



June 16, 2022

Mr. Chris Maurer
State of Washington
Department of Ecology
P.O. Box 47600
Olympia, WA 98504

Re: Remedial Investigation Report
REXAM Beverage Can Company / Ball Corporation
VCP Number: NW1105
1220 2nd Avenue North
Kent, King County, WA 98032
Site Number: 35918556

ENVISION Project ID: 302.REX

Dear Mr. Maurer:

On behalf of REXAM BEVERAGE CAN COMPANY (RBCC) / BALL CORPORATION, ENVISION ENVIRONMENTAL, INC. (ENVISION) is submitting the enclosed Remedial Investigation Report (RIR) for the above-referenced facility. The RIR includes the details on the attempts to gain access to install offsite downgradient monitoring wells, the installation of a new shallow monitoring well on the northeast side of the building, the groundwater sampling conducted in September 2021, a Terrestrial Ecological Evaluation Form, and the proposed Cleanup Levels for environmental media at the Site.

ENVISION is also requesting a written opinion on the RIR. The WA DOE's input will provide guidance in moving forward with the remediation of the Site.

Please do not hesitate to contact the undersigned if you have any questions or require additional information.

Very truly yours,

John H. Weakliem P.G.
Senior Geologist

Mark P. Roman
President

cc: Adam Musulin – BALL CORP



ENVISION ENVIRONMENTAL, INC.

REMEDIAL INVESTIGATION REPORT

for

REXAM BEVERAGE CAN COMPANY / BALL CORPORATION
1220 2nd AVENUE NORTH
KENT, KING COUNTY, WA 98032

SITE No.: 35918556
Voluntary Cleanup Program No. NW1105

Prepared For:

REXAM BEVERAGE CAN COMPANY / BALL CORPORATION
9300 West 108th Circle
Westminster, CO 80021-3682

Prepared by:

Mark Roman
Mark R. DeGregory
John H. Weakliem, P.G.



ENVISION ENVIRONMENTAL, INC.

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1.0 INTRODUCTION

ENVISION ENVIRONMENTAL, INC. (ENVISION) has prepared this Remedial Investigation Report on behalf of REXAM BEVERAGE CAN COMPANY (RBCC) / BALL CORPORATION (BALL) for the following facility (the Site):

REXAM BEVERAGE CAN COMPANY / BALL CORPORATION
1220 2nd Avenue North
Kent, WA 98032

Voluntary Cleanup Program (VCP) Case No. NW1105

Facility Site Identification No. 35918556

Cleanup Site Identification No. 3101

Current Operator:

REXAM BEVERAGE CAN COMPANY / BALL CORPORATION
9300 West 108th Circle
Westminster, CO 80021-3682

Adam Musulin, Manager, Environmental Services
AMUSULIN@ball.com
(303) 460-5629

Current Property Owners: According to information obtained from the King County Parcel Viewer Geographical Information System website, the current owners of the property are Pool 5 Industrial WA LLC (northern portion of property) and IC Industrial REIT (southern portion of property).

This report is being submitted to the Washington Department of Ecology (WA DOE) in partial fulfillment of the requirement to conduct a Remedial Investigation of the property. The report contains:

- Complete descriptions, data, and supporting documentation for the activities conducted since the submission of the Remedial Investigation Report – Indoor Air Sampling in June 2019.
- A summary of the Site conditions, Site history, previous investigations, interim remedial measures, and the Conceptual Site Model that have been developed and submitted in previous reports.
- The Cleanup Levels (CULs) that have been developed for the Site based on using Model Toxics Control Act (MTCA) default Method C and Method A (the latter for petroleum hydrocarbons only).
- A completed Terrestrial Ecological Evaluation form.
- A completed Request for Opinion Form.



The report was prepared in general accordance with the requirements defined in the MTCA Regulation (Washington Administrative Code [WAC] 173-340-350). The purpose of the Remedial Investigation, as defined in WAC 173-340-350, is to characterize the distribution of hazardous substances at the property and the threat to human health and the environment. The report is organized in general accordance with WA DOE document 16-09-006; Remedial Investigation (RI) Checklist; dated May 2016, revised June 2020.

This report was prepared by:

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The WA DOE Case Manager is Mr. Chris Maurer.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site and Area Description

The facility is located at the southeast corner of the intersection of 2nd Avenue North and South 228th Street in an industrial park in the south side of the O'Brien section of Kent, WA. The facility occupies approximately 11.5 acres of land. The Site location is shown on Figure 1, Property Location Map. A Site Plan is included as Figure 2. The nearby properties are light industrial and commercial. The nearest residences are located approximately 800 feet southeast of the property, beyond State Route 167 (Valley Freeway), a major limited-access highway constructed atop a high earthen embankment.

The Site consists of two (2) separate parcels. The northern parcel, Parcel Number 1322049183, contains a Manufacturing Building with an attached office area. The southern parcel, Parcel Number 3830900400, contains a Warehouse Building. The parcels are owned by different entities and are leased by RBCC. Parcel 1322049183 is owned by Pool 5 Industrial WA LLC; Parcel 3830900400 is owned by IC Industrial REIT. The Site (as defined in WAC 173-340-200) encompasses parts of both properties (only the northernmost part of the southern property). The geographic coordinates of the approximate center of the Site are 47.395527° North and 122.234594° West. The Site is located in the Northwest Quarter of the Northeast Quarter of Section 13, Township 22N, Range 04E. Legal descriptions of both properties are included in Appendix 1.

The facility consists of two (2) 1-story high-bay buildings, a 131,815-square foot Manufacturing Building and a 100,000-square foot Warehouse Building. An attached Wastewater Treatment Building is located on the west side of the Manufacturing Building. A covered drum storage area is centrally located in a paved area between the two (2) buildings on the eastern side of the property. An asphalt parking lot and truck access area are located on the west side of the buildings. 2nd Avenue North is located west of the parking area with industrial/commercial facilities beyond it. An out-of-service railroad siding and the BNSF main railroad lines are located on the east side of the property. A low-lying undeveloped grass-covered area is located between the out-of-service railroad siding and the BNSF main rail lines. This area is not occupied by RBCC and is a separate property (zoned Industrial) owned by Pool 5 Industrial WA LLC. The northern side of the property is bordered by South 228th Street. The area north of the Manufacturing Building is paved and borders the South 228th Street overpass (prior to construction of the South 228th Street overpass, this area contained an access driveway to the Site and landscaping). The pavement wraps around the northeastern corner of the Manufacturing Building. The southern side of the Warehouse Building is asphalt paved for truck access. Further southeast and south of the Site are the railroad siding, State Route 167, and industrial/commercial buildings. Industrial/commercial buildings are also located to the north across South 228th Street and to the east beyond the BNSF rail line.

Both buildings are constructed with concrete slab floors, concrete tilt-up walls, and built-up composition roofing. The roof joists and columns for both buildings are wood. There are no basements.



The facility is serviced by public utilities, which enter the property underground from the west. Water is supplied by the City of Kent. There are no water supply wells on the property. Stormwater and sanitary sewer services are also supplied by the City of Kent. There is no septic system, nor has there ever been one since the industrial development of the property.

The property is located within a large area with General Industrial (M-3) zoning. Potential future uses of the property are industrial or commercial. Property use by potentially sensitive populations is unlikely, as is redevelopment that would reduce the amount of impervious cover, based on the current and likely future use of the area.

The facility is located within the Puget Lowland Physiographic Province in King County, Washington. The approximate elevation is 37 feet above mean sea level (AMSL). The topography is generally flat. The regional topography slopes very slightly down to the west towards the Green River, approximately 1.8 miles to the west.

Surrounding properties are at approximately the same elevation. A ridge with approximately 100 feet of relief is located approximately 3,500 feet east of the facility.

2.2 Summary of Soil and Groundwater Conditions

Soil borings typically encountered 3 feet to 6 feet of fill; a boring immediately north of the Manufacturing Building encountered approximately 10 feet of fill. The fill generally consists of variable amounts of silt, sand, and gravel. The shallow native sediments consist of interlayered fine sand, silty fine sand, silt, silty clay, and clay. The sand and silty sand tend to form lenses in the finer-grained units or to grade laterally into the finer sediments.

Shallow groundwater is typically encountered between approximately 3.5 feet to 8.5 feet below ground surface (bgs). The depth to water in MW-107, located on the east side of the Manufacturing Building, is less, typically about 2 feet bgs. During the September 2021 sampling event, depth to groundwater was between approximately 6.5 feet bgs to 11.5 feet bgs. Shallow groundwater is semi-confined.

The direction of groundwater flow is generally to the west and northwest across much of the facility; major seasonal variation is not apparent. The horizontal groundwater gradient is generally low and variable. The direction of the vertical hydraulic gradient is variable; the gradient is low. It is likely that the variation in the direction in vertical gradient is due to differences in rainfall, both seasonally and from year to year. Hydraulic conductivity ranges from 1.6 feet/day to 11.5 feet/day, based on previous slug tests. These hydraulic conductivity values are typical of silty sands. The contaminants are adsorbed by organic carbon present in the aquifer matrix; thus, they exhibit retardation and move at a slower velocity than groundwater. Total organic carbon content is variable, with samples previously collected from near the water table ranging up to 1.3 weight %.



