

Potential Responsible Party Study Report
Orion Park Housing Community
Former Naval Air Station Moffett Field

Prepared for

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EXECUTIVE SUMMARY

The purpose of the Potential Responsible Party (“PRP”) Study for the Orion Park Housing Area (“OPHA”) is to determine whether an off-site source upgradient of OPHA has resulted in a plume of trichloroethylene (“TCE”) in groundwater migrating onto OPHA, and if possible, identify the source area. The PRP Study report presents the results of groundwater sampling in areas of interest near OPHA, and gauging of shallow groundwater elevations along the upgradient perimeter of OPHA.

Groundwater samples collected during previous investigations near the northeast (downgradient) boundary and along the southern (upgradient) boundary of OPHA contained elevated levels of TCE. The source of the plume was unknown. TCE was detected at elevated levels in both the A1 aquifer (up to approximately 30 feet bgs) and the A2 aquifer (between 35 and approximately 60 feet bgs).

A historical file review was conducted for the PRP study area, and several areas of interest were identified based on current or historical land use, proximity to OPHA, and direction with respect to the regional direction of groundwater flow. Permits were obtained from right-of-way (“ROW”) owners to conduct sampling in the ROWs near identified areas of interest.

Field activities were conducted between September 2 and 11, 2003. Field activities included the installation of eight temporary shallow piezometers, Cone Penetrometer Test (“CPT”) logging and multi-depth groundwater sampling at 19 locations and sampling of five existing monitoring wells upgradient of OPHA.

Groundwater elevation contour data from piezometers along the upgradient perimeter (southern property boundary) of OPHA indicate that shallow groundwater flow is to the northwest. The regional direction of groundwater flow in the A1 and A2 aquifers is reported to be to the north-northeast. The shallow piezometer data suggests that shallow groundwater flow along the southern perimeter of OPHA is influenced by Stevens Creek, located just west of OPHA.

A total of 54 samples were collected from water bearing zones at 19 multi-depth sample locations. The maximum concentrations of TCE and its breakdown product cis-1,2-dichloroethylene (“DCE”) were 870 µg/L and 980 µg/L, respectively, both

detected in the A2 aquifer zone. The maximum concentrations of both constituents were on the same order as maximum concentrations of TCE and DCE on OPHA (1,100 µg/L and 930 µg/L, respectively), indicating that the elevated concentrations observed on OPHA during previous investigations are not likely due to a source on OPHA. TCE and DCE concentrations and distribution patterns immediately upgradient of OPHA were similar to those observed on OPHA. Levels of TCE and DCE in sample areas west of Stevens Creek were significantly lower than concentrations on OPHA and the upgradient sampling area immediately south of OPHA.

Sampling in the PRP study sampling areas did not identify a source area in or near the areas sampled. The distribution of TCE and DCE on OPHA and the PRP study sampling areas indicates that elevated levels of TCE and DCE in both the A1 and A2 aquifer at OPHA are the result of the migration of a groundwater plume from upgradient of OPHA. The source of the plume could not be determined from the data collected. However, based on the width of the groundwater plume and the levels of TCE and DCE detected, it is our opinion that the source of the plume is located further upgradient than the areas investigated in this study and is located south of the Moffett-US 101 interchange. A possible source for the plume is the regional VOC plume located less than 4,000 feet southeast of OPHA.

Due to the complexity of the geology on OPHA and the upgradient PRP sampling area, interpretation of the plume movement is difficult. It has been suggested that the aquitard variability provides for hydraulic isolation between the A1 and A2 aquifer zones in some areas, as well as hydraulic communication between the A1 and A2 aquifers in other areas (FWENC, 2003 and Navy, 2003). In addition, upward hydraulic potential between the A1 and A2 aquifers has been reported at nested wells on Moffett (FWENC, 2001). These conditions suggest that upward flow from the A2 aquifer to the A1 aquifer may occur in some areas.

1.0 INTRODUCTION

The SI Group (“SIG”) was contracted by the National Training Center at Fort Irwin (“Army”) to provide Potential Responsible Party (“PRP”) Study services at Former Naval Air Station Moffett Field (“Moffett”). A trichloroethylene (“TCE”) plume had been previously identified in shallow groundwater beneath the majority of the Orion Park Housing Areas (“OPHA”). The source of the plume was unknown.

Under the Residential Communities Initiative (“RCI”), the Department of Defense wishes to transfer over responsibility for providing affordable, quality housing and supporting facilities for enlisted personnel at Moffett and their families to Clark Pinnacle Military Communities, LLC (“Clark”). Inclusion of OPHA in the transfer agreement has been postponed until the source of TCE in groundwater has been further investigated.

1.1 Project Objectives

The objective of the PRP Study is to determine whether an off-site source upgradient of OPHA has resulted in a plume of TCE in groundwater migrating onto OPHA, and if possible, identify the source area. This report presents the results of groundwater sampling in areas of interest near OPHA, and gauging of shallow groundwater elevations along the upgradient perimeter of OPHA.

The results from sampling upgradient of OPHA and the results from previous investigations conducted by others are used together to evaluate groundwater conditions upgradient of OPHA and their apparent influence on groundwater conditions on OPHA.

1.2 Coordination Effort and Agency Review

This study was not performed under the direction of the United States Environmental Protection Agency (“USEPA”) or the California Regional Water Quality Control Board (“RWQCB”). However, the draft work plan for the study was provided to the USEPA and RWQCB, as well as the Department of the Navy (“Navy”) and the National Aeronautics and Space Administration (“NASA”) for comments. The reviewers’ comments were incorporated into the final work plan to the maximum extent allowable by budget and schedule constraints.

1.3 Report Organization

The report is organized in the following format:

Section 1.0 - Introduction

Section 2.0 - Site Conditions

Section 3.0 - Field Activities

Section 4.0 - Quality Assurance and Quality Control

Section 5.0 - CPT Logging, Groundwater Sampling and Gauging Results

Section 6.0 - Conclusions

Section 7.0 - References

2.0 SITE CONDITIONS

2.1 Site Location and Background

OPHA and the upgradient PRP Study area are located south of the San Francisco Bay in the Santa Clara Valley, California, in or near the cities of Mountain View and Sunnyvale (Figure 2-1).

The PRP Study is located primarily to the south of OPHA and covers an area approximately 1 mile by 1 mile (Figure 2-2). The area includes residential, commercial and light industrial land use. Several areas of interest were identified based on current or historical land use, proximity to OPHA and location with respect to the regional direction of groundwater flow. Selection of the areas of interest was presented in the PRP Study Work Plan (SIG, 2003).

The following sampling areas were selected for investigation in an attempt to identify elevated concentrations of TCE that may be migrating onto OPHA and the direction of migration:

- The area west of OPHA on the west side of Stevens Creek, and
- The southern perimeter of OPHA.

The following sampling areas, near sites of interest identified during the review of historical and current land use, were selected for investigation in an attempt to identify a potential source area:

- The northeast cloverleaf of US 101 at Moffett Boulevard
- The southwest cloverleaf of US 101 at Moffett Boulevard
- Leong Drive and Fairchild Avenue
- Terra Bella Avenue at San Leandro Drive and San Rafael at San Leandro Drive

A sampling area was also selected northwest of the building located between OPHA and the Wescoat Housing Area ("WHA"). No specific information suggests that the building may be a potential source, however, the distribution of TCE and cis-1,2-dichloroethene ("DCE") on WHA and OPHA suggested that sampling in this area could be informative. Sampling areas are shown on Figure 2-2.

