Remedial Design/Remedial Action Work Plan

Hollingsworth & Vose Fiber Company
Corvallis, Oregon

DEQ ECSI #40

Prepared for:

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TABLE OF CONTENTS

SECTION PAGE

1 INTRODUCTION....................1
2 BACKGROUND....................2
2.1 Conceptual Site Model....................2
2.1.1 Site Geology and Hydrogeology....................3
2.1.2 Exposure Areas....................3
2.1.3 Transport....................4
2.2 Remediation History....................10
2.3 Site History Supporting Documents....................11
2.4 Applicable Regulations and Permits....................12
2.4.1 Oregon Applicable or Relevant and Appropriate Requirements....................13
2.4.2 Federal Applicable or Relevant and Appropriate Requirements....................14
3 PROJECT TEAM....................15
3.1 Department of Environmental Quality....................15
3.2 Hollingsworth & Vose....................15
3.3 PNG Environmental....................15
3.4 Subcontractors....................16
4 REMEDIAL ACTION OBJECTIVES STATUS....................17
4.1 Evanite DNAPL Remedial Action Objectives....................17
4.1.1 Short-Term Goals....................17
4.1.2 Intermediate-Term Goals....................17
4.1.3 Long-Term Goals....................18
4.2 Remedial Action Objective Attainment....................18
4.2.1 Short-Term Goal Attainment....................18
4.2.2 Intermediate-Term Goal Attainment....................19
4.2.3 Long-Term Goal Attainment....................21
5 REMEDIAL DESIGN....................23
5.1 DEQ Selected Remedy....................23
5.2 Overview of Remedy....................23
5.3 Design Elements....................24
5.3.1 Easement and Equitable Servitude....................24
5.3.2 Groundwater Containment, Pump and Treat, and DNAPL Pumping....................24
5.3.3 SVE and Sub-slab Depressurization....................26
5.3.4 Off-Gas Treatment....................27
5.3.5 Enhanced Reductive Dechlorination....................28
6 ROD IMPLEMENTATION AND REMEDY PROGRESSION....................30
6.1 Active Remediation....................30
6.2 Media Treatment....................32
6.3 Active Remediation Performance Monitoring....................32
6.4 Mass Flux Monitoring and MNA....................33
7 PROJECT DELIVERABLES....................36
7.1 Design Reports and Implementation....................36
7.2 Operations and Maintenance Plan....................37
7.3 Flux Monitoring Plan....................37
7.4 Performance Monitoring....................38
8 LIMITATIONS....................40

9 REFERENCES..41

TABLES

Table 1 – Neighborhood Area Wells Groundwater Analytical Results - VOCs
Table 2 – Upgradient Area Wells Groundwater Analytical Results - VOCs
Table 3 – Source Zone Wells Groundwater Analytical Results - VOCs
Table 4 – Hardboard Area Wells Groundwater Analytical Results – VOCs
Table 5 – Downgradient Area Wells Groundwater Analytical Results – VOCs
Table 6 – Pore Water Analytical Results – VOCs
Table 7 – Schedule of Project Deliverables

FIGURES

Figure 1 – Site Location Map
Figure 2 – TCE in Groundwater – 2018 Intermediate Conditions
Figure 3 – TCE in Groundwater – 2018 Deep Conditions
Figure 4 – 2018 TCE in Pore Water and Surface Water
Figure 5 – Former DNAPL Pool
Figure 6 – TCE in Groundwater – DMW-3 and DMW-17
Figure 7 – Tax Lots – CMMP Area
Figure 8 – TCE in Groundwater – DMW-2 and DMW-11
Figure 9 – Future Performance Monitoring Network
Figure 10 – Tax Lots – Groundwater Restriction
Figure 11 – Groundwater Elevation Contours – September 10, 2018
Figure 12 – Evanite Post-ROD Schematic
Figure 13 – Conceptual Mass Flux Migration

1 INTRODUCTION

PNG Environmental, Inc. (PNG) prepared this Remedial Design/Remedial Action (RD/RA) Work Plan on behalf of Hollingsworth & Vose Fiber Company (H&V) for its facility located at 1115 SE Crystal Lake Drive in Corvallis, Oregon (Figure 1) (the site). The purpose of this document is to summarize the Remedial Design (RD) and ongoing and planned Remedial Action (RA) for the H&V facility as required in the Record of Decision (ROD) (DEQ 2015). The Evanite facility has been engaged in continuous remedial action with U.S. Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (DEQ) approval since April 30, 1990 and, as such, the site has over three decades of investigation and remedial performance monitoring records.

Planned remedial actions were first presented in the Focused Feasibility Study (Kennec 2007) which led to several years of pilot testing associated with technologies for mass depletion of the DNAPL source zone and polishing of the remnant dissolved phase plume using enhanced reductive dechlorination (ERD). Success of the pilot testing resulted in the 2015 Focused Feasibility Study Addendum (FFSA) (PNG 2015a), from which the DEQ adopted the remedial scheme for the Staff Report (DEQ 2015). Public comment was positive and DEQ adopted the recommended alternative into the ROD. The ROD describing the selected remedy was signed September 21, 2015.

This RD/RA Work Plan is the first deliverable identified in the agreed Remedial Design / Remedial Action Scope of Work (SOW) for the Consent Judgment entered into between H&V and DEQ. As the SOW specifies, this RD/RA Work Plan will be followed by more specific plans and deliverables including a Sampling and Analysis Plan (SAP), Health and Safety Plan (HASP), Design and Implementation Plan, Performance Evaluation and Contingency Plan, Flux Monitoring Plan, Operations and Maintenance Plan (O&M), and Project Completion Construction Report. Each of these subcategory plans supports the remedial scheme and design criteria included herein.

The selected remedial technologies for treatment of soil and groundwater as presented in the FFSA, Staff Report, and ROD include:

- Institutional controls in the well-defined area of contaminated soil to protect site workers and institutional controls within the residual groundwater plume to protect industrial workers and one residential property owned by H&V. Institutional controls are described in the Easement and Equitable Servitudes (E&ES).
- Continued soil vapor extraction (SVE), sub-slab depressurization and associated off-gas treatment of gas in the DNAPL Source Area (east half of Submicro and adjoining property) to promote physical removal of trichloroethene (TCE) mass and mitigate potential vapor intrusion into that building.
- Continued groundwater extraction to maintain containment of impacted groundwater, flush the DNAPL Source Area, and expand the unsaturated zone within the source area, facilitating source depletion through SVE.
- Enhanced reductive dechlorination (ERD) in-situ treatment of groundwater in the residual Glass Plant and Submicro plumes as a polishing technology following physical mass depletion efforts.
- Continued performance monitoring of ongoing, active remediation that will be converted to a mass flux monitoring program as the plume is remediated and elements of the active remedial scheme are phased out.

2 BACKGROUND

The site is located at 1115 SE Crystal Lake Drive in Corvallis, Oregon (Figure 1). The history of the site and surrounding area and summaries of previous investigations are presented in this section and in the documents cited below.

2.1 CONCEPTUAL SITE MODEL

The Evanite conceptual site model (CSM) is based on historical knowledge of former site operations, onsite and regional soil boring and monitoring well logs, historical TCE recovery data from Source Zone remediation wells (i.e., groundwater and SVE), plume reaction to ERD pilot testing, and observed migration pathways of the Dense Non-Aqueous Phase Liquid (DNAPL) as it infiltrated and spread through the four primary soil horizons beneath the site. All site manufacturing operations resulting in the releases addressed in the CSM were performed by the former owner, Evanite Fiber Corporation; no TCE use has occurred since the sale of the property to H&V. TCE and related breakdown or degradation products are found within a groundwater plume that historically covered the entire site as well as an area in the neighborhood upgradient of the site. This plume has been substantially reduced in size due to active remediation since 1991 and now is centered around two site buildings (i.e., Submicro and Glass Plant No. 2 shown on Figures 2 and 3) and the industrial portion of the site immediately downgradient to the northeast.

Over two decades of aggressive site remediation has depleted the majority of the site plume which is now centered in an area at the former manufacturing area of the Submicro Building. This source area is discussed throughout this work plan as the Submicro DNAPL Source Zone, which is consistent with terminology used in EPA guidance documents for DNAPL investigation and remediation. This area is also referred to herein as the Submicro Source Zone or as the Source Zone.

The current CSM includes an intermediate plume section that is defined by potential risk for vapor intrusion into onsite buildings, and a deeper plume section that is defined by a potential risk of discharge of TCE at unacceptable concentrations to the Willamette and Marys Rivers. The vapor intrusion risk is limited to a small portion of the southeast corner of the Submicro Building and is currently mitigated by operation of the sub slab SVE system that also contributes to the ongoing source depletion efforts. Plume migration from the source area is remedied by the hydraulic containment resulting from ongoing groundwater extraction and treatment (i.e., pump and treat) activities that were initiated in 1991.

The intermediate groundwater plume (Figure 2) vapor intrusion risk-based concentration (RBC) for occupational settings is 3,700 micrograms per liter (ug/L) and the residential RBC is 200 ug/L. The current plume area exceeding the occupational RBC is less than a quarter of an acre, only potentially affecting the Submicro Building. Twenty-eight years of active remediation has reduced and focused site concerns for potential vapor intrusion down to the original source area at the Submicro Building. None of the other buildings in the H&V manufacturing areas and surrounding neighborhoods have vapor intrusion concerns.

The deep groundwater plume has also been substantially remediated. The original plume has been reduced and focused to a single well in the DNAPL Source Zone. The 1,000 ug/L TCE plume area is confined on-site and is less than an acre based on September 2019 monitoring data. Future source depletion efforts defined in the ROD are focused in this area.

The groundwater plume area exceeding the pore water screening criteria is less than five acres in size and encompasses the southern portion of the Submicro Building and downgradient to the northeast (Figure 3). Since pore water samples were first collected in 2010, this plume has been characterized intermittently in deep pore water from sample location RB-2, likely representing the leading edge of the plume. Note that shallower pore water samples from location RB-2 have not exceeded this criteria. No exceedance of the pore water screening criteria was measured at this location during the 2016 or 2017 sampling events. Other pore water locations have also not exceeded this criteria.

2.1.1 Site Geology and Hydrogeology

The general site stratigraphy is briefly outlined below. A more thorough review of site geology can be found in the FFS (Kennec 2007).

- Where structures are present, structural fill gravels have been measured to depths between one and seven feet below ground surface (bgs).
- From the native soil/structural fill interface to depths of approximately 20 feet, moderately dense silt and clay (Willamette Silt) forms a semi-confining layer.
- Between depths of approximately 20 and 40 feet is a unit of sandy gravel and silty/cemented sandy gravel (Linn Gravel Aquifer). Upper sections of this unit are often cemented in thin, layered zones. This unit is the only recognized aquifer in the area.
- The base of the Linn Gravel Aquifer ranges between 30 and 45 feet across the site and sits unconformably on a clayey silt to clay (Calapooia Clay). This clay aquitard is reported to be up to 100 feet thick in the Willamette Valley and beneath the site, as characterized by local well logs.

The deep site monitoring wells are screened between approximately 30-40 feet bgs near the base of the water bearing aquifer zone. The early wells were originally placed at the base of the aquifer 1) where local water well drillers had identified the most prolific water bearing zone, and 2) to target the DNAPL pool(s) that had accumulated on the underlying aquitard. In the past seven years, Evanite has been adding additional deep zone wells and intermediate wells in the DNAPL Source Zone to support remediation technology pilot testing activities and additional plume delineation. The intermediate wells generally straddle the transition from overlying silts into the Sandy Gravel Aquifer and are used for groundwater extraction, SVE, and ERD. These wells also intercept the water table and as such represent monitoring points for vapor intrusion.

Groundwater flow under static, pre-pumping conditions is to the north-northeast toward the Willamette and Marys Rivers, with historic minor fluctuations most likely caused by nearby residential pumping and surface water level stage changes in the nearby rivers. Current groundwater flow conditions are controlled by the cone of depression induced by groundwater extraction at the Evanite DNAPL Source Zone. Static groundwater conditions measured in January 2016 after a period of non-pumping confirmed the flow directions reported in the 1980s, prior to active remediation.

2.1.2 Exposure Areas

Current water quality data for the five exposure areas (or receptor zone areas) are presented in Figures 2 and 3 with pore water and surface water data presented on Figure 4. The boundaries between these areas were selected based on the TCE plume configuration (e.g., DNAPL Source Zone vs. dissolved phase plume) and applicable RBCs as defined by current land use setting (e.g., residential vs. occupational). Each area based on the current and likely future use has a unique set of cleanup criteria that is applicable. Whereas the current setting on all of Evanite properties is heavy industrial, zoning allows for possible future mixed use. As such, residential RBCs for vapor intrusion are discussed herein.

The Neighborhood Area is currently characterized by three monitoring wells (IMW-20, IMW-21, and IMW-22) in the neighborhood to the south of the facility. As indicated on Figures 2 and 3, the neighborhood area is isolated to the south and upgradient of the Evanite plumes. Only one of the three current monitoring wells contains detectable TCE (i.e., IMW-20) with H&V owning three lots containing and surrounding this well. Further, the E&ES restricts any well on these lots for beneficial groundwater use. The current applicable lowest RBC for this area is volatilization to indoor air from groundwater in a residential setting (TCE at 200 ug/L) which is an order of magnitude greater than the detected concentrations in IMW-20.

The Upgradient Area is characterized by six wells (DMW-5, DMW-18, DMW-19, DMW-9, DMW-1, and DMW-10) positioned along a south-to-north arc. These wells are located on the H&V Fiber upgradient boundary (i.e., upgradient of the DNAPL Source Zone) with applicable RBCs for TCE including vapor intrusion into occupational buildings (3,700 ug/L) or volatilization to outdoor air (occupational worker at 20,000 ug/L). With groundwater flow concentric toward the groundwater extraction center near the Submicro DNAPL Source Zone, any offsite upgradient contaminated groundwater plumes from another source would flow through these wells to be captured for treatment.

The Source Zone Area is represented by the three original DNAPL extraction wells (DMW-3, DMW-16, and DMW-17) and 22 wells added in recent years to support pilot tests performed to define a long-term remedy. Applicable groundwater RBCs would include vapor intrusion to indoor air and outdoor air in an occupational setting (TCE at 3,700 and 20,000 ug/L, respectively).

The Hardboard Area is located north and east of the Source Zone Area northeast and downgradient of the Submicro Building and is distinct because the current CSM suggests there is no DNAPL residual in this area. Sixteen wells characterize this area. Applicable RBCs would include vapor intrusion to indoor air and outdoor air in an occupational setting (TCE at 3,700 and 20,000 ug/L, respectively) and plume discharge to the river (TCE in pore water at 47 ug/L). The compliance plane for mass flux discharge monitoring will be defined by the northwest to southeast arc of monitoring wells in this Hardboard area. As source depletion in the Submicro Source Zone is transitioned to polishing technology, a mass flux monitoring plan will be developed in coordination with DEQ. The number of wells necessary to establish and locations of wells within this compliance plane will be defined at that time and will be based on the configuration of the depleted plume.

The Downgradient Area includes the large grass covered area north of site buildings and riverbank areas covered by thick briars along the Marys and Willamette Rivers. This is the hyporheic zone. Wells DMW-4, MW-6, MW-13, MW-15, and the downgradient pore water sampling locations characterize this area. DEQ's current ecological guidance was used to define the screening level for this area (i.e., Tier II SCV). The Tier II SCV for TCE is 47 ug/L.

2.1.3 Transport

The Source Zone Area near the Submicro Building is conceptually represented by residual DNAPL in the silts and residual and/or pockets of mobile DNAPL in the underlying sandy gravel aquifer. Initially, TCE entered the soil from spills in the former process area near monitoring wells DMW-3, DMW-28, and DMW-29. Upon release to the soil, the TCE

DNAPL, with up to 30% dissolved miscella oil, infiltrated vertically through three to six feet of coarse gravel fill material, a thick sequence of silt and silty sandy gravel aquifer matrix, and then ponded on the underlying clay aquitard surface. Source zone migration was primarily vertical with some lateral spreading due to heterogeneity in the layered structure of the silts and sandy silts.

In the Source Zone, small blebs of DNAPL at residual saturation levels have been observed trapped within and tightly sorbed into the unsaturated silts. This area has therefore been the focus of SVE source depletion efforts during several years of pilot testing and is a remediation focus area in the ROD. When installed in 2009, intermediate zone well IMW-3 contained high TCE concentrations, similar to deeper, pre-remediation levels found in 1986. This was expected since active remediation of deep groundwater extraction and treatment had not been focused at the water table. This well now produces the majority of TCE recovered through SVE with concentrations dropping three orders of magnitude from 2011 through 2015. Wells IMW-28, IMW-29, and IMW-31, located in the former Submicro Building process area, contained traces of visible non-aqueous phase liquid (NAPL) blebs during drilling and have been the focus of recent SVE efforts. Initial concentrations in these wells were substantially less than IMW-3 and a decreasing trend in soil vapor concentrations is evident as source depletion efforts continue. Interestingly, IMW-30, located between IMW-28 and 29 in the former process area, did not contain visible NAPL and soil vapor concentrations are somewhat small in comparison. This pattern attests to the extremely heterogeneous nature of the release and subsequent transport in the unsaturated zone.

Mobile DNAPL reached the aquifer and continued to migrate vertically and laterally on lower permeability finer grained horizons within the sand and gravel aquifer. The separate phase (i.e., DNAPL) migrated to the aquitard surface at approximately 40 feet bgs, accumulated in pools, and migrated in a general easterly direction along the relatively impermeable clay surface. Mobile DNAPL migration was documented at wells DMW-3, DMW-16, and DMW-17 where substantial quantities of separate phase NAPL were recovered until the early 2000s. Four other well locations (MW-23, MW-28, MW-31, and MW-41) contained soil staining and high photoionization detector (PID) readings at and into the aquitard surface indicating the former presence of NAPL. These locations provide a rough extent of the original DNAPL as they are bound by several wells that do not exhibit similar features. This footprint starts at the southeast end of the Submicro Building coincident with the former TCE manufacturing process and spreads east and northeast to beneath the west end of the Glass Plant Building. None of these wells currently contain any mobile NAPL as 28 years of flushing has apparently recovered available free product. One well remains with TCE concentrations above 10,000 ug/L (DMW-23), and no other wells exceed the occupational vapor intrusion RBC of 3,700 ug/L.

The Millrace historically represented a physical barrier (i.e., deep ditch) in the unsaturated zone between the TCE process area and other areas of the property. This former ditch now hosts a large diameter culvert between and separating the Submicro and Glass Plant Buildings (Figure 5). Whereas TCE contamination was expected to be encountered in the unsaturated zone beneath the former process and release area (Submicro Building area), any borings or wells located to the east of the Millrace were not expected to encounter TCE contamination above the seasonal high water table.

Intermediate groundwater TCE concentrations in wells west of the Millrace ranged in concentration from a high of 1,450 ug/L at IMW-31 to less than laboratory detection limits at other wells. TCE concentrations in water grab samples collected from depths of 27 to 29 feet bgs in the two wells installed in the Glass Plant Building in December 2015 (DMW-41 and DMW-42) ranged from 4.9 to 54 ug/L (as compared to the vapor intrusion RBC of

3,700 ug/L). This wedge of relatively clean water combined with the tight overlying silts provides a natural barrier to vapor intrusion into the overlying Glass Plant Building.

Neighborhood Area

Groundwater TCE concentrations in the neighborhood have been reduced to below the applicable RBCs following 28 years of aggressive groundwater extraction. Two wells (MW-21 and MW-22) in the neighborhood on SE Vera Avenue have been at nondetect or less than 1.0 ug/L for TCE since installation in 2008. Wells MW-21 and MW-22 are located in SE Vera Avenue and indicate there is no risk to residents of vapor intrusion or groundwater ingestion in this former plume area.

Ambient air samples have been collected at the source area six times between 2005 and 2013 and included samples at the south end of the Submicro Building Source Area. This location is some 500 feet from the nearest residential homes in the Neighborhood Area. DEQ evaluated these data and concluded in the Staff Report (DEQ 2015b) that "contamination from Evanite does not pose unacceptable risk to residents." Since these samples have been collected, H&V has converted from off-gas treatment using catalytic oxidation (CatOx) to activated carbon, which further ensures against the potential for TCE emissions from the treatment systems.

A third well (IMW-20) is located near SE Crystal Lake Drive directly across from the manufacturing facility on H&V property. The well was installed at the location of a residential well with the highest original concentration (MW-665 Vera well) to provide remediation performance data (PNG 2009a). After an initial decreasing TCE concentration trend following the resumption of groundwater extraction from DMW-12, the IMW-20 well has shown stable reduced volatile organic compound (VOC) concentrations over the past few years (Table 1). The September 2018 TCE concentration in the groundwater sample from IMW-20 was 22 ug/L with the average between 2014 and 2016 at 26 ug/L (Figure 2). These data are well below the applicable RBC of 200 ug/L for potential vapor intrusion in a residential setting. Water for this neighborhood in Corvallis is provided by the City of Corvallis; therefore, risk associated with potential ingestion does not exist. Further, well IMW-20 is located on one of three lots owned by H&V in the neighborhood area and is restricted for all beneficial uses per the E&ES.

As outlined in the ROD, if any residence in the neighborhood area wants to rehabilitate their former well, if even allowed to do so by the city, to the extent it is made aware of the well rehabilitation attempt, H&V will sample and analyze the well for constituents of concern (i.e., TCE). If contaminants from the former Evanite plume are found at above-applicable DEQ RBCs, an alternate water supply will be provided. Monitoring wells MW-21 and MW-22 located in SE Vera Avenue do not contain detectable TCE, so this scenario is highly unlikely.

DEQ is currently performing a regional study of several VOC-containing groundwater plumes outside of and unrelated to the site and has identified shallow groundwater with tetrachloroethene (PCE) and TCE at concentrations up to 556 and 2,660 ug/L, respectively (PNG 2008a). Based on current data in the Neighborhood Receptor Area with concentrations near the detection levels or nondetect, these plumes are currently not migrating onto Evanite property at any significant concentration.

Upgradient Area

The southern and western extent of the Evanite groundwater plume is characterized by this group of six upgradient monitoring wells (Table 2). TCE contamination in this Upgradient Area was generally attributed to Evanite as the concentration pattern correlated well with the geometry of the onsite TCE plume. However, due to the local shallow groundwater flow direction to the north and northeast toward the rivers, other regional chlorinated plumes located upgradient of Evanite had comingled into the Evanite plume.

Within a few years of startup of the groundwater remediation system, all of the Upgradient Area wells indicated a strong decreasing trend in TCE concentrations. Currently, groundwater from wells DMW-1, DMW-5, DMW-18, and DMW-19 do not contain TCE above laboratory reporting limits. In September 201, wells DMW-9 and DMW-10 contained TCE at 0.80 and 3.3 ug/L, respectively (Figure 3).

Overall, the upgradient wells have been stable at low TCE concentrations for several years, with TCE concentrations well below the occupational vapor intrusion RBC concentration of 3,700 ug/L as well as the residential RBC of 200 ug/L. After 28 years of aggressive groundwater pumping, it is likely that much of the TCE attributable to the Evanite plume has been flushed from the aquifer in the Upgradient Area. Groundwater pumping at Evanite has maintained a northerly shallow groundwater flow direction and as such it is possible that current low level detections of chlorinated compounds in these wells are attributable to the regional chlorinated VOC-containing groundwater plumes.

The Upgradient Area does not contain any contaminated soil; no risks exist for ingestion or inhalation for this potential exposure pathway.

Groundwater concentrations are generally non-detect or near the detection limit of 1 ug/L, where detected. Vapor intrusion to indoor air is not of concern with the occupational RBC at 3,700 ug/L and residential RBC at 200 ug/L. Further, the thick sequence of near-surface Willamette Silt soil and wedge of clean intermediate zone groundwater provide additional protection against upward migration of volatiles.

Source Zone Area

The Source Zone Area is the focus of pilot testing efforts to support the FFS (PNG 2008b and 2010a). Source zone groundwater data is summarized in Table 3 with data presented in Figures 2 and 3. The 2016 data is still somewhat influenced by the ERD pilot testing, which concluded October 29, 2013, with several of these wells (DMW-3 and DMW-17) used for the pilot test. For the September and December 2018 monitoring events, the fifteen deep Source Zone wells ranged in TCE concentrations from less than 1 ug/L at DMW-40 to 15,700 ug/L at DMW-23, which is located furthest away from the ERD pilot test. Well DMW-3, which historically contained the highest TCE concentrations, was reduced to a range of 1,600 to 2,400 ug/L following the ERD pilot testing. The December 2018 TCE concentration at DMW-3 of 2,270 ug/L indicates that the well has not rebounded following the ERD pilot test. The deep plume core has been substantially depleted from beneath the Submicro Building with the current core centered to the west around wells DMW-16 and DMW-23, which were not within the influence of the 2013 ERD pilot testing.

Potential risk of discharge to the rivers from the deep groundwater plume is currently addressed by the hydraulic containment system. Current remedial efforts are continuing to reduce the source area plume core with only four wells at concentrations higher than 1,000 ug/L in the annual sampling event. Remedial progress in the source area is illustrated by the TCE concentration trends in well DMW-17 and DMW-3 (Figure 6).

DMW-17 is located on the upgradient or south end of the DNAPL Source Zone. As indicated on Figure 6, the ERD pilot test reduced the TCE concentrations in this well to below 1 ug/L by the end of 2013. No appreciable rebound has occurred with the 2018 TCE concentrations ranging from nondetect to 29 ug/L. ERD polishing appears to have been successful at this location along the outer edge of the Source Zone.

DMW-3 is located at the center of the Source Zone. TCE concentrations dropped rapidly during the period from 1988 until 2000 as the mobile DNAPL was removed. From 2000 until 2014, concentrations were constant at just greater than 10,000 ug/L. The subsequent ERD testing and the SVE mass removal caused a decrease of TCE concentrations in this well to around 2,000 ug/L where concentrations appear stable since 2014.

The intermediate zone of the source area has been targeted for source depletion with SVE for eight years. Monitoring wells that are within an active SVE radius of influence indicate a strong trend in TCE concentration reduction. 2018 TCE concentrations in groundwater from 13 intermediate zone wells in the Source Zone range from less than 0.5 ug/L in IMW-40 to 4,830 ug/L at IMW-28. IMW-17 is unique in that the SVE implemented at this location in 2012 has decreased TCE concentrations in groundwater from this well to 620 ug/L in March 2013. Subsequent ERD pilot testing reduced the TCE concentration further, with the 2018 concentration at 223 ug/L.

Source depletion has reduced the potential risk from occupational vapor intrusion due to groundwater down to a very small area between the Submicro Building and Millrace; only groundwater from a single intermediate well (IMW-29) within the Submicro Building occasionally exceeds the RBC of 3,700 ug/L. Active SVE beneath the Submicro Building is an engineering control that addresses potential vapor intrusion risk to onsite workers.

Direct contact with contaminated soil is a potential exposure pathway for future construction workers or excavation workers in the areas beneath the east half of the Submicro Building and outside area between the Submicro Building and Millrace. This limited area is depicted on Figure 7. As the Figure 7 cross section shows, during the timeframe of any TCE release(s), the Millrace was open and served as a boundary preventing migration of TCE in the unsaturated zone towards the Glass Plant Building.

The vapor intrusion to indoor air pathway is of potential concern at the Submicro building due to Source Zone soil contamination beneath the building. This potential exposure is currently addressed with the SVE system which is active in the subslab as well as intermediate zone wells located beneath the building.

As stated in the ROD, any future "risks from contaminated soil by direct contact, ingestion, and inhalation, and risks of excavation worker exposure to soil and groundwater in the Source Zone will be addressed through maintenance of the concrete cap and through institutional controls." These controls have been implemented with the E&ES.

Hardboard Area

The Hardboard Area is located to the north and east of the DNAPL Source Zone and has not been characterized as containing any mobile DNAPL sources based on previous site investigations and knowledge of manufacturing history. Prior to implementation of groundwater remediation by Evanite in 1991, wells in this area contained high concentrations of TCE (Table 4) that are often indicative of DNAPL. However, unlike the Source Zone, TCE concentrations in groundwater steadily declined in response to aquifer pore space flushing to below 1,000 ug/L of TCE prior to becoming asymptotic.

September/December 2018 groundwater sampling results indicate the all intermediate zone TCE concentrations within the Hardboard Area are below 0.7 ug/L, with the majority being nondetect at an MRL of 0.5 ug/L. This concentration is well below the vapor intrusion RBCs for occupational and residential settings of 3,700 ug/L and 200 ug/L, respectively. Vapor intrusion is not a pathway of concern anywhere on the property outside of the Source Zone.

The highest TCE concentration in deep zone groundwater in 2018 was at DMW-8 (500 ug/L). DMW-8 has exhibited the greatest fluctuation in concentrations of all wells over the past decade. Since it is located on the very upgradient boundary of the original high concentration plume, its concentrations appear to be sensitive to minor changes in the groundwater extraction scheme. This well and the surrounding aquifer are targeted for the initial phase of ERD. Remedial progress in the Hardboard Area is illustrated by the TCE concentration trends in well DMW-2 and DMW-11 (Figure 8).

DMW-2 is located north and downgradient of the Source Zone. TCE concentrations in this well were initially indicative of DNAPL though no free product DNAPL was ever observed in this well. Groundwater extraction flushed this location resulting in a decreasing trend in concentrations that became asymptotic by 1998 near or below 2,000 ug/L TCE. Increased pumping starting during the pilot testing phase is coincident with a new decreasing trend and TCE concentrations are now below 500 ug/L. Although this location was not directly affected by the ERD testing, efforts for mass depletion in the Source Zone may be accountable for the most recent trend in decreasing concentrations. Results of the ERD pilot test suggest a groundwater plume zone with these characteristics will respond quickly and efficiently to this in situ treatment technology.

DMW-11 is located downgradient to the northeast of the Source Zone. TCE concentrations in this well are similar to DMW-2, with the TCE concentration becoming asymptotic by the year 2000 at below 500 ug/L (Figure 8). There is a decreasing concentration trend at this location with September 2018 sampling event indicating TCE at 14 ug/L.

The locations of DMW-2 and DMW-11 are targeted with several additional wells as a compliance plane for performance monitoring based on mass flux. These locations are just downgradient of the original extent of the mobile DNAPL pool and have not exhibited rebound after flushing (i.e., well nests MW-33, 34, and 35). Rebound is evaluated with each sampling event.

The deep contaminated plume remnant in the Hardboard area starts below the Glass Plant Building and appears to migrate to the east through DMW-35 (TCE at 368 ug/L) to DMW-39 and discharge at pore water location RB-2. The potential risk here is for pore water to exceed the screening level of 47 ug/L, which occurs at a depth of two to four feet into the sediment. This groundwater plume segment will be closely monitored and targeted in the second phase of ERD remediation.

There is no shallow contaminated soil in the Hardboard Area; risks from direct contact or ingestion for future site works do not exist. Vapor intrusion into buildings in this area is not of concern as TCE concentrations are all well below the applicable RBC of 3,700 ug/L.

Downgradient Area and Hyporheic Water

This area is characterized by three deep wells that are aligned perpendicular to the original plume flow direction (i.e., northeasterly migration from the Source Zone). Concentrations of TCE are less than 1 ug/L (MW-6) or not detected (MW-13 and MW-15). Well DMW-39, installed in December 2014, is located within the footprint of the former Hardboard Building and is located southwest or landward of the sub-area boundary approximately 160 feet upgradient of the Willamette River. The intermediate zone grab sample contained TCE at 1.2 ug/L; this area is not of concern for vapor intrusion in an occupational or residential setting. The September 2018 deep sample reported TCE at 5.8 ug/L and represents the leading edge of the remnant TCE plume in relation to the Willamette River (Figure 3). This plume segment is the primary reason pore water sampling is conducted.

Groundwater data for this area is provided in Tables 5 and pore water and surface water data in Table 6. Data are illustrated on Figures 2, 3, and 4 with applicable screening values for TCE posted on the figures and other chlorinated solvents included in the tables.

Based on direction from DEQ, the Oak Ridge National Laboratory's Tier II SCVs are appropriate screening criteria for the pore water analytical data for TCE, PCE, cis-1,2-DCE, and trans-1,2-DCE. Because no SCV value is reported for vinyl chloride, DEQ has adopted the EPA ecological screening value of 930 ug/L for that constituent. These screening levels represent a highly conservative lower threshold concentration from which site data are screened against to indicate if more evaluation is necessary. Currently, all but one of the pore water and near shore sample locations in the downgradient area are below the applicable pore water screening criteria. Intermittently, the exceedance of the TCE screening criteria value has been observed in a deep (two to four feet below sediment surface) pore water sample at RB-2. An exceedance was previously observed at this same location in 2011 and 2015; however, both the deep and shallow samples from this location were below the screening criteria in 2016 and 2017. The shallow sample at this location has consistently been below the screening criteria.

Screening level values for the degradation chemicals are summarized in Table 6 and comparison with analytical results indicates concentrations of these VOCs in all pore water samples are below respective criteria.

Surface water samples collected in the Willamette and Marys Rivers were nondetect for TCE and other COIs, and are below the applicable TCE surface water standard of 3.0 ug/L.

To the extent elements of the remnant groundwater plume in the hyporheic zone migrate beyond the hydraulic containment, those will be identified through pore water sampling.

Risks from shallow soil for vapor intrusion from the deep groundwater plume do not exist for reasons identical to those provided in the Hardboard discussion above.

2.2 REMEDIATION HISTORY

Routine site monitoring and reporting conducted since site discovery in 1986 was aimed at documentation of the pump and treat system performance with groundwater wells sampled on a quarterly basis. Groundwater extraction was operated continuously with significant TCE recovered over the first three years of operation. After several years of groundwater extraction, very little change in groundwater quality was noted between events as the groundwater surrounding each extraction well was flushed of mobile DNAPL and dissolved phase TCE. Concentrations in monitoring wells outside the core of the plume (i.e., the source zone at the Submicro Building) slowly decreased to relatively steady state concentration conditions by the late 1990's. TCE mass recovery between 2000 and 2011 was very consistent, with very little change in concentrations of TCE in site remediation wells.

Starting in late 2011 with the addition of a catalytic oxidizer purchased and installed for destruction of TCE off-gas, groundwater pumping from the source zone was increased to create a larger unsaturated zone cone of depression in the Submicro Building source zone. Soil vapor extraction (SVE) applied in newly installed wells at the top of the now unsaturated aquifer provided for an increase in TCE mass removal. Groundwater extraction necessary for dewatering the source zone was slowly increased through the period with upgrades implemented on the air stripper, surge tanks, water and air piping, and SVE system.

In 2013, PNG implemented a pilot test to evaluate ERD as a remedial alternative to be applied surrounding and within the source zone once the decreasing concentration trend in dissolved plume and/or SVE mass removal in the source zone became asymptotic. Wells were installed along the axis of the source zone plume on the south (i.e., upgradient) edge for injection of nutrients. A recirculation cell was established with extraction in the core of the source zone and, after augmentation, reinjection of the extracted water. The test was successful in stimulating degradation in a former DNAPL zone with significant concentrations of anaerobic degradation products measured in the test area.

Subsequent to successful pilot testing, PNG prepared an addendum to the 2007 FFS (Kennec 2007) presenting an amended remedial option (PNG 2015b). Remedy RA-2 Amended included 1) SVE for mass depletion at the DNAPL source zone and vapor intrusion protection for the Submicro Building, 2) aggressive groundwater extraction focused in the source zone to remove dissolved contaminants and increase the depth of the unsaturated zone, and 3) polishing with ERD starting at the periphery of the plume and moving into the source zone. Additional measures afforded by the current remedy include plume containment that prevents the plume from migrating into pore water at the river interface at concentrations greater than ecological screening concentrations and maintaining subslab depressurization for potential vapor intrusion beneath the Submicro Building.

DEQ concurred with the presentation and conclusions presented in the amended FS and prepared a Staff Report of the recommended remedial action (DEQ 2015b). DEQ prepared the ROD (DEQ 2015a) which included a summary of site conditions and selected the recommended remedial alternative as the remedial action for the site. DEQ stated that the remedial action selected was considered to be protective, effective, reliable, and cost effective. Current regulatory activities include DEQ's approval of the Consent Judgement to implement the remedial action.

A summary of design and construction elements completed to date is listed in Section 5.3.

2.3 SITE HISTORY SUPPORTING DOCUMENTS

Milestones for the Evanite investigation and remedial efforts are listed below with supporting references.

- May 25, 1987 Part B Post Closure Permit which presented the remedial investigation results and proposed remedial operations of pump and treat with focused SVE at the source area.
- Multiple annual performance monitoring reports between 1991 and 2002.
- December 20, 2002 draft Focused Remedial Investigation Report providing an update of the CSM.
- May 30, 2007 Focused Feasibility Study presented multiple remedial alternatives for future efforts and recommended a revised plan (Kennec 2007).
- January 30, 2008 Focused Feasibility Study Pilot Test Work Plan presented the background for numerous pilot tests aimed at 1) increasing mass depletion in the source zone and 2) enhanced reductive dechlorination polishing in areas where dissolved plume reduction had become asymptotic and in the source area once mass depletion was complete (PNG 2008c).
- 2009 DNAPL Source Zone Well Installation report (August 11) that updated the CSM in the source area to illustrate that mobile DNAPL had been removed by decades of flushing, but residual DNAPL remained in many areas (PNG 2009b).

- 2009 Remedial Performance Report (September 16) presented information regarding the upgrade of the existing remedial system and installation of new monitoring wells in the upgradient neighborhood. (PNG 2009c).
- Submicro SVE Pilot Test (January 28) presented results of Submicro subslab depressurization pilot testing (PNG 2010a).
- 2010 Remedial Performance Report (June 10) presented information regarding the Submicro SVE pilot test and an updated CSM. (PNG 2010b).
- 2011 Remedial Performance Report (July 19) presented information regarding system upgrades and an updated CSM as augmented by pore water data (PNG 2011).
- 2012 Remedial Performance Report (November 26) presented results from the CatOx treatment system startup and pilot testing and an updated CSM (PNG 2012).
- 2013 Remedial Performance Report (PNG, June 16, 2014) presented the results of new well installation, multiple pilot tests related to source depletion related to various extraction schemes, results for the ERD pilot test, and an updated CSM (PNG 2014a).
- 2014 Remedial Performance Report (March 12, 2015) presented the results of new well installation and an updated CSM necessary to support the amended FS (PNG 2015b).
- 2015 Focused Feasibility Study Addendum (February 12) addressed DEQ comments from the December 18, 2014 draft report in providing an additional remedial scheme that included mass depletion with ERD polishing as a preferred remedy (PNG 2015a).
- 2015 Remedial Performance Report (March 31, 2016) presented the results of new monitoring/remedial wells and an updated CSM to support remedial design; progress in meeting the DNAPL RAOs was documented (PNG 2016).
- Staff Report for Recommended Remedial Action (April 2015) prepared by DEQ presents the recommended remedy (DEQ 2015b)
- Record of Decision (September 21, 2015) prepared by DEQ finalizes the recommended remedy after addressing any public comment (DEQ 2015a).
- 2016 Remedial Performance Report (May 8, 2017) presented system modifications completed and progress in meeting the DNAPL RAOs was documented (PNG 2017).
- 2017 Remedial Performance Report (July 26, 2018) presented system modifications completed and progress in meeting the DNAPL RAOs was documented (PNG 2018).
- 2018 Remedial Performance Report (May 16, 2019) presented system modifications completed and progress in meeting the DNAPL RAOs was documented (PNG 2019).

2.4 APPLICABLE REGULATIONS AND PERMITS

Applicable of Relevant and Appropriate Requirements (ARARs) are used to set remedial goals and are utilized in the FS to determine whether potential remedies are protective and meet statutory requirements. ARARs can be grouped into three categories, based on CERCLA guidance:

- Chemical-specific requirements, which define acceptable exposure concentrations or water quality standards;
- Location-specific requirements, which may restrict remediation activities at sensitive or hazard-prone locations such as active fault zones, wildlife habitat, or flood plains; and
- Action-specific requirements, which may control activities and/or technologies.

Oregon Environmental Cleanup Rules (OAR 340-122) are generally applicable for the establishment of cleanup levels and selection of remedial actions for groundwater, soil and other media. OAR 340-122-0040(2) requires that hazardous substance remedial actions achieve one of three standards: 1) acceptable risk levels, 2) numeric standards developed as part of an approved generic remedy identified or developed by DEQ, or 3) background levels in areas where hazardous substances occur naturally.

The H&V facility operates under an ACDP permit issued by DEQ's Western Region. The permit expired on May 1, 2013, but was administratively extended until the permit is renewed. A future air quality permit for the H&V facility may incorporate DEQ's Cleaner Air Oregon (CAO) program requirements. After the H&V facility is called-in by DEQ to demonstrate compliance with the CAO program, H&V will cooperate with DEQ in evaluating emissions from the offgas treatment system under CAO, or otherwise, consistent with ORS 465.315(3). Following that evaluation, any new requirements for the operation of the offgas treatment system, if any are needed, will be specified in work plans developed pursuant to the Consent Judgment.

