58**
	03/20/03	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**12**	< 0.5	< 0.5	**0.83**	< 2	< 0.5	< 0.5	< 0.5	< 0.5
	06/11/03	**0.41 J**	**0.47 JB**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**9.5**	< 0.12	< 0.12	**0.94**	< 0.20	< 0.12	< 0.12	< 0.11	**0.25 J**
	09/11/03	**0.41 JB**	**0.32 JB**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**9.9**	< 0.12	< 0.12	**0.94**	< 0.20	< 0.12	< 0.12	< 0.11	**0.27 J**
	12/04/03	**0.35 J**	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	**19**	< 0.096	**19**	< 0.12	< 0.12	**0.99**	**0.27 J**	< 0.12	< 0.12	< 0.11	**0.46 J**
	03/15/04	**0.48 J**	**0.17 J**	**0.29 J**	**2.4**	< 0.15	< 0.13	< 0.23	< 0.096	**16**	< 0.12	< 0.12	**1.5**	< 0.20	< 0.12	< 0.12	< 0.11	**0.36 J**
	09/24/04	**0.43 J**	**0.15 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**9.9**	< 0.12	< 0.12	**1.5**	< 0.20	< 0.12	< 0.12	< 0.11	**0.31 J**
	04/05/05	**0.33 J**	**0.82**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**9.1**	< 0.12	< 0.13	**0.86**	< 0.20	< 0.12	< 0.14	< 0.13	**0.29 J**
	09/21/05	**0.44 J**	**0.34 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**10**	< 0.12	< 0.13	**1.6**	< 0.20	< 0.12	< 0.14	< 0.13	**0.27 J**
	03/14/06	**0.36 J**	**0.15 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**12**	< 0.12	< 0.13	**1.2**	< 0.20	< 0.12	< 0.14	< 0.13	**0.31 J**
	09/12/06	**0.39 J**	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**27**	< 0.12	< 0.13	**2.7**	< 0.20	< 0.12	< 0.14	< 0.13	**0.42 J**
	04/03/07	**0.31 J**	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**7.7**	< 0.12	< 0.13	**1.0**	< 0.20	< 0.12	< 0.14	< 0.13	**0.23 J**
	09/25/07	**0.37 J**	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**18**	< 0.12	< 0.13	**2.1**	< 0.20	< 0.12	< 0.14	< 0.13	**0.28 J**
	05/01/08	**0.34 J**	**0.34 J**	< 0.04	**0.12 J**	< 0.04	< 0.04	< 0.13	< 0.04	**4.6**	< 0.07	< 0.10	**0.8**	< 0.23	<0.05	< 0.06	<0.08	**0.25 J**

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-4	09/04/96	< 50	2,000	200	1,500	< 200	< 50	830	< 50	76	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50
	12/10/96	38	310	430	340	110 E	< 0.5	950	< 0.5	33	2.6	< 0.5	2.1	7 B	< 0.5	< 0.5	< 0.5	6.1
	03/04/97	29	160	580	210	170	< 0.5	1,100	< 0.5	140	1.9	< 0.5	12	7	4.8	1.0	< 0.5	15
	06/27/97	31	62	900	53	230	< 0.5	2,000	< 0.5	160	1.2	< 0.5	2.8	9.6	2.6	2.0	< 0.5	6.3
	09/04/97	23	120	570	42	< 2	< 0.5	820	< 0.5	52	1.4	< 0.5	2.5	7	< 0.5	0.8	< 0.5	6.9
dup	09/04/97	22	300	1,300	110	510	< 0.5	2,100	< 0.5	47	1.5	< 0.5	< 0.5	7.1	< 0.5	0.7	< 0.5	6.5
	12/04/97	23 J	320 J	860 J	250 J	180 J	< 0.5 J	960 J	< 0.5 J	22 J	1.3 J	< 0.5 J	1.2 J	7 J	< 0.5 J	1 J	< 0.5 J	3.4 J
	03/06/98	29	48	970	140	220	< 1	1,400	< 1	84	< 1	< 1	4	10	11	1.0	< 1	8
	06/18/98	140	390	1,200	1,800	260	< 12	1,700	< 12	410	< 12	< 12	< 12	45	< 12	< 12	< 12	< 12
	09/29/98	23 J	1,600 J	780 J	1,300 J	240 J	< 2	1000 J	< 2	33 J	< 2	< 2	< 2	8 J	< 2	< 2	< 2	< 2
	12/14/98	37	1,100	840	1,900	250	< 2	1,000	< 2	26	< 2	< 2	< 2	7	< 2	< 2	< 2	< 2
	03/03/99	18	8 B	790	13 B	110	< 2	1,300	4	72	< 2	< 2	6	9	< 2	< 2	< 2	8
	06/17/99	< 25	110	1,200	142	240	< 25	1,200	< 25	210	< 25	< 25	< 25	< 250	< 25	< 25	< 25	< 25
	09/17/99	18	540	850 J	1,230	220	< 0.2	820 J	< 0.2	36	< 0.2	< 0.2	1.4 E	9	< 0.3	< 0.3	< 0.2	< 0.3
	12/08/99	24	380 J	980 J	1,570 J	270	< 5	1,000 J	< 5	19	< 5	< 5	< 5	< 10	<5	<5 J	<5 J	<5
dup	12/08/99	23	360 J	970 J	1,560 J	260	< 5	1,100 J	< 5	20	< 5	< 5	< 5	< 10	<5	<5 J	<5 J	<5
	03/07/00	17	8	1,200	389	240	< 2	1,200	< 2	29	< 2	< 2	< 2	9	< 2	< 2	< 2	< 2
dup	03/07/00	17	8	1,200	389	240	< 2	1,200	< 2	28	< 2	< 2	< 2	9	< 2	< 2	< 2	< 2
	06/21/00	17	58	1,100	1,040	230	< 3	980	< 2	43	< 3	< 3	< 3	20	< 3	< 3	< 3	< 5
	09/12/00	10	25	610	820	140	< 1	840	< 1	14	< 1	< 1	< 1	6	< 1	< 1	< 1	1
	12/07/00	10 J	32	850	2,540	230	< 7	750 J	< 5	10 J	< 6	< 6	< 6	10 J	< 6	< 6	< 6	< 20
	03/15/01	19	37	820	850	210	< 0.7	770	< 0.5	23 J	2 J	< 0.6	0.7 J	11	< 0.6	< 0.6	< 0.6	< 2
	07/12/01	14	5 J	960	370	93	< 3.1	710	< 2.4	43	< 2.9	< 3	< 3	16 J	< 2.8	< 3	< 2.8	< 5.3
	09/25/01	6.5	2.1	230	38	27	< 0.5	340	< 0.5	27	0.71	< 0.5	0.74	5.9	< 0.5	< 0.5	< 0.5	3.6
	01/02/02	10	5.5	450	164	55	< 0.62	570	< 0.48	25	< 0.57	< 0.60	1.4 J	7.5 J	< 0.56	1.2 J	< 0.55	1.6 J
	03/28/02	12	18	700	184	65	< 0.62	810	< 0.48	87	< 0.57	< 0.60	2.6	13	< 0.57	2.3 J	< 0.55	6.2
	06/11/02	12	6.7	630	64	36	< 0.62	760	< 0.48	58	< 0.57	< 0.60	< 0.58	9.2 J	< 0.57	1.7 J	1.6 J	< 1.1
	09/18/02	11	11	690	1,640	160	< 0.31	570	< 0.24	20	< 0.29	< 0.30	1.1 J	7.6	< 0.29	0.70 J	< 0.28	1.9
	12/17/02	14	10	620	1,290	150	< 1	500	< 1	18	< 1	< 1	1	6.2	< 1	< 1	< 1	3.1
	03/20/03	16	2.3	740	325	140	< 1	530	< 1	13	< 1	< 1	< 1	5.3	< 1	< 1	< 1	1.3
	06/11/03	13	1.8 B	750	114	120	< 0.31	530	< 0.24	24	0.58 J	< 0.30	1.0 J	7.2	< 0.29	0.68 J	< 0.28	1.5
	09/11/03	13	9.3	780	1,990	200	< 0.25	460	< 0.20	18	< 0.23	< 0.24	1.1	6.8	< 0.23	0.34 J	< 0.22	2.3
	12/04/03	27	11	800	1,787	180	< 0.25	370	< 0.20	11	< 0.23	< 0.24	0.56 J	4.2	< 0.23	0.32 J	< 0.22	0.70 J
	03/15/04	24	5.6	730	702	160	< 0.13	420	< 0.096	15	< 0.12	< 0.12	0.67	6.2	< 0.12	0.48 J	< 0.11	0.59
	09/24/04	13	0.8	350	11.3	19	< 0.13	270	< 0.096	12	0.75	< 0.12	0.56	2.6	< 0.12	0.31 J	< 0.11	0.78
	04/04/05	21	3.6	730	690	170	< 0.28	400	< 0.28	10	0.86 J	< 0.25	0.42 J	3.9	< 0.24	0.34 J	0.46 J	0.66 J
	09/21/05	17	2.9	270	328	120	< 0.14	230	< 0.14	15	0.63	< 0.13	0.79	3.1	< 0.12	0.29 J	< 0.13	0.58
	03/15/06	20	2.1	81	376	140	< 0.14	300	< 0.14	12	0.66	< 0.13	0.46 J	3.7	< 0.12	0.19 J	< 0.13	0.86
	09/14/06	12	1.4	61	343	120	< 0.14	190	< 0.14	10	0.59	< 0.13	0.51	2.2	< 0.12	0.17 J	< 0.13	1.6
	04/04/07	17	0.78	22	151	140	< 0.14	110	< 0.14	7.2	0.49 J	< 0.13	0.25 J	1.3 J	< 0.12	0.15 J	< 0.13	0.090 J
	09/26/07	14	2.2	62	38.5	120	< 0.14	85	< 0.14	9.0	< 0.85	< 0.13	0.31 J	0.62 J	< 0.12	0.18 J	< 0.13	0.54
	05/02/08	13	1.1	18	6.9	100	< 0.04	96	< 0.04	4.5	< 0.76	< 0.10	0.13 J	0.61 J	< 0.05	< 0.16	< 0.08	0.10 J

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-5	09/04/96	< 25	< 25	< 25	< 25	< 100	< 25	< 25	< 25	< 25	< 25	< 25	**34**	< 50	< 25	**180**	**2,600**	< 25
	12/10/96	< 0.5	**1.3 B**	**1.0**	**1.6 B**	< 2	< 0.5	< 0.5	**0.9**	**0.7**	< 0.5	< 0.5	**28**	< 1	**3.4**	**130**	**3,400**	< 0.5
dup	12/10/96	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	**0.9**	**0.8**	< 0.5	**0.6**	**34**	< 1	**3.4**	**130**	**3,300**	< 0.5
	03/04/97	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	**0.7**	< 0.5	< 0.5	< 0.5	**21**	< 1	**3.1**	**100**	**3,100**	< 0.5
	06/27/97	< 5 J	< 5 J	< 5 J	< 5 J	< 20 J	< 5 J	< 5 J	< 5 J	< 5 J	< 5 J	< 5 J	**32**	< 10 J	< 5 J	**140 J**	**4,700 J**	< 5 J
	09/04/97	< 0.5	< 0.5	**0.9**	**0.9**	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**30**	< 1	**3.2**	**150**	**4,800**	< 0.5
	12/04/97	< 0.5	< 0.5	< 1.0	< 0.5	< 2	< 0.5	< 0.5	**0.6**	< 0.5	< 0.5	< 0.5	**18**	< 1	**3**	**120**	**4,400**	< 0.5
	03/06/98	< 5	< 5	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	**30**	< 10	< 5	**140**	**4,000**	< 5
	06/18/98	< 12	< 12	< 12	< 12	< 50	< 12	< 12	< 12	< 12	< 12	< 12	**28**	< 25	< 12	**130**	**4,100**	< 12
	09/29/98	< 10	< 10	< 10	< 10	< 40	< 10	< 10	<10	<10	<10	<10	**25**	< 20	< 10	**130**	**3,800**	< 10
	12/15/98	< 5	< 5	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	**34**	< 10	< 5	**120**	**3,300**	7
	03/02/99	< 12	< 12	< 12	< 24	< 50	< 12	< 12	< 12	< 12	< 12	< 12	**14**	< 25	< 12	**96**	**4,400**	< 12
	06/16/99	< 10	< 10	< 10	< 10	< 40	< 10	< 10	<10	<10	<10	<10	**12**	< 100	< 10	**110**	**3,400**	< 10
	09/16/99	< 0.2	< 0.2	< 0.2	< 0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.3	< 0.3	< 0.3	**120**	**3,000**	< 0.3
dup	09/16/99	< 0.2	< 0.2	< 0.2	< 0.4	< 0.2	< 0.2	< 0.2	**0.4 E**	< 0.2	**0.3 E**	**0.3 E**	**15**	< 0.3	**1.6**	**94**	**2,500**	< 0.3
	12/08/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5 J	< 0.5	< 0.5	< 0.5	< 0.5	**23**	<1	**1.2**	**120 J**	**2,600 J**	< 0.5
	03/07/00	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**17**	<1	**1.3**	**94**	**2,700**	< 0.5
	06/21/00	< 6	< 5	< 5	< 14	< 8	< 7	< 9	< 5	< 5	< 6	< 6	**6J**	**30 J**	< 6	**92**	**2,900**	< 20
	09/12/00	< 1	< 1	< 1	< 3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	**11**	< 5	**1**	**99**	**2,500**	< 1
	12/07/00	< 6	< 5	< 5	< 14	< 8	< 7	< 9	< 5	< 5	< 6	< 6	**10 J**	<10	< 6	**88**	**2,600**	< 20
	03/15/01	< 2	< 1	**3 J**	**2 J**	< 2	< 2	< 2	< 1	< 1	< 2	< 2	**8.2**	**5 J**	< 2	**87**	**2,300 J**	< 3
	07/12/01	< 1.1	< 0.98	< 0.98	< 1.9	< 1.5	< 1.3	< 1.8	< 0.96	< 0.91	< 1.2	< 1.2	**5.4**	< 2	< 1.2	**84**	**2,800**	< 2.2
	08/27/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**7.4**	< 10	< 5	**68**	**1,800**	< 5
	09/24/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 5	**74**	**1,800**	< 5
	10/22/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**7.1**	< 10	< 5	**76**	**1,600**	< 5
	11/19/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**12**	< 10	< 5	**75**	**2,000**	< 5
	01/02/02	< 0.53	< 0.49	< 0.49	< 0.93	< 0.71	< 0.62	< 1.2	< 0.48	**0.80 J**	< 0.57	< 0.60	**7.4**	< 0.97	**0.90 J**	**69**	**1,600**	< 1.1
	03/27/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	< 1.2	**2.9 J**	< 2.0	< 1.2	**70**	**2,500**	< 2.2
	06/11/02	< 0.53	< 0.49	< 0.65	< 1.5	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	< 0.60	**2.2 J**	< 0.97	**0.75 J**	**63**	**2,100**	< 1.1
	09/18/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	0.76	< 2.3	< 0.96	< 0.91	< 1.2	< 1.2	**3.7 J**	**4.0 J**	< 1.2	**76**	**2,600**	< 2.2
	12/16/02	< 5	< 5	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	**7.2**	< 20	< 5	**82**	**2,200**	< 5
	03/17/03	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	< 0.60	**7.6**	**1.1 J**	**0.6 J**	**57**	**1,500**	< 1.1
	06/10/03	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	< 1.2	**1.4 J**	< 2.0	< 1.2	**57**	**2,200**	< 2.2
	09/11/03	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	< 0.60	**1.5 J**	< 0.97	< 0.57	**86**	**2,400**	< 1.1
	12/05/03	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	< 0.60	**5**	< 0.97	< 0.57	**76**	**1,600**	< 1.1
	03/16/04	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	< 0.60	**0.80 J**	< 0.97	**0.70 J**	**47**	**1,700**	< 1.1
	09/22/04	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	< 0.60	**1.2 J**	< 0.97	**0.85 J**	**57**	**2,200**	< 1.1
	04/04/05	< 0.34	**0.28 J**	< 0.33	< 0.55	< 0.36	< 0.35	< 0.57	< 0.34	< 0.26	< 0.29	< 0.31	**1.5**	< 0.49	**0.43 J**	**45**	**1,300**	< 0.53
	09/20/05	< 0.14	**0.32 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	**2.0**	< 0.20	**0.53**	**48**	**1,300**	< 0.042
	03/14/06	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	< 0.61	**3.1**	< 0.97	< 0.58	**47**	**1,300**	< 0.21
	09/13/06	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	< 0.61	**3.6**	< 0.97	< 0.58	**59**	**1,600**	< 0.21
	04/05/07	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	< 0.61	**4.5**	**1.2 J**	< 0.58	**43**	**1,200**	< 0.21
	09/26/07	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	< 0.61	**6.7**	< 0.97	< 0.58	**49**	**1,300**	< 0.21
	05/01/08	< 0.12	**0.13 JD**	< 0.11	< 0.29	< 0.09	< 0.11	< 0.33	< 0.11	< 0.11	< 0.20	**0.28 JD**	**6.1**	< 0.58	**0.28 JD**	**37**	**990**	< 0.18