2.2 Geology and Hydrogeology

OPHA and the upgradient PRP study area are located in the Santa Clara Valley, at an elevation ranging from approximately 17 to 40 feet above mean sea level. The valley slopes to the northwest and is filled with unconsolidated to semi-unconsolidated sediments. According to previous investigations conducted at Moffett the sediments underlying the area consist of interfingering alluvial sediments and estuary deposits. The coarser-grained alluvial sediments may serve as preferential pathways for the flow of groundwater. The uppermost sediments are fine to coarse-grained and are derived from the Santa Cruz Mountains southwest of the housing area. These sediments were deposited on the gently sloping alluvial fan that merges with the basin, tidal and shallow marine sediments in and around Moffett. (IT, 1993).

Three principle aquifer units, separated by silt and clay aquitards, have been defined at the adjacent Moffett. The uppermost aquifer is known as the “A” aquifer. It extends from a depth of approximately 5 to 65 feet below ground surface (“bgs”) and is divided into two zones by a discontinuous, low permeability layer or aquitard. The A1 aquifer zone extends from a depth of 5 to 30 feet bgs and the A2 aquifer zone extends from 35 to 65 feet bgs. The A2 aquifer is also known as the B1 aquifer zone south of US Highway 101 (NARC, 2001). Groundwater in the A aquifer is reported to flow generally north-northeast toward San Francisco Bay. The horizontal gradient of the A aquifer is about 0.003 to 0.007 foot per foot (TT, 2003).

The “B” aquifer extends from a depth of 70 to 160 feet bgs and is separated from the A aquifer by a continuous clay layer. The groundwater in the B aquifer flows north-northeast toward the San Francisco Bay and has a horizontal gradient of 0.003 to 0.007 foot per foot. The B aquifer is a confined aquifer and the groundwater within the B aquifer is under confining pressure from recharge from the upgradient source areas.

The “C” aquifer is a confined aquifer extending locally from a depth of 155 to 250 feet bgs. The groundwater in the C aquifer flows north-northeast similar to the A and B aquifer but the horizontal gradient of the C aquifer is not as steep as the A and B aquifers. The C aquifer is separated from the B aquifer by a 20 to 40 foot thick clay layer known as the B/C aquitard. A strong upward vertical gradient exists between the B and C aquifers. Historically, groundwater from the C aquifer was used for drinking water and agricultural purposes, however the former domestic supply wells have been either abandoned or destroyed.

Near surface geology at OPHA and the adjacent WHA is composed of silts and clays from approximately 5 to 16 feet bgs. The silts and clays act as a confining layer for the first observed groundwater at most locations. Groundwater is encountered in deposits ranging from silts and sandy silts to medium to coarse gravely sands (stream channel deposits). The presence of these deposits, the depths at which they are encountered, and their thicknesses vary throughout the site. These deposits are separated by less permeable silt and silty clay mixtures of various thicknesses. It has been suggested that the aquitard variability provides for hydraulic isolation between the A1 and A2 aquifer zones in some areas, as well as hydraulic communication between the A1 and A2 aquifers in other areas (FWENC, 2003 and Navy, 2003). In addition, upward hydraulic potential between the A1 and A2 aquifers has been reported at nested wells on Moffett (FWENC, 2002). These conditions suggest that upward flow from the A2 to the A1 aquifer may occur in some areas. Site groundwater, regardless of depth, is reported to be under confining conditions (FWENC, 2003).

A discussion of subsurface conditions encountered during this investigation is included in Section 5.2.

2.3 Previous Investigations

Numerous investigations have been conducted at or near OPHA which are relevant to environmental conditions at OPHA. These include:

- The discovery by NASA of TCE in groundwater along the northeast border of OPHA (upgradient of NASA) in 1999 (SAIC, 1999);
- The 2000 Navy investigation along the southern (upgradient) boundary of OPHA, which detected TCE in groundwater at concentrations similar to those found in the 1999 NASA investigation (IT, 2000); and
- Navy investigations on OPHA and WHA in 2002 to assess the lateral and vertical extent of TCE, investigate potential on-site sources, and conduct a Baseline Human Health Risk Assessment (FWENC, 2003).

A detailed history of previous investigations at and near OPHA, is provided in the Navy's Site Characterization and Baseline Human Health Risk Assessment Work Plan

(FWENC, 2002). Figures showing the distribution of TCE at OPHA and WHA from previous investigations are included in Appendix A. Results from these investigations are included in the interpretation of the results from this study.

Due to its proximity to OPHA, investigations by the Middlefield/Ellis/Whisman (“MEW”) area companies, the Navy and NASA characterizing the nature and extent of the regional groundwater plume are also considered relevant to conditions at OPHA. The regional VOC plume originates in the area roughly bounded by Middlefield Road, Ellis Street and Whisman Road, located southeast of OPHA, then flows north across US 101 and onto Moffett where it co-mingles with Navy and NASA source areas. The plume is over 10,000 feet long and extends below the easternmost portions of WHA. Figures showing the regional plume boundaries in the A1 and A2/B1 aquifers are included in Appendix A (Locus, 2003). A carve-out agreement between MEW and NASA was completed in 1998 (USEPA, 1998).

A remedial investigation was conducted in the MEW area for Raytheon, Fairchild and Intel. A variety of chemicals, including chlorinated solvents, had been released at a number of facilities in an area roughly bounded by Middlefield Road, Ellis Street and Whisman Road. VOCs, including TCE and 1,1,1-trichloroethane (“TCA”) were the most frequently detected constituents in groundwater. An estimated 96 percent of the mass of TCE, 1,1,1-TCA and DCE isomers in groundwater that has emanated from the MEW area is within 100 feet bgs (HLA, 1988).

Investigations by the Navy have identified two possible source areas as contributing to the regional VOC plume (IT, 1993). The first is the location of a former dry cleaners sump, and the second is the location of a former and gas station. The portion and extend of the contribution from these sources is difficult to define as both sites are within the area of the regional VOC plume.

NASA investigations have identified six Areas of Interest (“AOIs”) with VOC contamination in groundwater, including AOI4 located just northeast of OPHA. It was during the investigation of AOI4 that the presence of TCE at OPHA was discovered.

No investigations are known to have been conducted within the PRP study sampling areas.

3.0 FIELD ACTIVITIES

Field activities were conducted between September 2, 2003 and September 11, 2003. Underground Service Alert was notified to obtain utility clearance prior to drilling activities. Utility clearance for sampling locations on NASA and Army property was obtained through the Army point of contact. In addition, an independent utility locating service was contracted to locate utilities on NASA and Army property.

Field activities included Cone Penetrometer Test (CPT) logging and multi-depth groundwater sampling at 19 locations, installation of eight temporary shallow piezometers and sampling of five existing monitoring wells at the service station located at 830 Leong Drive (Figure 3-1).

3.1 CPT Logging and Multi-depth Groundwater Sampling

CPT logging and multi-depth groundwater sampling was conducted at 19 locations outside of OPHA. Sample locations SIG1 through SIG19 are shown on Figure 3-1. Each location was hand-augered to 5 feet bgs prior to boring to avoid near surface obstructions.

At each sampling location the CPT was advanced to 44.5 feet bgs, producing a geologic log for that location. Geologic logs are included in Appendix B. The geologic log was used to identify up to five potential water bearing zones at each location. Groundwater samples were collected using HydroPunch[®] from a boring located immediately adjacent to the CPT boring. The HydroPunch[®] sampling system consisted of a single-use polyvinyl chloride ("PVC") screen approximately 5 feet in length, attached to a metal conical drive tip, housed in the CPT drive casing. The drive tip was advanced to the depth of the bottom of the water bearing zone, and drive casing was retracted over the depth of interest, thereby exposing the HydroPunch[®] screen interval to saturated formation. Groundwater flowed through the screen interval and into the annulus of the drive casing. A stainless steel bailer was used to retrieve groundwater samples. The groundwater was immediately transferred into three laboratory-certified clean, 40 ml VOA vials pre-preserved with HCl.