2.4.1 Oregon Applicable or Relevant and Appropriate Requirements

- Environmental Cleanup Rules (OAR 340-122): These rules establish the standards and procedures to be used for the determination of removal and remedial action necessary in the event of a release or threat of a release of a hazardous substance; this includes a process for evaluation and preliminary assessment of releases of hazardous substances, and a process for developing and maintaining a statewide list of confirmed releases and an inventory of sites requiring investigation, removal, remedial action, or related long-term engineering or institutional controls.
- Groundwater Protection Rules (OAR 340-040): This rule establishes the mandatory minimum groundwater quality protection requirements for federal and state agencies, cities, counties, industries, and citizens; more stringent regulations always supersede these criteria. The rule is applicable in establishing remediation goals and the guidance levels are chemical-specific.
- Underground Injection Control Rules (OAR 340-044): These rules were adopted in conformance with Part C of the federal Safe Drinking Water Act (SDWA) to govern the State of Oregon Underground Injection Control (UIC) program. The rules state that the injection of wastes to the subsurface shall be limited and controlled in a manner that protects existing groundwater quality for current or potential beneficial uses including use as a source of drinking water.
- Well Construction and Abandonment Standards (OAR 690-022 and 690-210): These standards are applicable to any construction or abandonment of wells constructed for any purpose, including monitoring and extraction wells.

- Solid Waste Management Rules (OAR 340-93 through 340-97): These rules regulate the disposal and permitting of solid waste.
- Hazardous Waste Management Rules (OAR 340-100 through 340-120): These rules govern the life cycle of hazardous waste, from the generation to the transportation, storage, treatment and disposal.
- General Emission Standards for Particulate Matter (OAR 340-208-100 through 210): Applicable to visible emissions and nuisance conditions from the selected soil remedy.
- Water Quality Management Plan (OAR 340-041 and 340-045): OAR 340-041 is applicable to establishing treated water discharge criteria and aquifer remediation goals. OAR 340-045 is applicable to permitting of extracted groundwater.
- Air Pollution Standards (OAR 340-030 and 340-032): Applicable to treatment generated air emissions.
- State of Oregon Best Management Practices for Storm Water Discharges Associated with Construction Activities: State of Oregon Best Management Practices (BMPs) are measures or controls that reduce pollutants at the source to prevent the pollution of storm water runoff discharged from the site. These practices can also be used to divert runoff away from areas of exposure to pollutants, such as raw materials, intermediate products, or finished products. BMPs are determined on a case by case basis.

2.4.2 Federal Applicable or Relevant and Appropriate Requirements

- Resource Conservation and Recovery Act (Subtitle C RCRA, 40 CFR 260-279): EPA waste management regulations specifically regarding management of hazardous waste.
- Hazardous and Solid Waste Amendments: These are Resource Conservation and Recovery Act (RCRA) amendments that require phasing out of land disposal of untreated hazardous waste by more stringent hazardous waste management standards. The amendments also include increased enforcement authority for the EPA and a program requiring corrective action.
- Identifications and Listing of Hazardous Wastes (40 CFR 261) This rule contains RCRA definitions and criteria for identifying hazardous waste, and is used to determine whether a waste is a listed or characteristic RCRA hazardous waste. That identification is crucial to the determination of further applicability of RCRA.
- Toxic Substances Control Act (15 U.S.C. 2605): This code contains provisions for testing of existing chemical substances and mixtures, regulation of hazardous chemical substances and mixtures, manufacture and processing notices, managing imminent hazards and reporting and recordkeeping requirements.
- Safe Drinking Water Act and Implementing Regulations (40 CFR 141): This act established federal drinking water maximum contaminant levels (MCLs) for public water supplies. The act applies to remedial activities that could result in a discharge of a pollutant to waters of the U.S.

Occupational Safety and Health Act (29 CFR 651 et seq. (1970): This act addresses worker health and safety in the workplace. The responsibility for protecting worker health in the workplace was assigned to the Occupational Health and Safety Administration (OSHA). OSHA mandates proper training and medical surveillance for workers who may come in contact with hazardous waste.

3 PROJECT TEAM

Management responsibilities of project personnel and lines of authority and communication are presented below. This hierarchy will be used to ensure that all team members are familiar with their expected roles in completing specific assignments. In addition, the hierarchy will ensure that PNG (or another qualified environmental consultant) meets the schedule required for project activities and properly communicates with DEQ, H&V Fiber, and other interested parties.

3.1 DEPARTMENT OF ENVIRONMENTAL QUALITY

Nancy Sawka is the DEQ Project Manager for the Evanite site. She has overall responsibility for administration of the RD/RA activities.

3.2 HOLLINGSWORTH & VOSE

Dan Kellom, a Professional Engineer (PE), is the H&V Project Coordinator and will be responsible for overseeing implementation of the RD/RA activities. Mr. Kellom will coordinate all activities with the DEQ Project Manager. Mr. Kellom is responsible for contracting with and directly supervising the environmental consultant(s) that will conduct the field, lab, analysis, and reporting tasks for the RD/RA. He will direct the consultant on a day to day basis and provide primary review of all reports and other work products. Mr. Kellom will also coordinate with DEQ regarding the area of concern (AOC) for the RD/RA.

3.3 PNG ENVIRONMENTAL

The consultant selected by H&V to conduct the RD/RA for the site is PNG Environmental. The consultant is responsible for report production, implementing the field program, including field sampling, data analysis, and reporting. PNG will also coordinate subcontracted laboratory analysis, well drilling, and remedial technology design and installation.

Paul McBeth, a Registered Geologist (RG) in Oregon, is the PNG Project Manager and will serve as the point of contact for Evanite. He will be responsible for implementing and executing the technical, quality assurance (QA), and administrative aspects of the RD/RA, including the overall management of the project team. Mr. McBeth will be responsible for the quality and timeliness of PNG documents. Mr. McBeth has overall responsibility for ensuring that the project meets the objectives of H&V Fiber and DEQ.

Mr. McBeth will be assisted by Samantha Biles, a PE in Oregon, and the RD/RA Task Manager. Ms. Biles is accountable for ensuring that the RD/RA is conducted in accordance with applicable plans and guidelines, including the Work Plan, SAP, QAPP, and HASP. She will communicate all technical, QA, and administrative matters to the PNG and H&V Project Managers. She will ensure that any deviations from the approved Work Plan are documented, communicated to H&V, and approved before implementation.

Brad Berggren, a PE and RG in Oregon, will assist the Project and Task Managers with RD/RA activities for the project. Mr. Berggren has over 30 years of engineering experience, including design and construction experience with similar projects. He has the responsibility of leading and coordinating the remedial action construction oversight activities undertaken by PNG in support of H&V. In addition, Mr. Berggren has been identified as an Alternate Project Manager to Mr. McBeth.

The overall management of the project-specific QA activities is the responsibility of the QA Manager Crystal Jones. Ms. Jones is responsible for implementation of site-specific QA activities, including field and laboratory quality control. In addition, the QA Manager will coordinate with the PNG Project and Task Managers and other project staff as applicable, during the reduction, review, and reporting of analytical data.

PNG Field Operations Manager, Jason Greifer, will be responsible for managing and supervising the field RD/RA implementation program and providing consultation and decision-making on day-to-day issues relating to the sampling activities. The Field Manager will monitor field activities to ensure that operations are consistent with plans and procedures and that the data acquired meet the analytical and data quality needs. When necessary, the Field Manager will document any deviations from the plans and procedures for approval. The Field Manager will be assisted in the field by other technical personnel to be determined. Mr. Greifer will also serve as the PNG Health and Safety Manager. As such he will be responsible for implementation of the site-specific HASP. Mr. Greifer will advise the project staff on health and safety issues, conduct daily health and safety tailgate meetings, and monitor the effectiveness of the health and safety program in the field.

If necessary, one or more other qualified environmental consultants may be selected by H&V to assist with RD/RA activities at the site. Such additional environmental consultants would be engaged consistent with prior notice to DEQ and consistent with the requirements specified in the Consent Judgment.

3.4 SUBCONTRACTORS

The services of several subcontractors (e.g. laboratory, remedial construction) will be necessary for the construction and supporting services during the RD/RA. The RD/RA Task Manager, with assistance from the Field Manager, as necessary and appropriate, will be the primary liaison between PNG, the H&V Project Manager, and each of the subcontractors. Subcontractors will be selected on the basis of qualifications and cost effectiveness. Currently, several subcontractors have been active at the site for multiple years with a track record of both criteria; these companies will fill the various roles at this time.

ESC Laboratories will provide laboratory analytical services. Qualification information is available at https://www.esclabsciences.com/ .

Terra Hydr will provide remedial technology and equipment, and remedial construction services. Qualification information is available at http://terrahydr.com/ .

It is anticipated that ETEC environmental services will provide and support maintenance of the ERD system as well as provide technical expertise as necessary. Qualification information is available at http://www.etecllc.com/ .

H&V will periodically evaluate all subcontractors for quality and cost and consider procuring additional companies, as necessary. Close communications will be maintained with DEQ during this process.

4 REMEDIAL ACTION OBJECTIVES STATUS

Site-specific remedial action objectives (RAOs) were first developed in the FFSA and later adopted in the ROD for groundwater, surface water, soil and air, for the purpose of achieving protection of human health, ecological receptors, and beneficial uses, as required by OAR 340-122-040. The RAOs were tightly structured from EPA guidance for DNAPL sites (ITRC 2004) which were developed after many years of failure in meeting health-based groundwater remediation goals at similar DNAPL sites. EPA guidance in the 1990's stated that there were no known treatment technologies currently available that could attain risk-based cleanup levels where subsurface DNAPL was present; complete removal of DNAPL from the subsurface was considered not practicable. By 2004, updated guidance was applied to direct remediation efforts in the Source Zone with containment and treatment (i.e., mass depletion) as the focus of early efforts, while emerging technologies were being developed that might provide for complete remediation in a reasonable time frame. These include enhanced reductive dichlorination and application of performance monitoring using mass flux techniques.

The RAOs for the site follow a three-step process with containment and mass depletion in the Source Zone as the first two steps, followed by in-situ treatment with the intent of a more long-term goal of meeting risk-based levels. This final goal is based on application of a VOC mass flux performance monitoring approach as afforded by in-situ ERD treatment and, ultimately, natural attenuation.

The first two decades of aggressive remediation and performance monitoring established that the site plume is restricted to TCE and its breakdown products. DEQ identified six target chemical VOCs for the site, including Trichloroethylene (TCE) and four other VOCs related to anaerobic and aerobic degradation of the TCE; Dichloroethene (DCE), Cis-1,2-Dichloroethene (Cis-1.2-DCE), Trans-1,2-Dichloroethene (Trans-1,2-DCE), and Vinyl Chloride (VC). Perchlorethylene (PCE) is also included as a low concentration impurity in the TCE stock. Collectively, these chemicals are referenced herein as target VOCs.

4.1 EVANITE DNAPL REMEDIAL ACTION OBJECTIVES

The three-tiered (i.e., short-term, intermediate-term, and long-term) RAOs set forth in the ROD include the following short-, intermediate- and long-term goals:

4.1.1 Short-Term Goals

The ROD established the following short-term RAO for remediation of DNAPL within the Source Zone:

1. Recovering mobile DNAPL.
2. Mitigating the potential for vapor intrusion of VOCs.
3. Preventing further migration of DNAPL.

4.1.2 Intermediate-Term Goals

The intermediate-term RAOs include:

1. Depleting the DNAPL source sufficiently to allow for natural attenuation.
2. Reducing dissolved-phase VOC concentrations outside the source zone.
3. Reducing the VOC mass discharge rate or flux from the source.
4. Reducing the DNAPL source mass or volume to the extent practicable.

5. Preventing the migration of in-situ remediation fluids (i.e., substrate-amended groundwater) beyond the treatment zone.

Hot Spots for several media are present in the DNAPL source zone. The short- and intermediate-goals set forth in the ROD call for Hot Spots to be treated to the extent feasible, as specified in OAR 340-122-090(4).

4.1.3 Long-Term Goals

The long-term goal for the site is the achievement of compliance with applicable RBCs and screening levels applicable to all contaminated media at the site with the exception of pathways controlled through long-term engineering or institutional controls. These screening levels include ecological values for groundwater discharge to the rivers and soil vapor values for groundwater and soil in the Submicro Source Zone.

4.2 REMEDIAL ACTION OBJECTIVE ATTAINMENT

Remedial goals have been substantially met at the site for many of the DNAPL-based RAOs due to twenty five years of groundwater flushing through pump and treat and five years of pilot testing of mass depletion and polishing technologies in the source area. Through 2016, a significant TCE mass has been physically removed and another significant mass of TCE destroyed in-situ through ERD. As the site moves into the permanent remedial scheme described in the ROD, many of the original RAOs have been met, as discussed in detail below.

4.2.1 Short-Term Goal Attainment

Short-term goal #1 has been fully achieved. This goal for recovering mobile DNAPL was essentially met in 2007 when the last DNAPL was recovered from well DMW-16. Starting in 2009, 15 deep wells have been installed in and surrounding the source area with one of the primary goals being to characterize the current and former extent of DNAPL accumulations. None of these wells have encountered mobile DNAPL and routine monitoring using an interface probe and/or clear bailers has confirmed these observations. Flushing of nearly 489.3 million gallons of groundwater, predominantly toward wells centered in the Source Zone, has successfully removed the mobile separate-phase DNAPL accumulations. Newly installed deep-zone remediation wells in the Submicro Building Source Area and within and surrounding the Glass Plant Building document that this RAO goal has been fully achieved.

Short-term goal #2 for mitigation of potential vapor intrusion has been met over the majority of the site and offsite through reduction in VOC concentrations in groundwater and soil. Engineering controls (SVE) ensure that unacceptable risk is not present in the limited remaining areas at the site where vapor intrusion over the applicable RBCs remains possible. Therefore, short-term goal #2 is met with continued operation of the current SVE system at the site. The current TCE RBCs for occupational and residential vapor intrusion are 3,700 and 200 ug/L, respectively. The intermediate zone groundwater plume map (Figure 2) illustrates the only areas on the Evanite site or offsite that exceed the residential vapor intrusion RBC. It is a small plume area located between the southeast corner of the Submicro Building and expands to the western edge of the Glass Plant Building. The area of the intermediate zone (water table) plume exceeding the TCE occupational RBC of 3,700 ug/L is merely a sliver of plume centered over the former process area between the Submicro Building and Millrace. Potential for vapor intrusion in the Submicro Building is controlled by the sub slab depressurization system component of the SVE mass depletion system. Indoor air concentrations are below the site-specific Submicro RBC concentration of 25 micrograms per cubic meter (ug/m^3). This engineering control will continue until VOC concentrations in soil and groundwater beneath the building are sufficiently depleted to allow indoor air to meet the applicable occupational RBC.

Near surface soil contamination is limited to the Submicro Building and area immediately to the east between the building and Millrace. As stated above, this area is protected by the SVE engineering control and the Easement and Equitable Servitudes

Short-term goal #3, further migration of DNAPL, has been met in the soil by mass depletion efforts, DNAPL recovery, and twenty five years of groundwater extraction and flushing. Migration in soil has been characterized as essentially vertically downward with the TCE accumulating in the subsurface beneath the footprint of Submicro Building. DNAPL contamination in soil did not spread laterally other than in association with localized heterogeneity within the silts as it migrated downward through the unsaturated soil matrix and aquifer to form the underlying accumulations. During drilling efforts in Submicro, residual blebs of DNAPL were observed in silty soils from borings DMW-28, DMW-29, and IMW-31 (note that location IMW-30 located between DMW-28 and 31 did not contain DNAPL blebs). Intermediate zone wells have been installed at these locations and mass depletion using dewatering and SVE is ongoing. A comparison of observations and PID readings from soil cores in wells IMW-30 and DMW-30, which were drilled approximately two years apart, provides additional evidence of mass depletion effectiveness. These wells are located less than ten feet from each other, so variations in PID readings between the two well installation events is likely indicative of the effectiveness of ongoing VOC mass depletion from groundwater extraction and SVE within the Submicro Building. The boring logs indicate an order of magnitude decrease in PID reading for similar depths throughout the cores.

The original DNAPL accumulation area is characterized by wells with mobile DNAPL recovered from the accumulations on the top of the aquitard, wells with residual DNAPL blebs at the base of the aquifer, and wells that formerly contained DNAPL at the top of the aquitard as evidenced by field observations such as discolored aquitard matrix combined with extremely high PID readings and high concentrations of TCE measured in soil. The original DNAPL accumulation area or pool extent is illustrated in Figure 5 with wells labeled as to the DNAPL evidence observed. Bounding wells outside of the original accumulation area did not have any of the field evidence at the aquifer-aquitard contact based on PNG's thorough field logging.

Current performance monitoring indicates all mobile DNAPL has been thoroughly flushed from the DNAPL pool area with no indication of residual product during monitoring; this short term goal has thus been achieved with the removal of mobile NAPL. Further, concentrations in these deep wells have decreased by orders of magnitude (Figure 3) to levels that are below those indicative of DNAPL. TCE is also found in the underlying aquitard where DNAPL historically migrated along the surface and migrated up to a few feet into the clays. Whereas there is no DNAPL remaining on the aquitard surface, TCE will slowly diffuse from the clay aquitard and dissolve into the overlying aquifer. In-situ ERD treatment in the source zone is intended to treat this slow diffusion of TCE via anaerobic degradation and will ensure that this short-term goal #3 remains addressed.

4.2.2 Intermediate-Term Goal Attainment

Intermediate-term goal #1. Groundwater plume areas outside of the Source Zone have been undergoing natural attenuation (intermediate-term goal #1) for decades as evidenced by the presence of chlorinated VOC breakdown products in groundwater. The area with greatest observed attenuation is downgradient of the Source Zone. As early as 1990, deep well DMW-6 contained as much as 10% cis-1,2-DCE (concentration of cis-1,2-DCE relative to total VOC concentration). Groundwater at MW-15 contained significant amounts of this TCE degradation compound with cis-1,2-DCE sometimes higher in concentration than TCE. Lesser concentrations of other degradation compounds were also measured. These wells contain very little dissolved oxygen and have negative ORPs suggesting localized anaerobic conditions conducive to natural degradation of TCE.

In-situ ERD treatment was the focus of the 2013 pilot testing and positive results supported this technology being selected in the ROD as a final active in-situ groundwater treatment remedy (e.g. polishing treatment). The pilot testing success of ERD treatment is presented in detail in the 2013 Remedial Performance Report (PNG 2014) with the results of the pilot test presented in Appendix B. The results of the ERD pilot test includes:

- It was not necessary to introduce a microbial community as sufficient native microbes capable of dechlorination were present and thrived once the substrate was added.
- Loading rates to sustain the dechlorination were achieved through the 4-inch diameter monitoring/injection wells.
- Hydraulic conditions in the aquifer were favorable to sustain a recirculation distance of 144 feet with a lateral front of 100 feet crossgradient to the injection and recovery wells.
- Plume containment was maintained surrounding the focused recirculation system.
- Dechlorination was substantial with decreases in chlorinated VOC concentrations (Figure 6).
- TCE concentration rebound was not observed for the first five months in the Submicro Source Zone after the test and long-term monitoring, as illustrated by wells DMW-17 and DMW-3 (Figure 6), suggests minimal rebound after three years.

Intermediate goal #1 has been met in all areas except the Source Zone.

Intermediate-term goal #2. Intermediate-term goal #2 is reduction of dissolved phase VOC concentrations outside of the Source Zone which began with startup of pump and treat active remediation in 1991. The residual VOC groundwater plumes outside of the source Zone now meet applicable RBCs with no VOC concentration rebound observed. In the Neighborhood Area, TCE concentrations have been reduced to 25 ug/L in the highest concentration well. The other two neighborhood wells are less than 1 ug/L TCE or TCE is not detected; a concentration threshold less than the neighborhood background.

The Upgradient Area plume has TCE concentrations that are lower than laboratory detection limits in three of the wells. Of the remaining wells, DMW-18, which is closest to the site, now reports TCE concentrations of less than 0.5 ug/L. Well DMW-10, on the northwest end of the plume, indicates concentrations decreased to 2.9 ug/L.

The Hardboard area is located immediately downgradient of the Source Zone and illustrates the greatest decrease in dissolved TCE concentrations. Flushing and mass depletion at the Source Zone have reduced concentrations to less than 1,000 ug/L (Figures 2 and 3). A plot of TCE concentrations versus time for two key extraction wells (DMW-2 and DMW-11 in Figure 8 demonstrates the TCE concentration reduction and lack of rebound to date.

Intermediate-term goal #2 has been met with all areas outside of the Source Zone meeting RBCs for dissolved VOC contamination. Future efforts are aimed at TCE reductions in the Source Zone such that hydraulic containment will no longer be necessary for continuing to meet this goal.

Intermediate-term goal #3. This goal, to reduce the TCE mass discharge rate or flux from the source, is the focus of the remedy selected in the ROD. To meet this goal, TCE mass depletion through 1) pump and treat and 2) dewatering coupled with SVE in the expanded unsaturated zone will continue for a period of time and then will be followed by ERD as a polishing in situ treatment technology. As the TCE mass is depleted, the aggressiveness of ERD will be controlled such that the rate of anaerobic degradation of TCE in the aquifer matches the slow diffusion of TCE from overlying and underlying fine grained matrices.

Intermediate-term goal #4 is to reduce the DNAPL source mass to the extent practicable. This goal is also being addressed by the ROD selected remedy, which includes all practicable measures needed to achieve this goal. The mobile DNAPL mass has already been removed and TCE mass depletion efforts to date have proven effective. The mass discharge from all remedial systems into the off-gas treatment system decreased to TCE at less than 700 mg/m^3 throughout 2016. New wells, system improvements, and optimization of operations will increase TCE mass removal during startup of the permanent, full scale remediation outlined in the ROD. Much of this work has been completed over the past few years with new pumps, modified and optimized piping, maintenance, additional of carbon offgas treatment, and installation of additional wells in and surrounding the Source Zone.

Intermediate-term goal #5 is for prevention of migration of in-situ remediation fluids beyond the treatment zone. This goal is currently met with the hydraulic containment in place since 1991. In the future, continued success in meeting this goal will be measured under the metric of mass flux migration from the treatment zone as illustrated in Figure 9. With this approach, ecological receptors at the river will be protected by preventing unacceptable migration of TCE flux beyond the compliance plane or transect.

Oregon has a preference for active treatment of Hot-Spots as specified in OAR 340-122-090(4). All Hot-Spots for soil and groundwater at the site are located in the Source Zone (PNG 2015b) where active treatment is implemented consistent with the ROD.

4.2.3 Long-Term Goal Attainment

The long-term goal for the site is the achievement of compliance with applicable RBCs and screening levels applicable to all contaminated media at the site with the exception of pathways controlled through long-term engineering or institutional controls.

Health-based risk from vapor intrusion into buildings is only of potential concern for the eastern half of the Submicro Building. Engineering controls associated with the SVE implemented for source depletion are ongoing with intrusion controlled via subslab depressurization. Long-term attainment of this goal to limit health-based risk from vapor intrusion into buildings will include continuation of the sub slab depressurization until the soil and groundwater contaminants are sufficiently depleted that indoor air meets the applicable RBCs for indoor air. Vapor intrusion resulting from site contamination is not an issue for any other buildings on or offsite of the site.

For soil contamination and hot-spots that are only present in the Source Zone, institutional controls are in place to protect workers and visitors. It is anticipated these controls will continue for the period of years until concentrations in soil have been sufficiently depleted to meet applicable RBCs for potential dermal contact, excavation worker, and trench worker exposure. Institutional controls to protect workers and visitors until the applicable RBCs are met are addressed in the Contaminated Media Management Plan (CMMP) and E&ES.

Achievement of regulatory criteria for groundwater will be measured through performance monitoring under a TCE mass flux metric as illustrated in Figure 9 and shows the mass flux monitoring transects and plume locations associated with this future performance monitoring network. Once the TCE mass depletion and ERD polishing treatment has been sufficiently effective such as to prevent unacceptable TCE mass flux from migrating from the Source Zone to the hyporheic zone at the ecologic compliance plane, hydraulic containment can be terminated in a controlled and monitored sequence. Unacceptable flux is defined by pore water measurements not exceeding the applicable standards for TCE and its breakdown products. Mass flux is further discussed in Section 6.1. The TCE standard for pore water is 47 ug/L. Performance monitoring will be modified and reduced in step with the transition from active remedial system operation and shutdown to natural attenuation. Until the groundwater goal can be attained, the E&ES provides protection against exposure due to a groundwater beneficial use.

5 REMEDIAL DESIGN

5.1 DEQ SELECTED REMEDY

The FFS Addendum Remedial Alternative RA-2am is the DEQ selected remedy for the site. The DEQ selected remedy is protective of and reduces long-term risks to human health and the environment. The selected remedy is described in DEQ's ROD, and summarized below.

5.2 OVERVIEW OF REMEDY

Much of the ROD selected remedy has been in place at the site since 1991. The ROD selected remedy involves the following remedial action elements:

- Institutional Controls preventing residential use of tax lots with shallow soil contamination.
- Institutional Controls restricting groundwater use for ingestion or agricultural use on specific H&V tax lots that are or were previously affected by the groundwater plume.
- Continued DNAPL monitoring and extraction if accumulations that have not been observed since 2007 become evident.
- Continued SVE in the DNAPL Source Zone (east half of Submicro and adjoining property) to promote physical removal of trichloroethene (TCE) mass and mitigate potential vapor intrusion into that building.
- Continued groundwater extraction to flush the DNAPL Source Zone, to expand the unsaturated zone within the source area to facilitate source depletion through SVE and maintain containment of impacted groundwater.
- Treatment of off-gas from the SVE system and air stripper. Historically, off-gas was treated using a catalytic oxidizer. The remediation system was modified in May 2017 to utilize vapor-phase activated carbon adsorption for off-gas treatment.
- ERD in-situ treatment of groundwater in the Glass Plant plume and Submicro Source Zones as a polishing technology following mass depletion efforts.
- Continued monitoring of groundwater and air quality and remedial system performance.
- Continued monitoring and assessment of groundwater plume capture prior to shut-off of groundwater extraction.
- Follow active groundwater remediation (i.e., groundwater extraction and ERD), with conversion to passive remediation using enhanced attenuation (EA) and subsequently monitored natural attenuation (MNA) as determined by reduced mass flux from the source zone. It is anticipated that active remediation will be phased out as the plume is remediated with sequencing from mass depletion to ERD polishing and finally to EA and MNA. An example of EA would be the periodic injection of a substrate into source zone wells to maintain anaerobic conditions necessary for destruction of TCE that slowly diffuses into the aquifer.

The groundwater extraction and treatment system is currently optimizing removal in the Source Zone at wells DMW-3, DMW-23 and DMW-24 which is characterized as the DNAPL Source Zone (Source Zone). Areas of the dissolved plume outside the Source Zone still requiring treatment to the lowest applicable standards associated with protection against TCE migration and discharge to surface water will be treated with ERD. This zone includes the remnant plume beneath the Glass Plant Building. Other remnant areas of the plume that have been remediated to below lowest applicable standards will be allowed to recover naturally by taking advantage of aquifer flushing conditions that were established in 1991 and continue through the mass depletion phase. Extracted groundwater will be treated in the existing air stripper and discharged under H&V's National Pollutant Discharge Elimination (NPDES) permit. Activated carbon adsorption treatment of the combined air stripper treatment unit vapor effluent and SVE effluent is active.

5.3 DESIGN ELEMENTS

5.3.1 Easement and Equitable Servitude

No remedial design will be required for the E&ES component of the selected remedy. The E&ES component of the remedy is effectively complete.

Institutional controls and an E&ES will prevent residential use of the tax lots with shallow soil contamination approved by DEQ. These include three tax lots that are underlain by the Submicro Source Zone Hot Spot illustrated on Figure 7. These tax lots also require a soil management plan specifying conditions under which digging can take place for any future development and/or utility work. The integrity of the cap between the Submicro building and the millrace shall be maintained to prevent direct exposure to contaminated soils. To address these, a Cap Monitoring and Maintenance and Contaminated Media Management Plan has been developed.

Groundwater use for ingestion or agricultural will be prohibited for multiple tax lots that are underlain by the current extent of the groundwater plume, with the majority of this plume area already having been remediated to lowest applicable cleanup standards. All lots in the restricted area are owned by H&V as illustrated in Figure 10 and as described in the E&ES.

Potential future groundwater use will be evaluated for other tax lots currently owned by H&V as the site work progresses. Restrictions may be needed depending on future success of the remedy and future use of these tax lots.

The historic plume extended into the neighborhood to the south of H&V property. This area of the plume has been remediated for years. During remedial efforts, Evanite (and H&V after their purchase of the properties) paid for city water for formerly affected houses. As outlined in the ROD, if H&V is notified that residents of the homes in the Neighborhood Area rehabilitate and use their wells in the future, H&V will sample and analyze the wells for constituents of potential concern. If site-related contaminants are found above applicable DEQ RBCs, an alternative water supply will be provided.

5.3.2 Groundwater Containment, Pump and Treat, and DNAPL Pumping

The Evanite groundwater extraction and treatment system currently involves active pumping from five extraction wells (Wells DMW-2, DMW-3, DMW-23, DMW-24, and DMW-29) containing 10- or 20-gallons per minute (gpm) submersible pumps connected to 2-inch diameter riser pipes. Each well has an individual line to the treatment system and can be individually controlled and monitored. Historically, 20 to 30 gpm of groundwater total (combined from all wells) was pumped to an oil/water separator tank, then a surge tank, and ultimately to an air stripper rated at 100 gpm with 340 cubic feet per minute (cfm) and 99 percent removal efficiency. Starting in 2018, in coordination with maintenance upgrades to the existing remediation system equipment, the target pumping rate will be increased to maximize yield and could approach 60 gpm in winter months. The higher yields will optimize mass depletion with SVE by lowering the water table and will have the additional effect of increasing the capture zone.

No additional remedial design will be necessary for the groundwater containment, pump and treat, and DNAPL pumping system. This system is operational and associated performance monitoring and evaluations are ongoing. During the past few years, this system has been fully upgraded to allow flexibility in adding additional wells or removing wells in the source zone to support optimization of mass depletion. It is anticipated that the well extraction scheme will be routinely modified to promote modification of flow streamlines in the source zone as a measure to address heterogeneity in the aquifer matrix.

Modifications performed to optimize the remedial systems have been performed from 2009 through 2017 and include the following:

Design Elements Completed (2015-2016)

- Prepared components of Evanite system design.
  - As-built of existing infrastructure.
  - Layout for piping systems for extraction, SVE, and ERD.
  - Wellhead design for flexibility between technologies.
  - Planned expansion of groundwater extraction to increase unsaturated zone/supplement SVE.
  - Vendor coordination with ERD injection system manufacturer.

Construction Elements Completed (starting in 2009 with pilot testing)

- 10 Groundwater extraction wells installed in Submicro NAPL Source Zone.
- 13 SVE wells installed in Submicro NAPL Source Zone.
- 10 deep source zone wells were constructed such that they could be converted to ERD wells (inject/extract).
- 13 intermediate zone SVE wells were constructed such that they could be converted to ERD wells (inject/extract).
- Re-plumbed SVE to air stripper to allow off-gas treatment.
- New SVE wells in Submicro Source Zone were plumbed to existing SVE system and are operating.
- Installed additional (second) SVE blower and modified piping to allow independent use.
- New deep wells in Submicro Source Zone were plumbed to existing groundwater extraction system and are operating.
- Upgraded older groundwater extraction pumps to grundfos "smart" pumps.
- Re-plumbed groundwater extraction treatment tanks for greater flows.
- Installed CatOx unit for off-gas treatment for SVE and groundwater air stripper.
- Developed operations and maintenance manual for CatOx unit.

- Installed activated carbon adsorption secondary treatment for primary treated groundwater discharged from air stripper.
- Rehabilitated air stripper tower and installed new media.
- Replaced pumps in groundwater treatment train.
- Installed groundwater and air flow meters at numerous critical locations.
- Upgraded groundwater extraction and treatment system control panel.
- Sealed treatment shed to maintain negative pressure with fugitive air treated by CatOx.
- Installed autodialer to notify of remediation system shutdowns.
- Installed a vapor phase activated carbon adsorption system to treat off-gas from the air stripper and SVE, replacing the existing CatOx treatment system.

The pumping scheme was modified in 2011 when the periphery areas of the plume were sufficiently flushed to reduce TCE concentrations to applicable standards. Over these past seven years, groundwater extraction has been continually focused on wells at the core of the DNAPL source zone as the plume shrinks in size.

From 1991 through 2007, TCE DNAPL was recovered from three wells in the source zone (MW-3, MW-16, and MW-17) through extraction from pools on the lower aquitard surface. Decay in recovery was rapid with 91% of mass recovered in the first three years. DNAPL will continue to be monitored in all wells and will be extracted if accumulations are observed. Recoverable amounts of DNAPL have not been observed since 2007.

The groundwater air stripper was rehabilitated in 2013 with new media and pumps. At that time, influent concentrations were around 10,000 ug/L TCE with 98% removal efficiency. Currently, the influent is averaging 4,200 ug/L with a 99% removal efficiency. Stripper effluent can be treated as a polishing step with activated carbon adsorption, if necessary. The stripper effluent TCE concentrations are much lower than Evanite's current NPDES permit limit of 0.5 mg/L before water is pumped to the NPDES permitted Treatment Ponds on the northeast side of the Willamette River.

Capture zone analysis for the site is based on a weight-of-evidence approach using both hydraulic and groundwater analytical data to evaluate the effectiveness of the containment system. The pump and treat system is designed for depletion and hydraulic containment of the non-aqueous phase liquids (NAPL) source zone, contaminant mass removal and shrinking of the source zone, and flushing of the dissolved phase portions of the plume found around the plume fringes (Kennec 2007). Hydraulic data includes gathering water level measurements and calculating groundwater elevations to establish the potentiometric groundwater surface and drawdown cones of depression (Figure 11. TCE is used as the indicator chemical to evaluate plume extent and relative mass reduction at the site. Two transects of monitoring wells as well as a transect of river pore water probes (Figure 9) are routinely monitored for water quality and confirm the capture zone is effective. Analyses of the capture zone are presented in each annual performance monitoring report.

5.3.3 SVE and Sub-slab Depressurization

Starting in 1991, Evanite operated six SVE wells that were screened in the Willamette Silts between depths of approximately 7 and 17 feet. Up until the installation of deeper intermediate zone wells in 2009, these six wells were the source of all TCE recovered by the SVE technology. These wells were plumbed to a common header of an SVE system and operated during summer months (not operated during winter months due to high moisture content in Willamette Silts during wet seasons) between 1991 and 2008.

Intermediate and deep wells were installed in and around the Source Zone in 2009, 2013, 2014, and 2015 to support the physical pilot testing activities. These wells allowed more aggressive groundwater extraction in the Source Zone and resulted in greater drawdown of groundwater levels (particularly in the summer and fall months). This greater drawdown of groundwater (along with CatOx treatment of off-gas starting in 2012) facilitated aggressive SVE pilot testing in the upper portions of the aquifer that was effective in increasing TCE mass removal in recent years.

Concurrent with the SVE pilot testing for source depletion, a pilot test to evaluate subslab depressurization of the Submicro Building for protection of vapor intrusion was conducted in 2009 (PNG 2010a). Two SVE legs plumbed into the subslab gravels of the Submicro Building provided adequate coverage in inducing greater than 0.005 inches of vacuum through application of the existing SVE system at relatively low flows of 50 cfm. During testing, initial subslab concentrations of TCE at 300 mg/m^3 were reduced quickly to 40 mg/m^3. Samples collected in 2017 indicate the subslab vapor concentrations range from 1 to 2.5 mg/m^3 during active subslab depressurization.

The SVE wells have recovered significant TCE mass since 1991. The SVE system continues to be effective; an estimated 1,209 pounds were recovered in 2017.

No remedial design is necessary for the SVE and subslab depressurization system. The system is operational and associated performance monitoring and evaluations are ongoing. Specifically, differential pressure monitoring through existing vapor monitoring points will be applied routinely to optimize operations.

In May 2017, off-gas treatment for SVE air was modified to use vapor phase activated carbon adsorption treatment instead of the CatOx. With the activated carbon adsorption system in place, the remedial design does not anticipate changes to the primary components of the SVE system.

5.3.4 Off-Gas Treatment

DEQ requires and regulates the off-gas treatment system as part of the ROD selected remedy to ensure that any TCE off-gassing is controlled in a way that is protective of human health and the environment. Off-gas from the SVE and air stripper was treated using a CatOx unit until early May 2017. At that time, the CatOx unit was shut down and modifications were made to facilitate treatment of off-gas with vapor phase activated carbon adsorption. Two 2,000-pound vapor-phase activated carbon adsorption vessels were purchased and installed in series near the Submicro Building. Modifications to site plumbing were made in order to route all off-gas from the SVE system and air stripper to the new activated carbon adsorption vessels for treatment. Following treatment, effluent air is discharged from a stack located above the adjacent Submicro Building roofline. The carbon adsorption system was designed to treat airflow at 600 cfm, sufficient for the two SVE blowers and the air stripper exhaust. Utilization of activated carbon in place of the CatOx allows for greater treatment effectiveness and operational independence from the plant manufacturing operations.

No remedial design is necessary for the off-gas treatment system. The treatment system is operational and performance monitoring is ongoing to establish effective operating parameters. The remedial design does not anticipate changes to the primary components of the off-gas treatment system. An updated monitoring program for long-term operations will be developed after the current start-up pilot testing operations are refined considering maximum groundwater extraction, SVE, and activated carbon adsorption rates.

The H&V facility operates under an ACDP permit issued by DEQ's Western Region. The permit expired on May 1, 2013, but was administratively extended until the permit is renewed. A future air quality permit for the H&V facility may incorporate DEQ's Cleaner Air Oregon (CAO) program requirements. After the H&V facility is called-in by DEQ to demonstrate compliance with the CAO program, H&V will cooperate with DEQ in evaluating emissions from the offgas treatment system under CAO, or otherwise, consistent with ORS 465.315(3). Following that evaluation, any new requirements for the operation of the offgas treatment system, if any are needed, will be specified in work plans developed pursuant to the Consent Judgment.

Treatment of off-gas from the SVE system and air stripper will continue until the concentrations of TCE (and decay products) being removed from the subsurface is below a level that would potentially cause unacceptable risk to site workers or nearby residents (i.e. exceedance of DEQ's default occupational and residential RBCs at the potential exposure point). This site's CatOx system was used for this treatment from 2011 to early 2017. The CatOx system was treating an average influent TCE concentration of 240 mg/m^3 at an average flow rate of 330 cfm. This included contaminated vapor from both the groundwater air stripper and the SVE systems. The CatOx unit's TCE destruction efficiency, as measured by influent and effluent TCE air concentrations, has ranged from 90% to 99%. Since conversion from the CatOx treatment system, the TCE removal efficiency of the vapor phase activated carbon adsorption treatment system is typically greater than 99.9%.

VOC concentrations in air before, between, and after the activated carbon adsorption vessels are regularly monitored. As required, spent carbon is removed and replaced. The spent carbon is disposed of at an off-site landfill (Subtitle C landfill in Arlington, Oregon). All waste materials are managed consistent with Oregon Rules (OAR 340-100 through 340-120).

5.3.5 Enhanced Reductive Dechlorination

Remedial design activities will focus on the ERD component of the selected remedy.

In-situ ERD pilot testing was performed in 2013 over a 25 week period from May through October 2013. Enhanced in-situ bioremediation (i.e., ERD) involves stimulating bacteria to encourage the breakdown of chlorinated solvents such as PCE to TCE and so on. This process is often used in combination with other technologies or as a polishing step after the DNAPL source zone has been sufficiently depleted (ITRC 2004). More than three years following shutdown of the ERD test, indicator parameters suggest much of the test area remains anaerobic despite depletion of the substrate. Based on these positive results, PNG recommended ERD as the polishing technology in the FFS and DEQ subsequently adopted this technology in the ROD.

The ROD remedy design anticipates installation of an ERD treatment system (e.g., enclosure, equipment, controls, etc.) similar to the pilot test unit. Conceptually, the ERD treatment system would involve in-situ delivery of a substrate (nutrient-amended carbohydrate) in a groundwater recirculation approach (i.e., amendment of extracted groundwater and subsequent injection at one to two upgradient well locations at a rate of approximately 10% or less of the total groundwater extraction system rate). It is anticipated that injection locations would be changed every 6 to 12 months to vary amended groundwater flow/delivery pathways and provide complete coverage or treatment of the Submicro Source Zone and Glass Plant Plume area.

Design objectives include installation of ERD system equipment similar in configuration and capabilities to the system pilot tested at the site in 2013. In particular, the ERD system design is expected to have a capability to operate as a recirculation in-situ treatment system (i.e., extracted groundwater would be amended with a carbohydrate-based substrate and injected into the target groundwater treatment zone) and inject augmented groundwater at a rate up to 20 gpm. In addition, the ERD system will be designed with the ability to connect with and inject at multiple wells. The ERD system design will identify piping materials and layouts that are compatible with the ongoing manufacturing nature of the facility, as well as providing flexibility to vary injection and extraction well configurations based upon performance monitoring results.