2.3 Property Uses and History

2.3.1 Historical Property Use

Historically, the area was vacant marshland and farmland until development in the early 1970s. The Manufacturing Building was constructed in approximately 1971 as an aluminum beverage can manufacturing facility. Long-service facility personnel stated the facility was one of the first industrial developments in the area. At that time, the northern part of the building contained the warehousing operation, and the central and southern part of the building contained the manufacturing operation. The present Warehouse Building was constructed in approximately 1979 – 1980 and has always been used for warehousing and shipping.

In the late 1980s – early 1990s, production was expanded, and the manufacturing areas were relocated and expanded within the Manufacturing Building. The present Wastewater Treatment Building was also constructed during this period. The present covered drum storage area was constructed between 1990 and 2002.

Historical manufacturing operations were primarily the same as those existing at present; however, aluminum coils were formerly delivered via the rail siding on the east side of the Manufacturing Building, and solvent-based materials (coatings and cleaners) were more commonly used within the process. The changeover to water-based materials was conducted over time in the 1980s. Another significant difference was that the cuppers, bodymakers, and can washers were formerly located in the central part of the Manufacturing Building, east of the present Wastewater Treatment Building. The figure included as Appendix 2 shows the former locations of the manufacturing and support areas.

2.3.2 Current Property Use and Facilities

The Site is currently used for the manufacture, warehousing, and shipping of two-piece aluminum beverage cans. Coils of sheet aluminum are delivered by truck. The coils are unrolled and fed into hydraulic punch presses (cupper). The cuppers stamp shallow cups from the aluminum sheet, which are then conveyed to bodymaker/trimmer units. The bodymakers draw and iron the cups into the basic shape of the can body by pressing the cups through a series of dies using hydraulic pressure. Water-soluble oil is used to lubricate the aluminum during these processes. After the can body is formed, the can ends are cut to length by the trimmer. The cuppers and bodymaker/trimmer units are often referred to as the Front End. The cans are then moved by vacuum conveyor to the can washer/drier, washed using acid/caustic solutions and dried in natural gas-fired ovens. The can bodies are then conveyed to the decorator/printer units or to the palletizer/depalletizer (pal/depal) units for storage until future processing. At the decorator/printer units, the can exteriors are coated and printed with customer labels using water-based coatings and inks, then dried in natural gas-fired ovens. The can interiors are then coated and dried in natural gas-fired ovens. The can ends are formed to accept

a lid, inspected and tested, then palletized and warehoused for shipment.

Typical support services include shipping and receiving; a small machine shop with a welding area located in the northwestern corner of the Manufacturing Building; grinding of bodymaker dies; air compressors and vacuum pumps; a cooling tower; a coolant/lubricant filtration system for recycling the water-soluble oil; can washwater pretreatment; an ink storage area; and a scrap aluminum baler with a cyclonic scrap conveyance system. Electrical transformers and a wastewater treatment system are located on the west side of the Manufacturing Building. A covered drum storage area is located in an asphalt paved area outside the southeastern corner of the Manufacturing Building. The Warehouse Building is a separate building located south of the Manufacturing Building and joined to it by a covered passage; the only activities ever conducted in the Warehouse Building are the storage of unfinished and finished cans, and shipping of finished cans by truck.

There are two (2) aboveground storage tanks (ASTs) located in a concrete-bermed area south of the transformers on the west side of the Manufacturing Building. Each AST has a capacity of approximately 6,000 gallons. One tank contains inside spray and the other contains overvarnish. There are also smaller ASTs inside the northern end of the Manufacturing Building for storage of virgin and waste hydraulic oil and water-soluble oil, and ASTs associated with wastewater treatment in the Wastewater Treatment Building. Offices, locker rooms, and a cafeteria are located along the northwestern side of the building. A cooling tower is located immediately west of the Wastewater Treatment Building.

Subsurface structures include concrete trenches, sumps and pits located in several areas of the northern end of the Manufacturing Building, including the baler area, the two (2) copper units, the two (2) bodymaker lines, the can washer area, the filter sump tank, the Schneider filter pit, the can washer chemical storage area, and the wastewater treatment system. The purpose of the trenches around the coppers, bodymakers, and baler is to collect oil and direct it to the filter sump tank, where tramp hydraulic oil is separated for offsite disposal, and water-soluble oil is treated and recycled through the bodymakers and coppers. The oil is pumped via overhead piping. The subsurface structures around the can washer and wastewater treatment system collect wastewater for processing and the floor trench around the can washer chemical storage area is for containing spills of water treatment chemicals and acids. The majority of the floor trenches are shallow, typically less than 1 foot in depth. The filter sump tank and Schneider filter pit are between approximately 8 feet to 10 feet in depth. Figure 3, Manufacturing Building Interior Equipment Layout, shows the locations of these features.



3.0 SUMMARY OF FINDINGS OF ENVIRONMENTAL INVESTIGATIONS

Impacted soil and groundwater related to historical beverage can manufacturing operations were discovered during environmental due diligence investigations conducted by a former property owner and by RBCC from 2000 through 2001; the reports of these investigations were submitted to WA DOE. The Site was enrolled by RBCC in the VCP in 2003 and a Site Investigation Workplan (SIW) was submitted to the WA DOE. The SIW stated that a Remedial Investigation would be conducted, and a Remedial Investigation Report would be prepared. Since the facility operates around the clock, all investigation activities had to be conducted during facility maintenance shutdown periods so that manufacturing operations were not disrupted. As a result, the Remedial Investigation was conducted in phases and the results were submitted to the WA DOE in multiple reports.

The results of previous investigations and interim actions conducted are summarized in this section. The referenced reports have been submitted to the WA DOE under the Site's VCP filing. The following investigations and interim remedial actions have taken place:

- Earth Tech, Inc. (EARTH TECH) removed a 12,000-gallon UST in 1998.
- Eckland Consultants, Inc., (ECKLAND) conducted a Phase I Environmental Site Assessment in early 2000.
- PRK Environmental Consulting Services (PRK) conducted a Phase II Environmental Site Assessment in early 2001.
- EARTH TECH conducted a Limited Phase II Environmental Site Assessment in late 2001.

The PRK and EARTH TECH Phase II reports included limited soil and groundwater sampling, primarily on the exterior of the Manufacturing Building, and the collection of a soil sample beneath the Manufacturing Building floor near the Schneider filter pit by PRK.

- ENVISION submitted a Voluntary Cleanup Program Application and Proposed Site Investigation Workplan in April 2003.
- ENVISION submitted the following series of Site assessment reports, interim remedial action reports, and status reports:
 - Environmental Assessment Report, June 2007. This included conducting CPT borings, replacement of selected small-bore wells with conventional monitoring wells, and groundwater sampling.
 - Environmental Assessment Report - Railroad Siding Excavation and Interior Subfloor Area Investigation, May 2009. This included excavation of the former compressor blowdown oil-impacted railroad ballast and shallow soil plus post-excavation soil sampling, as well as cleaning and inspections of subgrade structures in the manufacturing areas and shallow soil sampling at two (2) locations inside the Manufacturing Building where damaged floors were being replaced.
 - Environmental Assessment Report – Groundwater Sampling and Interior Subsurface Investigation, July 2010. This included cleaning and inspection of the



- remaining accessible subgrade structures in the manufacturing areas, and groundwater sampling of the permanent monitoring wells.
- Status Report – RBCC, June 2011. This included groundwater and subslab soil gas (SSSG) sampling. The former was conducted to assess the potential for offsite migration of impacted groundwater. The latter was conducted to aid in identifying source areas.
 - Letter reviewing actions taken to address a release of hydraulic oil from the baler, February 2012. This described the referenced release, the measures taken to recover the released oil, removal of impacted shallow soil, and post-excavation soil sampling.
 - Status Report – RBCC, March 2013. This included the results of quarterly groundwater monitoring from 2011 to early 2012, and soil sampling from 2011.
 - Status Report – RBCC, August 2014. This included the results of soil sampling in the identified source areas and additional groundwater sampling.
 - Interim Remedial Investigation Report – RBCC, August 2015. This was a comprehensive report that included detailed assessment of the previous work and the results of groundwater sampling conducted in 2015.
 - Indoor Air Sampling Workplan – RBCC, November 2016. Based on the findings of the Interim Remedial Investigation Report, indoor air (IA) sampling was recommended to determine if the vapor intrusion (VI) pathway was complete. This provided the proposed sampling workplan to the WA DOE for comment and approval.
 - Progress Report – Ball Corp (Former RBCC), July 10, 2018. This report provided the results of groundwater sampling conducted in 2018. It also proposed offsite well locations to complete groundwater delineation to the west and northwest.
 - Remedial Investigation Report – Indoor Air Sampling – RBCC / Ball Corporation, June 2019. This report provided the results of the IA sampling. The IA results showed the VI pathway was incomplete.

The Interim Remedial Investigation Report dated August 2015 contains detailed descriptions of field procedures, selection of contaminants of concern, sampling methodology and rationale, the Site characterization activities conducted to date, and the findings. Subsequent reports included the field procedures and findings of each phase. The following information is summarized from the above reports.