To sample the next depth interval, the outer casing was removed, and a new PVC screen and drive tip housed in decontaminated CPT drive casings were advanced to the

depth of the bottom of the next water bearing zone. This procedure was repeated for each potential water-bearing zone.

The number of potential water bearing zones identified at each sampling location ranged from 1 to 4. A total of 53 groundwater samples were collected. The HydroPunch[®] was left open for up to 15 minutes in an attempt to sample groundwater. Two zones were very slow to produce water (SIG1-41 and SIG9-40.5). These zones are noted on the cross-sections. Samples were analyzed for halogenated VOCs using EPA Method 8021B/8260B. Analytical results are summarized in Table 3-1. Laboratory analytical reports and chain-of-custody records are included in Appendix C.

The work plan called for the multi-depth sampling at 20 locations. The twentieth sample location had been selected approximately 150 feet west of SIG17. Considerable efforts were made to work around on-going construction activities in the Moffett Boulevard and US 101 interchange during this investigation. However, a last minute change in the schedule of construction activities in this area prevented access to the area for sampling.

3.2 Temporary Piezometer Installation

Temporary piezometers were installed at two locations on OPHA (SIG-P1 and SIG-P2), four locations south of OPHA (SIG5 through SIG8) and two locations west of Stevens Creek (SIG1 and SIG2). Temporary piezometer locations are shown on Figure 3-2.

Six of the piezometer locations corresponded to CPT logging and groundwater sampling locations (SIG1, SIG2, and SIG5 through SIG8). A CPT log was generated at SIG-P2. The CPT logs confirmed that a water bearing zone was present between the surface and 20 feet bgs, and 20-foot piezometers screened over the bottom 5 feet were installed at these piezometer locations. At SIG-P1, no CPT log was generated prior to piezometer installation. A 25-foot piezometer, screened over the bottom 5 feet was installed at this location to ensure that water was encountered.

Each location was hand-augured to 5 feet below ground surface (“bgs”) prior to boring to avoid near-surface obstructions then the boring was advanced to piezometer depth, and the 3/4-inch PVC pipe screened over the bottom 5 feet, was placed in the borehole and held in place as the outer casing was removed. The piezometers were cut off at ground level, capped and covered with a metal protective plate. No sand packing or

seal was used in the construction of the temporary piezometers, and the piezometers were not developed.

The piezometers were installed between September 4 and 6, 2003. The depth to groundwater was measured at each piezometer a minimum of two times to verify that the groundwater elevation had reached static equilibrium. On September 8, 2003 the elevation of the top of casing of each piezometer was surveyed. The piezometers were properly abandoned on September 8 and 9, 2003.

It should be noted that the elevation of the top of casing at SIG5 is an estimated value. At the time the top of casing elevations were surveyed this piezometer was overlooked. By the time the error was recognized the piezometers had been removed. The ground surface elevation at SIG5 was surveyed, and the top of casing elevation at SIG5 was estimated based on the ground surface elevation at the location of the piezometer. Since the piezometers were flush-mounted, the ground surface elevation is expected to be within 0.2 feet of actual top of casing elevation at SIG5.

The work plan called for surveying of a gauging point at the bridge over Stevens Creek along the shoulder of northbound US 101, and gauging of the depth to the surface of Stevens Creek at this point. The gauging point location was modified for the following reasons. Construction activities at the bridge prevented access to this location for surveying and gauging. In addition, the stretch of Stevens Creek from US 101 extending approximately 300 feet north appears to be concrete-lined and the creek bottom is "stair-stepped". As the creek continues further north the water slows considerably, and the bottom does not appear to be lined. The surface of a rock along the edge of Stevens Creek was selected as a reference elevation for surveying of the piezometer elevations. The surface elevation of Stevens Creek at this location was also measured with respect to the reference datum.

The shallow groundwater elevation at each piezometer and the surface elevation at Steven's Creek are shown on Figure 3-2, along with shallow groundwater elevation contours.

3.3 Sampling of Existing Monitoring Wells

Permission was obtained from the owner of a service station at 830 Leong Drive to collect samples from 5 existing monitoring wells on his property. Well logs were not available for the wells.

The depth to water and the depth to bottom of each well were measured prior to sampling. The wells were purged and groundwater samples were collected using a micropurging sampling technique. Teflon tubing was placed in the wells such that the tubing was near the mid-point between the groundwater surface and the bottom of the well. Using a peristaltic pump, water was purged at a rate of approximately 175 ml/min. The depth to water, temperature, conductivity and pH of the purge water were recorded. Once the water quality parameters had stabilized samples were collected using the 'straw method'. To collect samples using the straw method, the pump is stopped and the tubing is withdrawn from the well. Water from the tubing is allowed to drain into the sample bottles by gravity. Care is taken to avoid excessive agitation of the water during sampling. Samples were analyzed for halogenated VOCs using EPA Method 8021B/8260B. Analytical results are summarized in Table 3-2. Laboratory analytical reports and chain-of-custody records are included in Appendix C. Purge logs are included in Appendix D.

3.4 Permits

The Santa Clara Valley Water District requires the filing of an application for the drilling of any exploratory boring greater than 45 feet bgs. Since CPT logging and sampling did not exceed 45 feet no applications were needed.

Applications were submitted to the California Department of Transportation (Cal-Trans), the City of Mountain View, and the Santa Clara Valley Water District for permission to conduct sampling on their right-of-ways. Copies of the permits are included in Appendix E.

3.5 IDW Disposal

Soils excavated during hand auguring of the top 5 feet were screened visually and with a PID. No impacted soils were identified and soils were placed back in the top of the borehole prior to boring.

Decontamination water generated during decontamination of the sampling equipment was transported by the drilling subcontractor to their facility in Martinez, California, to be treated and discharged.

Purge water generated during sampling of the existing wells at 830 Leong Drive was drummed, labeled and stored on site pending laboratory analytical results.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

Samples were handled in accordance with the Work Plan. Water samples were analyzed by Severn Trent Laboratories San Francisco (STL) in Pleasanton, California. STL San Francisco is certified by the state of California. Level 2 data validation was included with the data packages from STL. No independent data validation was conducted. The chain-of-custody records and laboratory reports are included in Appendix C.

4.1 Field Duplicates

Field duplicates consist of two samples (an original and a duplicate) of the same matrix collected at the same time and locations, to the extent possible, and using the same sampling technique. The purpose of the field duplicate is to evaluate the precision of the overall sample collection and analysis process through the calculation of relative percent difference (“RPD”) for duplicate pairs. Field duplicates were collected at a frequency of one per ten samples and were analyzed for the same parameters as the original sample. Field duplicate pairs that contain a very low concentrations of analytes or are inhomogeneous can produce a greater variation leading to RPD outliers.

Results from five field duplicate pairs and the calculated RPDs are presented in Table 3-3. RPDs were not calculated for two of the duplicates pairs, as all analytes in the duplicate pairs were below the detection limits. The RPDs for detected analytes in the three duplicate pairs ranged from 0% to 51%. The higher RPDs were observed in samples with lower concentrations (SIG2-39-090603 and DUP B), while lower RPDs were observed in samples with higher concentrations (SIG19-35-091103 and DUP E). Results from field duplicates indicate that the precision of the overall sample collection and analysis process is acceptable.

4.2 Trip Blanks

Trip blanks are prepared by the laboratory, carried to the field and stored with water samples for VOC analysis. Trip blanks are used to determine if samples have been cross-contaminated with VOCs during sample collection and transportation to the laboratory. Trip blanks were provided in each cooler that contained water samples for VOC analysis.