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-6	09/04/96	**1.7**	**31**	< 0.5	< 0.5	< 2	< 0.5	**460**	< 0.5	**12**	**3.2**	< 0.5	**0.6**	**2 B**	< 0.5	< 0.5	< 0.5	< 0.5
	12/10/96	**1.2**	**26**	< 0.5	< 0.5	< 2	< 0.5	**240**	< 0.5	**13**	**2.1**	< 0.5	**0.7**	**1 B**	< 0.5	< 0.5	< 0.5	< 0.5
	03/04/97	**0.7**	**5.0**	< 0.5	< 0.5	< 2	< 0.5	**190 J**	< 0.5	**12**	**1.4**	< 0.5	**0.5**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	06/27/97	**1.2**	**7.3**	< 0.5	< 0.5	< 2	< 0.5	**370**	< 0.5	**13**	**2.2**	< 0.5	**0.9**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	09/04/97	**1.6**	**13.0**	< 0.5	**0.5**	< 2	< 0.5	**320**	< 0.5	**9.5**	**2.4**	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**2.7**	< 0.5
	12/04/97	**0.7**	**4.9**	< 0.5	< 0.5	< 2	< 0.5	**180**	< 0.5	**9.1**	**1.4**	< 0.5	**0.6**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	03/06/98	**1.1 B**	**9.4 B**	< 0.5	< 0.5	< 2	< 0.5	**150**	< 0.5	**11**	**1.8**	< 0.5	**0.6**	**2.5**	< 0.5	< 0.5	< 0.5	< 0.5
	06/18/98	**1.7 B**	**11 B**	< 0.5	< 0.5	< 2	< 0.5	**190**	< 0.5	**12**	**2.6**	< 0.5	**0.8**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	09/29/98	**1.5**	**8.9**	< 0.5	< 0.5	< 2	< 0.5	**190 E**	< 0.5	**10**	**2.1**	< 0.5	**0.7**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	12/15/98	< 0.5	**3.7 B**	< 0.5	< 0.5	< 2	< 0.5	**110**	< 0.5	**9.9**	**0.9**	< 0.5	**0.6**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	03/02/99	< 0.5	**3.2 B**	< 0.5	< 0.5	< 2	< 0.5	**180**	< 0.5	**10**	**0.9**	< 0.5	**0.6**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
dup	03/02/99	< 0.5	**3.1 B**	< 0.5	< 0.5	< 2	< 0.5	**170**	< 0.5	**9.5**	**0.8**	< 0.5	**0.6**	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	06/16/99	**0.5 B**	**2.3 B**	< 0.5	< 0.5	< 2	**0.9**	**100**	< 0.5	**7.4**	< 0.5	< 0.5	**0.5**	< 5	< 0.5	< 0.5	< 0.5	< 0.5
	09/16/99	**0.5 E**	**2.3 E**	< 0.2	< 0.4	< 0.2	< 0.2	**81**	< 0.2	**7.5**	**0.8**	< 0.2	**0.5**	< 0.3	< 0.3	< 0.3	< 0.2 J	< 0.3
	12/08/99	< 0.5	**1.5**	< 0.5	< 0.5	< 2	< 0.5	**73 J**	< 0.5	**7.2**	**0.7**	< 0.5	**0.6**	<1	< 0.5	< 0.5 J	< 0.5 J	< 0.5
	03/07/00	< 0.5	**1.8**	< 0.5	< 0.5	< 2	< 0.5	**72**	< 0.5	**6.9**	**0.8**	< 0.5	**0.5**	<1	< 0.5	< 0.5	< 0.5	< 0.5
	06/21/00	< 0.2	**0.7**	**0.78**	**0.7 J**	< 0.2	< 0.2	**29**	< 0.1	**6.6**	**0.4 J**	< 0.2	**0.3 J**	< 0.20	< 0.2	**0.3 J**	**2.6**	< 0.3
	09/12/00	< 1	< 1	< 1	< 3	< 1	< 1	**53**	< 1	**5**	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1
	12/07/00	**0.4 J**	**1.6 B**	< 0.1	< 0.2	< 0.2	< 0.2	**52 J**	< 0.1	**5.8**	**0.5 J**	< 0.2	**0.51**	< 0.20	< 0.2	< 0.2	< 0.2	< 0.3
	03/15/01	**0.3 J**	**1.6**	< 0.1	< 0.2	< 0.2	< 0.2	**54 D**	< 0.1	**6 J**	**0.64**	< 0.2	**0.4 J**	**0.4 J**	< 0.2	< 0.2	< 0.2	< 0.3
	07/12/01	**0.25 J**	**0.83**	< 0.098	< 0.19	< 0.15	< 0.13	**29**	< 0.096	**4.8**	**0.40 J**	< 0.12	**0.27 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/25/01	< 0.5	**1.2**	< 0.5	< 0.5	< 2	< 0.5	**47**	< 0.5	**5.9**	**0.53**	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	01/03/02	<0.11	**1.4 B**	< 0.098	< 0.19	< 0.15	< 0.13	**44**	< 0.096	**5.3**	**0.62**	< 0.12	**0.33 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	03/27/02	**0.43 J**	**1.2**	< 0.13	< 0.22	< 0.15	< 0.13	**63**	< 0.096	**5.1**	**0.78**	< 0.12	**0.38 J**	**0.29 J**	< 0.12	< 0.12	< 0.11	< 0.22
	06/14/02	<0.11	**0.37 J**	< 0.13	< 0.22	< 0.15	< 0.13	**11**	< 0.096	**3.4**	**0.15 J**	< 0.12	**0.22 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/18/02	**0.50**	**1.2**	< 0.13	< 0.22	< 0.15	< 0.13	**36**	< 0.096	**4.9**	**0.52**	< 0.12	**0.40 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	12/16/02	**0.58**	**1.2**	< 0.5	< 0.5	< 2	< 0.5	**51**	< 0.5	**4.6**	**0.76**	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5
	03/20/03	< 0.5	**0.6**	< 0.5	< 0.5	< 2	< 0.5	**31**	< 0.5	**3.4**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5
	06/11/03	< 0.11	**0.8 B**	< 0.13	< 0.22	< 0.15	< 0.13	**0.72**	< 0.096	**2.7**	< 0.12	< 0.12	**0.13 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/10/03	**0.20 JB**	**0.59 B**	< 0.13	< 0.22	< 0.15	< 0.13	**4.9**	< 0.096	**3.4**	< 0.12	< 0.12	**0.20 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	12/04/03	**0.23 J**	**0.45 J**	< 0.13	< 0.22	< 0.15	< 0.13	**13**	< 0.096	**3.2**	**0.34 J**	< 0.12	**0.26 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	03/16/04	< 0.11	**0.16 J**	< 0.13	< 0.22	< 0.15	< 0.13	**2.2**	< 0.096	**1.5**	< 0.12	< 0.12	**0.13 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/23/04	**0.31 J**	**0.73**	< 0.13	< 0.22	< 0.15	< 0.13	**19**	< 0.096	**3.6**	**0.57**	< 0.12	**0.34 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	04/05/05	< 0.14	**0.40 J**	< 0.13	< 0.22	< 0.15	< 0.14	**0.72**	< 0.14	**1.3**	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.22
	09/21/05	**0.31 J**	**0.54**	< 0.13	< 0.22	< 0.15	< 0.14	**12**	< 0.14	**3.8**	**0.44 J**	< 0.13	**0.31 J**	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	03/14/06	< 0.14	**0.13 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.74**	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
dup	03/14/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.73**	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	09/13/06	**0.27 J**	**0.17 J**	< 0.13	< 0.22	< 0.15	< 0.14	**10**	< 0.14	**3.3**	**0.46 J**	< 0.13	**0.31 J**	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	04/05/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.39 J**	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	**0.15 J**	< 0.13	< 0.042
	09/26/07	**0.21 J**	**0.14 J**	< 0.13	< 0.22	< 0.15	< 0.14	**1.3**	< 0.14	**2.4**	**0.25 J**	< 0.13	**0.23 J**	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	05/02/08	**0.05 J**	**0.11 J**	< 0.04	< 0.12	< 0.04	< 0.04	< 0.13	< 0.04	**0.34 J**	< 0.07	< 0.10	**0.10 J**	< 0.23	< 0.05	< 0.06	< 0.08	< 0.07

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-7	12/22/97	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**2.0**	< 0.5	**0.9**	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	03/06/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**1.3**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**2.4**	< 0.5
	06/18/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**1.0**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**4.5**	< 0.5
dup	06/18/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**1.0**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**4.4**	< 0.5
	09/29/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**1.1**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**1.7**	< 0.5
	12/14/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**0.8**	< 0.5
	03/03/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**2.1**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**3.8**	< 0.5
	06/17/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**0.6**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 5	< 0.5	< 0.5	**4.3**	< 0.5
	09/17/99	< 0.2	**0.2 EB**	**0.2 E**	< 0.4	< 0.2	**0.9**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.3	< 0.3	< 0.3	< 0.3	**2 B**	< 0.3
	12/08/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**2.3**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**14**	< 0.5
	03/07/00	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**2.0**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**1.4**	< 0.5
	06/21/00	< 0.2	< 0.1	**0.58**	**0.4 J**	< 0.2	**0.3 J**	**0.82**	< 0.1	**0.1 J**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	**9.0**	< 0.3
	09/12/00	< 1	< 1	< 1	< 3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	<5	< 1	< 1	**5**	< 1
	12/07/00	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	**1.7**	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.09	< 0.20	< 0.2	< 0.2	**1**	< 0.3
	03/15/01	< 0.2	**0.1 J**	< 0.1	< 0.2	< 0.2	**0.91**	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.09	< 0.20	< 0.2	< 0.2	**2.1**	< 0.3
	07/12/01	< 0.11	**0.11 J**	< 0.098	< 0.19	< 0.15	**0.28 J**	< 0.18	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**4.9**	< 0.22
	08/27/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**0.72**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**3**	< 0.5
	09/25/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**2.4**	< 0.5
	10/22/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**0.69**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**1.4**	< 0.5
	11/20/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**1.30**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	**1.8**	< 0.5
	01/03/02	< 0.11	**0.20 JB**	< 0.098	< 0.19	< 0.15	**1.2**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**1.4**	< 0.22
	03/28/02	< 0.11	**0.20 J**	< 0.13	< 0.22	< 0.15	**0.58**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	**0.28 J**	< 0.12	< 0.12	**3.5**	< 0.22
	06/14/02	< 0.11	<0.098	< 0.13	< 0.22	< 0.15	**0.31 J**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**4.7**	< 0.22
	09/17/02	< 0.11	<0.098	< 0.13	< 0.22	< 0.15	**0.37 J**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**2.9**	< 0.22
dup	09/17/02	< 0.11	<0.098	< 0.13	< 0.22	< 0.15	**0.36 J**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**2.7**	< 0.22
	12/17/02	< 0.5	< 0.5	< 0.5	< 0.5	< 2	**1.4**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	**1.0**	< 0.5
	03/17/03	< 0.11	<0.098	< 0.13	< 0.22	< 0.15	**1.3**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**1.5**	< 0.22
	06/10/03	< 0.11	**0.5 B**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**8.5**	< 0.22
	09/10/03	< 0.11	**0.33 JB**	< 0.13	< 0.22	< 0.15	**0.17 J**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**4.1**	< 0.22
	12/04/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	**1.7**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**0.86**	< 0.22
	03/16/04	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	**0.20 J**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**5.9**	< 0.22
	09/22/04	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	**0.51**	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	**2.8**	< 0.22
	04/04/05	< 0.14	**0.42 J**	< 0.13	< 0.22	< 0.15	**0.68**	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	**2.1**	< 0.22
	09/20/05	< 0.14	**0.17 J**	< 0.13	< 0.22	< 0.15	**0.28 J**	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	**0.18 J**	**3.4**	< 0.042
	03/14/06	< 0.14	**0.14 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	**6.9**	< 0.042
	09/13/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	**4.2**	< 0.042
	04/03/07	< 0.14	**4.3**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	**0.27 J**	< 0.12	< 0.14	**1.8**	< 0.042
	09/25/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	**3.2**	< 0.042
	05/01/08	<0.05	**0.11 J**	< 0.04	< 0.12	< 0.04	< 0.04	< 0.13	< 0.04	< 0.04	< 0.07	< 0.10	< 0.05	< 0.23	< 0.05	**0.09 J**	**5.4**	< 0.07

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-8	12/22/97	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	**1.4**	< 0.5	< 0.5	**3.3**	**2.9**	< 1	< 0.5	**33**	< 0.5	**0.7**
	03/06/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**1.2**	**1.3**	< 1	< 0.5	**20**	< 0.5	**0.7**
	06/18/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**3**	**2.5**	< 1	< 0.5	**34**	< 0.5	**0.8**
	09/29/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**3.2**	**2.8**	< 1	< 0.5	**35**	< 0.5	**0.6**
	12/14/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**2.9**	**2.6**	< 1	< 0.5	**35**	< 0.5	**0.6**
dup	12/14/98	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**3**	**2.8**	< 1	< 0.5	**35**	< 0.5	**0.6**
	03/02/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**1.9**	**1.9**	< 1	< 0.5	**29**	< 0.5	**0.6**
	06/16/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**1.3**	**1.3**	< 5	< 0.5	**16**	< 0.5	**0.6**
	09/16/99	< 0.2	< 0.2	< 0.2	< 0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	**1.1**	**1.3**	< 0.3	< 0.3	**15**	**0.2 EB**	**0.3 E**
	12/08/99	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**2**	**2.3**	< 1	< 0.5	**25**	< 0.5	< 0.5
	03/07/00	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**1.2**	**1.4**	< 1	< 0.5	**18**	< 0.5	< 0.5
	06/21/00	< 0.2	< 0.1	**0.4 J**	**0.3 J**	< 0.2	< 0.2	**0.5 J**	< 0.1	< 0.1	< 0.2	**1.3**	**1.5**	< 0.20	< 0.2	**16**	**1.2**	< 0.3
	09/12/00	< 1	< 1	< 1	< 3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	**2**	< 5	< 1	**19**	< 1	< 1
	12/07/00	< 0.2	**0.2 J**	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.2	**2**	**2.4**	< 0.20	< 0.2	**23**	< 0.2	**0.3 J**
	03/15/01	< 0.2	**0.2 J**	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.2	**1.4**	**1.4**	< 0.20	< 0.2	**18**	< 0.2	< 0.3
	07/12/01	< 0.11	**0.14 J**	< 0.098	< 0.19	< 0.15	< 0.13	< 0.18	< 0.096	< 0.091	< 0.12	**2.5**	**2.3**	< 0.20	< 0.12	**28**	< 0.11	**0.37 J**
	08/27/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	**0.91**	< 0.5	< 0.5
	09/25/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	**0.59**
	10/22/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	**0.5**
	11/20/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5
	01/03/02	< 0.11	**0.31 JB**	< 0.098	< 0.19	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**2**	**2.3**	< 0.20	< 0.12	**27**	< 0.11	< 0.22
	03/27/02	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**0.72**	**1.0**	< 0.20	< 0.12	**14**	**0.17 J**	< 0.22
	06/14/02	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**0.77**	**1.0**	< 0.20	< 0.12	**11**	**0.13 J**	< 0.22
	09/18/02	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**2.5**	**2.8**	< 0.20	< 0.12	**29**	**0.21 J**	**0.5**
	12/16/02	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**3.1**	**3.0**	< 2	< 0.5	**34**	< 0.5	**0.62**
	03/17/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**2.5**	**2.6**	< 0.20	< 0.12	**29**	**0.12 J**	< 0.22
	06/11/03	< 0.11	**0.66 B**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**1.2**	**1.7**	< 0.20	< 0.12	**16**	**0.51**	< 0.22
	09/10/03	< 0.11	**0.39 JB**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**2.2**	**2.4**	< 0.20	< 0.12	**32**	**0.26 J**	**0.41 J**
dup	09/10/03	< 0.11	**0.22 JB**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**2.3**	**2.5**	< 0.20	< 0.12	**32**	**0.21 J**	**0.45 J**
	12/04/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**2.8**	**3.2**	< 0.20	< 0.12	**36**	< 0.11	**0.6**
	03/16/04	< 0.11	**0.12 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**0.59**	**0.92**	< 0.20	< 0.12	**11**	**0.31 J**	< 0.22
	09/24/04	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	**1.7**	**2.4**	< 0.20	< 0.12	**20**	< 0.11	**0.38 J**
	04/05/05	< 0.14	**0.34 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	**0.99**	**1.6**	< 0.20	< 0.12	**15**	**0.26 J**	< 0.22
	09/20/05	< 0.14	**0.23 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	**1.3**	**2.3**	< 0.20	< 0.12	**19**	**0.43 J**	**0.13 J**
	03/15/06	< 0.14	**0.18 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	**0.60**	**1.1**	< 0.20	< 0.12	**9.8**	**0.26 J**	**0.08 J**
	09/13/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	**1.1**	**2.2**	< 0.20	< 0.12	**14**	**0.39 J**	**0.36 J**
	04/05/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	**0.49 J**	**0.90**	< 0.20	< 0.12	**7.4**	**0.31 J**	**0.050 J**
	09/26/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	**1.1**	**1.9**	< 0.20	< 0.12	**13**	**0.23 J**	**0.25 J**
	05/01/08	< 0.05	**0.09 J**	< 0.04	< 0.12	< 0.04	< 0.04	< 0.13	< 0.04	< 0.04	< 0.07	**0.65**	**0.99**	< 0.23	< 0.05	**6.5**	**0.34 J**	< 0.07

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-9	07/12/01	**3.5**	**1.2**	**0.12 J**	**0.18 J**	< 0.15	< 0.13	**15**	**0.10 J**	**2.3**	< 0.12	< 0.12	**4.1**	< 0.20	< 0.12	**0.28 J**	**0.15 J**	**0.26 J**
dup	07/12/01	**3.4**	**1.0**	< 0.098	**0.13 J**	< 0.15	< 0.13	**14**	**0.15 J**	**2.3**	< 0.12	< 0.12	**3.4**	< 0.20	< 0.12	**0.28 J**	**0.18 J**	**0.23 J**
	08/27/02	**4**	**1.7**	< 0.5	< 0.5	< 2.0	< 0.5	**12**	< 0.5	**2.4**	< 0.5	< 0.5	**5.2**	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5
	09/25/01	**3.6**	**1.2**	< 0.5	< 0.5	< 2.0	< 0.5	**12**	< 0.5	**2.3**	< 0.5	< 0.5	**4.8**	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5
	10/22/01	**4.1**	**1.4**	< 0.5	< 0.5	< 2.0	< 0.5	**12**	< 0.5	**2.3**	< 0.5	< 0.5	**5.9**	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5
	11/20/01	**4.5**	**1.4**	< 0.5	< 0.5	< 2.0	< 0.5	**10**	< 0.5	**1.8**	< 0.5	< 0.5	**8.4**	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5
	01/03/02	**1.8**	**0.59 B**	< 0.098	< 0.19	< 0.15	< 0.13	**2.9**	< 0.096	**0.65**	< 0.12	**0.78**	**31**	< 0.20	< 0.12	**18**	< 0.11	**0.29 J**
	03/27/02	< 0.11	**0.14 J**	< 0.13	< 0.22	< 0.15	< 0.13	**0.38 J**	< 0.096	< 0.091	< 0.12	**0.95**	**27**	**0.21 J**	< 0.12	**45**	< 0.11	**0.26 J**
	06/14/02	**2.6**	**1.0**	**0.13 J**	**0.23 J**	< 0.15	< 0.13	**19**	< 0.096	**1.8**	**0.21 J**	**0.25 J**	**12**	**0.28 J**	< 0.12	**6.2**	< 0.11	**0.25 J**
	09/17/02	**2.9**	**1.2**	**0.20 J**	**0.28 J**	< 0.15	< 0.13	**21**	< 0.096	**2.2**	< 0.12	< 0.12	**5.5**	**0.27 J**	< 0.12	**2.0**	< 0.11	**0.23 J**
	12/16/02	**2.7**	**0.93**	< 0.5	< 0.5	< 2.0	< 0.5	**21**	< 0.5	**2.4**	< 0.5	< 0.5	**4.2**	< 2.0	< 0.5	**0.9**	< 0.5	< 0.5
	03/17/03	**1.4**	**0.33 J**	< 0.13	**0.12 J**	< 0.15	< 0.13	**2.7**	< 0.096	**0.48 J**	< 0.12	**0.74**	**27**	< 0.20	< 0.12	**12**	< 0.11	< 0.22
	06/11/03	**1.9**	**0.99 B**	< 0.13	**0.13 J**	< 0.15	< 0.13	**34**	< 0.096	**2.3**	**0.41 J**	< 0.12	**4.3**	**0.40 J**	< 0.12	**1.7**	< 0.11	**0.22 J**
	09/10/03	**2.3 B**	**1.1 B**	< 0.13	< 0.22	< 0.15	< 0.13	**32**	< 0.096	**2.5**	**0.43 J**	< 0.12	**6.3**	**0.32 J**	< 0.12	**1.2**	< 0.11	**0.32 J**
	12/04/03	**3.1**	**0.88**	< 0.13	**0.21 J**	< 0.15	< 0.13	**27**	< 0.096	**2.5**	< 0.12	< 0.12	**6.4**	**0.24 J**	< 0.12	**0.48 J**	< 0.11	< 0.22
	03/16/04	**0.98**	**0.24 J**	< 0.13	< 0.22	< 0.15	< 0.13	**2.2**	< 0.096	**0.79**	< 0.12	**0.39 J**	**14**	< 0.20	< 0.12	**11**	< 0.11	**0.23 J**
	09/23/04	**2.0**	**0.71**	< 0.13	**0.15 J**	< 0.15	< 0.13	**18**	< 0.096	**1.9**	**0.35 J**	< 0.12	**2.5**	**0.27 J**	< 0.12	**0.16 J**	< 0.11	**0.49 J**
	04/05/05	**2.1**	**0.78**	< 0.13	< 0.22	< 0.15	< 0.14	**0.42 J**	< 0.14	**1.2**	< 0.12	**0.18 J**	**13**	< 0.20	< 0.12	**1.5**	< 0.13	**1.6**
	09/20/05	**2.2**	**0.86**	< 0.13	**0.13 J**	< 0.15	< 0.14	**15**	< 0.14	**1.9**	**0.34 J**	< 0.13	**1.1**	**0.25 J**	< 0.12	< 0.14	< 0.13	**0.35 J**
	03/14/06	**0.36 J**	**0.12 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.63**	< 0.12	< 0.13	**5.7**	< 0.20	< 0.12	**7.7**	< 0.13	**0.96**
	09/13/06	**2.0**	**0.63**	< 0.13	< 0.22	< 0.15	< 0.14	**12**	< 0.14	**1.6**	**0.35 J**	< 0.13	**1.1**	**0.22 J**	< 0.12	**0.19 J**	< 0.13	**0.59**
	04/05/07	**0.33 J**	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.31 J**	< 0.12	**0.23 J**	**9.9**	< 0.20	< 0.12	**7.6**	< 0.13	**0.78**
	09/26/07	**1.8**	**0.53**	< 0.13	< 0.22	< 0.15	< 0.14	**4.5**	< 0.14	**1.3**	**0.28 J**	< 0.13	**0.62**	< 0.20	< 0.12	< 0.14	< 0.13	**0.43 J**
	05/01/08	**1.2**	**0.39 J**	< 0.04	**0.18 J**	< 0.04	< 0.04	< 0.13	< 0.04	**0.43 J**	< 0.07	**0.22 J**	**13**	< 0.23	< 0.05	**0.57**	< 0.08	**2.7**