Additional deep and intermediate zone extraction/injection wells are utilized to achieve greater mass removal and prepare for application of in-situ biological degradation (enhanced reductive dechlorination). Additional deep and intermediate zone extraction/injection wells were installed during two well installation events in 2015 in anticipation of future remediation efforts. Although additional wells may be necessary in the future based upon evaluation of performance monitoring data during full-scale remedy implementation, no additional wells are planned at this time.

ERD recirculation is through and around the Source Zone with focused streamline treatment cells. As the streamline treatment cell becomes fully anaerobic and independent monitoring points exhibit substantial VOC concentration reductions approaching target levels or nondetect, the treatment cell is augmented with a final dose of substrate and a new flowline treatment cell is established. The system will continue to be modified and flowlines will be adjusted until the initial target area (e.g., beneath Glass Plant) is fully dosed. ERD-related substrate injections will be conducted in accordance with the State of Oregon Underground Injection Control program (OAR 340-044).

Once the Glass Plant remnant plume is adequately addressed based on performance criteria that include reduction in concentrations and establishment of optimal anaerobic conditions, the ERD system will be moved to the next target area (Submicro Source Zone) and operational modifications and adjustments will be repeated. Previously treated areas will be monitored for rebound. A second treatment round will be implemented, as necessary.

Once ERD in the Source Zone is complete, pilot test shutdown of SVE with monitoring will be performed to determine if it can remain shut off.

6 ROD IMPLEMENTATION AND REMEDY PROGRESSION

The sequence of remedial operations presented in the ROD, outlined below and illustrated on Figure 12 is the sequence of remedial operations moving forward. The overall remedial scheme is dynamic and performance based with a mix of active remediation including 1) plume hydraulic containment, 2) plume source depletion in the unsaturated and saturated zones using dewatering and SVE, and 3) depleted plume area polishing with ERD and engineering controls addressing a less than five-acre portion of the site that has not yet attained cleanup objectives. Treatment of extracted groundwater and soil vapor includes groundwater air stripping and activated carbon adsorption for air stripper and SVE off-gas. Performance monitoring includes three components that progress from 1) active remediation performance monitoring to 2) enhanced monitored natural attenuation (EMNA), and 3) monitored natural attenuation (MNA). Concurrent with the performance monitoring progression to EMNA and the end of plume capture/containment, mass flux monitoring will be applied as the basis for decisions regarding cessation of remedial operations and progression to MNA or, in the case of excessive contaminant concentration rebound (i.e., as defined by the TCE concentrations in groundwater that could migrate to surface water and exceed the pore water standard of 47 ug/L), reapplication of active remediation (e.g., plume capture/ERD) to the extent necessary.

The temporal relationship between various phases of active remediation, extracted media treatment and performance monitoring is illustrated in Figure 12. With continued plume shrinkage and reductions in VOC concentrations in the Source Zone, active treatment progresses from source depletion to ERD and, finally, EMNA and MNA. Ex-situ treatment is necessary to support the active remediation for groundwater and soil vapors. The performance monitoring will mature from ongoing active performance monitoring necessary to ensure effective and efficient operations to enhanced MNA where a more passive approach to ERD (i.e., reduced ERD substrate injection without extraction and recirculation) is used to degrade low concentrations of TCE diffusing from fine grained Source Zone media, and finally to MNA.

6.1 ACTIVE REMEDIATION

During source depletion dewatering, maximum groundwater extraction rates will be maintained which will, in turn, create the largest possible hydraulic containment in the Source Zone. This maximum dewatering also creates the maximum unsaturated zone for greater SVE mass removal effectiveness. This is termed Phase 1 Containment.

Source depletion using dewatering and SVE will be utilized in the DNAPL Source Zone (Submicro soil hotspot on Figure 2) until TCE concentrations in the extracted soil vapor reduce to asymptotic conditions. Concentrations in soil gas are currently measured in mg/m^3 with over 700 pounds removed by this technology each year. SVE will continue for multiple years.

The active source depletion remediation will transition to ERD when Evanite and DEQ agree conditions are appropriate. The Source Zone groundwater will then be monitored over a pilot test period under reduced dewatering and SVE conditions. If TCE concentration rebound is not significant (i.e., less than a few tens of ug/L in periphery areas and a few mg/L in the Source Zone), active remediation with Phase 1 Containment via source depletion will be converted to ERD. ERD pilot test results presented in the 2013, 2014, and 2015 annual performance reports suggest ERD will be successful as long as TCE concentrations in groundwater are less than approximately 10 mg/L.

Once Source Zone TCE concentrations are suitable for active remediation progression to ERD, hydraulic containment will be modified to minimal drawdown conditions (promoting biological degradation versus physical mass removal). The focus of the reduced drawdown within and downgradient of the Source Zone will be to allow for effective ERD groundwater recirculation cells while maintaining containment. This lower magnitude pumping will match or slightly exceed the aquifer underflow and be termed Phase 2 Containment.

During Phase 2 Containment, ERD recirculation is through and around the Source Zone with multiple focused streamline treatment cells. As a streamline treatment cell becomes fully anaerobic and independent monitoring points exhibit substantial VOC concentration reductions approaching target levels determined in design or nondetect, the treatment cell will be augmented with a final dose of substrate and a new flowline treatment cell is established. Target levels will be defined during development of the ERD performance monitoring planning in cooperation with DEQ and through application of the most recent EPA guidance for Mass Flux performance monitoring (ITRC 2010).

All site wells were constructed such that they could be used for ERD injection, extraction, or serve as monitoring points between the active wells. The system will continue to be modified and flowlines will be adjusted until the initial target treatment area (e.g., beneath the Glass Plant Building) is fully dosed. Dosage will be controlled and measured by several parameters such as the ability of the aquifer to accept the injections, groundwater withdrawal rates, and water quality parameters monitored during the pilot test, including:

- Total Organic Carbon.
- Ammonia.
- Specific Conductance.
- Dissolved Oxygen.
- pH.
- Oxidation Reduction Potential.
- Dissolved Iron.
- Concentration trends for TCE and degradation products.

The ERD substrate injection system will be moved or rerouted to the next target area (Submicro Source Zone) and operational procedures and adjustments will be repeated. Previously treated areas, such as under Glass Plant, will be monitored for TCE concentration rebound which would be illustrated by a steady increase in TCE concentrations once the substrate has been diminished and geochemical conditions are less conducive to anaerobic degradation. A second ERD treatment round will be implemented in previously treated areas that exhibit rebound, as necessary. Because the ERD system will be mounted in a skid unit and is mobile, it will be efficient to return to an area for redosing, as necessary.

SVE will be operated as a vapor intrusion engineering control beneath the Submicro Building and in the unsaturated zone beneath the building continuously throughout the ERD treatment phase.

Once H&V and DEQ agree ERD in the Source Zone is complete, a pilot test shutdown of aggressive ERD (i.e., recirculation with injection and extraction) will be transitioned to enhanced monitored natural attenuation consisting of substrate injection into the Source Zone wells. At this point, Phase 2 Containment will continue for a pilot period with active ERD recirculation off. ERD substrate will continue to be injected within the Source Zone at a relatively low rate to maintain anaerobic conditions. Monitoring in select source zone wells and along the flux monitoring transects (Figure 2) will be performed to determine if the extraction wells can remain shut off. The goal during this pilot shut down period and the subsequent EMNA and/or MNA phases of the remedy is for in-situ dechlorination treatment to match TCE diffusion in the Source Zone such that downgradient VOC concentrations do not exceed the natural attenuation capacity of the aquifer as measured (as described in Section 6.4 below) by the pore water standards (e.g., TCE at 47 ug/L).

6.2 MEDIA TREATMENT

The groundwater air stripper will remain operational whenever any groundwater is being extracted. Stripper media will be evaluated every six months to identify and allow maintenance for continued treatment effectiveness. Activated carbon adsorption polishing treatment of the air stripper water effluent is currently installed and available for secondary groundwater treatment or polishing as needed or desired.

Carbon adsorption treatment is operational for all off-gas from the air stripper and SVE. The catalytic oxidizer has been taken offline. Two large capacity activated carbon vessels will be maintained in series with performance monitoring for breakthrough performed monthly (or as Evanite and DEQ agree is appropriate) between the two canisters. This vapor treatment system will effectively remove greater than 99.9% of TCE.

Treatment of off-gas from the SVE system and air stripper will continue until the concentrations of TCE (and decay products) being removed from the subsurface is below a level that would potentially cause unacceptable risk to site workers or nearby residents (i.e. exceedance of DEQ's default occupational and residential RBCs at the potential exposure point).

6.3 ACTIVE REMEDIATION PERFORMANCE MONITORING

Performance monitoring will be conducted for the active remediation systems and media treatment systems. The current performance monitoring program will be modified to reflect conditions once the systems are constructed and pilot tested. These systems include the groundwater extraction, mass depletion SVE, subslab depressurization SVE, groundwater air stripper treatment, and off-gas carbon treatment. Typical performance will include:

- Groundwater extraction system.
  - Inspect well heads and in-line flow totalizers for physical and frost protection.
  - Measure for free product when wells are accessible.
  - Measure depth-to-water to calculate groundwater elevation and ensure plume hydraulic containment.
  - Monitor and modify groundwater extraction pumping rates.
  - Collect groundwater samples for VOC analysis from monitoring wells.
- Groundwater treatment system.
  - Inspect all piping, tanks, blowers, and pumps for signs of wear or damage. Replace or repair components as needed.
  - Monitor combined groundwater extraction flow rate and modify as necessary.
  - Monitor treatment components, including sampling for VOCs before/after the air stripper, and before/between/after the activated carbon polishing treatment canisters.
  - Track air stripper VOC removal efficiency. Reductions in efficiency are a sign the stripper media needs to be cleaned and/or air flow is restricted.
- Soil vapor extraction system.

- Inspect for system integrity.
- Measure flow rates of individual vapor extraction legs.
- Modify vapor flow rates, as necessary, to focus treatment of high TCE concentration zones and break up vapor flow lines.
- Measure VOC concentration in air using a PID.
- Sample air from individual vapor extraction legs for laboratory analysis.

■ Soil vapor treatment.

- Inspect all piping, flow meters, and blowers for signs of wear or damage. Replace or repair components as needed.
- Measure flow rates of SVE components, including before/after the SVE blower and where the air stripper exhaust combines with the SVE system exhaust.
- Measure VOC concentration in air using a PID.
- Sample before/after the CatOx or air-phase carbon treatment canisters (depending on which treatment technology is active) to ensure appropriate treatment efficiency and calculate mass removed via SVE technology.

■ ERD treatment.

- Sample groundwater from select wells for natural attenuation parameters to monitor treatment progression and effectiveness.
- Measure, monitor, and modify (as necessary) groundwater injection/extraction rates.
- Measure depth-to-water in injection wells to prevent surfacing of injected solution, adjusting injection rates/pressures as necessary.

■ ERD System.

- Install the ERD system with necessary plumbing modifications and groundwater temporary storage tanks.
- Inspect injection equipment and piping regularly. Buildup of amendment or fouling can clog pipes and valves. Clean and repair as needed.
- Modify flow rates as necessary to focus treatment of high TCE concentration zones and break up amended groundwater flow lines.
- Monitor and adjust amendment utilization rate.

Treatment monitoring will generally apply an approach that focuses the scope and frequency of monitoring as a record of consistent performance is established (e.g., correlation of VOC data to a calibrated PID, etc.).

6.4 MASS FLUX MONITORING AND MNA

The ROD selected remedy involves eventual conversion to passive groundwater remediation involving reduced TCE mass flux from the Source Zone together with natural attenuation to protect surface water. Six additional monitoring wells (DMW-33 and IMW-33, DMW-34 and IMW-34, and DMW-35 and IMW-35) were installed in 2014 along the downgradient boundary of the Submicro DNAPL Source Zone to provide data along the leading edge of the DNAPL source zone groundwater plume. These well installations;

together with DMW-2, DMW-11, and DMW-12; provide long-term monitoring locations downgradient of the DNAPL source zone for future evaluation of TCE mass flux as a primary tool for characterizing long-term remedy performance (Figure 13).

The area downgradient of the Source Zone (i.e., area of active remediation involving SVE, groundwater extraction and ERD) is characterized by two rows of wells that are aligned perpendicular to the original plume flow direction (i.e., northeast migrating from the source zone toward surface water). Wells DMW-2, IMW and DMW-34, DMW-11, IMW and DMW-35 and DMW-12 represent a row of wells at the leading edge of the highly concentrated groundwater plume. The other four wells stretch across the historical discharge face of shallow groundwater to the Willamette River (MW-6, DMW-15, DMW-13, and former well DMW-4 designated as river or near shore wells). These wells have been flushed and concentrations of TCE are now below 500 ug/L for the first row and below 5 ug/L for the near shore river wells (TCE concentrations were reported as high as 160,000 ug/L prior to hydraulic containment actions). Unlike the other groundwater plume areas, TCE degradation has been strongly evident in these near shore wells with cis-1,2-DCE and trans-1,2-DCE composing as much as 80% of the total VOC concentration relative to TCE. For example, MW-15 (located north of the T&E Center and about 120 feet from the river) has routinely contained vinyl chloride and cis-DCE at much higher concentrations than TCE. In recent years, MW-6 (located northwest of MW-15) has demonstrated a similar relationship between vinyl chloride and cis-DCE relative to TCE. Data for downgradient wells is presented in the 2016 Annual Report (PNG 2017).

Multiple lines of evidence indicate anaerobic degradation and natural attenuation are active in the area downgradient of the Source Zone, with TCE and TCE breakdown products at concentrations substantially below applicable screening levels. Currently, all pore water and groundwater from near shore wells in the downgradient area are below the applicable pore water ecological screening value. In addition, surface water samples collected in the Willamette and Marys Rivers have been non-detect for TCE and other chemicals, and are below the applicable TCE surface water standard of 3 ug/L.

The remedial design will not include specifics of the Mass Flux and MNA program. The details of the Mass Flux evaluation and MNA will be presented in the Flux Monitoring Plan (Section 7.3). This plan will be developed in conjunction with DEQ following implementation and operation of the physical mass removal and ERD in-situ groundwater remediation components of the remedy.

Mass flux measurements and modeling at the Phase 2 Containment wells will be used to establish a baseline VOC mass flux (i.e., pumping of wells may create a greater contaminant mass flux than under static conditions). Modeling will be used to estimate the acceptable VOC mass flux at the Phase 2 containment wells such that if groundwater containment was discontinued, the VOC mass flux to the river pore water interface would not represent an unacceptable risk. Once this acceptable VOC mass flux at the Phase 2 Containment wells is reached during active remediation activities, the containment extraction wells will be shut off for a pilot period to allow real-time mass flux measurements between the Source Zone wells, Phase 2 containment wells, riverbank wells, and river sediment pore water. If at any point within the pilot test a VOC mass flux along one of the three downgradient planes exceeds the acceptable modeled mass flux, Phase 2 containment will be re-implemented with additional ERD substrate introduction in the Source Zone completed, if needed. Based on the successful pilot testing of source depletion remediation technologies and ERD, it is not anticipated that other remediation technologies would be needed in the future.

The long-term goal with remedy progression is to reach a condition where either low-level substrate augmentation (EMNA) or MNA is sufficient to maintain VOC concentrations at levels such that the mass flux to the river wells and sediment pore water does not represent an unacceptable risk.

7 PROJECT DELIVERABLES

7.1 DESIGN REPORTS AND IMPLEMENTATION

Construction plans and specifications and related design information to accomplish the remedial action selected by DEQ shall be submitted to DEQ for review and approval. Project deliverables and associated schedules are listed on Table 7. Design reports shall be submitted in the following phases and according to the following schedules (unless later modified with DEQ's approval):

1. Existing Remedial System Components – As built drawings and equipment specifications for existing systems shall be submitted to DEQ to serve as the bases for the design of the ERD component of the DEQ selected remedy. This deliverable will be provided to DEQ for review within 45 days of finalization (i.e. court approval and entry) of the Consent Judgment.
2. Design – As discussed in the previous sections, all active remedial systems of the ROD selected remedy are in place and operational, except the ERD system. The design report shall include elements of the enhanced reductive dechlorination system listed below.
    a. ERD system design objectives, performance criteria, and standards.
    b. Description of design elements.
    c. Design calculations and analyses.
    d. Drawing index and design drawings.
    e. ERD equipment specifications.
    f. ERD construction sequence and schedule.
    g. General description of ERD system activities to be performed.
    h. Description of underground injection permitting requirements.
    i. ERD equipment startup and operator training requirements.
    j. Description of proposed control measures to minimize releases of hazardous substances to all environmental media during construction and installation activities.
    k. Description of any proposed surface water control measures during construction.
    l. Identification and description of dust control and noise abatement measures to minimize and monitor environmental impacts of construction or installation activities.
    m. Identification and description of any site security measures necessary to minimize exposure to hazardous situations during remedial action.

    The draft ERD design report shall be submitted to DEQ for review and comments within 90 days of finalization of the Consent Judgment.

    A final ERD Design Report shall incorporate required revisions resulting from DEQ's review and comments of the draft design. This final design shall provide the basis for the ERD system actions undertaken at the facility. The final design report shall include elements described above as well as identify the construction contractors that will perform the work. This document will be submitted to DEQ within 30 days of receipt of their comments on the draft plan.

Upon DEQ's approval of the final ERD Design Report, the ERD system installation shall be performed in accordance with the design plans.

PNG anticipates completion of the remedial design construction phase of the project within four months of DEQ's approval of the final design, provided the ERD unit is available in this timeframe. The schedule for completion of the ERD remedial design construction phase will be finalized with DEQ concurrence after DEQ approval for the final ERD Design Report is provided.

7.2 OPERATIONS AND MAINTENANCE PLAN

PNG will prepare an O&M Plan following installation, startup, and optimization of the ERD system, which could be in the range from two to four months after the ERD system is fully constructed. PNG will notify DEQ when the ERD system has been installed, started up, and optimized. The schedule for submittal of the O&M Plan will be finalized with DEQ concurrence after the ERD system is fully constructed. The O&M Plan will detail the specific operation and maintenance requirements for each constructed or installed remediation component of the active remedy. The O&M Plan will include:

- A description of equipment and monitoring components and an equipment replacement schedule.
- A description of normal O&M tasks, prescribe treatment or operation conditions, and frequency schedule of O&M tasks.
- A description and analysis of potential operating problems, sources of information for trouble-shooting, and common remedies.
- A description of routine monitoring, inspection, and laboratory testing requirements, associated QA/QC requirements, and monitoring locations, parameters, and frequency.
- A description of alternate O&M to prevent undue hazard in the event of system failure.
- A description of safety procedures and equipment required for operators during normal operations and in the event of system failure.
- A records management plan to include operating logs, laboratory results, and maintenance activities.
- Reporting procedures to address emergencies.
- A proposed schedule for submittal of O&M reports to DEQ 45 days after completion of startup and optimization.

7.3 FLUX MONITORING PLAN

During operation of the fully-constructed, optimized ERD system at the multiple target areas, a Flux Monitoring Plan with be developed on a schedule approved by and in coordination with DEQ that allows for a gradual reduction in groundwater pumping rates with the ultimate goal to stop pumping based on monitoring results. Trigger concentrations and critical decision points will be defined using the latest EPA guidance on Mass Flux monitoring combined with recent scientific literature. The Flux Monitoring Plan will describe how mass flux will be incorporated into the performance monitoring program to address several key criteria.

- Establish the mass of TCE migrating from the Source Zone toward the last remaining receptors at discharge to the rivers.
- Construct a predictive model for pore water concentrations as the remnant plume migrates and attenuates from the Source Zone transect and through the Phase 2 transect and river transects.
- Monitor the progress of reductive dechlorination in removing TCE that possibly continues to diffuse downward from the overlying Willamette Silts or upward from the Calapooia Clay aquitard.
- Establish criteria and monitoring necessary to return to active remediation due to rebound, including passive ERD via injection into the Source Zone, aggressive ERD using an injection and withdrawal circulation cell, and/or return to groundwater pumping to establish the minimal necessary capture zone.

7.4 PERFORMANCE MONITORING

Performance monitoring of the already established active remediation systems is ongoing. The current performance monitoring plan is presented each year in the Annual Performance Report and is optimized, as necessary to reflect current remedial activities. Following construction of the ROD remedy, this plan will be substantially rewritten and optimized for long-term future remedial efforts. The updated monitoring program will likely include:

- Monitoring of the remedial system influent and effluent contaminant concentrations and flow rates to provide data to quantify the mass of TCE removed from the subsurface, evaluate the efficiency of the treatment system, and quantify the mass of TCE removed from the subsurface and by the vapor phase activated carbon adsorption treatment system.
- Monitoring of the progress of SVE and groundwater extraction systems that are operated in a focused mode of aggressive mass reduction in the DNAPL source zone.
- Monitoring of the progress of the in-situ ERD groundwater treatment system to evaluate its contribution to mass reduction in the Source Zone.
- Monitoring of groundwater contaminant concentrations in the TCE plume to evaluate the following:
  - Hydraulic containment.
  - Progress with plume cleanup through comparison of soil vapor, groundwater, and surface water concentrations to applicable cleanup standards.
  - Potential rebound of TCE concentrations. Mass flux from the Source Zone.
  - Natural attenuation in areas downgradient of the Source Zone.

A draft Monitoring, Performance Evaluation, and Contingency Plan shall be submitted for DEQ review and comment following installation, startup, and optimization of the ERD system. A draft plan will be submitted to DEQ within 45 days after PNG notifies DEQ that the ERD system has been installed, started up, and optimized.

The objectives of the Monitoring, Performance Evaluation, and Contingency Plan include 1) monitoring variations in groundwater and soil gas quality at or near target remediation areas, 2) monitoring contaminant concentrations and migration, 3) evaluating the effectiveness of source removals and other remedial actions, 4) verifying results of fate and transport modeling, 5) and evaluating the effectiveness of operational SVE, groundwater pump and treat, and enhanced reductive dechlorination systems in attaining the remedial action objectives, goals, requirements, and specified cleanup levels.

The plan shall also propose response actions to occur in the event of statistically significant exceedance of the soil gas and groundwater remediation criteria during the long-term monitoring program.

A final plan shall be submitted for DEQ approval within 30 days of receipt of DEQ's comments on the draft plan.

8 LIMITATIONS

PNG has prepared this report for use by H&V Fiber Corporation. This report may be made available to future property owners and to regulatory agencies. This report is not intended for use by others and the information contained herein is not applicable to other sites.

Our interpretation of subsurface conditions is based on field observations and chemical analytical data. Areas with contamination may exist in portions of the site that were not explored or analyzed.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices and laws, rules, and regulations at the time that the report was prepared. No other conditions, express or implied, should be understood.

PNG ENVIRONMENTAL, INC.

Brad Berggren, P.E., R.G.
Senior Engineer

Paul McBeth, R.G.
President

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TABLES

Table 1
Neighborhood Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
Neighborhood Area Wells								
MW-20	01/05/2009	0.5 U	55	3.1	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.18 J	48	2.6	0.18 J	0.18 J	0.5 U	0.5 U
	06/01/2009	0.15 J	42	0.5 U	0.18 J	0.18 J	0.5 U	0.11 J
	09/14/2009	0.5 U	31	1.6	0.5 U	0.5 U	0.5 U	0.5 U
	12/03/2009	0.18 J	34	2.1	0.18 J	0.16 J	0.5 U	0.12 J
	03/24/2010	0.11 J	13	0.80	0.5 U	0.5 U	-	0.5 U
	06/08/2010	0.09 J	27	1.6	0.10 J	0.10 U	-	0.09 U
	09/29/2010	0.10 J	24	1.5	0.11 J	0.12 J	-	0.12 J
	03/22/2011	0.14 J	25	1.1	0.5 U	0.5 U	-	0.5 U
	06/07/2011	0.10 J	32	1.8	0.14 J	0.13 J	-	0.5 U
Duplicate (MW-99)	06/07/2011	0.10 J	30	1.8	0.12 J	0.12 J	-	0.5 U
	09/26/2011	0.5 U	29	1.7	0.5 U	0.5 U	-	0.5 U
	07/16/2012	0.5 U	32	1.9	0.5 U	0.5 U	-	0.5 U
	03/20/2013	1 U	27	1.6	1 U	1 U	-	1 U
	09/04/2013	1 U	18	1.2	1 U	1 U	-	1 U
	03/17/2014	1 U	28	1.4	1 U	1 U	-	1 U
	09/22/2014	1 U	20	1.1	1 U	1 U	-	1 U
	03/13/2015	1 U	16	1.0	1 U	1 U	-	1 U
	09/01/2015	1 U	22	1.3	1 UJ[1]	1 UJ[1]	-	1 U
IMW-20	03/01/2016	0.5 U	25 J	1.7	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2016	0.5 U	25	1.4	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-98)	09/13/2016	0.5 U	28	1.5	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2017	0.5 U	24	1.7	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	35	2.4	0.5 U	0.5 U	0.5 U	0.5 U
	03/05/2018	0.5 U	23	1.5	0.5 U	0.5 U	0.5 U	0.5 U
	09/11/2018	0.5 U	22	1.6	0.5 U	0.5 U	0.5 U	0.5 U
MW-21	01/05/2009	0.5 U	0.83	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.39 J	0.87	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	06/01/2009	0.28 J	0.68	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2009	0.5 U	0.78	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	12/03/2009	0.28 J	0.63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-99)	12/03/2009	0.33 J	0.67	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/24/2010	0.23 J	0.67	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/22/2011	0.27 J	0.68	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/26/2011	0.5 U	0.65	0.5 U	0.5 U	0.5 U	-	0.5 U
	07/12/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/04/2013	1 U	0.48 J	1 U	1 U	1 U	-	1 U
	09/22/2014	1 U	0.47 J	1 U	1 U	1 U	-	1 U
	09/01/2015	1 U	0.49 J	1 U	1 UJ[1]	1 UJ[1]	-	1 U
	09/13/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 1
Neighborhood Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-21 (cont'd)	09/18/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/11/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-22	01/05/2009	0.5 U	0.69	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.5 U	0.63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	06/01/2009	0.5 U	0.52	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2009	0.5 U	0.58	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	12/03/2009	0.5 U	0.48 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/24/2010	0.5 U	0.49 J	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/22/2011	0.5 U	0.56	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/26/2011	0.5 U	0.56	0.5 U	0.5 U	0.5 U	-	0.5 U
	07/12/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Duplicate (MW-99)	07/12/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/04/2013	1 U	0.49 J	1 U	1 U	1 U	-	1 U
	09/22/2014	1 U	1 U	1 U	1 U	1 U	-	1 U
	09/01/2015	1 U	1 U	1 U	1 UJ[1]	1 UJ[1]	-	1 U
	09/13/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/11/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DEQ Screening Level Criteria for Water								
Ingestion and Inhalation of Tap Water (Residential)[a]		12	0.49	36	360	280	2.8	0.027
Volitilization to Outdoor Air (Residential)[b]		64,000	3,300	>S	>S	570,000	16,000	350
Volitilization to Outdoor Air (Occupational)[c]		>S	20,000	>S	>S	2,400,000	68,000	5,900
Vapor Intrusion (Residential)[d]		3,700	200	>S	>S	29,000	1,100	17
Vapor Intrusion (Occupational)[e]		48,000	3,700	>S	>S	360,000	14,000	880
GW in Excavation[f]		5,600	430	18,000	180,000	44,000	10,000	960
Portland Harbor JSCS Levels								
Upland Source Control Screening Level[g]		0.33	3.0	NA	1,000	NA	NA	0.24
2004 AWQC (Human Health - Organism Only)[h]		3.3	30	NA	10,000	NA	NA	2.4
2004 AWQC (Ecological Receptors - Chronic)[i]		840	21,900	NA	NA	NA	NA	NA
Oak Ridge Tier II (Ecological Receptors)[j]		98	47	590	590	25	-	930 [k]

Table 1
Neighborhood Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Notes:

[a] Risk-based concentration (RBC) for ingestion/inhalation in a residential setting (revised May 2018)

[b] RBC for volatilization to outdoor air in a residential setting (revised May 2018)

[c] RBC for volatilization to outdoor air in an occupational setting (revised May 2018)

[d] RBC for vapor intrusion into buildings in a residential setting (revised May 2018)

[e] RBC for vapor intrusion into buildings in an occupational setting (revised May 2018)

[f] RBC for groundwater in excavation by a construction worker (revised May 2018)

[g] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Values listed are based on human health via fish ingestion

[h] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria for Organisms Only (DEQ 2004)

[i] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria - Ecologic Receptors - Chronic (DEQ 2004)

[j] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per Oak Ridge National Laboratory's Water Quality Criteria - Ecological Receptors - Tier II SCV
(Tier II SCV values were taken from Suter II, G.W. and Tsao, C.L., 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. ORNL publication ES/ER/TM-96/R2)

[k] Ecological screening value adopted by EPA in Regions 3,5 and 6.

ug/L = Micrograms per liter

U = not detected at the associated reporting limit

J = estimated trace concentration

J^1 = Data Validation Qualifier. The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

\- = Analyte not analyzed for this parameter

NA = Not applicable

>S = This RBC exceeds the solubility limit

Table 2
Upgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
Upgradient Area Wells								
MW-1	04/03/1986	-	2.0	-	-	-	-	-
	05/28/1986	-	1.0	-	-	-	-	-
	06/27/1986	-	23	-	-	-	-	-
	07/30/1986	-	4.0	-	-	-	-	-
	09/04/1986	-	1.0	-	-	-	-	-
	10/13/1986	-	1.0	-	-	-	-	-
	11/14/1986	-	2.0	-	-	-	-	-
	12/22/1986	1 U	1.0	-	1 U	1 U	1 U	-
	06/29/1987	2 U	1.0	-	1 U	1 U	1 U	5.0 C
	09/23/1987	2 U	1 U	-	1 U	1 U	1 U	2 U
	12/22/1987	1 U	6.0	-	1 U	1 U	1 U	1 U
	03/22/1988	1 U	1 U	-	1 U	1 U	1 U	1 U
	06/01/1988	1 U	1 U	1 U	1 U	1 U	2.0	1 U
	09/01/1988	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	12/27/1988	1 U	1 U	-	1 U	1 U	1 U	1 U
	03/17/1989	1 U	1 U	1 U	1 U	1 U	1.0	1 U
	06/15/1989	1 U	1 U	1 U	1 U	1 U	4.0	1 U
	09/12/1989	1 U	1 U	1 U	1 U	1 U	2.0	1 U
	12/27/1989	1 U	1 U	-	1 U	1 U	2.0	1 U
	03/16/1990	1 U	1 U	1 U	1 U	1 U	3.0	1 U
	06/27/1990	1 U	1.0	1 U	1 U	1 U	4.0	1 U
	09/24/1990	1 U	1 U	1 U	1 U	1 U	4.0	1 U
	12/14/1990	1 U	1 U	1 U	1 U	1 U	3.0	1 U
	03/15/1991	1 U	1 U	1 U	1 U	1 U	2.0	1 U
	03/16/1992	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	03/16/1993	1 U	1 U	-	1 U	1 U	1 U	1 U
	08/30/1994	1 U	3.2	-	1 U	1 U	1 U	1 U
	09/12/1995	1 U	1 U	-	1 U	1 U	1 U	1 U
	09/06/1996	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/04/1997	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/04/1998	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	08/31/1999	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/12/2000	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/20/2001	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	12/18/2001	0.5 U	2.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2002	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	06/13/2002	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/17/2002	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/23/2003	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2004	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/07/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	08/07/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 2
Upgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-1 (cont'd)	12/12/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/26/2007	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/25/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/23/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	07/12/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/04/2013	1.7	2.7	0.91 J	1 U	1 U		1 U
	09/22/2014	1 U	0.49 J	1 U	1 U	1 U	-	1 U
	09/01/2015	1 U	1 U	1 U	1 UJ[1]	1 UJ[1]	-	1 U
	09/13/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/11/2018	0.5 U	1.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-5	04/03/1986	-	46	-	-	-	-	-
	05/28/1986	-	1 U	-	-	-	-	-
	06/27/1986	-	1 U	-	-	-	-	-
	07/30/1986	-	1 U	-	-	-	-	-
	09/04/1986	-	1 U	-	-	-	-	-
	10/13/1986	-	1 U	-	-	-	-	-
	11/14/1986	-	1 U	-	-	-	-	-
	12/22/1986	1 U	1 U	-	1 U	1 U	1 U	1 U
	06/29/1987	1 U	1 U	-	1 U	1 U	1 U	2 U
	09/23/1987	2 U	1 U	-	1 U	1 U	1 U	5.0 C
	12/22/1987	1 U	4.0	-	1 U	1 U	1 U	1 U
	03/22/1988	1 U	1 U	-	1 U	1 U	1 U	1 U
	06/01/1988	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/01/1988	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	12/27/1988	1 U	1 U	-	1 U	1 U	1 U	1 U
	03/17/1989	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	06/15/1989	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/12/1989	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	12/27/1989	1 U	1 U	-	1 U	1 U	1 U	1 U
	03/16/1990	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/12/2000	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	12/13/2006	0.5 U	5.1	0.74	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/25/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/22/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	07/12/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/05/2013	1 U	1 U	1 U	1 U	1 U		1 U
Duplicate (MW-99)	09/05/2013	1 U	1 U	1 U	1 U	1 U		1 U
	09/22/2014	1 U	1.0	1 U	1 U	1 U	-	1 U
	09/01/2015	1 U	1 U	1 U	1 UJ[1]	1 UJ[1]	-	1 U

Table 2
Upgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-5 (cont'd)	09/13/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/11/2018	0.5 U	1.2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-9	03/02/1987	1 U	12	-	34	1 U	1 U	1 U
	06/30/1987	3.0 C	42	-	56	1 U	1.0	9.0 C
	09/23/1987	10 U	27	-	48	5 U	5 U	6.0 C
	12/22/1987	1 U	21	-	1 U	1 U	1 U	1.0
	03/22/1988	1 U	42	-	1 U	1 U	10	6.0
	06/01/1988	1 U	32	76	1 U	1 U	3.0	4.0
	09/01/1988	1 U	18	80	1 U	1 U	1 U	7.0
	12/29/1988	1 U	11	-	26	1 U	1 U	3.0 C
	03/17/1989	1 U	6.0	9.0	1 U	1 U	1 U	7.0
	06/15/1989	2.0	34	130	1 U	1.0	1 U	10
	09/12/1989	1 U	10	18	1 U	1 U	1 U	5.0
	12/27/1989	1 U	12		1 U	1 U	1 U	3.0
	03/16/1990	1 U	14	33	1 U	1 U	1 U	1 U
	06/27/1990	1 U	19	60	1 U	1 U	1 U	8.0
	09/24/1990	1 U	18	46	1 U	1 U	1 U	6.0
	12/14/1990	1 U	7.0	27	1 U	1 U	1 U	5.0
	03/15/1991	1 U	9.0	36	1 U	1 U	1 U	8.0
	06/04/1991	1 U	8.0	50	1 U	1 U	1 U	7.0
	09/04/1991	1.0	8.0	51	1 U	1 U	1 U	6.0
	12/06/1991	1.0	6.0	39	1 U	1 U	1 U	7.0
	03/16/1992	1 U	8.0	45	1 U	1 U	1.0	8.0
	06/05/1992	1 U	4.0	36	1 U	1 U	1 U	3.0
	09/04/1992	1 U	3.0	35	1 U	1 U	1 U	1 U
	12/30/1992	1 U	1 U	1 U	1 U	1 U	1 U	1.6
	03/15/1993	1 U	1 U	-	1 U	1 U	1 U	1.7
	06/16/1993	1 U	1.0	7.0	1 U	1 U	1 U	1 U
	09/10/1993	1 U	1 U	-	1 U	1 U	1 U	1 U
	12/17/1993	1 U	1 U	-	1 U	1 U	1 U	1 U
	03/10/1994	1 U	1 U	-	1 U	1 U	1 U	1 U
	06/29/1994	1 U	1 U	5.9	1 U	1 U	1 U	1 U
	08/30/1994	1 U	2 U	-	1 U	1 U	1 U	1 U
	03/21/1995	1 U	1 U	4.0	1 U	1 U	1 U	1 U
	09/12/1995	1 U	1 U	-	1 U	1 U	1 U	1 U
	09/05/1996	1 U	1 U	4.1	1 U	1 U	1 U	1.3
	09/04/1997	1 U	1 U	3.0	1 U	1 U	1 U	1 U
	09/04/1998	1 U	1 U	3.7	1 U	1 U	1 U	1.0
	09/02/1999	1 U	1 U	2.0	1 U	1 U	1 U	1 U
	09/12/2000	1 U	1 U	4.0	1 U	1 U	1 U	1.0
	09/19/2001	0.5 U	0.5 U	1.8	0.5 U	0.5 U	0.5 U	0.60

Table 2
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H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-9 (cont'd)	09/18/2002	0.5 U	0.5 U	3.0	0.5 U	0.5 U	0.5 U	1.1
	09/24/2003	0.5 U	0.5 U	2.5	0.5 U	0.5 U	0.5 U	0.50
	09/09/2004	0.5 U	0.5 U	2.9	0.5 U	0.5 U	0.5 U	1.0
	09/07/2005	0.5 U	0.5 U	2.1	0.5 U	0.5 U	0.5 U	0.76
	08/08/2006	0.5 U	0.5 U	1.8	0.5 U	0.5 U	0.5 U	0.5 U
	12/12/2006	0.5 U	0.84	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/27/2007	0.5 U	0.5 U	1.7	0.5 U	0.5 U	0.5 U	0.94
	03/23/2009	0.5 U	0.17 J	4.4	0.5 U	0.5 U	0.5 U	1.2
	09/14/2009	0.5 U	0.5 U	1.9	0.5 U	0.5 U	-	0.5 U
	03/25/2010	0.5 U	0.16 J	6.0	0.5 U	0.5 U	-	2.6
	03/23/2011	0.5 U	0.5 U	1.2	0.5 U	0.5 U	-	0.18 J
	07/16/2012	0.5 U	0.5 U	7.0	0.5 U	0.5 U	-	2.1
	09/05/2013	1 U	1 U	0.34 J	1 U	1 U		1 U
	09/22/2014	1 U	1 U	1 U	1 U	1 U	-	1 U
	09/01/2015	1 U	1 U	1 U	1 UJ[1]	1 UJ[1]	-	1 U
	09/13/2016	0.5 U	0.93	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
(DMW-9)	09/14/2017	0.5 U	0.5 U	1.1	0.5 U	0.5 U	0.5 U	0.5 U
	09/12/2018	0.5 U	0.80	0.63	0.5 U	0.5 U	0.5 U	0.5 U
MW-10	03/02/1987		650		110	10 U	10	10 U
	06/30/1987	93 C	400	-	83	8.0	7.0	4.0 C
	09/23/1987	95 C	900	-	200	6.0	7.0	10 C
	12/22/1987	4.0 U	2,400	-	4 U	4 U	12.0	4.0
	03/23/1988	40	1,400	-	5 U	5 U	5.0	5.0
	06/01/1988	36	500	200	1 U	2.0	4.0	2.0
	09/01/1988	40	680	250	3 U	3 U	3 U	3.0
	12/29/1988	63	780	-	130	2.0	3.0	4.0 C
	03/17/1989	27	6.0	21	1 U	3.0	2.0	1 U
	06/15/1989	33	500	60	1 U	3.0	1.0	5.0
	09/12/1989	3.0 U	530	70	3 U	3 U	3 U	3.0
	12/27/1989	16	870	-	10 U	10 U	10 U	10 U
	03/16/1990	31	330	48	1 U	1 U	1 U	1 U
	06/27/1990	20	310	4.5	5 U	5 U	5 U	5 U
	09/24/1990	20	300	40	1 U	1 U	1 U	1 U
	12/14/1990	24	170	28	1 U	1.0	1.0	1.0
	03/15/1991	20	110	10	5 U	5 U	5 U	5 U
	06/04/1991	17	57	6.0	5 U	5 U	5 U	5 U
	09/04/1991	18	40	6.0	1 U	1.0	2.0	1 U
	12/06/1991	7.0	15	5.0	1 U	1 U	1.0	1 U
	03/16/1992	15	18	4.0	1 U	1 U	4.0	1 U
	06/05/1992	10	13	5.0	1 U	1 U	1.0	1 U
	09/04/1992	7.0	9.0	4.0	1 U	1 U	1 U	1 U
	12/01/1992	5.1	5.1	-	1 U	1 U	1 U	1 U