Five trip blank samples were transported with the samples to the laboratory and analyzed for halogenated VOCs. None of the analytes were detected in the trip blanks above the reporting limit (Table 3-4).

4.3 Equipment Blanks

Equipment rinsate blanks were collected to evaluate field sampling and decontamination procedures by pouring laboratory grade deionized water over the decontaminated stainless steel bailer used to collect groundwater samples. One equipment blank was collected each day. The equipment rinsate blanks were preserved, packaged and sealed in same manner as the environmental samples. Equipment blanks were analyzed for halogenated VOCs. None of the analytes were detected in the equipment blanks above the reporting limit (Table 3-4).

4.4 Matrix Spike/Matrix Spike Duplicates

Matrix spike and matrix spike duplicate (MS/MSD) samples are prepared by spiking each with a known amount of target analyte. Once the spike is added to the MS/MSD sample, these samples are carried through the complete sample preparation process along with the other samples in the batch. The percent recovery (R%) for the MS/MSD samples are compared against each other and against the known amount of the spike to measure the accuracy of the analytical method. Two sets of MS/MSD samples were collected and submitted with the other samples. The R% and RPD were within the recommended limits. MS/MSD results are included with the laboratory analytical results in Appendix C.

5.0 GAUGING OF GROUNDWATER ELEVATIONS, CPT LOGGING AND GROUNDWATER SAMPLING RESULTS

Field activities were conducted from September 2, through September 11, 2003. As described in Section 3.0 of this report, field activities consisted of the installing of eight shallow temporary piezometers, gauging of the depth to groundwater water, surveying of the top of casing elevation and abandonment of the piezometers; CPT logging and multi-depth groundwater sampling at 19 locations; and sampling of five existing monitoring wells.

5.1 Groundwater Flow Direction

Groundwater elevations at the eight temporary piezometers and shallow groundwater elevation contours are shown in Figure 3-2. The groundwater elevation data from the six data points east of Stevens Creek indicate that shallow groundwater flow in the southwest corner of OPHA is to the northwest.

The regional direction of groundwater flow in both the A1 and A2 aquifer zones is documented as being to the north-northeast. Groundwater elevations are gauged over an extensive network of wells screened over the various aquifer zones. Regional groundwater elevation contour maps for the various aquifer zones showing the monitoring well network are included in Appendix F (Locus, 2002).

A review of the network of monitoring wells used to evaluate the regional direction of groundwater flow indicates a lack of data points in the general vicinity (within 2,000 feet) of Stevens Creek. Without accurate data from this area, it is not possible to fully determine the effect of Stevens Creek on the groundwater flow direction in the sampling area south of OPHA.

Based on the groundwater elevation data collected at the temporary piezometers (Figure 3-2), it appears that shallow groundwater flow along the western portion of the southern perimeter of OPHA is influenced by Stevens Creek. Additional groundwater elevation data is needed to determine the lateral extent of the apparent influence of Stevens Creek on the direction of shallow groundwater flow.

No groundwater elevation data was collected in the A2 aquifer zone for this investigation. Groundwater elevation data in the A2 aquifer zone in OPHA and the area

south of OPHA is needed to evaluate the direction of groundwater flow onto OPHA in the A2 aquifer.

5.2 Geology

The CPT logs were used to construct several geologic cross-sections (Figure 5-1). Cross-sections are presented in Figures 5-2 through 5-5. The concentrations of detected analytes in groundwater from each water bearing zone are shown in the cross-sections. These results are discussed in Section 5.3.

Relatively low permeability material, primarily clays and silts, was encountered from the ground surface to approximately 10 to 20 feet bgs at most sampling locations. During CPT logging at each sampling location, a pore pressure dissipation test was conducted to measure the hydrostatic water pressure and approximate depth to groundwater. The static water elevation at most locations was within the lower permeability materials. This is consistent with observations of confined conditions on OPHA during previous investigations (FW, 2002).

Relatively coarser-grained soils ranging from sandy silt to gravelly sand were typically first encountered between 13 and 17 feet bgs, this is referred to as the A1 aquifer zone. The thickness and lateral extent of this water bearing zone varied. As shown in Section A-A (Figure 5-2), a sand and gravelly sand sequence approximately 13 feet thick observed at SIG1 and SIG2 was absent in SIG3 and SIG4. Similarly, in Section D-D, sand and gravelly sand layers were observed in the A1 aquifer zone at SIG17 and SIG10, and sand at SIG11, while only a thin layer of sandy silt was found in the A1 aquifer zone at SIG19. The A1 aquifer zone in the sampling areas extends to approximately 19 to 29 feet bgs, which is consistent with observations from previous investigations at OPHA.

The A1/A2 aquitard consists of a zone of less permeable materials (silts and clays) between the more permeable A1 and A2 aquifer zones. The thickness and lateral extent of the A1/A2 aquitard varies over the sampling areas. At most locations a sequence of clayey silt and silty clays at least 5 feet thick separated the A1 and A2 aquifer zones. Reports on previous investigations at OPHA have suggested that the A1/A2 aquitard appeared to be missing in certain areas. However, the CPT logs from this investigation identified low permeability silty clay at most sampling locations, and

clayey silt at least 3 feet thick separating the A1 and A2 aquifer zones at each of the sampling locations.

Beneath the A1/A2 aquitard, additional relatively coarser grained soils, ranging from sandy silt to gravelly sand are referred to as the A2 aquifer zone. As seen in Section B-B (Figure 5-3), a coarse-grained sequence approximately 5 feet thick was observed at approximately 32 feet bgs in SIG6, but was absent from SIG7. Similar variability of coarse-grained zones can be seen on all cross-sections (Figures 5-2 through 5-5). The A2 aquifer zone beneath the sampling areas was first encountered between 28 to 40 feet bgs, this is consistent with observations at OPHA.

5.3 Chemical Concentrations in Groundwater

Laboratory analytical results from multi-depth groundwater sampling at SIG1 through SIG19 are presented in Table 3-1. To facilitate interpretation of this data with data collected during previous investigations at OPHA and WHA, the highest concentrations of TCE and DCE detected in the A1 and A2 aquifers at locations SIG1 through SIG19 were identified, and these values were plotted onto figures showing the distributions of TCE and DCE from previous investigations at OPHA and WHA (see Figures 5-6 through 5-9). The concentration contours shown in the original figures were not revised, and new contours were not generated based on the combined data set. A discussion of the concentration distributions for the combined data set is presented below.

Laboratory analytical results from groundwater samples collected from the five existing monitoring wells at 830 Leong Drive (location shown on see Figure 3-1) are presented in Table 3-2. No halogenated hydrocarbons were detected in any of the samples. The depth to groundwater at the wells ranged from approximately 8.5 to 9.5 feet bgs. The depth of each of the wells was approximately 27 feet bgs. Based on the depths of the wells, groundwater from these wells is representative of the A1 aquifer zone.

5.3.1 Distribution of TCE

The distribution of TCE in the A1 aquifer is presented in Figure 5-6. TCE concentrations at sample locations SIG5 through SIG8, along the southern perimeter of OPHA (75 µg/L to 230 µg/L), and SIG11, located approximately 700 feet south of the OPHA perimeter, are similar to concentrations observed on OPHA from previous investigations. The highest concentration (230 µg/L at SIG6) is on the same order as

the highest detection on OPHA (350 µg/L at FW35A). Concentrations of TCE at sample locations west of Stevens Creek and south of US 101 are considerably lower than concentrations on OPHA, however, detections above the Maximum Contaminant Level (“MCL”) of 5 µg/L were observed in both areas. The variability in the concentration of TCE in the A1 aquifer zone over the sampling area is similar to observations from previous groundwater investigations on OPHA.

