2019 Annual Report
Groundwater Monitoring and
Interim Action Performance Monitoring

Pasco Landfill NPL Site
Pasco, Washington

Submitted to:
Washington State Department of Ecology
Eastern Regional Office
4601 N Monroe Street
Spokane, Washington 99205-1295

On Behalf of the:
IWAG Group III

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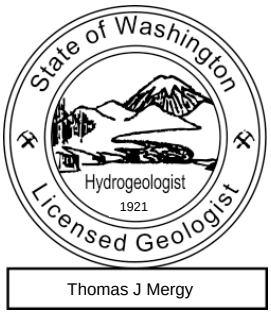
PBS
400 BRADLEY BLVD, SUITE 106
RICHLAND, WA 99352
509.942.1600 MAIN
866.727.0140 FAX
PBSUSA.COM

Mary McElheron, CHMM
IWA Site Manager
Senior Project Manager
PBS Engineering and Environmental Inc.

Mark Leece, P.E.
Principal Engineer
PBS Engineering and Environmental Inc.



Tom Mergy, LHG
Principal Hydrogeologist
PBS Engineering and Environmental Inc.

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1 INTRODUCTION

On behalf of the Industrial Waste Area Generators Group lll (IWAG), PBS Engineering and Environmental Inc. (PBS) has prepared this *2019 Annual Report Groundwater Monitoring and Interim Action Performance Monitoring* (2019 Annual Report) for the Pasco Landfill NPL Site (Site) in Pasco, Washington. This report is being submitted to the Washington State Department of Ecology (Ecology) in support of the ongoing obligations of the potentially liable persons (PLPs) under Agreed Order No. DE 9240 (Agreed Order) and Enforcement Order No. DE 16899, which went into effect on November 8, 2019.

This 2019 Annual Report summarizes the results of the groundwater monitoring and interim action performance monitoring activities conducted during 2019 and discusses the effectiveness of the various interim actions implemented at the Site.

This 2019 Annual Report contains the following enclosures:

- Attachment A contains the *Data Validation Report Pasco Sanitary Landfill Groundwater Monitoring October 2019 Sampling*, by Pyron Environmental, Inc., dated February 21, 2020.
- Attachment B contains shipping documents or receipts for wastes generated and transported off site for treatment during the fourth quarter of 2019.
- Attachment C contains monthly inspection checklists for the Industrial Waste Area landfill covers, detention/evaporation basins, and perimeter fencing for Zones A, C/D, and E during the fourth quarter of 2019.
- Attachment D contains the 2019 East Pasco Plume Area Well Location Survey memorandum prepared by the City of Pasco.

1.1 Site Location

The general location of the Site and the Pasco Sanitary Landfill (PSL) property are depicted on Figure 1. The PSL property is located approximately 1.5 miles northeast of the City of Pasco, in the southwest quarter of Section 15 and the northwest quarter of Section 22, Township 9 North, Range 30 East, Willamette Meridian, located in Franklin County, Washington. The PSL property is located on Dietrich Road near the intersection of Pasco-Kahlotus Road and U.S Highway 12.

The PSL property occupies an area of more than 250 acres consisting of rolling hills surrounded by irrigated cropland. The former municipal solid waste landfill (MSW Landfill), Balefill/Inert Waste Disposal Area, Industrial Waste Areas (IWAs), and the New Waste, Inc. (NWI) landfill are located within the PSL property. Figure 2 shows the locations of each waste area on the PSL property. Reporting requirements detailed in the Agreed Order and Enforcement Order for the MSW Landfill and Balefill/Inert Waste Disposal Areas are addressed in a separate report prepared by the Landfill Group (LFG). The NWI landfill is a modern and fully lined solid waste landfill located to the north of the MSW Landfill that opened on May 31, 1993 and closed in 2002. The NWI landfill is not considered further in this report. Data and discussion related to Zone B is also presented in a separate report prepared by Bayer Crop Science (BCS).

The formal definition of the Site is presented in the Agreed and Enforcement Orders. The Site boundary, as defined in the Orders and illustrated in Exhibit A of the Orders, encompasses both the PSL property and the Groundwater Protection Area (GPA).

1.2 Background

The operational and cleanup history of the Site is documented in the *Draft Final Focused Feasibility Study – Pasco Landfill National Priorities List Site* (FFS), dated August 2017. The reviewer is directed to the FFS for information related to the Site background.

The following technical documents pertaining to groundwater monitoring and interim actions under the Agreed and Enforcement Orders were submitted to Ecology during 2019:

- *Memorandum: Testing of Field Filters for Carbon Monoxide and Methane Measurements*, dated November 26, 2018.
- *Memorandum – Well Sampling and Residue Cleanout Summary Report, dated January 29, 2019.*
- *2018 Annual Report: Regenerative Thermal Oxidizer Performance Monitoring,* dated January 31, 2019.
- *Performance Test Report for Anguil Regenerative Thermal Oxidizer (2018),* dated February 4, 2019.
- *Revised Well Sampling and Residue Cleanout Summary Report,* dated March 14, 2019.
- *2018 Annual Report: Groundwater Monitoring and Interim Action Performance Monitoring,* dated March 18, 2019.
- *Memorandum – Conceptual Repair Plan for SVE Condensate Below Grade Moisture Separators,* dated June 7, 2019.
- *First Quarter 2019 - Groundwater Monitoring and Interim Action Performance Monitoring Report,* dated June 17, 2019.
- *Memorandum – Carbon Monoxide and Methane Measurement at Zone A Landfill,* dated June 28, 2019.
- *Revised Conceptual Repair Plan for SVE Condensate Below Grade Moisture Separators,* dated July 3, 2019.
- *2019 Performance Test Plan,* dated July 16, 2019.
- *Second Quarter 2019 Groundwater Monitoring and Interim Action Performance Monitoring Report,* dated September 16, 2019.
- *Addendum No. 4 – Below Grade Moisture Separator Upgrades and Condensate Sampling – Operations and Maintenance Manual, Soil Vapor Extraction System and Regenerative Thermal Oxidizer, Volume 1: SVE System O&M Manual (2017 Upgrades),* dated October 15, 2019.
- *Performance Test Report for Anguil Regenerative Thermal Oxidizer,* dated October 25, 2019
- *Zone A Removal Action Supplemental Groundwater Monitoring Plan,* dated November 26, 2019.
- *Zone A Decommissioning and Well Installation Plan,* dated November 26, 2019.
- *Zone A Removal Action Engineering Design Report, Agency Review Draft,* dated December 9, 2019.
- *Perimeter Air Monitoring Plan, Appendix B.3, Engineering Design Report*, dated December 17, 2019.
- *Addendum No. 4 to the SVE System O&M Manual (2017 Upgrades): Below Grade Moisture Separator Upgrades and Condensate Sampling,* dated December 18, 2019.
- *Third Quarter 2019 Groundwater Monitoring and Interim Action Performance Monitoring Report,* dated December 16, 2019.

See Section 4.1 for documents submitted to Ecology pertaining to the soil vapor extraction (SVE) and regenerative thermal oxidation (RTO) system operation.

Additionally, 12 Monthly Status Reports were submitted to Ecology during 2019. Each monthly report was submitted during the first full week of the month summarizing activities and publications delivered to Ecology during the preceding month.

2 OBJECTIVES

The specific objectives of the groundwater monitoring and interim action performance monitoring conducted at the Site include:

- Assessment of groundwater quality relative to the cleanup levels (CULs) in the Enforcement Order;
- Evaluation of trends in groundwater quality;
- Evaluation of the performance and effectiveness of the SVE and RTO systems; and
- Evaluation of subsidence on the Zone A cap.

This report presents and evaluates data collected during 2019 under the Agreed and Enforcement Orders and reports on groundwater monitoring, operations and maintenance activities completed in relation to the SVE system operating beneath and within the Zone A landfill, the RTO used to treat SVE system effluent, waste management, landfill covers on waste Zones A, C/D, and E, and institutional controls at the Site.

2.1 Contaminants of Potential Concern

Contaminants of Potential Concern (COPCs) were defined in the Site *Risk Assessment/Cleanup Level Analysis Report* (PSC, 1998) based upon the occurrence and quantification of compounds detected in soil and groundwater during the Site investigation. Further evaluation was performed as part of the *Draft* and *Draft Final Focused Feasibility Studies* (FFS), prepared in 2014 and 2017 and as part of Ecology's preparation of the Cleanup Action Plan in 2019.

2.2 Groundwater Cleanup Levels

Ecology presented draft CULs (dCULs) for the Site in 2013. These dCULs were updated in the 2014 FFS and presented again in the 2017 FFS. New CULs were established in the Cleanup Action Plan, which was presented as Exhibit B of the November 2019 Enforcement Order. For this annual report, results from 2019 groundwater monitoring are compared to the 2019 CULs. The point of compliance was changed to the standard point of compliance, defined as "…throughout the site from the uppermost level of the saturated zone extending vertically to the lowest depth that potentially could be affected by the site." in the Enforcement Order.

The following table summarizes the 2019 CULs:

Groundwater Cleanup Levels
in micrograms/liter (µg/L)

Compound	CUL
Tetrachloroethene	0.69
Trichloroethene	2.5
1,1-Dichloroethene	0.057
cis-1,2-Dichloroethene	12
Vinyl Chloride	0.053
1,1,1-Trichloroethane	200
1,2-Dichloroethane	0.38
1,1-Dichloroethane	7.68
Benzene	1.2

Compound	CUL
Methylene Chloride	5
Toluene	157
Total Chromium	100

3 GROUNDWATER MONITORING

3.1 Methodology

3.1.1 Groundwater Monitoring Wells

Groundwater monitoring at the Site was conducted in accordance with schedules and field sampling methods presented in:

- The *Revised Site-Wide Groundwater Performance and Protection Monitoring Operations and Maintenance Manual – Pasco Landfill Site* (Groundwater O&M Manual), dated October 10, 2017.

As part of the quarterly groundwater monitoring activities during January, April, July, and October 2019, groundwater levels were measured to the nearest 0.01-foot. Figure 3 illustrates the location of each sampled well in the groundwater monitoring well network. In January and July, groundwater levels were measured in wells that were sampled. In April and October, groundwater levels are measured in a larger selection of shallow and intermediate groundwater wells, according to the Groundwater O&M Manual. Groundwater levels are not measured in the residential wells because those wells were not constructed in a manner allowing such measurements.

Quarterly groundwater samples were collected in January, April, July, and October 2019. Semi-annual groundwater samples were collected in April and October. In response to semi-volatile organic compound (SVOC) concentrations detected in October 2017, SVOC analysis was conducted on samples collected at the three Zone A wells (MW-47S, MW-50S, and MW-53S) during all four quarters of 2019. Zone A well MW-52S has not been sampled since April 2018 due to the presence of LNAPL in the well. Table 1 summarizes the wells sampled and the specific chemical analyses performed on each sample during each quarterly and semi-annual sampling event.

During March 2019, additional monitoring for VOCs was performed at MW-53S in response to SVE system flow rate changes.

All laboratory data from groundwater samples collected at the Site during 2019 were submitted to a third-party data validator for evaluation. Data validation reports for the first through third quarters were submitted with the corresponding quarterly reports. Attachment A contains the data validation report for the fourth quarter 2019 sample analysis. A list of all analytical methods utilized for groundwater sample analysis is provided in the data validation report.

3.1.2 Residential Wells

The target sampling frequency for residential wells in the Groundwater Protection Area (GPA) is presented in the *Groundwater O&M Manual*. At a minimum, functional and safely accessible residential wells are sampled on a semi-annual basis during the second and fourth quarters. If any compound were detected in a residential well at a concentration that exceeds a CUL, that well would be moved to a quarterly sampling schedule. If all analytical results are below the CULs in four consecutive quarterly samples, the well would be moved back to a semi-annual sampling schedule.

At the start of 2019, none of the analytical data from the most recent four consecutive quarterly samples for any residential well contained a VOC concentration above a CUL for the Site. Therefore, the residential wells were sampled semi-annually as planned (i.e., during the second and fourth quarters).

The actual number of wells sampled during each semi-annual event in 2019 was dependent upon many factors including, whether permission was granted by the property owner, the well was safely accessible, and the equipment or piping were functional. The IWAG does not control or maintain the residential wells and is not responsible for their upkeep or performance. Table 1 summarizes the residential wells sampled during 2019.

Residential wells are further described in Section 3.2.4.2.6.

3.2 Findings

3.2.1 Groundwater Elevation Data

Quarterly groundwater elevation monitoring was performed in January, April, July, and October 2019. Table 2 presents the quarterly water level measurement data for 2019.

The groundwater levels listed for MW-52S have not been corrected for the non-aqueous phase liquid (NAPL) impacts on the water table elevation.

Both horizontal and vertical hydraulic gradients for the monitoring well network were evaluated for the second and fourth quarters of 2019.

3.2.2 Horizontal Hydraulic Gradients

Groundwater elevation contours were developed using the Site-wide groundwater elevation measurements collected in January, April, July, and October 2019 as summarized in Table 2. Site-wide groundwater elevation contours for shallow wells are presented in Figures 4 through 7.

The piezometric contours indicate that the groundwater flow direction beneath Zone A and across the PSL property was consistently southwesterly throughout 2019. The hydraulic gradient calculated between wells MW-52S in Zone A and MW-11S, approximately 1,109 feet southwest at the downgradient property boundary, averaged less than 0.002 feet/feet (ft/ft) during 2019.

The calculated off-property hydraulic gradient averaged less than 0.001 ft/ft during 2019 as measured between wells MW-11S, at the property boundary, and MW-43S. MW-43S is located approximately 8,025 feet south of the property boundary along East A Street and along the historical orientation of the dissolved-phase contaminant plume.

Hydraulic gradients measured in the shallow aquifer in 2019 were consistent throughout the year and were consistent with findings for prior years. The hydraulic gradient direction and slope at the Site are stable and are not expected to change in the future.

The hydraulic gradient for the intermediate portion of the aquifer on the PSL property, as measured between MW-47I and MW-11I (approximately 845 feet), averaged less than 0.002 ft/ft during 2019. The gradient for the intermediate portion, as measured between MW-11I and MW-54I (approximately 11,107 feet), averaged less than 0.0005 ft/ft during 2019.

As with the shallow aquifer, the hydraulic gradients in the intermediate portion of the aquifer were consistent throughout the year and were consistent with prior years. The hydraulic gradient direction for the intermediate portion of the aquifer is stable and is not expected to change in the future.

3.2.3 Vertical Hydraulic Gradients

Groupings of shallow and intermediate wells allow for the calculation of vertical hydraulic gradients throughout the aquifer. The gradients are calculated using groundwater elevations from the shallow and intermediate wells and the elevation of the center of the intermediate well screen. Because of the accuracy of the water level meter and survey instruments, the vertical gradients have been rounded to the nearest thousandth of a foot. Negative values reflect an upward vertical gradient. Table 3 summarizes vertical hydraulic gradients calculated for well clusters on the landfill property near Zone A and downgradient of the landfill property.

Vertical hydraulic gradients near Zone A have been calculated for four pairs of wells screened at the shallow and intermediate portions of the aquifer (#2R/I, MW-12S/I, MW-47S/I, and MW-49S/I). During 2019, the vertical hydraulic gradients for the four Zone A well pairs ranged from 0.005 ft/ft (downward) to -0.005 ft/ft (upward).

Four off-property well pairs are screened at the shallow and intermediate portions of the aquifer and are located along the inferred longitudinal axis of the dissolved-phase plume (MW-11S/I, MW-29S/I, MW-38S/I, and MW-43S/I). During 2019, the vertical gradients for the downgradient off-property well pairs ranged from 0.005 ft/ft in to -0.003 ft/ft.

The vertical gradient data, consistent with prior years, indicate that only very small vertical gradients exist at the Site and that these vertical gradients are unlikely to have a significant effect on the vertical migration of dissolved-phase compounds.

3.2.4 Groundwater Quality

Well stabilization parameters collected during well purging are summarized in Table 4. Laboratory analytical results from groundwater monitoring during 2019 are summarized in Tables 5 through 10. VOC data are split into two tables. Table 5 presents the monitoring results for the six VOC compounds that were detected in MW-53S and in wells outside of the Zone A landfill footprint, including residential wells. Table 6 presents the monitoring results for all 17 VOCs that were detected in wells completed within the Zone A landfill (MW-53S).

Groundwater quality data are evaluated by well groupings in Section 3.2.4.2 and by distribution of dissolved-phase contaminants in Section 3.2.4.3. Overall concentration trends for 2019 are also discussed in relation to SVE System Performance Monitoring in Section 4.6 – Groundwater Quality Trends. The evaluation of groundwater quality at the Site is focused on compounds that were detected at concentrations exceeding a CUL.

3.2.4.1 Well Stabilization Parameters

Well stabilization parameters are collected to evaluate steady-state conditions in each well prior to sampling and to evaluate data relative to measurements collected across the Site during the same event. Conductivity, pH, dissolved oxygen (DO), and turbidity are the primary parameters used to evaluate steady-state conditions prior to sample collection. During well purging, temperature and oxidation-reduction potential (ORP) are also stabilized and recorded. Well stabilization data are presented in Table 4.

3.2.4.2 Evaluation by Well Grouping

This section presents a discussion of the analytical results for the following groups of wells:

- Performance Monitoring Wells
  - MSW Landfill
  - Zone A
  - Zone B
  - Zones C and D
  - Zone E
- Sentinel Wells
- Property Boundary Wells
- Off-Property Downgradient Monitoring Wells
- Upgradient Wells
- Residential Wells

These well groupings are as presented in the *Groundwater O&M Manual* and on Table 5. Well locations are shown on Figure 3.

3.2.4.2.1 Performance Monitoring Wells

Performance monitoring wells are used to monitor the effectiveness of interim remedial measures and track changes in contaminant concentrations and distribution over time. They are located either directly under a waste zone or on the downgradient boundary of a zone. The performance monitoring wells are grouped into wells monitoring groundwater quality at the MSW, Zone A, Zone B, Zones C/D, and Zone E landfills. The wells associated with each landfill or zone are discussed below.

MSW Landfill Wells

The groundwater monitoring network for the MSW Landfill consists of wells 4R, MW-16S, MW-17SR, and MW-23S. Table 1 summarizes the wells sampled and analyses performed on samples from the MSW Landfill wells. Samples for VOC analysis were collected from wells 4R and MW-16S during all four quarters of 2019 and, in accordance with the Groundwater O&M Manual, MW-17SR and MW-23S were sampled semiannually.

The concentration of PCE detected in the third quarter sample from well 4R exceeded the CUL. No other VOC concentrations exceeded a CUL in samples collected from the MSW landfill wells. VOC data for the MSW landfill wells are summarized in Table 5.

Landfill parameter samples were collected from wells 4R, MW-16S, MW-17SR, and MW-23S during the second and fourth quarters. The landfill parameters analyzed include nitrate, ammonia, sulfate, manganese, total dissolved solids, total alkalinity, bicarbonate, carbonate, hydroxide, chloride, total organic carbon, calcium, total iron, magnesium, potassium, and sodium. Landfill parameter data are summarized in Table 10.

Total chromium was analyzed for samples from wells 4R and MW-16S during the second and fourth quarters of 2019. No chromium was detected in these samples.

Evaluation of MSW Landfill well data is provided in the 2019 Annual Report for the MSW Landfill as prepared by the LFG.

Zone A Wells

The groundwater monitoring network for Zone A consisted of eight wells during 2019. Wells EE-2, MW-13S, MW-47S, MW-50S, MW52S, MW-53S, and NVM-01 are completed in the shallow portion of the aquifer, and well MW-47I is completed in the intermediate portion of the aquifer. Intermediate well MW-47I is paired with the adjacent shallow well MW-47S. Table 1 summarizes the analyses performed on samples from each Zone A Performance Monitoring well.

VOC analysis was performed on samples from five wells (MW-13S, MW-47S, MW-50S, MW-53S, and NVM-01) on a quarterly basis during 2019 and on samples from two additional wells (EE-2 and MW-47I) on a semi-annual basis during the second and fourth quarters. Groundwater samples were not collected from MW-52S during 2019 due to the presence of measurable light non-aqueous phase liquid (LNAPL) on the water table. Additional VOC monitoring was performed on MW-53S during March 2019, in response to flow rate changes to the SVE system.

Table 5 presents VOC data for the six compounds detected in MW-53S and in wells outside the footprint of Zone A – PCE, TCE, 1-1-DCE, 1,2-DCA, chloroform, and benzene. Table 6 presents data for all compounds detected in MW-53S.