Table 2
Upgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-10 (cont'd)	03/16/1993	4.6	4.8	-	1 U	1 U	1 U	1 U
	06/16/1993	11	6.0	1 U	1 U	1 U	2.0	1 U
	09/10/1993	5.4	4.4	-	1 U	1 U	1 U	1 U
	12/17/1993	5.6	3.5	-	1 U	1 U	1 U	1 U
	03/09/1994	1.8	4.4	-	1 U	1 U	1 U	1 U
	06/29/1994	6.0	6.4	1 U	1 U	1 U	1 U	1 U
	08/30/1994	4.5	12	-	1 U	1 U	1 U	1 U
	03/21/1995	7.0	11	12	1 U	1 U	1 U	1 U
	09/12/1995	2.3	2.1	-	1 U	1 U	1 U	1 U
	03/14/1996	1.7	5.9	16	1 U	1 U	1 U	1 U
	09/05/1996	5.9	4.8	3.4	1 U	1 U	1 U	1 U
	03/21/1997	1.6	8.0	29	1 U	1 U	1 U	1 U
	09/04/1997	5.0	3.0	4.0	1 U	1 U	1 U	1 U
	03/13/1998	2.6	2.3	6.5	1 U	1 U	1 U	1 U
	09/04/1998	3.0	2.1	2.2	1 U	1 U	1 U	1 U
	04/02/1999	2.0	3.0	12	1 U	1 U	1 U	1 U
	09/02/1999	5.0	3.0	2.0	1 U	1 U	1 U	1 U
	03/02/2000	1.0	2.0	11	1 U	1 U	1 U	1 U
	09/12/2000	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/19/2001	3.0	1.8	2.1	0.5 U	0.5 U	0.5 U	0.5 U
	09/17/2002	6.8	3.7	1.1	0.5 U	0.50	0.50	0.5 U
	09/23/2003	6.5	3.6	2.3	0.5 U	0.5 U	0.60	0.5 U
	09/08/2004	5.1	2.6	0.9	0.5 U	0.5 U	0.5 U	0.5 U
	09/06/2005	5.5	3.9	0.67	0.5 U	0.5 U	0.5 U	0.5 U
	08/08/2006	4.8	4.4	1.0	0.5 U	0.5 U	0.5 U	0.5 U
	12/12/2006	3.5	4.2	2.0	0.5 U	0.5 U	0.5 U	0.5 U
	09/26/2007	4.3	3.2	2.0	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	2.4	3.3	1.5	0.5 U	0.29 J	0.27 J	0.5 U
	03/25/2010	3.4	3.1	0.57	0.5 U	0.40 J	-	0.5 U
	03/22/2011	3.5	14	2.4	0.5 U	0.70	-	0.5 U
	07/13/2012	2.8	5.5	1.3	0.5 U	0.5 U	-	0.5 U
Duplicate (MW-98)	07/13/2012	3.1	5.8	1.3	0.5 U	0.5 U	-	0.5 U
	09/05/2013	1 U	1 U	1 U	1 U	1 U		1 U
	09/22/2014	2.7	2.4	0.59 J	1 U	1 U	-	1 U
	09/01/2015	1.8	1.6	0.60 J	1 UJ[1]	1 UJ[1]	-	1 U
	09/13/2016	3.5	2.9	0.68	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	3.1	4.2	1.3	0.5 U	0.5 U	0.5 U	0.5 U
	09/12/2018	2.4	3.3	0.77	0.5 U	0.5 U	0.5 U	0.5 U
MW-18	12/29/1988	1 U	3,000		720	1 U	1 U	110 C
	06/27/1990	20 U	84	300	20 U	20 U	20 U	20 U
	09/24/1990	10 U	450	170	10 U	10 U	10 U	10 U
	12/14/1990	50 U	1,300	410	50 U	50 U	50 U	50 U

Table 2
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H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-18 (cont'd)	03/15/1991	1 U	63	32	1 U	1 U	1 U	1 U
	06/04/1991	10 U	370	110	10 U	10 U	10 U	10 U
	09/04/1991	1 U	820	100	1 U	1 U	1 U	4.0
	12/06/1991	20 U	1,200	90	20 U	20 U	20 U	20 U
	03/16/1992	20 U	900	80	20 U	20 U	20 U	20 U
	06/05/1992	10 U	740	40	10 U	10 U	10 U	10 U
	09/04/1992	20 U	710	20	20 U	20 U	20 U	20 U
	12/31/1992	10 U	780	-	10 U	10 U	10 U	10 U
	03/16/1993	10 U	550	-	10 U	10 U	10 U	10 U
	06/17/1993	10 U	440	20	10 U	10 U	10 U	10 U
	09/10/1993	1 U	460	-	1 U	1 U	1 U	1 U
	12/17/1993	1 U	400	-	1 U	1 U	1 U	1 U
	03/09/1994	5 U	260	-	5 U	5 U	5 U	5 U
	06/30/1994	10 U	280	15	10 U	10 U	10 U	10 U
	08/30/1994	10 U	318	-	10 U	10 U	10 U	10 U
	12/22/1994	5 U	150	-	5 U	5 U	5 U	5 U
	03/21/1995	1 U	115	10	1 U	1 U	1 U	1 U
	06/06/1995	5 U	76	-	5 U	5 U	5 U	5 U
	09/12/1995	1 U	59	-	1 U	1 U	1 U	1 U
	12/20/1995	1 U	77	2.6	1 U	1 U	1 U	1 U
	03/14/1996	1 U	48	5.8	1 U	1 U	1 U	1 U
	06/21/1996	1 U	60	10	1 U	1 U	1 U	1 U
	09/05/1996	1 U	54	13	1 U	1 U	1 U	1 U
	03/24/1997	1 U	51	7.3	1 U	1 U	1 U	1 U
	09/04/1997	1 U	37	14	1 U	1 U	1 U	1 U
	03/13/1998	1 U	25	6.3	1 U	1 U	1 U	1 U
	09/04/1998	1 U	26	4.5	1 U	1 U	1 U	1 U
	04/02/1999	1 U	24	6.0	1 U	1 U	1 U	1 U
	09/02/1999	1 U	28	9.0	1 U	1 U	1 U	1 U
	03/01/2000	1 U	32	9.0	1 U	1 U	1 U	1 U
	06/27/2000	1 U	24	12	1 U	1 U	1 U	1 U
	09/12/2000	1 U	20	9.0	1 U	1 U	1 U	1 U
	12/13/2000	1 U	23	6.5	1 U	1 U	1 U	1 U
	03/07/2001	1 U	14	4.1	1 U	1 U	1 U	1 U
	09/20/2001	0.5 U	21	4.1	0.5 U	0.5 U	0.5 U	1 U
	03/05/2002	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
	09/18/2002	0.5 U	9.9	2.1	0.5 U	0.5 U	0.5 U	1 U
	03/19/2003	0.5 U	6.4	2.7	0.5 U	0.5 U	0.5 U	1 U
	09/24/2003	0.5 U	6.3	1.5	0.5 U	0.5 U	0.5 U	1 U
	03/04/2004	0.5 U	15	6.6	0.5 U	0.5 U	0.5 U	1 U
	09/08/2004	0.5 U	6.0	6.5	0.5 U	0.5 U	0.5 U	1 U
	03/09/2005	0.5 U	1.6	0.5 U	0.5 U	0.5 U	0.5 U	1 U
	09/07/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U

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Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-18 (cont'd)	03/08/2006	0.5 U	19	7.3	0.5 U	0.5 U	0.5 U	1 U
	08/08/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
	12/13/2006	0.5 U	0.56	7.7	0.5 U	0.5 U	0.5 U	1 U
	03/20/2007	0.5 U	4.6	6.4	0.5 U	0.5 U	0.5 U	1 U
	09/27/2007	0.5 U	4.1	3.5	0.5 U	0.5 U	0.5 U	1 U
	03/13/2008	0.5 U	5.5	2.5	0.5 U	0.5 U	0.5 U	1 U
	03/23/2009	0.5 U	0.15 J	0.69	0.5 U	0.5 U	-	0.5 U
	03/26/2010	0.5 U	25	1.2	0.5 U	0.5 U	-	0.5 U
	06/08/2010	0.5 U	2.3	1.5	0.5 U	0.5 U	-	0.5 U
	03/23/2011	0.5 U	1.4	0.98	0.5 U	0.5 U	-	0.5 U
	07/16/2012	0.5 U	0.5 U	12	0.5 U	0.5 U	-	0.5 U
	09/05/2013	1 U	1.3	4.6	1 U	1 U		1 U
	09/23/2014	1 U	1 U	6	1 U	1 U	-	1 UJ[1]
	09/01/2015	1 U	8.9	4.6	1 UJ[1]	1 UJ[1]	-	1 U
	09/13/2016	0.5 U	0.5 U	22	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2017	0.5 U	4.7	2.5	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-98)	09/18/2017	0.5 U	4.6	2.4	0.5 U	0.5 U	0.5 U	0.5 U
	09/12/2018	0.5 U	5.1	2.0	0.5 U	0.5 U	0.5 U	0.5 U
MW-19	09/24/1990	4 U	220	270	4 U	4 U	4 U	4 U
	12/14/1990	40 U	2,400	760	40 U	40 U	40 U	40 U
	09/12/2000	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	12/12/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/25/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Duplicate (MW-99)	03/25/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/23/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	07/16/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/05/2013	1 U	0.41 J	0.32 J	1 U	1 U		1 U
	09/23/2014	1 U	1 U	1 U	1 U	1 U	-	1 UJ[1]
	09/01/2015	1 U	1 U	1 U	1 UJ[1]	1 UJ[1]	-	1 U
	09/13/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/12/2018	0.5 U	0.74	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 2
Upgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DEQ Screening Level Criteria for Water								
Ingestion and Inhalation of Tap Water (Residential)[a]		12	0.49	36	360	280	2.8	0.027
Volitilization to Outdoor Air (Residential)[b]		64,000	3,300	>S	>S	570,000	16,000	350
Volitilization to Outdoor Air (Occupational)[c]		>S	20,000	>S	>S	2,400,000	68,000	5,900
Vapor Intrusion (Residential)[d]		3,700	200	>S	>S	29,000	1,100	17
Vapor Intrusion (Occupational)[e]		48,000	3,700	>S	>S	360,000	14,000	880
GW in Excavation[f]		5,600	430	18,000	180,000	44,000	10,000	960
Portland Harbor JSCS Levels								
Upland Source Control Screening Level[g]		0.33	3.0	NA	1,000	NA	NA	0.24
2004 AWQC (Human Health - Organism Only)[h]		3.3	30	NA	10,000	NA	NA	2.4
2004 AWQC (Ecological Receptors - Chronic)[i]		840	21,900	NA	NA	NA	NA	NA
Oak Ridge Tier II (Ecological Receptors)[j]		98	47	590	590	25	-	930 [k]

Table 2
Upgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Notes:

[a] Risk-based concentration (RBC) for ingestion/inhalation in a residential setting (revised November 1, 2015)
[b] RBC for volatilization to outdoor air in a residential setting (revised November 1, 2015)
[c] RBC for volatilization to outdoor air in an occupational setting (revised November 1, 2015)
[d] RBC for vapor intrusion into buildings in a residential setting (revised November 1, 2015)
[e] RBC for vapor intrusion into buildings in an occupational setting (revised November 1, 2015)
[f] RBC for groundwater in excavation by a construction worker (revised November 1, 2015)
[g] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Values listed are based on human health via fish ingestion
[h] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria for Organisms Only (DEQ 2004)
[i] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria - Ecologic Receptors - Chronic (DEQ 2004)
[j] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per Oak Ridge National Laboratory's Water Quality Criteria - Ecological Receptors - Tier II SCV
[k] Ecological screening value adopted by EPA in Regions 3,5 and 6.
ug/L = Micrograms per liter
C = results of coelution
U = not detected at the associated reporting limit
J = estimated trace concentration
J[1] = Data Validation Qualifier. The analyte was detected above the method reporting limit. Results should be considered an estimate. See corresponding data validation report for further explanation.
- = Analyte not analyzed for this parameter
NA = Not applicable
>S = This RBC exceeds the solubility limit

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DNAPL Source Zone Area Wells								
DMW-3	04/03/1986	-	326,000	-	-	-	-	-
	05/28/1986	-	516,000	-	-	-	-	-
	06/27/1986	1,000 U	280,000	-	1,300	1,000 U	1,000 U	1,100 C
	07/30/1986	-	229,000	-	-	-	-	-
	09/04/1986	-	475,000	-	-	-	-	-
	10/13/1986	-	443,000	-	-	-	-	-
	11/14/1986	-	254,000	-	-	-	-	-
	12/22/1986	-	110,000	-	2,000	1,000 U	1,000	1,500 C
	06/29/1987	40,000 U	410,000	-	20,000 U	20,000 U	20,000 U	40,000 U
	09/23/1987	10,000 U	390,000	-	10,000	5,000 U	5,000 U	10,000 U
	12/22/1987	2,000 U	1,010,000	-	2,000 U	2,000 U	2,000 U	2,000 U
	03/17/1989	10,000 U	590,000	10,000 U	10,000 U	10,000 U	10,000 U	10,000 U
	06/15/1989	500 U	280,000	6,500	500 U	500 U	500 U	500
	09/12/1989	250 U	130,000	8,000	250 U	250 U	250 U	250 U
	12/28/1989	1,000 U	230,000	-	1,000 U	1,000 U	1,000 U	1,000 U
	03/16/1990	2,000 U	170,000	6,000	2,000 U	2,000 U	2,000 U	2,000 U
	12/14/1990	2,000 U	250,000	5,000	2,000 U	2,000 U	2,000 U	2,000 U
	03/15/1991	4,000 U	420,000	8,000	4,000 U	4,000 U	4,000 U	4,000 U
	06/04/1991	5,000 U	450,000	14,000	5,000 U	5,000 U	5,000 U	5,000 U
	09/04/1991	10,000 U	380,000	10,000 U	10,000 U	10,000 U	10,000 U	10,000 U
	12/06/1991	5,000 U	300,000	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U
	03/16/1992	1,000 U	160,000	3,000	1,000 U	1,000 U	1,000 U	1,000 U
	06/01/1992	-	98,000	-	-	-	-	-
	09/01/1992	-	96,000	-	-	-	-	-
	11/30/1992	-	120,000	-	-	-	-	-
	03/01/1993	-	81,000	-	-	-	-	-
	06/17/1993	2,000 U	106,000	2,000	2,000 U	2,000 U	2,000 U	2,000 U
	09/09/1993	100 U	48,000		100 U	100 U	100 U	100 U
	12/01/1993	-	58,000	-	-	-	-	-
	03/01/1994	-	61,000	-	-	-	-	-
	04/25/1994	500 U	75,000	1,800	500 U	500 U	500 U	500 U
	06/30/1994	2,000 U	61,000	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
	09/01/1994	-	28,000	-	-	-	-	-
	12/01/1994	-	56,000	-	-	-	-	-
	04/25/1995	-	47,000	-	-	-	-	-
	06/01/1995	-	35,000	-	-	-	-	-
	09/01/1995	-	25,700	-	-	-	-	-
	12/01/1995	-	53,000	-	-	-	-	-
	03/01/1996	-	45,000	-	-	-	-	-
	06/01/1996	-	42,000	-	-	-	-	-
	09/01/1996	-	20,000	-	-	-	-	-
	12/01/1996	-	26,000	-	-	-	-	-

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-3 (cont'd)	03/01/1997	-	21,000	-	-	-	-	-
	06/01/1997	-	17,000	-	-	-	-	-
	09/01/1997	-	9,600	-	-	-	-	-
	12/01/1997	-	12,100	-	-	-	-	-
	03/01/1998	-	15,000	-	-	-	-	-
	06/01/1998	-	16,700	-	-	-	-	-
	09/01/1998	-	9,280	-	-	-	-	-
	09/01/1999	-	15,400	-	-	-	-	-
	09/01/2000	-	890	-	-	-	-	-
	07/31/2001	-	11,900 E	-	-	-	-	-
	09/20/2001	3.5	15,600	832	4.3	2.0	0.5 U	5.4
	12/18/2001	100 U	17,500	1,010	100 U	100 U	100 U	100 U
	03/06/2002	3.5	22,500	1,670	5.2	3.1	0.5 U	11
	06/13/2002	3.7	22,100	1,390	5.5	3.3	0.5 U	14
	09/18/2002	-	16,800	-	-	-	-	-
	03/19/2003	-	17,200	-	-	-	-	-
	09/22/2003	-	14,400	-	-	-	-	-
	09/09/2004	-	11,900	-	-	-	-	-
	09/07/2005	-	14,200	-	-	-	-	-
	08/08/2006	-	14,000	-	-	-	-	-
	12/14/2006	2.3	8,030	1,750	11	3.3	0.5 U	17
	02/21/2007	-	73,700	-	-	-	-	-
	09/27/2007	-	11,100	-	-	-	-	-
	03/23/2009	25 U	14,800	756	3.4 J	25 U	-	7.2 J
	06/01/2009	25 U	14,900	780	25 U	25 U	-	25 U
	09/14/2009	25 U	14,900	857	25 U	25 U	-	25 U
	12/03/2009	25 U	11,700	682	4.2 J	25 U	-	6.9 J
	03/24/2010	5.6 J	18,800	946	5.4 J	25 U	-	10 J
	12/10/2010	25 U	13,900	796	25 U	25 U	-	25 U
	03/22/2011	25 U	18,700	791	25 U	25 U	-	7.0 J
	09/26/2011	25 U	10,900	2,630	25 U	25 U	-	173
	02/27/2012	25 U	11,700	615	25 U	25 U	-	25 U
	07/12/2012	25 U	12,000	739	25 U	25 U	-	25 U
	03/19/2013	5 U	3,100	260	5 U	5 U	-	5 U
	04/15/2013	25 U	3,000	220	25 U	25 U	-	25 U
	06/03/2013	25 U	1,900	1,200	25 U	25 U	-	25 U
	07/01/2013	10 U	1,800	1,400	9.0 J	10 U	-	4.2 J
	09/05/2013	0.71 J	2,500	1,100	4.4	1.6	-	13
	12/11/2013	5.0 U	2,100	530	2.3 J	5.0 U	-	18
	03/17/2014	50 U	1,600	450	50 U	50 U	-	14 J
	06/03/2014	50 U	1,900	440	50 U	50 U	-	50 U
Duplicate (DMW-99)	06/03/2014	50 U	1,800	380	50 U	50 U	-	50 U
	09/24/2014	50 U	1,700	430	50 U	50 U	-	50 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-3 (cont'd)	12/03/2014	50 U	2,400	580 J[1]	50 U	50 U	-	50 U
Duplicate (MW-99)	12/03/2014	0.41 J	2,200	510 J[1]	3.1 J[1]	2.3 J[1]	-	5.5 J[1]
	03/09/2015	50 U	1,600	290	50 U	50 U	-	50 U
	06/11/2015	50 U	1,900	230	50 U	50 U	-	50 U
	09/01/2015	50 U	2,120	293	50 U	50 U	-	50 U
	12/14/2015	0.5 U	2,210	164	1.1	0.72	-	0.76
	03/07/2015	0.5 U	2,110	297	1.5	1.3	0.5 U	2.5
	06/15/2016	10 U	2,470	242	10 U	10 U	10 U	10 U
	09/14/2016	0.74	2,340	276	1.7	1.3	0.5 U	1.9
	12/05/2016	0.57	2,380	232	1.3	0.94	0.5 U	1.1
	03/09/2017	13 U	2,260	215	13 U	13 U	13 U	13 U
	06/08/2017	0.76	2,850	221	1.6	1.0	0.5 U	0.95
	09/18/2017	13 U	2,960	259	13 U	13 U	13 U	13 U
	12/11/2017	0.80 U	2,440	178	1.1	0.82	0.5 U	0.85
	03/07/2018	0.77	2,180 J[1]	192	1.0	1.1	0.5 U	1.6
	06/06/2018	0.94	2,940	211	1.3	1.1	0.5 U	1.1
	09/10/2018	0.67	2,950	524	2.6	1.4	0.5 U	1.6
	12/04/2018	0.70	2,270	210	1.0	0.91	0.5 U	1.2
IMW-3	06/05/2009	500 U	442,000	2,560	500 U	500 U	-	500 U
	08/06/2009	500 U	318,000	5,820	500 U	500 U	-	500 U
	09/15/2009	250 U	134,000	18,200	250 U	250 U	-	250 U
	03/26/2010	1,000 U	444,700	4,790	1,000 U	1,000 U	-	1,000 U
	03/22/2011	500 UJ[1]	373,000	3,760 J[1]	500 UJ[1]	500 UJ[1]	-	500 UJ[1]
	06/04/2013	10 U	40,000	480	10 U	10 U	-	10 U
	03/18/2014	100 UJ[1]	14,000 J[1]	210	100 U	100 U	-	100 U
	03/03/2016	50 U	42,700	576	50 U	50 U	50 U	50 U
	03/09/2017	250 U	6,320	250 U	250 U	250 U	250 U	250 U
DMW-16	12/28/1988	100 U	810,000		18,000	100 U	100 U	2,200
	06/27/1990	2,000 U	650,000	22,000	2,000 U	2,000 U	2,000 U	2,000 U
	12/14/1990	2,000 U	600,000	16,000	2,000 U	2,000 U	2,000 U	2,000 U
	03/15/1991	10,000 U	330,000	10,000 U	10,000 U	10,000 U	10,000 U	10,000 U
	06/04/1991	2,000 U	136,000	13,000	2,000 U	2,000 U	2,000 U	2,000 U
	09/04/1991	2,000 U	120,000	5,000	2,000 U	2,000 U	2,000 U	2,000 U
	12/06/1991	2,000 U	130,000	3,000	2,000 U	2,000 U	2,000 U	2,000 U
	03/16/1992	2,000 U	64,000	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
	06/05/1992	1,000 U	73,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
	09/04/1992	1,000 U	38,000	1,000	1,000 U	1,000 U	1,000 U	1,000 U
	11/30/1992	-	77,300	-	-	-	-	-
	12/30/1992	2,000 U	51,000	-	2,000 U	2,000 U	2,000 U	2,000 U
	03/15/1993	1,000 U	83,000	-	1,000 U	1,000 U	1,000 U	1,000 U
	06/17/1993	1,000 U	39,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-16 (cont'd)	09/09/1993	50 U	26,000	-	50 U	50 U	50 U	50 U
	12/17/1993	50 U	28,000	-	50 U	50 U	50 U	50 U
	03/09/1994	500 U	23,000	-	500 U	500 U	500 U	500 U
	04/25/1994	500 U	25,000	500 U	500 U	500 U	500 U	500 U
	06/30/1994	100 U	32,000	470	100 U	100 U	100 U	100 U
	08/29/1994	50 U	24,300 J	-	50 U	50 U	50 U	50 U
	12/01/1994	-	25,000	-	-	-	-	-
	03/20/1995	200 U	20,800	410	200 U	200 U	200 U	200 U
	04/25/1995	-	27,000	-	-	-	-	-
	06/01/1995	-	15,000	-	-	-	-	-
	09/12/1995	500 U	13,000		500 U	500 U	500 U	500 U
	12/01/1995	-	11,000	-	-	-	-	-
	03/14/1996	5,000 U	11,000	110	5,000 U	5,000 U	5,000 U	5,000 U
	06/01/1996	-	7,900	-	-	-	-	-
	09/01/1996	-	8,900	-	-	-	-	-
	12/01/1996	-	9,000	-	-	-	-	-
	03/24/1997	100 U	14,100 E	180	100 U	100 U	100 U	100 U
	06/01/1997	-	6,090	-	-	-	-	-
	09/04/1997	200 U	9,000	200 U	200 U	200 U	200 U	200 U
	12/01/1997	-	7,600	-	-	-	-	-
	03/12/1998	200 U	8,600	200 U	200 U	200 U	200 U	200 U
	06/01/1998	-	6,200	-	-	-	-	-
	09/04/1998	100 U	6,320	154	100 U	100 U	100 U	100 U
	04/02/1999	100 U	9,010	130	100 U	100 U	100 U	100 U
	08/31/1999	100 U	5,910	146	100 U	100 U	100 U	100 U
	03/02/2000	100 U	8,520	221	100 U	100 U	100 U	100 U
	10/06/2000	1 U	9,090	-	2.6	1.1	1 U	1.8
	03/07/2001	3.8	4,280	241	1 U	22	1 U	4.2
	07/31/2001	-	4,710	-	-	-	-	-
	09/20/2001	-	4,080	-	-	-	-	-
	12/18/2001	-	5,200	-	-	-	-	-
	03/06/2002	-	5,380	-	-	-	-	-
	09/18/2002	-	4,520	-	-	-	-	-
	03/19/2003	-	7,630	-	-	-	-	-
	09/22/2003	-	6,630	-	-	-	-	-
	09/09/2004	-	5,910	-	-	-	-	-
	09/07/2005	-	3,760	-	-	-	-	-
	08/08/2006	-	3,960	-	-	-	-	-
	12/14/2006	25 U	9,560	4,460	25 U	25 U	25 U	52
	02/21/2007	-	21,300	-	-	-	-	-
	09/27/2007	-	7,150	-	-	-	-	-
	03/23/2009	25 U	5,380	128	25 U	25 U	-	25 U
	06/01/2009	10 U	4,240	162	10 U	10 U	-	10 U
	09/14/2009	10 U	4,970	215	10 U	10 U	-	10 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-16 (cont'd)	12/03/2009	10 U	6,380	181	10 U	10 U	-	10 U
	03/24/2010	50 U	14,100	2330	13 J	50 U	-	50 U
	12/10/2010	10 U	6,780	250	10 J	10 U	-	10 U
	03/22/2011	1.9 J	4,580	178	0.84 J	5 U	-	5 U
	09/26/2011	5 U	3,000	134	5 U	5 U	-	5 U
	07/12/2012	5 U	3,120	156	5 U	5 U	-	5 U
	03/20/2013	14 J	50,000	2,900	12 J	20 U	-	20 U
	06/04/2013	50 U	2,500	210	50 U	50 U	-	50 U
	07/02/2013	25 U	1,400	240	25 U	25 U	-	25 U
	09/05/2013	1 U	3,400	580	2.8	1.2	-	0.43 J
	12/11/2013	5 U	9,300	500	2.6 J	5.0 U	5 U	5.0 U
	03/18/2014	33 J[1]	4,300 J[1]	680	20 U	20 U	-	20 U
	06/04/2014	200 U	8,000	420	200 U	200 U	-	200 U
	09/22/2014	200 U	9,500	580	200 U	200 U	-	200 UJ[1]
	12/02/2014	25 U	1,700	860 J[1]	25 U	25 U	-	25 U
	03/12/2015	25 U	8,600	690	25 U	25 U	-	25 U
	06/10/2015	250 U	9,800	490	250 U	250 U	-	250 U
	09/02/2015	50 U	2,390	502	50 U	50 U	-	50 U
	12/15/2015	0.5 U	8,120	134	0.88	0.5 U	-	0.5 U
	03/03/2016	25 U	3,730	1,400	25 U	25 U	25 U	25 U
	06/13/2016	1.0	13,000 J[1]	808	2.8	1.7	0.5 U	4.9
	09/07/2016	50 U	6,670	887	50 U	50 U	50 U	50 U
	12/05/2016	0.5 U	1,970	726	2.7	1.8	0.5 U	3.7
	03/08/2017	25 U	4,920	544	25 U	25 U	25 U	25 U
	06/09/2017	0.83	4,740	480	3.3	2.1	0.5 U	3.0
Duplicate (MW-99)	06/09/2017	0.89	5,540	773	3.6	2.5	0.5 U	3.4
	09/18/2017	25 U	4,590	712	25 U	25 U	25 U	25 U
	12/11/2017	5 U	3,580	623	5 U	5 U	5 U	5 U
	03/06/2018	0.72	4,430 J[1]	790	3.9	2.2	0.5 U	6.5
	06/06/2018	0.99	3,470	723	5.1	3.4	0.5 U	5.5
	09/17/2018	0.5 U	5,140	847	4.3	2.6	0.5 U	6.5
Duplicate (MW-97)	09/17/2018	0.5 U	4,440	795	3.9	2.4	0.5 U	6.4
IMW-16	06/05/2009	500 U	1,310	500 U	500 U	500 U	-	500 U
	08/06/2009	10 U	5,160	37	10 U	10 U	-	10 U
	09/15/2009	0.5 U	248	8.7 U	0.5 U	0.5 U	-	0.5 U
	03/25/2010	0.5 U	148	7.3	0.08 J	0.32 J	-	0.5 U
	03/23/2011	0.09 J	354	4.5	0.09 J	0.5 U	-	0.5 U
	03/20/2013	1 U	140	12	1 U	1 U	-	1 U
	03/18/2014	1 UJ[1]	320 J[1]	1.2	1 U	1 U	-	1 U
	03/12/2015	5 U	530	8.9	5 U	5 U	-	5 U
	03/12/2015	5 U	530	8.9	5 U	5 U	-	5 U
	03/03/2016	2.5 U	177	3.1	2.5 U	2.5 U	2.5 U	2.5 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
IMW-16 (cont'd)	03/08/2017	0.5 U	640	1.1	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	333 J[1]	5.3	0.5 U	0.5 U	0.5 U	0.5 U
DMW-17	12/29/1988	37 C	200,000	-	7,100	10 U	10 U	440 C
	12/14/1990	400 U	130,000	4,200	400 U	400 U	400 U	400 U
	03/15/1991	2,000 U	66,000	2,000	2,000 U	2,000 U	2,000 U	2,000 U
	06/04/1991	2,000 U	164,000	3,000	2,000 U	2,000 U	2,000 U	2,000 U
	09/04/1991	4,000 U	110,000	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
	12/06/1991	2,000 U	75,000	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
	03/16/1992	2,000 U	59,000	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
	06/01/1992	-	57,000	-	-	-	-	-
	09/01/1992	-	51,000	-	-	-	-	-
	11/30/1992	-	48,000	-	-	-	-	-
	03/01/1993	-	20,000	-	-	-	-	-
	06/17/1993	200 U	2,200	600	200 U	200 U	200 U	200 U
	09/09/1993	1.7	9,100	-	6.3	1.0	1 U	30
	12/01/1993	-	16,000	-	-	-	-	-
	03/01/1994	-	20,000	-	-	-	-	-
	04/25/1994	500 U	16,000	760	500 U	500 U	500 U	500 U
	06/30/1994	250 U	27,000	300	250 U	250 U	250 U	250 U
	09/01/1994	-	21,000	-	-	-	-	-
	12/01/1994	-	19,000	-	-	-	-	-
	04/25/1995	-	12,400	-	-	-	-	-
	06/01/1995	-	3,200	-	-	-	-	-
	09/01/1995	-	3,500	-	-	-	-	-
	06/01/1996	-	3,000	-	-	-	-	-
	12/01/1996	-	560	-	-	-	-	-
	09/01/1997	-	900	-	-	-	-	-
	12/05/1997	100 U	6,250	135	100 U	100 U	100 U	100 U
	03/01/1998	-	1,450	-	-	-	-	-
	09/01/2000	-	150	-	-	-	-	-
	12/14/2006	0.5 U	453	241	1.2	0.55	0.5 U	3.5
	02/21/2007	-	510	-	-	-	-	-
	03/23/2009	1.1 U	408	107	0.65 J	0.32 J	-	1.1
	06/01/2009	1.1 U	734	254	1.7	1.1 U	-	2.5
	09/14/2009	1.1 U	388	203	1.1 U	1.1 U	-	1.4
	12/03/2009	0.5 U	216	80	0.7	0.41 J	-	2.3
	03/24/2010	1.1 U	466	209	1.4	0.70 J	-	26
	12/10/2010	1.1 U	1,110	415	1.5	1.1 U	-	5.8
	03/22/2011	0.5 U	443	89	0.55	0.32 J	-	1.2
	09/26/2011	0.5 U	247	142	0.98	0.5 U	-	1.1
	07/12/2012	0.5 U	244	79	0.5 U	0.5 U	-	0.55
	03/19/2013	1.0 U	200	56	0.41 J	1.0 U	-	1.2
	04/15/2013	2.0 U	180	32	2 U	2.0 U	-	2.0 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-17 (cont'd)	06/03/2013	1.0 U	9.7	2,200	13	1.6	-	2.4
	07/01/2013	20 U	20 U	2,300	13	20.0 U	-	70.0
	09/04/2013	100 U	100 U	350	100 U	100 U	-	120
	12/10/2013	1 U	1 U	77	0.81 J	1 U	-	34
	03/17/2014	1 U	0.76 J	34	1 U	1 U	-	14
	06/03/2014	1 U	1.6	63	1 U	1 U	-	22
	09/24/2014	1 U	4.3	78	1 U	1 U	-	11 J[1]
	12/02/2014	1 U	9.4	56 J[1]	1 U	0.43 J	-	5.2 J[1]
	03/10/2015	1 U	3.7	110	0.81 J	1 U	-	5.8
	06/10/2015	1 U	3.7	93	0.52 J	0.43 J	-	7.9
	09/01/2015	1 U	3.1	36	1 U	1 U	-	4.3
	12/15/2015	0.5 U	14	35	0.50 U	0.50 U	-	1.2
	03/03/2016	0.5 U	53	147	1.0	0.68	0.5 U	8.8
	06/13/2016	0.5 U	161	34	0.5 U	0.5 U	0.5 U	1.0
	09/06/2016	0.5 U	28	34	0.5 U	0.5 U	0.5 U	0.78
	09/06/2016	0.5 U	38	23	0.5 U	0.5 U	0.5 U	0.86
	03/07/2017	0.5 U	24	33	0.5 U	0.5 U	0.5 U	0.68
	06/08/2017	0.5 U	38	36	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	6.3	17	0.5 U	0.5 U	0.5 U	0.55
	12/05/2017	0.5 U	22	24	0.5 U	0.5 U	0.5 U	0.55
	03/05/2018	0.5 U	20 J[1]	84	0.5 U	0.5 U	0.5 U	1.7
	06/05/2018	0.5 U	29	42	0.5 U	0.5 U	0.5 U	1.2
	09/14/2018	0.5 U	27	29	0.5 U	0.5 U	0.5 U	0.87
	12/04/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
IMW-17	06/10/2009	2.5 U	786	1,450	6.0	5.9	-	74
	08/06/2009	5 U	3,670	1,870	9.1	7.4	-	39
	09/15/2009	10 U	4,850	1,270	10 U	10 U	-	20
	03/26/2010	25 U	16,800	5,370	29	22 J	-	93
	03/23/2011	50 U	41,800	15,600	60	55	-	244
	03/20/2013	1 U	620	620	2.4	2.1	-	1.3
	06/03/2013	5 U	35	900	5.6	5.0 U	-	7.8
	07/01/2013	5 U	20	1,500	7.9	5.0 U	-	5.6
	03/17/2014	25 U	25 U	130	25 U	25 U	-	18 J
	06/03/2014	25 U	24 J	650	25 U	25 U	-	64
	03/10/2015	25 U	57	240	25 U	25 U	-	25 U
	03/03/2016	0.5 U	17	46	0.65	0.5 U	0.5 U	2.3
	03/07/2017	0.5 U	197	62	0.82	0.5 U	0.5 U	1.0
	03/06/2018	0.5 U	223 J[1]	197	1.6	0.5 U	0.5 U	0.85
DMW-23	06/10/2009	500 U	202,000	1,640	500 U	500 U	-	500 U
	08/06/2009	100 U	46,300	1,140	100 U	100 U	-	100 U
	09/15/2009	100 U	49,500	1,390	100 U	100 U	-	100 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-23 (cont'd)	03/26/2010	100 U	45,400	1,120	100 U	100 U	-	100 U
	03/22/2011	50 U	37,900	1,080	50 U	50 U	-	50 U
	02/27/2012	50 U	36,400	723	50 U	50 U	-	50 U
	07/12/2012	50 U	21,800	351	50 U	50 U	-	50 U
	03/19/2013	250 U	43,000	670	250 U	250 U	-	250 U
	06/03/2013	250 U	21,000	250 U	250 U	250 U	-	250 U
	07/01/2013	250 U	19,000	500	200 U	200 U	-	200 U
	09/04/2013	200 U	15,000	490	200 U	200 U	-	200 U
	12/11/2013	20 U	16,000	380	20 U	20 U	-	20 U
	03/18/2014	50 UJ[1]	11,000 J[1]	360	50 U	50 U	-	50 U
	06/03/2014	500 U	8,200	250 J	500 U	500 U	-	500 U
	09/23/2014	500 U	13,000	360 J	500 U	500 U	-	500 UJ[1]
	12/03/2014	200 U	13,000	390	200 U	200 U	-	200 U
	03/09/2015	200 U	12,000	340	200 U	200 U	-	200 U
	06/11/2015	200 U	12,000	280	200 U	200 U	-	200 U
	09/02/2015	200 U	15,600	436	200 U	200 U	-	200 U
	12/15/2015	0.5 U	12,500	67	0.73	0.50 U	-	0.5 U
	03/07/2016	1.7	12,000	662	5.1	1.4	0.5 U	0.98
	06/15/2016	50 U	14,900	359	50 U	50 U	50 U	50 U
	09/14/2016	3.8 J[1]	18,900 J[1]	457 J[1]	3.8 J[1]	2.5 UJ[1]	2.5 UJ[1]	2.5 UJ[1]
	12/05/2016	3.1	14,000	332	1.8	1.5	0.5 U	1.5
	03/08/2017	100 U	21,100	330	100 U	100 U	100 U	100 U
	06/08/2017	4.1	15,700	337	7.9	1.6	0.5 U	1.3
	09/18/2017	100 U	14,400	531	100 U	100 U	100 U	100 U
	12/11/2017	5 U	12,600	432	5 U	5 U	5 U	5 U
	03/07/2018	2.6	9,120 J[1]	447	2.6	1.6	0.5 U	1.6
	06/06/2018	2.4	8,540	379	2.3	1.6	0.5 U	1.2
	09/10/2018	2.8	14,500	563	15	1.4	0.5 U	1.2
	12/04/2018	3.5	15,700	563	11	1.6	0.5 U	1.4
DMW-24	06/03/2009	2.4	3,970	180	1.2	0.5 U	-	0.61
	08/06/2009	1.3 J	2,050	130	5 U	5 U	-	5 U
	09/15/2009	5 U	2,000	108	5 U	5 U	-	5 U
	03/25/2010	1.6 J	3,140	330	1.6 J	0.85 J	-	3.6 J
	03/23/2011	2.4 J	3,270	161	1.3 J	5 U	-	5 U
	02/27/2012	1.3 J	1,720	137	2.5 U	2.5 U	-	2.5 U
	07/12/2012	5 U	1,800	141	5 U	5 U	-	5 U
	03/19/2013	5 U	1,400	110	5 U	5 U	-	5 U
	04/15/2013	10 U	1,600	100	10 U	10 U	-	10 U
	06/03/2013	10 U	1,800	570	10 U	10 U	-	10 U
	07/02/2013	10 U	2,000	550	10 U	10 U	-	10 U
	07/31/2013	25 U	2,900	500	25 U	25 U	-	25 U
	09/05/2013	2.5 J	3,300	520	2.9 J	5 U	-	3.1 J

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Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-24 (cont'd)	12/10/2013	1.8 J	2,900	290	2.4	0.98 J	-	1.4 J
	03/17/2014	50 U	1,400	410	50 U	50 U	-	50 U
	06/04/2014	50 U	2,400	320	50 U	50 U	-	50 U
	09/23/2014	50 U	900	200	50 U	50 U	-	50 UJ[1]
	12/03/2014	20 U	820	230	20 U	20 U	-	20 U
	03/11/2015	20 U	890	200	20 U	20 U	-	20 U
	06/11/2015	20 U	680	160	20 U	20 U	-	20 U
	09/01/2015	20 U	923	230	20 U	20 U	-	20 U
	12/14/2015	0.5 U	619	141	0.80	0.58	-	1.1
	03/07/2016	2.5 U	705	298	2.5 U	2.5 U	2.5 U	5.2
	06/15/2016	2.5 U	836	166	2.5 U	2.5 U	2.5 U	2.5 U
	09/14/2016	0.56	807	195	1.1	0.67	0.5 U	1.2
	12/05/2016	0.5 U	772	188	1.1	0.71	0.5 U	1.2
	03/09/2017	5 U	711	202	5 U	5 U	5 U	5 U
	06/08/2017	0.5 U	720	155	1.3	0.88	0.5 U	0.66
	09/18/2017	5 U	783	150	5 U	5 U	5 U	5 U
	12/11/2017	0.5 U	794	145	0.86	0.72	0.5 U	0.5 U
	03/06/2018	0.5 U	498 J[1]	172	1.0	0.80	0.5 U	0.78
	06/06/2018	0.5 U	746	172	1.0	0.81	0.5 U	0.52
	09/10/2018	0.5 U	982	152	1.0	0.80	0.5 U	0.5 U
	12/04/2018	0.5 U	800	142	0.94	0.74	0.5 U	0.5 U
IMW-24	06/03/2008	50 U	25,800	3,320	50 U	50 U	-	63
	08/06/2009	5 U	2,040	629	3.6 J	1.9 J	-	8.8
	09/15/2009	10 U	4,500	728	10 U	10 U	-	10 U
	03/25/2010	25 U	10,100	2,310	12 J	7.2 J	-	32
	03/23/2011	50 U	36,900	5,720	22 J	15 J	-	86
	03/20/2013	1 U	1,400	560	2.7	0.76 J	-	2.3
	04/15/2013	10 U	3,600	620	10 U	10 U	-	2.7
	06/03/2013	25 U	12 J	1,900	11 J	20 U	-	20 U
	07/02/2013	25 U	1,600	2,100	12 J	25 U	-	25 U
	07/31/2013	1 U	1,300	2,300	12	3.3	-	85
	09/04/2013	25 U	120	480	25 U	25 U	-	82
	12/10/2013	1 U	4.2	140	1.7	0.49 J	-	42
	03/17/2014	1 U	300	260	1.2	0.66 J	-	28
	06/04/2014	10 U	900	480	10 U	10 U	-	42
	03/10/2015	10 U	1,600	350	10 U	10 U	-	20
	03/03/2016	5 U	1,820	81	5 U	5 U	5 U	5 U
	03/09/2017	10 U	1,810	130	10 U	10 U	10 U	10 U
	03/06/2018	0.5 U	1,390 J[1]	44	0.5 U	0.5 U	0.5 U	0.5 U
DMW-25	06/05/2009	500 U	81,000	685	500 U	500 U	-	500 U
	08/06/2009	5 U	2,600	351	1.9 J	5 U	-	5 U