Based on the isoconcentration contours generated from the results of previous investigations, it was suggested that TCE in the A1 aquifer zone was migrating onto OPHA along the southern boundary and to a lesser extent, the western boundary (at FW35A). The current data support the suggestion that TCE is migrating from along the southern boundary. However, the data does not support the theory of migration across the western boundary. TCE concentrations in all samples collected west of OPHA and west of Stevens Creek (SIG1 through SIG4) were low (between non-detect and 25 µg/L). These are similar to the range of concentrations observed in the A1 aquifer inside the western perimeter of OPHA (with the exception of sample FW35A). Due to the discontinuous and heterogeneous nature of the aquifer zone, the data does not preclude a western source. However, based on the direction of shallow groundwater flow along the southern perimeter of OPHA (to the northwest), it is more likely that TCE is migrating onto OPHA from the southern perimeter.

The distribution of TCE in the A2 aquifer is presented in Figure 5-7. The highest detections were found at SIG5 (870 µg/L) and SIG9 (850 µg/L). These concentrations are of similar magnitude to the highest concentrations observed on OPHA (1,100 µg/L at FW17B). Significant detections were also found at SIG6 (420 µg/L), SIG19 (440 µg/L) and SIG8 (160 µg/L). Groundwater samples collected from the other 14 locations ranged from below the detection limit to 28 µg/L.

The TCE contours for the A2 aquifer generated from previous investigations suggested that TCE was migrating onto OPHA primarily along the western and southern boundaries at the southwest corner, with a few lower concentrations on the southeast corner of OPHA. This theory was based on the high concentrations of TCE observed at FW17B, FW20B and FW18B, located in the center of OPHA, and the absence of high concentrations in the southern portion of OPHA. The groundwater data collected outside the southern and western perimeter of OPHA during this investigation do not support this theory. Concentrations of TCE in the A2 aquifer zone west of Stevens

Creek ranged from non-detect to 26 µg/L (SIG1 through SIG4, SIG16 and SIG18). Due to the discontinuous and heterogeneous nature of the aquifer zone, the data does not preclude a western source. However, TCE concentrations over 800 µg/L immediately outside the southern perimeter of OPHA (SIG5), and further upgradient (SIG9) suggest that TCE in the A2 aquifer is migrating onto OPHA from the southern perimeter.

As previously discussed, the direction of regional flow is reported to be to the north-northeast. No information is available on the direction of groundwater flow in the A2 aquifer at, or immediately upgradient of OPHA. Stevens Creek may have an influence on the direction of groundwater flow in the A2 aquifer, however, it is not likely to have as strong an influence as was observed at the shallow groundwater piezometers.

The presence of TCE in the A1 and A2 aquifers does not appear to be strongly correlated. At SIG6 and SIG8, outside the perimeter, concentrations in the A1 and A2 aquifer are similar. This was also seen at nearby FW11B and FW41A in the southwest corner of OPHA. However, at SIG5, SIG9 and SIG19, the concentrations of TCE in the A2 aquifer were 870 µg/L, 850 µg/L and 440 µg/L, respectively, while the concentrations in the A1 aquifer were 81 at SIG5 and non-detect at SIG9 and SIG19. Conversely, at SIG11, TCE was detected at 160 µg/L in the A1 aquifer, and not detected in the A2 aquifer. It is possible that a discontinuity in the A1/A2 aquitard downgradient of SIG9 and SIG19 is allowing the movement of the plume from the A2 aquifer zone to the A1 aquifer zone. Another possibility is that water bearing zones identified in the A1 aquifer zone at SIG9 and SIG19, where TCE was not detected, are not along the same flow path as A1 water bearing zones at sampling locations further upgradient where TCE was detected at elevated levels.

5.3.2 Distribution of DCE

The distribution of DCE in the A1 aquifer zone is presented in Figure 5-8. The highest detection of DCE upgradient of OPHA was 570 µg/L at SIG11, located approximately 400 feet south of the perimeter of OPHA, followed by 190 µg/L at SIG5, 120 µg/L at SIG8 and 110 µg/L at SIG6, located immediately south of OPHA. These concentrations are similar to the range of concentrations observed on OPHA in previous studies, where the highest concentration of DCE in the A1 aquifer was 660 µg/L at FW11B. Moderate detections of DCE were found at SIG13 (54 µg/L) and SIG7 (41 µg/L). Concentrations at the remaining sample locations ranged from below the detection limit to 10 µg/L.

The isoconcentration contours generated from the results of previous investigations suggested that DCE in the A1 aquifer zone was migrating onto OPHA along the southern boundary. Concentrations of DCE in the A1 aquifer upgradient of OPHA support this idea.

The distribution of DCE in the A2 aquifer zone is presented in Figure 5-9. The highest detection of DCE was 980 µg/L at SIG19 (located approximately 350 feet south of the perimeter of OPHA), followed by 260 µg/L at SIG9 (approximately 300 feet south of the perimeter), 210 µg/L at SIG8, 190 µg/L at SIG6 and 110 µg/L at SIG5 (all immediately south of the perimeter). These concentrations are similar to the range of concentrations observed on OPHA, where the highest concentration was 930 µg/L at FW11B, in the southwest corner of OPHA. Concentrations of DCE in the A2 aquifer zone at the remainder of the sample locations ranged from below the detection limit to 26 µg/L.

The distribution of DCE in the A2 aquifer zone on OPHA and the upgradient sampling areas indicates that DCE is migrating onto OPHA from the southern perimeter.

Along the southern portion of OPHA and the sampling areas just south of the perimeter of OPHA, there appears to be some correlation between the presence of DCE in the A1 and A2 aquifer zones (see SIG5, SIG6, and SIG8 from this investigation and FW11B and FW09B from the previous investigations). However, further upgradient high concentrations in the A2 aquifer at sample locations SIG9 and SIG19 (260 µg/L and 980 µg/L, respectively), were not observed in the A1 aquifer. At SIG11, DCE was detected at 570 µg/L in the A1 aquifer, and not detected in the A2 aquifer. The correlation of DCE in the A1 and A2 sampling zones is similar to the correlation observed for TCE concentrations. As discussed in the last paragraphs of Section 5.3.1, a discontinuity in the A1/A2 aquitard downgradient of SIG9 and SIG19 may explain higher concentrations of DCE observed in the A1 aquifer zone at downgradient sample locations SIG5, SIG6, SIG8, FW11B, FW12B and FW9B.

5.3.3 Detection of Other Chemicals

Tetrachloroethene (PCE) was detected at 200 µg/L in the A1 aquifer zone at sample location SIG13, located approximately 900 feet south of OPHA. The concentrations of TCE and DCE in this sample were 23 µg/L and 19 µg/L, respectively. PCE was also detected at low levels (3.5 µg/L) in the A1 aquifer zone at sample location SIG10. Since PCE was not detected at any other sample locations or in the A2 aquifer zone, nor was

PCE detected during previous investigations on OPHA this detection is not believed to be related to elevated concentrations of TCE and DCE at OPHA. The presence of PCE in the A1 aquifer zone may be the result of a small release from the dry cleaning located at 835 Leong Drive or a former dry cleaning establishment at 859 Moffett Boulevard (now Leong Drive).

Vinyl chloride was detected at SIG8 and SIG19 at concentrations of 3.7 µg/L and 30 µg/L, respectively.