Groundwater monitoring wells MW-52S and MW-53S are considered source zone wells as they are screened immediately beneath the Zone A wastes. During 2019, LNAPL was present in MW-52S. VOCs were detected in samples from MW-53S with concentrations of PCE and benzene exceeding a CUL during 2019. Tables 5 and 6 summarize VOC data for the Zone A wells.

No VOCs were detected at a concentration above a CUL in any other sample from Zone A monitoring wells including the Zone A performance monitoring well in the intermediate portion of the aquifer (MW-47I) during 2019.

SVOC analysis was performed on samples from the Zone A source well MW-53S and the two performance monitoring wells (MW-47S and MW-50S) during all four quarterly monitoring events in 2019. SVOCs were detected in samples from MW-47S, MW-50S, and MW-53S during 2019. SVOC data are summarized in Table 7. There are no site-specific CULs for any of the detected SVOCs.

Herbicide analysis was performed on samples from the Zone A well MW-53S during the second and fourth quarters. No herbicides were detected in samples analyzed during 2019. Herbicide data are summarized in Table 8.

Total chromium analysis was performed on samples from MW-47S and MW-50S during second and fourth quarters of 2019. No total chromium was detected at concentrations above a CUL during the second quarter, and no chromium was detected for the fourth quarter samples. Chromium data are summarized in Table 9.

NAPL monitoring was conducted on a biweekly basis at MW-52S and MW-53S during the first and second quarters and with Ecology approval, was decreased to monthly during the third and fourth quarters of 2019. No LNAPL has been measured in MW-52S with the interface probe since deployment of a sorbent sock for LNAPL recovery in August 2018. No LNAPL was detected in MW-53S during 2019, and no dense non-aqueous phase liquid (DNAPL) has been detected in either well. Table 11 summarizes measurements made during NAPL monitoring.

The NAPL sorbent sock deployed in MW`-52S was subject to bi-weekly and/or monthly monitoring throughout 2019, which involved weighing and inspecting the NAPL sock. The sorbent sock was replaced after 64 to 91 days at 13% to 42% capacity. Sorption was determined using the two specific gravity measurements obtained from the LNAPL samples collected in June 2017 and May 2018. A total of five sorbent socks were deployed in 2019, each of which sorbed between 224 and 590 milliliters (mL) of LNAPL (calculated using a specific gravity of 0.83) or between 182 and 480 mL of NAPL (calculated assuming a specific gravity of 1.02). Table 12 summarizes the NAPL sorption and removal and deployment of sorbent socks in MW-52S.

Zone B Well
The groundwater monitoring network for Zone B consisted of well MW-26SR during 2019. MW-26SR was sampled for VOCs, SVOCs, and herbicides semiannually, during the second and fourth quarters. Table 1 summarizes the analyses performed on samples from this well.

No VOCs, SVOCs, or herbicides were detected in samples collected from MW-26SR during 2019. VOC, SVOC, and herbicide data are summarized in Tables 5, 7, and 8, respectively.

Zone C/D Well
The groundwater monitoring network for Zones C and D consisted of well MW-55S in 2019. Well MW-55S was sampled for VOCs during all four quarters and total chromium semiannually during the second and fourth quarters. Table 1 summarizes the analyses performed on samples from the Zone C/D well.

No VOCs were detected in samples collected from MW-55S during 2019. No total chromium was detected in MW-55S during the second quarter 2019 at a concentration above the CUL. VOC and chromium data are summarized in Tables 5 and 9, respectively.

Zone E Well
The groundwater monitoring network for Zone E consisted of well MW-27SR during 2019. Well MW-27SR was sampled for VOCs during all four quarters and total chromium semiannually during the second and fourth quarters. Table 1 summarizes the analyses performed on samples from the Zone E well.

No VOCs were detected in samples collected from MW-27SR during 2019. No total chromium was detected in the second quarter sample at a concentration above the CUL. VOC and total chromium data are summarized in Tables 5 and 9, respectively.

3.2.4.2.2 Sentinel Wells
Sentinel wells are located between a landfill or waste zone and the property boundary. The sentinel wells, in conjunction with the performance monitoring wells, provide a means of tracking changes in contaminant concentrations over the distance from each source area and over time. This information is used to estimate concentration attenuation with distance from each source area.

The sentinel well monitoring network consists of six shallow wells (2R, MW-12S, MW-15S, MW-18S, MW-19S, and MW-49S) and three intermediate wells (2I, MW-12ID, and MW-49I). Each of the intermediate depth wells is paired with an adjacent shallow zone well. Table 1 summarizes the analyses performed on samples from each sentinel well.

All shallow sentinel wells were analyzed for VOCs on a quarterly basis. Shallow sentinel well MW-19S was sampled for total chromium and landfill parameters during the second and fourth quarters. The three intermediate sentinel wells were analyzed for VOCs on a semi-annual basis in the second and fourth quarters.

No VOC concentrations were detected in samples from the sentinel wells during 2019 above the CULs. VOC data are summarized in Table 5.

Total chromium was not detected in the sample from sentinel well MW-19S in 2019. Total chromium data are summarized in Table 9. Landfill parameter data are summarized in Table 10.

3.2.4.2.3 Property Boundary Wells

The property boundary groundwater monitoring network consists of five shallow wells (MW-10S, MW-11S, MW-22S, MW-24S, and MW-51S) and one intermediate depth well (MW-11I). Samples from the five shallow wells and the intermediate depth well were analyzed for VOCs on a semi-annual basis in the second and fourth quarters. Samples from MW-22S, an MSW Landfill well, were analyzed for total chromium on a semi-annual basis during the second and fourth quarters. Table 1 summarizes the analyses performed on samples from the Property Boundary Wells.

No VOCs or total chromium were detected in samples collected from the property boundary monitoring wells during 2019 at a concentration exceeding a CUL. VOC and total chromium data are summarized in Tables 5 and 9, respectively.

The monitoring data for well MW-22S will be discussed in the 2019 Annual Report for the MSW Landfill.

3.2.4.2.4 Off-Property Downgradient Monitoring Wells

The off-property downgradient monitoring well network consists of 12 shallow wells (MW-29S, MW-31S, MW-34S, MW-37S, MW-38S, MW-40S, MW-41SR, MW-42S, MW-43S, MW-44S, MW-45S, and MW-46S) and four intermediate depth wells (MW-29I, MW-38I, MW-43I, and MW54I). All downgradient off-property wells were analyzed for VOCs semiannually, during the second and fourth quarters of 2019. Each intermediate depth well is paired with an adjacent shallow depth well, except for MW-54I, the furthest downgradient well. Table 1 summarizes the analyses performed on samples from the off-property downgradient monitoring wells.
No VOCs were detected for any of the downgradient monitoring wells at concentrations exceeding a CUL during 2019. VOC data are summarized in Table 5.

3.2.4.2.5 Upgradient Wells

The upgradient monitoring well network consists of two shallow wells (MW-20S and MW-25SR). Table 1 summarizes the analyses performed on samples from the upgradient wells. Samples from MW-25SR were analyzed for VOCs, SVOCs, and herbicides on a semi-annual basis during the second and fourth quarters. Samples from MW-20S were analyzed for landfill parameters and total chromium on a semi-annual basis during the second and fourth quarters.

No VOCs, SVOCs, herbicides, or chromium were detected in samples collected from the upgradient monitoring wells during 2019. VOC, SVOC, herbicide, total chromium, and landfill parameter data are summarized in Tables 5, 7, 8, 9, and 10, respectively.

3.2.4.2.6 Residential Wells

As outlined in the methodology section for residential wells, at the start of 2019, all 16 residential wells in the GPA were scheduled for semi-annual VOC sampling and analysis. Because of access and/or equipment limitations, groundwater samples were collected from 8 residential wells in 2019. Table 1 summarizes residential well sampling and analysis.

VOCs detected for samples collected from the residential wells are summarized in Table 5.
No VOCs were detected at a concentration exceeding a CUL in any of the residential wells during 2019. Based on these data, all residential wells will remain on a semi-annual monitoring schedule at the start of 2020.

3.2.4.3 Contaminant Distribution

This section discusses the dissolved-phase distribution of the compounds for which CULs have been established for the Site and for which observed concentrations exceeded a CUL during 2019. PCE and benzene were detected at concentrations above a CUL during 2019. Concentrations of PCE were detected above the CUL in 4R and MW-53S, while benzene was only detected above its CUL in MW-53S. As discussed in Section 3.2.4.2.1, MW-52S contained LNAPL during 2019, and groundwater samples were not collected from MW-52S during 2019.

Two wells contained contaminant concentrations above a CUL during 2019: MW-53S, which is screened below the Zone A landfill; and well 4R, which is located immediately adjacent to and downgradient of the MSW landfill.

A contaminant distribution map has been prepared only for compounds with concentrations exceeding a CUL in more than one well and detected in more than three wells outside of Zone A. For 2019, PCE was the only compound with contaminant distributions that triggered a map. A map depicting the distribution and concentrations of PCE during each quarterly monitoring event is presented in Figure 8.

Concentrations of PCE exceeded the CUL in MW-53S during the first and second quarters, as well as during the March 2019 monitoring event. Concentrations of PCE exceeded the CUL in 4R during the third quarter of 2019. The distribution of PCE is presented in Figure 8.

The benzene concentration detected in the second quarter sample from MW-53S exceeded the CUL. No other benzene exceedances were detected in 2019. Site-wide groundwater concentrations of benzene are presented in Tables 5 and 6.

3.2.4.4 Landfill Parameters

Samples from wells 4R, MW-16S, MW-17SR, MW-19S, MW-20S, and MW-23S were analyzed for landfill parameters during the second and fourth quarters of 2019. Table 1 summarizes the analytical results for landfill parameter monitoring. Landfill parameter data are summarized in Table 10. Landfill parameter data will be discussed in the 2019 Annual Report for the MSW Landfill as prepared by the LFG.

4 REMEDIATION SYSTEM PERFORMANCE MONITORING

4.1 SVE and RTO System Operation

A soil vapor extraction (SVE) system has been in operation at Zone A of the IWA as part of Interim Actions at the Site since May 1997. Since 2012, the system has been connected to six SVE wells (VEW-06S, VEW-06I, VEW-06D, VEW-07S, VEW-07I, and VEW-07D) within the Zone A landfill. During 2019, only the shallow (VEW-06S and VEW-07S) and deep (VEW-06D and VEW-07D) SVE wells were used for active vapor extraction. Flow rates at the shallow vapor extraction wells VEW-06S and VEW-07S were reduced to zero scfm on February 20, 2019, and only deep wells were used during the remainder of 2019.

Effluent from the SVE system has been piped directly to a regenerative thermal oxidizer (RTO), built by Anguil Environmental Systems, Inc (Anguil) since July 14, 2017. The RTO system is permitted, under *Approval Order #16AQ-E031*, issued by Ecology's Air Quality Program on May 2, 2017. Performance testing, conducted in August 2019, indicates that the RTO is operating in compliance with the operating permit. The *Performance*

Test Report for Anguil Regenerative Thermal Oxidizer, which summarizes the stack testing for the Anguil RTO was submitted October 25, 2019, and the *2019 Annual Report: Regenerative Thermal Oxidizer Performance Monitoring* was submitted to Ecology on January 31, 2020.

During 2019, operation, monitoring, and upgrades of the SVE system and RTO were conducted in accordance with the following Ecology approved documents:

- *Operation and Maintenance Manual Soil Vapor Extraction System and Regenerative Thermal Oxidizer Volume 1: SVE System O&M Manual (2017 Upgrades)*, dated December 13, 2017.
- *Operation and Maintenance Manual Soil Vapor Extraction System and Regenerative Thermal Oxidizer Volume 2: RTO System O&M Manual (2017 Installation),* dated December 13, 2017.
- *Revised Addendum No. 2 SVE Well Residue Cleanout – Operation and Maintenance Manual Soil Vapor Extraction System and Regenerative Thermal Oxidizer Volume 1: SVE System O&M Manual (2017 Upgrades)*, dated July 3, 2018.
- *Memorandum: Verification Testing of Carbon Monoxide and Methane Measurements*, dated August 24, 2018.
- *Proposal to modify SVE flow rates*, dated November 13, 2018.
- *Addendum No. 3 – 2018 SVE Upgrades, Operations and Maintenance Manual, Soil Vapor Extraction System and Regenerative Thermal Oxidizer, Volume 1: SVE System O&M Manual (2017 Upgrades),* dated November 15, 2018.
- *Memorandum: Testing of Field Filters for Carbon Monoxide and Methane Measurements,* dated November 26, 2018.
- *Memorandum: Carbon Monoxide and Methane Measurement at Zone A Landfill, Pasco Landfill NPL Site*, dated June 28, 2019.
- *Addendum No. 4 – Below Grade Moisture Separator and Condensate Sampling, Operations and Maintenance Manual, Soil Vapor Extraction System and Regenerative Thermal Oxidizer, Volume 1: SVE System O&M Manual (2017 Upgrades)*, dated December 18, 2019.

Numerous meetings and communications between the IWAG and Ecology also guided operation, monitoring, and upgrades to the systems.

During 2019, routine SVE performance monitoring included both field observation and measurement, and laboratory analysis of the SVE system and effluent air stream.

4.2 SVE System Monitoring and Vapor Treatment

Monitoring of the SVE system was performed using active and inactive vapor extraction wells (VEWs), vapor monitoring wells VMW-50S, VMW-51I, and VMW-51D, and vacuum monitoring probes within and surrounding Zone A. Figure 9 illustrates the locations of these features.

SVE system operational parameters were measured and recorded on a weekly basis at the wellheads and at the SVE equipment compound. Parameters recorded included wellhead vacuum and airflow and skid vacuum, dilution airflow, wellhead temperature, carbon dioxide (CO_2), oxygen (O_2), and carbon monoxide (CO). CO Monitoring was performed on a bi-weekly basis during 2019. Field measurements were conducted using a GEM 5000 Landfill Gas Analyzer to monitor CO_2, O_2, and CO. Data from SVE performance monitoring are presented in Tables 13 through 16.

Temperature measurements for the shallow and deep wells were made at the wellheads. Temperature in the intermediate depth wells was measured via a downhole thermocouple.

Operational parameters presented in Table 13 were recorded at each of the extraction wells (VEW-06S/I/D and VEW-07S/I/D), and VMW-51I. Flow rates from individual SVE system wells are presented in Figure 10. During 2019, the both the shallow and deep SVE wells (VEW-6S, VEW-07S, VEW-06D, VEW-07D) were operated until February 20, at which time the shallow wells were shut down and only the deep wells were run for the remainder of 2019. After February 20, 2019, flow rates at the deep vapor extraction wells VEW-06D and VEW-07D were increased to 175 scfm on February 15, 200 scfm on February 27, and 250 scfm on March 7. The deep wells have been operated at a targeted flow rate of 250 cfm since March 7. Combined line flow rates ranged from 171 to 576 scfm, with an average of 498 scfm delivered to the RTO after the March 7 airflow changes to the deep extraction wells.

Vacuum monitoring was performed during 2019 to monitor SVE system operation, confirm the presence of negative pressure beneath the geomembrane, and to assess radius of influence of the SVE system. Vacuum measurements were collected weekly at the SVE wells throughout 2019. Vacuum measurement data for the SVE wells are presented in Table 13 and Figure 12. In addition to the SVE well vacuum measurements, vacuum measurements were collected at the inactive SVE extraction wells VEW-04 and VEW-05, at vacuum monitoring wells VMW-50S, VMW-51I, VMW-51D, at vacuum monitoring probes (VMPs) through the Zone A cap (VMP-02, VMP-04, VMP-05, VMP-06, VMP-08, VMP-09, VMP-10), and VMPs outside the barrier wall (VMP-13S, VMP-13D, VMP-17, VMP-18, VMP-19, VMP-20, and VMP-21). Biweekly vacuum measurement data for these 19 monitoring locations are presented in Table 14.

As mentioned above and illustrated in Tables 13 and 14 and Figure 11, airflow in the shallow extraction wells was decreased to zero scfm on February 20, 2019, while airflow in the deep extraction wells were increased to approximately 250 scfm. In response to the adjustments in extraction well airflow, vacuum measured in VMW-51I[1] and the other shallow vacuum monitoring points beneath the Zone A cover (VMP-02, 04, 05, 06, 08, 09, and 10) decreased. By comparison, vacuum in intermediate and deep wells in and around Zone A (VEW-04, VEW-05, VMW-50S[2], and VEW-51D) and VMPs outside of the protective barrier wall (VMP-13S, 13D, 17, 18, 19, 20, and 21) were relatively less affected. Vacuum measurements for each location, for the entire year, are shown on Table 14. These data illustrate that changes in vacuum and airflow at the shallow SVE wells have the greatest effect on the wells and probes set in the shallow intervals beneath the Zone A cover system. Meanwhile, such changes do little to affect vapor monitoring probes screened at the shallow interval outside the protective barrier wall. The protective barrier wall, which was installed in 2015 along the northern and northeastern boundaries of the Zone A landfill, effectively limited airflow between the SVE system and the Balefill Area during 2019.

In addition, the vacuum data illustrate that the radius of influence of the SVE system encompasses all shallow, intermediate, and deep intervals beneath the Zone A cover, and deep extraction wells beyond the cover, providing an effective means of contaminant source removal for the Zone A landfill.

Vapor samples were collected at each active extraction well (VEW-06S/D, and VEW-07S/D) and from the combined line before fresh air dilution at the RTO (SV-BRTO) on a biweekly schedule throughout 2019. As noted above, since the shallow wells were only active through February 20, 2019, there are no sample data for

[1] VMW-51I was installed with a screen within a shallow interval of 30 to 35 feet bgs.

[2] VMW-50S was installed with a screen within an intermediate interval of 42 to 57 feet bgs.

VEW-06S or VEW-07S after that date. In accordance with procedures established for increased monitoring following changes in extraction well flow rates, vapor samples were collected weekly from the deep wells and combined line from April 9, 2019 to May 6, 2019. Samples were submitted for laboratory analysis of VOCs using a modified EPA Method 8260. The laboratory data are presented in Table 15.

A contaminant mass removal rate is calculated for each sample location and sample using the total VOC concentration and the measured flow rate. Figure 12 illustrates the average daily contaminant mass removal rates from the active SVE wells and for the combined SVE system effluent line from October 5, 2015 through the end of December 2019.

Between January 2, 2019 and December 16, 2019, contaminant mass removal rates based on SV-BRTO sample data ranged from a low of 27 pounds/day (lb/day) on February 12, 2019, to the high of 157 lb/day on September 24, 2019. Based on SV-BRTO data, the SVE system recovered an estimated 22,287 pounds of VOCs during 2019, with an average combined SVE mass removal rate of 64 lb/day or 2.7 lb/hour. Analysis for Tentatively Identified Compounds (TICs), which was performed as part of RTO stack testing in August 2019 indicated that the extracted VOC mass could be higher than that calculated with the standard EPA Method 8260 target compounds. More information on TICs in the extracted soil vapors can be found in the *Performance Summary Report for Anguil Regenerative Thermal Oxidizer*, dated October 25, 2019.

The SVE system has recovered a total of approximately 1,106,837 pounds of VOCs between May 1997 and December 30, 2019. The cumulative mass removal is illustrated in Figure 13.

The recovery of approximately 22,287 pounds of total VOCs in 2019 was achieved exclusively using the shallow and deep extraction wells. Although shallow extraction wells were inactive after February 20, 2019 and intermediate extraction wells were not active during 2019, continual operation of the SVE system provided a demonstrated means of protecting groundwater quality (refer to Section 4.6 below).

4.3 Carbon Monoxide Monitoring

Carbon monoxide (CO) monitoring activities were performed in accordance with the following documents:

- Sampling and Analysis Plan in Attachment A of the *Operations and Maintenance Manual – Soil Vapor Extraction System and Regenerative Thermal Oxidizer – Volume 1: SVE System O&M Manual (2017 Upgrades),* prepared by PBS, dated December 13, 2017.
- *Memorandum – Verification Testing of Carbon Monoxide and Methane Measurements*, dated August 24, 2018.
- *Memorandum – Testing of Field Filters for Carbon Monoxide and Methane Measurements*, dated November 26, 2018.
- *Memorandum: Carbon Monoxide and Methane Measurement at Zone A Landfill, Pasco Landfill NPL Site*, dated June 28, 2019.