The Interim Remedial Investigation Report dated August 2015 summarized the results of the soil, groundwater and SSSG sampling conducted to that point. The following have been identified as contaminants of concern, based on the property history and the initial sampling results:

- Volatile Organic Compounds (VOC) – solvents and components of solvent-based inks and coatings;
- 1,4-Dioxane – as a stabilizer for 1,1,1-trichloroethane;
- Total Petroleum Hydrocarbons (TPH) – Gasoline Range Organics (GRO), Diesel Range Organics (DRO) as kerosene/jet fuel, and motor or heavy oil – resulting from releases of water-soluble, lubricating, and hydraulic oils.



Semi-volatile organic compounds (SVOC), Priority Pollutant Metals (PPM), and hexavalent chromium were initially considered potential contaminants of concern. Sampling for these constituents has shown they are not contaminants of concern.

3.1 Soil Conditions

In the central part of the Manufacturing Building, VOC- and TPH-impacted soil is present from immediately below the floor to the groundwater table. This is the area of the former Front End. The areal extent of the VOC impact is greatest in soil immediately above the groundwater table, and the highest contaminant concentrations are found in this zone. Generally, 1,1,1-trichloroethane is present at the highest concentration, with elevated concentrations of 1,1-dichloroethene and 1,1-dichloroethane also observed over much of the area. Lower concentrations of tetrachloroethene and trichloroethene are also present. A variety of aromatic and aliphatic VOCs were also detected at lower concentrations; their concentration trends generally follow that of 1,1,1-trichloroethane. The highest concentrations in soil in this area were observed in soil sample locations SB302 at 7 feet to 8 feet bgs; SB303 at 3.5 feet to 4.5 feet bgs; and SB304 from 7 feet to 9 feet bgs. TPH impact (primarily #2 diesel and Motor Oil fractions above their MTCA Method A standards) in this area also extends from immediately beneath the floor to the water table. Appendix 3 contains figures depicting the sample locations and isopleths of the 1,1,1-trichloroethane and TPH concentrations. Summaries of soil analytical results are provided in the data tables found in Appendix 4 and Appendix 5. Appendix 6 includes cross sections depicting both the geology and vertical extents of soil contamination.

In soil beneath the northern part of the Manufacturing Building (the current Front End), VOC concentrations are considerably lower, and the impacted area is less in areal extent. In this area, the highest concentrations are observed in shallow soil in sample location SB110 at 1 foot to 2 feet bgs. The contaminants detected at the highest concentrations in this area were 1,1,1-trichloroethane, 1,1-dichloroethane, and methylene chloride. TPH is present immediately below the floor in an area of approximately 160 feet by approximately 40 feet to 65 feet. Over most of this area, the vertical impact is limited to less than 2 feet below the floor. When VOCs are present, such as near the baler, TPH can be present several feet below the floor, but it does not extend to the water table. The cross section between Stations C and D included in Appendix 6 depicts this.

All impacted soil at the Site is located under impervious cover beneath the Manufacturing Building and in a small exterior area located under the pavement adjacent to the northeast corner of the Manufacturing Building. Soil screening levels for determining the potential for VI have not been established by the WA DOE.

The source of the contaminants is from releases through cracks and joints in floors and shallow trenches. Where chlorinated solvents were used (parts cleaning and floor washing), contaminants reached greater depths. When there was sufficient volume of solvents released, this provided the driving force for contaminants to migrate to the water table, primarily in the Former Front End area. Less vertical migration occurred in the Current Front End area because the use of chlorinated solvents was decreasing when the Current Front End commenced operation. There



is no ongoing contaminant migration in soil because of the change from VOC-based materials to water-based materials.

3.2 Groundwater Conditions

Shallow groundwater has been impacted by VOCs, primarily chlorinated VOCs. Over the course of the investigation of the Site, a significant decrease in contaminant concentrations has been observed.

3.2.1 Site Groundwater Conditions

In 2001, a groundwater sample collected from a temporary monitoring well located adjacent to a stormwater catchbasin just west of the Wastewater Treatment Building (near the location of well MW-105R [see Figure 2]) exhibited the following VOCs at elevated concentrations or above a MTCA CUL:

- Vinyl Chloride – 700 µg/l
- Chloroethane – 5,900 µg/l
- 1,1-Dichloroethene – 1,800 µg/l
- Methylene chloride – 73 µg/l
- 1,1-Dichloroethane – 24,000 µg/l
- 1,2-Dichloroethane – 87 µg/l
- cis-1,2-Dichloroethene – 110 µg/l
- 1,1,1-Trichloroethane – 27,000 µg/l
- Trichloroethene – 83 µg/l
- Tetrachloroethene – 29 µg/l

A small-bore monitoring well (ETMW-1) was installed in this area using direct-push techniques and sampled in 2001. The sampling results were similar to the 2001 results obtained from the temporary well. In 2005, ETMW-1 was replaced with a conventional monitoring well (MW-105) and again, the results were similar to previous sampling:

- Vinyl Chloride – 1,600 µg/l
- Chloroethane – 4,000 µg/l
- 1,1-Dichloroethene – 390 µg/l
- Methylene chloride – 39 µg/l
- 1,1-Dichloroethane – 4,700 µg/l
- 1,2-Dichloroethane – 33 µg/l
- cis-1,2-Dichloroethene – 39 µg/l
- 1,1,1-Trichloroethane – 2,700 µg/l
- 1,1,2-Trichloroethane – 4.0 µg/l
- Trichloroethene – 11 µg/l
- Tetrachloroethene – 22 µg/l

In contrast, the 2018 groundwater sampling of the replacement well installed in this area (MW-105R) showed the following results:

- Vinyl Chloride – not detected
- Chloroethane – 71 µg/l
- 1,1-Dichloroethene – not detected
- Methylene chloride – not detected
- 1,1-Dichloroethane – 14 µg/l
- 1,2-Dichloroethane – not detected
- 1,1,1-Trichloroethane – not detected
- Trichloroethene – not detected
- Tetrachloroethene – not detected
- 1,4-Dioxane – 12 µg/l.

The groundwater results obtained from MW-105R during the sampling conducted in September 2021 (described in Section 7 of this report) were (average of sample and duplicate):

- Vinyl Chloride – 4.2 µg/l
- Chloroethane – 305 µg/l
- 1,1-Dichloroethene – not detected
- Methylene chloride – not detected
- 1,1-Dichloroethane – 100 µg/l
- 1,2-Dichloroethane – 1.9 µg/l
- 1,1,1-Trichloroethane – 1.6 µg/l
- Trichloroethene – not detected
- Tetrachloroethene – not detected
- 1,4-Dioxane – 55.5 µg/l.

The most recent results show an increase in concentrations since 2018 at this location, but concentrations are still low relative to what has been observed historically in this area; this is further discussed in Section 7.

The area of impacted shallow groundwater is located beneath the Manufacturing Building and small parts of the paved areas north, northwest, and west of the Manufacturing Building. The primary source of the groundwater contamination is the impacted soil in the former Front End.

The highest contaminant concentrations in groundwater are observed in MW-108, located in the area of impacted soil in the former Front End. This area is characterized by an elevated concentration of the parent compound 1,1,1-trichloroethane, as well as elevated concentrations of daughter products 1,1-dichloroethane and chloroethane, and 1,4-dioxane which was an additive of 1,1,1-trichloroethane. Lower concentrations of daughter products 1,1-dichloroethene and vinyl chloride are observed in this area. Of note,



contaminant concentrations generally decrease markedly away from MW-108. Only occasional very low concentrations of 1,1,1-trichloroethane are observed in the remaining monitoring wells. Chloroethane concentrations are somewhat lower in ETMW-7, considerably lower in MW-105R, MW-102, and MW-106, and are observed at very low concentrations, at most, in the remaining monitoring wells. The concentration of 1,1-dichloroethane is over an order of magnitude lower in MW-105R, and the only other well in which it was detected in the September 2021 round of sampling was at a low concentration in ETMW-7.

The deep well installed on the Site, MW-201, demonstrates there is no impact to deeper groundwater.

Groundwater and soil gas data do not indicate that impacted groundwater has migrated beyond the Site boundary to the north and northwest.

3.2.2 Attempts to Install Offsite Groundwater Wells

To complete groundwater delineation, the July 10, 2018 Progress Report proposed to install offsite wells north, northwest, and west of the groundwater contaminant plume, as shown on the figure included as Appendix 7 of this Remedial Investigation Report. In its review of the 2018 Progress Report, the WA DOE Case Manager at that time (Mr. Jason Cook) requested the addition of a shallow well on the eastern side of the building near the northeast corner of the building (the current well MW-113 shown on Figure 2).

The proposed offsite monitoring well locations and property addresses were:

- 7650 South 228th Street (Former Sears Holdings Business Unit – now CenterPoint Properties)
- 7908 South 228th Street (Graphic Impressions)
- 1221 2nd Avenue North (Hermanson Corp.)
- 1215 2nd Avenue North (Protective Coatings, Inc.)

A proposed Access Agreement was submitted to each property owner and was provided to WA DOE in late 2018. ENVISION initially received feedback from three (3) of the property owners, with miscellaneous questions raised by some property owners. ENVISION provided responses to all questions.