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-10	07/12/01	< 0.11	**0.14 J**	< 0.098	< 0.19	< 0.15	< 0.13	< 0.18	< 0.096	< 0.091	< 0.12	< 0.12	**0.65**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/25/01	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.59**	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5
	01/03/02	< 0.11	**0.45 JB**	< 0.098	< 0.19	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.48 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
dup	01/03/02	< 0.11	**0.44 JB**	< 0.098	< 0.19	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.44 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	03/28/02	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.48 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	06/14/02	< 0.11	**0.24 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.41 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/17/02	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.59**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	12/17/02	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0	< 0.5	< 0.5	< 0.5	< 0.5
	03/20/03	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0	< 0.5	< 0.5	< 0.5	< 0.5
	06/10/03	< 0.11	**0.43 JB**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.37 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/10/03	< 0.11	**0.22 JB**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.47 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	12/04/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.46 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	03/16/04	< 0.11	**0.17 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.45 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/22/04	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.34 J**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	04/05/05	< 0.11	**0.42 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	**0.33 J**	< 0.20	< 0.12	< 0.14	< 0.11	< 0.22
	09/20/05	< 0.14	**0.16**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	**0.41 J**	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	03/15/06	< 0.14	**0.16 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	**0.26 J**	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	09/12/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	**0.30 J**	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	04/03/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	**0.20 J**	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	09/24/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	**0.14 J**	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	05/01/08	< 0.05	**0.15 J**	< 0.04	< 0.12	< 0.04	< 0.04	< 0.13	< 0.04	< 0.04	< 0.07	< 0.10	**0.17 J**	< 0.23	< 0.05	< 0.06	< 0.08	< 0.07

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-11	07/12/01	—	—	—	—	—	< 1.3	< 1.8	< 0.96	< 0.91	< 1.2	< 1.2	**19**	< 2.0	< 1.2	**78**	**2,000**	**2.5 J**
	08/27/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**19**	< 10	< 5	**69**	**1,600**	< 5
	09/24/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**22**	< 10	< 5	**84**	**1,900**	< 5
	10/15/01	<0.5	<0.5	<0.5	<0.5	—	<0.5	<0.5	<0.5	**1.4**	< 0.5	**0.53**	**28**	<1.0	< 0.5	**83**	**1,600**	**1.2**
	10/15/01	<0.5	<0.5	<0.5	<0.5	—	<0.5	<0.5	<0.5	**1.4**	< 0.5	**0.54**	**29**	<1.0	< 0.5	**86**	**1,700**	**1.2**
	10/22/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**25**	<10	< 5	**92**	**2,000**	< 5
	10/22/01	<2.5	<2.5	<2.5	<2.5	—	<2.5	< 2.5	< 2.5	< 2.5	< 2.5	<2.5	**25**	<5	< 2.5	**92**	**2,000**	< 2.5
	10/29/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**25**	< 10	< 5	**91**	**1,700**	< 5
	10/29/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**25**	< 10	< 5	**92**	**1,800**	< 5
	11/19/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**20**	< 10	< 5	**78**	**1,900**	< 5
	01/02/02	< 0.53	< 0.49	< 0.49	< 0.93	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	< 0.60	**18**	< 0.97	< 0.56	**78**	**1,900**	< 1.1
	03/27/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	< 1.2	**19**	**4.0 J**	< 1.2	**67**	**1,800**	< 2.2
	06/11/02	< 0.53	< 0.49	< 0.49	< 1.5	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	< 0.60	**19**	< 0.97	< 0.57	**64**	**1,500**	< 1.1
	09/17/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	< 1.2	**16**	< 2.0	< 1.2	**67**	**2,000**	< 2.2
	12/16/02	1.1	< 1.0	< 1.0	< 1.0	< 4.0	< 1.0	< 1.0	< 1.0	**2.2**	< 1.0	< 1.0	**7.9**	< 4.0	< 1.0	**40**	**680**	**1.7**
	03/17/03	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	**1.0 J**	< 0.57	< 0.60	**7.5**	**1.3 J**	< 0.57	**46**	**1,100**	< 1.1
	03/17/03	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	**1.0 J**	< 0.57	< 0.60	**7.5**	**1.3 J**	< 0.57	**45**	**1,100**	< 1.1
	06/10/03	< 0.53	**0.85 JB**	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	**0.50 J**	**0.9 J**	< 0.57	< 0.60	**7.4**	< 0.97	< 0.57	**53**	**1,500**	**1.5 J**
	09/10/03	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	**0.50 J**	< 0.46	< 0.57	< 0.60	**6.0**	< 0.97	**0.75 J**	**62**	**1,700**	**1.6 J**
	12/05/03	**0.86 J**	< 0.2	< 0.26	< 0.44	< 0.29	< 0.25	< 0.46	**0.20 J**	**2.9**	< 0.23	**0.40 J**	**8.8**	< 0.39	**0.30 J**	**58**	**1,100**	**2.1**
	03/16/04	< 0.53	< 0.49	< 0.65	< 1.5	< 0.71	< 0.62	< 1.2	**0.55 J**	**0.55 J**	< 0.57	< 0.60	**5.2**	< 0.97	**0.65 J**	**47**	**1,500**	< 1.1
	09/22/04	< 0.27	< 0.25	< 0.33	< 0.55	< 0.36	< 0.31	< 0.57	**0.43 J**	**0.70 J**	< 0.29	< 0.30	**6.3**	< 0.49	**0.58 J**	**47**	**1,300**	**0.78 J**
	04/04/05	< 0.34	**0.58 J**	< 0.33	< 0.55	< 0.36	< 0.35	< 0.57	< 0.34	**0.68 J**	< 0.29	< 0.31	**13**	< 0.49	**0.50 J**	**48**	**1,300**	< 0.53
	09/20/05	< 0.14	**0.17 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	**0.21 J**	**0.45 J**	< 0.12	**0.19 J**	**29**	< 0.20	**0.61**	**52**	**1,400**	**0.35 J**
	03/14/06	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	**0.65 J**	< 0.57	< 0.61	**51**	< 0.97	**0.60 J**	**50**	**1,000**	**0.80 J**
	09/13/06	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	< 0.61	**28**	< 0.97	< 0.58	**50**	**1,100**	**0.70 J**
	04/04/07	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	< 0.61	**50**	< 0.97	< 0.58	**38**	**1,200**	< 2.1
	09/26/07	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	< 0.61	**41**	< 0.97	< 0.58	**42**	**1,200**	< 2.1
	05/01/08	< 0.12	**<0.13 JD**	< 0.11	< 0.29	< 0.09	< 0.11	< 0.33	**0.20 JD**	< 0.11	< 0.19	< 0.25	**26**	< 0.58	**0.28 J**	**35**	**910**	< 0.18

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-12	07/12/01	—	—	—	—	—	< 3.1	< 4.4	< 2.4	< 2.3	< 2.9	< 3.0	**170**	< 4.9	< 2.8	**200**	**6,100**	< 5.3
	08/27/01	< 25	< 25	< 25	< 25	—	< 25	< 25	< 25	< 25	< 25	< 25	**150**	< 25	< 25	**160**	**6,000**	< 25
	09/24/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**52**	< 10	< 5	**86**	**2,400**	< 5
	10/15/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**23**	< 10	< 5	**43**	**1,500**	< 5
dup	10/15/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**22**	< 10	< 5	**40**	**1,600**	< 5
	10/22/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**48**	< 10	< 5	**66**	**2,600**	< 5
	10/22/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**39**	< 10	< 5	**62**	**2,400**	< 5
	10/29/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**61**	< 10	< 5	**76**	**2,300**	< 5
dup	10/29/01	< 5	< 5	< 5	< 5	—	< 5	< 5	< 5	< 5	< 5	< 5	**60**	< 10	< 5	**70**	**2,100**	< 5
	11/19/01	< 10	< 10	< 10	< 10	—	< 10	< 10	< 10	< 10	< 10	< 10	**190**	< 20	< 10	**210**	**3,300**	< 10
	01/03/02	< 0.21	**0.4 JB**	< 0.20	0.62 J	< 0.29	< 0.25	2.6	**0.22 J**	**0.52 J**	< 0.23	**1.1**	**340**	< 0.39	< 0.23	**72**	**440**	< 0.43
	03/27/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**7.7**	**2,700**	< 2.0	< 1.2	**640**	**2,100**	< 2.2
dup	03/27/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**8.5**	**2,800**	< 2.0	< 1.2	**660**	**2,300**	< 2.2
	06/11/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**5.5**	**2,000**	< 2.0	< 1.2	**600**	**2,400**	< 2.2
dup	06/11/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**5.6**	**2,000**	< 2.0	< 1.2	**580**	**2,400**	< 2.2
	09/17/02	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**9.4**	**3,500**	< 2.0	< 1.2	**720**	**1,300**	< 2.2
	12/16/02	< 5	< 5	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	**9.3**	**3,600**	< 20	< 5	**1,300**	**430**	< 5
	03/17/03	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	**5.5**	**2,500**	**1.5 J**	< 0.57	**1,200**	**460**	< 1.1
	06/10/03	< 1.1	< 0.98	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**4.8 J**	**2,200**	< 2.0	< 1.2	**1,500**	**2,100**	< 2.2
	09/10/03	< 1.1	**1.0 JB**	< 1.3	< 2.2	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**4.5 J**	**2,400**	< 2.0	< 1.2	**3,500**	**900**	**12**
	12/05/03	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	**4.7**	**2,000**	**1.3 J**	< 0.57	**2,100**	**1,500**	**37**
	03/16/04	< 0.42	< 0.39	< 0.52	< 1.2	< 0.57	< 0.50	< 0.91	< 0.39	< 0.37	< 0.46	**4.8**	**2,500**	< 0.78	< 0.46	**1,200**	**2,100**	**57**
	09/22/04	< 0.53	< 0.49	< 0.65	< 1.1	< 0.71	< 0.62	< 1.2	< 0.48	< 0.46	< 0.57	**4.1**	**2,300**	< 0.97	< 0.57	**1,700**	**880**	**60**
	04/04/05	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	**3.2**	**2,200**	< 0.97	< 0.58	**1,000**	**760**	**18**
	09/20/05	< 1.4	< 1.1	< 1.3	< 2.2	< 1.5	< 1.4	< 2.3	< 1.4	< 1.1	< 1.2	**4.4 J**	**2,800**	< 2.0	< 1.2	**1,500**	**390**	**38**
	03/14/06	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	**2.4 J**	**1,700**	< 0.97	< 0.58	**500**	**1,100**	**15**
	09/13/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.15 J**	< 0.12	**4.2**	**2,600**	< 0.20	< 0.12	**1,400**	**400**	**54**
	04/04/07	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	**1.5 J**	**1,200**	< 0.97	< 0.58	**450**	**1,200**	**3.8**
	09/26/07	< 0.68	< 0.54	< 0.65	< 1.1	< 0.71	< 0.70	< 1.2	< 0.68	< 0.51	< 0.57	**3.0**	**1,700**	< 0.97	< 0.58	**1,100**	**470**	**39**
	05/01/08	**0.15 JD**	**0.18 JD**	< 0.11	< 0.29	< 0.09	< 0.11	< 0.33	**0.15 JD**	< 0.11	< 0.19	**1.4**	**1,000**	< 0.58	< 0.13	**390**	**850**	**5.9**

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-13	03/31/03	< 25	**21,000**	**1,600**	**6,900**	**260**	< 25	**260**	< 25	**2,700**	< 25	**320**	**23,000**	< 100	**2,900**	< 25	< 25	**1,100**
	05/14/03	< 11	**21,000**	**1,900**	**8,100**	**320**	< 13	**440**	< 9.6	**3,600**	< 12	**440**	**25,000**	**23 J**	**3,700**	< 12	< 11	**1,200**
	06/11/03	< 11	**20,000**	**2,300**	**9,800**	**370**	< 13	**490**	< 9.6	**3,900**	< 12	**440**	**26,000**	**25 J**	**3,600**	< 12	< 11	**1,200**
dup	06/11/03	< 11	**22,000**	**2,500**	**10,600**	**410**	< 13	**470**	< 9.6	**4,000**	< 12	**450**	**29,000**	**30 J**	**3,800**	< 12	< 11	**1,300**
	09/11/03	**5.5 J**	**25,000**	**2,400**	**10,200**	**400**	< 6.2	**490**	< 4.8	**4,400**	< 5.7	**460**	**30,000**	**25 J**	**4,100**	< 5.9	< 5.5	**1,400**
	12/04/03	**6.5 J**	**29,000**	**2,900**	**12,300**	**510**	< 6.2	**380**	< 4.8	**5,600**	< 5.7	**490**	**33,000**	**25 J**	**3,300**	< 5.9	< 5.5	**1,800**
	03/15/04	**7 J**	**32,000**	**2,900**	**14,000**	**540**	< 6.2	**310**	< 4.8	**6,200**	< 5.7	**490**	**38,000**	**26 J**	**2,900**	< 5.9	< 5.5	**1,700**
	06/10/04	< 11	**25,000**	**2,300**	**10,300**	**310**	< 13	**260**	< 9.6	**5,300**	< 12	**470**	**31,000**	**58 J**	**2,800**	< 12	< 11	**2,200**
	09/23/04	< 11	**17,000**	**2,000**	**8,900**	**320**	< 13	**380**	< 9.6	**4,500**	< 12	**370**	**22,000**	**25 J**	**2,600**	< 12	< 11	**2,100**
	04/05/05	< 0.14	**210**	**34**	**120**	**5.7**	< 0.14	**5.3**	< 0.14	**100**	< 0.12	**7.4**	**470**	**0.39 J**	**26**	< 0.14	**0.23 J**	**86**
	09/21/05	**1.4**	**2,900**	**620**	**2,570**	**70**	< 0.28	**340**	< 0.28	**930**	**0.50 J**	**44**	**2,900**	**3.2 J**	**280**	**0.28 J**	**0.48 J**	**740**
	03/15/06	< 2.8	**3,400**	**580**	**2,830**	**79**	< 2.8	**450**	< 54	**1,100**	< 2.3	**13**	**1,100**	**12 J**	**220**	< 2.7	< 2.6	**1,900**
	09/14/06	< 6.8	**7,100**	**990**	**4,900**	**130**	< 7.0	**860**	< 6.8	**1,300**	< 5.7	**65**	**5,400**	**10 J**	**150**	< 6.7	< 6.3	**1,900**
	04/04/07	< 6.8	**13,000**	**1,800**	**8,000**	**300**	< 7.0	**350**	< 6.8	**2,800**	< 5.7	**130**	**11,000**	**18 J**	**73**	< 6.7	< 6.3	**1,800**
	09/25/07	< 3.4	**9,800**	**1,400**	**6,200**	**250**	< 3.5	**480**	< 3.4	**1,600**	< 2.9	**89**	**6,700**	**8.3 J**	**100**	< 3.4	< 3.2	**1,500**
	05/02/08	**2.4 J**	**9,300**	**1,600**	**6,800**	**290**	< 0.84	**680**	< 0.84	**1,300**	< 1.5	**71**	**5,600**	**8.2 J**	**50**	< 1.3	**1.8 J**	**2,900**
MW-14	10/30/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	12/04/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	03/16/04	< 0.11	**0.21 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	06/10/04	< 0.11	**0.10 J**	< 0.13	**0.31 J**	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/24/04	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	04/05/05	< 0.14	**0.28 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.22
	09/21/05	< 0.14	**0.14 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	03/14/06	< 0.14	**0.12 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	09/13/06	< 0.14	**1.3**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	04/04/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	09/26/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	05/02/08	< 0.05	**0.14 J**	< 0.042	**0.18 J**	**0.05 J**	< 0.04	< 0.13	< 0.04	**0.07 J**	< 0.07	< 0.10	< 0.05	< 0.23	< 0.05	< 0.06	< 0.08	< 0.07

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-15	10/30/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	**0.14 J**	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	**0.29 J**
	12/04/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	**0.14 J**	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	**0.35 J**
	03/16/04	< 0.11	**0.17 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	**0.14 J**	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	**0.24 J**
	06/10/04	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	**0.23 J**
	09/24/04	< 0.11	**0.15 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	**3.8**	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	04/05/05	< 0.14	**0.27 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.22
	09/21/05	< 0.14	**0.19 J**	< 0.13	< 0.22	< 0.12	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.14 J**
	03/14/06	< 0.14	**0.11 J**	< 0.13	< 0.22	< 0.12	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.042
	09/13/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.20 J**
	04/04/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.12 J**
	09/26/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.10 J**
	05/02/08	< 0.05	**0.07 J**	< 0.04	< 0.12	< 0.04	< 0.04	< 0.13	< 0.04	**0.06 J**	< 0.07	< 0.10	< 0.05	< 0.23	< 0.05	< 0.06	< 0.08	**0.11 J**
MW-16	10/30/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	**0.27 J**	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	12/05/03	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	03/16/04	< 0.11	**0.12 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	06/10/04	< 0.11	**0.15 J**	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	09/23/04	< 0.11	< 0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	**0.10 J**	< 0.091	< 0.12	< 0.12	< 0.12	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22
	04/05/05	< 0.14	**0.34 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	< 0.22
	09/21/05	< 0.14	< 0.11	**0.21 J**	**0.33 J**	**0.16 J**	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.12 J**
	03/15/06	< 0.14	**0.18 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.28 J**
	09/13/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	**0.45 J**	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.28 J**
	04/05/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.14 J**	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.26 J**
	09/26/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	**0.41 J**	< 0.11	< 0.12	< 0.13	< 0.12	< 0.20	< 0.12	< 0.14	< 0.13	**0.26 J**
	05/02/08	< 0.05	**0.10 J**	< 0.042	< 0.12	< 0.037	< 0.042	< 0.13	< 0.042	**0.16 J**	< 0.073	< 0.10	< 0.05	< 0.23	< 0.50	< 0.06	< 0.08	**0.55**