As indicated in the Sampling and Analysis Plan, the wells monitored for carbon monoxide levels included all six vapor extraction wells (VEW-06S/I/D and VEW-07S/I/D) and vapor monitoring well VMW-51I. Field measurements were made using a GEM 5000 Landfill Gas Analyzer. Field measurements were collected from each well on a bi-weekly basis during 2019. Sample collection and laboratory analysis were only carried out for those wells with a field reading greater than 100 parts per million (ppm), and samples from qualifying wells were collected on a bi-weekly basis through February 2019. Samples were collected monthly from March to

July 2019, after which they were moved to an every-other month schedule. Tedlar bag samples were collected for laboratory analysis by modified EPA Methods 25C and 3C.

For monitoring events on January 7, February 4, and February 18, a carbon filter preconditioned (saturated) with a 50% CH_4 calibration gas was used in-line with the GEM 5000 during monitoring. A H_2S filter was used in line with the GEM 5000 during the January 21 monitoring event, as a replacement for the carbon filter, which was not working properly. During March, April and May, measurements were recorded both with no filter on the GEM 5000 and with a H_2S filter in line with the GEM 5000, in order to assess the consistency of the non-filtered versus filtered measurements against laboratory measurements. Results as presented in *Memorandum: Carbon Monoxide and Methane Measurement at Zone A Landfill, Pasco Landfill NPL Site*, dated June 28, 2019, indicated that the H_2S filters were more consistent with laboratory results. H_2S filters were used for CO monitoring from June through December of 2019.

Table 16 contains carbon monoxide monitoring data.

4.4 Zone A Landfill Subsurface Monitoring

Thermocouples and co-located with gas probes, installed during 2017, were monitored throughout 2019. Subsurface temperatures were routinely monitored at 20 to 28 thermocouples located at various depths in nine thermocouple array locations across the Zone A landfill. While temperature data was downloaded on a biweekly basis through February 12, 2019, weekly through October 15, 2019, then bi-weekly through the end of December 2019, temperatures were recorded on an hourly basis throughout 2019. Temperature data for 2019 is summarized in Table 17 and Figures 14 through 22.

Soil vapor parameters, including pressure (vacuum), CH_4, CO_2, O_2, and CO, were collected from 19 GIs located in the nine GI arrays across Zone A on a biweekly basis throughout 2019. In accordance with recommendation in the June 2019 Memorandum, and with Ecology approval on August 14, 2019, CH_4 monitoring was eliminated from soil vapor monitoring. GI monitoring data were provided to Ecology on a routine basis and were included with the monthly status reports presented at the beginning of each month. Soil vapor data for 2019 is summarized in Table 18.

4.5 SVE System Maintenance and Repair Reporting

During cleaning and inspection of the below-grade moisture separators (BGMSs) in May 2019, a leak was detected in one of the couplers on the secondary condensate conveyance line at the VEW-06SD separator. In August 2019, upgrades were made to the BGMSs and conveyance piping in accordance with the *Revised Conceptual Repair Plan for SVE Condensate Below Grade Moisture Separators,* dated July 3, 2019. Two existing BGMSs were removed, and secondary containment sumps, leak detection sensors, and pump counters were installed. During the work, the SVE condensate management system continued to operate, using temporary above-ground conveyance lines between the BGMSs and the oil water separator. New permanent SVE condensate conveyance lines were installed as part of the upgrades. *Addendum 4 Below Grade Moisture Separator Upgrades and Condensate Sampling*, dated December 18, 2019 summarizes the repairs and upgrades.

SVE system shutdowns occurred both as planned events for routine system maintenance and system upgrades, and as unplanned shutdowns in 2019. Planned shutdowns included RTO inspection and testing, upgrades to the SVE system, upgrades to building ventilation, LEL sensor calibration, as well as equipment maintenance. Unplanned shutdowns were primarily related to local power outages, upset conditions caused by minor adjustments to the system, and on the effects of high ambient temperatures on the air compressor.

During the fourth quarter, the only system shutdown was related to a belt in the air compressor breaking, which is buried in the equipment and required partial disassembly for access.

Details of each shutdown that occurred between January 1, 2019 and September 30, 2019, were included in the first, second, and third quarter reports. Shutdowns that occurred during the fourth quarter of 2019 are summarized in Table 19. A complete summary of system shutdowns is documented in *2019 Annual Report: Regenerative Thermal Oxidizer Performance Monitoring,* dated January 31, 2020.

4.6 Groundwater Quality Trends

VOC data presented in quarterly and annual reports, including the Phase I Additional Interim Action (AIA) investigation reported in the 2008 and 2009 Annual Reports, illustrate that extraction of soil vapor and groundwater quality associated with Zone A is closely linked, and contaminant transport through the vadose zone to the water table is a primary mechanism for contaminant migration from the Zone A wastes to groundwater. During 2019, only wells 4R and MW-53S contained VOCs at a concentration exceeding a CUL. Due to the presence of LNAPL in the well, it is assumed that VOC concentrations are likely to exceed CULs in MW-52S. No other wells throughout the Site, including performance monitoring or sentinel wells immediately downgradient of the MSW landfill and Zone A, contained a CUL exceedance for any VOCs at any time during 2019 (Tables 5 and 6).

Regarding Zone A, LNAPL was present in MW-52S and 17 VOCs were detected above laboratory reporting limits with concentrations of PCE and benzene exceeding their CUL in MW-53S during 2019. Meanwhile, groundwater data for all twelve performance monitoring and sentinel wells downgradient of Zone A (2R, 2I, EE-2, MW-12S, MW-12ID, MW-13S, MW-47S, MW-47I, MW-49S, MW-49I, MW-50S, and NVM-01) illustrate that groundwater quality improves markedly between the source wells and those outside of the Zone A cover, with only four compounds detected, one compound detected in more than two wells, and all VOC concentrations remaining below CULs during all four quarters of 2019.

The only other exceedance of a CUL occurred in well 4R during the third quarter of 2019. Concentrations of all VOCs in all other wells downgradient of the MSW landfill were below CULs.

No analysis of trends was prepared for non-Zone A wells across the Site due to low concentrations, the limited number of detected compounds, and stable concentrations below CULs.

5 WASTE MANAGEMENT

Table 20 summarizes waste volumes disposed of or treated off-site during 2019. Attachment B contains shipping papers and other documentation for materials transported off-site during the fourth quarter of 2019. Waste documentation for January through October 2019 was previously presented in the first, second, and third quarter reports for 2019.

5.1 SVE System Waste Storage, Characterization, and Management

During 2019, condensate generated within the SVE system was stored in polyethylene tanks in secondary containment prior to transport off-site. Sampling and characterization of condensate is performed semi-annually or as necessary to confirm the composition of the condensate and its consistency with the established waste profile. Condensate may also be sampled if there is a substantial change in SVE system operation or a change in the rate of condensate accumulation. Condensate sampling was performed on March 3, 2019 and analyzed for: pH (Method SM4500H), VOCs (EPA Method 8260), SVOCs (EPA Method 8270), PAHs (EPA Method 8270 SIM), PCBs (EPA Method 8082), RCRA-8 metals and Washington State Metals (EPA Method 200.8/245.1), flashpoint (EPA Method 1010), and cyanide (Method SM4500-CN). The

condensate was sampled again on September 10, 2019 and analyzed for VOCs (EPA Method 8260) and SVOCs (EPA Method 8270).

As reported in the *Second Quarter 2019 Groundwater Monitoring and Interim Action Performance Monitoring Report,* dated September 16, 2019*,* two drums of wash water from steam cleaning and vacuuming the deep SVE wells was categorized as non-hazardous, non-dangerous waste, and the drums were transported by Northern Environmental of Tacoma, Washington to PRS Group in Tacoma, Washington on April 22, 2019. Eight partially full drums of SVE condensate and wash water generated from the steam cleaning of the intermediate (I) well below-grade moisture separators (BGMS) on May 10, 2019 were categorized as non-hazardous, non-dangerous, and the drums were transported by Northern Environmental of Tacoma, Washington to PRS Group in Tacoma, Washington on June 28, 2019. Another partial drum containing light non-aqueous phase liquid (LNAPL) generated from the I-well BGMS cleanout was categorized as hazardous waste and transported off-site by Northern to Waste Management (CWMNW) in Arlington, Oregon on June 28, 2019.

A total of 8,676 gallons of SVE condensate was collected in 2019. All the SVE condensate was designated as non-hazardous, non-dangerous, non-regulated waste based on characterization results and transported to PRS Group in Tacoma, Washington, for treatment and disposal on September 27 and December 3, 2019.

5.2 Groundwater Monitoring Waste Storage, Characterization, and Management

Purge and decontamination water generated during routine sampling was stored in polyethylene tanks for off-site treatment.

During 2019, 550 gallons of water from well purging was stored on-site and characterized as non-hazardous, non-dangerous, and non-regulated waste. Following review and approval of the characterization data by City of Pasco Wastewater Treatment Plant staff, the purge water was transported to the City of Pasco Wastewater Treatment Plant for treatment and disposal on June 11, 2019.

Additionally, a total of two 55-gallon drums containing spent LNAPL sorbent socks from MW-52S were transported off-site to Chemical Waste Management of the Northwest, Inc. (CWMNW) in Arlington, Oregon for incineration. The drums of NAPL socks were characterized as hazardous and dangerous waste and assigned waste codes D001, D018, D027, D028, D039, and D040 using laboratory data from a May 14, 2018 LNAPL sample from MW-52S. Disposal documentation for these drums was provided in the first and second quarter 2019 reports.

5.3 Drummed Waste Management

Eighty-eight drums of investigational material and 137 soil cores generated during drilling in the Zone A landfill performed as part of Combustion Investigation activities were transported off-site for treatment and disposal on February 26 and 27, 2019. Additional information related to this waste was reported in 2018 Annual Report, dated March 16, 2019 and the *First Quarter 2019 Groundwater Monitoring and Interim Action Performance Monitoring Report,* dated June 17, 2019.

6 LANDFILL CAP PERFORMANCE MONITORING

Monitoring of the Zone A, C/D, and E landfill caps during 2019 was conducted in accordance with the following Ecology approved documents:

- *Operations and Maintenance Manual for Industrial Waste Area Caps – Zones A, C/D, and E – Pasco Landfill Site Pasco, Washington*, dated November 21, 2013.

Monthly visual inspections are performed to monitor the condition of the Zone A, C/D, and E landfill covers, detention and evaporation basins, and perimeter fencing. Each monthly inspection is recorded on an inspection checklist. The monthly inspection checklists include assessment of man-made, animal-made, and natural disturbances. Disturbances under evaluation or requiring repairs are noted on the checklist. Monthly inspection checklists for Zones A, C/D, and E for the first, second, and third quarters of 2019, were presented in the corresponding quarterly reports. The monthly checklists for the fourth quarter of 2019 are available in Attachment C.

The surface of each cover is checked for vehicle traffic, burrowing, erosion, vegetation, and settlement. The Zone A cover inspection also involves inspection of sumps within settlement depressions.

Detention and evaporation basins on each landfill cover are checked for disturbances including damage to the liner, staff gauge, or anchor trench along with levels of accumulated water, sediment, or vegetation. Perimeter fencing for each landfill is inspected for disturbances such as damage from vehicles, burrowing under the fence line, vegetation accumulation, and leaning fence posts.

6.1 Zone A Landfill

The Zone A Landfill Cover, Detention/Evaporation Basin, and Fence Inspection Checklists for the fourth quarter of 2019 are presented in Attachment C. Zone A cover settlement, vent monitoring, and fencing is addressed below.

No conditions requiring maintenance or repair were observed on the Zone A cap, basins, or fencing in 2019.

6.1.1 Zone A Settlement

Monitoring of differential settlement of the Zone A cap has been ongoing since May 2008. From 2008 through 2013, monitoring included periodic surveys of settlement monitoring plates. In December 2011, the entire surface of Zone A was surveyed with a ground-based lidar scanner to produce three-dimensional (3D) point cloud data for as-built documentation after cap maintenance and SVE system upgrades. Routine lidar surveying was initiated in April 2013. During December 2015, a new baseline scan was performed to capture changes in the northern portion of the Zone A cover following construction activities and installation of the protective barrier wall. Lidar surveys were performed on a quarterly basis from 2013 through 2018 to evaluate the progression of settlement. Each survey is evaluated through production of a differential surface map for comparison of the quarterly data relative to the December 2011 baseline lidar survey to evaluate total settlement, relative to the December 2015 baseline to evaluate settlement in the northern portion of Zone A, and relative to the prior quarterly survey to assess incremental settlement.

As approved by Ecology on February 22, 2019, in anticipation of drum removal work to be performed as required by the Enforcement Order, Lidar surveys were performed semi-annually during 2019. Differential surface maps were provided in the first and third quarter reports during 2019. Elevation changes throughout Zone A were less than 0.1 feet during 2019.

Visual inspection and the differential surface maps indicate that the surface of Zone A remained stable during 2019.

6.1.2 Zone A Fencing

Zone A Fencing was inspected on a monthly basis in 2019. No changes were made to Zone A fencing, and the fencing remained intact during 2019.

6.2 Zones C/D and E Landfills

The Zone C/D and Zone E Landfill Cover, Detention/Evaporation Basin, and Fence Inspection Checklists for the fourth quarter of 2019 are presented in Attachment C. No conditions requiring maintenance or repair were observed on the Zone C/D or E caps, basins, or fencing in 2019.

7 INSTITUTIONAL CONTROLS

Institutional controls for the Site are presented in:

- *Pasco Landfill Site Updated Institutional Controls Plan – Revision 1*, dated October 7, 2013.

Institutional controls at the Site include gates restricting access to the landfill, fencing around the perimeter of Zones A, B, C/D, and E, and informational signage posted around the Site. As discussed above, perimeter fencing is inspected monthly. Informational signage is monitored during the monthly inspections as well as during operations and maintenance activities. Fencing Inspection Checklists are included in Attachment C.

Other institutional controls for the Site include City of Pasco Ordinance No. 3469 and Municipal Code Section 16.06.040, and Franklin County Ordinance No. 2-99 and Code Chapter 17.56. Both City of Pasco and Franklin County ordinances prohibit installation of new drinking water wells within the Groundwater Protection Area (GPA). As part of the control measures, the City of Pasco and Franklin County are responsible for monitoring and controlling building and development permits within the GPA.

The annual well survey is a component of the institutional controls. A summary of the well survey provided by the City of Pasco, 2019—East Pasco Plume Area—Well Location Survey, is included in Attachment E. No annual institutional control report has been received from Franklin County for 2019

8 SUMMARY

The primary findings and conclusions from the groundwater monitoring and the interim action operations and maintenance in 2019 are summarized as follows:

- Groundwater quality at the downgradient property boundary, and locations downgradient of the property boundary, continued to comply with the CULs throughout 2019. No samples from property boundary wells or downgradient wells contained a COC at a concentration exceeding a CUL at any time in 2019.
- The only locations at the Site where groundwater quality exceeded a CUL were at well 4R, which is a performance monitoring well for the MSW Landfill; and at well MW-53S, which is a source zone well installed inside of Zone A immediately below Zone A wastes. Samples from wells along the downgradient extent of the Zone A landfill did not contain any compounds with a detected concentration exceeding a CUL at any time in 2019.
- While MW-52S was not sampled during 2019, the presence of LNAPL on the water table in MW-52S influenced groundwater quality in MW-52S during 2019.
- The current groundwater monitoring network is adequate to assess and evaluate ongoing groundwater quality at the Site.
- Improvements in groundwater quality continue to indicate that the SVE system is an effective interim action remedial technology and protective of groundwater quality for contamination associated with Zone A.
- The covers at Zones B, C/D, and E have been effective in protecting groundwater quality in these areas.
- Approximately 22,287 pounds of total VOCs were removed from the Zone A landfill in 2019. This mass removal rate is approximately 59% higher than the mass removal in 2018, estimated to be due to the increased flowrate extracted from the deep wells.
- Vacuum monitoring throughout Zone A, during 2019, confirms that changes in flow rates in shallow extraction wells, and their ultimate shutoff, did not adversely impact the radius of influence of the SVE system, as all shallow vacuum monitoring points completed beneath the Zone A cover and within the boundary wall were confirmed to be under vacuum.
- The protective barrier wall along the northern and northeastern boundaries of the Zone A landfill effectively limited airflow between the SVE system and the Balefill Area during 2019. This is evidenced by minimal change to vacuum measurements in shallow probes in the Balefill Area outside of the protective barrier wall despite significant changes in SVE system airflow during 2019.
- No settlement of the Zone A cover was observed during 2019.
- Constituent concentrations in condensate produced during operation of the SVE system remained beneath hazardous and dangerous waste concentration limits during 2019.
- The RTO operated in full compliance with the specified destruction efficiency and other requirements in the State Approval Order throughout 2019.

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TABLES

Table 1
Wells Sampled and Analyses Performed
2019 Annual Report
PERIOD: 1/1 - 12/31/2019 Pasco Landfill NPL Site, Pasco, WA

WELL	Jan/Q1		Apr/Q2					Jul/Q3		Oct/Q4				
	VOCs with SIM	SVOCs with SIM	VOCs with SIM	SVOCs with SIM	Herbicides	Landfill Parameters	Total Chromium	VOCs with SIM	SVOCs with SIM	VOCs with SIM	SVOCs with SIM	Herbicides	Landfill Parameters	Total Chromium
Performance Monitoring Wells - Municipal Solid Waste Landfill														
4R	X	-	X	-	-	X	X	X	-	X	-	-	X	X
MW-16S	X	-	X	-	-	X	X	X	-	X	-	-	X	X
MW-17SR	-	-	X	-	-	X	-	-	-	X	-	-	X	-
MW-23S	-	-	X	-	-	X	-	-	-	X	-	-	X	-
Performance Monitoring Wells - Zone A														
EE-2	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-13S	X	-	X	-	-	-	-	X	-	X	-	-	-	-
MW-47S	X	X	X	X	-	-	X	X	X	X	X	-	-	X
MW-47I	-		X	-	-	-	-	-	-	X	-	-	-	-
MW-50S	X	X	X	X	-	-	X	X	X	X	X	-	-	X
MW-52S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-53S	X	X	X	X	X	-	-	X	X	X	X	X	-	-
NVM-01	X	-	X	-	-	-	-	X	-	X	-	-	-	-
Performance Monitoring Wells - Zone B														
MW-26SR	-	-	X	X	X	-	-	-	-	X	X	X	-	-
Performance Monitoring Wells - Zone C/D														
MW-55S	X	-	X	-	-	-	X	X	-	X	-	-	-	X
Performance Monitoring Wells - Zone E														
MW-27SR	X	-	X	-	-	-	X	X	-	X	-	-	-	X
Sentinel Wells														
MW-15S	X	-	X	-	-	-	-	X	-	X	-	-	-	-
MW-18S	X	-	X	-	-	-	-	X	-	X	-	-	-	-
MW-19S	X	-	X	-	-	X	X	X	-	X	-	-	X	X
2R	X	-	X	-	-	-	-	X	-	X	-	-	-	-
2I	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-12S	X	-	X	-	-	-	-	X	-	X	-	-	-	-
MW-12ID	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-49S	X	-	X	-	-	-	-	X	-	X	-	-	-	-
MW-49I	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Property Boundary Wells														
MW-22S	-	-	X	-	-	-	X	-	-	X	-	-	-	X
MW-24S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-10S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-11S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-11I	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-51S	-	-	X	-	-	-	-	-	-	X	-	-	-	-

Table 1
Wells Sampled and Analyses Performed
2019 Annual Report
PERIOD: 1/1 - 12/31/2019 Pasco Landfill NPL Site, Pasco, WA

WELL	Jan/Q1		Apr/Q2					Jul/Q3		Oct/Q4				
	VOCs with SIM	SVOCs with SIM	VOCs with SIM	SVOCs with SIM	Herbicides	Landfill Parameters	Total Chromium	VOCs with SIM	SVOCs with SIM	VOCs with SIM	SVOCs with SIM	Herbicides	Landfill Parameters	Total Chromium
Downgradient Wells														
MW-29S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-29I	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-31S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-34S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-37S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-38S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-38I	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-40S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-41SR	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-42S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-43S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-43I	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-44S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-45S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-46S	-	-	X	-	-	-	-	-	-	X	-	-	-	-
MW-54I	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Upgradient Wells														
MW-20S	-	-	-	-	-	X	X	-	-	-	-	-	X	X
MW-25SR	-	-	X	X	X	-	-	-	-	X	X	X	-	-
Residential Wells														
Bonnie1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bradley	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Hand	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Hommes	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lopez	-	-	-	-	-	-	-	-	-	X	-	-	-	-
Montalvo	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Norvell	-	-	-	-	-	-	-	-	-	X	-	-	-	-
Norvell2	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Rada	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reisinger2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rindt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salinas	-	-	X	-	-	-	-	-	-	X	-	-	-	-
West	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Yenney1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yenney2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yenney3	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-52S was not sampled in 2019 due to the presence of LNAPL.
MW-53S was sampled for VOCs in March 2019.
Landfill parameters include analysis for nitrate, ammonia, sulfate, manganese, total dissolved solids, alkalinity, bicarbonate, chloride, total organic carbon, calcium, iron, magnesium, potassium, and sodium.