During the IA sampling event in 2019, ENVISION met with the following representatives regarding property access:

Mr. Shane DeLaCruz
Davis Property & Investment (Graphic Impressions is a tenant)
7908 South 228th Street



**ENVISION
ENVIRONMENTAL, INC.**

- In a February 27, 2019 e-mail to ENVISION following the meeting, Mr. DeLaCruz stated that the ownership was “*not comfortable with allowing a monitoring well on the Property.*”

**Ms. Jana Burbank, Mr. Tom Nolan, and Mr. Erich Holcomb
Hermanson Company LLC (HERMANSON)
1221 2nd Avenue North**

- Just before the meeting, ENVISION received an e-mail from HERMANSON that posed numerous questions and concerns;
- No additional questions or concerns were raised during the meeting;
- ENVISION’s July 1, 2019 e-mail to Hermanson provided responses to all their questions;
- ENVISION has since followed up with HERMANSON, but has not received any response.

ENVISION also reached out to:

**Protective Coatings, Inc. (PCI)
1215 2nd Avenue North**

- ENVISION’s contact at PCI responded that he had been directed by the persons reviewing the access request to not meet with ENVISION;
- PCI was in the VCP (VCP Project Number NW2843); Facility Site ID is 85155236 and Cleanup Site ID is 12337. However, a termination letter dated December 13, 2021 was found in the WA DOE Cleanup and Tank Search online database. A Cleanup Action Report was submitted on January 26, 2022, so the current regulatory status of the property is unclear.

7650 South 228th Street (Formerly Sears Holdings Business Unit, now CenterPoint Properties Trust)

- In April 2019, ENVISION observed that the property had recently been sold to CenterPoint Properties Trust based upon updated information in the online King County tax records;
- On April 17, 2019, ENVISION submitted the Draft Access Agreement Package to CenterPoint Properties;
- In late April 2019, ENVISION received a call from Mr. John Houlihan of Houlihan Law, legal counsel for CenterPoint Properties, who stated CenterPoint Properties conducted environmental due diligence on the property that included soil sampling and groundwater sampling using temporary monitoring wells. Mr. Houlihan said that they could share these data and hopefully eliminate the need to install any permanent monitoring wells on their property;

- In a May 7, 2019 e-mail, Mr. Houlihan provided ENVISION with data tables and a figure showing the sample locations for sampling conducted in August 2018 on this property as part of their due diligence.
- In this e-mail, Mr. Houlihan stated: *“CenterPoint is not inclined to consent to the well placement. As I mentioned, when CenterPoint recently acquired the property, the limited phase 2 work did not indicate any soil or groundwater impacts at the selected sampling locations.”*

During an October 2019 conference call with Mr. Jason Cook of the WA DOE, Mr. Cook stated that the WA DOE would try to get access to these properties through the State Attorney General. The following transpired as a result of this effort by WA DOE:

- In January 2020 the WA DOE was provided the complete 2018 report of the 7650 South 228th Street Limited Subsurface Investigation; this was forwarded to ENVISION. A copy is included as Appendix 8 and is discussed in Section 3.2.3.
- In March 2020 an Access Agreement was signed with PCI to allow sampling of MW-4 and MW-5 on their property (see Figure 2 for the locations of these monitoring wells on PCI’s property). These wells were sampled in September 2021; the results are discussed in Section 7.3.2.
- No response was received from the other offsite properties.
- Based on the results of the 7650 South 228th Street limited subsurface investigation, Mr. Jason Cook considered these data could be used to demonstrate that the plume was delineated to the northwest.
- In addition, Mr. Jason Cook stated that RBCC/BALL had made substantial efforts to try to gain access to these offsite properties to install groundwater delineation points, and further action by RBCC/BALL to gain access is not needed.

3.2.3 Groundwater Conditions, 7650 South 228th Street

In 2018, a Phase I ESA was performed at this property by Farallon Consulting, L.L.C. (FARALLON) that identified potential migration of non-halogenated solvents, halogenated organic compounds, and/or petroleum constituents to this property from former operations at nearby properties. A limited subsurface investigation was performed by FARALLON in August 2018 to investigate the issue; a complete copy of the report reviewing this investigation is included as Appendix 8. The suspect offsite properties were not specified in the report; however, based on the analytical parameters and boring locations, it can be deduced that the RBCC/BALL property was among those identified as a potential source of contaminants migrating from offsite. To investigate this possibility, five (5) soil borings were installed to 15 feet bgs by FARALLON. Groundwater was encountered in each of the borings.

Boring FB-1 was installed in the southeastern corner of the property; this boring was located approximately 300 feet northwest of RBCC monitoring well MW-102. Boring FB-2 was installed near the southeastern corner of the building. Borings FB-3 and FB-4 were installed in the parking area on the east side of the building. Finally, boring FB-5 was



installed in the central part of the parking area south of the building. These locations are all depicted on the figures in the report included in Appendix 8.

One (1) soil and one (1) groundwater sample were collected from each boring and submitted for laboratory analysis of: TPH-DRO by Northwest Method NWTPH-Dx; TPH oil-range organics (ORO) by Northwest Method NWTPH-Dx; VOCs by USEPA Method 8260C; and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270D with Selected Ion Monitoring (SIM). Boring FB-2 exhibited 340 mg/Kg of TPH-ORO, below its MTCA Method A CUL of 2,000 mg/Kg for Residential Soil. All soil samples exhibited trace concentrations of acetone ranging from 0.035 mg/Kg in FB-1 to 0.34 mg/Kg in FB-5. Borings FB-2 through FB-5 exhibited trace concentrations of 2-butanone, ranging from 0.011 mg/Kg in FB-2 to 0.092 mg/Kg in FB-5. No other analytes were detected in soil.

In the groundwater samples, TPH-DRO was detected in FB-4 at 330 µg/l, which is below the MTCA Method A CUL of 500 µg/l. Phenanthrene was detected in FB-2 at 0.16 µg/l; there is no MTCA Method A CUL established for phenanthrene. Lastly, carbon disulfide was detected at 0.23 µg/l in FB-2. No other analytes were detected in groundwater.

FARALLON concluded that there was no impact to this property from any of the potential offsite sources of contamination.

3.3 Interim Remedial Actions

The following summarizes the interim remedial activities conducted at the Site. Details on these activities were provided in previous submissions to the WA DOE as noted below. No other spills or releases of hazardous materials or petroleum products are known to have occurred.

3.3.1 UST Removal, 1998

Removal of a 12,000-gallon underground storage tank (UST) containing lubrication oil from the north side of the Manufacturing Building was carried out in October/November 1998 by EARTH TECH. Although minor spills and overfills had apparently occurred, the tank was in a concrete secondary containment vault and impact was confined to bedding material within the containment. EARTH TECH concluded that no soil impact had occurred. ENVISION's April 2003 Proposed SIW and VCP Application submittal included a complete copy of EARTH TECH's report on this activity.

3.3.2 Removal of Stained Ballast and Product, 2007

In 2007, stained ballast was removed from the railroad siding on the east side of the Site where free oil product had been observed. The released material was a result of compressor blowdown discharges. Monitoring well ETMW-4, located adjacent to the stained ballast, was abandoned. The stained ballast was removed and replaced with clean ballast. Due to the shallow perched water in this area at the time, soil excavation and sampling could not be conducted during this work. The excavation was lined with



polyethylene sheeting prior to backfilling with clean ballast so that soil excavation could be conducted during drier conditions. During a later period of dry weather, soil was excavated in an area approximately 32 feet long by 10 feet wide and between 1 foot to 4 feet bgs. Post-excavation soil samples were collected for analysis of TPH-GRO and TPH-DRO, PPMs plus hexavalent chromium, VOCs, and SVOCs. Low to trace concentrations of several VOCs, TPH fractions, SVOCs, and PPM were detected; none exceeded a MTCA Method A CUL. Details on these activities were included in ENVISION's May 2009 Environmental Assessment Report – Railroad Siding Excavation and Interior Subfloor Area Investigation.

Based upon the results of the interim remedial activities, no further action is warranted for this area.

3.3.3 Hydraulic Oil Release from Baler

In December 2011, approximately 10 to 15 gallons of hydraulic oil were released from a pressure fitting on the aluminum scrap baler through the overhead door located on the east side of the Manufacturing Building at its northeast corner. The release occurred on December 17, 2011 and was reported to the WA DOE the same day. The WA DOE assigned Spill Incident Number 11-4213 to the incident. The hydraulic oil impacted the adjacent asphalt pavement and a portion of the oil flowed to the east slightly impacting the soil/gravel area adjacent to the edge of the pavement. Site personnel immediately placed oil sorbent booms to prevent additional hydraulic oil from running off the asphalt pavement, and then used sorbent materials and a floor scrubber to remove the hydraulic oil from the pavement. No hydraulic oil was released to stormwater drains, the sanitary sewer system, or to waterways. The Site contracted with Northwest Stormwater Maintenance (NSM) of Kent, Washington to address the impacted soil/gravel area adjacent to the asphalt pavement. NSM excavated an area of approximately 12 feet by 20 feet of impacted soil and gravel to a depth of 4 inches and transported approximately 7,000 pounds of soil, gravel, and water offsite for disposal. Upon completing the excavation, the area was inspected and no evidence (visual or olfactory) of the release was observed in the soil/gravel area. Soil sampling conducted by ENVISION on December 29, 2011 found minor, limited impacts by TPH-motor oil range apparently unrelated to the recent hydraulic oil release.