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Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-17	10/30/03	**15**	**5.8**	**260**	**1,616**	**22**	< 0.25	**190**	**0.34 J**	**4.3**	**2.1**	< 0.24	**2.8**	**1.5 J**	< 0.23	< 0.24	< 0.22	**9.1**
	12/04/03	**11**	**5.8**	**180**	**1,412**	**17**	< 0.25	**140**	< 0.20	**4.1**	**1.4**	< 0.24	< 0.24	**0.68 J**	< 0.23	< 0.24	< 0.22	**0.54 J**
	03/15/04	**21**	**9.6**	**170**	**1,428**	**29**	< 0.13	**230**	**0.34 J**	**5.3**	**2.5**	< 0.12	**13**	**2.7**	< 0.12	< 0.12	< 0.11	**57**
	06/10/04	**14**	**5.4**	**190**	**2,114**	**22**	< 0.13	**180**	< 0.096	**4.1**	**1.9**	< 0.12	**0.32 J**	**1.4 J**	< 0.12	< 0.12	< 0.11	**0.93**
	09/23/04	**12**	**4.1**	**220**	**1,616**	**21**	< 0.62	**170**	< 0.48	**3.6**	**1.8 J**	< 0.60	< 0.58	**1.8 J**	< 0.57	< 0.59	< 0.55	< 1.1
dup	09/23/04	**13**	**4.2**	**230**	**1,617**	**22**	< 0.62	**180**	< 0.48	**3.7**	**2.0 J**	< 0.60	< 0.58	**1.8 J**	< 0.57	< 0.59	< 0.55	< 1.1
	04/05/05	**11**	**4.6**	**120**	**1,200**	**16**	< 0.35	**140**	< 0.34	**2.9**	**1.4**	< 0.31	< 0.29	**0.95 J**	< 0.29	< 0.34	< 0.32	< 0.53
	09/21/05	**13**	**4.9**	**150**	**1,413**	**26**	< 0.14	**180**	< 0.14	**3.4**	**1.5**	< 0.13	**0.12 J**	**0.84 J**	< 0.12	< 0.14	< 0.13	**0.24 J**
	03/15/06	**19**	**3.1**	**200 J**	**1,614 J**	**22 J**	< 0.70	**280**	< 2.5	**4.1**	**2.6**	< 0.61	< 0.58	**1.7 J**	< 0.58	< 0.67	< 0.63	**0.55 J**
	09/12/06	**12**	**1.4**	**63**	**448**	**9.6**	< 0.14	**170**	< 0.14	**3.2**	**1.4**	< 0.13	**2.1**	**0.78 J**	< 0.12	< 0.14	< 0.13	**10**
	04/04/07	**20**	**2.1**	**75**	**1,013**	**23**	< 0.35	**230**	< 0.34	**2.9**	**2.6**	< 0.31	**0.70 J**	**1.4 J**	< 0.29	< 0.34	< 0.32	**2.3**
	09/24/07	**14**	**0.93**	**8.1**	**377**	**19**	< 0.14	**150**	< 0.14	**2.7**	**2.2**	< 0.31	< 0.12	**0.99 J**	< 0.12	< 0.14	< 0.13	**0.13 J**
	05/01/08	**7.9**	**1.4**	**50**	**206**	**12**	< 0.04	**77**	< 0.04	**2.7**	< 1.1	< 0.10	**0.050 J**	**0.33 J**	< 0.05	**0.08 J**	< 0.08	**0.10 J**
MW-18	10/30/03	< 2.1	**120**	**14**	**93**	< 2.9	< 2.5	**14**	< 2.0	**12**	< 2.3	**6.2 J**	**5,400**	< 3.9	< 2.3	< 2.4	< 2.2	**7,900**
	12/04/03	**1.6 J**	**71**	**9**	**50**	< 1.5	< 1.3	**23**	< 0.96	**15**	< 1.2	**3.7 J**	**3,500**	< 2.0	< 1.2	< 1.2	< 1.1	**4,700**
dup	12/04/03	**1.6 J**	**68**	**8.5**	**48**	< 1.5	< 1.3	**20**	< 0.96	**14**	< 1.2	**3.7 J**	**3,700**	< 2.0	< 1.2	< 1.2	< 1.1	**5,400**
	03/16/04	**0.17 J**	**1.4**	**1.7**	**6.4**	**0.28 J**	< 0.13	**1.8**	< 0.096	**4.9**	< 0.12	< 0.12	**16**	< 0.20	< 0.12	< 0.12	< 0.11	**23**
	06/10/04	< 0.11	**0.42 J**	**0.83**	**3.6**	< 0.15	< 0.13	**0.91**	< 0.096	**2.7**	< 0.12	< 0.12	**5.0**	< 0.20	< 0.12	< 0.12	< 0.11	**6.6**
	09/23/04	< 0.11	**0.24 J**	**0.86**	**3.6**	< 0.15	< 0.13	**1.2**	< 0.096	**2.4**	< 0.12	< 0.12	**4.5**	< 0.20	< 0.12	**0.13 J**	**0.16 J**	**4.4**
	04/05/05	< 0.14	**0.33 J**	**0.49 J**	**1.4**	< 0.15	< 0.14	**1.4**	< 0.14	**1.8**	< 0.12	< 0.13	**7.2**	< 0.20	< 0.12	**0.44 J**	< 0.13	**5.1**
dup	04/05/05	< 0.14	**0.65**	**0.46 J**	**1.3**	< 0.15	< 0.14	**1.3**	< 0.14	**1.7**	< 0.12	< 0.13	**6.0**	< 0.20	< 0.12	**0.37 J**	< 0.13	**4.3**
	09/20/05	< 0.14	**0.35 J**	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	**0.36 J**	**0.37 J**	< 0.12	< 0.13	**62**	< 0.20	< 0.12	**2.1**	**2.2**	**5.3**
	03/15/06	< 0.14	**0.18 J**	< 0.13	**1.12**	< 0.15	< 0.14	**0.66**	< 0.14	**0.92**	< 0.12	< 0.13	**0.60**	< 0.20	< 0.12	< 0.14	< 0.13	**0.85**
	09/12/06	< 0.14	< 0.11	< 0.13	**0.80 J**	< 0.15	< 0.14	**1.0**	< 0.14	**0.48 J**	< 0.12	< 0.13	**0.77**	< 0.20	< 0.12	< 0.14	< 0.13	**1.3**
	04/03/07	< 0.14	**0.15 J**	< 0.13	**0.71 J**	< 0.15	< 0.14	< 0.23	< 0.14	**0.31 J**	< 0.12	< 0.13	**0.36 J**	< 0.20	< 0.12	< 0.14	< 0.13	**0.36 J**
	09/24/07	< 0.14	< 0.11	< 0.13	**0.93 J**	< 0.15	< 0.14	**0.46 J**	< 0.14	**0.21 J**	< 0.12	< 0.13	**0.52**	< 0.20	< 0.12	< 0.14	< 0.13	**0.55**
	05/01/08	**0.07 J**	**0.25 J**	< 0.04	**0.79 J**	**0.10 J**	< 0.04	**0.25 J**	< 0.04	**0.27 J**	< 0.07	< 0.10	**0.36 J**	< 0.23	< 0.05	< 0.06	< 0.08	**0.34 J**

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VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-19	02/20/04	3.1 J	180	13	73	1.3 J	< 0.13	11	< 0.096	11	< 0.12	< 0.12	0.51	0.23 J	< 0.12	< 0.12	< 0.11	3
	03/16/04	3.0	110	9.5	42	0.90 J	< 0.13	5.8	< 0.096	9.2	< 0.12	< 0.12	0.32 J	< 0.20	< 0.12	< 0.12	< 0.11	12
dup	03/16/04	3.0	99	10	44	1.0 J	< 0.13	6.1	< 0.096	9.6	< 0.12	< 0.12	0.39 J	< 0.20	< 0.12	< 0.12	< 0.11	12
	06/10/04	1.6	1.3	0.47 J	2.06	< 0.15	< 0.13	< 0.23	< 0.096	1.4	< 0.12	< 0.12	2.7	< 0.20	< 0.12	< 0.12	< 0.11	42
	09/23/04	1.2	17	2.4	10.4	0.19 J	< 0.13	2.7	< 0.096	3.4	< 0.12	< 0.12	4.1	< 0.20	< 0.12	< 0.12	< 0.11	38
	04/05/05	1.2	1.2	0.27 J	0.49 J	< 0.15	< 0.14	0.28 J	< 0.14	1.9	< 0.12	< 0.13	11	< 0.20	< 0.12	< 0.14	< 0.13	44
	09/21/05	1.4	1.1	2.4	6.9	0.47 J	< 0.14	1.2	< 0.14	2.2	< 0.12	0.79	74	< 0.20	< 0.12	1.3	< 0.13	47
	03/15/06	1.1	0.55	0.39 J	1.92	< 0.15	< 0.14	0.34 J	< 0.14	1.6	< 0.12	< 0.13	10	< 0.20	< 0.12	1.1	< 0.13	30
	09/12/06	1.4	1.1	7.9	18.2	1.1 J	< 0.14	4.5	< 0.14	2.6	< 0.12	< 0.13	18	< 0.20	< 0.12	< 0.14	< 0.13	20
	04/03/07	1.1	0.58	1.4	12.6	0.71 J	< 0.14	0.90	< 0.14	2.0	< 0.12	< 0.13	39	< 0.20	< 0.12	< 0.14	< 0.13	72
	09/24/07	0.90	0.62 J	0.97	11.5	0.84 J	< 0.14	0.92	< 0.14	1.1	< 0.12	< 0.13	3.9	< 0.20	< 0.12	< 0.14	< 0.13	37
	05/02/08	1.0	0.59	0.58	21.4	1.8 J	< 0.042	1.6	< 0.04	1.9	< 0.07	< 0.10	0.18 J	< 0.23	< 0.05	< 0.06	<0.08	2
MW-20	07/28/05	18	1.7	4.3	124	< 2.0	< 0.50	140	< 0.50	1.6	< 0.50	< 0.50	< 0.50	< 2.0	< 0.50	< 0.50	< 0.50	< 0.50
	09/20/05	16	1.5	1.4	92	1.1 J	< 0.14	130	< 0.14	0.39 J	< 0.12	< 0.13	0.14 J	0.57 J	< 0.12	< 0.14	< 0.13	0.14 J
dup	09/20/05	16	1.4	1.5	92	1.0 J	< 0.14	130	< 0.14	0.35 J	< 0.12	< 0.13	0.15 J	0.57 J	< 0.12	< 0.14	< 0.13	0.16 J
	03/15/06	16	1.5	3.0	144	0.87 J	< 0.14	140	< 0.14	1.7 J	< 0.12	< 0.13	0.12 J	0.86 J	< 0.12	< 0.14	< 0.13	0.23 J
	09/12/06	15	0.86	0.17 J	35	0.44 J	< 0.14	140	< 0.14	0.12 J	< 0.12	< 0.13	0.15 J	0.56 J	< 0.12	< 0.14	< 0.13	0.22 J
	04/05/07	15	1.6	0.57	114	1.2 J	< 0.14	88	< 0.14	0.93	< 0.12	< 0.13	0.15 J	0.74 J	< 0.12	< 0.14	< 0.13	0.21 J
	09/26/07	13	1.2	0.22 J	22.7	0.96 J	< 0.14	85	< 0.14	< 0.11	< 0.12	< 0.13	0.12 J	0.46 J	< 0.12	< 0.14	< 0.13	0.13 J
	05/02/08	11	0.93	0.26 J	71	0.47 J	< 0.04	76	< 0.04	0.19 J	< 0.34	< 0.10	0.16 J	0.46 J	< 0.05	0.07 J	< 0.08	0.14 J
MW-21	09/14/06	< 6.8	9,300	1,700	8,100	210	< 7.0	210	< 6.8	1,700	< 5.7	71	8,400	15 J	1,200	190	160	1,500
dup	09/14/06	< 6.8	9,300	1,600	7,400	200	< 7.0	210	< 6.8	1,600	< 5.7	63	8,500	15 J	1,000	160	140	1,400
	04/04/07	1.3 J	11,000	1,900	7,600	260	< 0.35	140	0.80 J	2,200	0.50 J	57	8,400	12	470	16	2.5	1,500
MW-21	09/25/07	< 3.4	7,400	1,500	6,300	220	< 3.5	230	< 3.4	2,400	< 2.9	42	5,900	15 J	100	< 3.4	< 3.2	3,100
(cont.)	05/02/08	1.6 J	7,000	1,400	6,100	190	< 0.84	440	< 0.84	2,200	< 1.5	32	4,000	9.0 J	59	< 1.3	<1.6	3,800
MW-22	09/14/06	< 6.8	7,700	1,300	5,900	130	< 7.0	1,700	< 6.8	1,500	< 5.7	14 J	1,900	< 9.7	< 5.8	< 6.7	< 6.3	2,600
	04/04/07	< 6.8	17,000	2,300	9,900	330	< 7.0	610	< 6.8	3,700	< 5.7	22 J	3,300	< 9.7	< 5.8	< 6.7	< 6.3	4,800
dup	04/04/07	< 6.8	17,000	2,300	9,900	330	< 7.0	610	< 6.8	3,600	< 5.7	22 J	3,100	< 9.7	< 5.8	< 6.7	< 6.3	4,600
	09/26/07	3.0 J	4,000	920	3,650	130	< 5.0	1,800	< 1.4	370	< 1.2	18	1,600	2.2 J	8.2	< 1.4	< 1.3	1,100
	05/02/08	3.6 J	7,000	1,400	5,800	200	< 0.84	2,100	< 0.84	780	< 1.5	7.2 J	540	7.6 JD	< 1.0	< 1.3	< 1.6	1,400

Table 5

VOCs Detected in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,2-Dichloro-propane	Chloro-ethane	Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	Methylene Chloride	TCA	TCE	PCE	Vinyl Chloride
MW-23	09/13/06	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.36 J**	< 0.12	< 0.13	**0.96**	< 0.20	< 0.12	< 0.14	**0.28 J**	**0.090 J**
	04/04/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	**0.21 J**	< 0.23	< 0.14	**0.14 J**	< 0.12	< 0.13	**3.2**	< 0.20	< 0.12	**0.22 J**	**1.8**	**0.090 J**
	09/25/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	**0.14 J**	< 0.23	< 0.14	**0.25 J**	< 0.12	< 0.13	**2.4**	< 0.20	< 0.12	**0.17 J**	**1.7**	**0.13 J**
dup	09/25/07	< 0.14	< 0.11	< 0.13	< 0.22	< 0.15	< 0.14	< 0.23	< 0.14	**0.26 J**	< 0.12	< 0.13	**2.1**	< 0.20	< 0.12	**0.17 J**	**1.9**	**0.12 J**
	05/01/08	<0.05	**0.07 J**	< 0.04	< 0.12	< 0.04	**0.12 J**	< 0.13	< 0.04	**0.18 J**	< 0.07	**0.18 J**	**3.2**	<0.23	< 0.05	**0.25 J**	**3**	**0.08 J**
INJ-1	07/09/01	—	—	—	—	—	< 0.62	**25**	< 0.48	**9.3**	< 0.58	**0.65 J**	**29**	< 0.97	< 0.56	**97**	**620**	**2.9**
	11/20/01	<0.5	<0.5	<0.5	<0.5	—	<0.5	**2.8**	< 0.5	**1.2**	< 0.50	< 0.50	**8.1**	< 1.0	< 0.5	**30**	**17**	<0.5
	06/11/02	<0.21	<0.20	<0.26	<0.6	< 0.29	< 0.26	< 0.46	< 0.20	**0.60 J**	< 0.23	**1.9**	**520**	< 0.39	< 0.23	**3.7**	**8.5**	**0.44 J**
INJ-2	07/09/01	—	—	—	—	—	< 3.1	< 4.4	< 2.4	< 2.3	< 2.9	< 3.0	**200**	< 4.9	< 2.8	**240**	**6,300**	**5.5 J**
	10/15/01	<0.5	<0.5	**1.6**	**6**	—	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.1**	<1.0	<0.5	**1.8**	**33**	< 0.5
	10/22/01	<0.5	**0.53**	**2.9**	**11.3**	—	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2**	<1.0	<0.5	**2.8**	**57**	< 0.5
	10/29/01	<0.5	**0.65**	**1.4**	**6.8**	—	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.9**	<1.0	<0.5	**4.3**	**68**	< 0.5
	11/19/01	<0.5	<0.5	**0.89**	**4.4**	—	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**7.3**	<1.0	<0.5	**9.2**	**230**	< 0.5
	06/11/02	<1.1	<0.98	<1.3	<2.9	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**5.4**	**2,100**	< 2.0	< 1.2	**600**	**1,000**	< 2.2
	06/10/03	<1.1	**1.1 JB**	<1.3	<2.9	< 1.5	< 1.3	< 2.3	< 0.96	< 0.91	< 1.2	**5.3**	**2,100**	< 2.0	< 1.2	**610**	**2,700**	< 2.2
INJ-3	07/09/01	—	—	—	—	—	< 0.62	**5.9**	< 0.48	**3.4**	< 0.58	**0.95 J**	**39**	< 0.97	< 0.56	**250**	**520**	**7.3**
	11/20/01	<1.0	<1.0	<1.0	<1.0	—	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**49**	<2	<1.0	**130**	**670**	**1.8**
	06/11/02	<0.53	<0.49	<0.65	< 1.5	< 0.71	< 0.62	< 1.2	< 0.48	**1.2 J**	< 0.57	**3.4**	**1,200**	< 0.97	< 0.57	**240**	**530**	**180**
	12/17/02	**1.3**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**2.0**	< 0.5	**0.53**	**250**	< 2	< 0.5	**100**	**150**	**90**
dup	12/17/02	**1.2**	< 0.5	< 0.5	< 0.5	< 2	< 0.5	< 0.5	< 0.5	**1.9**	< 0.5	**0.6**	**270**	< 2	< 0.5	**120**	**180**	**91**
	06/10/03	< 0.21	**0.80 JB**	< 0.26	< 0.44	< 0.29	< 0.25	**2.2**	< 0.20	**0.40 J**	< 0.23	**0.98 J**	**350**	< 0.39	< 0.23	**140**	**390**	**78**
P-1	09/24/04	< 0.11	<0.098	< 0.13	< 0.22	< 0.15	< 0.13	< 0.23	< 0.096	**0.28 J**	< 0.12	< 0.12	**1.2**	< 0.20	< 0.12	< 0.12	< 0.11	< 0.22

NOTE: All results in µg/L.
1995 analyses performed using EPA Method 8240A.
Analyses since 1996 performed using EPA Method 8260A.
Only indicator hazardous substances shown.
Detections shown in bold.
Shaded results above their respective cleanup level.
< = less than the concentration shown.
— = not quantitated.
dup = duplicate sample.
B = the analyte was also detected in an associated blank.
J = the associated numerical value is an estimated quantity based on data review or laboratory estimate below the MRL but above the MDL.

E = laboratory estimated concentration.
Results from June 2000 and from December 2000 onward are reported relative to the method detection limits (MDLs) due to elevated method reporting limits.
1,2,4-TMB = 1,2,4-trimethylbenzene.
1,1-DCA = 1,1-dichlorethane.
1,2-DCA = 1,2-dichlorethane.
1,1-DCE = 1,1-dichlorethene.
cis-1,2-DCE = cis-1,2-dichloroethene.
TCA = 1,1,1-trichloroethane.
TCE = trichloroethene.
PCE = tetrachloroethene.

Table 6

General Chemistry Parameters in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	EPA Method 300.0 Chloride	EPA Method 300.0 Nitrate as Nitrogen	EPA Method 300.0 Sulfate	Hach Method 8131 Sulfide	Hach Method AL AP MG-L Total Alkalinity	EPA Method 415.1 Total Organic Carbon	EPA Method 6010A/6010B Manganese	EPA Method 6010A/6010B Total Iron	Hach Method 8008 Total Iron	Hach Method 8146 Ferrous Iron	EPA Method 160.1 Total Dissolved Solids
MW-1	09/04/96	130	—	88.0	—	—	—	2.1	29.6	—	—	990
	12/15/98	68.5	< 0.2	4.3	0.070	500	47.0	—	—	23.4	24.6	—
	03/02/99	64.5	0.2	5.8	0.266	540	37.0	—	—	29.4	18.2	—
	06/17/99	49	0.3	6.7	0.110	460	40.5	—	—	24.0	20.8	—
	09/16/99	59.8	< 0.2	7.2	0.249	400	42.1	—	—	11.0	18.8	—
	09/18/02	—	—	—	—	—	37	—	—	—	—	—
MW-2	09/04/96	18.0	—	0.3	—	—	—	3.21	112	—	—	576
	12/15/98	13.6	0.3	5.3	0.017	260	26.4	—	—	23.9	30.4	—
	03/02/99	14.3	0.9	13.1	0.037	360	22.8	—	—	46.4	23.0	—
	06/16/99	13	1.0	7.5	0.054	420	24.2	—	—	86.5	66.7	—
dup	06/16/99	12.2	1.3	12.8	—	—	25.1	—	—	—	—	—
	09/16/99	14.6	< 0.2	< 0.2	0.037	400	27.2	—	—	94.6	61.9	—
	09/18/02	—	—	—	—	—	33	—	—	—	—	—
MW-3	09/04/96	26.0	—	0.9	—	—	—	3.17	36.3	—	—	952
dup	09/04/96	26.0	—	1.1	—	—	—	3.13	38.5	—	—	976
	12/14/98	29.8	< 0.2	< 0.2	< 0.001	660	44.5	—	—	34.4	34.2	—
	03/03/99	25.6	< 0.2	0.3	0.013	640	52.8	—	—	33.0	31.7	—
	06/17/99	17.1	< 0.2	< 0.2	0.013	640	57.9	—	—	59.7	38.0	—
	09/17/99	14.5	< 0.2	< 0.2	0.047	520	62.4	—	—	100.1	47.7	—
MW-4	09/04/96	110	—	37.0	—	—	—	9.89	83.9	—	—	796
	12/14/98	89.7	< 0.2	15.6	0.026	840	23.4	—	—	59.8	59.1	—
	03/03/99	45.0	< 0.2	183	0.880	900	12.8	—	—	12.9	7.5	—
	06/17/99	60.9	0.3	61.7	0.159	840	18.2	—	—	6.99	4.75	—
	09/17/99	77.3	< 0.2	2.0	0.071	870	18.4	—	—	24.3	13.4	—
	09/18/02	—	—	—	—	—	19	—	—	—	—	—