Table 2
Site-Wide Groundwater Elevation Data
2019 Annual Report

PERIOD: 1/1 - 12/31/2019 Pasco Landfill NPL Site

WELL ID	Q1	Q2	Q3	Q4	RANGE
#9	--	359.16	--	356.20	2.73
1R	--	352.83	--	350.94	1.97
2I	--	352.92	--	351.16	1.98
2R	352.11	352.86	351.77	351.05	2.01
4R	357.08	358.32	--	355.48	2.68
8R	--	357.22	--	354.64	2.50
EE-2	--	353.57	--	351.72	2.06
EE-6R	--	357.66	--	354.97	2.52
MW-10S	--	352.27	--	350.45	1.86
MW-11S	--	352.05	--	350.28	1.28
MW-11I	--	352.04	--	350.27	2.39
MW-12S	352.19	353.1	352.00	351.17	2.01
MW-12ID	--	353.07	--	351.22	2.03
MW-13S	352.47	353.34	352.25	351.51	2.12
MW-14S	--	354.87	--	352.72	2.17
MW-15S	352.85	353.82	352.57	351.71	2.08
MW-16S	358.63	359.94	358.33	356.87	2.75
MW-17SR	--	355.65	--	353.26	2.31
MW-18S	354.96	356.05	354.66	353.63	2.38
MW-19S	356.91	358.18	356.56	355.34	2.72
MW-20S	--	360.82	--	357.55	2.93
MW-22S	--	353.95	--	351.98	2.16
MW-23S	--	359.60	--	356.96	2.62
MW-24S	--	352.88	--	351.17	2.04
MW-25SR	--	359.04	--	356.14	2.80
MW-26SR	--	358.07	--	355.38	2.67
MW-27SR	357.50	358.89	357.20	356.01	2.74
MW-28S	--	364.07	--	360.33	3.36
MW-29S	--	350.77	--	349.18	1.61
MW-29I	--	350.82	--	349.24	1.66
MW-30S	--	350.21	--	348.80	1.58
MW-31S	--	350.50	--	349.10	1.55
MW-32S	--	350.41	--	348.89	1.69
MW-34S	--	349.58	--	348.16	1.48
MW-36S	--	348.89	--	347.59	1.37
MW-37S	--	348.82	--	347.93	1.44
MW-38S	--	348.51	--	347.31	1.26
MW-38I	--	348.49	--	347.29	1.34

Table 2
Site-Wide Groundwater Elevation Data
2019 Annual Report

WELL ID	Q1	Q2	Q3	Q4	RANGE
MW-40S	--	348.15	--	346.97	1.30
MW-41SR	--	348.29	--	347.18	1.30
MW-42S	--	347.83	--	346.69	1.25
MW-43S	--	347.90	--	346.83	2.23
MW-43I	--	347.83	--	346.73	1.23
MW-44S	--	347.86	--	346.76	1.16
MW-45S	--	348.26	--	347.11	1.23
MW-46S	--	349.86	--	348.38	1.51
MW-47S	352.65	353.40	352.24	351.40	1.99
MW-47I	--	353.41	--	351.36	2.01
MW-48S	--	353.28	--	351.34	2.01
MW-49S	351.87	352.70	351.65	350.87	1.96
MW-49I	--	352.65	--	350.75	2.21
MW-50S	357.41	353.66	352.49	351.71	1.75
MW-51S	--	352.29	--	350.66	1.89
MW-52S	354.11	354.15	352.89	351.97	2.21
MW-53S	352.71	353.73	352.47	351.58	2.09
MW-54I	--	346.68	--	345.78	0.91
MW-55S	356.46	357.73	356.19	355.03	2.59
NVM-01	355.31*	353.25	352.18	352.79	2.02
NW-1	--	--	--	--	--
NW-2	--	366.97	--	--	--
NW-3	--	364.73	--	--	--
NW-4	--	366.84	--	--	--
NW-5	--	367.93	--	363.59	3.70

Notes:
Water levels were collected only at the wells that were sampled during the Q1 and Q3 monitoring events. NW-1 was not accessible for measurement during 2019, and NW-2, -3, and -4 were not accessible during Q3.
-- = Water level not measured.
* Measurement appears to be erroneous. Not used to map contours or calculate range.
Vertical Datum is based on NAVD 1988

Table 3
Evaluation of Vertical Gradients
2019 Annual Report
Pasco Landfill NPL Site

PERIOD: 1/1 - 12/31/2019

	Shallow Well	Water Elevation (in feet)	Shallow to Intermediate Vertical Piezometric Gradient	Intermediate Well	Elevation at Center of Screen (in feet)	Water Elevation (in feet)
April 2019						
Zone A Wells	**2R**	352.86	-0.002	**2I**	327.50	352.92
	MW-12S	353.10	0.001	**MW-12ID**	326.80	353.07
	MW-47S	353.40	<±0.001	**MW-47I**	326.70	353.41
	MW-49S	352.70	0.002	**MW-49I**	328.90	352.65
Off Property Wells	**MW-11S**	352.05	<±0.001	**MW-11I**	328.94	352.04
	MW-29S	350.77	-0.003	**MW-29I**	331.39	350.82
	MW-38S	348.51	0.001	**MW-38I**	333.17	348.49
	MW-43S	347.90	0.003	**MW-43I**	327.22	347.83
October 2019						
Zone A Wells	**2R**	351.05	-0.005	**2I**	327.50	351.16
	MW-12S	351.17	-0.002	**MW-12ID**	326.80	351.22
	MW-47S	351.40	0.002	**MW-47I**	326.70	351.36
	MW-49S	350.87	0.005	**MW-49I**	328.90	350.75
Off Property Wells	**MW-11S**	350.28	<±0.001	**MW-11I**	328.94	350.27
	MW-29S	349.18	-0.003	**MW-29I**	331.39	349.24
	MW-38S	347.31	0.001	**MW-38I**	333.17	347.29
	MW-43S	346.83	0.005	**MW-43I**	327.22	346.73

Notes:
Vertical Datum is based on NAVD 1988

Well	Date	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (mV)	pH	Specific Conductivity (mS/m)	Temperature (°C)	Turbidity (NTU)
2I	4/23/2019	5.97	163.9	7.97	63	17.6	0.12
	10/22/2019	5.88	74.4	7.97	70	18.4	0.11
2R	1/23/2019	6.12	94.9	7.63	64	17.1	0.15
	4/23/2019	6.08	147.6	8.06	64	17.6	0.15
	7/23/2019	6.26	46.5	7.74	68	19.0	0.00
	10/22/2019	6.15	69.8	8.05	70	18.5	0.10
4R	1/22/2019	5.63	171.9	7.25	74	16.4	0.19
	4/24/2019	5.86	125.0	7.66	77	17.4	0.00
	7/23/2019	5.96	68.1	7.19	81	18.4	0.00
	10/23/2019	3.49	58.6	7.50	83	17.5	0.00
EE-2	4/23/2019	6.34	152.7	8.13	64	19.5	0.38
	10/22/2019	6.25	79.2	8.03	70	19.6	0.13
MW-10S	4/23/2019	6.40	104.4	8.11	64	18.4	0.56
	10/24/2019	6.10	51.4	8.08	71	18.3	0.37
MW-11I	4/23/2019	6.03	134.4	8.08	64	17.7	0.35
	10/24/2019	6.04	64.8	8.04	70	17.2	0.10
MW-11S	4/23/2019	6.31	121.9	8.03	67	18.2	0.18
	10/24/2019	6.09	65.6	7.99	73	17.7	0.06
MW-12ID	4/23/2019	6.37	157.4	8.13	63	17.8	0.29
	10/22/2019	6.10	81.3	8.03	69	18.1	0.05
MW-12S	1/23/2019	6.61	67.1	7.57	64	17.7	0.34
	4/23/2019	4.97	135.7	7.98	66	19.0	0.24
	7/23/2019	5.05	6.1	7.58	74	19.9	0.00
	10/22/2019	4.33	70.4	7.96	74	19.2	0.10
MW-13S	1/23/2019	6.30	88.3	7.62	64	17.1	0.33
	4/23/2019	6.26	143.1	8.06	65	18.4	0.14
	7/23/2019	6.28	73.1	7.69	71	19.1	0.00
	10/22/2019	6.19	72.5	7.99	72	18.8	0.02
MW-15S	1/22/2019	4.21	190.6	7.15	*	16.5	0.17
	4/23/2019	6.30	166.6	7.49	84	17.5	0.33
	7/23/2019	4.78	67.9	7.25	87	18.5	0.00
	10/22/2019	4.80	109.8	7.42	82	17.8	0.00
MW-16S	1/22/2019	4.98	91.1	7.40	69	16.3	0.17
	4/24/2019	3.80	127.8	7.57	69	18.1	0.00
	7/23/2019	4.89	54.7	7.16	71	19.0	0.04
	10/23/2019	4.67	36.2	7.65	76	17.3	0.08
MW-17SR	4/24/2019	6.04	121	8.07	64	17.9	0.00
	10/23/2019	6.04	43.5	8.06	72	17.9	0.00
MW-18S	1/22/2019	6.26	80.8	7.70	64	17.0	0.20
	4/25/2019	6.52	86.4	8.12	64	17.6	0.00
	7/23/2019	6.65	33.1	7.74	68	19.3	0.00
	10/24/2019	6.67	81.0	7.92	70	17.3	0.21
MW-19S	1/22/2019	7.73	111.1	7.37	74	16.9	0.20
	4/24/2019	8.08	127.3	7.78	81	18.0	0.00
	7/23/2019	7.46	70.8	7.43	83	18.9	0.01
	10/23/2019	7.02	45.9	7.82	77	17.8	0.00
MW-20S	4/24/2019	6.70	95.2	8.14	64	18.3	0.00
	10/23/2019	6.23	25.7	8.15	69	18.3	0.11
MW-22S	4/25/2019	6.00	155.3	7.96	65	17.4	0.00
	10/31/2019	5.96	137.0	7.71	71	16.8	0.32
MW-23S	4/24/2019	5.77	142.3	7.89	63	18.0	0.00
	10/23/2019	4.72	52.0	7.82	75	17.8	0.02

Well	Date	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (mV)	pH	Specific Conductivity (mS/m)	Temperature (°C)	Turbidity (NTU)
MW-24S	4/23/2019	6.21	149.9	7.94	69	17.9	0.07
	10/31/2019	5.93	84.2	7.71	69	17.8	0.10
MW-25SR	4/25/2019	7.42	96.9	8.22	63	17.8	0.11
	10/23/2019	6.46	120.4	7.98	69	17.1	0.00
MW-26SR	4/25/2019	6.80	61.7	8.11	64	17.3	0.09
	10/23/2019	7.95	83.9	8.05	69	16.7	0.46
MW-27SR	1/22/2019	6.75	81.8	7.69	63	16.8	0.19
	4/24/2019	6.46	111.5	8.07	64	18.9	0.00
	7/23/2019	6.57	56.5	7.69	69	18.9	0.00
	10/24/2019	6.47	81.3	8.02	70	17.6	0.34
MW-29I	4/24/2019	6.17	109.2	8.09	64	18.7	0.00
	10/22/2019	5.96	73.2	8.01	71	19.0	0.00
MW-29S	4/24/2019	6.44	97.2	8.05	67	19.3	0.12
	10/22/2019	5.99	71.0	7.99	71	19.9	0.03
MW-31S	4/24/2019	6.27	94.4	7.98	67	18.2	0.00
	10/22/2019	5.97	63.3	7.92	73	18.6	0.59
MW-34S	4/23/2019	6.69	137.8	7.98	67	19.2	0.26
	10/22/2019	6.13	61.0	7.91	73	18.3	0.00
MW-37S	4/23/2019	6.43	102	7.98	67	18.9	0.27
	10/22/2019	6.27	45.6	7.92	73	18.7	0.19
MW-38I	4/24/2019	6.39	96.2	8.09	64	18.8	0.00
	10/22/2019	6.08	54.5	8.02	71	18.8	0.00
MW-38S	4/24/2019	8.32	108.0	8.15	69	18.4	0.35
	10/22/2019	8.01	59.8	8.14	69	19.6	0.05
MW-40S	4/23/2019	6.72	93.8	7.99	68	19.1	0.55
	10/22/2019	6.45	88.2	7.87	74	18.6	0.00
MW-41SR	4/24/2019	7.65	106.1	8.14	56	18.1	0.43
	10/22/2019	7.30	65.9	8.08	59	18.5	0.45
MW-42S	4/23/2019	7.48	124.4	8.03	67	19.2	0.21
	10/22/2019	7.33	59.1	7.96	76	18.8	0.06
MW-43I	4/23/2019	6.37	141.4	8.06	65	18.9	0.10
	10/22/2019	6.17	53.0	8.00	71	19.0	0.00
MW-43S	4/23/2019	6.19	97.8	8.05	66	19.0	0.21
	10/22/2019	6.17	43.7	7.98	75	19.2	0.53
MW-44S	4/23/2019	6.99	133.6	7.95	71	19.3	0.32
	10/22/2019	7.13	63.0	7.88	77	19.4	0.00
MW-45S	4/24/2019	6.09	92.7	7.90	70	18.2	0.02
	10/22/2019	6.04	60.8	7.93	75	18.7	0.00
MW-46S	4/24/2019	6.21	107.4	7.94	68	18.2	0.00
	10/22/2019	6.06	69.9	7.91	72	18.7	0.00
MW-47I	4/25/2019	6.30	111.6	8.12	65	17.5	0.09
	10/23/2019	6.15	5.0	8.01	70	17.6	0.00
MW-47S	1/23/2019	1.56	-108.7	7.63	57	17.9	2.85
	4/25/2019	1.54	-111.9	8.00	75	19.9	0.89
	7/24/2019	0.40	-155.7	7.58	81	19.9	3.46
	10/23/2019	0.39	-147.5	7.94	72	18.9	2.31
MW-49I	4/23/2019	6.19	159.9	8.09	63	17.6	0.08
	10/23/2019	6.04	53.0	8.09	68	17.9	0.00
MW-49S	1/23/2019	1.30	93.2	7.20	70	16.5	0.22
	4/23/2019	2.64	134.3	7.63	72	18.1	0.23
	7/23/2019	1.33	57.4	7.30	81	19.2	0.00
	10/23/2019	1.50	50.9	7.63	80	18.3	0.00

Well	Date	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (mV)	pH	Specific Conductivity (mS/m)	Temperature (°C)	Turbidity (NTU)
MW-50S	1/23/2019	0.59	49.6	7.18	73	18.4	0.64
	4/25/2019	0.83	49.0	7.62	82	19.9	0.01
	7/24/2019	0.69	4.1	7.24	96	20.4	0.00
	10/23/2019	1.60	-11.7	7.65	80	19.7	0.94
MW-51S	4/23/2019	6.05	137.4	8.08	64	17.8	0.10
	10/31/2019	6.02	77.6	7.88	64	17.5	0.08
MW-53S	1/23/2019	4.69	-111.7	6.78	65	23.3	0.89
	4/25/2019	4.18	58.4	7.77	66	26.8	0.40
	7/23/2019	4.47	-92.9	7.29	69	25.9	0.16
	10/23/2019	4.13	-109.2	7.22	70	23.6	0.27
MW-54I	4/23/2019	6.39	141.2	8.03	69	17.7	0.31
	10/22/2019	6.18	73.9	7.95	77	17.4	0.00
MW-55S	1/22/2019	6.84	65.6	7.67	63	16.9	0.36
	4/25/2019	6.67	89.1	8.11	64	17.8	0.00
	7/23/2019	6.65	39.2	7.72	69	19.6	0.00
	10/24/2019	6.58	70.8	8.02	69	17.4	0.23
NVM-01	1/23/2019	1.83	35.6	7.44	69	18.9	1.21
	4/25/2019	1.01	65.5	7.83	79	20	0.38
	7/24/2019	0.42	27.8	7.46	92	20.5	0.10
	10/23/2019	1.26	-14.5	7.82	78	19.9	0.73
BRADLEY	4/25/2019	4.77	186.9	7.84	77	16.3	0.00
	10/24/2019	4.49	111.2	7.78	83	16	0.00
HAND	4/25/2019	4.68	133.2	7.94	76	16.9	0.00
	10/24/2019	4.62	90.5	7.91	82	16.6	0.38
LOPEZ	10/24/2019	1.81	-82.9	7.94	72	17.9	3.36
MONTALVO	4/25/2019	5.37	119.5	7.94	74	16.4	0.00
	10/24/2019	5.43	85.8	7.92	79	16.2	0.02
NORVELL2	4/25/2019	5.79	166.1	7.90	73	16.2	0.00
	10/24/2019	5.70	96.5	7.86	78	16.1	0.05
SALINAS	4/25/2019	5.72	56.7	8.01	66	16.9	2.21
	10/24/2019	5.73	76.7	8.00	72	16.4	0.03
WEST	4/25/2019	6.65	-167.3	8.73	47	14.6	7.90
	10/24/2019	5.73	70.9	8.29	68	16.3	25.08

* No reading due to user error.

Table 5
Volatile Organic Compounds
Detected in MW-53S and in Wells Outside of Zone A (in ug/L)
2019 Annual Report

Well Group	Well	Date	Tetra chloro ethene	Tri chloro ethene	Chloroform	1,1-Dichloro ethene	1,2-Dichloro ethane	Benzene
2019 Clean-up Levels (µg/L)			**0.69**	**2.5**		**0.057**	**0.38**	**1.2**
Municipal Solid Waste (MSW) Landfill Wells	**4R**	1/22/2019	0.39	0.11	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/24/2019	0.69	0.16	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	**0.82**	0.14	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	0.63	0.13	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-16S	1/22/2019	0.26	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/24/2019	0.29	0.091	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	0.21	0.085	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-17SR	4/24/2019	<0.20 U	0.064	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-23S	4/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
Zone A Wells	**EE-2**	4/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-13S	1/23/2019	<0.20 U	0.057	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	<0.20 U	0.065	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.075	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-47S	1/23/2019	<0.20 U	0.13	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/25/2019	<0.20 U	0.13	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/24/2019	<0.20 U	0.10	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	0.090	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-47I	4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-50S	1/23/2019	<0.20 U	0.19	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/25/2019	0.24	0.32	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/24/2019	0.24	0.21	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	0.18	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-52S	NS	--	--	--	--	--	--
		NS	--	--	--	--	--	--
		NS	--	--	--	--	--	--
		NS	--	--	--	--	--	--
	MW-53S	1/23/2019	**1.3 J**	1.7 J	<2.0 U	<0.020 U	0.11 J	0.81 J
		3/13/2019	**0.74**	0.74	<2.0 U	<0.020 U	<0.020 U	**1.3**
		4/25/2019	**1.2**	0.89	<2.0 U	<0.020 U	<0.020 U	0.96
		7/23/2019	0.57	0.65	<2.0 U	<0.020 U	0.045	0.57
		10/23/2019	0.41	0.59	<2.0 U	<0.020 U	0.051	0.22
See table 6 for additional compounds detected in MW-52S and MW-53S.								