Based on the post-excavation soil sampling results, ENVISION requested the Spill Incident for the hydraulic oil release be closed out and proposed that the release be addressed under the existing VCP case. ENVISION's February 12, 2012 letter report provided the details of this activity

3.4 Subslab Soil Gas Conditions

In April 2011, ENVISION conducted SSSG sampling as a reconnaissance tool to determine if source areas of VOCs were present beneath the Manufacturing Building. This work was reported in ENVISION's June 2011 Status Report and the findings are summarized below.



For each SSSG sample location, a temporary soil gas probe was installed and purged, and a soil gas sample was collected using a new laboratory-supplied 1-liter Tedlar bag. All samples were analyzed for VOCs via USEPA Method 8260B and SVOCs via USEPA Method 8270C. Copies of the sample location maps, and sample results summary table are included as Appendix 9. Since the Site is industrial, the soil gas sampling results were compared to Method C Subslab Soil Gas Screening Levels. A number of subslab samples exhibited soil gas concentrations above screening levels, which primarily included chloromethane, vinyl chloride, 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene, and tetrachloroethene. Several exceedances of 1,1,2-trichloroethane, carbon tetrachloride, chloroform, ethylene dichloride (1,2-dichloroethane or EDC), benzene, and xylene were also encountered.

The soil gas sampling results showed two (2) areas of elevated concentrations below the Manufacturing Building. The first area is located immediately around the baler in the northeast portion of the building. The second area is located around the former Front End, centrally located in the building. These areas generally correspond to the areas of soil impact.

3.5 Indoor Air Sampling Results

In order to determine if the VI pathway was complete, IA sampling was conducted from February 26 to February 27, 2019. The WA DOE was provided advance notice of the IA sampling event and the work was carried out in accordance with the Quality Assurance Project Plan (QAPP) included in the Indoor Air Sampling Workplan dated November 2016.

ENVISION reviewed the Safety Data Sheet (SDS) file for the Site to identify potential sources of VOCs from products used or stored inside the buildings. ENVISION also conducted a building survey to identify pertinent building construction and heating, ventilation, and air conditioning (HVAC) system details, potential background sources of VOCs, and whether potential pathways for VI were evident. ENVISION also attempted to obtain drawings of the building HVAC system and underground utilities; however, no drawings of either the building's HVAC system or underground utilities were available.

Seven (7) IA samples were collected from the Manufacturing Building in areas where elevated SSSG concentrations of VOCs had been observed. The Warehouse Building was not sampled, as it is located more than 100 feet from groundwater impacted by VOCs above VI screening levels. In addition, two (2) ambient air (AA) samples were collected, one on the east side and the other on the west side of the Manufacturing Building. A trip blank was collected by randomly selecting a Summa canister provided by the laboratory and returning it unopened to the laboratory for analysis. Sample locations are shown in the figure included in Appendix 10. The summary table of the results of this work is included in Appendix 11.

The IA samples exhibited detections of one (1) or more of 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, toluene, xylenes, chloroform, 1,2-dichloroethane, carbon tetrachloride, and benzene. Both ambient air samples exhibited relatively low-level detections of chloroform, 1,2-dichloroethane, carbon tetrachloride, and benzene (all less than 1 $\mu\text{g}/\text{m}^3$). The only exceedance



of a Method C Indoor Air CUL (the most stringent of the cancer/noncancer criterion) was of benzene ($3.21 \mu\text{g}/\text{m}^3$ Method C Indoor Air CUL), ranging from $3.8 \mu\text{g}/\text{m}^3$ to $44 \mu\text{g}/\text{m}^3$ in the samples from the current Front End area (samples IA-1 and IA-2) and the former Front End area (samples IA-3, IA-4 and IA-5). This analyte was also detected below the Method C Indoor Air CUL at $0.70 \mu\text{g}/\text{m}^3$ in the office and at $1.5 \mu\text{g}/\text{m}^3$ in the welding shop. The highest concentrations, ranging from $42 \mu\text{g}/\text{m}^3$ to $44 \mu\text{g}/\text{m}^3$, were found in the samples from the former Front End (IA-3, IA-4, and IA-5). The concentrations near the Schneider filter pit (IA-1) and the cuppers (IA-2), both of which are in the current Front End, were significantly lower (at $3.9 \mu\text{g}/\text{m}^3$ and $3.8 \mu\text{g}/\text{m}^3$, respectively) and narrowly exceeded the Method C Indoor Air CUL.

Based on the very low concentrations of benzene detected in soil and groundwater samples, the benzene detections in IA were attributed to truck exhaust associated with Site activities rather than VI. In addition, the benzene detections in the ambient air samples showed that it is also present in outdoor air, most likely attributable to vehicle exhaust from the nearby Valley Freeway. The results and conclusions were reported in the Remedial Investigation Report – Indoor Air Sampling – RBCC / Ball Corporation, June 2019.



4.0 CONCEPTUAL SITE MODEL

The conceptual Site model has been developed to understand Site conditions, release history, exposure pathways, and contaminant fate and transport. It is based on Site history and geology, typical historical practices and conditions in aluminum beverage can manufacturing facilities, and data obtained in the investigations conducted to date. Cuppers, bodymaker/trimmers, and the baler at these facilities are typically mounted on thick concrete foundations that are isolated from the main concrete floor slabs. The floor slab and foundation joints are sealed; however, over time the seals typically deteriorate due to the vibration from the hydraulic equipment. Floor trench systems collect oil (water-soluble oil used to lubricate the aluminum and tramp oil released from the hydraulic systems) and direct it to collection sumps for treatment, recycling, and/or offsite disposal. The concrete trenches may also develop cracks over time. During operations, the floors in these areas, especially the bodymaker/trimmer areas, can become oily and are routinely cleaned. Historically, small quantities of 1,1,1-trichloroethane or other chlorinated solvents may have sometimes been used to remove the oil from the floor areas. Secondary operations included cleaning of parts and equipment (sometimes including steam cleaning), maintenance and repair activities, and similar operations that sometimes utilized solvents (both chlorinated and non-chlorinated). These activities were sometimes conducted over convenient sections of the floor trench and sump systems to contain any released materials. Solvent use decreased over time as these facilities transitioned to water-based coatings, and by the early- to mid-1990s, the use of chlorinated solvents was typically discontinued. Thus, typical contaminants from early releases included chlorinated and non-chlorinated solvents, hydraulic oil, compressor oil, and elevated TPH concentrations due to water-soluble oils. Later releases typically did not include VOCs, reflecting the decrease in solvent use.

There are two (2) separate areas in the Manufacturing Building where the Front End (cuppers and bodymaker/trimmers) has been/is located:

- The original Front End was located in the area south of the present can washer chemical storage area from the commencement of manufacturing operations until the late 1980s/early 1990s.
- The current Front End is located in the northern part of the building.

The baler has always been located in the same place, near the northeast corner of the Manufacturing Building. The release pathways in these areas were via breaches of integrity, primarily in the floor slab and floor slab/equipment foundation joints and shallow floor trenches/sumps. By the time the plant expanded manufacturing capabilities and constructed the current Front End, the use of chlorinated solvents was decreasing, and would have largely been discontinued within several years after the relocation of the Front End. The released material would have slowly migrated laterally and downwards through the breaches of integrity in each area as long as releases continued. Where oils were released with little or no solvents involved, impact tended to be localized immediately under the building floor and did not migrate extensively, either vertically or laterally. If sufficient solvent was released vertical migration could occur.

Locally, where sufficient released contaminant mass was present, contaminants reached the



water table. The biodegradation of the oils, especially the water-soluble oils, would promote reducing conditions in the soil column and in groundwater, leading to reductive dechlorination of the chlorinated solvents and producing daughter compounds including 1,1-dichloroethene, 1,1-dichloroethane, chloroethane, and vinyl chloride due to degradation of 1,1,1-trichloroethane; and trichloroethene, cis-1,2-dichloroethene, and vinyl chloride from tetrachloroethene degradation. The small amounts of chlorinated solvents released would not lead to vertical migration of dense non-aqueous phase liquid (DNAPL) below the water table, as evidenced by the lack of impact to deeper groundwater. The VOCs are adsorbed to organic carbon and fine-grained sediments in the soil column and in the smear zone.



5.0 DEVELOPMENT OF CLEANUP LEVELS FOR SITE

ENVISION had discussed the establishment of CULs for the Site with the previous WA DOE Case Manager (Mr. Jason Cook). In a Technical Memorandum dated July 24, 2019, the WA DOE specified the use of MTCA Method C CULs (cancer) for impacted soil and groundwater for all previously identified contaminants of concern. A copy of this Technical Memorandum is included as Appendix 12. ENVISION has developed the CULs using the default Method C option, as discussed in this section.

The property meets the conditions for use of Method C Soil CULs that are listed in WAC 173-340-745. Appropriate institutional controls will be implemented in accordance with WAC 173-340-440 to limit potential exposure to residual hazardous substances, including at a minimum, placement of a covenant on the property restricting the use of the area where industrial soil CULs are proposed to industrial uses.