5.3.4 Constituent Distributions and Potential Source Areas

The range of concentrations of DCE and TCE observed in the upgradient sampling areas was similar to the range of concentrations observed on OPHA during previous investigations. In most cases, the distribution of constituents in the sampling areas just upgradient of the southern perimeter of OPHA resembles the concentrations just inside OPHA. The maximum concentrations of TCE observed in the A1 and A2 aquifer zones in the upgradient sampling areas (230 µg/L and 870 µg/L, respectively) are on the same order as the highest concentrations on OPHA (350 µg/L in the A1 aquifer and 1,100 µg/L in the A2 aquifer). Similarly, the maximum concentrations of DCE observed in the A1 and A2 aquifer zones in the upgradient sampling areas (570 µg/L and 980 µg/L, respectively) are on the same order as the highest concentrations on OPHA (660 µg/L in the A1 aquifer and 930 in the A2 aquifer). This indicates that isolated “hot spots” observed on OPHA during previous investigations, and attributed by others to sources on OPHA are not likely due to sources on OPHA.

The distribution of TCE and DCE on OPHA and the PRP study sampling areas indicates that elevated levels of TCE and DCE in both the A1 and A2 aquifer at OPHA are the result of the migration of an upgradient groundwater plume. The source of the groundwater plume could not be determined from the data collected during this investigation. Based on the width of the groundwater plume at the most upgradient area sampled (greater than 800 feet) and the levels of TCE and DCE detected (less than 0.12% of saturation), the source of the plume appears to be located further upgradient than the Moffett Boulevard – US 101 interchange. A possible source for the plume is the regional VOC plume which originates less than 4,000 feet southeast of OPHA. No other likely source areas were identified in this study.

The movement of chlorinated solvents released into the environment as a separate phase liquid is affected by the type of release (e.g., a one-time large release, or a slower release over time) and subsurface geology encountered. Due to their higher density, chlorinated solvents will tend to migrate downward below the water table. Downward migration with lateral spreading through coarser aquifer materials will continue until the source volume is exhausted, or a zone of lower permeability is encountered and pooling occurs. Movement of a plume of dissolved chlorinated solvents, however, is not significantly affected by the small increase in density, and will not tend to sink. Movement of a TCE plume is determined by hydraulic gradients and the distribution of coarser grained material which served as preferential flow pathways.

Due to the complexity of the geology on OPHA and the upgradient PRP sampling area, interpretation of the plume movement is difficult. Based on geologic logs collected during this and previous investigations, the factors affecting plume movement (i.e., the distribution of coarse grained layers, and the presence or absence of the A1/A2 aquitard) vary significantly over short distances.

Differences in the depth, thickness and soil type of water bearing zones identified at the various sample locations within the same aquifer zone suggests that a water bearing zones identified at one sample location may not be hydraulically connected or lie along the same flow path as the water bearing zone identified at another nearby sample location. This may provide some explanation of the variability in the levels of TCE and DCE observed between samples collected from the same aquifer zone at nearby sample locations.

It has been suggested that the aquitard variability provides for hydraulic isolation between the A1 and A2 aquifer zones in some areas, as well as hydraulic communication between the A1 and A2 aquifers in other areas. In addition, upward hydraulic potential between the A1 and A2 aquifers has been reported at nested wells on Moffett. These conditions suggest that upward flow from the A2 to the A1 aquifer may occur in some areas.

6.0 CONCLUSIONS

The regional direction of groundwater flow in both the A1 and A2 aquifer zones is documented as being to the north-northeast. A review of the network of monitoring wells used to evaluate the regional direction of groundwater flow indicates a lack of data points in the general vicinity (within 2,000 feet) of Stevens Creek. Groundwater elevation data collected at temporary piezometers during this investigation indicates that shallow groundwater flow along the western portion of the southern perimeter of OPHA is to the northwest. No groundwater elevation data was collected in the A2 aquifer zone during this investigation. Monitoring of groundwater elevations in both the A1 and A2 aquifers is needed to evaluate the direction of local groundwater flow at OPHA, and the lateral extent of the influence of Stevens Creek.

The range of concentrations of DCE and TCE observed in the upgradient sampling areas was similar to the range of concentrations observed on OPHA. In most cases, the distribution of constituents in the sampling areas just upgradient of the southern perimeter of OPHA resembles the concentrations just inside OPHA.

Maximum concentrations of TCE and DCE observed in the both the A1 and A2 aquifer zones in the upgradient sampling areas are on the same order as the highest concentrations on OPHA. This indicates that isolated "hotspots" observed on OPHA during previous investigations and attributed by others to a source on OPHA are not likely due to sources on OPHA.

The distribution of TCE and DCE on OPHA and the PRP study sampling areas indicates that elevated levels of TCE and DCE in both the A1 and A2 aquifer at OPHA are the result of the migration of an upgradient groundwater plume.

Levels of TCE and DCE at sample locations west of Stevens Creek were significantly lower than concentrations on OPHA and the upgradient sampling area directly south of OPHA. Due to the discontinuous and heterogeneous nature of the aquifer zones, the data collected during this study does not preclude a western source. However, there is no evidence from this investigation to suggest that the TCE plume is migrating from west of Stevens Creek onto OPHA.

The source of the groundwater plume could not be determined from the data collected. Based on the width of the groundwater plume at the most upgradient area sampled (greater than 800 feet) and the levels detected (less than 0.12% of saturation), the source of the plume appears to be located further upgradient than the Moffett Boulevard – US 101 interchange. A possible source for the plume is the regional VOC plume located less than 4,000 feet southeast of OPHA. No other likely source areas south of OPHA were identified during this study.

Due to the complexity of the geology on OPHA and the upgradient PRP sampling area, interpretation of the plume movement is difficult. Based on geologic logs collected during this and previous investigations, the factors affecting plume movement (i.e., the distribution of coarser grained layers which provide preferential migration pathways, and the presence or absence of the A1/A2 aquitard which provides hydraulic isolation) vary significantly over short distances.

It has been suggested that the aquitard variability provides for hydraulic isolation between the A1 and A2 aquifer zones in some areas, as well as hydraulic communication between the A1 and A2 aquifers in other areas (FWENC, 2003 and Navy 2003). In addition, upward hydraulic potential between the A1 and A2 aquifers has been reported at nested wells on Moffett (FWENC, 2001). These conditions suggest that upward flow from the A2 aquifer to the A1 aquifer may occur in some areas.

Further investigation of the vertical component of flow is needed to evaluate connectivity between the A1 and A2 aquifers. Investigations should include evaluations of upward hydraulic head potentials from the A2 to A1 aquifers, and aquifer tests in areas where the A1/A2 aquitard is believed to be absent to evaluate flow between the A1 and A2 aquifers.