EPA Methods 8260 and 8260 SIM
Results in bold indicate an exceedance of a CUL.
U = Compound not detected above reporting limit.
J = Estimated concentration or reporting limit

Well Group	Well	Date	Tetra chloro ethene	Tri chloro ethene	Chloroform	1,1-Dichloro ethene	1,2-Dichloro ethane	Benzene
2019 Clean-up Levels (µg/L)			**0.69**	**2.5**		**0.057**	**0.38**	**1.2**
Zone A Wells	**NVM-01**	1/23/2019	0.32	0.46	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/25/2019	0.50	0.65	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/24/2019	0.35	0.26	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	0.22	<2.0 U	<0.020 U	<0.020 U	<0.028 U
Zone B	**MW-26SR**	4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
Zone C/D	**MW-55S**	1/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
Zone E	**MW-27SR**	1/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
Sentinel Wells	**MW-15S**	1/22/2019	0.27	0.30	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/23/2019	0.47	0.38	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	0.35	0.20	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	0.32	0.22	<2.0 U	0.020	<0.020 U	<0.028 U
	MW-18S	1/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-19S	1/22/2019	0.35	0.10	2.3	<0.020 U	<0.020 U	<0.028 U
		4/24/2019	0.63	0.20	4.6	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	0.42	0.11	2.2	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	0.28	0.088	2.4	<0.020 U	<0.020 U	<0.028 U
	2R	1/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	2I	4/23/2019	<0.20 U	0.15	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.10	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-12S	1/23/2019	<0.20 U	0.098	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		4/23/2019	<0.20 U	0.28	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	<0.20 U	0.11	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.10	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-12ID	4/23/2019	<0.20 U	0.061	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-49S	1/23/2019	<0.20 U	0.16	<2.0 U	<0.020 U	0.021	<0.028 U
		4/23/2019	<0.20 U	0.20	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		7/23/2019	<0.20 U	0.24	<2.0 U	<0.020 U	<0.020 U	0.035
		10/23/2019	<0.20 U	0.23	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-49I	4/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U

EPA Methods 8260 and 8260 SIM
Results in bold indicate an exceedance of a CUL.
U = Compound not detected above reporting limit.
J = Estimated concentration or reporting limit

Well Group	Well	Date	Tetra chloro ethene	Tri chloro ethene	Chloroform	1,1-Dichloro ethene	1,2-Dichloro ethane	Benzene
2019 Clean-up Levels (µg/L)			**0.69**	**2.5**		**0.057**	**0.38**	**1.2**
Property Boundary Wells	**MW-22S**	4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/31/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-24S	4/23/2019	<0.20 U	0.18	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/31/2019	0.21	0.17	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-10S	4/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-11S	4/23/2019	<0.20 U	0.061	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	0.058	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-11I	4/23/2019	<0.20 U	0.061	<2.0 U	<0.020 U	0.057	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	0.054	<0.028 U
	MW-51S	4/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/31/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
Off-Property Wells	**MW-29S**	4/24/2019	<0.20 U	0.19	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.11	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-29I	4/24/2019	<0.20 U	0.063	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.054	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-31S	4/24/2019	<0.20 U	0.11	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.15	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-34S	4/23/2019	<0.20 U	0.088	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.094	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-37S	4/23/2019	<0.20 U	0.085	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.085	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-38S	4/24/2019	<0.20 U	0.57	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.25	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-38I	4/24/2019	<0.20 U	0.11	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.098	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-40S	4/23/2019	<0.20 U	0.11	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.069	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-41SR	4/24/2019	<0.20 U	0.23	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.15	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-42S	4/23/2019	<0.20 U	0.078	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.061	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-43S	4/23/2019	<0.20 U	0.18	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.16	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-43I	4/23/2019	<0.20 U	0.14	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.13	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-44S	4/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-45S	4/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-46S	4/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	MW-54I	4/23/2019	<0.20 U	0.18	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/22/2019	<0.20 U	0.18	<2.0 U	<0.020 U	<0.020 U	<0.028 U
Upgradient Well	**MW-25SR**	4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/23/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U

EPA Methods 8260 and 8260 SIM
Results in bold indicate an exceedance of a CUL.
U = Compound not detected above reporting limit.
J = Estimated concentration or reporting limit

Table 5
Volatile Organic Compounds
Detected in MW-53S and in Wells Outside of Zone A (in ug/L)
2019 Annual Report

Well Group	Well	Date	Tetra chloro ethene	Tri chloro ethene	Chloroform	1,1-Dichloro ethene	1,2-Dichloro ethane	Benzene
2019 Clean-up Levels (µg/L)			**0.69**	**2.5**		**0.057**	**0.38**	**1.2**
Residential Wells	**Bradley**	4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	Hand	4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	Lopez	10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	Montalvo	4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	Norvell2	4/25/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	<0.053 U	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	Salinas	4/25/2019	0.21	0.14	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	0.11	<2.0 U	<0.020 U	<0.020 U	<0.028 U
	West	4/25/2019	0.31	0.16	<2.0 U	<0.020 U	<0.020 U	<0.028 U
		10/24/2019	<0.20 U	0.11	<2.0 U	<0.020 U	<0.020 U	<0.028 U

EPA Methods 8260 and 8260 SIM
Results in bold indicate an exceedance of a CUL.
U = Compound not detected above reporting limit.
J = Estimated concentration or reporting limit

Table 6
Volatile Organic Compounds in Groundwater
Compounds Detected in Zone A (in ug/L)
2019 Annual Report
Pasco Landfill NPL Site

Well Group	Well	Date	Chloroethenes						Chloroethanes		Chloromethanes	Aromatics		
			Tetra chloro ethene	Tri chloro ethene	1,1,1-Trichloroethane	1,1-Dichloro ethene	cis-1,2-Dichloro ethene	Vinyl Chloride	1,1-Dichloroethane	1,2-Dichloro ethane	Methylene Chloride	Benzene	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene
2019 Clean-up Levels (µg/L)			**0.69**	**2.5**	**200**	**0.057**	**12**	**0.053**	**7.68**	**0.38**	**5**	**1.2**	**-**	**-**
Zone A Wells	**MW-53S**	1/23/2019	**1.3 J**	1.7 J	<2.0 U	<0.020 U	<2.0 U	<0.032 U	<2.0 U	0.11 J	<5.0 U	0.81 J	24	10
		3/13/2019	**0.74**	0.74	<2.0 U	<0.020 U	<2.0 U	<0.032 U	<2.0 U	<0.020 U	<5.0 U	**1.3**	16	6.6
		4/25/2019	**1.2**	0.89	<2.0 U	<0.020 U	<2.0 U	<0.032 U	<2.0 U	<0.020 U	<5.0 U	0.96	17	8.8
		7/23/2019	0.57	0.65	<2.0 U	<0.020 U	<2.0 U	<0.032 U	<2.0 U	0.045	<5.0 U	0.57	8.3	4.6
		10/23/2019	0.41	0.59	<2.0 U	<0.020 U	<2.0 U	<0.032 U	<2.0 U	0.051	<5.0 U	0.22	11	4.7

Well Group	Well	Date	Aromatics						Ketones			Other VOCs	
			Ethyl benzene	n-Propyl benzene	Naphthalene	Toluene	m,p-Xylene	o-Xylene	Methyl isobutyl ketone	2-Butanone (MEK)	Acetone	Ethanol	tert-Butyl Alcohol
2019 Clean-up Levels (µg/L)			**-**	**-**	**-**	**157**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Zone A Wells	**MW-53S**	1/23/2019	14	3.0 J	29	27	50 J	23 J	89	63 J	270 J	<710 U	31
		3/13/2019	8.2	<2.0 U	20	14	29	13	25	25	94	<710 U	<13 U
		4/25/2019	8.3	2.1	8.2	18	31	14	<10 U	<10 U	<25 U	<710 U	<13 U
		7/23/2019	5.6	<2.0 U	12 J	13	16	7.7	28	25	100	<710 U	14
		10/23/2019	5.9	<2.0 U	6.8	14	20	10	45	68	370	830	34

Note: MW-52S was not sampled during 2019 due to LNAPL in the well.

EPA Methods 8260 and 8260SIM
Results in bold text indicate an exceedance of a CUL.
U = Compound not detected above reporting limit.
J = Estimated concentration or reporting limit

Table 7
Semi-Volatile Organic Compounds in Groundwater
Detected Compounds Only (in ug/L)
2019 Annual Report
PERIOD: 1/1 - 12/31/2019 Pasco Landfill NPL Site

Well	Qtr	1-Methyl naph thalene	2-Methyl naph thalene	2,4-Di methyl phenol	3-&4-Methyl phenol	Anthra cene	Benzo(a) anthra cene	Benzo(a) pyrene	Benzo(b) fluoran thene	Benzo (g,h,i) perylene	Benzo(k) fluoran thene	Benzoic Acid
MW-25SR	Q2	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
	Q4	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
MW-26SR	Q2	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
	Q4	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
MW-47S	Q1	<0.020 U	<0.020 U	<2.0 U	<2.0 U	0.093	0.13	0.12	0.13	0.12	0.13	<10 U
	Q2	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
	Q3	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
	Q4	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
MW-50S	Q1	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
	Q2	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
	Q3	<0.020 U	<0.020 U	<2.0 U	<2.0 U	0.036	0.039	0.030	0.035	0.039	0.041	<10 U
	Q4	<0.020 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
MW-53S	Q1	3.5	5.8	5.7	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	44
	Q2	1.6	2.7	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U
	Q3	1.8	2.8	<2.0 U	<2.0 U	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	18
	Q4	1.4	2.1	<2.0 U	7.1	<0.020 U	<0.020 U	<0.029 U	<0.030 U	<0.020 U	<0.021 U	<10 U

EPA Methods 8270 and 8270SIM
U = Compound not detected above reporting limit.
J = Field duplicate results did not meet the advisory control criteria.

Table 7
Semi-Volatile Organic Compounds in Groundwater
Detected Compounds Only (in ug/L)
2019 Annual Report
PERIOD: 1/1 - 12/31/2019 Pasco Landfill NPL Site

Well	Qtr	Benzyl Alcohol	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	N-Nitrosodimethylamine	Naphthalene	Phenanthrene	Phenol	Pyrene	Pyridine
MW-25SR	**Q2**	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<5.0 U
	Q4	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<5.0 U
MW-26SR	**Q2**	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<5.0 U
	Q4	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<5.0 U
MW-47S	**Q1**	<2.0 U	0.092	0.071	0.14	0.044	0.11	<2.0 U	<0.020 U	0.092	<2.0 U	0.15	<5.0 U
	Q2	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<5.0 U
	Q3	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<5.0 U
	Q4	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<5.0 U
MW-50S	**Q1**	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<5.0 U
	Q2	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<5.0 U
	Q3	<2.0 U	0.061	0.039	0.056	<0.020 U	0.040	<2.0 U	<0.020 U	<2.0 U	<2.0 U	0.052	<5.0 U
	Q4	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	<0.020 U	<2.0 U	<2.0 U	<0.020 U	<5.0 U
MW-53S	**Q1**	9.3	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	3.4	29	0.10	11	<0.020 U	20
	Q2	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	8.2	0.045	<2.0 U	<0.020 U	<5.0 U
	Q3	<2.0 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<0.020 U	<2.0 U	12 J	<2.0 U	4.6	<0.020 U	<5.0 U
	Q4	<2.0 U	<0.020 U	<0.020 U	<0.020 U	0.022	<0.020 U	<2.0 U	6.8	<2.0 U	3.6 J	<0.020 U	<5.0 U

EPA Methods 8270 and 8270SIM
U = Compound not detected above reporting limit.
J = Field duplicate results did not meet the advisory control criteria.

Table 8
Chlorinated Herbicides in Groundwater
(in ug/L)
2019 Annual Report

PERIOD: 1/1 to 12/31/2019 Pasco Landfill NPL Site

HERBICIDE	MW-25SR		MW-26SR		MW-53S	
	Q2	Q4	Q2	Q4	Q2	Q4
2,4,5-T	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U
2,4-D	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U
2,4-DB	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U
4-Nitrophenol	<0.080 U	<0.016 U	<0.080 U	<0.016 U	<0.080 U	<0.016 U
Dicamba	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U
Dichloroprop	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U
Dinoseb	<0.040 U	<0.040 UJ	<0.040 U	<0.040 UJ	<0.040 U	<0.040 U
MCPA	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U
MCPP	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U
Pentachlorophenol	<0.080 U	<0.080 U	<0.080 U	<0.080 U	<0.080 U	<0.080 U
Silvex (2,4,5-TP)	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U	<0.040 U

EPA Method 8151A
U = Compound not detected above reporting limit

Table 9
Chromium in Groundwater (in ug/L)
2019 Annual Report

PERIOD: 1/1 - 12/31/2019 Pasco Landfill NPL Site

WELL	Total Chromium	
	Q2	Q4
2019 Clean-up Level: 100 µg/L		
4R	<2.0 U	<2.0 U
MW-16S	<2.0 U	<2.0 U
MW-19S	<2.0 U	<2.0 U
MW-20S	<2.0 U	<2.0 U
MW-22S	2.1	<2.0 U
MW-27SR	2.7	<2.0 U
MW-47S	2.2	<2.0 U
MW-50S	<2.0 U	<10 U
MW-55S	2.0	<2.0 U

EPA Method 200.8
U = Compound not detected above reporting limit
J = Estimated concentration or reporting limit

Table 10
Landfill Parameters in Groundwater
(in mg/L)
2019 Annual Report

WELL	Quarter	Nitrate (as N)	Ammonia (as N)	Sulfate	Manganese	Total Dissolved Solids	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Chloride	Total Organic Carbon	Calcium	Total Iron	Magnesium	Potassium	Sodium
4R	Q2	10	<0.050 U	65	<0.0011 UJ	500	270	270	<15 U	<15 U	29	0.79	87	<0.021 U	28	9.9	37
	Q4	11	<0.050 U	63	<0.0010 U	500	270	270	<15 U	<15 U	32	1.70	90	<0.020 U	27	7.4	36
MW-16S	Q2	9.7	<0.050 U	56	0.0047	440	240	240	<15 U	<15 U	23	0.75	68	<0.021 U	32	7.8	34
	Q4	11	<0.050 U	58	0.0094	450	240	240	<15 U	<15 U	26	0.99	74	0.036	28	7.7	35
MW-17SR	Q2	11	<0.050 U	54	<0.0011 U	420	200	200	<15 U	<15 U	21	0.67	66	<0.021 U	26	7.3	34
	Q4	12	<0.050 U	58	0.0012	400	200	200	<15 U	<15 U	25	0.79	65	<0.020 U	26	7.1	34
MW-19S	Q2	11	<0.050 U	57	<0.0011 U	510	220	220	<15 U	<15 U	63	0.62	76	<0.021 U	24	12	63
	Q4	12	<0.050 U	58	<0.0010 U	480	200	200	<15 U	<15 U	46	0.83	72	<0.020 U	22	11	43
MW-20S	Q2	12	<0.050 U	55	<0.0011 U	420	190	190	<15 U	<15 U	24	0.79	62	0.024	26	7.5	34
	Q4	12	<0.050 U	58	<0.0010 U	430	200	200	<15 U	<15 U	25	0.95	62	<0.020 U	26	7.1	34
MW-23S	Q2	12	<0.050 U	57	<0.0011 U	410	190	190	<15 U	<15 U	23	0.57	63	<0.021 U	24	7.6	33
	Q4	11	<0.050 U	59	<0.0010 U	470	240	240	<15 U	<15 U	27	0.79	74	<0.020 U	27	7.9	34

EPA Methods 200.8, 300.0, 350.1, SM 2320B, SM 2540C, SM 5310C, and SW-846 6010C
U = Compound not detected above reporting limit
J = Estimated concentration or reporting limit

Table 11
NAPL Monitoring - Zone A Landfill
2019 Annual Report
Pasco Landfill NPL Site, Pasco, WA

PERIOD: 1/1 - 12/31/2019

Date	Depth to LNAPL (ft)	Depth to Water (ft)	Groundwater Elevation (ft AMSL)	Initial LNAPL Thickness (ft)	Initial LNAPL Thickness (in)	Final LNAPL Thickness (ft)	Final LNAPL Thickness (in)	Approximate Volume Removed	Sample or Sorbent Sock	DNAPL	Depth to NAPL (ft)	Depth to Water (ft)	Groundwater Elevation (ft AMSL)	DNAPL
MW-52S											**MW-53S**			
1/2/2019	ND	78.43	352.87	0	0	NA	NA	NA	--	ND	ND	76.16	352.49	ND
1/14/2019	ND	78.31	352.99	0	0	NA	NA	NA	--	ND	ND	76.03	352.62	ND
1/15/2019	--	--	--	--	--	--	--	--	New Sock	--	--	--	--	--
1/28/2019	ND	78.15	353.15	0	0.0	NA	NA	NA	--	ND	ND	75.91	352.74	ND
2/4/2019	ND	78.04	353.26	0	0	NA	NA	NA	--	ND	ND	75.8	352.85	ND
2/18/2019	ND	77.86	353.44	0	0	NA	NA	NA	--	ND	ND	75.67	352.98	ND
3/4/2019	ND	77.65	353.65	0	0	NA	NA	NA	--	ND	ND	75.45	353.2	ND
3/18/2019	ND	77.46	353.84	0	0	NA	NA	NA	--	ND	ND	75.26	353.39	ND
4/2/2019	ND	77.25	354.05	0	0	NA	NA	NA	New Sock	ND	ND	75.04	353.61	ND
4/15/2019	ND	77.17	354.13	0	0	NA	NA	NA	--	ND	ND	74.94	353.71	ND
4/26/2019	ND	77.32	353.98	0	0	NA	NA	NA	--	ND	ND	75.11	353.54	ND
5/13/2019	ND	77.52	353.78	0	0	NA	NA	NA	--	ND	ND	75.31	353.34	ND
5/28/2019	ND	77.52	353.78	0	0	NA	NA	NA	--	ND	ND	75.32	353.33	ND
6/10/2019	ND	77.81	353.49	0	0	NA	NA	NA	--	ND	ND	75.59	353.06	ND
6/24/2019	ND	77.87	353.43	0	0	NA	NA	NA	New Sock	ND	ND	75.63	353.02	ND
7/22/2019	ND	78.43	352.87	0	0	NA	NA	NA		ND	ND	76.2	352.45	ND
8/19/2019	ND	79.1	352.2	0	0	NA	NA	NA		ND	ND	76.86	351.79	ND
9/23/2019	ND	79.64	351.66	0	0	NA	NA	NA	New Sock	ND	ND	77.39	351.26	ND
10/21/2019	ND	79.33	351.97	0	0	NA	NA	NA	--	ND	ND	77.07	351.58	ND
11/25/2019	ND	78.87	352.43	0	0	NA	NA	NA	--	ND	ND	76.6	352.05	ND
12/23/2019	ND	78.5	352.8	0	0	NA	NA	NA	New Sock	ND	ND	76.33	352.32	ND

0.07 gallons equals approximately 250 milliliters

'-- = No measurement taken

NA = Not Applicable

ND = Not Detected

Table 12
NAPL Sorbent Sock
NAPL Removal and Sock Replacement
2019 Annual Report
Pasco Landfill NPL Site, Pasco, WA

PERIOD: 1/1 - 12/31/2019

Date	Weight of Sock (lb)	Total Weight Absorbed by Sock (g)	Estimated Total Volume Absorbed by Sock Using 0.83 Specific Gravity (mL)	Estimated Total Volume Absorbed by Sock Using 1.02 Specific Gravity (mL)	Days Sock Suspended in Well	New Sock Deployed
1/2/2019	1.43	390	470	382	51	No
1/14/2019	1.49	417	503	409	63	No
1/15/2019	New Sock Deployed					
1/28/2019	0.85	127	153	125	13	No
2/4/2019	0.88	141	169	138	20	No
2/18/2019	0.94	168	202	165	34	No
3/4/2019	1.14	259	312	253	48	No
3/18/2019	1.34	349	421	342	62	No
4/2/2019	1.45	399	481	391	77	Yes
4/15/2019	0.79	91	109	89	13	No
4/26/2019	0.83	109	131	107	24	No
5/13/2019	1.08	222	268	218	41	No
5/28/2019	1.14	249	301	245	56	No
6/10/2019	1.23	290	350	285	69	No
6/24/2019	1.32	331	399	325	83	Yes
7/22/2019	0.97	172	208	169	28	No
8/19/2019	1.12	240	290	236	56	No
9/23/2019	1.67	490	590	480	91	Yes
10/21/2019	0.77	91	109	89	28	No
11/25/2019	0.81	109	131	107	63	No
12/23/2019	0.98	186	224	182	91	Yes

Estimated sorbent capacity of sock: 1419 mL

Note: Total volume calculated as follows:

$$\frac{(W_c - W_s) * 453.59 \frac{g}{lb}}{0.83 \frac{g}{mL}}$$

Where:

W_c= current sock weight (lb)
W_s= sock weight (lb)
453.59= grams per pound
0.83= density of NAPL assumed from specific gravity measurement