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General Chemistry Parameters in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	EPA Method 300.0 Chloride	EPA Method 300.0 Nitrate as Nitrogen	EPA Method 300.0 Sulfate	Hach Method 8131 Sulfide	Hach Method AL AP MG-L Total Alkalinity	EPA Method 415.1 Total Organic Carbon	EPA Method 6010A/6010B Manganese	EPA Method 6010A/6010B Total Iron	Hach Method 8008 Total Iron	Hach Method 8146 Ferrous Iron	EPA Method 160.1 Total Dissolved Solids
MW-5	09/04/96	17.0	—	32	—	—	—	0.34	0.107	—	—	332
	12/15/98	17.5	< 0.2	17.3	0	200	7.8	—	—	0.090	0.024	—
	03/02/99	6.9	2.4	22.0	0.002	145	4.8	—	—	0.137	0.060	—
	06/16/99	6.2	2.5	20.5	0.002	180	6.0	—	—	0.125	0.042	—
	09/16/99	6.8	1.5	20.7	0.001	160	5.9	—	—	0.052	0.008	—
dup	09/16/99	6.2	1.5	20.4	—	—	5.9	—	—	—	—	—
	09/18/02	—	—	—	—	—	7.2	—	—	—	—	—
	09/13/06	—	0.6	34.1	—	—	—	—	—	—	—	—
MW-6	09/04/96	340	—	0.6	—	—	—	9.28	222	—	—	1,260
	12/15/98	199	< 0.2	11.7	0.014	460	22.6	—	—	114	125	—
	03/02/99	213	0.6	19.8	0.015	500	15.8	—	—	170	63	—
dup	03/02/99	208	0.6	46.6	—	—	15.9	—	—	—	—	—
	06/16/99	232	0.3	11.6	0.009	520	21	—	—	192	120	—
	09/16/99	130	< 0.5	27.3	0.047	480	18.5	—	—	169	95	—
	09/18/02	—	—	—	—	—	20	—	—	—	—	—
MW-7	12/14/98	5.4	< 0.2	1.6	0.003	260	9.4	—	—	3.36	3.17	—
	03/03/99	5.7	1.3	12.7	0.010	180	6.5	—	—	1.79	1.72	—
	06/17/99	6.8	2.3	25.1	0.005	200	9.2	—	—	2.21	1.86	—
	09/17/99	8.1	0.3	21.4	0.004	240	10.6	—	—	3.58	2.98	—
MW-8	12/14/98	9.2	< 0.2	20.4	—	260	10.0	—	—	1.13	0.98	—
dup	12/14/98	9.3	< 0.2	20.4	—	—	10.1	—	—	—	—	—
	03/02/99	12.7	0.3	29.7	0.023	260	8.9	—	—	2.03	0.77	—
	06/16/99	12.8	< 0.2	29.1	0.009	240	9.6	—	—	0.70	0.50	—
	09/16/99	10.5	< 0.2	21.1	0.007	260	10.5	—	—	1.02	0.45	—
	09/18/02	—	—	—	—	—	11.4	—	—	—	—	—
MW-13	09/24/04	56.1	< 0.2	0.6	0.05	260	40.3	1.40	37.1	—	1.5	—
	04/05/05	4.3	< 0.1	6.1	< 0.01	50	5.8	0.145	3.3	—	2.4	—
	09/14/06	—	< 0.1	< 0.2	—	—	—	—	—	—	—	—

Table 6

General Chemistry Parameters in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	EPA Method 300.0 Chloride	EPA Method 300.0 Nitrate as Nitrogen	EPA Method 300.0 Sulfate	Hach Method 8131 Sulfide	Hach Method AL AP MG-L Total Alkalinity	EPA Method 415.1 Total Organic Carbon	EPA Method 6010A/6010B Manganese	EPA Method 6010A/6010B Total Iron	Hach Method 8008 Total Iron	Hach Method 8146 Ferrous Iron	EPA Method 160.1 Total Dissolved Solids
MW-14	09/24/04	6.2	< 0.2	< 0.2	< 0.01	240	11.8	1.12	32.7	—	2.0	—
	04/05/05	6.3	< 0.1	< 0.2	< 0.01	215	12.8	1.24	35.7	—	1.8	—
MW-15	09/24/04	6.6	< 0.2	< 0.2	< 0.01	240	7.9	1.33	34.8	—	1.6	—
	04/05/05	7.5	< 0.1	< 0.2	< 0.01	190	8.0	1.41	35.9	—	2.0	—
	09/13/06	—	< 0.1	< 0.2	—	—	—	—	—	—	—	—
MW-16	09/23/04	33.5	< 0.2	8.1	< 0.01	420	24.1	3.71	108	—	2.0	—
	04/05/05	36.2	< 0.1	1.1	< 0.01	295	23.6	3.92	114	—	2.2	—
MW-17	09/23/04	49.7	< 0.2	< 0.2	< 0.01	1,320	32.9	1.77	55.7	—	2.4	—
dup	09/23/04	46.9	< 0.2	< 0.2	—	—	32.8	1.75	54.9	—	—	—
	04/05/05	50.0	< 0.1	< 0.2	< 0.01	230	32.7	0.92	40.1	—	2.5	—
	09/12/06	—	< 0.1	0.3	—	—	—	—	—	—	—	—
MW-18	09/23/04	8.7	< 0.2	< 0.2	< 0.01	380	17.1	1.64	54.4	—	2.3	—
	04/05/05	8.9	< 0.1	< 0.2	< 0.01	295	17.7	1.62	50.2	—	2.4	—
dup	04/05/05	8.8	< 0.1	< 0.2	—	—	17.2	1.61	50.0	—	—	—
MW-19	09/23/04	23.0	< 0.2	0.3	< 0.01	340	19.2	1.44	64.0	—	1.8	—
	04/05/05	18.9	< 0.1	3.7	< 0.01	250	19.9	1.31	65.8	—	2.6	—
MW-20	09/20/05	50.7	< 0.1	1.4	< 0.01	355	29.1	3.60	88	—	2.2	—
MW-21	09/14/06	—	< 0.1	4.0	—	—	—	—	—	—	—	—
dup	09/14/06	—	< 0.1	3.9	—	—	—	—	—	—	—	—
MW-22	09/14/06	—	0.4	49.9	—	—	—	—	—	—	—	—
MW-23	09/13/06	—	< 0.1	29.0	—	—	—	—	—	—	—	—
P-1	09/24/04	8.8	< 0.2	< 0.2	< 0.01	220	20.7	1.10	38.1	—	2.0	—

NOTE: All results in mg/L. < = less than the method reporting limit shown.
— = not analyzed. dup = duplicate sample.

Table 7

Dissolved Organic Gases in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Modified RSK Method 175		
		Methane	Ethene	Ethane
MW-1	12/15/98	18	0.310	0.110
	03/02/99	15	0.270	0.075
	06/17/99	8.4	0.170	0.044
	09/17/99	14	0.230	0.083
MW-2	12/15/98	13	< 0.0005	0.0011
	03/02/99	8.6	< 0.0005	0.00088
	06/16/99	13	< 0.0005	0.001
dup	06/16/99	13	< 0.0005	0.00097
	09/16/99	17	< 0.0005	0.0012
MW-3	12/14/98	10	0.00095	0.0069
	03/03/99	5.7	0.0012	0.0093
	06/17/99	3.8	0.00093	0.0032
	09/17/99	4.3	0.00088	0.0068
MW-4	12/14/98	16	1.5	0.130
	03/03/99	10	0.730	0.110
	06/17/99	12	1.3	0.110
	09/17/99	14	1.0	0.150
MW-5	12/15/98	< 0.0005	< 0.0005	< 0.0005
	03/02/99	0.066	< 0.0005	< 0.0005
	06/16/99	0.0078	< 0.0005	< 0.0005
	09/16/99	0.028	< 0.0005	< 0.0005
dup	09/16/99	0.026	< 0.0005	< 0.0005
MW-6	12/15/98	14	0.031	0.13
	03/02/99	9.8	0.015	0.094
dup	03/02/99	12	0.016	0.12
	06/16/99	11	0.01	0.10
	09/16/99	13	0.0082	0.098
MW-7	12/14/98	0.0019	< 0.0005	< 0.0005
	03/03/99	0.034	< 0.0005	< 0.0005
	06/17/99	0.0079	< 0.0005	< 0.0005
	09/17/99	0.015	< 0.0005	< 0.0005
MW-8	12/14/98	0.023	< 0.0005	< 0.0005
dup	12/14/98	0.025	< 0.0005	< 0.0005
	03/02/99	0.012	< 0.0005	< 0.0005
	06/16/99	0.0052	< 0.0005	< 0.0005
	09/16/99	0.018	< 0.0005	< 0.0005

Table 7

Dissolved Organic Gases in Groundwater Samples from Wells
Univar USA Inc. Facility, Kent, Washington

Sample Location	Date Collected	Modified RSK Method 175		
		Methane	Ethene	Ethane
MW-13	09/24/04	13	0.680	0.015
	04/05/05	0.52	0.027	0.0019
MW-14	09/24/04	5.8	0.0012	0.0022
	04/05/05	5.9	< 0.00055	0.00041
MW-15	09/24/04	7.7	< 0.0008	0.0017
	04/05/05	6.5	< 0.00055	0.0015
MW-16	09/23/04	16	0.0013	0.0032
	04/05/05	17	0.002	0.0037
MW-17	09/23/04	13	0.061	0.290
dup	09/23/04	13	0.060	0.290
	04/05/05	13	0.070	0.290
MW-18	09/23/04	4.5	0.0032	0.025
	04/05/05	4.8	0.0015	0.016
dup	04/05/05	5.7	0.0018	0.019
MW-19	09/23/04	5.6	0.870	0.032
	04/05/05	5.4	0.097	0.040
MW-20	09/20/05	13	0.010	0.240
P-1	09/24/04	5.1	< 0.0008	0.0030

NOTE: All results in mg/L.
< = less than the method reporting limit shown.
dup = duplicate sample.

Table 8

Soil and Groundwater Cleanup Levels
Univar USA Inc. Facility, Kent, Washington

Potential IHS	Groundwater (ug/L)		Soil (mg/kg)		Final IHS	
	Maximum 2003 Detection	Final CUL	Maximum Detection	Final CUL	Groundwater	Soil
1,1-DCA	5.6E+03	8.0E+02	4.2E-01	4.4E+00	Y	N
1,1-DCE	4.9E+02	7.0E+00	1.6E-01	5.0E-02	Y	Y
1,2-DCA	2.1E+00	5.0E-01	1.5E-03	5.5E-03	Y	N
1,2-DCP	1.7E+00	6.4E-01	ND	5.0E-03	Y	N
1,3,5-TMB	2.8E+02	4.0E+02	1.6E+00	8.4E+00	N	N
1,2,4-TMB	5.1E+02	4.0E+02	2.8E+00	3.1E+01	Y	N
2-butanone (MEK)	3.3E+01	4.8E+03	2.0E-01	2.0E+01	N	N
Acetone	8.2E+01	7.2E+03	3.1E+00	2.9E+01	N	N
Benzene	2.7E+01	8.0E-01	8.6E-03	5.5E-03	Y	Y
CFC-113 (Freon 113)	NA	2.4E+04	NA	1.0E+04	N	N
Chloroethane	5.3E+02	1.5E+01	6.9E-02	7.6E-02	Y	N
Chloroform	9.0E+00	7.2E+00	1.5E-02	4.1E-02	Y	N
cis-1,2-DCE	3.3E+04	7.0E+01	2.1E-01	3.5E-01	Y	N
Ethylbenzene	2.9E+03	7.0E+02	6.0E-01	6.0E+00	Y	N
Hexane	5.3E+01	4.8E+02	9.9E-02	9.6E+01	N	N
Isopropylbenzene	1.0E+02	8.0E+02	2.7E-01	7.4E+00	N	N
Methylene Chloride	2.5E+01	5.0E+00	1.4E+00	2.2E-02	Y	Y
n-propylbenzene	1.6E+02	3.2E+02	7.3E-01	2.0E+01	N	N
PCE	2.7E+03	8.6E-01	1.6E+02	9.0E-03	Y	Y
TCA	4.1E+03	2.0E+02	4.5E-01	1.6E+00	Y	N
TCE	3.5E+03	4.0E+00	6.3E-01	2.6E-02	Y	Y
Toluene	2.9E+04	1.0E+03	1.0E+00	7.3E+00	Y	N
Total Xylenes	1.2E+04	1.6E+03	4.2E+00	1.5E+01	Y	N
trans-1,2-DCE	6.6E+01	1.0E+02	5.7E-03	5.4E-01	N	N
Vinyl Chloride	7.9E+03	5.0E-01	1.9E-01	5.5E-03	Y	Y

Notes: IHS = indicator hazardous substance
CUL = cleanup level
ND = not detected
NA = not analyzed

Table 9

Summary of Design Basis Parameters
Cleanup Action Alternative Evaluation
Univar USA Inc. Facility, Kent, Washington

IHS	Cleanup Level (µg/L)	Design Basis Parameter Area 1 MW-13/MW-21	Design Basis Parameter Area 2 MW-5	Comments
Volatile Organic Compounds (µg/L)				
1,1,1-trichloroethane (TCA)	200	5,000	NA	Between probe and well results
1,1-dichloroethane (1,1-DCA)	800	1,700	NA	Maximum well detection
1,1-dichloroethene (1,1-DCE)	7	71	4	Maximum well detection
1,2,4-trimethylbenzene (1,2,4-TMB)	400	210	NA	Maximum well detection
Benzene	0.8	1.4	NA	Maximum well detection
Chloroethane	15	1,700	NA	Maximum well detection
cis-1,2-dichloroethene (cis-1,2-DCE)	70	8,400	NA	Maximum well detection
Ethylbenzene	700	4,900	NA	Maximum well detection
Methylene chloride	5	15	NA	Maximum well detection
Tetrachloroethene (PCE)	0.86	5,000	1600	Area 1- between probe and well results Area 2 - maximum well results
Toluene	1,000	9,300	NA	Maximum well detection
Total xylenes	1,600	8,100	NA	Maximum well detection
Trichloroethene (TCE)	4	3,500	1500	Area 1- between probe and well results Area 2 - maximum well results
Vinyl chloride	0.5	2,600	54	Maximum well detection
Geochemical Parameters (mg/L)				
Dissolved oxygen	NA	0.4	0.5	Representative value from well results
Nitrate	NA	0.4	2	Representative value from well results
Manganese	NA	1.4	0.34	Representative value from well results
Total iron	NA	37	0.13	Representative value from well results
Ferrous iron	NA	2.4	0.04	Representative value from well results
Sulfate	NA	4	21	Representative value from well results
Physical and Hydrogeologic Properties				
Treatment area width (ft)	NA	80	60	Specified
Treatment area length (ft)	NA	120	60	Specified
Depth to water (ft bgs)	NA	5	5	Average of well measurements
Depth to top of contaminated zone (ft)	NA	20	5	From remedial investigation report
Thickness of contaminated zone (ft)	NA	22	15	From remedial investigation report
Aquifer soil type	NA	Sand (SP)	Silty Sand (SM)	From remedial investigation report
Total porosity	NA	0.4	0.4	Estimate
Effective porosity	NA	0.2	0.2	Estimate
Hydraulic conductivity (ft/day)	NA	50	50	Average from remedial investigation
Hydraulic gradient (ft/ft)	NA	0.0011	0.0015	Average from well measurements
Shallow groundwater velocity (ft/year)	NA	30 - 300	30 - 300	Average from well measurements
Deep groundwater velocity (ft/year)	NA	10 - 100	10 - 100	Average from well measurements

Notes:
1. Concentrations for Area 1 are based on data from direct push probes SB-30, SB-31, and SB-38 and monitoring wells MW-13, MW-21, and MW-22. Well data taken from 2005/2006 monitoring results.
2. Concentrations for Area 2 are based on data from wells MW-5, MW-11, MW-12 and MW-23 for 2005 and 2006 monitoring data.
3. NA = not applicable
4. ft = feet
5. bgs = gelow ground surface

Table 10

Preliminary Performance and Compliance Monitoring Program
Univar USA Inc. Facility, Kent, Washington

Well	Monitoring Purpose	Water Level Measurement Frequency	Groundwater Sampling Frequency: Field Parameters	VOCs (Full List)	Substrate Distribution	Attenuation Suite	Biological Testing
Shallow Monitoring Wells							
MW-1	MW-1/MW-4 Performance	SA	SA	SA	–	SA	–
MW-2	Compliance	SA	SA	SA	–	–	–
MW-3	Compliance	SA	SA	SA	–	–	–
MW-4	MW-1/MW-4 Performance	SA	SA	SA	–	SA	–
MW-5	MW-5 Performance	SA	B, Q/SA	B, Q/SA	Q/SA	B, Q/SA	B, SA/A
MW-6	Compliance	SA	SA	SA	–	–	–
MW-7	Compliance	SA	SA	SA	–	–	–
MW-8	Compliance	SA	SA	SA	–	–	–
MW-9	Compliance	SA	SA	SA	–	–	–
MW-10	Compliance	SA	SA	SA	–	–	–
MW-11	Compliance	SA	SA	SA	–	–	–
MW-12	MW-5 Performance	SA	B, Q/SA	B, Q/SA	Q/SA	B, Q/SA	B, SA/A
MW-23	MW-5 Performance	SA	B, Q/SA	B, Q/SA	Q/SA	B, Q/SA	B, SA/A
Deep Monitoring Wells and Piezometer							
MW-13	MW-13 Performance	SA	B, Q/SA	B, Q/SA	Q/SA	B, Q/SA	–
MW-14	Compliance	SA	SA	SA	–	–	–
MW-15	Compliance	SA	SA	SA	–	–	–
MW-16	Compliance	SA	SA	SA	–	–	–
MW-17	MW-13 Performance	SA	SA	SA	SA	SA	–
MW-18	MW-13 Performance	SA	SA	SA	SA	SA	–
MW-19	Compliance	SA	SA	SA	–	–	–
MW-20	Compliance	SA	SA	SA	–	–	–
MW-21	MW-13 Performance	SA	B, Q/SA	B, Q/SA	Q/SA	B, Q/SA	–
MW-22	MW-13 Performance	SA	B, Q/SA	B, Q/SA	Q/SA	B, Q/SA	–
P-1	Water level measurement	SA	–	–	–	–	–
Pilot Test Injection Wells							
INJ-1	To be decommissioned	–	–	–	–	–	–
INJ-2	To be decommissioned	–	–	–	–	–	–
INJ-3A	To be decommissioned	–	–	–	–	–	–

Notes:
1. B = Baseline event to be conducted prior to injections
2. Q = Quarterly
3. SA = Semiannually
4. Q/SA = Quarterly through two years after final injections, semiannually thereafter
5. SA/A = Semiannually to annually following bioaugmentation, depending on bioaugmentation results
6. Field parameters include pH, specific conductance, temperature, turbidity, dissolved oxygen, and oxidation-reduction potential
7. VOCs (Full List) = Volatile organic compounds, including chlorinated and aromatic hydrocarbons
8. Substrate distribution includes TOC analysis and visual inspection for substrate in groundwater sample.
9. Attenuation Suite includes dissolved gases, chloride, sulfate, sulfide, nitrate, manganese, alkalinity and ferrous iron until two years following final injection. Subsequently, only dissolved gases will be analyzed.
10. Biological Testing includes polymerase chain reaction testing to quantify known dechlorinating microbes.