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H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-25 (cont'd)	09/15/2009	10 U	7,700	415	10 U	10 U	-	10 U
	03/26/2010	10 U	4,690	151	10 U	10 U	-	3.9 J
	03/22/2011	10 U	6,920	117	10 U	10 U	-	10 U
	02/27/2012	25 U	8,770	202	25 U	25 U	-	25 U
	07/13/2012	10 U	3,860	297	10 U	10 U	-	10 U
	03/20/2013	1 U	540	51	1 U	1 U	-	1 U
	04/15/2013	5 U	1,100	70	5 U	5 U	-	5 U
	06/03/2013	10 U	260	380	10 U	10 U	-	10 U
	07/01/2013	2 U	990	1400	11	1.7 J	-	2.9
	07/31/2013	25 U	2,600	1,400	25 U	25 U	-	20 J
	09/04/2013	25 U	4,600	860	25 U	25 U	-	46
	12/18/2013	50 U	2,800	330	50 U	50 U	-	19 J
	03/17/2014	50 U	4,100	240	50 U	50 U	-	50 U
	06/03/2014	50 U	3,500	220	50 U	50 U	-	50 U
	09/22/2014	5 U	230	130	5 U	5 U	-	12
	12/02/2014	5 U	1,100	220 J[1]	2.1 J[1]	2.0 J[1]	-	2.0 J[1]
	03/10/2015	5 U	360	66	5 U	5 U	-	5 U
	06/10/2015	5 U	370	68	5 U	5 U	-	5 U
	09/01/2015	5 U	646	138	5 U	5 U	-	5 U
	12/15/2015	0.5 U	108	22	0.5 U	0.5 U	-	0.5 U
	03/03/2016	0.5 U	1,480	275	2.1	2.1	0.5 U	2.3
	06/13/2016	0.5 U	948 J[1]	101	0.61	0.5 U	0.5 U	0.57
	09/07/2016	2.5 U	1,470	210	2.5 U	2.5 U	2.5 U	2.5 U
	12/05/2016	0.5 U	1,040	125	0.73	0.71	0.5 U	1.0
	03/08/2017	10 U	933	72	10 U	10 U	10 U	10 U
	06/09/2017	0.5 U	1,280	119	0.74	0.70	0.5 U	0.53
	09/18/2017	10 U	2,030	160	10 U	10 U	10 U	10 U
	12/05/2017	5 U	1,570	167	5 U	5 U	5 U	5 U
	03/06/2018	0.5 U	800 J[1]	123	0.68	0.78	0.5 U	1.4
	06/06/2018	5 U	1,170	117	5 U	5 U	5 U	5 U
Duplicate (MW-99)	06/06/2018	0.5 U	1,360	129	0.70	0.63	0.5 U	0.52
	09/17/2018	0.5 U	1,630	214	1.3	1.1	0.5 U	0.66
	12/04/2018	0.5 U	184	39	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-99)	12/04/2018	0.5 U	182	40	0.5 U	0.5 U	0.5 U	0.5 U
IMW-25	06/05/2009	500 U	6,670	500 U	500 U	500 U	-	500 U
	08/06/2009	25 U	16,500	275	25 U	25 U	-	25 U
	09/15/2009	50 U	45,800	1,300	50 U	50 U	-	50 U
	03/26/2010	0.5 U	386	6.2	0.5 U	0.5 U	-	0.5 U
	03/23/2011	5 U	1,900	59	5 U	5 U	-	5 U
	03/20/2013	1 U	23	0.95 J	1 U	1 U	-	1 U
	04/15/2013	1 U	310	2.40	1 U	1 U	-	1 U
	07/02/2013	5 U	8,500	1,700	6.3	2.1 J	-	3.1 J
	03/18/2014	1 U	130	11	1 U	1 U	-	1 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
IMW-25 (cont'd)	03/10/2015	1 U	3,900	200	1.2	1 U	-	0.86 J
	03/03/2016	0.5 U	1,770	33	0.5 U	0.5 U	0.5 U	0.5 U
	03/08/2017	0.5 U	85	3.8	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	447 J[1]	15	0.5 U	0.5 U	0.5 U	0.5 U
DMW-26	01/07/2015	0.56 J	360	26	1 U	1 U	-	1 U
	03/11/2015	0.61 J	53	6.8	1 U	1 U	-	1 U
	06/11/2015	1 U	100	16	1 U	1 U	-	1 U
	09/02/2015	1 U	38	24	1 U	1 U	-	1 U
	12/14/2015	0.5 U	25	4.4	0.5 U	0.5 U	-	0.5 U
	03/02/2016	0.52	722	118	0.58	0.5 U	0.5 U	0.5 U
	06/13/2016	0.5 U	60	7.9	0.5 U	0.5 U	0.5 U	0.5 U
	09/07/2016	0.60	112	11	0.5 U	0.5 U	0.5 U	0.5 U
	12/05/2016	0.63	49	5.6	0.5 U	0.5 U	0.5 U	0.5 U
	03/08/2017	0.64	55	6.4	0.5 U	0.5 U	0.5 U	0.5 U
	06/09/2017	0.62	55	7.4	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.71	57	6.8	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-99)	09/14/2017	0.66	57	6.9	0.5 U	0.5 U	0.5 U	0.5 U
	12/05/2017	0.71	50	7.0	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	16	3.8	0.5 U	0.5 U	0.5 U	0.5 U
	06/05/2018	0.5 U	24	3.8	0.5 U	0.5 U	0.5 U	0.5 U
	09/17/2018	0.66	48	5.4	0.5 U	0.5 U	0.5 U	0.5 U
	12/04/2018	0.5 U	61	18	0.5 U	0.5 U	0.5 U	0.78
IMW-26	06/10/2009	50 U	128,000	24,600	45 J	26 J	-	31 J
	08/06/2009	100 U	41,400	6,300	100 U	100 U	-	100 U
	09/15/2009	100 U	91,900	8,370	100 U	100 U	-	100 U
	03/26/2010	50 U	32,400	10,000	87	50 U	-	50 U
	03/23/2011	50 U	55,300	16,000	23 J	16 J	-	48 J
	03/20/2013	1 U	430	74	0.53 J	1 U	-	1 U
	03/18/2014	1 UJ[1]	64 J[1]	19	1 U	1 U	-	1 U
	03/11/2015	1 U	280	47	1 U	1 U	-	1 U
	03/02/2016	5 U	314	30	5 U	5 U	5 U	5 U
	03/08/2017	0.5 U	184	23	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	68 J[1]	19	0.5 U	0.5 U	0.5 U	0.5 U
DMW-27	03/20/2013	1 U	5.8	7.4	1 U	1 U	-	1 U
	04/15/2013	1 U	5.2	7.0	1 U	1 U	-	1 U
	03/18/2014	1 UJ[1]	32 J[1]	77	1 U	1 U	-	3.1
	06/04/2014	1 U	0.59 J	21	1 U	1 U	-	18
	09/23/2014	1 U	3.8	12	1 U	1 U	-	6.2
	12/02/2014	1 U	1 U	16 J[1]	1 U	1 U	-	10 J[1]
	03/12/2015	1 U	30	41	1 U	1 U	-	10
	06/11/2015	1 U	2.1	24	1 U	1 U	-	6.8

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-27 (cont'd)	09/01/2015	1 U	1.1	19	1 U	1 U	-	3.5
	12/15/2015	0.5 U	0.51	1.1	0.5 U	0.5 U	-	0.5 U
	03/02/2016	0.5 U	39	24	0.5 U	0.5 U	0.5 U	13
	06/13/2016	0.5 U	0.71	32	0.5 U	0.5 U	0.5 U	3.1
	09/06/2016	0.5 U	0.99	65	0.5 U	0.5 U	0.5 U	7.6
	12/05/2016	0.5 U	0.80	34	0.5 U	0.5 U	0.5 U	3.9
	03/07/2017	0.5 U	1.2	61	0.5 U	0.5 U	0.5 U	6.5
Duplicate (DMW-99)	03/07/2017	0.5 U	0.99	60	0.5 U	0.5 U	0.5 U	6.3
	06/08/2017	0.5 U	1.2	21	0.5 U	0.5 U	0.5 U	1.9
	09/14/2017	0.5 U	0.85	25	0.5 U	0.5 U	0.5 U	3.5
	12/05/2017	0.5 U	2.4	27	0.5 U	0.5 U	0.5 U	2.4
	03/05/2018	0.5 U	0.66 J[1]	24	0.5 U	0.5 U	0.5 U	3.0
	06/05/2018	0.5 U	0.52	7.2	0.5 U	0.5 U	0.5 U	1.4
	09/14/2018	0.5 U	0.87	9.7	0.5 U	0.5 U	0.5 U	3.0
	12/04/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
IMW-27	03/20/2013	1 U	16	13	1 U	1 U	-	1 U
	04/15/2013	1 U	16	12	1 U	1 U	-	1 U
	03/18/2014	1 U	4.7	78	1 U	1 U	-	30
	06/04/2014	1 U	1 U	0.65 J	1 U	1 U	-	1 U
	03/12/2015	1 U	160	22	1 U	1 U	-	0.82 J
	03/02/2016	0.5 U	28	7.1	0.5 U	0.5 U	0.5 U	0.5 U
	06/13/2016	0.5 U	39	32	0.5 U	0.5 U	0.5 U	13
	03/07/2017	0.5 U	2.7	7.6	0.5 U	0.5 U	0.5 U	0.5 U
	03/05/2018	0.5 U	0.5 UJ[1]	1.3	0.5 U	0.5 U	0.5 U	0.5 U
DMW-28	03/20/2013	0.87 J	700	12	1 U	1 U	-	1 U
	06/04/2013	5.0 U	1,500	18 U	5 U	5 U	-	5 U
	07/02/2013	10.0 U	1,100	15	10 U	10 U	-	10 U
	09/05/2013	0.86 J	1,100	15	1 U	1 U	-	0.54 J
	12/11/2013	0.82 J	500	14	1 U	1 U	-	0.31 J
	03/19/2014	0.76 J[1]	1,600 J[1]	14	1 U	1 U	-	1 U
	06/04/2014	50 U	1,400	50 U	50 U	50 U	-	50 U
	09/24/2014	5 U	190	73	5 U	5 U	-	5 U
	12/01/2014	5 U	1,200	43 J[1]	5 U	5 U	-	5 U
	03/11/2015	50 U	1,600	62	50 U	50 U	-	50 U
Duplicate (DMW-99)	03/11/2015	0.93 J	1,500	35	1 U	1 U	-	1 U
	06/11/2015	50 U	1,200	20 J	50 U	50 U	-	50 U
	09/02/2015	50 U	1,260	16 J	50 U	50 U	-	50 U
	12/15/2015	0.81	931	6.0	0.5 U	0.5 U	-	0.5 U
	03/03/2016	1.2	1,770	120	0.64	0.5 U	0.5 U	0.5 U
	06/13/2016	0.89	925 J[1]	140	0.62	0.5 U	0.5 U	0.5 U
	09/07/2016	2.5 U	1,370	125	2.5 U	2.5 U	2.5 U	2.5 U
	12/06/2016	1.3	1,140	155	1.2	0.76	0.5 U	0.5 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-28 (cont'd)	03/07/2017	10 U	731	118	10 U	10 U	10 U	10 U
	06/09/2017	0.5 U	383	75	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.61	614	157	0.80	0.5 U	0.5 U	0.5 U
	12/05/2017	0.51	664	109	0.54	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	328 J[1]	75	0.69	0.5 U	0.5 U	0.5 U
	06/06/2018	0.5 U	745	134	0.76	0.55	0.5 U	0.5 U
	09/17/2018	0.54	889	176	1.1	0.5 U	0.5 U	0.5 U
IMW-28	03/20/2013	0.50 J	4,200	1,500	9.3	0.58 J	-	4.2
	07/02/2013	25 U	5,100	1,800	25 U	25 U	-	25 U
	12/11/2013	5 U	2,200	1,700	7.2	2.1 J		11
	03/19/2014	10 UJ[1]	5,500 J[1]	1,300	5.6 J	10 U	-	3.5 J
	03/11/2015	100 U	8,800	1,400	100 U	100 U	-	100 U
	03/03/2016	50 U	8,830	3,050	50 U	50 U	50 U	50 U
Duplicate (DMW-98)	03/03/2016	1.3	7,050	2,470	10	0.62	0.5 U	0.71
	03/06/2017	50 U	6,610	1,280	50 U	50 U	50 U	50 U
	03/07/2018	0.62	4,830 J[1]	390	2.0	0.5 U	0.5 U	0.5 U
DMW-29	03/19/2013	1 U	28	3.0	1 U	1 U	-	1 U
	04/15/2013	1 U	29	14	1 U	1 U	-	1 U
	05/09/2013	1 U	760	120	1.4	1 U	-	1 U
	06/03/2013	0.38	1,300	1.0 U	1.8	1.0 U	-	1.0 U
	07/02/2013	10 U	1,000	140	10 U	10 U	-	10 U
	07/31/2013	10 U	1,200	190	10 U	10 U	-	10 U
	09/04/2013	10 U	1,400	220	10 U	10 U	-	4.2 J
	12/11/2013	1 U	400	85	0.90 J	1 U	-	0.42 J
	03/19/2014	0.45 J[1]	1,500 J[1]	160	1.2	1 U	-	0.65 J
Duplicate (DMW-99)	03/19/2014	0.44 J[1]	1,600 J[1]	180	1.2	1 U	-	0.73 J
	06/03/2014	50 U	800	140	50 U	50 U	-	50 U
	09/23/2014	5 U	390	95	5 U	5 U	-	5 U
Duplicate (DMW-98)	09/23/2014	1 U	180	74	0.66 J	1 U	-	0.40 J[1]
	12/01/2014	5 U	310	75 J[1]	5 U	5 U	-	5 U
	03/09/2015	5 U	630	75	5 U	5 U	-	5 U
	06/11/2015	5 U	160	52	3.6 J	5 U	-	5 U
	09/02/2015	5 U	207	56	5 U	5 U	-	5 U
	12/14/2015	0.5 U	69	22	0.58	0.5 U	-	0.5 U
	03/07/2016	0.5 U	870	67	0.5 U	0.5 U	0.5 U	0.5 U
	06/15/2016	2.5 U	803	74	2.5 U	2.5 U	2.5 U	2.5 U
Duplicate (DMW-99)	06/15/2016	0.5 U	739	69	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2016	0.5 U	179	61	0.51	0.5 U	0.5 U	0.5 U
	12/05/2016	0.5 U	30	3.5	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2017	0.5 U	876	88	0.86	0.5 U	0.5 U	0.5 U
	06/08/2017	0.5 U	806	92	4.8	0.5 U	0.5 U	0.5 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-29 (cont'd)	09/18/2017	0.5 U	173	54	0.5 U	0.5 U	0.5 U	0.5 U
	12/11/2017	0.5 U	396	93	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-99)	12/11/2017	0.5 U	352	86	0.53	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	672 J[1]	90	0.52	0.5 U	0.5 U	0.5 U
	06/06/2018	0.5 U	465	91	0.94	0.5 U	0.5 U	0.5 U
	09/10/2018	0.5 U	884	142	3.6	0.5 U	0.5 U	0.5 U
	12/04/2018	0.5 U	64	31	0.5 U	0.5 U	0.5 U	0.5 U
IMW-29	03/19/2013	50 U	9,400	420	50 U	50 U	-	50 U
	06/04/2013	50 U	8,000	640	50 U	50 U	-	50 U
	07/02/2013	50 U	6,700	560	50 U	50 U	-	50 U
	03/19/2014	20 UJ[1]	5,800 J[1]	270	20 U	20 U	-	20 U
	03/11/2015	100 U	1,600	75 J	100 U	100 U	-	100 U
	03/03/2016	2.3	19,100	152	1.3	0.5 U	0.5 U	0.62
	03/06/2017	10 U	2,660	109	10 U	10 U	10 U	10 U
	03/07/2018	1.1 J[1]	2,850	50	0.66	0.5 U	0.5 U	0.5 U
DMW-30	12/14/2015	0.5 U	61	3.7	0.5 U	0.5 U	-	0.5 U
	03/03/2016	0.5 U	835	179	0.79	0.51	0.5 U	0.5 U
	06/13/2016	0.5 U	92 J[1]	21	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2016	0.5 U	153	8.7	0.5 U	0.5 U	0.5 U	0.5 U
	12/06/2016	0.5 U	111	7.4	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2017	0.5 U	200	25	0.5 U	0.5 U	0.5 U	0.5 U
	06/08/2017	0.5 U	386	91	0.63	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	90	50	0.5 U	0.5 U	0.5 U	0.5 U
	12/05/2017	0.5 U	76	28	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	841	172	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-98)	03/07/2018	0.5 U	834	180	0.5 U	0.5 U	0.5 U	0.5 U
	06/05/2018	0.5 U	171	76	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2018	0.5 U	95	79	0.5 U	0.5 U	0.5 U	0.5 U
	12/04/2018	0.5 U	50	67	0.5 U	0.5 U	0.5 U	0.5 U
IMW-30	03/20/2013	1 U	38	100	1 U	1 U	-	2.0
	03/19/2014	1 UJ[1]	300 J[1]	490	1.7	0.45 J	-	5.0
	03/11/2015	1 U	15	50	1 U	1 U	-	2.0
	03/03/2016	0.5 U	192	79	0.5 U	0.5 U	0.5 U	0.54
	03/06/2017	2.5 U	291	108	2.5 U	2.5 U	2.5 U	2.5 U
	03/07/2018	0.5 U	1,140 J[1]	227	1.2	0.5 U	0.5 U	0.85
IMW-31	03/19/2013	1 U	33	9.8	1 U	1 U	-	1 U
	03/19/2014	0.40 UJ[1]	2,000 J[1]	85	0.48 J	1 U	-	1 U
	03/11/2015	1 U	59	36	1 U	1 U	-	1.4
	03/03/2016	0.57	4,270	50	0.5 U	0.5 U	0.5 U	0.5 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
IMW-31 (cont'd)	03/06/2017	25 U	6,320	212	25 U	25 U	25 U	25 U
	03/07/2018	0.5 U	1,450	87	0.91	0.5 U	0.5 U	0.5 U
DMW-32	01/19/2015	0.47 J	370	0.39 J	1 U	1 U	-	1 U
	03/12/2015	1 U	66	16	1 U	1 U	-	1 U
	06/10/2015	1 U	39	1 U	1 U	1 U	-	1 U
	09/03/2015	1 U	215	0.42 J	1 U	1 U	-	1 U
	12/16/2015	0.5 U	366	4.0	0.5 U	0.5 U	-	0.5 U
	03/03/2016	0.5 U	70 J[1]	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	06/15/2016	0.5 U	33	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2016	0.5 U	174	7.1	0.5 U	0.5 U	0.5 U	0.5 U
	12/06/2016	0.5 U	187	17	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2017	0.5 U	115	13	0.5 U	0.5 U	0.5 U	0.5 U
	06/08/2017	0.5 U	80	20	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	148	37	0.5 U	0.5 U	0.5 U	0.5 U
	12/05/2017	0.5 U	116	28	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	89	39	0.5 U	0.5 U	0.5 U	0.64
	06/05/2018	0.5 U	79	24	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	148	45	0.5 U	0.5 U	0.5 U	0.5 U
	12/04/2018	0.5 U	197	51	0.5 U	0.5 U	0.5 U	0.5 U
IMW-32	12/14/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/03/2016	0.5 U	8.4 J[1]	1.9	0.5 U	0.5 U	0.5 U	0.5 U
	06/15/2016	0.5 U	0.53	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	12/06/2016	0.5 U	7.8	0.63	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2017	0.5 U	0.99	0.57	0.5 U	0.5 U	0.5 U	0.5 U
	06/08/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	12/05/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	3.0	0.51	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DMW-36	01/08/2015	1 U	87	10	1 U	1 U	-	1 U
	03/13/2015	1 U	5.8	7.3	1 U	1 U	-	1 U
	06/11/2015	1 U	5.8	13	1 U	1 U	-	1 U
	09/03/2015	1 U	3.5	15	1 U	1 U	-	1 U
	12/16/2015	0.5 U	4.5	7.0	0.5 U	0.5 U	-	0.5 U
	03/03/2016	0.5 U	14 J[1]	5.0	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2016	0.5 U	4.9	2.7	0.5 U	0.5 U	0.5 U	0.5 U
	03/09/2017	0.5 U	2.0	1.8	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2017	0.5 U	2.6	5.1	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	4.2	4.4	0.5 U	0.5 U	0.5 U	0.5 U

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-35 (cont'd)	09/14/2018	0.5 U	1.8	8.3	0.5 U	0.5 U	0.5 U	0.5 U
DMW-40	12/14/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/03/2016	0.5 U	0.74 J[1]	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	06/13/2016	0.5 U	0.5 U	1.7	0.5 U	0.5 U	0.5 U	0.5 U
	09/07/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	12/06/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	0.55	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
IMW-40	12/14/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/03/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	06/13/2016	0.5 U	0.88 J[1]	0.61	0.5 U	0.5 U	0.5 U	0.5 U
	09/07/2016	0.5 U	0.54	1.3	0.5 U	0.5 U	0.5 U	0.5 U
	12/06/2016	0.5 U	0.92	1.5	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2017	0.5 U	0.81	1.7	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.88	2.6	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	0.79	1.7	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	1.5	1.9	0.5 U	0.5 U	0.5 U	0.5 U
DMW-41	12/16/2015	0.5 U	1,650	261	1.3	0.95	-	0.5 U
Duplicate (MW-99)	12/16/2015	2.5 U	1,190	254	2.5 U	2.5 U	-	2.5 U
	03/03/2016	2.5 U	2.5 U	2,190	9.5	3.2	2.5 U	2.5 U
	06/15/2016	10 U	106	36,800	134	44	10 U	46
	09/14/2016	0.5 U	1,510	99	0.5 U	0.5 U	0.5 U	0.5 U
	12/07/2016	0.5 U	1,760	153	0.69	0.61	0.5 U	0.5 U
Duplicate (MW-99)	12/07/2016	0.5 U	1,840	153	0.70	0.61	0.5 U	0.5 U
	03/09/2017	10 U	1,880	129	10 U	10 U	10 U	10 U
	09/19/2017	10 U	1,360	115	10 U	10 U	10 U	10 U
	03/13/2018	10 U	1,750	148	10 U	10 U	10 U	10 U
Duplicate (MW-97)	03/13/2018	0.5 U	1,540	135	0.73	0.5 U	0.5 U	0.64
	09/14/2018	0.5 U	1,890	315	1.6	0.97	0.5 U	2.7

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DEQ Screening Level Criteria for Water								
Ingestion and Inhalation of Tap Water (Residential)[a]		12	0.49	36	360	280	2.8	0.027
Volitilization to Outdoor Air (Residential)[b]		64,000	3,300	>S	>S	570,000	16,000	350
Volitilization to Outdoor Air (Occupational)[c]		>S	20,000	>S	>S	2,400,000	68,000	5,900
Vapor Intrusion (Residential)[d]		3,700	200	>S	>S	29,000	1,100	17
Vapor Intrusion (Occupational)[e]		48,000	3,700	>S	>S	360,000	14,000	880
GW in Excavation[f]		5,600	430	18,000	180,000	44,000	10,000	960
Portland Harbor JSCS Levels								
Upland Source Control Screening Level[g]		0.33	3.0	NA	1,000	NA	NA	0.24
2004 AWQC (Human Health - Organism Only)[h]		3.3	30	NA	10,000	NA	NA	2.4
2004 AWQC (Ecological Receptors - Chronic)[i]		840	21,900	NA	NA	NA	NA	NA
Oak Ridge Tier II (Ecological Receptors)[j]		98	47	590	590	25	-	930 [k]

Table 3
Source Zone Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Notes:

[a] Risk-based concentration (RBC) for ingestion/inhalation in a residential setting (revised May 2018)

[b] RBC for volatilization to outdoor air in a residential setting (revised May 2018)

[c] RBC for volatilization to outdoor air in an occupational setting (revised May 2018)

[d] RBC for vapor intrusion into buildings in a residential setting (revised May 2018)

[e] RBC for vapor intrusion into buildings in an occupational setting (revised May 2018)

[f] RBC for groundwater in excavation by a construction worker (revised May 2018)

[g] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Values listed are based on human health via fish ingestion

[h] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria for Organisms Only (DEQ 2004)

[i] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria - Ecologic Receptors - Chronic (DEQ 2004)

[j] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per Oak Ridge National Laboratory's Water Quality Criteria - Ecological Receptors - Tier II SCV

[k] Ecological screening value adopted by EPA in Regions 3,5 and 6.

ug/L = Micrograms per liter

C = results of coelution

E = value reported exceeds linear calibration range; estimated concentration.

U = not detected at the associated reporting limit

J = estimated trace concentration

J[1] = Data Validation Qualifier. The analyte was detected above the method reporting limit. Results should be considered an estimate. See corresponding data validation report for further explanation.

- = Analyte not analyzed for this parameter

NA = Not applicable

>S = This RBC exceeds the solubility limit

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
Hardboard Area Wells								
DMW-2	04/03/1986	-	47,000	-	-	-	-	-
	05/28/1986	-	223,000	-	-	-	-	-
	06/27/1986	1,000 U	260,000	-	6,700	1,000 U	1,000 U	4,200
	07/30/1986	-	129,000	-	-	-	-	-
	09/04/1986	-	358,000	-	-	-	-	-
	10/13/1986	-	335,000	-	-	-	-	-
	11/14/1986	-	87,000	-	-	-	-	-
	12/22/1986	23	290,000	-	26,000	78	26	1,014
	06/29/1987	10,000 U	100,000	-	17,000	5,000 U	5,000 U	10,000 U
	09/23/1987	2,000 U	58,000	-	9,000	1,000 U	1,000 U	2,000 U
	12/22/1987	33	450,000	-	23,000	97	15	1,500
	03/29/1988	1,000 U	460,000	-	1,000 U	1,000 U	1,000 U	1,000 U
	06/01/1988	1,000 U	440,000	76,000	1,000 U	1,000 U	1,000 U	2,000
	09/01/1988	2,000 U	630,000	50,000	2,000 U	2,000 U	2,000 U	2,000 U
	01/03/1989	100 U	710,000	-	41,000	100 U	100 U	3,500
	03/17/1989	700 U	360,000	8,700	700 U	700 U	700 U	2,000
	06/15/1989	4,000 U	860,000	20,000	4,000 U	4,000 U	4,000 U	4,000 U
	09/12/1989	1,000 U	480,000	12,000	1,000 U	1,000 U	1,000 U	1,000 U
	10/27/1989	56	580,000	-	-	130	50 U	3,300 E
	12/28/1989	1,000 U	520,000	-	1,000 U	1,000 U	1,000 U	1,100
	03/16/1990	1,000 U	660,000	16,000	1,000 U	1,000 U	1,000 U	1,000 U
	12/12/1990	3,600 U	400,000	-	-	3,600 U	3,600 U	7,100 U
	03/15/1991	10,000 U	290,000	10,000 U	10,000	10,000 U	10,000 U	10,000 U
	06/04/1991	10,000 U	210,000	10,000 U	10,000 U	10,000 U	10,000 U	10,000 U
	09/04/1991	5,000 U	190,000	-		5,000 U	5,000 U	10,000 U
	12/06/1991	5,000 U	140,000	8,000	5,000 U	5,000 U	5,000 U	5,000 U
	03/16/1992	1,000 U	83,000	5,000	1,000 U	1,000 U	1,000 U	1,000 U
	06/01/1992	-	71,000	-	-	-	-	-
	09/03/1992	5,000 U	44,000	-	-	5,000 U	5,000 U	10,000 U
	11/30/1992	-	53,300	-	-	-	-	-
	03/01/1993	-	28,000	-	-	-	-	-
	06/17/1993	500 U	20,000	5,500	500 U	500 U	500 U	500 U
	09/08/1993	4.0 J	17,000		33	15	5 U	81
	12/01/1993	-	10,200	-	-	-	-	-
	03/01/1994	-	18,000	-	-	-	-	-
	04/25/1994	200 U	12,000	6.9	310	200 U	200 U	200 U
	06/30/1994	2.0 J	8,500	-	-	8.0	5 U	72
	09/01/1994	-	11,000	-	-	-	-	-
	12/01/1994	-	10,000	-	-	-	-	-
	04/25/1995	-	8,000	-	-	-	-	-
	06/06/1995	2.0 J	3,800	-	-	7.0	5 U	97
	09/01/1995	-	5,300	-	-	-	-	-

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-2 (cont'd)	12/01/1995	-	1,600	-	-	-	-	-
	03/01/1996	-	1,600	-	-	-	-	-
	06/01/1996	-	2,000	-	-	-	-	-
	09/05/1996	1.0 J	3,400	-	-	5.0	5 U	110
	12/01/1996	-	500	-	-	-	-	-
	03/01/1997	-	1,050	-	-	-	-	-
	06/20/1997	200 U	2,800	1,900	200 U	200 U	200 U	200 U
	09/01/1997	-	600	-	-	-	-	-
	12/01/1997	-	1,270	-	-	-	-	-
	03/01/1998	-	1,480	-	-	-	-	-
	06/19/1998	1.0	1,710	818	10	2.0	1 U	186
	09/01/1998	-	2,810	-	-	-	-	-
	08/30/1999	50 U	2,000	730	50 U	50 U	50 U	91
	08/22/2000	1 U	810	-	1.8	1 U	1 U	72
	07/31/2001	-	1,630	-	-	-	-	-
	09/20/2001	-	1,930	-	-	-	-	-
	12/18/2001	-	820	-	-	-	-	-
	03/06/2002	-	155	-	-	-	-	-
	09/18/2002	-	2,700	-	-	-	-	-
	03/19/2003	-	1,680	-	-	-	-	-
	09/22/2003	-	1,790	-	-	-	-	-
	09/09/2004	-	1,460	-	-	-	-	-
	08/08/2006	-	2,350	-	-	-	-	-
	12/14/2006	0.59	2,690	516	3.1	3.1	0.5 U	18
	09/27/2007	-	1,290	-	-	-	-	-
	03/23/2009	0.27 J	735	183	0.89 J	1.2	-	12
	06/01/2009	1.1 U	717	163	1.1 U	1.1	-	8.1
	09/14/2009	2.5 U	1,150	152	2.5 U	2.5 U	-	2.5 U
	12/03/2009	0.26 J	569	135	0.57 J	1.0 J	-	15
	03/24/2010	0.50 J	1,650	183	0.96 J	1.3 J	-	8.9
	12/10/2010	1.1 U	564	154	1.1 U	1.2	-	20
	03/22/2011	0.21 J	501	108	0.50 J	1.1	-	11
	09/26/2011	1.1 U	587	46	1.1 U	1.1 U	-	4.3
	02/27/2012	1.1 U	449	155	0.63 J	0.93 J	-	10
	07/12/2012	0.5 U	78	75	0.5 U	0.72	-	3.5
	03/19/2013	1.0 U	320	160	0.58 J	1.3	-	9.2
	09/04/2013	5.0 U	400	120	5 U	5 U	-	9.6
	03/17/2014	5 U	340	120	5 U	5 U	-	12
	06/03/2014	5 U	300	120	5 U	5 U	-	8
	09/22/2014	5 U	230	130	5 U	5 U	-	12 J[1]
Duplicate (DMW-99)	09/22/2014	1 U	190	180	0.58 J	0.99 J	-	16
	12/16/2014	1 U	140	190	0.75 J	0.91 J	-	18
	03/09/2015	5 U	300	100	5 U	5 U	-	2.1 J

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-2 (cont'd)	09/02/2015	5 U	402	140	5 U	5 U	-	7.1
Duplicate (DMW-98)	09/02/2015	10 U	394	132	10 U	10 U	-	6.8 J
	03/07/2016	0.5 U	444	120	0.56	1.0	0.5 U	2.7
	09/14/2016	0.5 U	457	92	0.50	1.0	0.5 U	0.5 U
	09/14/2016	0.5 U	484	102	0.57	1.1	0.5 U	0.54
	03/08/2017	2.5 U	197	126	2.5 U	2.5 U	2.5 U	2.5 U
	09/18/2017	2.5 U	318	112	2.5 U	2.5 U	2.5 U	5.5
	03/07/2018	0.5 U	85 J[1]	221	0.5 U	0.85	0.5 U	1.7
	06/06/2018	0.5 U	273	129	0.62	1.6	0.5 U	5.2
	09/13/2018	0.5 U	118	429	2.3	2.4	0.5 U	5.8
	12/04/2018	0.5 U	303	126	0.77	1.3	0.5 U	6.3
MW-7	03/02/1987	100 U	160,000	-	13,000	100 U	100 U	2,000 C
	07/01/1987	20,000 U	140,000	-	18,000	10,000 U	10,000 U	20,000 U
	09/24/1987	10,000 U	100,000	-	10,000	5,000 U	5,000 U	10,000 U
	12/22/1987	700 U	200,000	-	700 U	700 U	700 U	700 U
	03/23/1988	1,000 U	248,000	-	1,000 U	1,000 U	1,000 U	1,000 U
	06/01/1988	500 U	170,000	17,000	500 U	500 U	500 U	500 U
	09/01/1988	400 U	92,000	8,000	400 U	400 U	400 U	400 U
	12/30/1988	100 U	200,000	-	100 U	100 U	100 U	1,000 C
	03/17/1989	1 U	104,000	3,000	1 U	1 U	1 U	400
	06/15/1989	1,000 U	280,000	8,000	1,000 U	1,000 U	1,000 U	1,000 U
	09/12/1989	500 U	80,000	5,500	500 U	500 U	500 U	500 U
	12/27/1989	100 U	130,000	-	100 U	100 U	100 U	220
	03/16/1990	1,000 U	180,000	6,000	1,000 U	1,000 U	1,000 U	1,000 U
	06/27/1990	2,000 U	200,000	8,000	2,000 U	2,000 U	2,000 U	2,000 U
	09/24/1990	4,000 U	150,000	6,000	4,000 U	4,000 U	4,000 U	4,000 U
	12/14/1990	2,000 U	150,000	6,000	2,000 U	2,000 U	2,000 U	2,000 U
	03/15/1991	4,000 U	100,000	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
	06/04/1991	1,000 U	27,000	1,000	1,000 U	1,000 U	1,000 U	1,000 U
	09/04/1991	25 U	1,800	190	25 U	25 U	25 U	25 U
	12/06/1991	100 U	2,000	200	100 U	100 U	100 U	100 U
	03/16/1992	10 U	200	150	10 U	10 U	10 U	10 U
	06/05/1992	10 U	150	40	10 U	10 U	10 U	10 U
	09/04/1992	1 U	99	36	1 U	1 U	1 U	2.0
	12/30/1992	1 U	60	-	1 U	1 U	1 U	4.0
	03/16/1993	5 U	93	-	5 U	5 U	5 U	5 U
	06/17/1993	2 U	100	73	2 U	2 U	2 U	2 U
	09/10/1993	1 U	39	-	1 U	1 U	1 U	1 U
	12/16/1993	1 U	20	-	1 U	1 U	1 U	1 U
	03/10/1994	1 U	20	-	1 U	1 U	1 U	1 U
	06/30/1994	1 U	11	21	1 U	1 U	1 U	1 U
	08/30/1994	1 U	54	-	1 U	1 U	1 U	1.3

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-7 (cont'd)	03/21/1995	1 U	66	32	1 U	1 U	1 U	1 U
	09/12/1995	1 U	12	-	1 U	1 U	1 U	1 U
	03/15/1996	1 U	7.3	3.0	1 U	1 U	1 U	1 U
	09/05/1996	1 U	4.1	2.4	1 U	1 U	1 U	1 U
	03/24/1997	1 U	23	5.1	1 U	1 U	1 U	1 U
	09/04/1997	1 U	4.0	1 U	1 U	1 U	1 U	1 U
	03/13/1998	1 U	4.2	1.6	1 U	1 U	1 U	1 U
	09/04/1998	1 U	4.1	1 U	1 U	1 U	1 U	1 U
	04/02/1999	1 U	16	2.0	1 U	1 U	1 U	1 U
	09/02/1999	1 U	1.0	1 U	1 U	1 U	1 U	1 U
	03/01/2000	1 U	3.0	2.0	1 U	1 U	1 U	1 U
	09/12/2000	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	03/07/2001	1 U	68	5.8	1 U	1 U	1 U	1.9
	09/20/2001	0.5 U	0.70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	12/19/2001	0.5 U	150	11	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2002	0.5 U	1.4	0.50	0.5 U	0.5 U	0.5 U	0.5 U
	06/13/2002	0.5 U	3.9	0.70	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2002	0.5 U	3.8	1.0	0.5 U	0.5 U	0.5 U	0.5 U
	03/19/2003	0.5 U	2.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/24/2003	0.5 U	5.0	0.90	0.5 U	0.5 U	0.5 U	0.5 U
	03/04/2004	0.5 U	4.8	2.0	0.5 U	0.5 U	0.5 U	0.5 U
	09/09/2004	0.5 U	4.1	0.90	0.5 U	0.5 U	0.5 U	0.5 U
	03/08/2005	0.5 U	2.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/07/2005	0.5 U	3.0	1.1	0.5 U	0.5 U	0.5 U	0.5 U
	03/08/2006	0.5 U	3.6	2.2	0.5 U	0.5 U	0.5 U	0.5 U
	08/08/2006	0.5 U	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	12/13/2006	0.5 U	312	24	0.5 U	0.5 U	0.5 U	0.5 U
	03/20/2007	0.5 U	4.3	1.2	0.5 U	0.5 U	0.5 U	0.5 U
	09/27/2007	0.5 U	8.4	1.5	0.5 U	0.5 U	0.5 U	0.5 U
	03/13/2008	0.5 U	2.2	2.6	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.5 U	2.4	3.4	0.5 U	0.5 U	-	0.5 U
	12/03/2009	0.5 U	8.8	1.2	0.5 U	0.5 U	-	0.5 U
	03/26/2010	0.5 U	1.1	0.31 J	0.5 U	0.5 U	-	0.5 U
	03/23/2011	0.5 U	1.8	1.4	0.5 U	0.5 U	-	0.5 U
	07/16/2012	0.5 U	0.54	1.7	0.5 U	0.5 U	-	0.5 U
	03/20/2013	1 U	0.86 J	1 U	1 U	1 U	-	1 U
Duplicate (MW-99)	03/20/2013	1 U	0.77 J	1 U	1 U	1 U	-	1 U
	09/05/2013	1 U	1.4	0.78 J	1 U	1 U	-	1 U
	03/17/2014	1 U	0.86 J	1 U	1 U	1 U	-	1 U
	09/23/2014	1 U	1 U	0.56 J	1 U	1 U	-	1 UJ[1]
	03/13/2015	1 U	0.60 J	1 U	1 U	1 U	-	1 U
	09/01/2015	1 U	6.3	3.2	1 UJ[1]	1 UJ[1]	-	1 U
	03/01/2016	0.5 U	0.64 J[1]	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-7 (cont'd)	09/13/2016	0.5 U	1.1	1.6	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2017	0.5 U	0.5 U	0.60	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/05/2018	0.5 U	0.86 J[1]	0.96	0.5 U	0.5 U	0.5 U	0.5 U
	09/12/2018	0.5 U	1.7	2.4	0.5 U	0.5 U	0.5 U	0.5 U
MW-8	02/19/1987	100 U	140,000	-	8,800	100 U	100 U	600 C
	03/02/1987	100 U	230,000	-	17,000	100 U	100 U	2,000 C
	06/30/1987	10,000 U	260,000	-	24,000	5,000 U	5,000 U	10,000 U
	09/24/1987	10,000 U	240,000	-	20,000	5,000 U	5,000 U	10,000 U
	12/22/1987	1,000 U	196,000	-	1,000 U	1,000 U	1,000 U	1,000 U
	03/23/1988	1,000 U	292,000	-	1,000 U	1,000 U	1,000 U	1,000 U
	06/01/1988	500 U	125,000	14,000	500 U	500 U	500 U	500 U
	09/01/1988	700 U	186,000	11,000	700 U	700 U	700 U	700 U
	12/30/1988	100 U	270,000		100 U	100 U	100 U	1,200 C
	03/17/1989	100 U	124,000	3,600	100 U	100 U	100 U	500
	06/15/1989	1,000 U	350,000	36,000	1,000 U	1,000 U	1,000 U	1,000
	09/12/1989	500 U	125,000	7,500	500	500 U	500 U	500 U
	12/27/1989	100 U	290,000	-	100 U	100 U	100 U	540
	03/16/1990	2,000 U	220,000	10,000	2,000 U	2,000 U	2,000 U	2,000 U
	06/27/1990	5,000 U	230,000	13,000	5,000 U	5,000 U	5,000 U	5,000 U
	09/24/1990	4,000 U	190,000	7,000	4,000 U	4,000 U	4,000 U	4,000 U
	12/14/1990	4,000 U	230,000	7,000	4,000 U	4,000 U	4,000 U	4,000 U
	03/15/1991	4,000 U	48,000	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
	06/04/1991	1,000 U	57,000	2,000	1,000 U	1,000 U	1,000 U	1,000 U
	09/04/1991	1,000 U	46,000	2,000	1,000 U	1,000 U	1,000 U	1,000 U
	12/06/1991	1,000 U	27,000	1,200	1,000 U	1,000 U	1,000 U	1,000 U
	03/16/1992	100 U	20,000	800	100 U	100 U	100 U	100 U
	06/05/1992	1,000 U	13,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
	09/04/1992	100 U	9,500	400	100 U	100 U	100 U	100 U
	12/30/1992	100 U	7,000	-	100 U	100 U	100 U	100 U
	03/16/1993	100 U	6,900	-	100 U	100 U	100 U	100 U
	06/17/1993	100 U	5,500	200	100 U	100 U	100 U	100 U
	09/10/1993	1 U	4,000	-	1 U	1 U	1 U	8.2
	12/16/1993	1 U	4,800	-	1 U	1 U	1 U	5.2
	03/10/1994	50 U	2,700	-	50 U	50 U	50 U	50 U
	06/29/1994	100 U	3,400	150	100 U	100 U	100 U	100 U
	08/30/1994	20 U	1,840	-	20 U	20 U	20 U	20 U
	12/22/1994	50 U	1,400	-	50 U	50 U	50 U	50 U
	03/21/1995	20 U	1,600	79	20 U	20 U	20 U	20 U
	06/06/1995	50 U	1,500	-	50 U	50 U	50 U	50 U
	09/12/1995	50 U	1,400	-	50 U	50 U	50 U	50 U
	12/20/1995	10 U	910	20	10 U	10 U	10 U	10 U