Well	Date	Well Head Vacuum (in. H_2O)	Skid Vacuum (in. H_2O)	Well Head Airflow (cfm)	Dilution Airflow (cfm)	Well Head Temperature (°F)	Well Head CO_2 (%)	Well Head O_2 (%)
VEW-06S	1/2/2019	-15.0		21	0	102	4.3	14.9
	1/7/2019	-13.4		21	0	101	2.8	17.9
	1/14/2019	-15.3		20	0	99	4.0	16.2
	1/21/2019	-14.0		18	0	101	3.8	15.2
	1/28/2019	-15.3		18	0	98	3.8	16.1
	2/4/2019	-14.7		18	0	95	3.3	17.1
	2/12/2019	-16.4		20	0	97	4.1	15.8
	2/18/2019	-14.2		23	0	97	4.0	16.7
	2/25/2019	-2.8		0	0	90	3.8	16.8
	3/4/2019	-2.2		0	0	95	3.7	16.4
	3/11/2019	-0.2		0	0	84	3.3	16.5
	3/18/2019	-1.1		0	0	92	3.6	16.0
	3/25/2019	-0.8		0	0	93	3.3	16.1
	4/1/2019	-2.1		0	0	93	3.2	15.5
	4/9/2019	-3.1		0	0	92	3.4	15.7
	4/15/2019	-0.2		0	0	93	2.6	15.7
	4/22/2019	-0.2		0	0	96	3.1	13.8
	4/29/2019	-0.2		0	0	92	3.4	15.5
	5/6/2019	-0.4		0	0	93	2.5	15.2
	5/14/2019	-0.2		0	0	92	3.2	15.1
	5/20/2019	-0.2		0	0	92	3.0	13.6
	5/28/2019	-0.2		0	0	93	3.2	13.7
	6/3/2019	-0.7		0	0	92	2.4	15.1
	6/10/2019	-0.2		0	0	95	3.4	13.8
	6/17/2019	-0.3		0	0	95	2.7	14.2
	6/24/2019	-0.1		0	0	95	3.3	14.4
	7/2/2019	-0.2		0	0	96	2.8	14.8
	7/8/2019	-0.3		0	0	95	3.0	14.7
	7/15/2019	-0.2		0	0	97	2.8	14.8
	7/22/2019	-0.2		0	0	98	3.7	14.1
	7/30/2019	-0.2		0	0	98	3.0	14.5
	8/8/2019	-0.1		0	0	99	3.4	14.5
	8/12/2019	-0.2		0	0	96	3.1	14.4
	8/19/2019	-0.2		0	0	97	3.2	14.5
	8/26/2019	-0.3		0	0	98	2.3	15.9
	9/2/2019	-0.2		0	0	98	4.1	14.3
	9/9/2019	-0.6		0	0	98	2.8	15.7
	9/17/2019	-0.2		0	0	98	3.5	16.1
	9/24/2019	-0.1		0	0	98	2.5	16.4
	9/30/2019	-0.3		0	0	98	3.0	17.3
	10/7/2019	-0.1		0	0	98	2.2	16.4
	10/15/2019	-0.2		0	0	96	2.9	18.0
	10/21/2019	-0.4		0	0	97	2.1	17.9
	10/29/2019	-0.2		0	0	95	2.4	18.3
	11/4/2019	-0.3		0	0	95	2.1	17.7
	11/11/2019	-0.3		0	0	94	2.7	18.0
	11/18/2019	0.0		0	0	95	2.6	17.1
	11/26/2019	-0.1		0	0	93	2.7	17.4
	12/2/2019	-0.3		0	0	92	2.0	18.5
	12/10/2019	-0.2		0	0	92	2.1	18.5
	12/16/2019	-0.4		0	0	90	1.8	18.7
	12/23/2019	-0.2		0	0	90	2.3	17.8

Well	Date	Well Head Vacuum (in. H_2O)	Skid Vacuum (in. H_2O)	Well Head Airflow (cfm)	Dilution Airflow (cfm)	Well Head Temperature (°F)	Well Head CO_2 (%)	Well Head O_2 (%)
VEW-06I	1/2/2019	-0.5		0	0	142	14.6	1.1
	1/7/2019	-0.9		0	0	142	8.6	9.0
	1/14/2019	-0.4		0	0	142	14.0	1.4
	1/21/2019	-0.9		0	0	142	9.3	6.9
	1/28/2019	-0.5		0	0	142	14.1	0.9
	2/4/2019	-1.4		0	0	142	9.8	7.3
	2/12/2019	-0.3		0	0	142	14.2	1.4
	2/18/2019	-0.6		0	0	142	9.3	7.0
	2/25/2019	-0.3		0	0	142	15.7	0.7
	3/4/2019	-0.4		0	0	143		
	3/11/2019	-0.4		0	0	144	16.4	0.8
	3/11/2019*	-0.4		0	0	144	10.4	3.0
	3/18/2019	-0.4		0	0	144	11.4	4.4
	3/25/2019	0.0		0	0	143	16.4	0.6
	4/1/2019	-0.3		0	0	143	11.6	4.5
	4/9/2019	-0.6		0	0	142	15.4	0.8
	4/15/2019	-0.4		0	0	142	12.1	4.5
	4/22/2019	-0.3		0	0	142	17.5	0.8
	4/29/2019	-0.3		0	0	141	12.1	4.3
	5/6/2019	-0.6		0	0	142	15.9	0.8
	5/14/2019	-0.3		0	0	141	12.7	3.9
	5/20/2019	-0.2		0	0	142	15.8	1.6
	5/28/2019	-0.4		0	0	140	10.7	4.4
	6/3/2019	-0.6		0	0	138	15.1	1.1
	6/10/2019	-0.3		0	0	139	11.8	3.7
	6/17/2019	-0.4		0	0	140	15.1	1.0
	6/24/2019	-0.2		0	0	139	12.0	3.8
	7/2/2019	-0.4		0	0	139	15.1	1.0
	7/8/2019	-0.4		0	0	138	12.1	3.6
	7/15/2019	-0.4		0	0	138	15.4	0.5
	7/22/2019	-0.4		0	0	138	11.5	3.8
	7/30/2019	-0.4		0	0	139	15.2	0.9
	8/8/2019	-0.2		0	0	138	12.7	3.9
	8/12/2019	-0.4		0	0	136	15.6	0.7
	8/19/2019	-0.3		0	0	136	11.9	4.8
	8/26/2019	-0.5		0	0	137	14.9	0.8
	9/2/2019	-0.3		0	0	136	11.1	4.1
	9/9/2019	-0.6		0	0	136	14.5	1.1
	9/17/2019	-0.5		0	0	136	10.6	5.8
	9/24/2019	-0.2		0	0	136	14.6	1.0
	9/30/2019	-0.6		0	0	136	10.3	6.6
	10/7/2019	-0.1		0	0	137	14.9	0.9
	10/15/2019	-0.5		0	0	136	11.1	5.4
	10/21/2019	-0.7		0	0	136	14.4	2.4
	10/29/2019	-0.6		0	0	136	10.1	7.3
	11/4/2019	-0.5		0	0	136	15.1	1.8
	11/11/2019	-0.5		0	0	136	10.4	6.6
	11/18/2019	-0.1		0	0	136	15.5	1.2
	11/26/2019	-0.2		0	0	136	13.1	4.5
	12/2/2019	-0.6		0	0	136	15.3	1.4
	12/10/2019	-0.4		0	0	137	10.8	6.2
	12/16/2019	-0.7		0	0	137	14.6	2.3
	12/23/2019	-0.4		0	0	137	11.0	5.8

Well	Date	Well Head Vacuum (in. H_2O)	Skid Vacuum (in. H_2O)	Well Head Airflow (cfm)	Dilution Airflow (cfm)	Well Head Temperature (°F)	Well Head CO_2 (%)	Well Head O_2 (%)
VEW-06D	1/2/2019	-19.8		159	0	95	5.7	14.3
	1/7/2019	-19.0		158	0	95	3.4	17.8
	1/14/2019	-20.8		153	0	94	5.4	15.4
	1/21/2019	-19.8		135	0	95	3.7	14.2
	1/28/2019	-21.4		135	0	93	5.4	14.7
	2/4/2019	-20.4		135	0	92	4.1	16.8
	2/12/2019	-23.1		149	0	93	5.6	15.5
	2/18/2019	-25.7		173	0	92	4.7	15.1
	2/25/2019	-31.4		212	0	90	5.6	15.3
	3/4/2019	-33.5		210	0	92	6.4	14.6
	3/11/2019	-27.7		254	0	90	5.4	15.7
	3/18/2019	-25.6		253	0	92	5.1	14.5
	3/25/2019	-25.8		239	0	92	5.4	15.0
	4/1/2019	-25.3		240	0	92	3.5	14.4
	4/9/2019	-26.7		252	0	92	5.3	14.2
	4/15/2019	-25.9		252	0	93	3.2	15.6
	4/22/2019	-25.5		249	0	100	5.6	12.9
	4/29/2019	-21.9		250	0	93	4.2	14.6
	5/6/2019	-25.6		248	0	95	5.4	13.4
	5/14/2019	-20.3		225	0	96	3.0	14.1
	5/20/2019	-29.3		280	0	96	5.3	13.5
	5/28/2019	-24.7		281	0	96	3.8	13.6
	6/3/2019	-29.2		276	0	96	5.2	13.7
	6/10/2019	-29.3		279	0	96	4.2	13.9
	6/17/2019	-28.9		278	0	96	5.2	13.3
	6/24/2019	-28.8		275	0	96	3.4	14.1
	7/2/2019	-29.3		280	0	95	5.2	13.9
	7/8/2019	-29.1		280	0	96	3.3	14.1
	7/15/2019	-29.4		280	0	96	5.2	13.7
	7/22/2019	-29.3		280	0	97	4.2	13.5
	7/30/2019	-28.5		281	0	98	4.7	14.1
	8/8/2019	-30.3		277	0	103	3.9	14.4
	8/12/2019	-27.4		287	0	96	5.7	14.0
	8/19/2019	-26.5		281	0	96	3.9	13.7
	8/26/2019	-32.9		303	0	96	5.5	13.8
	9/2/2019	-32.9		302	0	95	4.3	13.2
	9/9/2019	-43.3		273	0	92	5.8	13.5
	9/17/2019	-43.6		275	0	92	4.1	14.3
	9/24/2019	-50.8		250	0	92	5.4	13.9
	9/30/2019	-49.3		265	0	90	4.1	15.1
	10/7/2019	-47.2		267	0	92	5.1	14.0
	10/15/2019	-48.8		267	0	90	4.2	15.0
	10/21/2019	-50.6		270	0	90	5.3	15.4
	10/29/2019	-50.4		270	0	88	3.9	15.5
	11/4/2019	-50.0		272	0	90	5.3	14.9
	11/11/2019	-50.5		273	0	88	4.4	15.1
	11/18/2019	-48.9		274	0	88	5.2	14.7
	11/26/2019	-49.0		270	0	88	4.5	14.8
	12/2/2019	-50.9		274	0	88	5.3	15.2
	12/10/2019	-50.8		274	0	88	4.5	15.2
	12/16/2019	-51.8		273	0	88	5.3	15.2
	12/23/2019	-50.9		272	0	88	4.3	14.6

Well	Date	Well Head Vacuum (in. H_2O)	Skid Vacuum (in. H_2O)	Well Head Airflow (cfm)	Dilution Airflow (cfm)	Well Head Temperature (°F)	Well Head CO_2 (%)	Well Head O_2 (%)
VEW-07S	1/2/2019	-2.9		21	0	92	5.0	14.4
	1/7/2019	-3.4		21	0	90	4	16.1
	1/14/2019	-2.9		20	0	90	4.8	15.5
	1/21/2019	-3.3		18	0	92	3.8	14.7
	1/28/2019	-2.9		18	0	90	4.5	15.4
	2/4/2019	-2.6		18	0	82	4.6	14.4
	2/12/2019	-2.9		20	0	85	4.9	14.9
	2/18/2019	-3.2		23	0	88	4.2	15.5
	2/25/2019	-1.9		0	0	88	2.9	17.3
	3/4/2019	-0.4		0	0	92	2.7	14.4
	3/11/2019	-0.3		0	0	89	3.2	16.2
	3/18/2019	-0.2		0	0	91	2.2	15.3
	3/25/2019	-0.4		0	0	90	3.9	15.1
	4/1/2019	-0.4		0	0	91	3.1	12.3
	4/9/2019	-0.4		0	0	91	3.7	15.1
	4/15/2019	-0.4		0	0	90	2.5	16.5
	4/22/2019	-0.2		0	0	92	3	14.7
	4/29/2019	-0.3		0	0	78	0.9	20.3
	5/6/2019	-0.4		0	0	91	1.2	18.4
	5/14/2019	-0.2		0	0	90	1.4	17.2
	5/20/2019	-0.3		0	0	90	2.2	16.1
	5/28/2019	-0.2		0	0	93	1.5	17
	6/3/2019	-0.3		0	0	90	2.1	16.5
	6/10/2019	-0.2		0	0	93	1.3	17.1
	6/17/2019	-0.3		0	0	95	1.6	17.2
	6/24/2019	-0.2		0	0	95	1.2	17.3
	7/2/2019	-0.2		0	0	96	1.6	17.8
	7/8/2019	-0.2		0	0	95	1.1	18
	7/15/2019	-0.3		0	0	97	1.1	18.1
	7/22/2019	-0.3		0	0	97	1.3	16.6
	7/30/2019	-0.2		0	0	99	2.0	17.3
	8/8/2019	-0.2		0	0	99	2.0	14.1
	8/12/2019	-0.3		0	0	97	1.4	18.4
	8/19/2019	-0.2		0	0	98	1.6	17
	8/26/2019	-0.3		0	0	98	1	19.1
	9/2/2019	-0.2		0	0	99	0.9	18.6
	9/9/2019	-0.3		0	0	96	0.7	19.8
	9/17/2019	-0.2		0	0	98	1	19
	9/24/2019	-0.2		0	0	97	1.1	18.1
	9/30/2019	-0.3		0	0	97	1	18.9
	10/7/2019	-0.1		0	0	97	1.2	17.3
	10/15/2019	-0.2		0	0	95	1.2	19.2
	10/21/2019	-0.6		0	0	97	1	19.1
	10/29/2019	-0.3		0	0	94	1.2	19.3
	11/4/2019	-0.5		0	0	95	1.1	18.5
	11/11/2019	-0.2		0	0	93	1.4	19.2
	11/18/2019	-0.1		0	0	92	1.2	18.7
	11/26/2019	-0.1		0	0	92	2.8	14.9
	12/2/2019	-0.4		0	0	92	2	18.4
	12/10/2019	-0.2		0	0	89	1	19.4
	12/16/2019	-0.4		0	0	89	2.1	18.3
	12/23/2019	-0.3		0	0	89	1.6	18.9

Well	Date	Well Head Vacuum (in. H_2O)	Skid Vacuum (in. H_2O)	Well Head Airflow (cfm)	Dilution Airflow (cfm)	Well Head Temperature (°F)	Well Head CO_2 (%)	Well Head O_2 (%)
VEW-07I	1/2/2019	-0.5		0	0	144	13.1	2.4
	1/7/2019	-1.4		0	0	145	8.1	8.5
	1/14/2019	-0.5		0	0	144	12.4	3.0
	1/21/2019	-1.2		0	0	145	6.6	10.3
	1/28/2019	-0.6		0	0	144	12.5	2.4
	2/4/2019	-1.1		0	0	143	8.0	9.5
	2/12/2019	-0.6		0	0	143	13.3	1.5
	2/18/2019	-1.1		0	0	144	6.8	11.3
	2/25/2019	-0.4		0	0	143	13.1	2.0
	3/4/2019	-0.8		0	0	144		
	3/11/2019	-0.6		0	0	143	11.6	3.7
	3/11/2019*	-0.8		0	0	143	8.1	5.5
	3/18/2019	-0.6		0	0	144	8.7	6.8
	3/25/2019	-0.7		0	0	142	12.0	3.5
	4/1/2019	-0.7		0	0	142	9.5	4.6
	4/9/2019	-0.9		0	0	141	11.8	3.3
	4/15/2019	-0.8		0	0	141	9.4	5.1
	4/22/2019	-0.8		0	0	141	12.9	1.8
	4/29/2019	-0.7		0	0	141	5.6	10.2
	5/6/2019	-1.1		0	0	140	10.6	3.8
	5/14/2019	-0.6		0	0	140	8.1	6.1
	5/20/2019	-0.6		0	0	141	11.6	2.2
	5/28/2019	-0.6		0	0	140	7.4	7.6
	6/3/2019	-0.9		0	0	139	11.0	2.5
	6/10/2019	-0.6		0	0	138	8.0	6.4
	6/17/2019	-0.7		0	0	138	9.6	4.6
	6/24/2019	-0.5		0	0	138	9.6	3.6
	7/2/2019	-0.5		0	0	138	11.1	2.9
	7/8/2019	-0.6		0	0	137	6.5	7.9
	7/15/2019	-0.7		0	0	137	11.3	2.7
	7/22/2019	-0.7		0	0	137	7.3	7.7
	7/30/2019	-0.6		0	0	138	11.1	1.5
	8/8/2019	-0.4		0	0	135	8.7	5.0
	8/12/2019	-0.8		0	0	135	12.1	1.4
	8/19/2019	-0.8		0	0	133	6.3	8.2
	8/26/2019	-0.7		0	0	135	11.4	2.5
	9/2/2019	-0.6		0	0	137	8.2	5.3
	9/9/2019	-0.8		0	0	137	11.8	2.7
	9/17/2019	-0.8		0	0	134	7.1	9.5
	9/24/2019	-0.7		0	0	134	12.0	3.3
	9/30/2019	-0.9		0	0	134	6.2	11.5
	10/7/2019	-0.3		0	0	134	13.4	2.0
	10/15/2019	-0.8		0	0	134	7.6	8.4
	10/21/2019	-1.2		0	0	133	13.2	3.1
	10/29/2019	-0.9		0	0	134	7.0	10.6
	11/4/2019	-1.1		0	0	133	13.2	3.1
	11/11/2019	-0.7		0	0	133	7.2	9.6
	11/18/2019	-0.5		0	0	132	14.1	2.2
	11/26/2019	-0.5		0	0	133	8.6	7.9
	12/2/2019	-1.1		0	0	132	13.3	3.1
	12/10/2019	-0.8		0	0	132	7.7	9.6
	12/16/2019	-1.1		0	0	132	13.8	2.6
	12/23/2019	-1.0		0	0	132	9.0	8.6

Well	Date	Well Head Vacuum (in. H_2O)	Skid Vacuum (in. H_2O)	Well Head Airflow (cfm)	Dilution Airflow (cfm)	Well Head Temperature (°F)	Well Head CO_2 (%)	Well Head O_2 (%)
VEW-07D	1/2/2019	-27.0		159	0	95	2.0	19.0
	1/7/2019	-28.0		158	0	92	0.9	20.9
	1/14/2019	-27.2		153	0	92	2.0	19.6
	1/21/2019	-27.8		135	0	90	2.2	18.3
	1/28/2019	-27.1		135	0	92	2.0	19.4
	2/4/2019	-24.2		135	0	88	1.5	18.7
	2/12/2019	-29.2		149	0	89	2.1	19.7
	2/18/2019	-33.5		173	0	92	1.4	19.3
	2/25/2019	-34.2		212	0	90	2.0	19.8
	3/4/2019	-36.2		210	0	91	1.0	19.5
	3/11/2019	-34.3		257	0	90	2.1	19.6
	3/18/2019	-34.8		256	0	89	1.2	19.2
	3/25/2019	-34.4		278	0	90	2.2	18.8
	4/1/2019	-34.3		238	0	92	1.4	18.5
	4/9/2019	-37.2		234	0	92	2.1	18.4
	4/15/2019	-40.7		214	0	92	1.8	18.4
	4/22/2019	-42.7		248	0	96	2.6	16.9
	4/29/2019	-36.8		254	0	92	1.1	18.8
	5/6/2019	-37.8		200	-	93	2.2	17.6
	5/14/2019	-25.9		225	0	91	0.8	17.8
	5/20/2019	-26.5		176	0	95	2.1	17.5
	5/28/2019	-24.7		175	0	96	0.8	17.9
	6/3/2019	-23.5		121	0	95	1.9	18.2
	6/10/2019	-25.9		184	0	96	1.0	17.9
	6/17/2019	-28.0		128	0	96	1.8	17.4
	6/24/2019	-25.5		124	0	95	1.1	17.8
	7/2/2019	-25.8		137	0	95	1.8	18.1
	7/8/2019	-24.3		194	0	95	0.9	18.1
	7/15/2019	-25.5		121	0	95	1.8	17.5
	7/22/2019	-27.1		220	0	96	1.3	17.2
	7/30/2019	-30.7		137	0	98	1.9	18.0
	8/8/2019	-33.7		138	0	99	1.1	18.8
	8/12/2019	-26.2		260	0	94	2.1	17.6
	8/19/2019	-33.5		137	0	96	0.9	18.1
	8/26/2019	-35.8		174	0	95	1.8	18.1
	9/2/2019	-36.1		130	0	94	1.0	18
	9/9/2019	-53.6		207	0	90	1.9	18.0
	9/17/2019	-54.4		224	0	90	0.9	18.3
	9/24/2019	-51.3		263	0	90	1.9	17.6
	9/30/2019	-50.9		248	0	88	1.6	18.7
	10/7/2019	-49.1		252	0	90	1.7	17.4
	10/15/2019	-51.2		244	0	88	1.3	18.8
	10/21/2019	-52.9		242	0	89	1.9	18.4
	10/29/2019	-54.2		244	0	85	1.3	19.0
	11/4/2019	-53.1		239	0	90	1.8	18.1
	11/11/2019	-53.6		239	0	88	1.6	18.8
	11/18/2019	-52.2		239		88	1.8	18.6
	11/26/2019	-52.0		238	0	88	1.5	18.6
	12/2/2019	-54.4		239	0	87	1.9	19.2
	12/10/2019	-54.5		237	0	84	1.6	18.6
	12/16/2019	-55.5		234	0	87	1.9	18.9
	12/23/2019	-54.6		231	0	85	2.4	18.6