Table 11

Construction, Operation, and Maintenance Costs
Alternative 3 - Enhanced Reductive Dechlorination, Natural Attenuation and Institutional Controls

Capital Costs					
ITEM	UNIT COST	UNITS	QUANTITY		COST
Planning and Design Costs					
1. Groundwater Monitoring Plan	$ 10,000	LS	1	$	10,000
2. Injection Test	$ 25,000	LS	1	$	25,000
3. Cleanup Action Design	$ 20,000	LS	1	$	20,000
4. UIC Program Permitting	$ 2,000	LS	1	$	2,000
Subtotal Planning and Design				**$**	**57,000**
Construction Costs					
1. Shallow Injection Wells (~ 20 ft bgs)	$ 2,000	EA	18	$	36,000
2. Deeper Injection Wells (~ 42 ft bgs)	$ 2,500	EA	41	$	102,500
3. Direct-Push Injection Points (~ 42 ft bgs)	$ 1,500	EA	7	$	10,500
4. Decommission INJ-1, INJ-2, INJ-3, & MW-11	$ 750	EA	4	$	3,000
5. Disposal of Remediation Wastes	$ 5,000	LS	1	$	5,000
6. Engineering Oversight	$ 30,000	LS	1	$	30,000
7. Construction Report	$ 10,000	LS	1	$	10,000
Subtotal Construction Costs				**$**	**197,000**
Sales Tax on Materials (8.9%)				$	13,973
Subtotal Capital Costs				**$**	**267,973**
Capital Cost Contingency (20%)				$	53,595
TOTAL CAPITAL COSTS				**$**	**321,568**

Operation and Maintenance Costs							
Activity	UNIT COST	UNITS	QUANTITY		ANNUAL COST		**PW[1]**
Emulsified Oil Injection (initial application)							
1. Newman Zone Emulsion	$ 2.00	LB	10,200	$	20,400		
2. Bioaugmentation Culture	$ 170	L	81	$	13,770		
3. Equipment	$ 9,000	LS	1	$	9,000		
4. Labor	$ 27,000	LS	1	$	27,000		
Total				$	70,170	**$**	**70,170**
Emulsified Oil Injection (second application)							
1. Newman Zone Emulsion	$ 2.00	LB	10,200	$	20,400		
2. Equipment	$ 9,000	LS	1	$	9,000		
3. Labor	$ 23,000	LS	1	$	23,000		
Total				$	52,400	**$**	**45,768**
Groundwater Monitoring and Reporting							
1. Baseline Monitoring	$ 14,000	LS	1	$	14,000	$	14,000
2. Monitoring Years 1 through 4	$ 36,000	LS	1	$	36,000	$	121,940
3. Monitoring Years 5 through 20	$ 25,000	LS	1	$	25,000	$	180,170
4. Progress Reporting (yrs 1 through 4)	$ 20,000	LS	1	$	20,000	$	67,744
5. Progress Reporting (yrs 5 through 20)	$ 10,000	LS	1	$	10,000	$	72,068
6. Groundwater Report (yrs 1 through 20)	$ 10,000	LS	1	$	10,000	$	105,940
Total						**$**	**561,862**
Pavemement Maintenance	$ 1,500	LS	1	$	1,500	$	15,891
Subtotal O & M Costs						**$**	**693,691**
O & M Contigency (10%)						$	69,369
TOTAL OPERATION AND MAINTENANCE COSTS						**$**	**763,060**
TOTAL ESTIMATED PRESENT WORTH COST						**$**	**1,084,628**

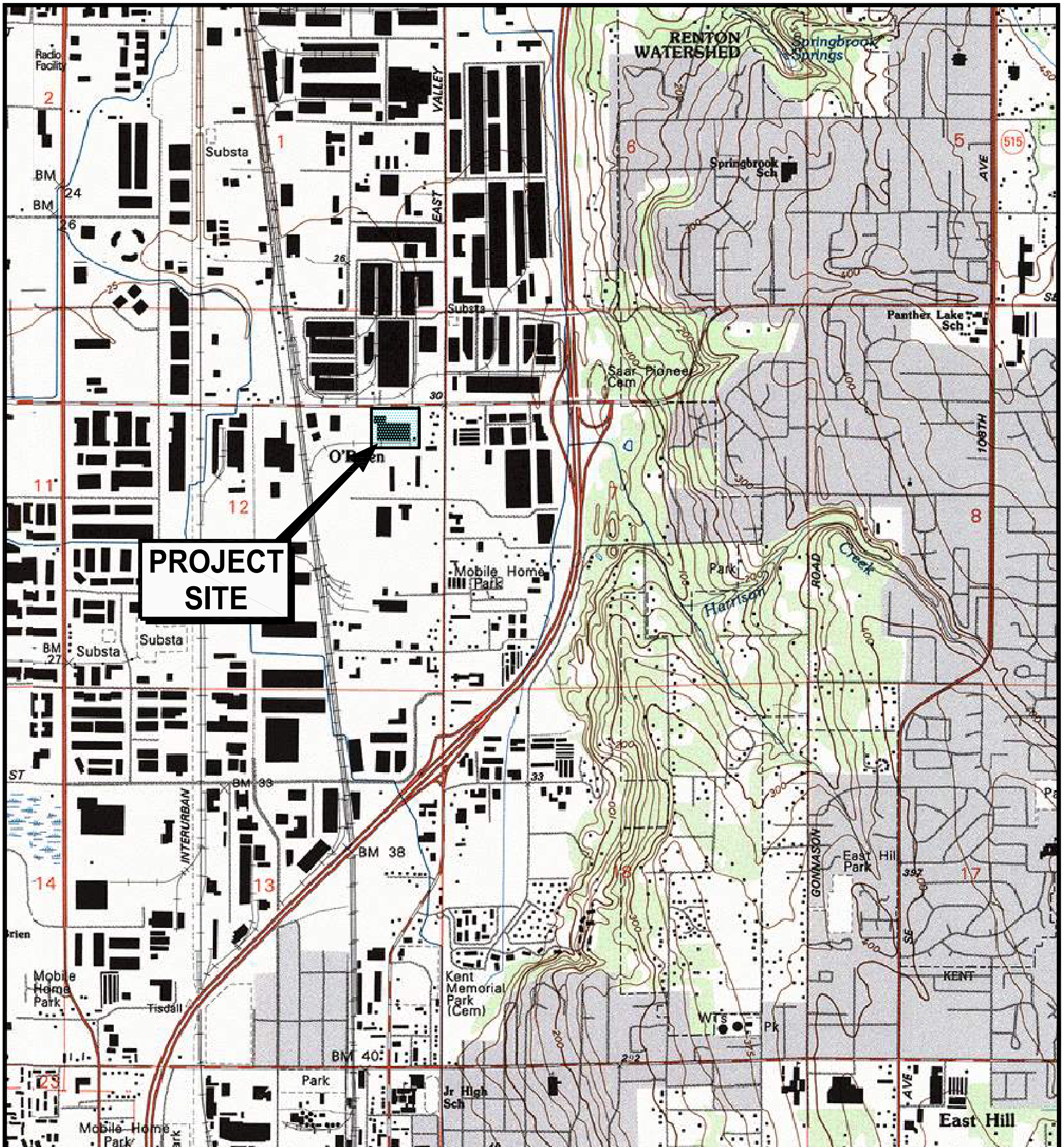
[1] PW = present worth, calculated assuming a 7% discount rate using the average annual cost and years of operation indicated in the following formula:

$$PW = A\frac{(1+i)^n - 1}{i(1+i)^n}$$

A = average annual cost
i = discount rate
n = number of years of operation

All total costs are in 2009 dollars.

FIGURES



0 2000 4000

Scale in Feet

N

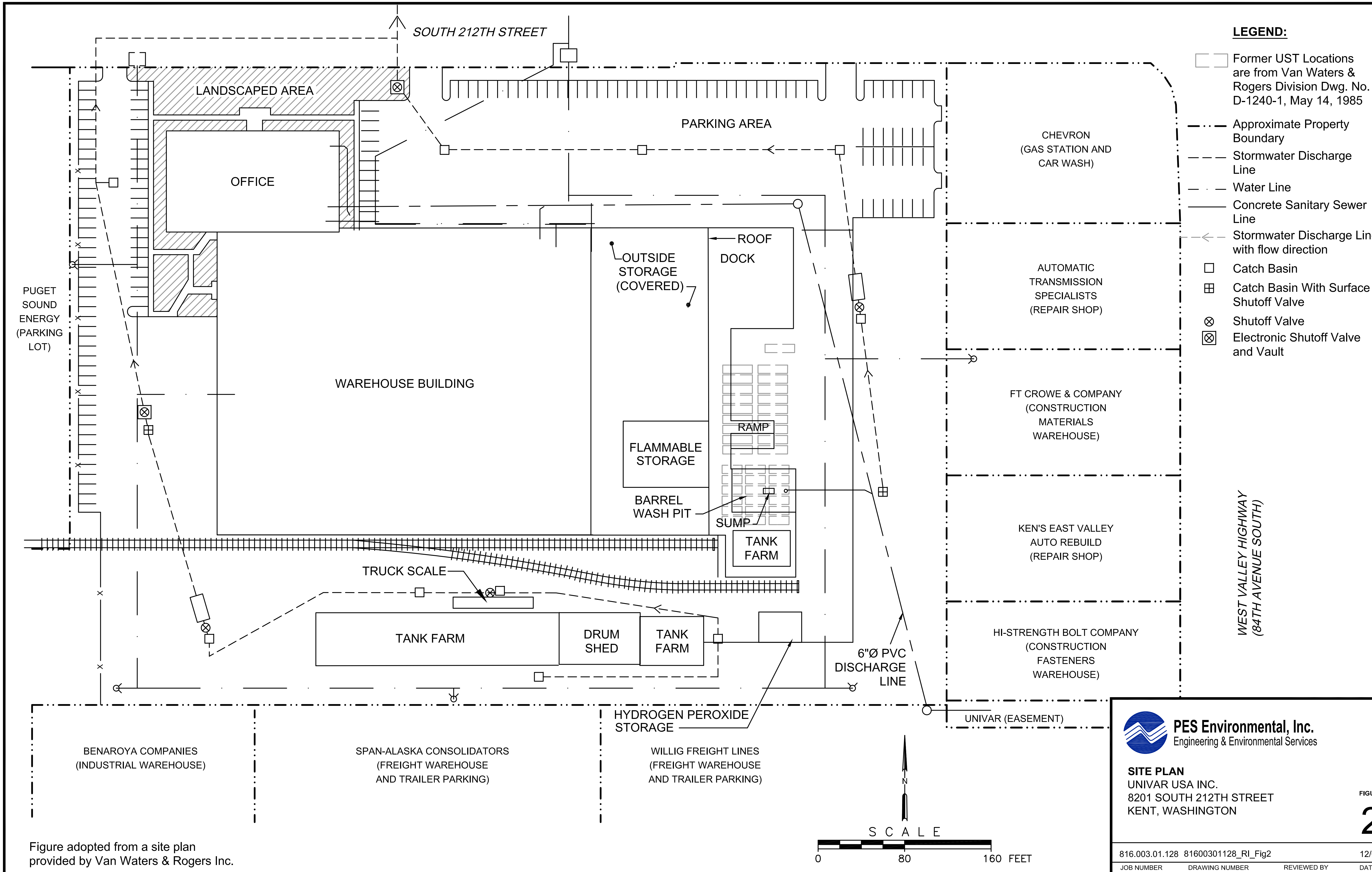
U.S.G.S. Topo Map - Renton, Washington 7.5-minute quadrangle.1994

PES Environmental, Inc.
Engineering & Environmental Services

SITE LOCATION MAP
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE
1

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301128_RI_Fig1		12/08


SOUTH 212TH STREET
LANDSCAPED AREA
PARKING AREA
OFFICE
WAREHOUSE BUILDING
OUTSIDE STORAGE (COVERED)
ROOF
DOCK
RAMP
FLAMMABLE STORAGE
BARREL WASH PIT
SUMP
TANK FARM
TRUCK SCALE
TANK FARM
DRUM SHED
TANK FARM
6"Ø PVC DISCHARGE LINE
HYDROGEN PEROXIDE STORAGE
UNIVAR (EASEMENT)
PUGET SOUND ENERGY (PARKING LOT)
CHEVRON (GAS STATION AND CAR WASH)
AUTOMATIC TRANSMISSION SPECIALISTS (REPAIR SHOP)
FT CROWE & COMPANY (CONSTRUCTION MATERIALS WAREHOUSE)
KEN'S EAST VALLEY AUTO REBUILD (REPAIR SHOP)
HI-STRENGTH BOLT COMPANY (CONSTRUCTION FASTENERS WAREHOUSE)
WEST VALLEY HIGHWAY (84TH AVENUE SOUTH)
BENAROYA COMPANIES (INDUSTRIAL WAREHOUSE)
SPAN-ALASKA CONSOLIDATORS (FREIGHT WAREHOUSE AND TRAILER PARKING)
WILLIG FREIGHT LINES (FREIGHT WAREHOUSE AND TRAILER PARKING)
LEGEND:
Former UST Locations are from Van Waters & Rogers Division Dwg. No. D-1240-1, May 14, 1985
Approximate Property Boundary
Stormwater Discharge Line
Water Line
Concrete Sanitary Sewer Line
Stormwater Discharge Line with flow direction
Catch Basin
Catch Basin With Surface Shutoff Valve
Shutoff Valve
Electronic Shutoff Valve and Vault
N
SCALE
0
80
160 FEET
Figure adopted from a site plan provided by Van Waters & Rogers Inc.
PES Environmental, Inc.
Engineering & Environmental Services
SITE PLAN
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON
FIGURE
2
816.003.01.128
81600301128_RI_Fig2
12/08
JOB NUMBER
DRAWING NUMBER
REVIEWED BY
DATE

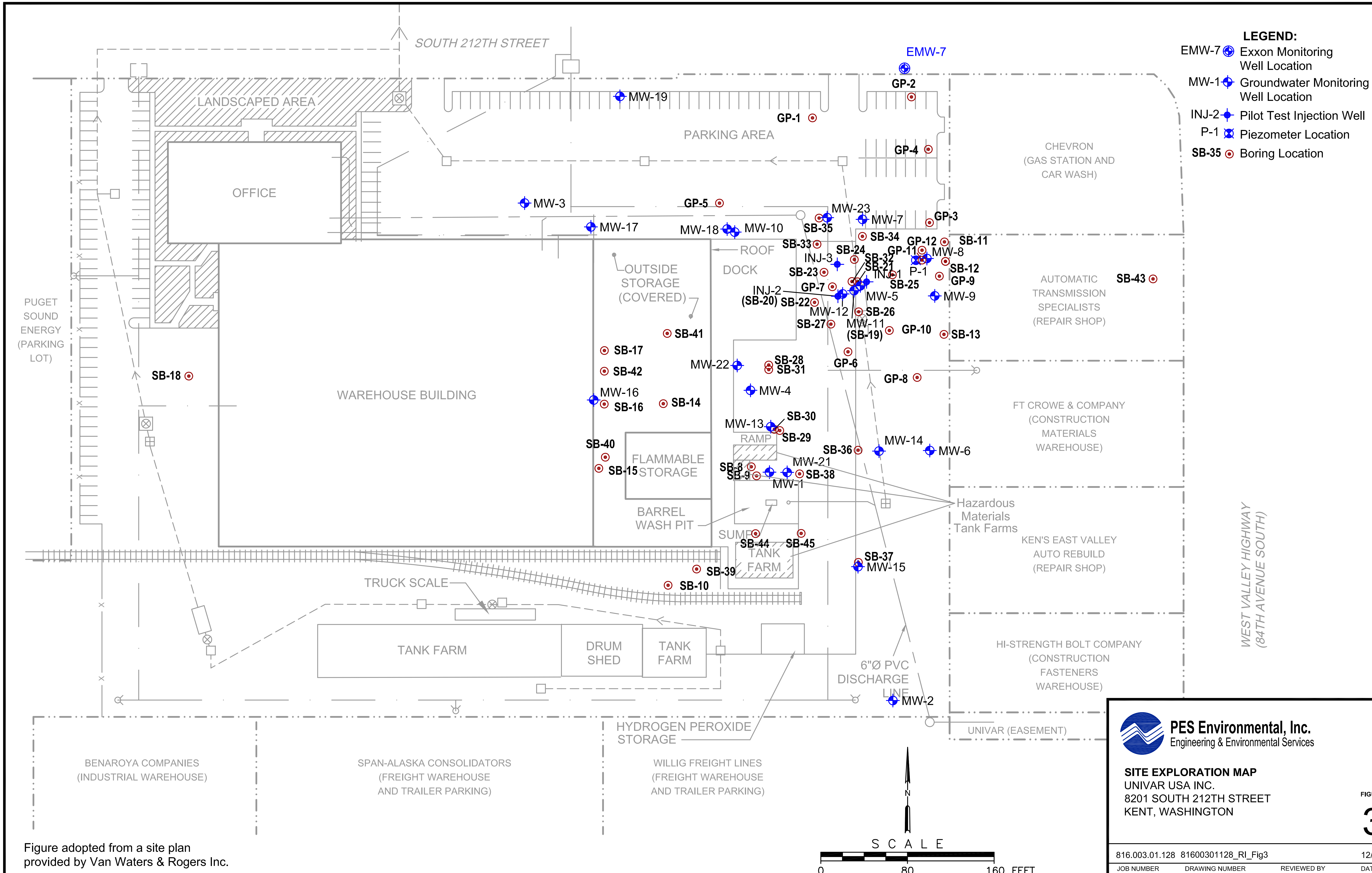


Figure adopted from a site plan provided by Van Waters & Rogers Inc.

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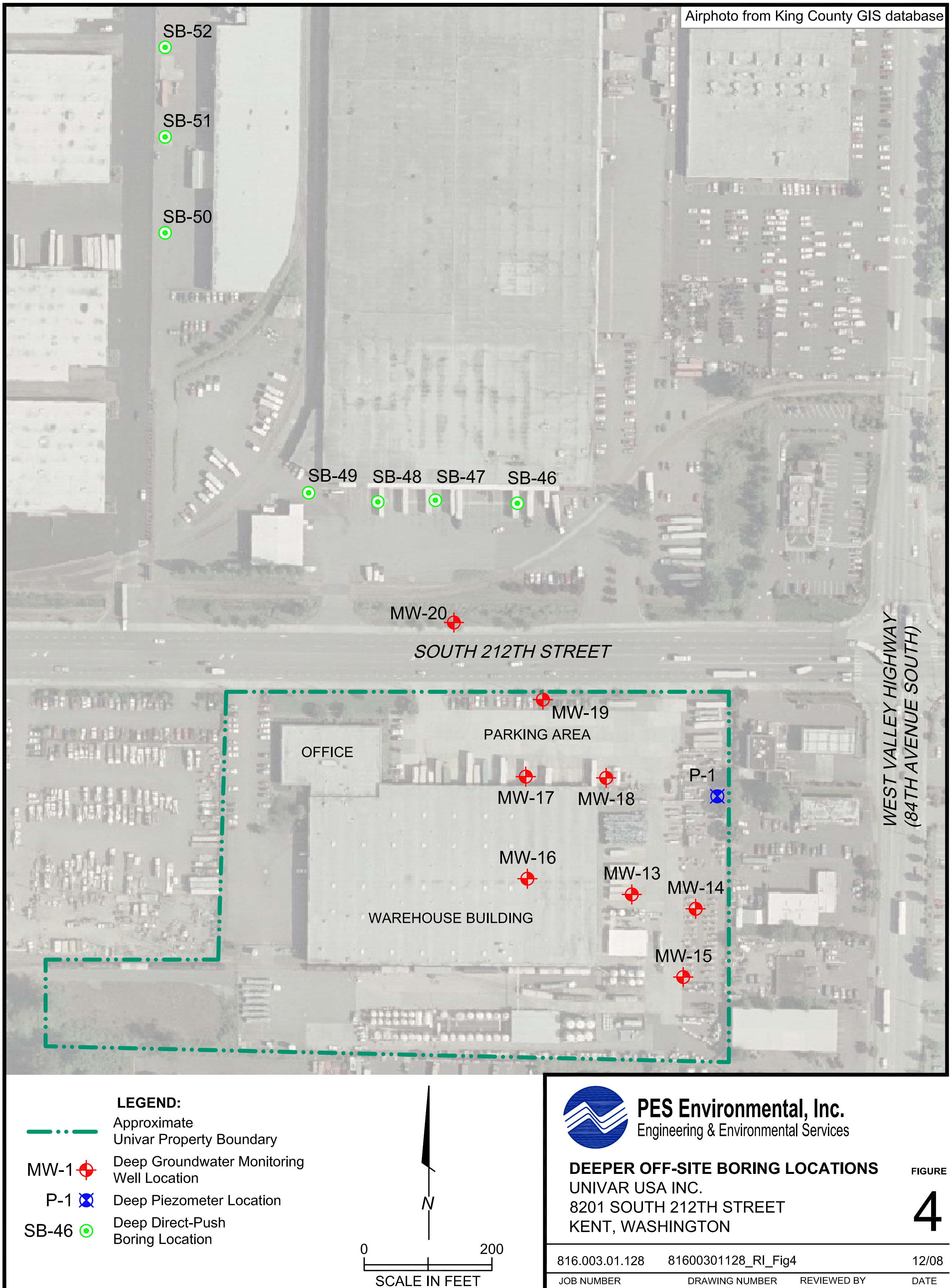
SITE EXPLORATION MAP
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE 3