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-8 (cont'd)	03/15/1996	1 U	660	35	1 U	1 U	1 U	1 U
	06/21/1996	1 U	696	69	1 U	1 U	1 U	1 U
	09/05/1996	1 U	80	9.5	1 U	1 U	1 U	1 U
	03/24/1997	10 U	711	61	10 U	10 U	10 U	10 U
	09/04/1997	1 U	632	61	1 U	1 U	1 U	1 U
	03/13/1998	10 U	527	54	10 U	10 U	10 U	10 U
	09/04/1998	10 U	511	43	10 U	10 U	10 U	10 U
	04/02/1999	10 U	560	33	10 U	10 U	10 U	10 U
	09/02/1999	10 U	536	45	10 U	10 U	10 U	10 U
	03/01/2000	10 U	346	28	10 U	10 U	10 U	10 U
	06/27/2000	1 U	371	43	1.0 U	1 U	1 U	1 U
	09/12/2000	1 U	521	43	1.0 U	1 U	1 U	1
	03/07/2001	1 U	271	44	1.0 U	1.1	1 U	1.0
	09/20/2001	0.5 U	427	51	0.5 U	0.5 U	0.5 U	1.4
	03/05/2002	0.5 U	0.5 U	0.60	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2002	0.5 U	770	47	0.5 U	0.60	0.5 U	1.4
	03/19/2003	0.5 U	446	33	0.5 U	0.5 U	0.5 U	1.1
	09/24/2003	0.5 U	464	37	0.5 U	0.50	0.5 U	1.2
	03/04/2004	0.5 U	258	24	0.5 U	0.5 U	0.5 U	0.90
	09/09/2004	0.5 U	311	25	0.5 U	0.5 U	0.5 U	0.60
	03/09/2005	0.5 U	507	33	0.5 U	0.63	0.5 U	1.2
	09/07/2005	0.5 U	811	28	1.1 U	1.1 U	1.1 U	1.1 U
	03/08/2006	0.5 U	266	18	0.5 U	0.5 U	0.5 U	0.5 U
	08/08/2006	2.5 U	1,010	48	2.5 U	2.5 U	2.5 U	2.5 U
	12/13/2006	0.5 U	451	43	0.5 U	0.51	0.5 U	1.0
	03/20/2007	0.5 U	285	18	0.15 J	0.28 J	0.5 U	0.52
	09/27/2007	1.1 U	422	26	1.1 U	1.1 U	1.1 U	1.1 U
	03/13/2008	0.5 U	458	23	0.5 U	0.51	0.5 U	0.58
	03/23/2009	0.5 U	14.8	1.9	0.5 U	0.5 U	-	0.5 U
	09/14/2009	1.1 U	414	31	1.1 U	1.1 U	-	1.1 U
	12/03/2009	1.1 U	855	51	0.46 J	1.3	-	0.87 J
	03/26/2010	2.5 U	1,230	61	0.59 J	1.7 J	-	2.5 U
	03/26/2010	2.5 U	1,170	60	2.5 U	1.7 J	-	2.5 U
	06/08/2010	0.06 U	222	19	0.14 J	0.40 J	-	0.22 J
Duplicate (MW-98)	06/08/2010	0.06 U	215	19	0.15 J	0.42 J	-	0.24 J
	09/29/2010	0.5 UJ[1]	150 J[1]	11 UJ[1]	0.5 UJ[1]	0.15 J[1]	-	0.5 UJ[1]
Duplicate (MW-98)	09/29/2010	0.5 UJ[1]	51 J[1]	4.5 UJ[1]	0.10 J[1]	0.31 J[1]	-	0.5 UJ[1]
	03/23/2011	0.5 U	0.63	0.74	0.5 U	0.5 U	-	0.5 U
Duplicate (MW-98)	03/23/2011	0.5 U	1.7	0.78	0.5 U	0.5 U	-	0.5 U
	09/26/2011	0.5 U	720	39	0.5 U	0.98	-	0.5 U
Duplicate (MW-99)	09/26/2011	0.5 U	749	43	0.5 U	1.1	-	0.5 U
	07/16/2012	1.1 U	715	39	1.1 U	1.1 U	-	1.1 U
	03/20/2013	1.0 U	750	40	1.0 U	0.99 J	-	0.30 J

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-8 (cont'd)	09/05/2013	1 U	1.6	0.47 J	1 U	1 U		1 U
Duplicate (MW-98)	09/05/2013	1 U	1.9	0.51 J	1 U	1 U		1 U
	03/17/2014	1 U	0.59 J	0.44 J	1 U	1 U	-	1 U
Duplicate (MW-98)	03/17/2014	1 U	0.66 J	0.41 J	1 U	1 U	-	1 U
	09/23/2014	1 U	1 U	1 U	1 U	1 U	-	1 UJ[1]
	03/13/2015	1 U	0.93 J	0.54 J	1 U	1 U	-	1 U
	09/01/2015	1 U	594	38	0.77 J[1]	0.78 J[1]	-	0.38 J
(DMW-8)	03/02/2016	0.5 U	4.4 J[1]	0.74	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2016	0.5 U	1,010	55	0.51	1.6	0.5 U	0.5 U
	03/07/2017	0.5 U	1.7	3.1	0.5 U	0.5 U	0.5 U	0.5 U
	09/19/2017	0.5 U	539	35	0.5 U	0.98	0.5 U	0.5 U
	03/07/2018	0.5 U	748	42	0.5 U	0.5 U	0.5 U	0.5 U
	09/12/2018	0.5 U	420	29	0.5 U	0.92	0.5 U	0.5 U
Duplicate (MW-99)	09/12/2018	0.5 U	500	24	0.5 U	0.81	0.5 U	0.5 U
DMW-11	06/01/1988	250 U	85,000	2,400	250 U	250 U	250 U	250 U
	09/01/1988	400 U	68,000	1,100	400 U	400 U	400 U	400 U
	12/28/1988	100 U	88,000	-	1,600	100 U	100 U	100 U
	03/17/1989	200 U	71,000	300	200 U	200 U	200 U	200 U
	06/15/1989	1,000 U	180,000	1,000	1,000 U	1,000 U	1,000 U	1,000 U
	09/12/1989	250 U	55,000	750	250 U	250 U	250 U	250 U
	12/28/1989	100 U	91,000	-	100 U	100 U	100 U	100 U
	03/16/1990	1,000 U	93,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
	12/14/1990	200 U	53,000	500	200 U	200 U	200 U	200 U
	03/15/1991	1,000 U	55,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
	06/04/1991	1,000 U	46,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
	09/04/1991	1,000 U	43,000	1,000	1,000 U	1,000 U	1,000 U	1,000 U
	12/06/1991	1,000 U	29,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
	03/16/1992	100 U	21,000	600	100 U	100 U	100 U	100 U
	06/01/1992	-	22,000	-	-	-	-	-
	09/01/1992	-	14,000	-	-	-	-	-
	11/30/1992	-	16,000	-	-	-	-	-
	03/01/1993	-	9,000	-	-	-	-	-
	06/17/1993	100 U	8,000	400	100 U	100 U	100 U	100 U
	09/08/1993	1 U	7,500	-	1 U	1 U	1 U	9.0
	12/01/1993	-	5,800	-	-	-	-	-
	03/01/1994	-	16,000	-	-	-	-	-
	04/25/1994	100 U	3,800	730	100 U	100 U	100 U	100 U
	06/30/1994	250 U	7,800	290	250 U	250 U	250 U	250 U
	09/01/1994	-	10,600	-	-	-	-	-
	12/01/1994	-	9,000	-	-	-	-	-
	04/25/1995	-	2,100	-	-	-	-	-
	06/01/1995	-	4,700	-	-	-	-	-

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-11 (cont'd)	09/01/1995	-	3,900	-	-	-	-	-
	12/01/1995	-	2,900	-	-	-	-	-
	03/01/1996	-	6,700	-	-	-	-	-
	06/01/1996	-	860	-	-	-	-	-
	09/01/1996	-	1,140	-	-	-	-	-
	12/01/1996	-	960	-	-	-	-	-
	03/01/1997	-	500	-	-	-	-	-
	06/01/1997	-	880	-	-	-	-	-
	09/01/1997	-	1,000	-	-	-	-	-
	12/01/1997	-	700	-	-	-	-	-
	03/01/1998	-	500	-	-	-	-	-
	06/01/1998	-	1,700	-	-	-	-	-
	09/01/1998	-	660	-	-	-	-	-
	09/01/1999	-	770	-	-	-	-	-
	09/01/2000	-	220	-	-	-	-	-
	07/31/2001	-	418	-	-	-	-	-
	09/20/2001	-	363	-	-	-	-	-
	12/18/2001	-	309	-	-	-	-	-
	03/06/2002	-	382	-	-	-	-	-
	09/18/2002	-	458	-	-	-	-	-
	03/19/2003	-	394	-	-	-	-	-
	09/22/2003	-	495	-	-	-	-	-
	09/09/2004	-	375	-	-	-	-	-
	09/07/2005	-	320	-	-	-	-	-
	08/08/2006	-	436	-	-	-	-	-
	12/14/2006	0.8	68	119	0.61	0.5 U	0.5 U	2.2
	09/27/2007	-	456	-	-	-	-	-
	03/23/2009	0.17	88	13	0.10 J	0.32 J	-	0.18 J
	06/01/2009	0.79	5.7	4.3	0.5 U	0.5 U	-	0.5 U
	09/14/2009	1.1 U	358	67	1.1 U	1.1 U	-	1.1 U
	12/03/2009	0.31 J	5.7	5.0	0.5 U	0.14 J	-	0.13 J
	03/24/2010	0.26 J	86	22	0.14 J	0.24 J	-	0.5 U
	12/10/2010	0.76	2.9	4.2	0.5 U	0.5 U	-	0.5 U
	03/22/2011	0.21 J	46	9.6	0.5 U	0.22 J	-	0.5 U
	09/26/2011	0.5 U	239	51	0.5 U	0.53	-	0.5 U
	07/12/2012	0.5 U	219	36	0.5 U	0.59	-	0.5 U
	03/19/2013	0.46 J	5.2	5.9	1.0 U	1.0 U	-	1.0 U
	09/05/2013	1 U	170	41	0.45 J	0.53 J		1 U
	03/17/2014	1 U	1 U	5.4	1 U	1 U	-	1 U
	09/22/2014	1 U	130	30	1 U	1 U	-	1 U
	03/12/2015	1 U	100	28	1 U	1 U	-	1 U
	09/03/2015	1 U	40	14	1 U	1 U	-	1 U

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Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
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Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-11 (cont'd)	03/11/2016	0.5 U	124	21	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-97)	03/11/2016	0.5 U	120	20	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2016	0.5 U	108	29	0.5 U	0.5 U	0.5 U	0.5 U
	03/09/2017	1.6	1.9	5.0	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-97)	03/09/2017	1.7	1.7	5.0	0.5 U	0.5 U	0.5 U	0.5 U
	09/19/2017	1.1	2.3	3.4	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	1.0 J[1]	4.6	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	1.1	14	7.5	0.5 U	0.5 U	0.5 U	0.5 U
DMW-12	06/01/1988	500 U	85,000	7,800	500 U	500 U	500 U	500 U
	06/01/1988	500 U	110,000	14,000	500 U	500 U	500 U	500 U
	09/01/1988	400 U	108,000	10,000	400 U	400 U	400 U	400 U
	12/28/1988	100 U	160,000	-	16,000	100 U	100 U	530
	03/17/1989	100 U	66,000	2,400	100 U	100 U	100 U	500
	06/15/1989	500 U	140,000	4,500	500 U	500 U	500 U	500 U
	09/12/1989	250 U	65,000	4,500	250 U	250 U	250 U	250 U
	12/28/1989	100 U	72,000	-	100 U	100 U	100 U	100 U
	03/16/1990	1,000 U	98,000	4,000	1,000 U	1,000 U	1,000 U	1,000 U
	12/14/1990	1,000 U	150,000	7,000	1,000 U	1,000 U	1,000 U	1,000 U
	03/15/1991	2,000 U	52,000	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
	06/04/1991	1,000 U	28,000	1,000	1,000 U	1,000 U	1,000 U	1,000 U
	09/04/1991	1,000 U	240,000	6,000	1,000 U	1,000 U	1,000 U	1,000 U
	12/06/1991	1,000 U	20,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
	03/06/1992	100 U	10,000	500	100 U	100 U	100 U	100 U
	06/01/1992	-	10,000	-	-	-	-	-
	09/01/1992	-	9,000	-	-	-	-	-
	11/30/1992	-	8,100	-	-	-	-	-
	03/01/1993	-	5,000	-	-	-	-	-
	06/17/1993	100 U	3,000	300	100 U	100 U	100 U	100 U
	09/08/1993	1 U	2,700	-	1 U	1 U	1 U	4.6
	12/01/1993	-	8,000	-	-	-	-	-
	03/01/1994	-	3,000	-	-	-	-	-
	04/25/1994	10 U	1,500	110	10 U	10 U	10 U	10 U
	06/30/1994	100 U	1,600	100	100 U	100 U	100 U	100 U
	09/01/1994	-	4,000	-	-	-	-	-
	12/01/1994	-	8,000	-	-	-	-	-
	04/25/1995	-	600	-	-	-	-	-
	06/01/1995	-	500	-	-	-	-	-
	09/01/1995	-	500	-	-	-	-	-
	12/01/1995	-	4,100	-	-	-	-	-
	03/01/1996	-	378	-	-	-	-	-
	06/01/1996	-	200	-	-	-	-	-

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-12 (cont'd)	09/01/1996	-	340	-	-	-	-	-
	12/01/1996	-	400	-	-	-	-	-
	03/01/1997	-	300	-	-	-	-	-
	06/01/1997	-	280	-	-	-	-	-
	09/01/1997	-	340	-	-	-	-	-
	12/01/1997	-	360	-	-	-	-	-
	03/01/1998	-	220	-	-	-	-	-
	06/01/1998	-	380	-	-	-	-	-
	09/01/1998	-	220	-	-	-	-	-
	09/01/1999	-	360	-	-	-	-	-
	09/01/2000	-	150	-	-	-	-	-
	07/31/2001	-	285	-	-	-	-	-
	09/20/2001	-	227	-	-	-	-	-
	12/18/2001	-	208	-	-	-	-	-
	03/06/2002	-	182	-	-	-	-	-
	09/18/2002	-	176	-	-	-	-	-
	03/19/2003	-	175	-	-	-	-	-
	09/22/2003	-	253	-	-	-	-	-
	09/09/2004	-	289	-	-	-	-	-
	12/14/2006	0.5 U	329	93	0.70	0.66	0.5 U	0.90
	09/27/2007	-	364	-	-	-	-	-
	03/23/2009	0.13 J	70	11	0.13 J	0.14 J	-	0.44 J
	06/01/2009	0.5 U	23	10	0.5 U	0.5 U	-	0.5 U
	09/12/2009	0.5 U	175	33	0.5 U	0.5 U	-	0.5 U
	12/03/2009	0.14 J	139	28	0.20 J	0.32 J	-	0.24 J
	03/24/2010	0.15 J	138	27	0.24 J	0.29 J	-	0.5 U
	06/07/2011	0.10 J	140	23	0.16 J	0.25 J	-	0.5 U
	09/26/2011	0.5 U	139	28	0.5 U	0.5 U	-	0.5 U
	07/12/2012	0.5 U	3.5	1.3	0.5 U	0.5 U	-	0.5 U
	03/20/2013	1.0 U	47	5.5	1.0 U	1.0 U	-	1.0 U
	09/05/2013	1.1	34	6.1	1 U	1 U	-	1 U
	03/18/2014	1 UJ[1]	150 J[1]	34	1 U	1 U	-	1 U
	09/23/2014	1 U	5.1	5.0	1 U	1 U	-	0.74 J[1]
	03/13/2015	1 U	9.0	3.7	1 U	1 U	-	1 U
	09/02/2015	1 U	2.7	2.0	1 UJ[1]	1 UJ[1]	-	0.42 J
Duplicate (MW-99)	09/02/2015	1 U	2.8	2.1	1 U	1 U	-	0.46 J
	03/02/2016	0.5 U	17 J[1]	4.0	0.5 U	0.5 U	0.5 U	0.5 U
	09/06/2016	0.5 U	2.9	1.9	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2017	0.5 U	5.0	23	0.5 U	0.5 U	0.5 U	13
	09/18/2017	0.5 U	1.0	61	0.5 U	0.5 U	0.5 U	47
	03/05/2018	0.5 U	5.7	2.1	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	2.3	5.4	0.5 U	0.5 U	0.5 U	1.4

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-14	06/01/1988	1 U	38	2.0	1 U	1 U	1 U	1 U
	09/01/1988	1 U	42	2.0	1 U	1 U	1 U	1 U
	12/28/1988	1 U	25	-	1 U	1 U	1 U	1 U
	03/17/1989	1 U	22	1 U	1 U	1 U	1 U	1 U
	06/15/1989	1 U	36	1.0	1 U	1 U	1 U	1 U
	09/12/1989	1 U	14	1 U	1 U	1 U	1 U	1 U
	12/28/1989	1 U	23	-	1 U	1 U	1 U	1 U
	03/16/1990	1 U	29	1.0	1 U	1 U	1 U	1 U
	06/27/1990	1 U	40	3.0	1 U	1 U	1 U	1 U
	09/24/1990	1 U	29	3.0	1 U	1 U	1 U	1 U
	12/14/1990	1 U	18	2.0	1 U	1 U	1 U	1 U
	03/15/1991	1 U	28	3.0	1 U	1 U	1 U	1 U
	06/04/1991	1 U	35	8.0	1 U	1 U	1 U	1 U
	09/04/1991	1 U	84	10	1 U	1 U	1 U	1 U
	12/06/1991	5 U	32	5 U	5 U	5 U	5 U	5 U
	03/16/1992	1 U	30	2.0	1 U	1 U	1 U	1 U
	06/05/1992	1 U	40	4.0	1 U	1 U	1 U	1.0
	09/04/1992	1 U	31	2.0	1 U	1 U	1 U	1 U
	12/01/1992	1 U	11	-	1 U	1 U	1 U	1 U
	03/16/1993	1 U	11	-	1 U	1 U	1 U	1 U
	06/16/1993	1 U	10	1 U	1 U	1 U	1 U	1 U
	09/09/1993	1 U	24	-	1 U	1 U	1 U	1 U
	12/16/1993	1 U	3.9	-	1 U	1 U	1 U	1 U
	03/09/1994	1 U	4.0	-	1 U	1 U	1 U	1 U
	06/29/1994	1 U	6.9	1.0	1 U	1 U	1 U	1 U
	08/30/1994	1 U	12	-	1 U	1 U	1 U	1 U
	12/21/1994	1 U	1.4	-	1 U	1 U	1 U	1 U
	03/20/1995	1 U	8.0	2.0	1 U	1 U	1 U	1 U
	06/06/1995	1 U	5.1	-	1 U	1 U	1 U	1 U
	09/11/1995	1 U	3.3	-	1 U	1 U	1 U	1 U
	12/20/1995	1 U	2.5	1 U	1 U	1 U	1 U	1 U
	03/14/1996	1 U	3.9	1 U	1 U	1 U	1 U	1 U
	06/21/1996	1.5	5.0	1 U	1 U	1 U	1 U	1 U
	09/06/1996	1.2	5.8	1 U	1 U	1 U	1 U	1 U
	03/21/1997	2.4	4.2	1 U	1 U	1 U	1 U	1 U
	09/04/1997	2.0	4.0	1 U	1 U	1 U	1 U	1 U
	03/12/1998	2.6	2.4	1 U	1 U	1 U	1 U	1 U
	09/03/1998	2.5	3.6	1 U	1 U	1 U	1 U	1 U
	04/01/1999	3.0	2.0	1 U	1 U	1 U	1 U	1 U
	08/31/1999	2.0	2.0	1 U	1 U	1 U	1 U	1 U
	09/12/2000	3.0	2.0	1 U	1 U	1 U	1 U	1 U
	09/21/2001	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/17/2002	3.2	7.1	1.6	0.5 U	0.5 U	0.5 U	0.5 U

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-14 (cont'd)	09/23/2003	2.3	2.3	0.80	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2004	2.5	1.6	0.80	0.5 U	0.5 U	0.5 U	1.1
	09/07/2005	1.7	1.8	1.2	0.5 U	0.5 U	0.5 U	0.5 U
	08/07/2006	1.3	2.3	1.2	0.5 U	0.5 U	0.5 U	0.5 U
	12/13/2006	1.9	2.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/26/2007	2.2	1.8	0.60	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.26 J	0.56	0.65	0.5 U	0.5 U	0.10 J	0.5 U
	03/25/2010	0.23 J	0.72	0.27 J	0.5 U	0.5 U	-	0.5 U
	03/22/2011	0.17 J	0.99	0.20 J	0.5 U	0.5 U	-	0.5 U
Duplicate (MW-99)	03/22/2011	0.14 J	0.97	0.19 J	0.5 U	0.5 U	-	0.5 U
	07/13/2012	0.5 U	0.74	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/05/2013	1 U	0.87 J	1.6	1 U	1 U		1 U
	09/22/2014	0.37 J	2.0	3.9	1 U	1 U	-	1 U
	09/01/2015	1 U	1.7	5.2	1 UJ[1]	1 UJ[1]	-	1 U
	09/14/2016	0.5 U	1.9	4.0	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2017	0.5 U	1.4	3.8	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	0.98	1.1	0.5 U	0.5 U	0.5 U	0.5 U
DMW-33	01/09/2014	0.88	26	3.1	1 U	1 U	-	1 U
	03/17/2014	1 U	7.6	6.6	1 U	1 U	-	1 U
	06/03/2014	1 U	6.6	2.6	1 U	1 U	-	1 U
	09/24/2014	0.44 J	11	2.4	1 U	1 U	-	1 UJ[1]
	12/01/2014	0.50 J	14	6.1 J[1]	1 UJ[1]	1 UJ[1]	-	1 UJ[1]
	03/13/2015	1 U	7.5	2.5	1 U	1 U	-	1 U
	09/03/2015	1 U	7.4	1.7	1 UJ[1]	1 UJ[1]	-	1 U
	03/02/2016	0.5 U	15 J[1]	2.9	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-99)	03/02/2016	0.5 U	15 J[1]	2.7	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2016	0.5 U	22	2.6	0.5 U	0.5 U	0.5 U	0.5 U
	03/09/2017	0.5 U	7.8	3.7	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	4.0	0.73	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	0.5 U	0.81	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	4.3	1.4	0.5 U	0.5 U	0.5 U	0.5 U
IMW-33	01/09/2014	1 U	0.53 J	1 U	1 U	1 U	-	1 U
	03/17/2014	1 U	1 U	1.6	1 U	1 U	-	1 U
	06/03/2014	1 U	1 U	0.68 J	1 U	1 U	-	1 U
	09/24/2014	1 U	0.54 J	1.3	1 U	1 U	-	1 UJ[1]
	12/01/2014	1 U	0.48 J	2.0 J[1]	1 U	1 U	-	1 U
	03/13/2015	1 U	0.70 J	1 U	1 U	1 U	-	1 U
	09/15/2015	1 U	1 U	0.45 J	1 UJ[1]	1 UJ[1]	-	1 U
	03/02/2016	0.5 U	0.5 UJ[1]	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2016	0.5 U	0.57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
IMW-33 (cont'd)	03/09/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-99)	03/06/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	0.69	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DMW-34	01/09/2014	1 U	800	120	0.70 J	1.9	-	0.87 J
	03/17/2014	20 U	190	26	20 U	20 U	-	20 U
	06/03/2014	1 U	32	4.5	1 U	1 U	-	1 U
	09/22/2014	1 U	34	4.4	1 U	1 U	-	1 UJ[1]
	12/16/2014	1 U	610	130	0.59 J	1.5	-	0.56 J
	03/13/2015	1 U	42	6.7	1 U	1 U	-	1 U
	09/03/2015	1 U	39	6.6	1 U	1 U	-	1 U
	03/02/2016	0.5 U	49 J[1]	13	0.5 U	0.5 U	0.5 U	0.5 U
	09/09/2016	0.5 U	74	10	0.5 U	0.5 U	0.5 U	0.5 U
	03/09/2017	0.5 UJ[1]	42 J[1]	6.5 J[1]	0.5 UJ[1]	0.5 UJ[1]	0.5 UJ[1]	0.5 UJ[1]
	09/19/2017	0.5 U	20	3.0	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	144	31	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2018	0.5 U	39	5.4	0.5 U	0.5 U	0.5 U	0.5 U
IMW-34	01/09/2014	1 U	4.1	0.52 J	1 U	1 U	-	1 U
	03/17/2014	1 U	1 U	1 U	1 U	1 U	-	1 U
	06/03/2014	1 U	1 U	1 U	1 U	1 U	-	1 U
	09/22/2014	1 U	1 U	1 U	1 U	1 U	-	1 U
	12/16/2014	1 U	0.66 J	0.37 J	1 U	1 U	-	1 U
	03/13/2015	1 U	0.47 J	1 U	1 U	1 U	-	1 U
	09/03/2015	1 U	1 U	1 U	1 UJ[1]	1 UJ[1]	-	1 U
	03/02/2016	0.5 U	3.6 J[1]	2.6	0.5 U	0.5 U	0.5 U	0.5 U
	09/09/2016	0.5 U	23	2.9	0.5 U	0.5 U	0.5 U	0.5 U
	03/09/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/19/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DMW-35	01/14/2014	5 U	490	51	1 U	1 J	-	1 U
	03/18/2014	5 U	550	150	5 U	5 U	-	5 U
	06/03/2014	5 U	570	150	5 U	5 U	-	5 U
	09/22/2014	5 U	620	230	5 U	5 U	-	5 U
	12/02/2014	5 U	340	110 J[1]	5 U	5 U	-	5 U
	03/13/2015	5 U	1,700	880	2.2 J	3.0 J	-	2.7 J
	09/03/2015	10 U	475	151	10 U	10 U	-	10 U
	03/02/2016	0.5 U	128 J[1]	243	1.1	1.5	0.5 U	0.5 U

Table 4
Hardboard Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-35 (cont'd)	09/09/2016	0.5 U	457	204	1.5	1.2	0.5 U	2.5
Duplicate (MW-99)	09/09/2016	0.5 U	499	195	1.2	1.1	0.5 U	2.1
	03/07/2017	5 U	364	233	5 U	5 U	5 U	5 U
	09/18/2017	5 U	434	191	5 U	5 U	5 U	5 U
	03/06/2018	0.5 U	116	121	0.5 U	0.74	0.5 U	0.5 U
	09/14/2018	0.5 U	368	263	1.2	1.6	0.5 U	5.2
IMW-35	01/14/2014	1 U	1 U	0.86 J	1 U	1 U	-	1 U
	03/18/2014	1 U	1 U	0.34 J	1 U	1 U	-	1 U
	06/03/2014	1 U	0.43 J	0.56 J	1 U	1 U	-	1 U
	09/22/2014	1 U	1 U	1 U	1 U	1 U	-	1 U
	12/02/2014	1 U	1 U	0.52 J[1]	1 U	1 U	-	1 U
	03/13/2015	1 U	1 U	1.2	1 U	1 U	-	1 U
	09/03/2015	1 U	0.41 J	0.87 J	1 U	1 U	-	1 U
	03/02/2016	1 U	0.85 J[1]	0.51	0.5 U	0.5 U	0.5 U	0.5 U
	09/09/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2017	0.5 U	0.5 U	0.64	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2017	0.5 U	0.5 U	0.91	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	0.5 U	0.73	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2018	0.5 U	0.5 U	1.0	0.5 U	0.5 U	0.5 U	0.5 U
DMW-37	03/13/2015	1 U	22	1.9	1 U	1 U	-	1 U
	06/10/2015	1 U	8.2	1.0	1 U	1 U	-	1 U
	09/01/2015	1 U	18	3.9	1 UJ[1]	1 UJ[1]	-	1 U
	12/16/2015	0.5 U	15	1.2	0.5 U	0.5 U	-	0.5 U
	03/02/2016	0.5 U	6.2 J[1]	0.75	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2016	0.5 U	14	2.2	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2017	0.5 U	17	2.2	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2017	0.5 U	16	2.0	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2018	0.5 U	14	1.4	0.5 U	0.5 U	0.5 U	0.5 U
	09/12/2018	0.5 U	13	2.0	0.5 U	0.5 U	0.5 U	0.5 U
DMW-38	01/19/2015	1 U	360	26	1 U	1 U	-	1 U
Duplicate (DMW-98)	03/13/2015	10 U	230	24	10 U	10 U	-	10 U
	03/13/2015	1 U	240	23	1 U	1 U	-	1 U
	06/10/2015	1 U	170	20	1 U	1 U	-	1 U
	09/03/2015	1 U	176	19	1 U	1 U	-	1 U
	12/16/2015	0.5 U	143	47	0.5 U	0.5 U	-	3.6
	03/02/2016	0.5 U	506 J[1]	63	0.5 U	0.58	0.5 U	0.5 U
	09/08/2016	0.5 U	407	41	0.5 U	0.69	0.5 U	0.5 U
	03/09/2017	0.5 U	226	24	0.5 U	0.5 U	0.5 U	0.5 U
	09/19/2017	0.5 U	191	20	0.5 U	0.5 U	0.5 U	0.5 U
	03/06/2018	0.5 U	204	93	0.5 U	0.71	0.5 U	6.4

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Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DMW-38 (cont'd)	09/14/2018	0.5 U	254	21	0.5 U	0.52	0.5 U	0.5 U
Duplicate (MW-98)	09/14/2018	0.5 U	243	21	0.5 U	0.54	0.5 U	0.5 U
DMW-39	01/19/2015	1 U	330	85	1 U	0.82 J	-	0.41 J
	03/13/2015	20 U	49	460	20 U	20 U	-	20 U
	06/10/2015	1 U	2.6	1.6	1 U	1 U	-	1 U
	09/02/2015	1 U	6.7	2.4	1 UJ[1]	1 UJ[1]	-	1 U
	12/16/2015	0.5 U	21	5.4	0.5 U	0.5 U	-	0.5 U
	03/02/2016	0.5 U	17 J[1]	4.6	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2016	0.5 U	4.9	2.1	0.5 U	0.5 U	0.5 U	0.5 U
	03/07/2017	0.5 U	52	13	0.5 U	0.5 U	0.5 U	0.5 U
	09/18/2017	0.5 U	12	3.5	0.5 U	0.5 U	0.5 U	0.5 U
	03/05/2018	0.5 U	19	4.6	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	5.8	1.4	0.5 U	0.5 U	0.5 U	0.5 U
DMW-42	12/16/2015	0.5 U	13	7.4	0.5 U	0.5 U	-	0.5 U
	03/03/2016	0.5 U	54	48	0.5 U	0.5 U	0.5 U	0.5 U
	06/15/2016	0.5 U	15	13	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2016	0.5 U	4.6	10	0.5 U	0.5 U	0.5 U	0.5 U
	12/07/2016	0.5 U	1.6	28	0.5 U	0.5 U	0.5 U	0.5 U
	03/09/2017	0.5 U	0.61	1.3	0.5 U	0.5 U	0.5 U	0.5 U
	09/19/2017	0.5 U	9.8	12	0.5 U	0.5 U	0.5 U	0.5 U
Duplicate (MW-97)	09/19/2017	0.5 U	9.9	13	0.5 U	0.5 U	0.5 U	0.5 U
	03/13/2018	0.5 U	11	12	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2018	0.5 U	2.7	5.4	0.5 U	0.5 U	0.5 U	0.5 U
DEQ Screening Level Criteria for Water								
Ingestion and Inhalation of Tap Water (Residential)[a]		12	0.49	36	360	280	2.8	0.027
Volitilization to Outdoor Air (Residential)[b]		64,000	3,300	>S	>S	570,000	16,000	350
Volitilization to Outdoor Air (Occupational)[c]		>S	20,000	>S	>S	2,400,000	68,000	5,900
Vapor Intrusion (Residential)[d]		3,700	200	>S	>S	29,000	1,100	17
Vapor Intrusion (Occupational)[e]		48,000	3,700	>S	>S	360,000	14,000	880
GW in Excavation[f]		5,600	430	18,000	180,000	44,000	10,000	960
Portland Harbor JSCS Levels								
Upland Source Control Screening Level[g]		0.33	3.0	NA	1,000	NA	NA	0.24
2004 AWQC (Human Health - Organism Only)[h]		3.3	30	NA	10,000	NA	NA	2.4
2004 AWQC (Ecological Receptors - Chronic)[i]		840	21,900	NA	NA	NA	NA	NA
Oak Ridge Tier II (Ecological Receptors)[j]		98	47	590	590	25	-	930 [k]

Table 4
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H&V Fiber Corporation
Corvallis, Oregon

Notes:

[a] Risk-based concentration (RBC) for ingestion/inhalation in a residential setting (revised May 2018)
[b] RBC for volatilization to outdoor air in a residential setting (revised May 2018)
[c] RBC for volatilization to outdoor air in an occupational setting (revised May 2018)
[d] RBC for vapor intrusion into buildings in a residential setting (revised May 2018)
[e] RBC for vapor intrusion into buildings in an occupational setting (revised May 2018)
[f] RBC for groundwater in excavation by a construction worker (revised May 2018)
[g] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Values listed are based on human health via fish ingestion
[h] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria for Organisms Only (DEQ 2004)
[i] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria - Ecologic Receptors - Chronic (DEQ 2004)
[j] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per Oak Ridge National Laboratory's Water Quality Criteria - Ecological Receptors - Tier II SCV
[k] Ecological screening value adopted by EPA in Regions 3,5 and 6.
ug/L = Micrograms per liter
C = results of coelution
E = value reported exceeds linear calibration range; estimated concentration.
U = not detected at the associated reporting limit
J = estimated trace concentration
J[1] = Data Validation Qualifier. The analyte was detected above the method reporting limit. Results should be considered an estimate. See corresponding data validation report for further
- = Analyte not analyzed for this parameter
NA = Not applicable
>S = This RBC exceeds the solubility limit

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
Downgradient Area Wells								
MW-4	04/03/1986	-	5,320	-	-	-	-	-
	05/28/1986	-	2,360	-	-	-	-	-
	06/27/1986	100 U	4,200		340	100 U	100 U	100 U
	07/30/1986	-	14,300	-	-	-	-	-
	09/04/1986	-	15,900	-	-	-	-	-
	10/13/1986	-	10,700	-	-	-	-	-
	11/14/1986	-	1,260	-	-	-	-	-
	12/22/1986	10 U	780	-	26	10 U	10 U	10 U
	10/06/1987	20 U	720	-	110	10 U	10 U	20 U
	12/22/1987	1 U	1,100	-	1 U	1 U	1 U	3.0
	03/22/1988	10 U	3,100	-	10 U	10 U	10 U	10 U
	06/01/1988	4 U	1,300	33	4 U	4 U	4 U	4 U
	09/01/1988	2 U	710	70	2 U	2 U	2 U	2 U
	12/27/1988	1 U	2,500	-	300	1 U	1 U	9.0 C
	03/17/1989	1 U	2.0	1 U	1 U	1 U	1 U	1 U
	06/15/1989	38	5,300	400	3.0	5.0	1.0	49
	09/12/1989	10 U	2,500	280	10 U	10 U	10 U	10 U
	12/29/1989	1,000 U	17,000		1,000 U	1,000 U	1,000 U	1,000 U
	03/16/1990	5 U	1,600	120	5 U	5 U	5 U	5 U
	06/27/1990	20 U	5,000	440	20 U	20 U	20 U	20 U
	09/24/1990	100 U	7,000	400	100 U	100 U	100 U	100 U
	12/14/1990	30 U	8,800	400	30 U	30 U	30 U	30 U
	03/15/1991	100 U	1,200	100	100 U	100 U	100 U	100
	06/04/1991	100 U	1,500	200	100 U	100 U	100 U	100 U
	09/04/1991	20 U	8,900	1,200	20 U	20 U	20 U	20 U
	12/06/1991	100 U	1,700	400	100 U	100 U	100 U	100 U
	03/16/1992	50 U	6,200	860	50 U	50 U	50 U	50 U
	06/05/1992	100 U	5,800	530	100 U	100 U	100 U	100 U
	09/04/1992	100 U	4,300	600	100 U	100 U	100 U	100
	12/31/1992	5 U	320	-	5 U	5 U	5 U	5 U
	03/16/1993	20 U	1,000	-	20 U	20 U	20 U	20 U
	06/17/1993	20 U	640	140	20 U	20 U	20 U	20 U
	09/09/1993	5 U	2,300	-	5 U	5 U	5 U	15
	12/16/1993	10 U	920	-	10 U	10 U	10 U	10 U
	03/09/1994	25 U	1,000	-	25 U	25 U	25 U	25 U
	06/30/1994	200 U	5,500	1,500	200 U	200 U	200 U	200 U
	08/29/1994	50 U	3,520	-	50 U	50 U	50 U	50 U
	12/31/1994	20 U	730	-	20 U	20 U	20 U	20 U
	03/20/1995	10 U	827	220	10 U	10 U	10 U	10 U
	06/06/1995	25 U	1,400	-	25 U	25 U	25 U	25 U
	09/11/1995	2 U	1,400	-	2 U	2 U	2 U	12
	12/20/1995	1 U	250	90	1 U	1 U	1 U	3.2

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-4 (cont'd)	03/15/1996	1 U	210	51	1 U	1 U	1 U	1 U
	06/21/1996	10 U	728	138	10 U	10 U	10 U	10 U
	09/05/1996	20 U	1,250	299	20 U	20 U	20 U	24
	12/23/1996	1 U	102	70	1 U	1 U	1 U	5.9
	03/21/1997	10 U	191	59	10 U	10 U	10 U	10 U
	06/20/1997	10 U	395	176	10 U	10 U	10 U	10 U
	09/04/1997	5 U	421	181	5 U	5 U	5 U	5 U
	12/05/1997	10 U	164	109	10 U	10 U	10 U	18
	03/12/1998	2 U	135	73	2 U	2 U	2 U	4.1
	06/04/1998	4 U	226	169	4 U	4 U	4 U	9.0
	09/03/1998	5 U	344	190	5 U	5 U	5 U	5.9
	12/28/1998	5 U	118	141	5 U	5 U	5 U	7.0
	04/01/1999	2 U	114	71	2 U	2 U	2 U	3.0
	06/16/1999	2 U	118	94	2 U	2 U	2 U	6.0
	08/31/1999	5 U	353	206	5 U	5 U	5 U	8.0
	12/06/1999	2 U	112	109	2 U	2 U	2 U	11
	03/02/2000	5 U	85	62	5 U	5 U	5 U	5 U
	06/27/2000	1 U	288	308	1.1	1 U	1 U	11
	09/12/2000	1 U	380	345	2.0	1.0	1 U	14
	12/13/2000	1 U	190	179	1 U	1.0	1 U	5.4
	03/08/2001	1 U	231	177	1 U	1.4	1 U	7.0
	09/19/2001	0.5 U	581	473	2.7	2.0	0.5 U	13
	12/18/2001	0.5 U	86	82	0.5 U	0.50	0.5 U	4.4
	03/06/2002	0.5 U	79	140	0.70	0.50	0.5 U	5.8
	06/13/2002	0.5 U	213	217	0.90	0.70	0.5 U	5.1
	09/17/2002	0.5 U	323	332	1.4	1.1	0.5 U	16
	03/19/2003	0.5 U	103	129	0.5 U	0.5 U	0.5 U	9.4
	09/23/2003	0.5 U	407	514	2.5	2.0	0.5 U	20
	03/03/2004	0.5 U	88	119	0.5 U	0.5 U	0.5 U	9.6
	09/08/2004	0.5 U	278	309	1.3	1.0	0.5 U	9.7
	03/08/2005	0.5 U	301	307	1.1	0.81	0.5 U	6.9
	09/06/2005	0.5 U	426	398	1.7	1.2	0.5 U	9.4
	03/08/2006	0.5 U	225	268	1.1	1.0	0.5 U	6.6
	08/07/2006	0.5 U	1,090	1,110	6.2	4.9	0.5 U	30
	12/13/2006	0.5 U	149	306	1.1	1.8	0.5 U	18
	03/20/2007	1 U	416	501	1.8	1.4	1 U	12
	09/26/2007	5 U	1,580	2,190	8.3	6.7	5 U	65
	03/13/2008	1 U	419	468	2.2	1.7	1 U	12
	03/23/2009	0.5 U	48	174	0.58	0.29 J	-	0.5 U
	09/15/2009	1 U	774	946	5.0	3.8	-	27
	03/25/2010	1 U	488	541	2.4	1.8	-	13
	09/29/2010	0.33 J	642	757	3.9	2.4	-	25
	03/22/2011	0.10 J	165	218	0.88	0.72	-	7.3