Well	Date	Well Head Vacuum (in. H_2O)	Skid Vacuum (in. H_2O)	Well Head Airflow (cfm)	Dilution Airflow (cfm)	Well Head Temperature (°F)	Well Head CO_2 (%)	Well Head O_2 (%)
VMW-51I	1/2/2019	-0.3	-26.0			52	19.3	0.4
	1/7/2019	-1.3	-23.6			52	18.1	1.5
	1/14/2019	-0.2	-26.0			45	19.0	0.5
	1/21/2019	-1.1	-23.6			48	16.3	2.4
	1/28/2019	-0.8	-26.0			50	18.5	0.8
	2/4/2019	-0.4	-22.9			42	15.6	3.2
	2/12/2019	-0.2	-28.4			45	19.0	0.5
	2/18/2019	-0.9	-30.1			52	15.4	3.0
	2/25/2019	-0.3	-28.0			45	18.2	0.7
	3/4/2019	-2.3	-36.0			52	12.1	0.6
	3/11/2019	-0.6	-32.9			40	18.4	0.6
	3/18/2019	-2.1	-32.7			52	14.4	0.3
	3/25/2019	-0.2	-32.9			52	18.5	0.5
	4/1/2019	-1.8	-33.1			62	16.4	0.3
	4/9/2019	-0.7	-35.4			62	18.7	0.4
	4/15/2019	-2.0	-37.0			58	16.4	0.3
	4/22/2019	-0.5	-41.6			63	18.7	0.4
	4/29/2019	-2.0	-35.3			64	17.1	0.3
	5/6/2019	-0.7	-36.0			70	18.6	0.4
	5/14/2019	-1.7	-23.7			65	17.1	0.3
	5/20/2019	-0.4	-24.0			70	18.8	0.3
	5/28/2019	-2.0	-20.4			72	16.4	0.2
	6/3/2019	-0.9	-21.0			73	18.8	0.4
	6/10/2019	-1.7	-21.9			72	15.9	0.2
	6/17/2019	-0.6	-24.0			82	18.5	0.4
	6/24/2019	-1.4				76	16.7	0.2
	7/2/2019	-0.5	-22.7			80	19.0	0.0
	7/8/2019	-0.4	-22.1			77	16.9	0.2
	7/15/2019	-0.5	-23.3			78	18.8	0.4
	7/22/2019	-0.5	-24.1			78	14.9	0.2
	7/30/2019	-0.5	-28.0			85	18.3	0.7
	8/8/2019	-0.3	-31.2			89	16.3	0.4
	8/12/2019	-0.6	-24.5			78	18.9	0.4
	8/19/2019	-0.6	-27.4			72	15.9	0.3
	8/26/2019	-0.6	-31.9			84	18.6	0.5
	9/2/2019	-0.5	-31.9			89	17.3	0.4
	9/9/2019	-0.6	-52.9			88	18.5	0.5
	9/17/2019	-0.8	-53.6			82	16.7	0.5
	9/24/2019	-0.7	-50.4			73	18.3	0.6
	9/30/2019	-0.9	-49.8			72	17.6	0.5
	10/7/2019	-0.2	-47.7			78	18.4	0.6
	10/15/2019	-0.6	-49.9			76	16.9	0.5
	10/21/2019	-0.9	-51.2			74	18.6	0.7
	10/29/2019	-0.9	-50.0			56	16.1	0.7
	11/4/2019	-0.7	-51.3			72	18.6	0.6
	11/11/2019	-0.8	-51.7			55	15.5	0.5
	11/18/2019	-0.3	-51.5			70	18.8	0.5
	11/26/2019	-0.4	-50.9			68	17.4	0.2
	12/2/2019	-0.8	53.1			62	18.4	0.7
	12/10/2019	-0.6	-52.8			65	17.1	0.5
	12/16/2019	-0.7	-53.3			65	18.2	0.9
	12/23/2019	-0.8	-52.9			70	16.2	0.5

Note: Sample collection was not completed on 3/4/19 due to freezing temperatures. A replacement sample and parameters were collected on 3/11/19.

in. H_2O	inches of water column
PID	photoionization detector
ppm	parts per million
SVE	soil vapor extraction
cfm	cubic feet per minute
*	measurement equals or exceeds upper limit of instrument
% as CH_4	percent LEL as methane
LEL	lower explosive limit

Table 14
Vacuum Monitoring (in inches of H_2O)
2019 Annual Report
Pasco Landfill NPL Site, Pasco, WA

PERIOD: 1/1 - 12/31/2019

Date	Locations Beneath Zone A Cap										Locations Outside Protective Barrier Wall (In Order From West to East)									South
	VMP 02	VMP 04	VMP 05	VMP 06	VMP 08	VMP 09	VMP 10	VMW 51i	VMW 51D	V-2	VMP 19	VMP 20	VEW 05	VMP 17	VMP 18	VMP 13S	VMP 13D	VMW 50S	VMP 21	VEW 04
1/7/2019	-0.7	-1.8	-1.3	-0.9	-0.7	-0.6	-0.6	-1.3	-4.0	-0.2	-0.8	-0.7	-3.5	-0.9	-0.4	-0.3	-0.3	-3.5	-0.3	-3.5
1/21/2019	-0.6	-1.5	-1.1	-0.7	-0.7	-0.6	-0.5	-1.1	-3.3	-0.2	-0.7	-0.6	-2.9	-0.7	-0.3	-0.3	-0.3	-2.9	-0.2	-2.7
2/4/2019	-0.3	-1.1	-0.7	-0.4	-0.2	-0.2	-0.2	-0.4	-1.0	-0.1	-0.3	-0.3	-1.7	-0.2	-0.1	0.0	-0.1	-1.5	-0.1	-1.3
2/18/2019	-0.5	-1.5	-0.9	-0.5	-0.5	-0.4	-0.4	-0.9	-2.7	-0.2	-0.5	-0.5	-2.1	-0.4	-0.2	-0.1	-0.2	-2.1	-0.1	-1.8
3/4/2019	-0.2	-0.5	-0.3	-0.3	-0.3	-0.3	-0.3	-0.7	-2.3	-0.1	-0.3	-0.3	-1.8	-0.2	-0.1	-0.1	-0.1	-1.6	-0.1	-1.3
3/18/2019	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.5	-2.1	-0.1	-0.4	-0.3	-1.7	-0.3	-0.2	-0.1	-0.1	-1.6	-0.1	-1.3
4/1/2019	-0.3	-0.5	-0.4	-0.3	-0.3	-0.3	-0.3	-0.4	-1.8	-0.1	-0.3	-0.3	-1.4	-0.3	-0.1	-0.1	-0.1	-1.2	-0.1	-1.1
4/15/2019	-0.1	-0.2	-0.2	-0.2	-0.1	-0.2	-0.2	-0.5	-2.0	-0.1	-0.2	-0.2	-1.4	-0.2	-0.1	-0.1	-0.1	-1.4	-0.1	-1.1
4/29/2019	-0.2	-0.2	-0.2	-0.3	-0.2	-0.2	-0.2	-0.5	-2.0	-0.1	-0.3	-0.3	-1.5	-0.3	0.0	-0.1	-0.1	-1.4	0.0	-1.2
5/14/2019	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2	-0.5	-1.7	-0.1	-0.3	-0.3	-1.3	-0.2	-0.4	-0.1	-0.1	-1.4	-0.1	-1.2
5/28/2019	-0.3	-0.3	-0.4	-0.4	-0.2	-0.2	-0.3	-0.7	-2.0	-0.1	-0.4	-0.3	-1.6	-0.3	-0.2	-0.1	-0.1	-1.6	-0.1	-1.4
6/10/2019	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.4	-1.7	-0.02	-0.2	-0.2	-1.2	-0.2	-0.1	-0.1	-0.1	-1.3	0.0	-1.1
6/24/2019	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.4	-1.4	-0.1	-0.2	-0.2	-1.1	-0.2	-0.1	-0.1	-0.1	-1.0	-0.1	-0.8
7/8/2019	-0.2	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.4	-1.7	-0.1	-0.3	-0.3	-1.4	-0.2	-0.3	-0.1	-0.1	-1.3	-0.1	-1.1
7/22/2019	-0.2	-0.2	-0.3	-0.2	-0.1	-0.2	-0.2	-0.5	-1.9	-0.1	-0.3	-0.2	-1.6	-0.3	-0.5	-0.1	-0.1	-1.6	-0.1	-1.3
8/8/2019	-0.2	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.3	-1.2	-0.01	-0.1	-0.1	-0.8	-0.1	-0.1	0.0	-0.1	-0.7	0.0	-0.6
8/19/2019	-0.2	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.6	-2.3	-0.1	-0.4	-0.3	-1.9	-0.4	-0.2	-0.1	-0.1	-1.9	-0.1	-1.6
9/2/2019	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.5	-2.1	-0.1	-0.3	-0.2	-1.7	-0.3	-0.1	-0.1	-0.2	-1.7	-0.1	-1.4
9/17/2019	-0.2	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.8	-2.8	-0.1	-0.5	-0.4	-2.2	-0.4	-0.2	-0.1	-0.2	-2.0	-0.2	-1.7
9/30/2019	-0.3	-0.4	-0.5	-0.5	-0.3	-0.2	-0.4	-0.9	-3.2	-0.2	-0.5	-0.4	-2.6	-0.5	-0.2	-0.2	-0.2	-2.4	-0.1	-2.2
10/15/2019	-0.2	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.6	-2.5	-0.1	-0.3	-0.3	-1.9	-0.3	-0.2	-0.1	-0.1	-1.7	-0.1	-1.5
10/29/2019	-0.3	-0.3	-0.4	-0.5	-0.3	-0.3	-0.3	-0.9	-3.6	-0.1	-0.5	-0.5	-3.0	-0.5	-0.2	-0.2	-0.2	-2.7	-0.1	-2.5
11/11/2019	-0.3	-0.3	-0.4	-0.4	-0.2	-0.2	-0.2	-0.8	-3.0	-0.2	-0.4	-0.3	-2.4	-0.4	-0.2	-0.1	-0.1	-2.0	-0.1	-1.8
11/26/2019	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.4	-1.8	-0.04	-0.2	-0.1	-1.3	-0.1	-0.1	-0.1	-0.1	-1.0	0.0	-0.7
12/10/2019	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.6	-2.5	-0.03	-0.3	-0.2	-1.9	-0.3	-0.1	-0.1	-0.1	-1.7	0.0	-1.4
12/23/2019	-0.3	-0.3	-0.4	-0.4	-0.2	-0.2	-0.2	-0.8	-3.1	-0.1	-0.4	-0.39	-2.47	-0.5	-0.1	-0.1	-0.2	-2.3	-0.1	-2.0

Table 15
SVE System Analytical Data and Removal Rates
Detected Compounds Only (in µg/L)
2019 Annual Report
Pasco Landfill NPL Site

PERIOD: 1/1 - 12/31/2019

Sample Location	Date	Toluene	m,p-Xylene	4-Methyl-2-pentanone (MIBK)	Acetone	2-butanone (MEK)	Ethanol	Ethyl benzene	o-Xylene	Trichloroethene	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	n-propyl benzene	Tetrachloroethene	Methylene chloride	1,1-Dichloroethane	Isopropyl benzene	1,2-Dichloroethane	Chloroethane	1,2-Dichlorobenzene	Benzene	Chloromethane	cis-1,2-Dichloroethene
SV-BRTO	1/2/2019	320	160	150	110	130	<20 U	64	50	35	14	8.8	5.1	5.6	4.7	4.0	2.1	0.32	0.85	1.5	0.88	<0.20 U	0.56
	1/14/2019	350	140	130	81	120	<20 U	55	39	34	5.6	3.5	2.4	4.5	5.9	3.7	1.4	0.29	0.84	0.49	0.73	<0.20 U	0.52
	1/28/2019	430	180	130	76	110	<20 U	69	52	42	8.5	5.8	3.8	6.8	5.6	3.9	2.1	0.33	1.0	0.70	0.9	0.34	0.60
	2/12/2019	300	170	56	37	44	120	54	41	39	14	15	11	8.3	8.3	6.1	5.2	0.45	1.4	1.6	1.3	0.27	1.1
	2/25/2019	490	210	170	96	150	89	86	62	54	9.3	6.2	4.6	7.3	4.5	4.1	2.5	0.33	0.75	0.85	0.92	<0.20 U	0.82
	3/11/2019	520	240	160	94	160	<20 U	93	77	64	33	10	6.9	8.1	4.6	3.9	3.4	0.39	0.72	1.9	1.0	<0.20 U	0.78
	3/25/2019	640	210	220	88	150	<20 U	83	65	70	14	8.5	5.5	7.5	4.0	3.6	3.0	0.39	0.74	1.4	1.0	<0.20 U	0.71
	4/9/2019	750	210	250	84	140	<20 U	82	66	67	15	9.7	6.8	10	5.0	4.1	3.8	0.53	0.89	1.6	1.2	<0.20 U	0.99
	4/15/2019	920	240	260	110	150	<20 U	92	75	69	32	12	8.2	9.4	4.7	4.3	3.9	0.40	0.81	2.1	1.1	<0.20 U	1.0
	4/22/2019	420	240	150	78	130	<20 U	88	55	61	11	6.7	3.8	6.6	2.0	2.8	2.0	0.30	0.51	1.4	0.71	<0.20 U	0.49
	4/29/2019	650	250	160	82	130	<20 U	85	60	60	12	8.5	5.4	7.9	4.5	3.3	2.8	0.37	0.77	1.2	1.0	<0.20 U	0.63
	5/6/2019	570	270	210	82	150	<20 U	86	66	64	14	9.9	6.4	8.7	3.9	3.8	3.4	0.36	0.93	1.5	1.0	<0.20 U	0.75
	5/20/2019	500	250	180	95	140	<20 U	100	86	71	15	8.5	5.6	7.0	3.6	3.5	3.1	0.48	0.66	1.6	0.90	<0.20 U	0.60
	6/3/2019	530	200	150	60	95	<20 U	85	63	56	24	10	6.3	9.4	6.3	5.5	3.8	0.54	1.2	1.6	1.3	0.23	0.74
	6/17/2019	800	200	180	80	120	<20 U	85	62	54	21	12	8.1	16	7.2	7.2	4.5	0.54	1.7	1.6	1.5	0.27	1.1
	7/2/2019	910	230	150	74	110	150	75	55	44	21	9.8	8.0	9.2	5.5	4.1	2.9	0.38	0.83	1.5	1.1	<0.20 U	0.69
	7/15/2019	870	190	140	130	120	150	72	55	46	16	7.7	5.2	6.8	4.7	4.1	2.3	0.39	0.92	0.98	1.0	<0.20 U	0.51
	7/30/2019	690	260	150	140	140	200	81	65	52	24	14	8.8	11	6.6	5.9	3.6	0.52	1.2	2.1	1.5	0.22	0.87
	8/12/2019	300	180	120	110	110	65	60	48	37	7.1	4.6	3.0	3.6	1.4	2.7	1.3	0.27	0.60	0.55	0.64	<0.20 U	0.34
	8/26/2019	1,100	250	150	91	120	160	83	53	44	15	13	8.9	9.7	5.2	6.2	3.4	0.44	1.3	1.9	1.3	0.24	0.75
	9/9/2019	710	230	160	130	130	110	80	56	43	22	15	14	12	3.6	6.3	6.2	0.42	1.4	2.0	1.4	0.31	0.72
	9/24/2019	1,000	290	370	130	150	1100	100	76	49	32	19	15	14	3.2	3.8	6.1	2.3	6.6	10	7.8	1.8	5.0
	10/7/2019	470	290	120	140	150	96	110	72	45	14	8.6	6.5	7.6	2.0	3.5	2.9	0.28	0.64	1.5	0.85	<0.20 U	0.50
	10/21/2019	480	250	160	160	140	73	79	62	39	9.3	6.1	4.4	5.1	1.8	2.7	1.9	0.27	0.69	0.62	0.71	<0.20 U	0.37
	11/4/2019	660	79	76	79	77	78	26	19	15	6.9	4.9	3.4	5.5	2.0	3.0	1.5	0.24	0.67	0.54	0.64	<0.20 U	0.35
	11/18/2019	670	160	140	140	140	78	59	47	13	8.5	6.2	4.2	4.5	2.3	2.3	1.7	0.23	0.60	0.80	0.53	<0.20 U	0.32
	12/2/2019	410	130	110	120	110	55	44	35	23	6.1	3.8	2.6	3.7	1.4	2.2	1.2	0.24	0.57	0.55	0.57	<0.20 U	0.31
	12/16/2019	500	230	140	120	130	85	77	64	31	15	10	7.3	8.3	2.6	3.5	3.9	0.31	0.77	1.3	0.86	0.27	0.51

Modified EPA Method 8260
U = Not detected above reporting limit
J = Estimated concentration

lbs/day = (X)µg/L x 28.32 L/ft3/min x 0.002205 lb/g / 1,000,000 µg/g x 1440 min/day

Table 15
SVE System Analytical Data and Removal Rates
Detected Compounds Only (in µg/L)
2019 Annual Report
Pasco Landfill NPL Site