The location of the contaminated media beneath part of the Manufacturing Building and active traffic areas severely limits access to the entire volume of contamination. The property is an active manufacturing facility, and the magnitude and types of remedial activities needed to meet Method B CULs at the Site would produce safety risks and increase the risk of worker exposure to Site contaminants. Method B CULs would also be technically impossible to meet given the access limitations. Thus, the Site meets the criteria specified in WAC 173-340-706 for the use of Method C CULs.

5.1 Nature of Contamination

As noted in this submission and in previous reports, the source of the contamination at the property has been releases of solvents and TPH to the environment through breaches of integrity in concrete floors and shallow subsurface structures in both the former Front End (the part of the manufacturing process where beverage can bodies are formed from aluminum sheet metal) and the current Front End. These areas encompass approximately the center and north-central parts of the Manufacturing Building. Due to the proximity of these areas to each other, the area of contaminated soil and groundwater is considered as the "Site" (by definition per the MTCA).

5.2 Potentially Contaminated Media

Based on the sampling conducted, the impacted media at the Site are subsurface soil (in the vadose zone and the smear zone), shallow groundwater, and soil vapor. The impacted soil is located entirely under impervious cover and has been delineated. The groundwater impact is limited to shallow groundwater and has been delineated by clean groundwater samples to the east, south, and southwest. Groundwater delineation is further discussed in Section 7.

Deeper groundwater has been shown to not be impacted based on the sample results from deep well MW-201. The IA sampling has shown that IA is not impacted by the Site contamination.



There is no sediment or surface water on or near the Site and there are no pathways to these environmental media from the Site; thus, these environmental media are not of concern.

The contaminants identified in soil, groundwater, soil gas, and indoor air are listed by the matrix in which they have been detected in Table 1. For soil, soil gas, and indoor air, the number of detections and maximum concentration detected in each matrix are shown. For groundwater, the maximum concentration detected, the date the maximum concentration was detected, and its concentration (if detected) in the most recent groundwater sampling event (September 2021) are shown.

As seen in these data, several analytes do not appear to be of significance, in that they were detected once or twice at a trace concentration in a single environmental medium or were detected only in soil gas. In soil, hexane, 1,1-dichloropropene, 1,2-dichlorobenzene, 1,2-dichloropropane, 2,2-dichloropropane, and styrene were each detected once or twice; the highest concentration of any of these detections was 0.062 mg/Kg. These analytes were not detected in groundwater, soil gas, or indoor air, with the exceptions of styrene, detected once in groundwater in 2010 at 0.42 µg/l, and hexane, detected twice in 2018 at a maximum concentration of 7.3 µg/l. In soil gas, 11 samples exhibited chloromethane at concentrations up to 30,000 µg/m³. Methyl tert-butyl ether (MTBE) was detected in three (3) samples up to 200 µg/m³. Chloromethane was detected once in groundwater at a trace concentration in 2010. MTBE has not been detected in soil or groundwater. Thus, these analytes have been eliminated as potential contaminants of concern at the Site.

5.3 Potential Exposure Pathways, Land Use, and Receptors

The current and potential pathways of exposure are:

- Direct Contact Pathway (Ingestion/Inhalation of Soil) – Currently, this pathway is incomplete due to the contaminated soil being located completely beneath impervious cover. However, facility construction activities could change this condition.
- Soil to Groundwater – Currently, this pathway is complete, as shown by the groundwater sampling results. However, the contaminant concentrations have exhibited decreases over the course of the investigation, as discussed further in Section 7.
- Groundwater Use – Currently, this pathway is incomplete, as there are no water supply wells (potable, industrial supply, irrigation, etc.) near the Site. Potential groundwater use must be considered since the Site groundwater does not meet the conditions specified in WAC 173-340-720 to not be considered a potential potable water source.
- Soil and Groundwater to SSSG - Currently, this pathway is complete, as shown by the SSSG sampling results.
- SSSG to IA - Currently, this pathway is incomplete as shown by the IA sample results. However, facility construction activities could change this condition. No other buildings



are close enough to the SSSG impacts to exhibit potential IA impact.

As noted in Section 5.2, there is no sediment or surface water on or near the Site; thus, the pathways of contaminated sediment migration offsite or discharge of impacted groundwater to surface water are not present.

The current Site land use is industrial. Land use in the area immediately surrounding the Site is industrial or commercial. The closest residential properties are located beyond State Route 167, a limited-access divided highway constructed atop a large earthen embankment. The only potential future uses of the property and Site are industrial/commercial.

Under current Site conditions, there are no receptors, as none of the pathways from the contaminant to a receptor are complete. If Site conditions changed significantly, receptors would be limited to construction workers and possibly industrial workers in relatively short-term exposures. If shallow groundwater use began (this is considered highly unlikely, as the entire area is supplied with public water), industrial workers and visitors could become receptors.

5.4 Method C and TPH Cleanup Levels for Site

Under the MTCA, CULs must be adjusted to account for potential groundwater use, additive cancer risk, and noncancer effects from multiple hazardous substances and/or multiple exposure pathways, as well as the applicable or relevant and appropriate requirements (ARARs). If a CUL is less than the minimum detection limit (MDL) for the analyte, the MDL is considered the CUL.

Table 2 lists the Method C CULs proposed for groundwater. Because the use of groundwater as a potential drinking water source must be considered, the USEPA and WA DOE Maximum Contaminant Levels (MCL) and non-zero Maximum Contaminant Level Goals (MCLG) must be considered in establishing groundwater CULs.

ENVISION proposes to use the Method C CULs for groundwater discussed above to calculate unsaturated and saturated soil concentrations that are protective of groundwater at the CUL using the equations, assumptions, and default inputs specified in the MTCA in conjunction with the current version of the WA DOE Worksheet for Calculating Soil Cleanup Levels for Unrestricted & Industrial Land Use. Table 3 shows the default Method C Direct Contact CULs and the MDL-based CULs that are protective of groundwater. Upon receipt of WA DOE concurrence to use the Method C for groundwater values, ENVISION will calculate Protection of Groundwater CULs for soil. The Protection of Groundwater CULs are the most stringent CULs.

ENVISION proposes to use Method A CULs for all TPH components in soil. These are also included in Table 3. Use of the Method A CULs for TPH in combination with Method C for other analytes has been accepted by the WA DOE at other properties. The TPH impact in soil is primarily due to releases of water-soluble oils and tramp hydraulic oil. As noted, where limited releases of solvent have occurred, relatively little TPH migration has occurred. The primary risk for contaminant migration are the chlorinated VOCs.



5.5 Natural Resources/Ecological Receptors

According to the King County GIS website, the only potentially environmentally sensitive areas in the area of the Site is Mill Creek, which is unclassified. This stretch of Mill Creek has been diverted and canalized. Further, it is located beyond the main railroad line and the South 228th Street overpass from the Site.

The Site qualifies for an exclusion from a terrestrial ecological evaluation because there is less than 1.5 acres of contiguous undeveloped land within 500 feet of the Site affected by hazardous substances other than those listed in WAC 173-340-7491(1)(c)(ii) and none of the chemicals listed in WAC 173-340-7491.1(c)(ii) are present at the Site.

ENVISION has completed a Terrestrial Ecological Evaluation Form for the Site. This form is included in Appendix 13.

6.0 SHALLOW MONITORING WELL INSTALLATION

On September 14, 2021, Holocene Drilling, Inc. (HOLOCENE) of Puyallup, WA, a Washington-licensed drilling contractor, installed monitoring well MW-113 on the northeastern side of the building in the former railroad spur, as shown on Figure 2. HOLOCENE submitted a Notice of Intent to Construct a Resource Protection Well to the WA DOE and called the public markout number to clear the well location for underground utilities. A copy of the Notice of Intent and the well report are included as Appendix 14. ENVISION also contracted with Applied Professional Services, Inc. (APS) of North Bend, WA to clear the area of underground utilities before commencing drilling.

A Diedrich D-50 drill rig was used to drill the borehole using 8-inch outside diameter hollow-stem augers. The well was logged from cuttings by an experienced ENVISION field geologist. The cuttings were screened with an organic vapor monitor (OVM) equipped with a photoionization detector (PID) with a 10.6-eV lamp energy. The meter was calibrated in the field before use to a standard of 100 parts per million (ppm) isobutylene gas. All readings were below 2 response units. No odors or staining that would indicate impact was observed.

The boring was advanced to 15 feet bgs. Sandy gravel ballast was encountered to 2.5 feet bgs, then sandy brown silt was encountered to 5 feet bgs. Below this depth, wet dark brown, very soft silty clay was encountered to the end of the boring. A 2-inch diameter PVC well was installed to 14 feet bgs, with 10 feet of 0.01-inch slot screen and a PVC endcap. The well pipe was flush-jointed, and no glue was used in its construction. A sand pack was installed from 2 feet bgs to 14 feet bgs with a grout seal above it. The well was finished as a flush mount with a concrete pad, expansion plug, and lock. The well construction and lithology are shown on the well log included in Appendix 15.