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301128_RI_Fig3		12/08



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DEEPER OFF-SITE BORING LOCATIONS
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE 4

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301128_RI_Fig4		12/08

LEGEND:

Existing Exxon Monitoring Well Location

MW-1 — Groundwater Monitoring Well Location

26.75 — Groundwater Elevation in Feet Above NAVD 88 on September 24, 2007

26.6 — Generalized Groundwater Elevation Contour

Approximate Groundwater Flow Direction

N

SCALE

0 100 200 FEET

Airphoto from King County GIS database

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GROUNDWATER CONTOUR MAP,
SHALLOW ZONE - SEPTEMBER 24, 2007
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE
5

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301128_RI_Fig5		12/08

LEGEND:

MW-16 Groundwater Monitoring Well Location

P-1 Piezometer Location

25.63 Groundwater Elevation in Feet Above NAVD 88 on September 24, 2007

25.6 Generalized Groundwater Elevation Contour

Approximate Groundwater Flow Direction

* Anomalous Groundwater Elevation Not Used in Contouring

N

SCALE

0 100 200 FEET

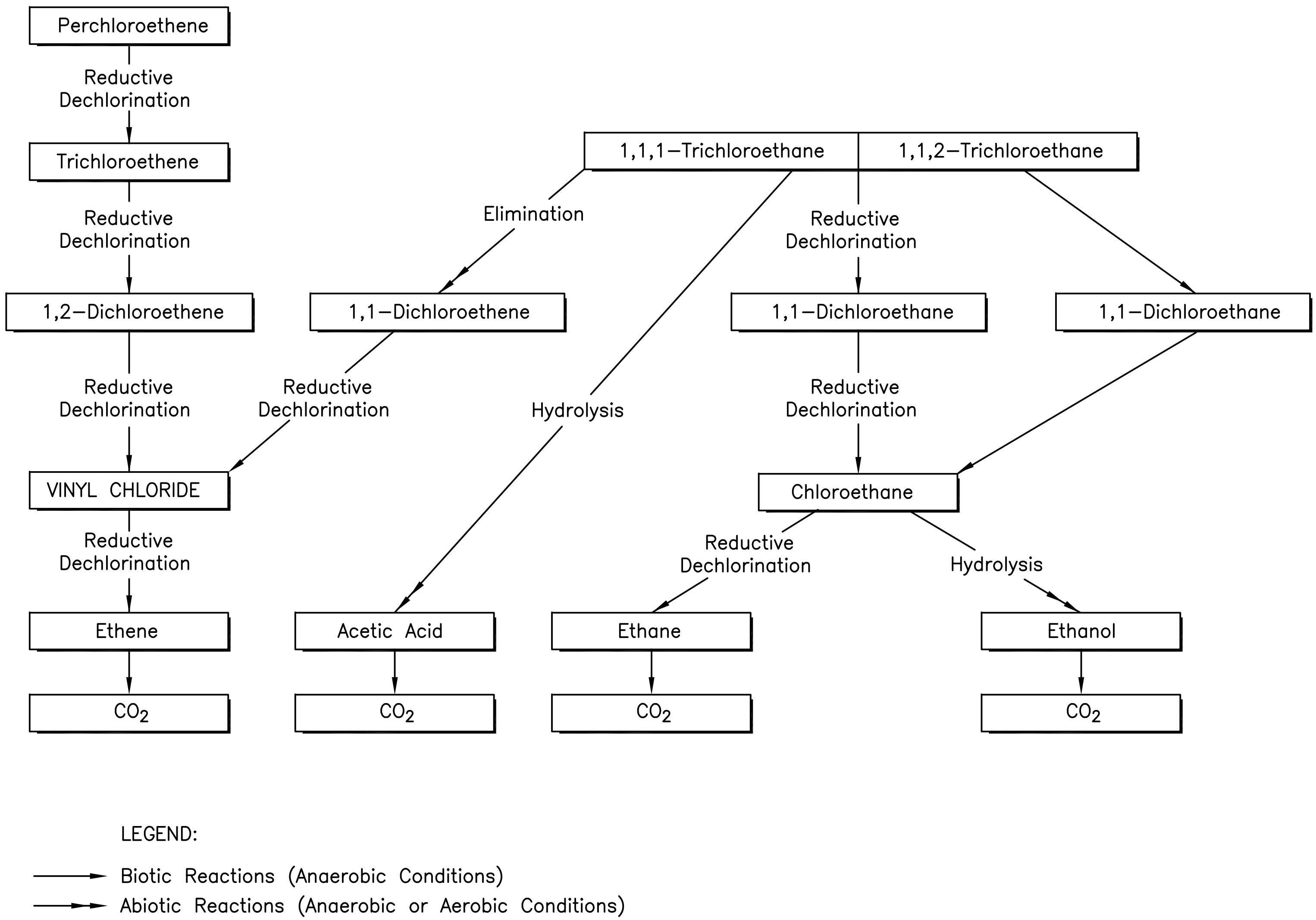
Airphoto from King County GIS database

PES Environmental, Inc.
Engineering & Environmental Services

GROUNDWATER CONTOUR MAP, DEEP ZONE - SEPTEMBER 24, 2007
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE
6

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301128_RI_Fig6		12/08



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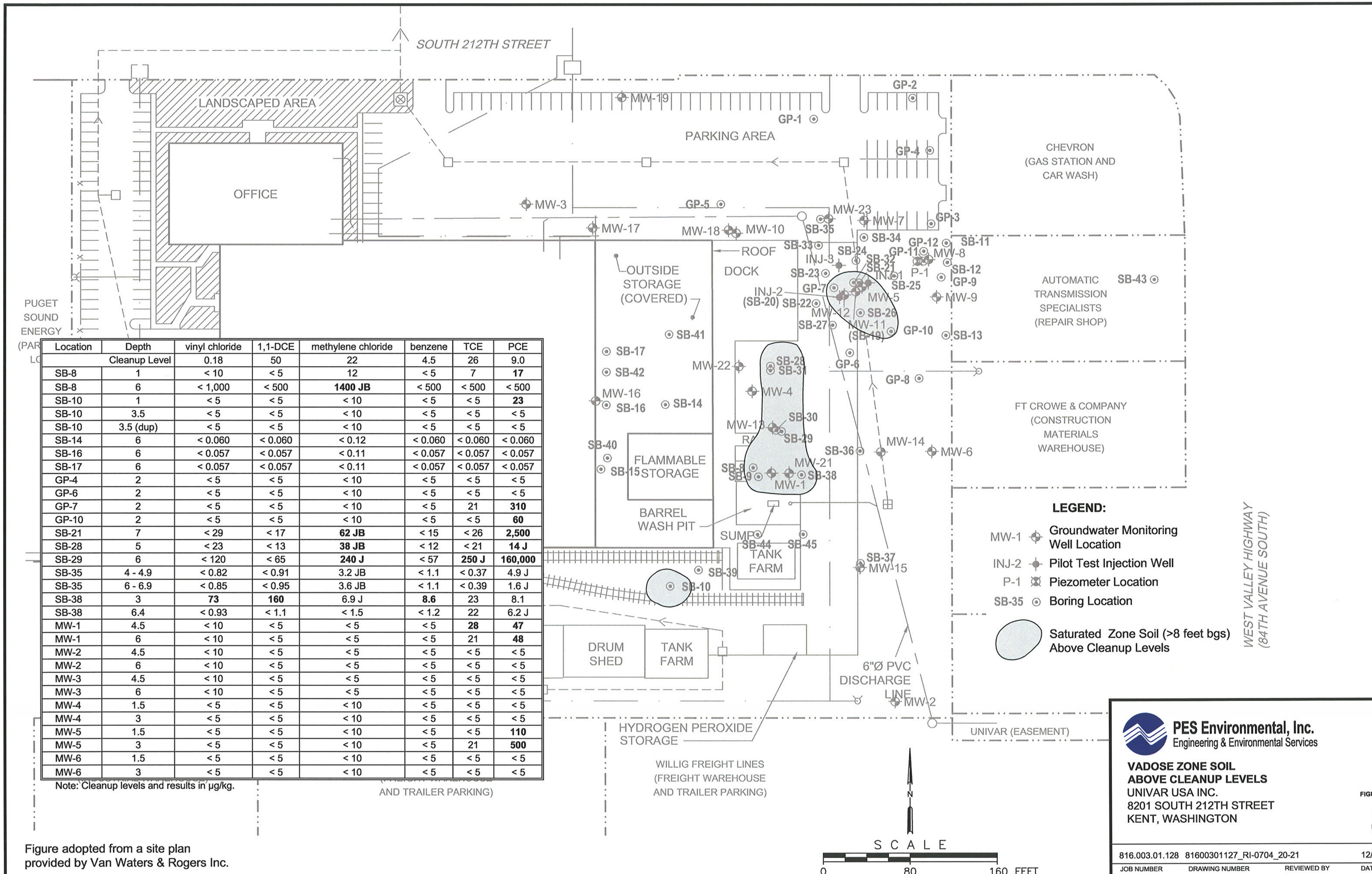
Engineering & Environmental Services

DEGRADATION PATHWAYS FOR COMMON CHLORINATED SOLVENTS
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE
7

816.003.01.128	81600301128_RI_Fig7		12/08
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Location	Depth	vinyl chloride	1,1-DCE	methylene chloride	benzene	TCE	PCE
	Cleanup Level	0.18	50	22	4.5	26	9.0
SB-8	1	< 10	< 5	12	< 5	7	**17**
SB-8	6	< 1,000	< 500	**1400 JB**	< 500	< 500	< 500
SB-10	1	< 5	< 5	< 10	< 5	< 5	**23**
SB-10	3.5	< 5	< 5	< 10	< 5	< 5	< 5
SB-10	3.5 (dup)	< 5	< 5	< 10	< 5	< 5	< 5
SB-14	6	< 0.060	< 0.060	< 0.12	< 0.060	< 0.060	< 0.060
SB-16	6	< 0.057	< 0.057	< 0.11	< 0.057	< 0.057	< 0.057
SB-17	6	< 0.057	< 0.057	< 0.11	< 0.057	< 0.057	< 0.057
GP-4	2	< 5	< 5	< 10	< 5	< 5	< 5
GP-6	2	< 5	< 5	< 10	< 5	< 5	< 5
GP-7	2	< 5	< 5	< 10	< 5	21	**310**
GP-10	2	< 5	< 5	< 10	< 5	< 5	**60**
SB-21	7	< 29	< 17	**62 JB**	< 15	< 26	**2,500**
SB-28	5	< 23	< 13	**38 JB**	< 12	< 21	**14 J**
SB-29	6	< 120	< 65	**240 J**	< 57	**250 J**	**160,000**
SB-35	4 - 4.9	< 0.82	< 0.91	3.2 JB	< 1.1	< 0.37	4.9 J
SB-35	6 - 6.9	< 0.85	< 0.95	3.6 JB	< 1.1	< 0.39	1.6 J
SB-38	3	**73**	**160**	6.9 J	**8.6**	23	8.1
SB-38	6.4	< 0.93	< 1.1	< 1.5	< 1.2	22	6.2 J
MW-1	4.5	< 10	< 5	< 5	< 5	**28**	**47**
MW-1	6	< 10	< 5	< 5	< 5	21	**48**
MW-2	4.5	< 10	< 5	< 5	< 5	< 5	< 5
MW-2	6	< 10	< 5	< 5	< 5	< 5	< 5
MW-3	4.5	< 10	< 5	< 5	< 5	< 5	< 5
MW-3	6	< 10	< 5	< 5	< 5	< 5	< 5
MW-4	1.5	< 5	< 5	< 10	< 5	< 5	< 5
MW-4	3	< 5	< 5	< 10	< 5	< 5	< 5
MW-5	1.5	< 5	< 5	< 10	< 5	< 5	**110**
MW-5	3	< 5	< 5	< 10	< 5	21	**500**
MW-6	1.5	< 5	< 5	< 10	< 5	< 5	< 5
MW-6	3	< 5	< 5	< 10	< 5	< 5	< 5

Note: Cleanup levels and results in µg/kg.

Figure adopted from a site plan provided by Van Waters & Rogers Inc.

PES Environmental, Inc.
Engineering & Environmental Services

VADOSE ZONE SOIL ABOVE CLEANUP LEVELS
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE 8

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301127_RI-0704_20-21		12/08

Location	Depth	vinyl chloride	1,1-DCE	methylene chloride	benzene	TCE	PCE
	Cleanup Level	0.18	50	22	4.5	26	9.0
SB-19	10	< 29	< 29	< 57	< 29	**56**	**3,500**
SB-20	10	< 33	< 33	< 65	< 33	**630**	**910**
SB-21	11	< 28	< 16	**61 JB**	< 14	< 25	**800**
SB-21	16	< 0.80	< 0.89	5.7 JB	< 1.1	1.2 J	**28**
SB-21	17.7	< 0.80	< 0.90	4.1 JB	< 1.1	2.5 J	**33**
SB-22	11.3	**1.3 J**	< 0.90	4.6 JB	< 1.1	0.79 J	**30**
SB-22	17.7	< 0.77	< 0.85	5.6 JB	< 0.97	< 0.35	< 0.39
SB-23	10	**1.6 J**	< 0.98	5.8 JB	< 1.2	< 0.40	0.96 J
SB-23	15.4	< 0.81	< 0.90	8.0 JB	< 1.1	3.9 J	**81**
SB-24	10	< 29	< 17	**69 JB**	< 15	**120**	**830**
SB-24	14.8	< 0.85	< 0.94	5.2 JB	< 1.1	12	**56**
SB-25	11	< 0.84	< 0.93	6.3 JB	< 1.1	**31**	< 0.42
SB-25	15.5	< 0.85	< 0.95	5.9 JB	< 1.1	**160**	0.63 J
SB-26	11.9	< 0.83	< 0.92	7.4 JB	< 1.1	< 0.38	< 0.42
SB-26	17.5	< 0.87	< 0.96	6.3 JB	2.3 J	< 0.39	< 0.44
SB-27	11.5	< 0.99	< 1.1	6.6 JB	**4.6 J**	< 0.45	3.3 J
SB-27	17	< 0.78	< 0.87	6.1 JB	< 1.0	< 0.36	< 0.39
SB-30	8.5-9.4	< 6.2	< 6.2	< 13	< 6.2	< 6.2	< 6.2
SB-30	14.4-15.3	< 9.9	< 9.9	< 20	< 9.9	< 9.9	< 9.9
SB-30	24-24.9	< 6.5	< 6.5	< 13	< 6.5	< 6.5	< 6.5
SB-30	29-29.9	< 6.3	< 6.3	< 13	< 6.3	< 6.3	< 6.3
SB-30	40.5-41.4	< 6.4	< 6.4	< 13	< 6.4	< 6.4	< 6.4
SB-30	44.5-45.4	< 30	< 30	< 59	< 30	< 30	< 30
SB-31	10.2 -11.1	< 24	< 24	< 48	< 24	< 24	< 24
SB-31	28.8 - 29.7	< 6.2	< 6.2	< 13	< 6.2	< 6.2	< 6.2
SB-31	35-35.9	< 6.1	< 6.1	< 13	< 6.1	< 6.1	< 6.1
SB-32	24.6-25.5	< 6.3	< 6.3	< 13	< 6.3	< 6.3	< 6.3
SB-33	10-10.9	< 34	< 34	< 67	< 34	**59**	**1,800**
SB-33	14.1-15	< 32	< 32	< 63	< 32	< 32	**420**
SB-33	24.6-25.5	< 6.4	< 6.4	< 13	< 6.4	< 6.4	< 6.4
SB-34	10.6-11.5	< 6.6	< 6.6	< 14	< 6.6	< 6.6	< 6.6
SB-34	14.7-15.6	< 6.3	< 6.3	< 13	< 6.3	< 6.3	< 6.3
SB-34	26.4-27.3	< 6.2	< 6.2	< 13	< 6.2	< 6.2	< 6.2
SB-35	10 - 10.9	< 0.79	< 0.88	3.4 JB	< 1.1	< 0.36	< 0.40
SB-35	12 - 12.9	< 0.81	< 0.90	3.5 JB	< 1.1	< 0.37	< 0.41
SB-35	16 -16.9	< 0.79	< 0.88	3.8 JB	< 1.0	1.6 J	< 0.4
SB-35	20 - 20.9	< 0.77	< 0.86	2.9 JB	< 0.99	0.76 J	< 0.39
SB-35	24 - 24.9	< 0.76	< 0.84	3.0 JB	< 0.96	< 0.34	< 0.38
SB-38	12.4	< 0.84	< 0.94	< 1.3	1.9 J	21	7.2
SB-38	17.3	< 0.79	< 0.88	1.3 J	< 1.1	1.4 J	< 0.40
SB-38	25	**190**	**120**	8.8 J	1.5 J	10	6.1
SB-38	27.8	**0.61**	37	< 1.3	2.7 J	1.6 J	0.95 J
SB-38	32.8	**3.2 J**	< 0.90	< 1.3	< 1.1	4.1 J	1.6 J
SB-38	37.8	**7.5**	4.8 J	2.5 J	< 1.1	25	**130**
SB-41	37	< 0.75	< 0.84	2.2 J	< 0.96	< 0.34	< 0.38
SB-41	42.5	< 0.73	< 0.81	2.2 J	< 0.93	< 0.33	< 0.37
MW-11	10	< 6.6	< 6.6	< 14	< 6.6	7	**1,500**
MW-19	44.5	< 0.85	< 0.95	4.7 J	< 1.1	< 0.39	< 0.43
INJ-2	10	< 6.5	< 6.5	< 13	< 6.5	**62**	**9,300**

Note: Cleanup levels and results in µg/kg.