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-6	05/28/1986	-	882	-	-	-	-	-
	06/27/1986	-	815	-	-	-	-	-
	07/30/1986	-	427	-	-	-	-	-
	09/04/1986	-	3,610	-	-	-	-	-
	10/13/1986	-	559	-	-	-	-	-
	11/14/1986	-	435	-	-	-	-	-
	12/22/1986	10 U	450	-	250	10 U	10 U	10 U
	07/01/1987	20 U	3,500	-	880	10 U	10 U	20 U
	09/23/1987	100 U	6,900	-	1,500	50 U	50 U	50 C
	12/22/1987	20 U	3,200	-	20 U	20 U	20 U	20 U
	03/23/1988	1 U	350	-	2.0	1 U	1 U	2.0
	06/01/1988	1 U	400	1,300	2.0	1 U	1 U	8.0
	09/01/1988	1 U	110	90	1 U	1 U	1 U	1.0
	12/27/1988	3.0	15,000	-	2,500	4.0	1 U	160
	03/17/1989	40 U	16,600	2,200	80	40 U	40 U	300
	06/15/1989	40 U	4,500	1,300	40 U	40 U	40 U	70
	09/12/1989	3 U	600	10	3 U	3 U	3 U	3 U
	12/27/1989	1 U	33,000	-	1 U	1 U	1 U	110
	03/16/1990	10 U	15,000	2,000	10 U	10 U	10 U	10 U
	06/27/1990	200 U	22,000	2,400	200 U	200 U	200 U	200 U
	09/24/1990	50 U	2,600	280	50 U	50 U	50 U	50 U
	12/14/1990	50 U	43,000	4,800	50 U	50 U	50 U	200
	03/15/1991	100 U	5,900	2,200	100 U	100 U	100 U	100
	06/04/1991	100 U	30,300	100 U	100 U	100 U	100 U	100 U
	09/04/1991	1,000 U	21,000	2,000	1,000 U	1,000 U	1,000 U	1,000 U
	12/06/1991	1,000 U	4,500	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
	03/16/1992	100 U	24,000	2,000	100 U	100 U	100 U	100 U
	06/05/1992	100 U	6,600	580	100 U	100 U	100 U	100 U
	09/04/1992	25 U	3,200	310	25 U	25 U	25 U	25 U
	12/01/1992	1 U	84	-	1 U	1 U	1 U	1 U
	03/16/1993	1 U	25	-	1 U	1 U	1 U	1 U
	06/17/1993	250 U	13,000	1,000	250 U	250 U	250 U	250 U
	09/09/1993	1 U	3,600	-	1 U	1 U	1 U	15
	12/16/1993	5 U	2,500	-	5 U	5 U	5 U	5 U
	03/09/1994	50 U	2,200	-	50 U	50 U	50 U	50 U
	06/30/1994	500 U	15,000	1,500	500 U	500 U	500 U	500 U
	08/29/1994	50 U	4,620	-	50 U	50 U	50 U	50 U
	12/21/1994	50 U	990	-	50 U	50 U	50 U	50 U
	03/20/1995	100 U	8,680	1,010	100 U	100 U	100 U	100 U
	06/06/1995	200 U	4,100	-	200 U	200 U	200 U	200 U
	09/11/1995	50 U	3,000	-	50 U	50 U	50 U	50 U
	12/20/1995	1 U	820	110	1 U	1 U	1 U	1.8
	03/14/1996	5 U	9,700	1,200	5.8	5 U	5 U	43

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-6 (cont'd)	06/21/1996	20 U	1,100	112	20 U	20 U	20 U	20 U
	09/06/1996	100 U	3,970	512	100 U	100 U	100 U	100 U
	12/23/1996	10 U	1,160	197	10 U	10 U	10 U	10 U
	03/21/1997	100 U	4,420	1,040	100 U	100 U	100 U	100 U
	06/20/1997	20 U	1,160	174	20 U	20 U	20 U	20 U
	09/04/1997	100 U	1,720	281	100 U	100 U	100 U	100 U
	12/05/1997	50 U	893	125	50 U	50 U	50 U	50 U
	03/12/1998	50 U	4,030	866	50 U	50 U	50 U	50 U
	06/04/1998	50 U	2,690	536	50 U	50 U	50 U	50 U
	09/03/1998	10 U	413	73	10 U	10 U	10 U	10 U
	12/28/1998	10 U	1,440	399	10 U	10 U	10 U	13
	04/01/1999	20 U	310	912	20 U	20 U	20 U	25
	06/16/1999	20 U	959	202	20 U	20 U	20 U	20 U
	08/31/1999	20 U	402	75	20 U	20 U	20 U	20 U
	12/06/1999	1 U	34	17	1 U	1 U	1 U	1.0
	03/02/2000	10 U	1,480	583	10 U	10 U	10 U	15
	06/27/2000	1 U	543	115	1 U	1 U	1 U	4.0
	09/12/2000	1 U	57	14	1 U	1 U	1 U	1 U
	12/13/2000	1 U	1,050	233	1.3	1 U	1 U	5.4
	03/08/2001	1 U	1,020	317	1.4	3.2	1 U	6.5
	09/20/2001	0.5 U	44	18	0.5 U	0.5 U	0.5 U	0.5 U
	03/05/2002	0.5 U	48	32	0.5 U	0.5 U	0.5 U	1.1
	09/17/2002	0.5 U	1,500	606	1.9	1.6	0.5 U	19
	03/19/2003	0.5 U	358	215	0.5 U	0.5 U	0.5 U	7.2
	09/23/2003	0.5 U	10	16	0.5 U	0.5 U	0.5 U	1.7
	03/03/2004	0.5 U	1.3	1.1	0.5 U	0.5 U	0.5 U	0.5 U
	09/08/2004	0.5 U	12	7.2	0.5 U	0.5 U	0.5 U	0.60
	03/08/2005	0.5 U	0.83	4.5	0.5 U	0.5 U	0.5 U	0.5 U
	09/06/2005	0.5 U	14	6.9	0.5 U	0.5 U	0.5 U	0.5 U
	03/08/2006	0.5 U	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	08/07/2006	0.5 U	395	206	1.2	1.8	0.5 U	9.9
	12/12/2006	0.5 U	3.4	34	0.5 U	0.5 U	0.5 U	1.6
	03/19/2007	0.5 U	3.5	3.3	0.5 U	0.5 U	0.5 U	0.25 J
	09/26/2007	0.5 U	74	156	0.78	0.68	0.5 U	11
	03/12/2008	0.5 U	1.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.5 U	0.36 J	0.27 J	0.5 U	0.5 U	-	0.5 U
	09/14/2009	0.5 U	1.4	4.2	0.5 U	0.5 U	-	0.5 U
	03/25/2010	0.5 U	0.31 J	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/29/2010	0.5 U	0.21 J	0.24 J	0.5 U	0.5 U	-	0.5 U
	03/23/2011	0.5 U	75	114	0.40 J	0.76	-	7.4
	06/07/2011	0.5 U	15	138	0.41 J	0.55	-	35
	09/26/2011	0.5 U	159	343	1.2	1.7	-	23
	07/16/2012	0.5 U	0.5 U	0.59	0.5 U	0.5 U	-	0.5 U

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-6 (cont'd)	09/05/2013	1 U	14	180	0.49	1.0		46
	09/23/2014	1 U	0.60 J	7.2	1 U	1 U	-	3.4
	09/02/2015	1 U	1.1	12	1 UJ[1]	1 UJ[1]	-	4.3
	09/13/2016	0.5 U	4.8	23	0.5 U	0.5 U	0.5 U	8.6
	09/14/2017	0.5 U	16	85	0.5 U	0.68	0.5 U	4.2
	09/13/2018	0.5 U	0.78	7.6	0.5 U	0.5 U	0.5 U	7.3
MW-13	09/01/1988	1 U	1 U	7.0	1 U	1 U	1 U	1 U
	01/03/1989	1 U	23	-	22	1 U	1 U	1 U
	03/17/1989	1 U	1.0	4.0	1 U	1 U	1 U	1 U
	06/15/1989	1 U	5,000	900	7.0	4.0	1 U	23
	09/12/1989	10 U	2,900	660	10 U	10 U	10 U	10 U
	12/27/1989	1 U	1,800	-	2.0	1.0	1 U	12
	03/16/1990	1 U	120	18	1 U	1 U	1 U	1 U
	12/14/2006	0.5 U	1.2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	03/23/2009	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/14/2009	0.5 U	0.5 U	1.1	0.5 U	0.5 U	-	0.5 U
	03/25/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/29/2010	0.5 U	0.5 U	0.63	0.5 U	0.5 U	-	0.56
	03/23/2011	0.5 U	0.12 J	0.10 J	0.5 U	0.5 U	-	0.5 U
	06/07/2011	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/26/2011	0.5 U	0.5 U	1.5	0.5 U	0.5 U	-	0.5 U
	07/13/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/05/2013	1 U	1 U	0.39 J	1 U	1 U		1 U
	09/23/2014	1 U	1 U	1 U	1 U	1 U	-	1 U
	09/02/2015	1 U	1 U	0.44 J	1 U	1 U	-	1 U
	09/14/2016	0.5 U	1 U	4.3	0.5 U	0.5 U	0.5 U	0.69
	09/14/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	0.5 U	0.72	0.5 U	0.5 U	0.5 U	0.5 U
MW-15	06/01/1988	500 U	50,000	20,000	500 U	500 U	500 U	250
	09/01/1988	200 U	55,000	14,000	200 U	200 U	200 U	200
	12/28/1988	10 U	33,000	-	11,000	10 U	10 U	48 C
	03/17/1989	70 U	30,500	4,500	70 U	70 U	70 U	600
	06/15/1989	500 U	160,000	44,000	500 U	500 U	500 U	1,500
	09/12/1989	500 U	75,000	13,000	500 U	500 U	500 U	500 U
	12/28/1989	100 U	150,000	-	100 U	100 U	100 U	260
	03/16/1990	1,000 U	74,000	9,000	1,000 U	1,000 U	1,000 U	1,000 U
	06/27/1990	5,000 U	160,000	18,000	5,000 U	5,000 U	5,000 U	5,000 U
	09/24/1990	50 U	4,200	1,200	50 U	50 U	50 U	50 U
	12/14/1990	400 U	120,000	14,000	400 U	400 U	400 U	400
	03/15/1991	2,000 U	100,000	12,000	2,000 U	2,000 U	2,000 U	2,000 U
	06/04/1991	2,000 U	92,000	16,000	2,000 U	2,000 U	2,000 U	2,000 U

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-15 (cont'd)	09/04/1991	2,000 U	84,000	12,000	2,000 U	2,000 U	2,000 U	2,000 U
	12/06/1991	20 U	58	6,000	20 U	20 U	20 U	210
	03/16/1992	2,000 U	25,000	20,000	2,000 U	2,000 U	2,000 U	2,000 U
	06/05/1992	2,000 U	16,000	16,000	2,000 U	2,000 U	2,000 U	2,000 U
	09/04/1992	100 U	6,900	13,000	100 U	100 U	100 U	100 U
	12/30/1992	2 U	20	-	2.2	2 U	2 U	170
	03/16/1993	1 U	14	-	1 U	1 U	1 U	14
	06/17/1993	1 U	3.0	9,000	27	18	1 U	110 J
	09/09/1993	1 U	2.4	-	11	7.6	1 U	280
	12/16/1993	1 U	1 U	-	2.2	3.4	1 U	240
	03/09/1994	1 U	1.4	-	7.1	5.2	1 U	390
	06/30/1994	250 U	310	7,500	250 U	250 U	250 U	490
	08/29/1994	100 U	289	-	100 U	100 U	100 U	538
	12/21/1994	2 U	21	-	2 U	2 U	2 U	89
	03/20/1995	20 U	36	1,800	20 U	20 U	20 U	770
	06/06/1995	25 U	45	-	25 U	25 U	25 U	870
	09/11/1995	5 U	13	-	5 U	5 U	5 U	500
	12/20/1995	1 U	22	51	1 U	1 U	1 U	65
	03/14/1996	1 U	22	550	1 U	1 U	1 U	350
	06/21/1996	20 U	34	874	20 U	20 U	20 U	473
	09/06/1996	10 U	34	955	10 U	10 U	10 U	339
	12/23/1996	1 U	18	30	1 U	1 U	1 U	55
	03/21/1997	10 U	24	42	10 U	10 U	10 U	147
	06/20/1997	1 U	21	965	1 U	2.2	1 U	614
	09/04/1997	5 U	11	1,070	5 U	5 U	5 U	729
	12/05/1997	20 U	26	89	20 U	20 U	20 U	324
	03/12/1998	5 U	18	100	5 U	5 U	5 U	238
	06/04/1998	5 U	18	92	5 U	5 U	5 U	206
	09/03/1998	5 U	15	576	5 U	5 U	5 U	248
	12/28/1998	5 U	11	227	5 U	5 U	5 U	397
	04/01/1999	5 U	10	186	5 U	5 U	5 U	364
	06/16/1999	5 U	10	131	5 U	5 U	5 U	289
	08/31/1999	5 U	11	92	5 U	5 U	5 U	93
	12/06/1999	2 U	9.0	55	2 U	2 U	2 U	164
	03/02/2000	1 U	8.0	44	1 U	1 U	1 U	112
	07/24/2000	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	09/12/2000	1 U	8.0	192	1 U	1 U	1 U	175
	12/13/2000	1 U	6.9	162	1 U	1 U	1 U	202
	03/08/2001	1 U	9.9	206	1 U	1 U	1 U	197
	09/20/2001	0.5 U	6.6	313	0.5 U	1.3	0.5 U	187
	12/18/2001	0.5 U	7.1	137	0.5 U	0.60	0.5 U	270
	03/06/2002	0.5 U	10	150	0.5 U	0.60	0.5 U	183
	06/13/2002	0.5 U	7.1	180	0.5 U	0.60	0.5 U	335

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
MW-15 (cont'd)	09/17/2002	0.5 U	7.7	269	0.5 U	0.70	0.5 U	711
	03/19/2003	0.5 U	7.4	70	0.5 U	0.5 U	0.5 U	210
	09/23/2003	0.5 U	14	121	0.5 U	0.5 U	0.5 U	358
	03/03/2004	0.5 U	12	71	0.5 U	0.5 U	0.5 U	177
	09/08/2004	0.5 U	5.0	77	0.5 U	0.5 U	0.5 U	340
	03/08/2005	0.5 U	14	93	0.5 U	0.5 U	0.5 U	99
	09/06/2005	0.5 U	7.8	60	0.5 U	0.5 U	0.5 U	197
	03/08/2006	0.5 U	18	184	0.5 U	1.4	0.5 U	162
	08/07/2006	0.5 U	7.2	82	0.5 U	0.5 U	0.5 U	136
	12/12/2006	0.5 U	5.7	31	0.5 U	0.5 U	0.5 U	96
	03/19/2007	0.5 U	5.8	102	0.18 J	0.34 J	0.5 U	171
	09/26/2007	0.5 U	5.0	21	0.5 U	0.5 U	0.5 U	91
	03/12/2008	0.5 U	5.5	28	0.5 U	0.5 U	0.5 U	82
	03/23/2009	0.5 U	0.5 U	0.44 J	0.5 U	0.5 U	-	2.6
	09/14/2009	0.5 U	0.5 U	0.50 U	0.5 U	0.5 U	-	0.5 U
	03/25/2010	0.5 U	0.5 U	0.27 J	0.5 U	0.5 U	-	1.0
	09/29/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	03/23/2011	0.5 U	1.9	0.54	0.5 U	0.5 U	-	0.5 U
	06/07/2011	0.5 U	0.5 U	0.09 J	0.5 U	0.5 U	-	0.5 U
	09/26/2011	0.5 U	3.3	2.1	0.5 U	0.5 U	-	0.5 U
	07/13/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
	09/05/2013	1 U	0.52 J	1.5	1 U	1 U		0.39 J
	09/23/2014	1 U	1 U	1 U	1 U	1 U	-	1 U
	09/02/2015	1 U	1 U	1 U	1 UJ[1]	1 UJ[1]	-	1.7
	09/13/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/14/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	09/13/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Well	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-dichloroethene	Trans-1,2-dichloroethene	1,1-Dichloroethene	1,1-Dichloroethane	Vinyl chloride
DEQ Screening Level Criteria for Water								
Ingestion and Inhalation of Tap Water (Residential)[a]		12	0.49	36	360	280	2.8	0.027
Volitilization to Outdoor Air (Residential)[b]		64,000	3,300	>S	>S	570,000	16,000	350
Volitilization to Outdoor Air (Occupational)[c]		>S	20,000	>S	>S	2,400,000	68,000	5,900
Vapor Intrusion (Residential)[d]		3,700	200	>S	>S	29,000	1,100	17
Vapor Intrusion (Occupational)[e]		48,000	3,700	>S	>S	360,000	14,000	880
GW in Excavation[f]		5,600	430	18,000	180,000	44,000	10,000	960
Portland Harbor JSCS Levels								
Upland Source Control Screening Level[g]		0.33	3.0	NA	1,000	NA	NA	0.24
2004 AWQC (Human Health - Organism Only)[h]		3.3	30	NA	10,000	NA	NA	2.4
2004 AWQC (Ecological Receptors - Chronic)[i]		840	21,900	NA	NA	NA	NA	NA
Oak Ridge Tier II (Ecological Receptors)[j]		98	47	590	590	25	-	930 [k]

Table 5
Downgradient Area Wells Groundwater Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Notes:

[a] Risk-based concentration (RBC) for ingestion/inhalation in a residential setting (revised May 2018)

[b] RBC for volatilization to outdoor air in a residential setting (revised May 2018)

[c] RBC for volatilization to outdoor air in an occupational setting (revised May 2018)

[d] RBC for vapor intrusion into buildings in a residential setting (revised May 2018)

[e] RBC for vapor intrusion into buildings in an occupational setting (revised May 2018)

[f] RBC for groundwater in excavation by a construction worker (revised May 2018)

[g] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Values listed are based on human health via fish ingestion

[h] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria for Organisms Only (DEQ 2004)

[i] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per DEQ's Ambient Water Quality Criteria - Ecologic Receptors - Chronic (DEQ 2004)

[j] DEQ, Portland Harbor JSCS, Table 3-1 (revised 7/16/07). Per Oak Ridge National Laboratory's Water Quality Criteria - Ecological Receptors - Tier II SCV
(Tier II SCV values were taken from Suter II, G.W. and Tsao, C.L., 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. ORNL publication ES/ER/TM-96/R2)

[k] Ecological screening value adopted by EPA in Regions 3,5 and 6.

ug/L = Micrograms per liter

C = results of coelution

U = not detected at the associated reporting limit

J = estimated trace concentration

J[1] = Data Validation Qualifier. The analyte was detected above the method reporting limit. Results should be considered an estimate. See corresponding data validation report for

\- = Analyte not analyzed for this parameter

NA = Not applicable

>S = This RBC exceeds the solubility limit

Table 6
Pore Water and Surface Water Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Sample ID	Sample Depth[a] (inches)	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride
Pore Water								
RB0-24	24	09/27/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB0-24	24	09/28/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB0-24	24	09/25/2013	1 UJ[1]	1 U	1 U	1 U	1 U	1 U
RB0-24	24	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
RB0-24	24	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
RB0-42	42	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
RB0-24	24	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB0-36	36	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB0-24	24	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB0-36	36	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB0-24	24	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB0-36	36	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB1-12	12	09/29/2010	0.50	2.9	1.8	0.5 U	0.5 U	0.11 J
RB1-16	16	09/27/2011	0.64	4.4	1.9	0.5 U	0.5 U	0.5 U
RB1-16	16	09/28/2012	0.5 U	0.34 J	0.37 J	0.5 U	0.5 U	0.5 U
RB1-16	16	09/25/2013	0.55 J[1]	3.8	1.8	1 U	1 U	1 U
RB1-16	16	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
RB1-24	24	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
RB1-48	48	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
RB1-24	24	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB1-36	36	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB1-24	24	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB1-36	36	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB1-24	24	09/27/2018	0.56	3.3	2.3	0.5 U	0.5 U	0.5 U
RB1-36	36	09/27/2018	0.69	3.5	2.4	0.5 U	0.5 U	0.5 U
RB2-12	12	09/29/2010	0.89	23	10	0.12 J	0.5 U	1.1
RB2-18	18	09/29/2010	0.95	14	4.4	0.5 U	0.5 U	0.5 U
RB2-24	24	09/27/2011	0.83	13	3.2	0.5 U	0.5 U	0.5 U
RB2-36	36	09/27/2011	0.5 U	**167**	47	0.5 U	0.51	6.6
RB2-24	24	09/28/2012	0.75	11	3.6	0.5 U	0.5 U	0.5 U
RB2-36	36	09/28/2012	0.81	12	4.2	0.5 U	0.5 U	0.5 U
RB2-24	24	09/25/2013	0.52 J[1]	10	3.5	1 U	1 U	1 U
RB2-36	36	09/25/2013	0.44 J[1]	9.0	3.4	1 U	1 U	1 U
RB2-24	24	10/13/2014	1 U	9.1	3.0	1 U	1 U	1 U
RB2-36	36	10/13/2014	1 U	18	5.0	1 U	1 U	1 U
RB2-48	48	09/15/2015	1 U	**152**	109	0.49 J	0.70 J	12
RB2-24	24	09/12/2016	0.52	17	6.7	0.5 U	0.5 U	0.89
RB2-48	48	09/12/2016	0.5 U	18	69	0.5 U	0.5 U	27

Table 6
Pore Water and Surface Water Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Sample ID	Sample Depth[a] (inches)	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride
RB2-24	24	09/13/2017	0.5 U	8.3	2.6	0.5 U	0.5 U	0.5 U
RB2-48	48	09/13/2017	0.5 U	7.4	2.6	0.5 U	0.5 U	0.5 U
RB2-18	18	09/27/2018	0.5 U	1.4	2.0	0.5 U	0.5 U	5.4
RB2-24	24	09/27/2018	0.5 U	**131**	26	0.5 U	0.5 U	0.5 U
RB3-13	13	09/29/2010	0.5 U	0.63	10	0.5 U	0.21 J	5.1
RB3-10	10	09/27/2011	0.5 U	0.5 U	6.4	0.5 U	0.5 U	0.5 U
RB3-10	10	09/28/2012	0.5 U	0.5 U	3.5	0.5 U	4.3	0.5 U
RB3-10	10	09/25/2013	1 UJ[1]	6.8	7.1	1 U	1 U	1 U
RB3-12	12	10/13/2014	1 U	1 U	0.58 J	1 U	1 U	2.4
RB3-12	12	09/15/2015	1 U	1.8	11	1 U	1 U	1.0 J
RB3-12	12	09/12/2016	0.5 U	1.8	2.0	0.5 U	0.5 U	0.56
RB3-12	12	09/13/2017	0.5 U	1.5	11	0.5 U	0.5 U	4.0
RB3-12	12	09/27/2018	0.5 U	0.75	0.86	0.5 U	0.5 U	0.5 U
RB4-18	18	09/29/2010	0.5 U	0.5 U	0.16 J	0.5 U	0.5 U	0.26 J
RB4-34	34	09/29/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.17 J
RB4-38	38	09/27/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB4-24	24	09/28/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.28 J	0.5 U
RB4-18	18	09/25/2013	1 UJ[1]	1 U	1 U	1 U	1 U	1 U
RB4-34	34	09/25/2013	1 UJ[1]	1 U	1 U	1 U	1 U	1 U
RB4-18	18	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
RB4-36	36	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
RB4-24	24	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
RB4-48	48	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
RB4-24	24	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB4-48	48	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB4-24	24	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB4-48	48	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB4-24	24	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB4-72	72	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB5-70	70	09/29/2010	0.5 U	0.5 U	0.72	0.5 U	0.5 U	0.27 J
RB5-24	24	09/27/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB5-48	48	09/27/2011	0.5	0.5 U	3.3	0.5 U	0.5 U	0.5 U
RB5-24	24	09/28/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB5-26	26	09/25/2013	1 UJ[1]	1 U	1 U	1 U	1 U	1 U
RB5-26	26	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
RB5-24	24	09/15/2015	1 U	1 U	1 U	1 U	1 U	0.33 J
RB5-48	48	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
RB5-24	24	09/16/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.64
RB5-48	48	09/16/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.71

Table 6
Pore Water and Surface Water Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Sample ID	Sample Depth[a] (inches)	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride
RB5-24	24	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.69
RB5-48	48	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.62
RB5-24	24	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB5-48	48	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB6-30	30	09/29/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB6-50	50	09/29/2010	0.5 U	0.5 U	0.08 J	0.5 U	0.5 U	0.5 U
RB6-48	48	09/27/2011	0.5 U	0.5 U	2.7	0.5 U	0.5 U	19
RB6-24	24	09/28/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.65	0.5 U
RB6-48	48	09/28/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB6-24	24	09/25/2013	1 UJ[1]	1 U	1 U	1 U	1 U	1 U
RB6-48	48	09/25/2013	1 UJ[1]	1 U	1 U	1 U	1 U	1 U
RB6-24	24	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
RB6-48	48	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
RB6-24	24	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
RB6-48	48	09/15/2015	1 U	1 U	4.8	1 U	1 U	33
RB6-24	24	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB6-48	48	09/12/2016	0.5 U	0.5 U	2.2	0.5 U	0.5 U	9.6
RB6-24	24	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.7
RB6-48	48	09/13/2017	0.5 U	0.5 U	11	0.5 U	0.5 U	132
RB6-24	24	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB6-48	48	09/27/2018	0.5 U	0.5 U	37	0.5 U	0.5 U	39
Surface Water								
RB2-SW	-	09/28/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/25/2013	1 UJ[1]	1 U	1 U	1 U	1 U	1 U
	-	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
	-	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
	-	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB3-SW	-	09/27/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB5-SW	-	09/27/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
RB6-SW	-	09/27/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/28/2012	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/25/2013	1 UJ[1]	1 U	1 U	1 U	1 U	1 U
	-	10/13/2014	1 U	1 U	1 U	1 U	1 U	1 U
	-	09/15/2015	1 U	1 U	1 U	1 U	1 U	1 U
	-	09/12/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 6
Pore Water and Surface Water Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Sample ID	Sample Depth[a] (inches)	Date	Tetrachloroethene	Trichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride
RB-6-SW (cont'd)	-	09/13/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/27/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
EMR-1 (Millrace 1)	-	03/19/2013	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	-	03/17/2014	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	-	09/22/2014	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	-	03/10/2015	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	-	03/02/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/19/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	03/06/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/17/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
EMR-4 (Millrace 4)	-	03/19/2013	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	-	03/17/2014	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	-	03/10/2015	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	-	03/02/2016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/19/2017	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	03/06/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	-	09/17/2018	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Screening Criteria								
Oak Ridge Tier II (Ecological Receptors)[b]			98	47	590	590	25	930[c]

Table 6
Pore Water and Surface Water Analytical Results - VOCs (ug/L)
H&V Fiber Corporation
Corvallis, Oregon

Notes:

[a] Sample depth is relative to in-water sediment elevation. All samples were collected in approximately 12 inches of water.

[b] Per Oak Ridge National Laboratory's Water Quality Criteria - Ecological Receptors - Tier II SCV (Tier II SCV values were taken from Suter II, G.W. and Tsao, C.L., 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. ORNL publication ES/ER/TM-96/R2)

[c] Ecological screening value adopted by EPA in Regions 3, 5 and 6.

ug/L = Micrograms per liter

U = not detected at the associated reporting limit

J = estimated trace concentration

J^1 = Data Validation Qualifier. The numerical value reported is approximate. See Data Validation report for further information.

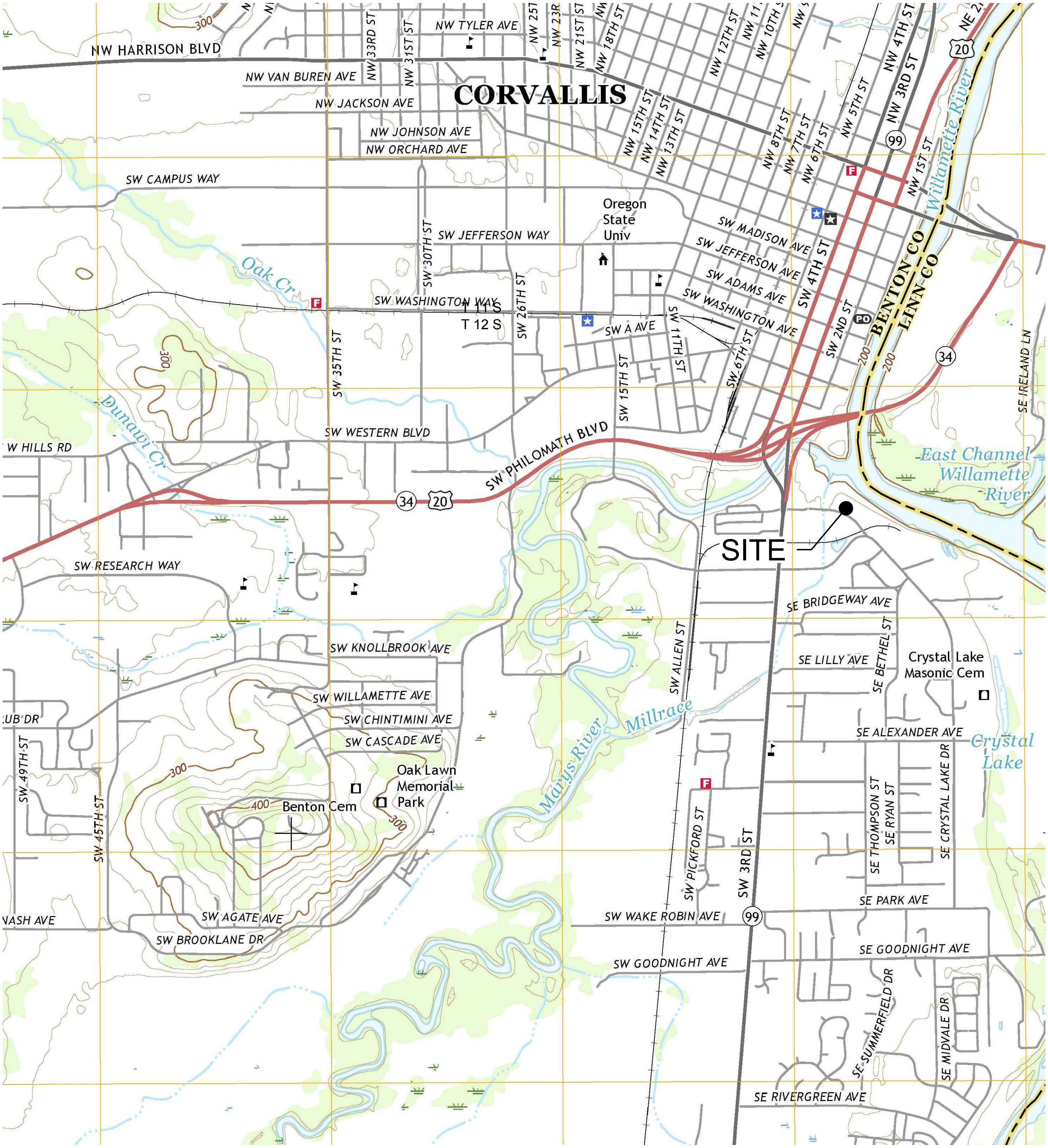
Values in **BOLD** exceed stated screening criteria.

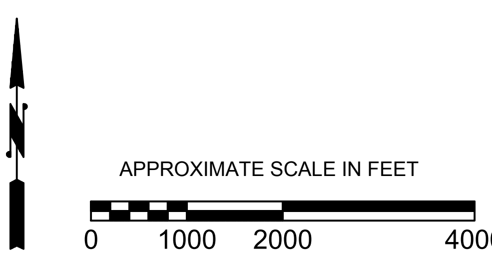
Table 7
Schedule of Project Deliverables
H&V Fiber Corporation

Deliverables	**Schedule**
Existing remedial system component drawings and specifications	To DEQ within 45 days of finalization of the Consent Judgement
Draft ERD Design Report	To DEQ within 90 days of finalization of the Consent Judgement
Final ERD Design Report	To DEQ within 30 days of receipt of their comments on the draft report
Operations and Maintenance (O&M) Plan	To DEQ within 45 days after ERD system startup and optimization
Flux Monitoring Plan	To be developed in coordination with DEQ
Draft Monitoring, Performance Evaluation, and Contingency Plan	To DEQ within 45 days after ERD system startup and optimization
Final Monitoring, Performance Evaluation, and Contingency Plan	To DEQ within 30 days of receipt of their comments on the draft plan

Notes:
DEQ = Oregon Department of Environmental Quality

FIGURES





NOTE:
USGS, Corvallis Quadrangle
Oregon
7.5 Minute Series (Topographic)
Lat: 44°33'12.02"N, Long: 123°15'31.82"W

PNG ENVIRONMENTAL, INC. 6665 SW Hampton Street, Suite 101 Tigard, OR 97223 TEL (503) 620-2387 FAX (503) 620-2977	DATE: 7-11-19 FILE NAME: 1122-01 DRAWN BY: JJT APPROVED BY: SV	H&V FIBER 1115 SE CRYSTAL LAKE DR CORVALLIS, OREGON	SITE LOCATION MAP	Project No. 1122-03 Figure No. 1

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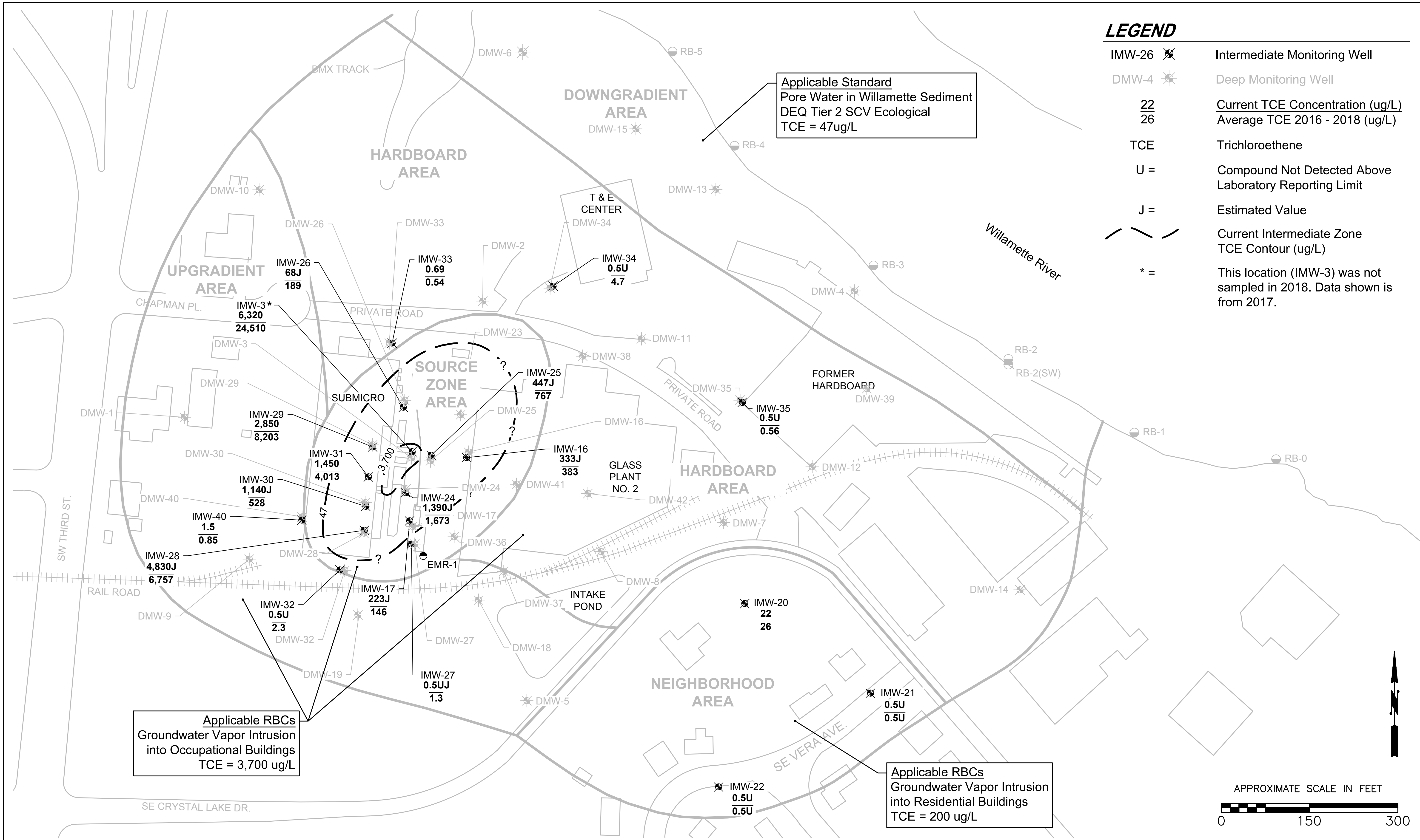

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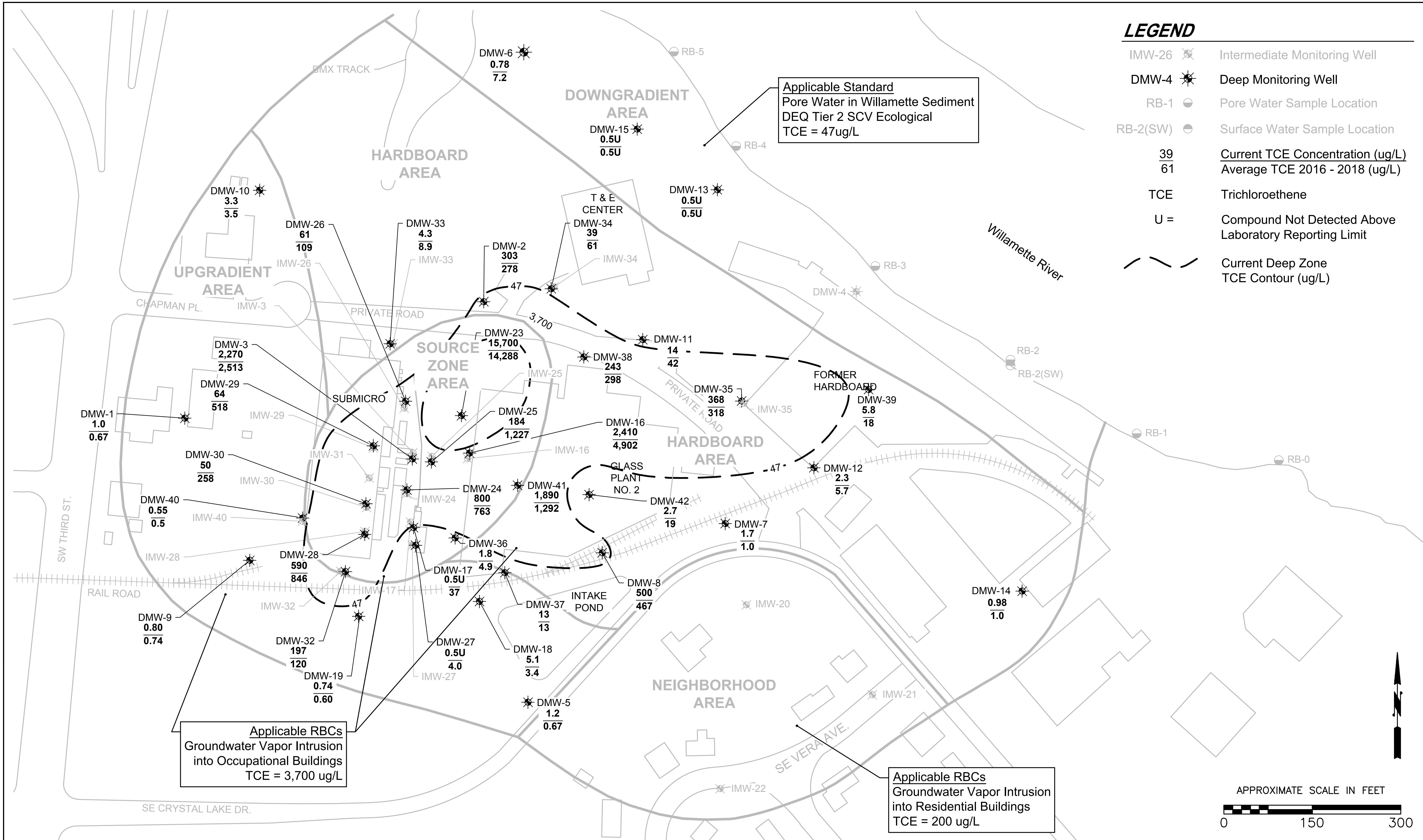
PNG ENVIRONMENTAL, INC. 6665 SW Hampton St., Ste. 101 TEL (503) 620-2387 Tigard, OR 97223 FAX (503) 620-2977	DATE: 7-1-19 FILE NAME: 1122-03 DRAWN BY: JJT APPROVED BY: SV	H&V FIBER 1115 SE CRYSTAL LAKE DR CORVALLIS, OREGON	TCE IN GROUNDWATER 2018 INTERMEDIATE CONDITIONS	Project No. 1122-03 Figure No. 2