7.0 REFERENCES

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Tables

Table 3-1
Groundwater Chemical Data Summary - CPT Sampling
PRP Study - Orion Park Housing Area
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Sample ID	SIG5-23-090403	SIG5-42-090403	SIG6-20-090403	SIG6-31-090403	SIG6-38-090403	SIG8-20.5-090503	SIG8-24-090503
Sample Date	9/4/2003	9/4/2003	9/4/2003	9/4/2003	9/4/2003	9/5/2003	9/5/2003
Sample Time	10:50	11:15	12:25	13:00	14:00	8:50	9:15
Sample Depth (feet)	20-23'	38-42'	15-20'	29-31'	33-38'	16.5-20.5'	21.5-24'
Dichlorodifluoromethane	µg/L <2.0	<10	<5.0	<5.0	<5.0	<2.0	<2.0
Vinyl Chloride	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	1.5
Chloroethane	µg/L <2.0	<10	<5.0	<5.0	<5.0	<2.0	<2.0
Trichlorofluoromethane	µg/L <2.0	<10	<5.0	<5.0	<5.0	<2.0	<2.0
1,1-Dichloroethene	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	1.3
Methylene Chloride	µg/L <10	<50	<25	<25	<25	<10	<10
trans-1,2-Dichloroethene	µg/L 2.5	<5.0	3.6	4.2	<2.5	4.2	12
cis-1,2-Dichloroethene	µg/L 190	110	110	190	70	48	120
1,1-Dichloroethane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Chloroform	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
1,1,1-Trichloroethane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Carbon tetrachloride	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
1,2-Dichloroethane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Trichloroethene	µg/L 81	870	230	400	420	87	100
1,2-Dichloropropane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Bromodichloromethane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
2-Chloroethylvinyl ether	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
trans-1,3-Dichloropropene	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
cis-1,3-Dichloropropene	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
1,1,2-Trichloroethane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Tetrachloroethene	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Dibromochloromethane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Chlorobenzene	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Bromoform	µg/L <4.0	<20	<10	<10	<10	<1.0	<1.0
1,1,2,2-Tetrachloroethane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
1,3-Dichlorobenzene	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
1,4-Dichlorobenzene	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
1,2-Dichlorobenzene	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Trichlorotrifluoroethane	µg/L <1.0	<5.0	<2.5	<2.5	<2.5	<1.0	<1.0
Chloromethane	µg/L <2.0	<10	<5.0	<5.0	<5.0	<2.0	<2.0
Bromomethane	µg/L <2.0	<10	<5.0	<5.0	<5.0	<2.0	<2.0

Table 3-1
Groundwater Chemical Data Summary - CPT Sampling
PRP Study - Orion Park Housing Area
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Sample ID	SIG8-35-090503	SIG7-22-090503	SIG9-22-090503	SIG9-31.5-090503	SIG9-40.5-090503	SIG9-43.5-090503	DUPA (SIG9-22-090503)
Sample Date	9/5/2003	9/5/2003	9/5/2003	9/5/2003	9/5/2003	9/5/2003	9/5/2003
Sample Time	9:30	11:30	14:15	14:30	14:45	16:05	
Sample Depth (feet)	33-35'	17-22'	20.5-22'	28.5-31.5	39-40.5'	41-43.5'	20.5-22'
Dichlorodifluoromethane	µg/L	<5.0	<2.0	<1.0	<2.0	<1.0	<1.0
Vinyl Chloride	µg/L	3.7	<1.0	<0.5	<1.0	<0.5	<5.0
Chloroethane	µg/L	<5.0	<2.0	<1.0	<2.0	<1.0	<10
Trichlorofluoromethane	µg/L	<5.0	<2.0	<1.0	<2.0	<1.0	<10
1,1-Dichloroethene	µg/L	3.1	<1.0	<0.5	<1.0	<0.5	<5.0
Methylene Chloride	µg/L	<25	<10	<5.0	<10	<5.0	<50
trans-1,2-Dichloroethene	µg/L	25	3.3	<0.5	4.8	<0.5	5.7
cis-1,2-Dichloroethene	µg/L	210	41	<0.5	130	<0.5	260
1,1-Dichloroethane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Chloroform	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
1,1,1-Trichloroethane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Carbon tetrachloride	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
1,2-Dichloroethane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Trichloroethene	µg/L	160	75	<0.5	110	<0.5	850
1,2-Dichloropropane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Bromodichloromethane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
2-Chloroethylvinyl ether	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
trans-1,3-Dichloropropene	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
cis-1,3-Dichloropropene	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
1,1,2-Trichloroethane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Tetrachloroethene	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Dibromochloromethane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Chlorobenzene	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Bromoform	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
1,3-Dichlorobenzene	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
1,4-Dichlorobenzene	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
1,2-Dichlorobenzene	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Trichlorotrifluoroethane	µg/L	<2.5	<1.0	<0.5	<1.0	<0.5	<5.0
Chloromethane	µg/L	<5.0	<2.0	<1.0	<2.0	<1.0	<10
Bromomethane	µg/L	<5.0	<2.0	<1.0	<2.0	<1.0	<10

Table 3-1
Groundwater Chemical Data Summary - CPT Sampling
PRP Study - Orion Park Housing Area
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Sample ID	SIG11-43.5-090803	SIG13-22-090903	SIG13-26-090903	SIG13-36-090903	SIG12-19-090903	SIG12-28.5-090903
Sample Date	9/8/2003	9/9/2003	9/9/2003	9/9/2003	9/9/2003	9/9/2003
Sample Time	13:50	8:35	8:50	9:25	10:35	10:50
Sample Depth (feet)	41-43.5'	18-22'	24-26'	32-36'	17-19'	23.5-28.5'
Dichlorodifluoromethane	µg/L	<1.0	<5.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1.0	<5.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	<1.0	<5.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Methylene Chloride	µg/L	<5.0	<25	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethene	µg/L	<0.5	19	54	2.9	5.4
1,1-Dichloroethane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Chloroform	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Carbon tetrachloride	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Trichloroethene	µg/L	<0.5	23	15	24	1.5
1,2-Dichloropropane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
2-Chloroethylvinyl ether	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropene	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Tetrachloroethene	µg/L	<0.5	200	12	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<0.5	<10	<2.0	<2.0	<2.0
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Trichlorotrifluoroethane	µg/L	<0.5	<2.5	<0.5	<0.5	<0.5
Chloromethane	µg/L	<1.0	<5.0	<1.0	<1.0	<1.0
Bromomethane	µg/L	<1.0	<5.0	<1.0	<1.0	<1.0

Table 3-1
Groundwater Chemical Data Summary - CPT Sampling
PRP Study - Orion Park Housing Area
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Sample ID	SIG12-33.5-090903	DUP C (SIG12-28.5-090903)	SIG14-22-090903	SIG14-26-090903	SIG14-42-090903	SIG15-34.5-090903
Sample Date	9/9/2003	9/9/2003	9/9/2003	9/9/2003	9/9/2003	9/9/2003
Sample Time	11:10		12:55	13:10	13:40	14:45
Sample Depth (feet)	28-33.5'	23.5-28.5'	18-22'	23-26'	39-42'	29.5-34.5'
Dichlorodifluoromethane	µg/L <1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L <1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L <1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	µg/L <5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	µg/L 0.8	<0.5	<0.5	1.3	<0.5	<0.5
cis-1,2-Dichloroethene	µg/L 2.1	0.55	<0.5	8.2	<0.5	2.6
1,1-Dichloroethane	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	µg/L 28	14	12	30	<0.5	29
1,2-Dichloropropane	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chloroethylvinyl ether	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropene	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	µg/L <0.5	<0.5	<0.5	1.8	<0.5	<0.5
Dibromochloromethane	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L <2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,2,2-Tetrachloroethane	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L <0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorotrifluoroethane	µg/L <0.5	0.52	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L <1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	µg/L <1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Table 3-1
Groundwater Chemical Data Summary - CPT Sampling
PRP Study - Orion Park Housing Area
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Sample ID	SIG15-44-090903	SIG16-21-091003	SIG16-27-091003	SIG16-34-091003	SIG16-41-091003	DUP D (SIG16-41-091003)
Sample Date	9/9/2003	9/10/2003	9/10/2003	9/10/2003	9/10/2003	9/10/2003
Sample Time	15:00	9:05	9:20	9:35	9:55	
Sample Depth (feet)	41-44'	16-21'	24-27'	31-34'	38-41'	38-41'
Dichlorodifluoromethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	µg/L	<0.5	0.63	0.59	<0.5	<0.5
1,2-Dichloropropane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chloroethylvinyl ether	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorotrifluoroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0