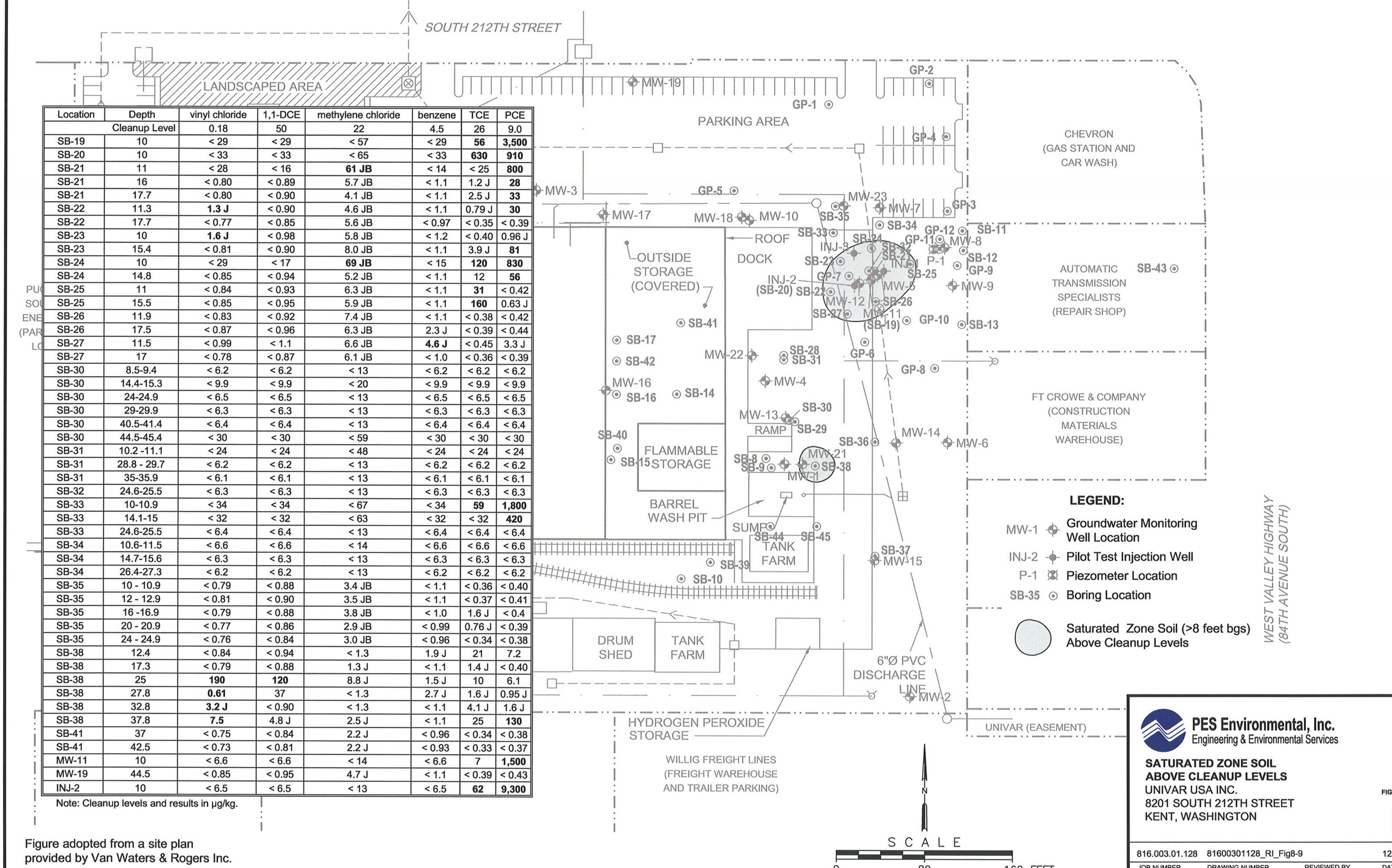


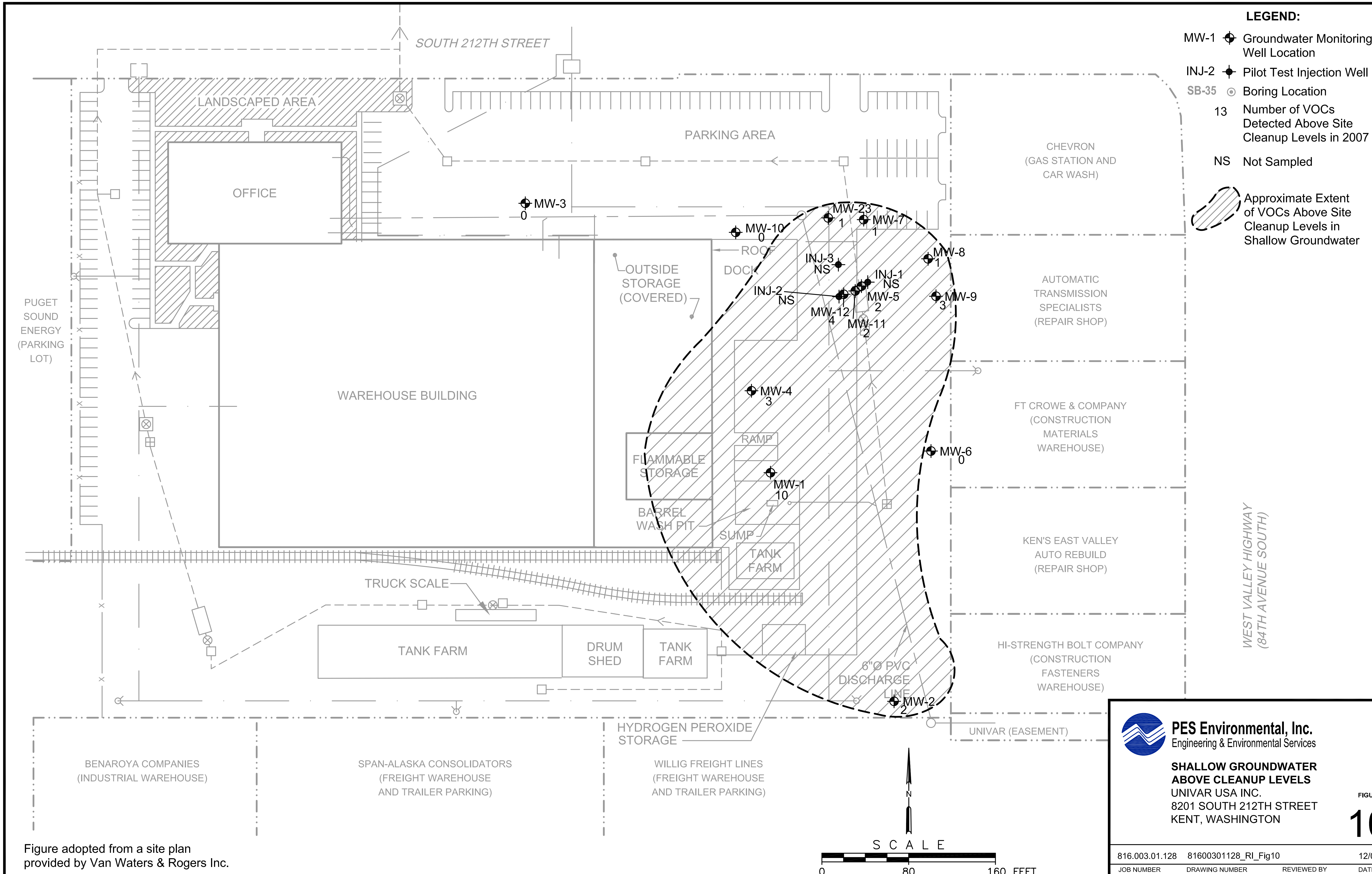
Figure adopted from a site plan provided by Van Waters & Rogers Inc.

PES Environmental, Inc.
Engineering & Environmental Services

SATURATED ZONE SOIL ABOVE CLEANUP LEVELS
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE
9

816.003.01.128	81600301128_RI_Fig8-9		12/08
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



LEGEND:
MW-1 Groundwater Monitoring Well Location
INJ-2 Pilot Test Injection Well
SB-35 Boring Location
13 Number of VOCs Detected Above Site Cleanup Levels in 2007
NS Not Sampled
Approximate Extent of VOCs Above Site Cleanup Levels in Shallow Groundwater
SOUTH 212TH STREET
LANDSCAPED AREA
PARKING AREA
OFFICE
WAREHOUSE BUILDING
OUTSIDE STORAGE (COVERED)
ROOF
DOCK
FLAMMABLE STORAGE
BARREL WASH PIT
SUMP
RAMP
TANK FARM
TRUCK SCALE
TANK FARM
DRUM SHED
TANK FARM
6"Ø PVC DISCHARGE LINE
HYDROGEN PEROXIDE STORAGE
MW-3 0
MW-10 0
MW-23 1
MW-7 1
MW-8 1
INJ-3 NS
INJ-1 NS
INJ-2 NS
MW-5 2
MW-9 3
MW-12 4
MW-11 2
MW-4 3
MW-6 0
MW-1 10
MW-2 2
PUGET SOUND ENERGY (PARKING LOT)
CHEVRON (GAS STATION AND CAR WASH)
AUTOMATIC TRANSMISSION SPECIALISTS (REPAIR SHOP)
FT CROWE & COMPANY (CONSTRUCTION MATERIALS WAREHOUSE)
KEN'S EAST VALLEY AUTO REBUILD (REPAIR SHOP)
HI-STRENGTH BOLT COMPANY (CONSTRUCTION FASTENERS WAREHOUSE)
WEST VALLEY HIGHWAY (84TH AVENUE SOUTH)
UNIVAR (EASEMENT)
BENAROYA COMPANIES (INDUSTRIAL WAREHOUSE)
SPAN-ALASKA CONSOLIDATORS (FREIGHT WAREHOUSE AND TRAILER PARKING)
WILLIG FREIGHT LINES (FREIGHT WAREHOUSE AND TRAILER PARKING)
N
SCALE
0 80 160 FEET
Figure adopted from a site plan provided by Van Waters & Rogers Inc.
PES Environmental, Inc.
Engineering & Environmental Services
SHALLOW GROUNDWATER ABOVE CLEANUP LEVELS
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON
FIGURE 10
816.003.01.128 JOB NUMBER
81600301128_RI_Fig10 DRAWING NUMBER
REVIEWED BY
12/08 DATE

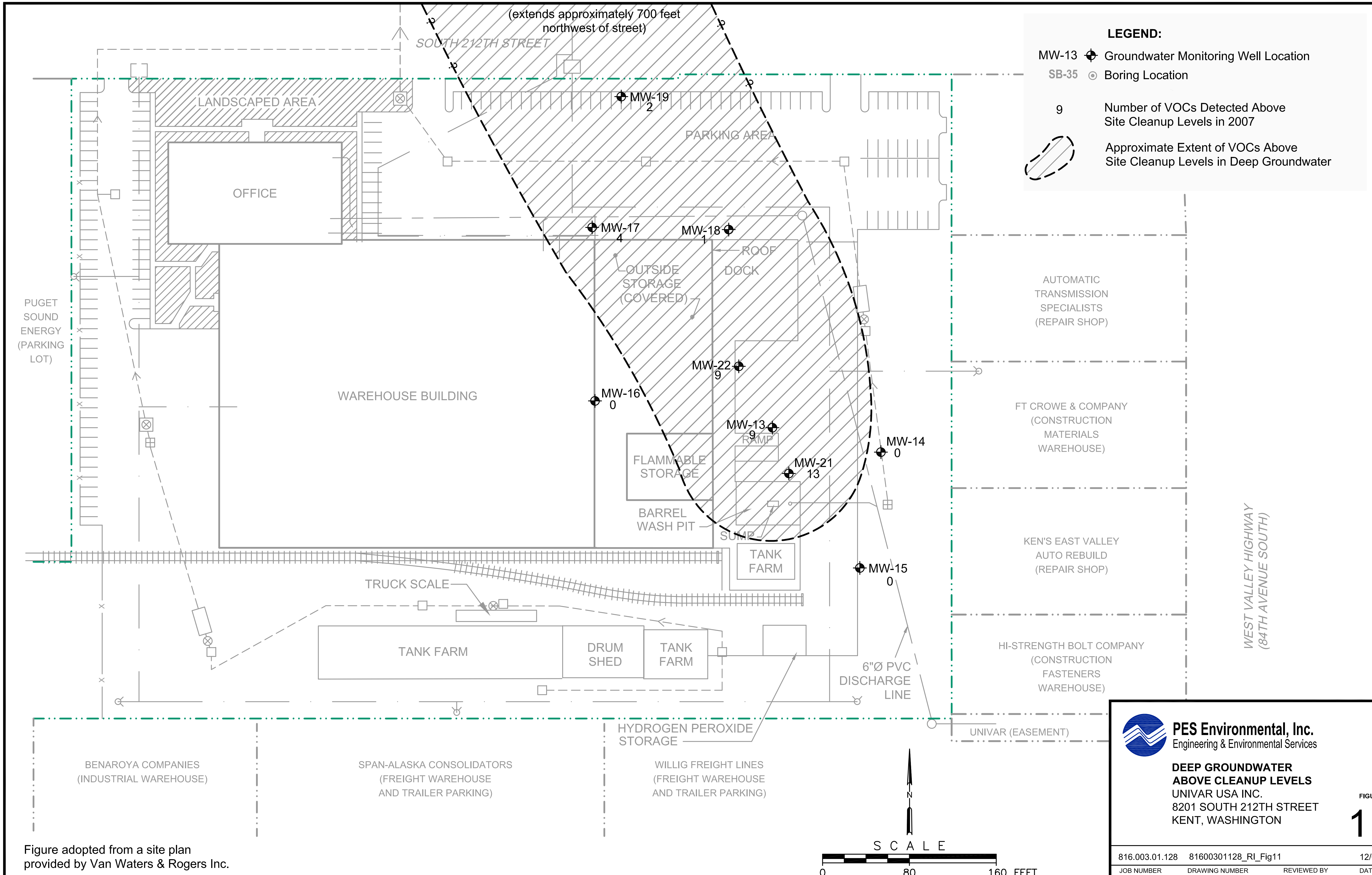


Figure adopted from a site plan provided by Van Waters & Rogers Inc.

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DEEP GROUNDWATER ABOVE CLEANUP LEVELS
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE
11

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301128_RI_Fig11		12/08

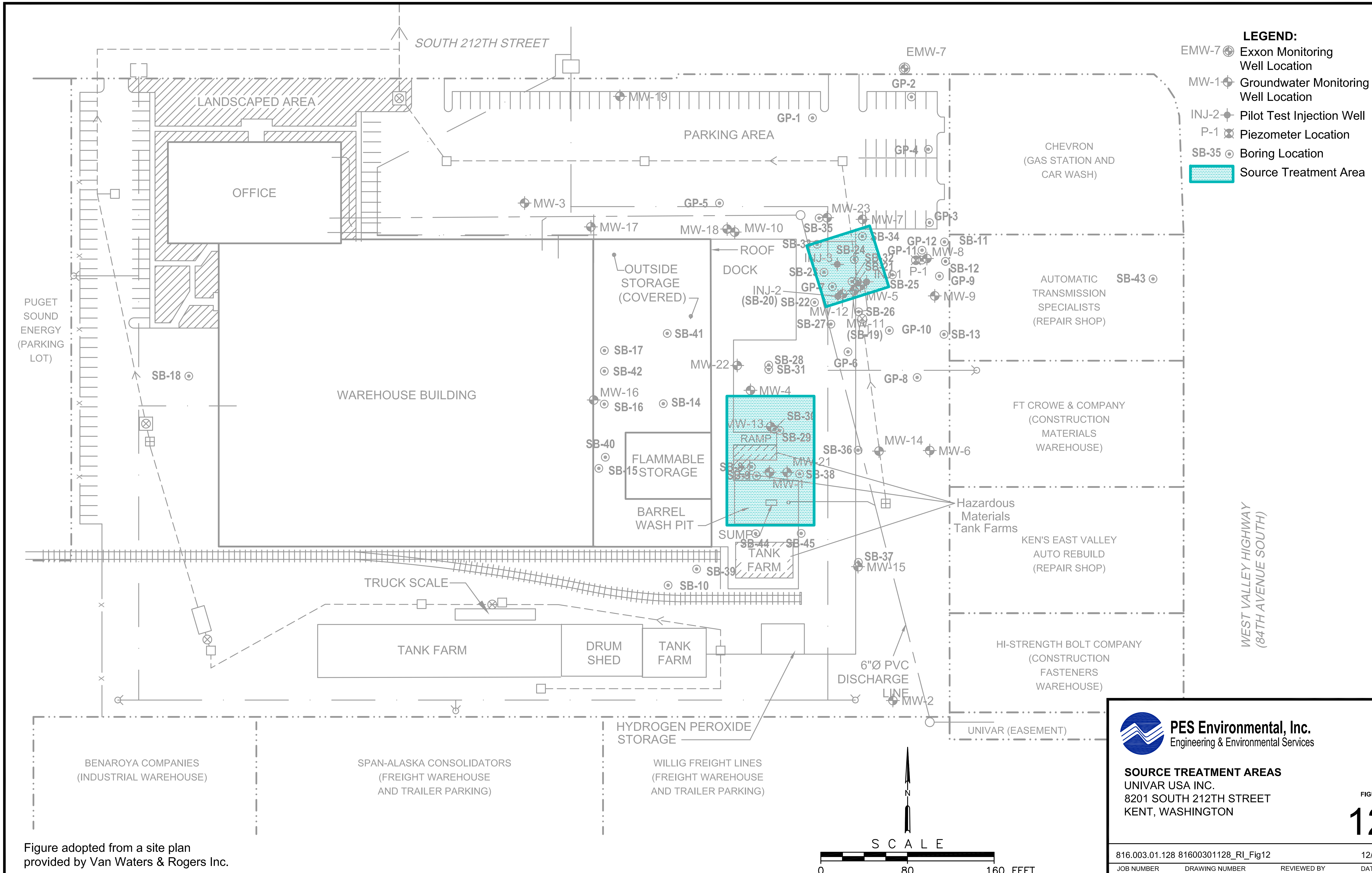


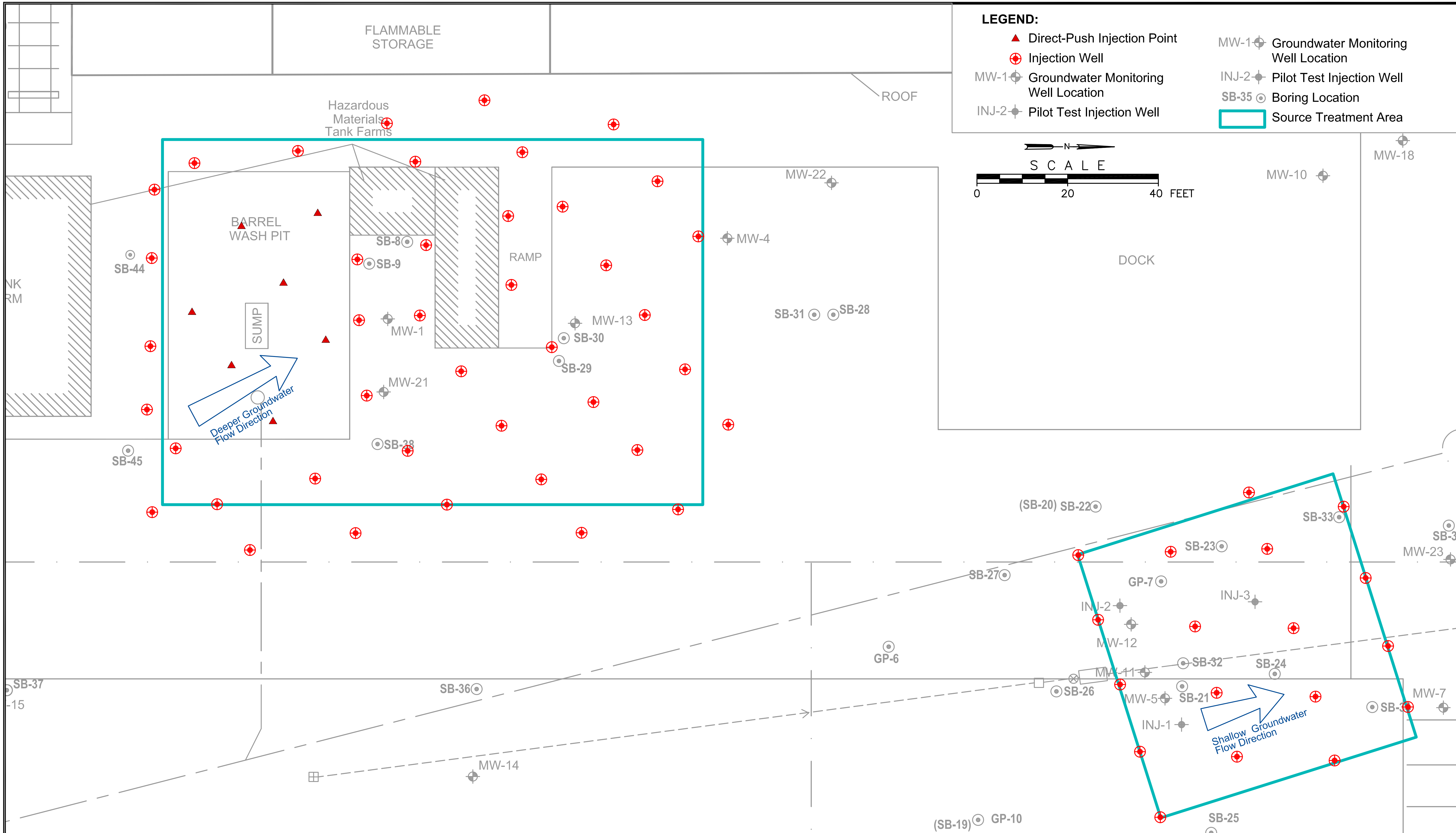
Figure adopted from a site plan provided by Van Waters & Rogers Inc.

PES Environmental, Inc.
Engineering & Environmental Services

SOURCE TREATMENT AREAS
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE
12

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301128_RI_Fig12		12/08



CONCEPTUAL INJECTION WELL LAYOUT FOR SOURCE AREA TREATMENT
UNIVAR USA INC.
8201 SOUTH 212TH STREET
KENT, WASHINGTON

FIGURE
13

PES Environmental, Inc.
Engineering & Environmental Services

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
816.003.01.128	81600301128_RI_Fig13		12/08

Figure 14
Preliminary Schedule
UNIVAR USA INC.
8201 South 2121th Street, Kent, Washington