Following installation, the well was developed by over pumping and surging with a submersible pump. The well was developed for approximately ½ hour, at which point turbidity was low. All cuttings and development water were drummed in 55-gallon Department of Transportation- (DOT) approved steel drums, labelled, and staged in an area designated by Site personnel for subsequent proper offsite disposal.

Following installation, the well location, ground elevation, and top of casing elevation were surveyed by a Washington-licensed surveyor from Contour Engineering, LLC (CONTOUR) of Gig Harbor, WA. A copy of the survey information is included in Appendix 16.



7.0 MONITORING WELL SAMPLING

7.1 Groundwater Sampling Procedure

Groundwater sampling was conducted on September 15 and 16, 2021. All Site monitoring wells were sampled for VOCs plus the 15 Tentatively Identified Compounds (TICs) of the highest estimated concentration via USEPA Method 8260D. Vinyl chloride was analyzed via USEPA Method 8260C and 1,4-dioxane was analyzed via USEPA Method 8620D with SIM. Monitoring wells MW-4 and MW-5 on the PCI property were also sampled for the same parameters on September 15, 2021.

The monitoring wells were gauged and sampled from clean to most impacted to minimize the potential for cross-contamination. Prior to purging the wells, depth-to-water measurements were first collected from all wells to the nearest 0.01 foot using a Solinst electronic interface probe. Well headspace was measured using a PID calibrated before use in the field to a standard of 100 ppm of isobutylene immediately after opening the well. The depths to water, calculated groundwater elevations, and PID readings are presented in Table 4.

Each well was purged to remove stagnant water within the well casing and sand pack. Low-flow purging/sampling was used to minimize turbidity and volume of water purged. The shallow wells were purged using a peristaltic pump equipped with Teflon-lined polyethylene tubing of ¼ inch internal diameter. The end of the tubing was set to the center of the screened interval. During purging, depth to water was monitored using an electronic water level meter in the 2-inch diameter wells; this was not possible in the smaller diameter ETMW-series wells. To collect samples, the tubing was carefully withdrawn from the well when filled, and the pump flow was reversed to fill the containers. All purge water was drummed in 55-gallon DOT-approved steel drums, labelled, and staged in an area designated by Site personnel for subsequent proper offsite disposal.

Deep monitoring well MW-201 was sampled using a decontaminated Mega-Monsoon submersible pump equipped with Teflon-lined polyethylene tubing of ¼ inch internal diameter. The pump was set at the center of the screened interval. Samples were collected directly through the pump.

During purging, water quality parameters (temperature, pH, dissolved oxygen, specific conductivity, and oxidation-reduction potential [ORP]) were measured using a YSI water quality meter and a flow-through cell to monitor well stabilization. Turbidity was measured using a LaMotte 2020 Turbidity Meter. Data were recorded on field forms, copies of which are included in Appendix 17. Purging was conducted in accordance with USEPA Region 9 Guidance and Protocols.

Groundwater samples were collected after stabilization of the water quality parameters in new laboratory-supplied bottles preserved with hydrochloric acid, except for the samples analyzed for vinyl chloride via USEPA Method 8260C, which were unpreserved. This is the standard procedure of the analytical laboratory used for the work; it follows the recommendation of SW-846 Chapter 4 for collection of an unpreserved aqueous sample when vinyl chloride is a target



compound.

Each sample was labeled with project identification, sample identification and time of sample collection, then immediately placed in a laboratory cooler containing ice. The samples were transported under chain-of-custody protocol by ENVISION personnel to Friedman & Bruya, Inc. of Seattle, WA (a Washington-licensed analytical laboratory) for analysis. One (1) blind duplicate sample was collected each day. Field blanks were collected each day for all analytes by collecting laboratory-supplied analyte-free water through new sampling equipment into appropriate containers. Each cooler also contained a laboratory-supplied trip blank.

7.2 Groundwater Elevation Measurements

Depth to water in Site monitoring wells ranged from 6.50 feet below top of casing (BTOC) in MW-107 to 11.50 feet BTOC in MW-101. The wells that were gauged on the PCI property (MW-4 and MW-5) exhibited slightly lower groundwater elevations than nearby wells on the western part of the Site (MW-103, ETMW-2, and ETMW-7). In MW-101, 0.10 foot of free product (oil) was observed on the water table. This well has intermittently exhibited a similar thickness of free product in previous monitoring events. The groundwater elevation data are tabulated in Table 4. Figure 4 shows the groundwater elevation contour map.

The groundwater contour map shows that groundwater flow in the area of the Manufacturing Building is generally to the northwest and west, consistent with previous events. The horizontal hydraulic gradient varies slightly across the Site. The horizontal gradient between MW-108 and MW-102 was approximately 0.008 ft/ft and the horizontal gradient between MW-104 and MW-4 was approximately 0.005 ft/ft, as shown in Table 5. The groundwater elevation in MW-105R was 29.73 feet AMSL and the groundwater elevation was slightly lower in deep well MW-201 (29.50 feet AMSL), indicating a slight downward vertical hydraulic gradient (approximately 0.004 ft/ft to 0.005 ft/ft) during this event. A copy of the calculation is included in Appendix 18. This is consistent with historical events, in that a low vertical gradient is observed. In some quarters the direction is upwards, in others downwards.

Relative to recent events, depths to water in the monitoring wells in this event were several feet lower than in previous events. This likely reflects the effect of drier summer weather on groundwater elevations. Again, no major change in groundwater flow direction was observed.

7.3 Groundwater Results

7.3.1 Water Quality Parameters

The wells stabilized during purging. The results for the water quality parameters for this event are summarized in Table 6. Measurements were not collected from MW-101 due to the presence of light non-aqueous phase liquid (LNAPL). Dissolved oxygen results in all monitoring wells were 0.87 mg/l or less after purging apart from MW-113, which exhibited 1.05 mg/l. The ORP values in all wells were negative apart from MW-105R at 17.6 mV and MW-113 at 33.7 mV. These values indicate reducing conditions.



In the shallow monitoring wells, pH ranged from 6.29 S.U. to 6.78 S.U.; in deep monitoring well MW-201 the pH was 7.34. Turbidity was less than 19.5 nephelometric turbidity units (NTU) in the shallow wells (except for MW-105R, which dried during purging). In MW-201, the turbidity was higher, at 58.0 NTU. Conductivity ranged from 0.201 mS/cm to 0.90 mS/cm. Temperature ranged from 17.5 °C to 22.3 °C in the shallow monitoring wells. The temperature in MW-201 was slightly less, at 17.1 °C. The field parameters in the monitoring wells on the PCI property were similar to those observed in the Site wells.

7.3.2 Groundwater Analytical Results

The laboratory analytical results for the samples are included as Table 7. The laboratory deliverables packages are included as Appendix 19. Figure 5 plots the detected concentrations by monitoring well. The laboratory data were reviewed to determine if issues were present that might limit the data usability. Both field blank samples exhibited low level detections of methylene chloride; these were attributed to laboratory contamination and flagged by the laboratory. As this analyte was not detected in any of the groundwater samples, the issue does not impact data usability. Duplicate samples exhibited good agreement with the original samples.

In laboratory report 109299, the calibration standard, laboratory control sample, and laboratory control sample duplicate did not pass the Method 8260D acceptance criteria for MTBE and 2,2-dichloropropane. The data were flagged accordingly. Neither analyte was detected in any of the associated samples.

In laboratory report 109300, the laboratory control sample exceeded the acceptance criteria for MTBE under Method 8260D. The compound was not detected in the associated samples; therefore, the data were considered acceptable by the laboratory.

No other data quality issues were identified by the laboratory or ENVISION that would adversely impact the data. These issues do not adversely impact data quality; these data are usable for their purpose.

Shallow monitoring wells ETMW-3, MW-104, and MW-107, and deep monitoring well MW-201 exhibited no detections of any analyte, either targeted or as a TIC. Shallow monitoring wells ETMW-2 (1,4-dioxane and an individual TIC) and the new monitoring well MW-113 (vinyl chloride, 1,2,4-trimethylbenzene, and an individual TIC) exhibited occasional isolated trace to low concentrations, none exceeding their respective Method C CULs.

Shallow wells MW-102 and MW-103 exhibited 1,4-dioxane at 91 µg/l and 10 µg/l; both exceeded its Method C CUL of 4.4 µg/l.