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H&V FIBER
1115 SE CRYSTAL LAKE DR
CORVALLIS, OREGON

TCE IN GROUNDWATER
2018 DEEP CONDITIONS

Project No. 1122-03
Figure No. 3

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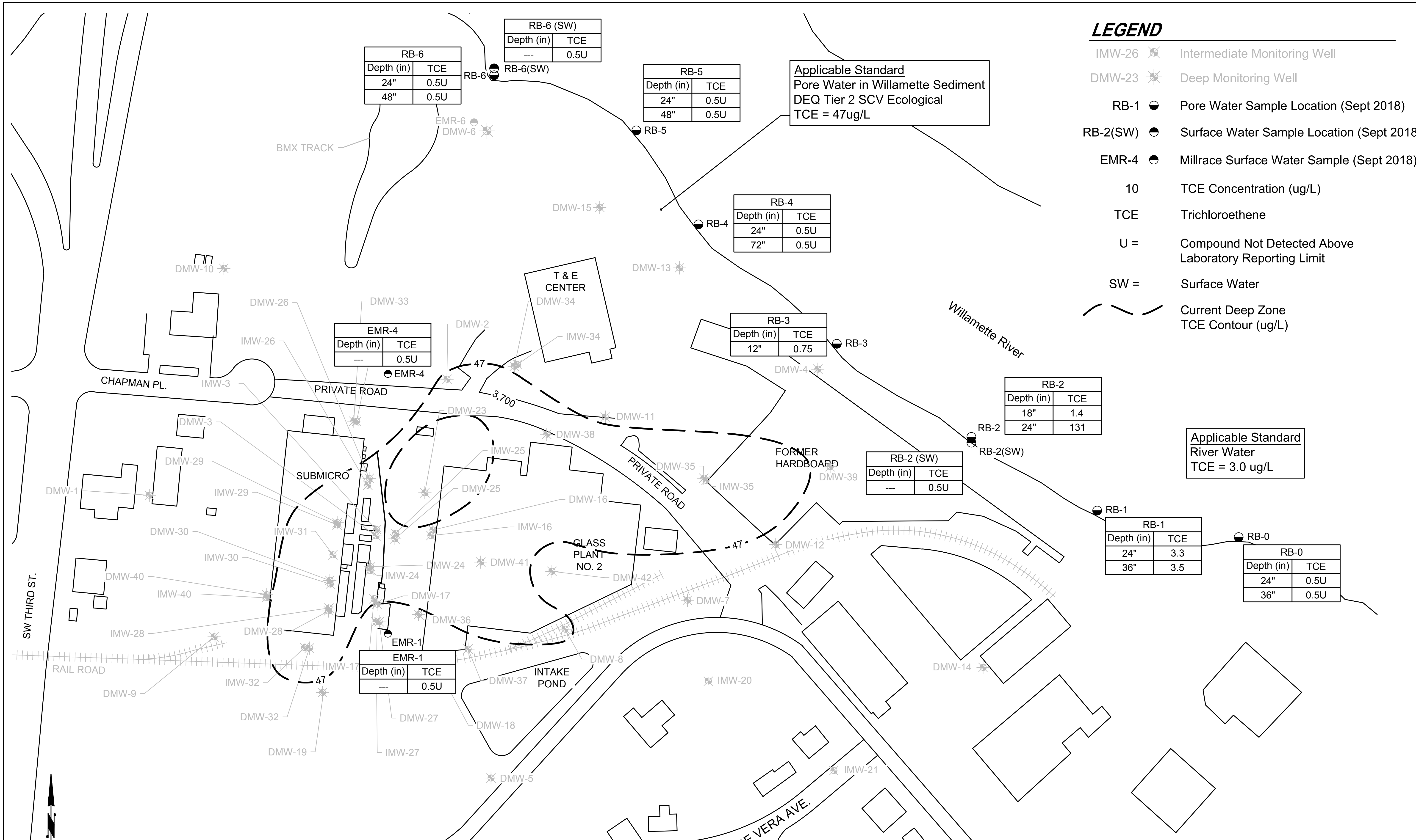

RB-6 (SW)	
Depth (in)	TCE
---	0.5U

RB-6	
Depth (in)	TCE
24"	0.5U
48"	0.5U

RB-5	
Depth (in)	TCE
24"	0.5U
48"	0.5U

RB-4	
Depth (in)	TCE
24"	0.5U
72"	0.5U

RB-3	
Depth (in)	TCE
12"	0.75

EMR-4	
Depth (in)	TCE
---	0.5U

RB-2	
Depth (in)	TCE
18"	1.4
24"	131

RB-2 (SW)	
Depth (in)	TCE
---	0.5U

RB-1	
Depth (in)	TCE
24"	3.3
36"	3.5

RB-0	
Depth (in)	TCE
24"	0.5U
36"	0.5U

EMR-1	
Depth (in)	TCE
---	0.5U

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DATE: 7-1-19
FILE NAME: 1122-03
DRAWN BY: JJT
APPROVED BY: SV

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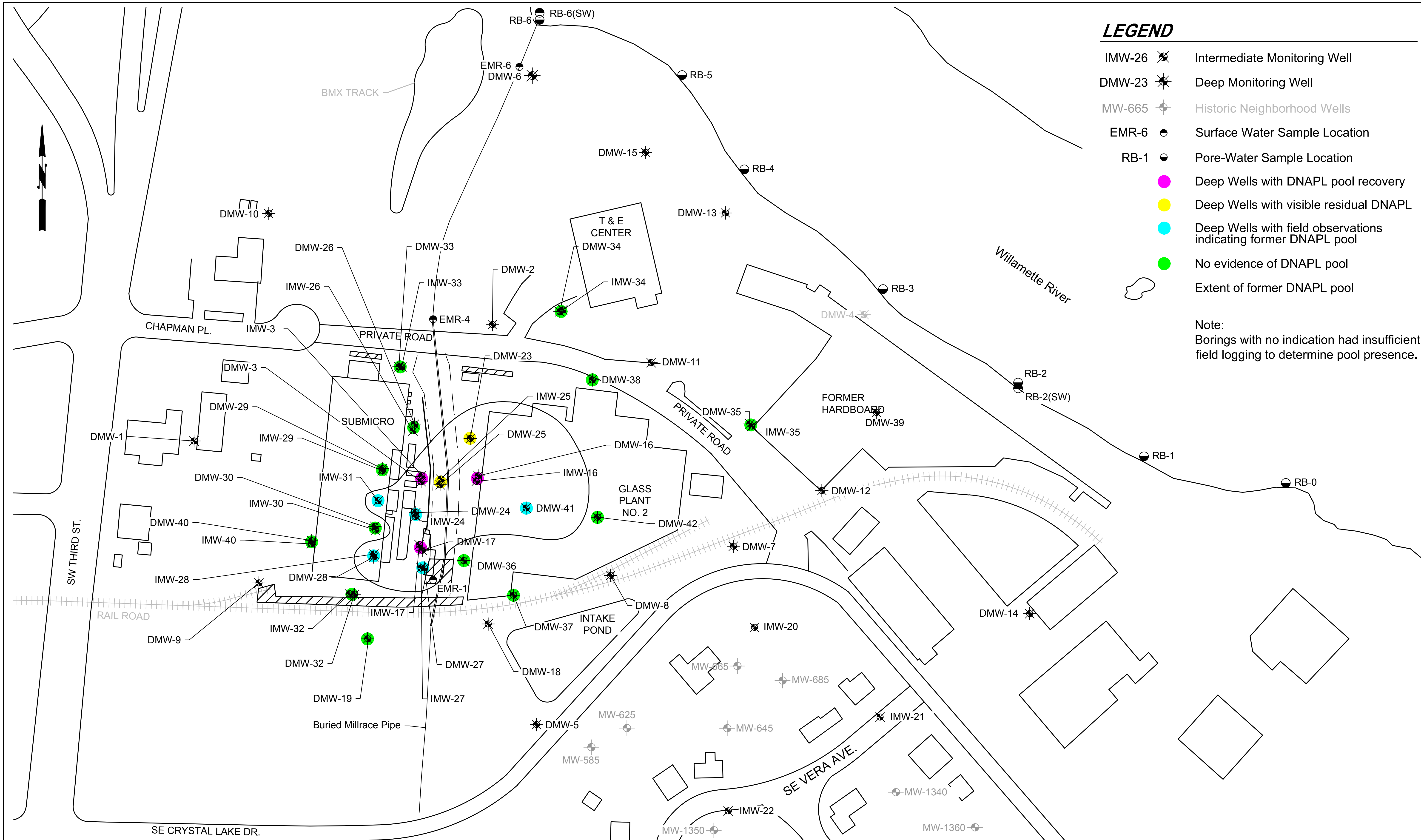
1115 SE CRYSTAL LAKE DR.
CORVALLIS, OREGON

2018 TCE IN PORE WATER AND SURFACE WATER

Project No. 1122-03
Figure No. 4



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DATE:	7-11-19
FILE NAME:	1122-03
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APPROVED BY:	SV

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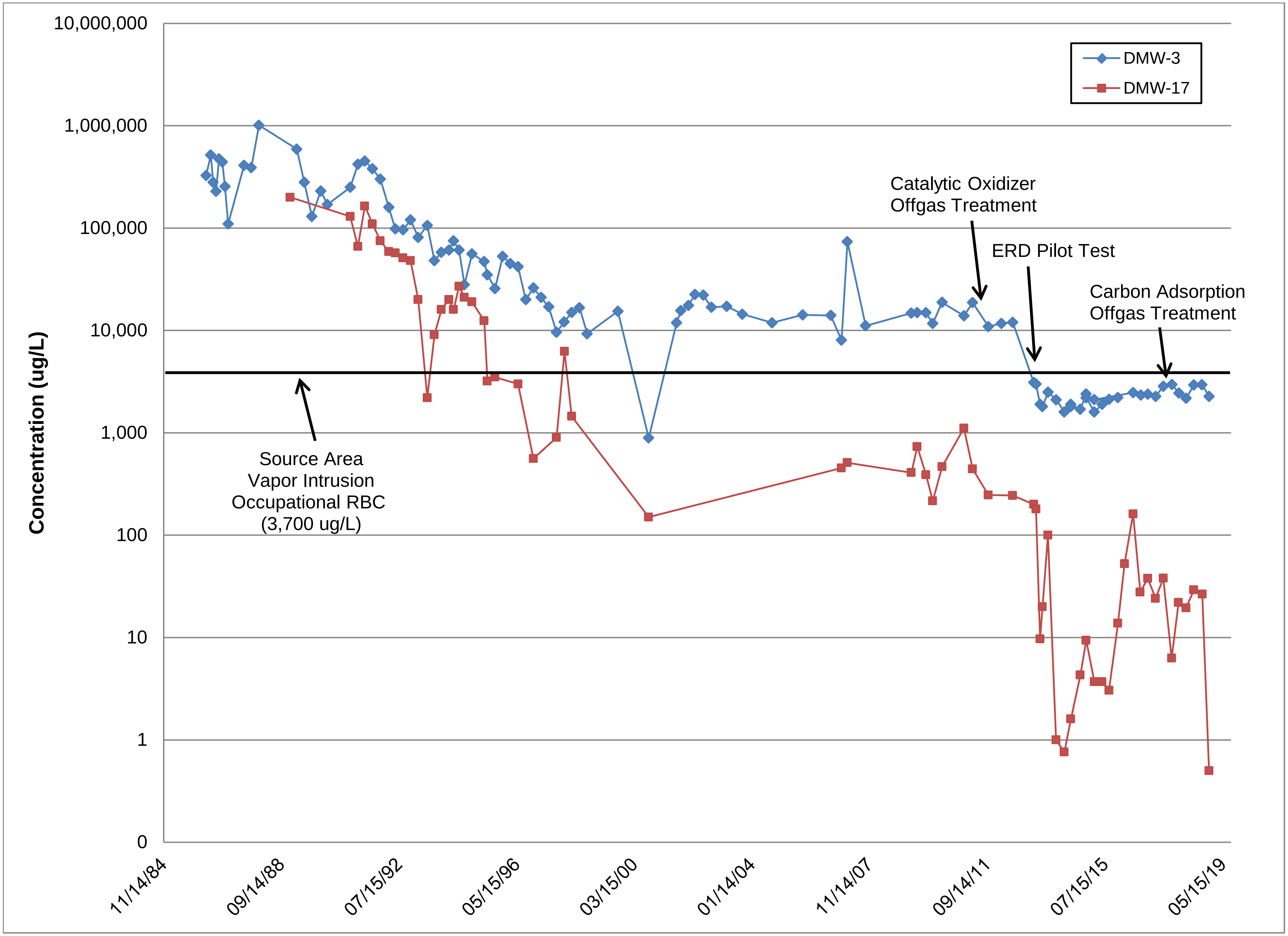
1115 SE CRYSTAL LAKE DR
CORVALLIS, OREGON

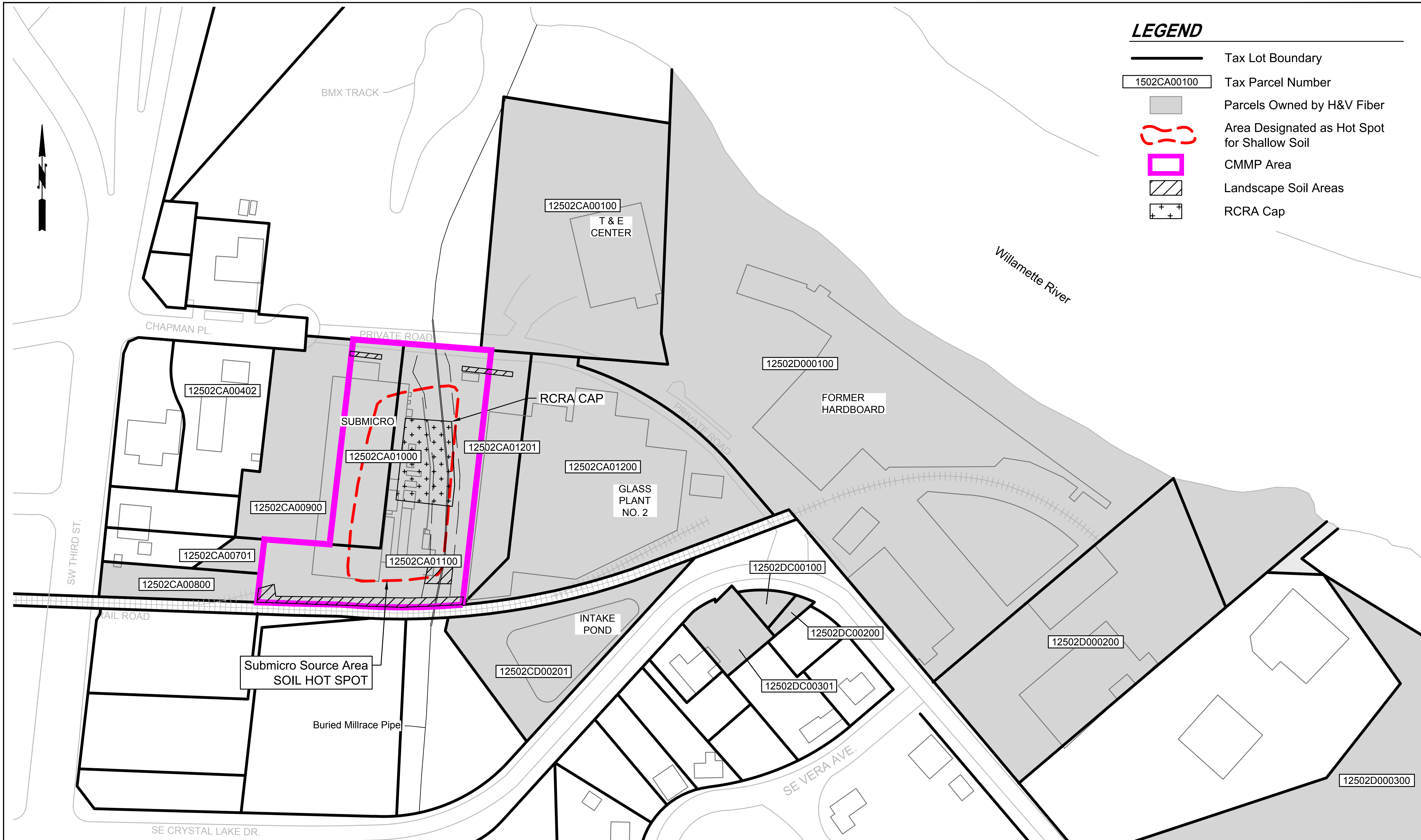
FORMER DNAPL POOL

Project No. 1122-03

Figure No. 5

Figure 6
TCE in Groundwater - DMW-3 and DMW-17
H&V Fiber Corporation





APPROXIMATE SCALE IN FEET

0 150 300

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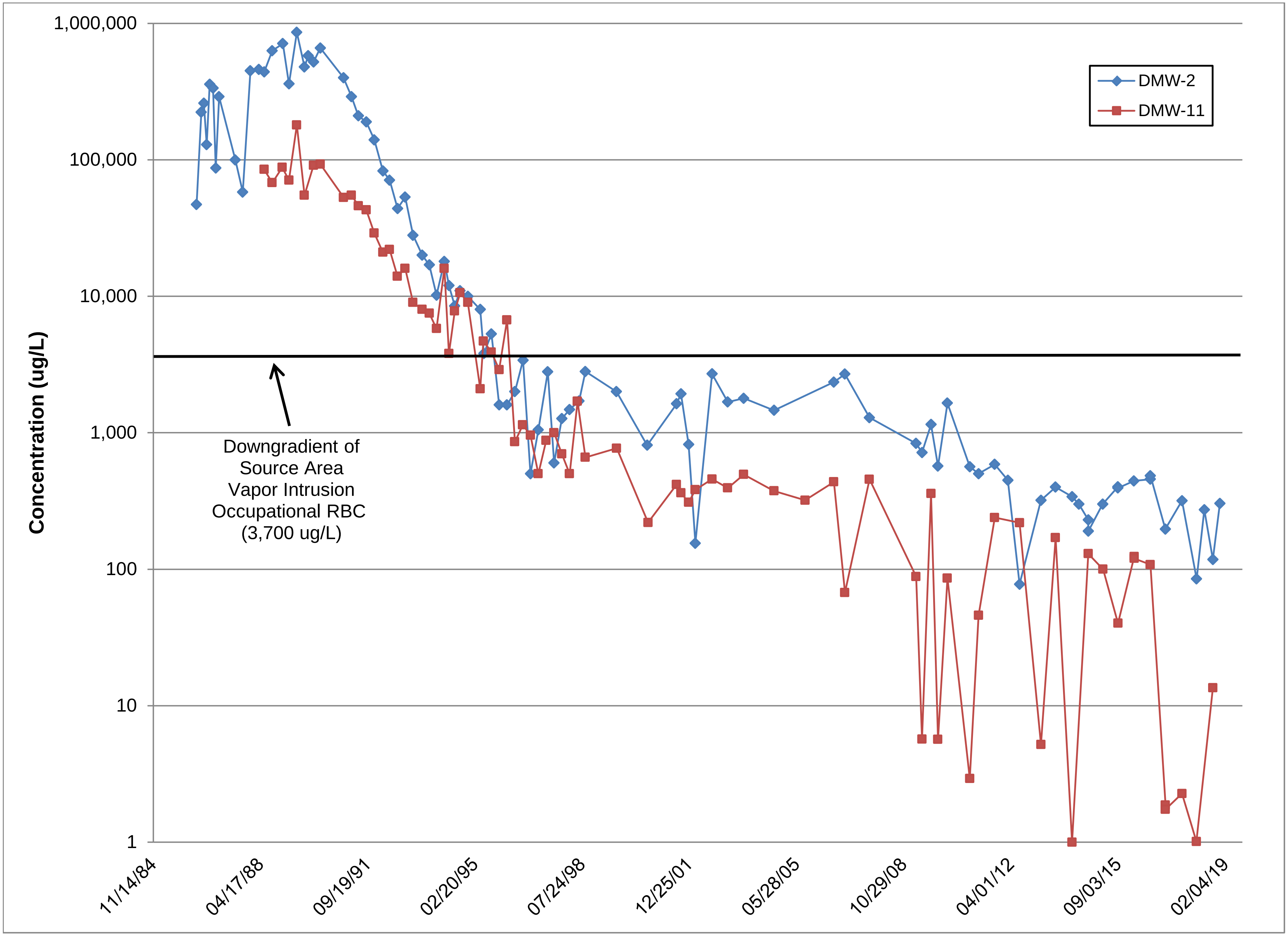
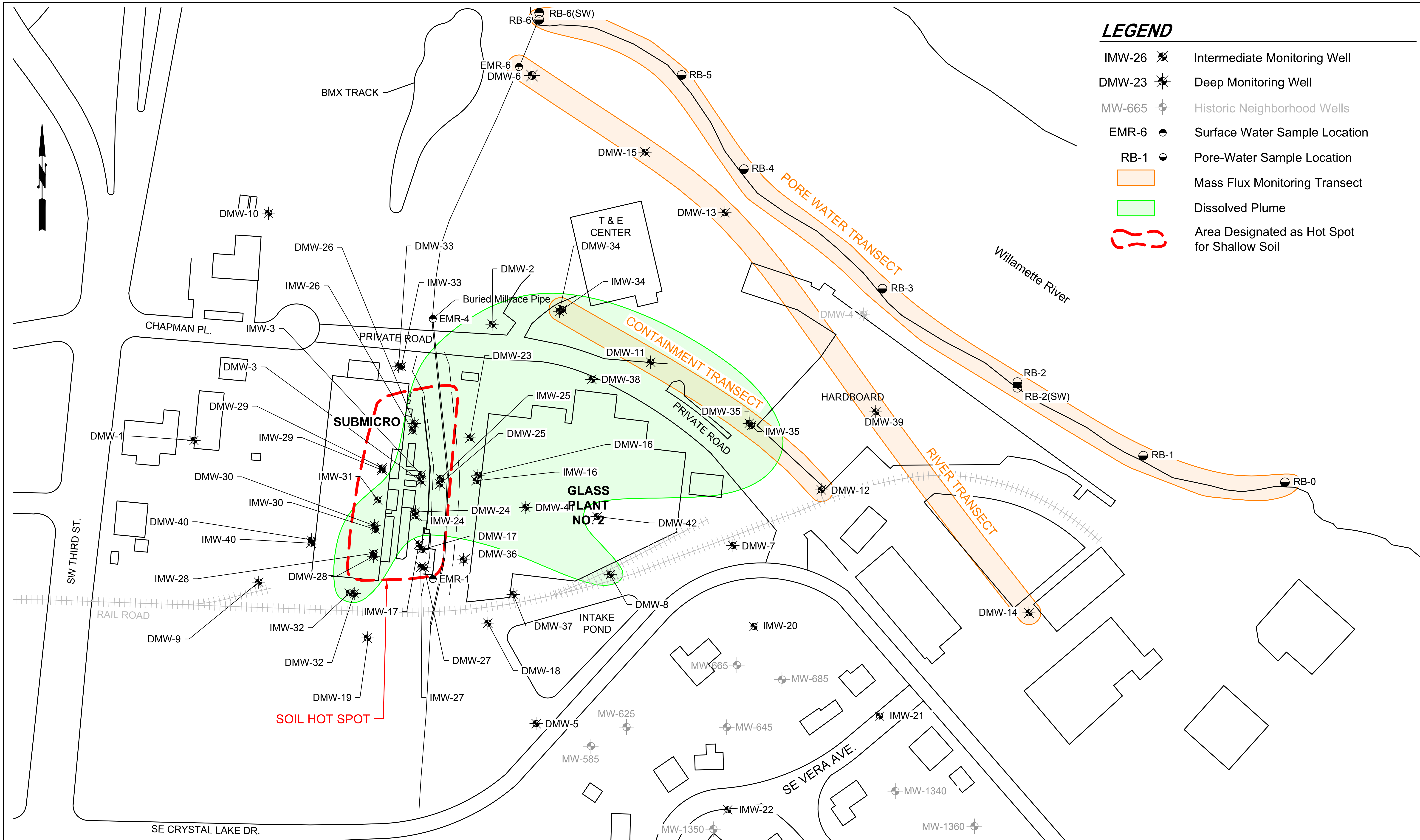
Figure 8
TCE in Groundwater - DMW-2 and DMW-11
H&V Fiber Corporation





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APPROVED BY: SV

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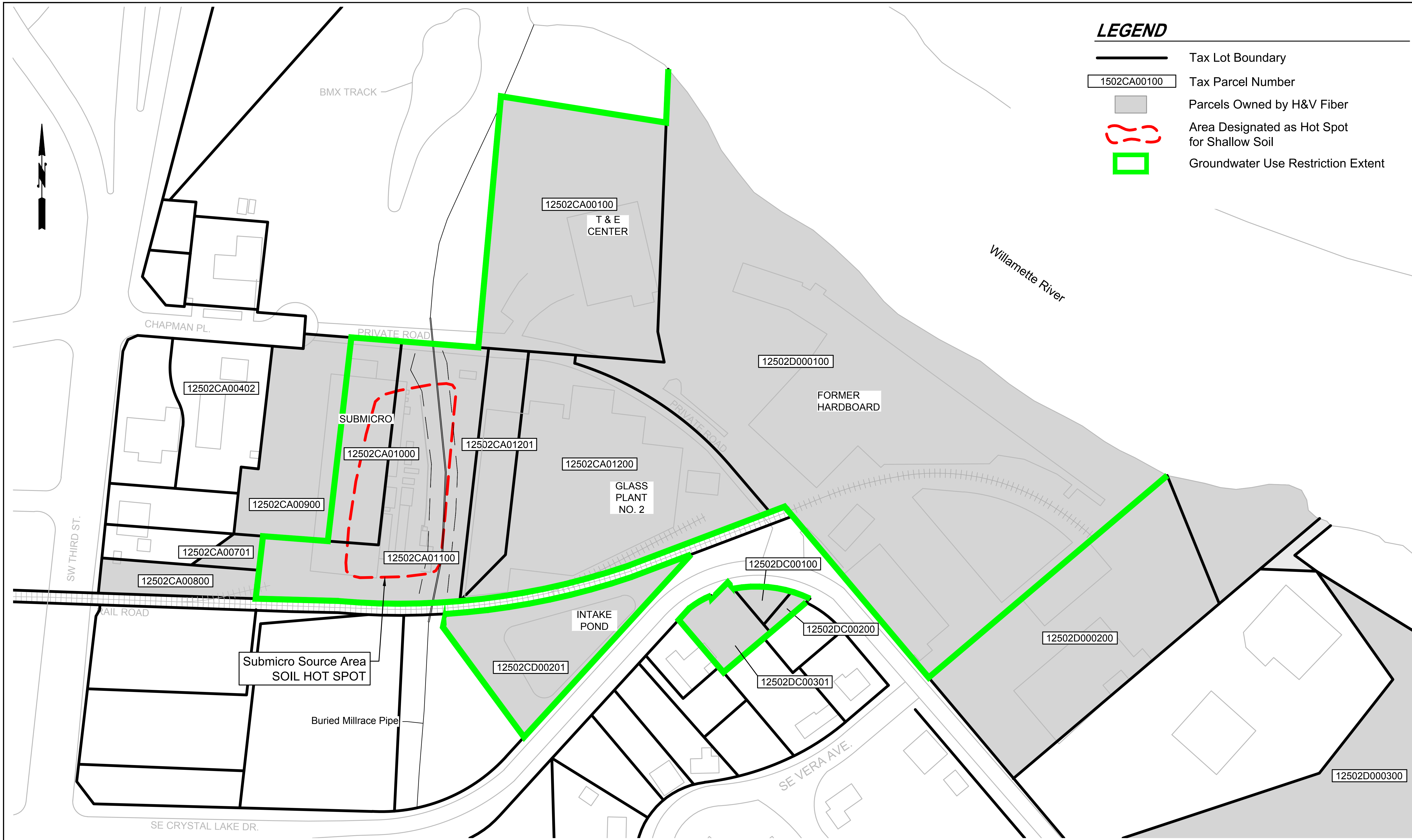
1115 SE CRYSTAL LAKE DR
CORVALLIS, OREGON

FUTURE PERFORMANCE MONITORING NETWORK

Project No. 1122-03

Figure No. 9



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FILE NAME: 1122-03
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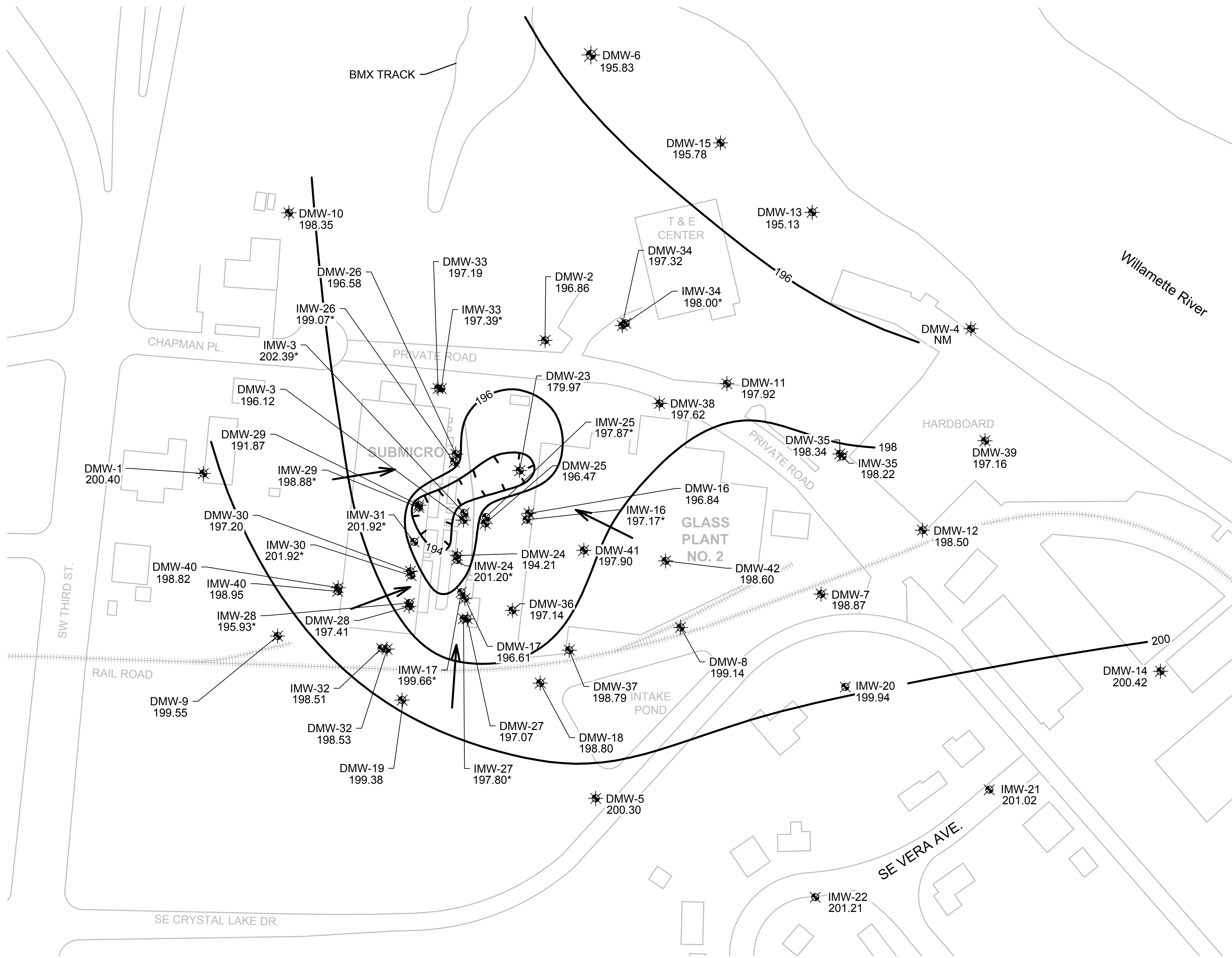
1115 SE CRYSTAL LAKE DR
CORVALLIS, OREGON

TAX LOTS
GROUNDWATER RESTRICTION

Project No. 1122-03
Figure No. 10



LEGEND

IMW-26	Intermediate Monitoring Well
DMW-23	Deep Monitoring Well
196.52	Groundwater Elevation (Feet)
NM =	Not Measured
	Groundwater Contour
	Groundwater Flow Direction
* =	Not used for contouring

GROUNDWATER EXTRACTION RATES (gpm)	
DMW-2	0
DMW-3	9.5
DMW-23	5.9
DMW-24	13.7
DMW-29	2.6
TOTAL	31.7

Notes:
DMW-2 down due to pump maintenance.
DMW-23 pump was cycling at time of measurement.
Groundwater Extraction Rate at time of Elevation Measurement.
Groundwater elevation in Intermediate Monitoring Wells near the source area are influenced by SVE and thus not used for contouring.

APPROXIMATE SCALE IN FEET

0 150 300

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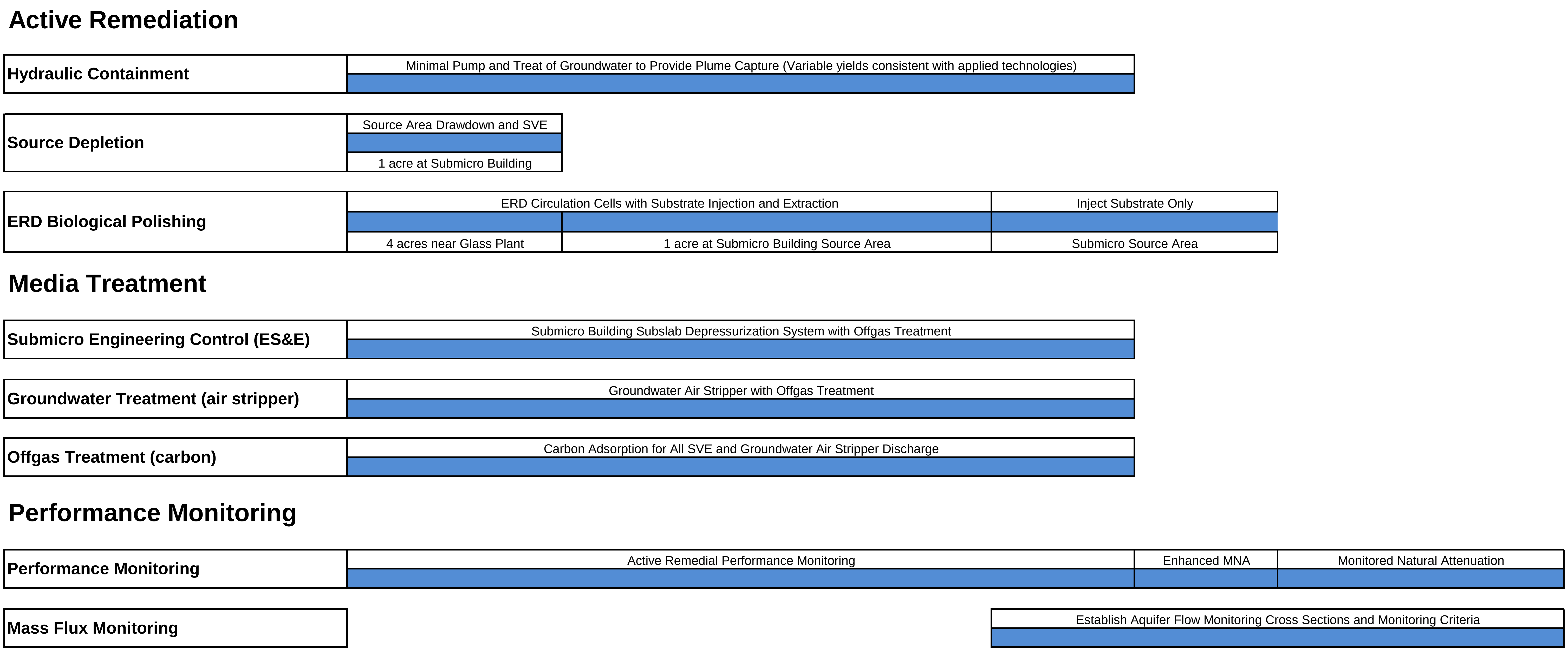
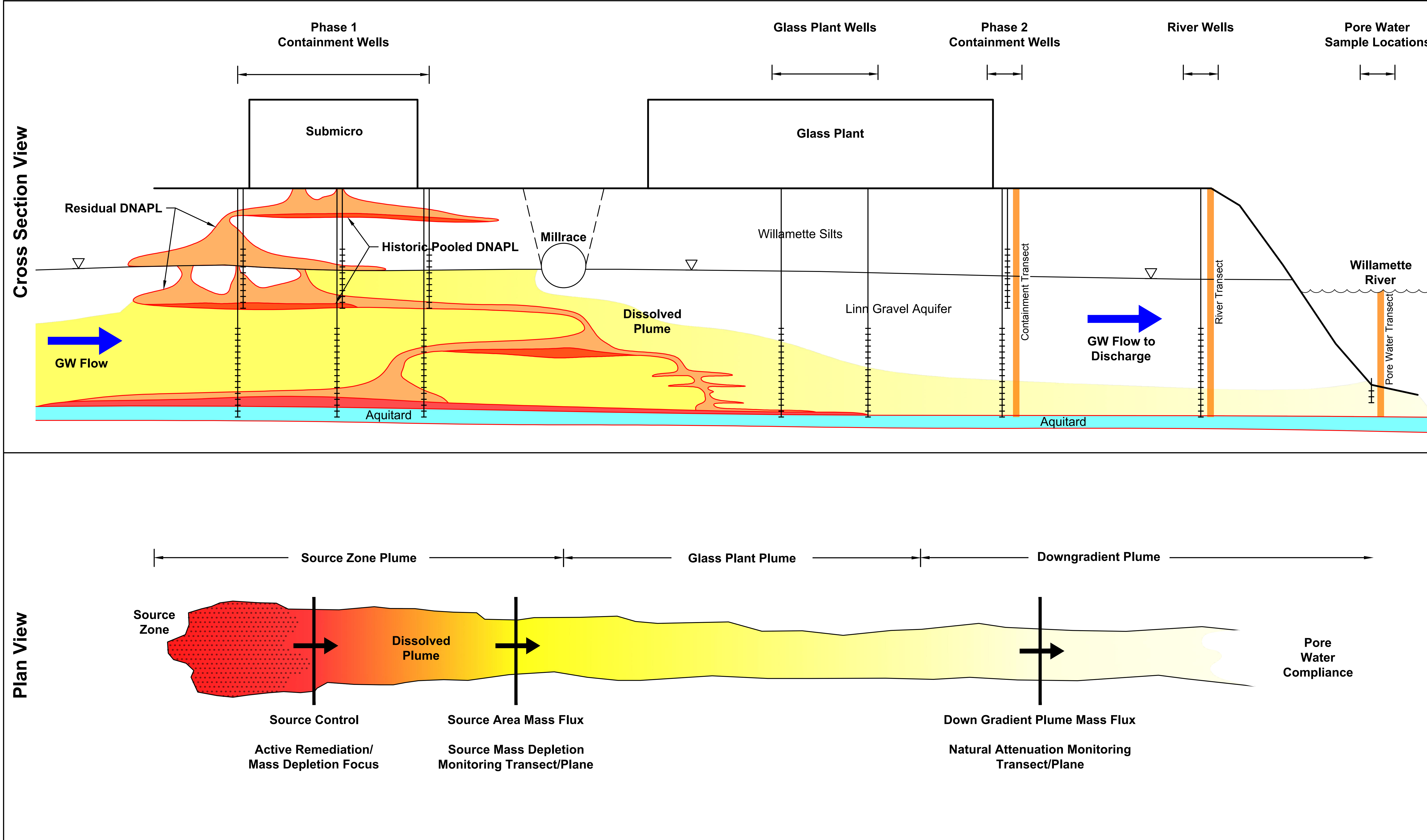
Figure 12
Evanite Post-ROD Remediation Schematic





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