Table 3-1
Groundwater Chemical Data Summary - CPT Sampling
PRP Study - Orion Park Housing Area
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Sample ID	SIG19-23-091103	SIG19-31-091103	SIG19-35-091103	SIG19-42-091103	DUP E (SIG19-35-091103)
Sample Date	9/11/2003	9/11/2003	9/11/2003	9/11/2003	9/11/2003
Sample Time	11:00	11:15	11:30	11:45	
Sample Depth (feet)	21-23'	28-31'	32-35'	40-42'	32-35'
Dichlorodifluoromethane	µg/L	<1.0	<20	<10	<20
Vinyl Chloride	µg/L	<0.5	30	17	5.1
Chloroethane	µg/L	<1.0	<20	<10	<20
Trichlorofluoromethane	µg/L	<1.0	<20	<10	<20
1,1-Dichloroethene	µg/L	<0.5	<10	6.7	<5.0
Methylene Chloride	µg/L	<5.0	<100	<50	<50
trans-1,2-Dichloroethene	µg/L	<0.5	220	170	25
cis-1,2-Dichloroethene	µg/L	<0.5	980	660	300
1,1-Dichloroethane	µg/L	<0.5	<10	<5.0	<5.0
Chloroform	µg/L	<0.5	<10	<5.0	<5.0
1,1,1-Trichloroethane	µg/L	<0.5	<10	<5.0	<5.0
Carbon tetrachloride	µg/L	<0.5	<10	<5.0	<5.0
1,2-Dichloroethane	µg/L	<0.5	<10	<5.0	<5.0
Trichloroethene	µg/L	<0.5	420	420	8.9
1,2-Dichloropropane	µg/L	<0.5	<10	<5.0	<5.0
Bromodichloromethane	µg/L	<0.5	<10	<5.0	<5.0
2-Chloroethylvinyl ether	µg/L	<0.5	<10	<5.0	<5.0
trans-1,3-Dichloropropene	µg/L	<0.5	<10	<5.0	<5.0
cis-1,3-Dichloropropene	µg/L	<0.5	<10	<5.0	<5.0
1,1,2-Trichloroethane	µg/L	<0.5	<10	<5.0	<5.0
Tetrachloroethene	µg/L	<0.5	<10	<5.0	<5.0
Dibromochloromethane	µg/L	<0.5	<10	<5.0	<5.0
Chlorobenzene	µg/L	<0.5	<10	<5.0	<5.0
Bromoform	µg/L	<2.0	<40	<20	<20
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<10	<5.0	<5.0
1,3-Dichlorobenzene	µg/L	<0.5	<10	<5.0	<5.0
1,4-Dichlorobenzene	µg/L	<0.5	<10	<5.0	<5.0
1,2-Dichlorobenzene	µg/L	<0.5	<10	<5.0	<5.0
Trichlorotrifluoroethane	µg/L	<0.5	<10	<5.0	<5.0
Chloromethane	µg/L	<1.0	<20	<10	<10
Bromomethane	µg/L	<1.0	<20	<10	<10

Table 3-2
Groundwater Chemical Data Summary - Existing Wells
PRP Study - Orion Park Housing Area
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Sample ID		MW-1	MW-2	MW-3	MW-4	MW-5
Sample Date		9/10/2003	9/10/2003	9/9/2003	9/9/2003	9/9/2003
Sample Time		11:35	11:00	18:10	17:40	16:55
Dichlorodifluoromethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chloroethylvinyl ether	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorotrifluoroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5

Table 3-3
 Duplicate Groundwater Sample Chemical Data Summary
 PRP Study - Orion Park Housing Area
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Sample ID		SIG9-22-090503 DUP A	SIG9-22-090503	SIG2-39-090603 DUP B	SIG2-39-090603	RPD (%)
Dichlorodifluoromethane	µg/L	<1.0	<1.0	<1.0	<1.0	
Vinyl Chloride	µg/L	<0.5	<0.5	<0.5	<0.5	
Chloroethane	µg/L	<1.0	<1.0	<1.0	<1.0	
Trichlorofluoromethane	µg/L	<1.0	<1.0	<1.0	<1.0	
1,1-Dichloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	
Methylene Chloride	µg/L	<5.0	<5.0	<5.0	<5.0	
trans-1,2-Dichloroethene	µg/L	<0.5	<0.5	0.51	<0.5	NC
cis-1,2-Dichloroethene	µg/L	<0.5	<0.5	12	9.3	-29%
1,1-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	
Chloroform	µg/L	<0.5	<0.5	<0.5	<0.5	
1,1,1-Trichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	
Carbon tetrachloride	µg/L	<0.5	<0.5	<0.5	<0.5	
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	
Trichloroethene	µg/L	<0.5	<0.5	7.4	15	51%
1,2-Dichloropropane	µg/L	<0.5	<0.5	<0.5	<0.5	
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	
2-Chloroethylvinyl ether	µg/L	<0.5	<0.5	<0.5	<0.5	
trans-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	
1,1,2-Trichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	
Tetrachloroethene	µg/L	<0.5	<0.5	<0.5	<0.5	
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	
Bromoform	µg/L	<2.0	<2.0	<0.5	<0.5	
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	
1,3-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	
1,2-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	
Trichlorotrifluoroethane	µg/L	<0.5	<0.5	<0.5	<0.5	
Chloromethane	µg/L	<1.0	<1.0	<1.0	<1.0	
Bromomethane	µg/L	<1.0	<1.0	<1.0	<1.0	

NC = Not Calculated

Table 3-3
Duplicate Groundwater Sample Chemical Data Summary
PRP Study - Orion Park Housing Area
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Sample ID		SIG12-28.5-090903	SIG12-28.5-090903	RPD (%)	SIG16-41-09103	SIG16-41-09103	SIG19-35-091103	SIG19-35-091103	RPD (%)
		DUPC			DUP D		DUP E		
Dichlorodifluoromethane	µg/L	<1.0	<1.0		<1.0	<1.0	<20	<10	
Vinyl Chloride	µg/L	<0.5	<0.5		<0.5	<0.5	17	17	0%
Chloroethane	µg/L	<1.0	<1.0		<1.0	<1.0	<20	<10	
Trichlorofluoromethane	µg/L	<1.0	<1.0		<1.0	<1.0	<20	<10	
1,1-Dichloroethene	µg/L	<0.5	<0.5		<0.5	<0.5	<10	6.7	NC
Methylene Chloride	µg/L	<5.0	<5.0		<5.0	<5.0	<100	<50	
trans-1,2-Dichloroethene	µg/L	<0.5	<0.5		<0.5	<0.5	160	170	6%
cis-1,2-Dichloroethene	µg/L	0.55	0.78	29%	<0.5	<0.5	660	660	0%
1,1-Dichloroethane	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Chloroform	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
1,1,1-Trichloroethane	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Carbon tetrachloride	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
1,2-Dichloroethane	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Trichloroethene	µg/L	14	16	13%	<0.5	<0.5	440	420	-5%
1,2-Dichloropropane	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Bromodichloromethane	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
2-Chloroethylvinyl ether	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
trans-1,3-Dichloropropene	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
1,1,2-Trichloroethane	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Tetrachloroethene	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Dibromochloromethane	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Chlorobenzene	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Bromoform	µg/L	<2.0	<2.0		<2.0	<2.0	<40	<20	
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
1,3-Dichlorobenzene	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
1,4-Dichlorobenzene	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
1,2-Dichlorobenzene	µg/L	<0.5	<0.5		<0.5	<0.5	<10	<5.0	
Trichlorotrifluoroethane	µg/L	0.52	<0.5	NC	<0.5	<0.5	<10	<5.0	
Chloromethane	µg/L	<1.0	<1.0		<1.0	<1.0	<20	<10	
Bromomethane	µg/L	<1.0	<1.0		<1.0	<1.0	<20	<10	

NC = Not Calculated