Shallow well ETMW-7 exhibited the following exceedances:

- Vinyl chloride at 2.7 µg/l versus its Method C CUL of 0.29 µg/l
- 1,2-Dichloroethane at 6.9 µg/l versus its Method C CUL of 4.8 µg/l



- 1,4-Dioxane at 310 µg/l versus its Method C CUL of 4.4 µg/l
- Chloroethane at 2,200 µg/l versus its Method C CUL of 830 µg/l

Shallow well MW-105R exhibited the following exceedances:

- Vinyl chloride at 4.3 µg/l (4.1 µg/l in the duplicate) versus its Method C CUL of 0.29 µg/l
- 1,1-Dichloroethane at 100 µg/l in both the standard and duplicate samples versus its Method C CUL of 77 µg/l
- 1,4-Dioxane at 60 µg/l (51 µg/l in the duplicate) versus its Method C CUL of 4.4 µg/l

Shallow well MW-108 exhibited the highest concentrations of all the wells, with the following exceedances:

- Vinyl chloride at 100 µg/l versus its Method C CUL of 0.29 µg/l
- 1,1-Dichloroethene at 120 µg/l versus its Method C CUL of 7.0 µg/l
- 1,1-Dichloroethane at 1,200 µg/l versus its Method C CUL of 77 µg/l
- 1,1,1-Trichloroethane at 1,700 µg/l versus its Method C CUL of 200 µg/l
- 1,2-Dichloroethane at 5.8 µg/l versus its Method C CUL of 4.8 µg/l
- 1,4-Dioxane at 3,200 µg/l versus its Method C CUL of 4.4 µg/l
- Chloroethane at 2,300 µg/l versus its Method C CUL of 830 µg/l

Offsite monitoring wells on the PCI property:

- MW-4 exhibited a low concentration of 1,4-dioxane (0.94 mg/l), below its Method C CUL of 4.4 µg/l.
- MW-5 exhibited the following limited exceedances:
 - Vinyl chloride at 0.51 µg/l (0.38 µg/l in the duplicate) versus its Method C CUL of 0.29 µg/l
 - 1,4-Dioxane at 23 µg/l (18 µg/l in the duplicate) versus its Method C CUL of 4.4 µg/l

7.4 Discussion of Groundwater Results

Table 8 lists the historical groundwater data, including the September 2021 data. Overall, source area monitoring well MW-108 exhibited an increase in concentrations of vinyl chloride, chloroethane, 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, and 1,4-dioxane in this event relative to recent monitoring results. These concentrations are lower than observed in the initial sampling event for this well, except for 1,4-dioxane, chloroethane, vinyl chloride, and 1,1-dichloroethene. ETMW-7 exhibited increases in vinyl chloride, chloroethane, 1,2-dichloroethane, and 1,4-dioxane relative to historical data. Concentrations in MW-105R increased from 2018 but were similar to concentrations observed in 2014 and 2015; these were much lower than the concentrations observed in MW-105 up to July 2011. The remaining wells generally exhibited similar or lower concentrations in this event than previously observed.



Review of the historical analytical data from MW-108 against the depth to water shows that the contaminant concentration trends in this well appear to be possibly related to the depth to water; when the depth to water is greater the concentrations generally increase. Table 9 lists the depth to water and the concentrations of major contaminants in this well across the four (4) groundwater sampling events conducted between 2014 and 2021. This may indicate the main source of groundwater impact in this area is a thin zone at depth from which contaminant desorption is greater than at other locations in the soil column; when the water table is higher this effect may be diluted.

The fact that daughter products of reductive dechlorination continue to be observed in MW-108 indicates reductive dechlorination of 1,1,1-trichloroethane is still taking place. The absence of 1,1,1-trichloroethane in wells away from source area well MW-108 indicates the degradation is rapid enough to limit contaminant migration. Overall, the plume is apparently stable in extent. The variations in concentration in MW-108 are apparently short-term events and do not appear to represent long-term increasing trends.

Downgradient monitoring wells (e.g., MW-102, MW-105R, and MW-106) are characterized by low to no detectable concentrations of 1,1,1-trichloroethane. These exhibit 1,4-dioxane and the products of reductive dechlorination of 1,1,1-trichloroethane. Concentrations in these wells have trended downwards with time.

As noted in Section 3.2.2, ENVISION had limited success in obtaining access to install downgradient monitoring wells on offsite properties. However, the data that were obtained allow some conclusions on the downgradient extent of the plume to be made. As noted, the temporary monitoring well that was installed and sampled in the southeastern part of the property at 7650 South 228th Street in August 2018 did not exhibit the Site contaminants of concern that were observed in MW-102 in February 2018. In the 2018 monitoring event, chloroethane was detected in MW-102 at 920 µg/l and 1,4-dioxane at 1,400 µg/l; neither were detected at 7650 South 228th Street, directly downgradient of MW-102. Concerning the results obtained from the wells on the PCI property, ETMW-7 exhibited chloroethane at 2,200 µg/l, vinyl chloride at 2.7 µg/l, 1,2-dichloroethane at 6.9 µg/l, 1,1-dichloroethane at 2.1 µg/l, and 1,4-dioxane at 310 µg/l in September 2021. In MW-5 on the PCI property, located 120 feet downgradient of ETMW-7, chloroethane, 1,1-dichloroethane, and 1,2-dichloroethane were not detected, vinyl chloride was detected at 0.51 µg/l (0.38 µg/l in the duplicate) and 1,4-dioxane was detected at 23 µg/l (18 µg/l in the duplicate). In MW-4 on the PCI property, located approximately 200 feet downgradient of ETMW-7, only 1,4-dioxane was detected at 0.94 µg/l, below its Method C Groundwater CUL.

Thus, the data obtained show that exceedances in the contaminant plume extend less than 200 feet from the northern, northwestern, and western property lines for the Site.



8.0 AREAS REQUIRING CLEANUP – FOLLOW-UP ACTIVITIES

The WA DOE requested that the downgradient extent of shallow groundwater impact be determined through the installation and sampling of downgradient offsite monitoring wells. The areas downgradient of the Site for which groundwater data is limited are to the north and west. As noted in Section 3.2.2, ENVISION attempted to obtain access to install monitoring wells on four (4) offsite properties; despite extensive efforts and the assistance of the State of Washington Attorney General these attempts were not successful.

Although ENVISION was not able to obtain access to downgradient property owners to install and sample wells, permission to sample selected monitoring wells was obtained from PCI at 1215 2nd Avenue North, located west of the southern portion of the Site. In addition, a Limited Site Investigation Report was obtained from the property at 7650 South 228th Street (northwest of the Site), which included groundwater sampling of Site contaminants of concern. Both properties are located downgradient of the Site.

The data obtained from the sampling of PCI monitoring wells MW-4 and MW-5, the Site monitoring well sampling, and review of the Limited Site Investigation Report for 7650 South 228th Street have provided sufficient information to estimate the downgradient extent of the contaminant plume in shallow groundwater and thus, sufficiently delineates the plume for the purpose of remedial selection. ENVISION considered that without such delineation and WA DOE concurrence, conducting remedial selection and a feasibility study was premature, as the extent of groundwater impact is critical in determining the remediation needed to protect receptors and to control contaminant migration.

The sources of the soil, groundwater, and SSSG contamination have been identified. The areas exhibiting elevated contaminant concentrations have been defined, along with the extent of the contamination in the impacted media. With the ability to estimate the extent of the shallow groundwater plume based on downgradient groundwater data, remedy selection is possible.

8.1 Constituents of Concern

The constituents of concern are VOCs (primarily chlorinated VOCs) and TPH. Table 1 lists the specific compounds from these groups that have been identified in soil, groundwater, and soil gas at the Site.

8.2 Soil

The areas of soil that exhibit impact and require further action are all located below impervious cover as follows:

- Immediately beneath the floor to the water table and smear zone in the central part of the Manufacturing Building (former Front End). The contaminants of concern in this area are VOCs (primarily chlorinated VOCs) and TPH.
- Immediately beneath the floor in the northern part of the Manufacturing Building (baler



and current Front End). Impact at the water table in this area is not present. The primary contaminants of concern in this area are VOCs and TPH. Concentrations of chlorinated VOCs are lower in this area.

- Shallow soil in the area of the coppers extending northwards to the current Front End. This impact is very limited in depth and is located within approximately 2 feet of the base of the building floor. The primary contaminant of concern is TPH in this area.

The approximate extents of these areas are identified on Figure 6.

The primary drivers for addressing soil impact are the impact to groundwater and soil gas. The former Front End is the most significant area of impacted soil.

8.3 Groundwater

The area of shallow groundwater that exhibits impact and may require further action is located beneath the Manufacturing Building extending west to 2nd Avenue North. The approximate extent of this area is identified on Figure 6. Deep groundwater does not exhibit impact.

As discussed in Section 7, the groundwater impact from the Site apparently extends less than 200 feet from the property line to the northwest and west. This area is located almost entirely beneath paved roads and parking lots.

8.4 Soil Gas

The area of soil gas that exhibits impact is located beneath the northern and central part of the Manufacturing Building. The approximate extent of this area is identified on Figure 6.

8.5 Follow-Up Activities

Based on the findings of the overall investigation, soil, groundwater, and possibly soil gas remediation will be required to address the ongoing impact to groundwater and soil gas. As the Site is in active use as an industrial facility, potential remedial alternatives are limited.

ENVISION proposes to perform a Feasibility Study to evaluate potential remedial technologies to address the soil, soil gas and groundwater contamination that have been identified and characterized at the Site. It is anticipated that these will include (but will not be limited to) the use of institutional and engineering controls. Remediation Levels and points of compliance will be developed for each environmental medium.

The overall objectives of the remediation are:

- Limit the transfer of contaminant mass from soil to groundwater and soil gas to control contaminant migration and prevent potential exposure via these pathways.
- Maintain existing impervious cover to prevent direct contact as well as to aid in control of infiltrating precipitation through remaining impacted soil.



- Establish and maintain institutional controls to eliminate the use of the property by sensitive populations.

Appendix 20 contains a Request for Opinion Form to obtain a formal WA DOE opinion on this report.



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