Sample Location	Date	n-butyl benzene	p-Isopropyl toluene	Sec-Butyl benzene	Dichloro difluoro methane (CFC-12)	Trichloro fluoro methane (CFC-11)	Chloroform	1,1,1-Trichloro ethane	1,2,3-Trichloro propane	1,1-Dichloro ethene	Chloro benzene	Naphthalene	Vinyl chloride	1,3-Dichloro benzene	1,4-Dichlorob enzene	1,2,4-Trichloro benzene	Carbon disulfide	trans-1,2-Dichloro ethene	Total VOCs (µg/L)	Flow Rate (scfm)	Removal Rate (lbs/day)
SV-BRTO	1/2/2019	0.63	0.42	<0.20 U	<0.20 U	<0.20 U	0.24	<0.20 U	<0.20 U	0.23	<0.20 U	0.37	0.063	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1069	360	35
	1/14/2019	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.21	<0.20 U	<0.20 U	0.20	<0.20 U	<0.20 U	0.056	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	979	354	31
	1/28/2019	0.32	0.29	0.32	0.52	<0.20 U	0.24	<0.20 U	<0.20 U	0.25	<0.20 U	<0.20 U	0.094	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1131	307	31
	2/12/2019	1.6	1.1	1.2	0.23	<0.20 U	0.45	<0.20 U	<0.20 U	0.38	0.30	0.35	0.097	<0.20 U	0.21	<0.20 U	<0.20 U	<0.20 U	941	319	27
	2/25/2019	0.39	0.31	0.35	<0.20 U	<0.20 U	0.21	<0.20 U	<0.20 U	0.23	<0.20 U	0.26	0.064	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1451	419	55
	3/11/2019	0.90	0.55	0.65	<0.20 U	<0.20 U	0.24	<0.20 U	<0.20 U	0.22	<0.20 U	0.44	0.065	<0.20 U	0.24	<0.20 U	<0.20 U	<0.20 U	1486	511	68
	3/25/2019	0.77	0.50	0.56	<0.20 U	<0.20 U	0.22	<0.20 U	<0.20 U	0.21	<0.20 U	0.34	0.057	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1579	507	72
	4/9/2019	0.96	0.67	0.73	<0.20 U	<0.20 U	0.37	<0.20 U	<0.20 U	0.24	0.21	0.33	0.060	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1712	488	75
	4/15/2019	1.2	0.77	0.84	<0.20 U	<0.20 U	0.42	<0.20 U	<0.20 U	0.24	0.21	1.0	0.056	<0.20 U	0.24	<0.20 U	<0.20 U	<0.20 U	2001	481	87
	4/22/2019	0.48	0.32	0.32	<0.20 U	<0.20 U	0.42	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.48	0.035	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1262	171	19
	4/29/2019	0.61	0.45	0.51	<0.20 U	<0.20 U	0.40	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.23	0.050	<0.20 U	<0.20 U	<0.20 U	0.23	<0.20 U	1528	576	79
	5/6/2019	0.86	0.61	0.67	<0.20 U	<0.20 U	0.44	<0.20 U	<0.20 U	0.21	<0.20 U	0.55	0.050	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1556	463	65
	5/20/2019	0.72	0.47	0.51	<0.20 U	<0.20 U	0.64	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.56	0.046	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1475	384	51
	6/3/2019	0.78	0.50	0.57	<0.20 U	<0.20 U	0.67	<0.20 U	<0.20 U	0.26	0.21	0.43	0.079	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1313	411	49
	6/17/2019	0.88	0.66	0.76	0.23	<0.20 U	0.88	<0.20 U	<0.20 U	0.43	0.26	0.30	0.079	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1668	389	58
	7/2/2019	0.71	0.49	0.49	<0.20 U	<0.20 U	<0.22 U	<0.20 U	<0.20 U	0.22	<0.20 U	0.34	<0.020 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1865	400	67
	7/15/2019	0.50	0.37	0.39	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.24	0.053	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1825	376	62
	7/30/2019	1.0	0.64	0.64	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.29	0.25	0.55	0.078	<0.20 U	0.24	<0.20 U	<0.20 U	<0.20 U	1862	389	65
	8/12/2019	0.25	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.032	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1056	457	43
	8/26/2019	1.1	0.73	0.70	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.24	0.21	0.28	0.073	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	2122	518	99
	9/9/2019	1.7	1.2	1.3	0.21	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.26	0.32	0.36	0.084	<0.20 U	0.26	<0.20 U	0.21	<0.20 U	1740	519	81
	9/24/2019	9.3	5.8	6.9	1.1	0.32	<0.20 U	0.80	<0.20 U	1.4	2.4	2.0	0.47	0.63	1.3	0.42	0.77	0.92	3426	509	157
	10/7/2019	0.82	0.55	0.51	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.53	0.035	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1544	517	72
	10/21/2019	0.34	0.26	0.29	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.023	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1478	514	68
	11/4/2019	0.31	0.26	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.021	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1139	511	52
	11/18/2019	0.45	0.38	0.34	<0.20 U	<0.20 U	0.39	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.28	0.024	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1481	511	68
	12/2/2019	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.24	<0.020 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1060	510	49
	12/16/2019	0.85	0.65	0.61	0.21	<0.20 U	0.20	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.25	0.043	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1434	509	66

Modified EPA Method 8260
U = Not detected above reporting limit
J = Estimated concentration

lbs/day = (X)µg/L x 28.32 L/ft3/min x 0.002205 lb/g / 1,000,000 µg/g x 1440 min/day

Table 15
SVE System Analytical Data and Removal Rates
Detected Compounds Only (in µg/L)
2019 Annual Report
Pasco Landfill NPL Site

Sample Location	Date	Toluene	m,p-Xylene	4-Methyl-2-pentanone (MIBK)	Acetone	2-butanone (MEK)	Ethanol	Ethyl benzene	o-Xylene	Trichloroethene	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	n-propyl benzene	Tetrachloroethene	Methylene chloride	1,1-Dichloroethane	Isopropyl benzene	1,2-Dichloroethane	Chloroethane	1,2-Dichlorobenzene	Benzene	Chloromethane	cis-1,2-Dichloroethene
VEW-06S	1/2/2019	15	23	8.3	<2.5 U	<1.0 U	<20 U	7.7	8.7	7.9	6.6	3.7	<0.20 U	1.9	<0.50 U	1.8	0.59	0.20	1.2	0.36	<0.20 U	<0.20 U	0.20
	1/14/2019	31	29	8.4	<2.5 U	2.4	<20 U	9.3	10	11.0	8.4	4.5	2.3	2.5	2.7	2.3	0.74	0.26	1.7	0.74	0.21	0.37	<0.20 U
	1/28/2019	36	71	9.3	<2.5 U	1.0	<20 U	13	15	14	9.9	5.8	3.0	3.3	2.5	2.5	1.1	0.27	2.1	0.83	0.23	0.74	<0.20 U
	2/12/2019	24	53	2.5	<2.5 U	<1.0 U	<20 U	11	13	15	12	7.4	4.3	3.7	1.7	2.5	1.3	0.22	1.9	0.74	0.20	0.39	<0.20 U
VEW-06D	1/2/2019	270	150	92	43	24	<20 U	58	46	11	7.5	4.6	<0.20 U	3.5	0.67	1.9	1.4	<0.20 U	0.27	0.30	0.56	<0.20 U	0.24
	1/14/2019	410	160	100	42	38	<20 U	61	45	13	6.5	3.9	2.5	4.0	3.1	2.3	1.4	0.21	0.41	0.51	0.64	<0.20 U	0.31
	1/28/2019	680	160	90	35	34	<20 U	61	44	27	7.1	4.6	2.9	5.3	2.4	2.4	1.8	0.23	0.51	0.58	0.71	<0.20 U	0.29
	2/12/2019	240	160	35	22	16	45	48	38	26	10	6.3	4.3	5.7	1.60	2.1	2.1	<0.20 U	0.37	0.72	0.61	<0.20 U	0.31
	2/25/2019	410	190	87	39	43	<20 U	77	57	41	12	6.9	4.4	5.9	1.2	2.4	2.3	0.24	0.45	1.3	0.72	<0.20 U	0.46
	3/11/2019	410	190	93	39	42	<20 U	76	58	57	9.6	6.0	4.7	7.5	2.0	2.7	2.8	0.31	0.62	0.70	0.96	<0.20 U	0.52
	3/25/2019	470	160	84	32	35	<20 U	61	46	58	7.2	4.6	3.4	5.5	1.1	1.9	2.1	0.28	0.46	0.32	0.80	<0.20 U	0.35
	4/9/2019	300	180	86	34	30	<20 U	68	53	63	16	10	7.6	10	2.6	2.8	4.1	0.47	0.72	0.78	1.1	<0.20 U	0.61
	4/15/2019	630	190	89	34	34	<20 U	69	55	59	12	8.0	5.9	6.6	1.1	1.9	3.0	0.28	0.48	0.57	0.75	<0.20 U	0.39
	4/22/2019	200	170	79	32	33	<20 U	58	38	52	7.8	4.8	2.6	5.4	<0.50 U	1.5	1.4	0.23	0.35	0.81	0.51	<0.20 U	<0.20 U
	4/29/2019	440	200	84	32	26	<20 U	64	44	53	15	12	9.2	14	2.5	2.6	5.1	0.40	0.71	0.45	1.2	<0.20 U	0.47
	5/6/2019	320	210	89	33	39	<20 U	65	48	59	8.6	6.1	4.3	5.8	0.81	1.6	2.4	0.26	0.47	0.33	0.67	<0.20 U	0.30
	5/20/2019	280	190	83	37	31	<20 U	74	64	62	11	6.2	4.2	4.5	1.4	2.1	2.1	0.38	0.41	0.60	0.68	<0.20 U	0.31
	6/3/2019	320	180	88	32	25	<20 U	73	54	49	14	8.6	5.6	8.2	3.2	3.8	3.4	0.41	0.74	0.63	1.0	<0.20 U	0.52
	6/17/2019	470	140	81	24	29	<20 U	56	41	37	13	8.0	5.4	8.7	2.3	3.8	3.2	0.35	0.83	0.68	0.96	<0.20 U	0.51
	7/2/2019	620	220	100	44	39	130	72	52	43	19	11	9.2	11	4.4	4.0	3.4	0.40	0.75	1.1	1.2	<0.20 U	0.65
	7/15/2019	600	150	78	66	47	110	53	42	33	13	8.3	5.7	8.2	2.9	3.4	2.9	0.33	0.68	0.72	0.94	<0.20 U	0.35
	7/30/2019	350	170	78	66	41	110	53	43	32	16	10	6.5	8.1	2.3	3.1	2.9	0.35	0.61	0.77	0.95	<0.20 U	0.38
	8/13/2019	220	150	71	52	38	75	48	40	27	7.1	4.3	2.8	3.2	<0.50 U	1.7	1.2	0.22	0.35	0.69	0.50	<0.20 U	<0.20 U
	8/26/2019	670	170	74	34	24	43	53	35	29	10	7.3	5.7	6.2	1.6	2.5	2.3	0.24	0.41	0.62	0.68	<0.20 U	0.27
	9/9/2019	450	170	69	53	36	38	54	42	26	10	7.0	5.3	6.5	<0.50 U	2.3	2.5	0.27	0.60	0.41	0.75	<0.20 U	0.27
	9/24/2019	510	190	79	51	40	95	63	52	26	21	14	11	10	2.6	3.2	4.6	0.40	0.77	1.5	1.1	<0.20 U	0.38
	10/7/2019	590	230	77	63	43	52	74	50	27	9.5	5.8	4.6	5.4	<0.50 U	1.9	2.1	0.26	0.45	0.73	0.62	<0.20 U	0.24
	10/21/2019	290	150	72	64	38	34	46	40	21	8.1	5.3	3.8	4.6	0.71	1.9	1.8	0.25	0.46	0.56	0.60	<0.20 U	0.31
	11/4/2019	120	78	42	36	24	37	23	20	9.7	6.9	4.5	2.8	3.7	0.58	1.4	1.2	<0.20 U	0.36	0.57	0.38	<0.20 U	<0.20 U
	11/18/2019	270	110	66	56	35	48	39	34	8.5	8.9	6.2	3.8	3.8	1.3	1.5	1.6	<0.20 U	0.41	0.83	0.42	<0.20 U	0.25
	12/2/2019	290	160	70	65	38	36	53	45	12	7.7	4.6	2.9	3.5	<0.50 U	1.6	1.3	0.24	0.44	0.61	0.51	<0.20 U	0.27
	12/16/2019	290	150	77	61	45	29	51	44	15	8.8	5.7	4.2	5.8	1.0	1.9	2.4	0.26	0.48	0.64	0.60	<0.20 U	0.26

Modified EPA Method 8260
U = Not detected above reporting limit
J = Estimated concentration

lbs/day = (X)µg/L x 28.32 L/ft3/min x 0.002205 lb/g / 1,000,000 µg/g x 1440 min/day

Table 15
SVE System Analytical Data and Removal Rates
Detected Compounds Only (in µg/L)
2019 Annual Report
Pasco Landfill NPL Site

Sample Location	Date	n-butyl benzene	p-Isopropyl toluene	Sec-Butyl benzene	Dichlorodifluoromethane (CFC-12)	Trichlorofluoromethane (CFC-11)	Chloroform	1,1,1-Trichloroethane	1,2,3-Trichloropropane	1,1-Dichloroethene	Chlorobenzene	Naphthalene	Vinyl chloride	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2,4-Trichlorobenzene	Carbon disulfide	trans-1,2-Dichloroethene	Total VOCs (µg/L)	Flow Rate (scfm)	Removal Rate (lbs/day)
VEW-06S	1/2/2019	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.49	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.020 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	88	21	0.17
	1/14/2019	0.50	0.32	0.30	<0.20 U	<0.20 U	0.61	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.020 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	130	20	0.23
	1/28/2019	0.64	0.45	0.43	<0.20 U	<0.20 U	0.70	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.020 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	194	20	0.35
	2/12/2019	1.1	0.74	0.68	<0.20 U	<0.20 U	0.73	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.020 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	158	20	0.28
VEW-06D	1/2/2019	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.029	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	715	159	10
	1/14/2019	0.25	<0.20 U	0.20	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.050	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	895	153	12
	1/28/2019	0.30	0.24	0.26	0.96	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.072	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,162	153	16
	2/12/2019	0.60	0.44	0.48	0.23	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.038	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	666	153	9
	2/25/2019	0.71	0.46	0.45	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.43	0.044	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	984	212	19
	3/11/2019	0.48	0.34	0.42	0.27	<0.20 U	0.30	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.054	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,005	254	23
	3/25/2019	0.32	0.26	0.32	<0.20 U	<0.20 U	0.20	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.039	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	975	239	21
	4/9/2019	1.1	0.81	0.89	0.23	<0.20 U	0.30	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.30	0.052	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	874	252	20
	4/15/2019	0.78	0.60	0.68	<0.20 U	<0.20 U	0.37	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.34	0.035	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,204	252	27
	4/22/2019	0.38	0.31	0.28	<0.20 U	<0.20 U	0.44	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.41	0.023	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	689	249	15
	4/29/2019	1.0	0.85	1.0	0.31	<0.20 U	0.73	<0.20 U	<0.20 U	<0.20 U	0.23	<0.20 U	0.055	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,011	250	23
	5/6/2019	0.51	0.42	0.49	<0.20 U	<0.20 U	0.41	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.20	0.029	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	897	248	20
	5/20/2019	0.55	0.38	0.42	<0.20 U	<0.20 U	0.68	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.38	0.032	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	857	280	22
	6/3/2019	0.69	0.49	0.57	0.28	<0.20 U	0.60	<0.20 U	<0.20 U	0.25	<0.20 U	0.32	0.056	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	874	276	22
	6/17/2019	0.72	0.52	0.60	0.26	<0.20 U	0.70	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.26	0.033	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	929	278	23
	7/2/2019	0.84	0.63	0.64	0.32	<0.20 U	<0.22 U	<0.20 U	<0.20 U	0.21	0.21	0.37	<0.020 U	<0.20 U	<0.20 U	<0.20 U	0.21	<0.20 U	1,390	280	35
	7/15/2019	0.70	0.49	0.50	0.21	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.35	0.047	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,229	280	31
	7/30/2019	0.83	0.57	0.57	0.24	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.37	0.045	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	998	281	25
	8/13/2019	0.32	0.21	0.21	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.39	0.021	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	744	287	19
	8/26/2019	0.73	0.55	0.52	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.027	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,172	303	32
	9/9/2019	0.55	0.44	0.49	0.28	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.032	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	976	273	24
	9/24/2019	1.5	0.90	1.2	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.22	0.38	0.043	<0.20 U	0.20	<0.20 U	0.21	<0.20 U	1,181	250	27
	10/7/2019	0.59	0.40	0.39	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.32	0.025	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,239	267	30
	10/21/2019	0.39	0.28	0.27	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.021	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	784	270	19
	11/4/2019	0.35	0.26	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.020 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	413	272	10
	11/18/2019	0.57	0.43	0.37	0.29	<0.20 U	0.41	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.28	0.020	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	698	274	17
	12/2/2019	0.24	0.21	0.22	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.020	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	793	274	20
	12/16/2019	0.51	0.40	0.39	0.25	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.026	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	796	273	20

Modified EPA Method 8260
U = Not detected above reporting limit
J = Estimated concentration

lbs/day = (X)µg/L x 28.32 L/ft3/min x 0.002205 lb/g / 1,000,000 µg/g x 1440 min/day

Table 15
SVE System Analytical Data and Removal Rates
Detected Compounds Only (in µg/L)
2019 Annual Report
Pasco Landfill NPL Site

Sample Location	Date	Toluene	m,p-Xylene	4-Methyl-2-pentanone (MIBK)	Acetone	2-butanone (MEK)	Ethanol	Ethyl benzene	o-Xylene	Trichloroethene	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	n-propyl benzene	Tetrachloroethene	Methylene chloride	1,1-Dichloroethane	Isopropyl benzene	1,2-Dichloroethane	Chloroethane	1,2-Dichlorobenzene	Benzene	Chloromethane	cis-1,2-Dichloroethene
VEW-07S	1/2/2019	88	110	27	11	11	<20 U	41	39	12	11	6.9	3.6	2.2	3.0	3.4	1.4	0.49	3.4	1.2	0.56	1.1	<0.20 U
	1/14/2019	85	120	14	12	13	<20 U	40	36	23	25	16	15	7.6	9.8	8.6	5.0	0.89	11	2.0	1.5	2.9	0.31
	1/28/2019	75	100	13	4.4	4.4	<20 U	36	29	16	10	6.9	3.2	3.3	5.6	4.2	1.8	0.60	5.6	1.3	0.77	2.3	<0.20 U
	2/12/2019	72	130	6.0	3.1	2.4	<20 U	35	34	20	23	13	8.4	4.5	5.0	4.4	3.2	0.58	5.1	1.6	0.77	1.2	0.22
VEW-07D	1/2/2019	510	220	240	110	130	90	93	72	63	12	7.4	4.7	5.8	5.8	4.5	2.0	0.38	0.71	1.0	0.94	<0.20 U	0.82
	1/14/2019	590	180	260	150	230	130	74	54	56	8.3	4.9	3.4	6.6	9.4	5.6	1.9	0.42	1.1	0.58	1.1	0.25	1.0
	1/28/2019	660	230	300	150	210	<20 U	94	70	70	12	7.8	5.4	11	11	7.2	3.2	0.52	1.5	1.0	1.4	0.53	1.3
	2/12/2019	500	260	100	90	120	130	82	66	65	15	9.7	7.8	10	7.8	5.4	3.4	0.42	0.86	0.99	1.1	<0.20 U	1.1
	2/25/2019	650	280	250	160	270	160	110	82	78	13	8.4	6.4	9.4	8.1	6.1	3.1	0.45	1.1	1.2	1.1	0.29	1.3
	3/11/2019	1,200	290	340	170	300	<20 U	110	90	85	15	9.6	6.8	10	7.8	5.7	3.6	0.49	1.0	1.7	1.3	0.31	1.2
	3/25/2019	1,000	220	340	150	270	<20 U	92	65	87	8.8	5.9	4.6	10	7.4	5.9	2.9	0.52	1.1	0.54	1.4	0.31	1.1
	4/9/2019	1,000	260	400	130	280	110	100	81	83	26	17	15	16	13	9.0	8.3	0.84	1.9	2.6	2.2	0.48	2.3
	4/15/2019	1,200	270	470	150	370	<20 U	100	79	80	31	12	8.4	12	7.4	6.4	4.2	0.51	1.2	1.7	1.3	0.27	1.5
	4/22/2019	610	360	300	150	200	<20 U	140	79	88	30	11	6.4	11	5.0	5.8	3.2	0.50	1.1	2.2	1.2	0.24	1.1
	4/29/2019	1,100	840	390	160	250	<20 U	130	86	95	27	19	13	19	9.4	7.7	6.6	0.42	1.9	2.5	1.8	0.45	1.6
	5/6/2019	910	310	340	140	340	<20 U	100	76	81	14	10	7.0	11	6.3	5.5	3.8	0.31	1.2	1.2	1.2	0.32	1.1
	5/20/2019	730	280	340	130	250	<20 U	120	100	81	35	12	8.6	12	8.8	7.5	4.6	0.75	1.4	2.3	1.5	0.37	1.4
	6/3/2019	640	260	300	130	200	<20 U	120	83	77	28	21	13	14	11	11	8.2	0.54	2.8	3.0	2.2	0.54	1.8
	6/17/2019	530	250	260	120	240	<20 U	110	78	68	26	13	8.4	14	11	9.2	4.6	0.47	2.4	1.9	1.7	0.53	1.5
	7/2/2019	1,500	1,300	680	390	550	370	140	88	77	31	20	19	23	15	10	5.4	0.78	2.2	2.8	2.3	0.61	2.0
	7/15/2019	1,200	250	460	490	510	290	94	73	63	22	13	8.9	13	11	8.0	4.0	0.58	1.9	2.1	1.7	0.40	1.1
	7/30/2019	860	600	370	370	380	310	97	76	63	28	19	11	12	9.8	7.7	4.2	0.61	1.6	3.1	1.8	0.35	1.2
	8/12/2019	510	270	270	200	280	160	88	68	56	9.3	5.9	3.8	4.4	3.5	4.1	1.6	0.35	1.1	1.0	0.86	<0.20 U	0.54
	8/26/2019	1,400	1,000	500	290	360	220	110	65	62	13	12	8.5	9.8	7.1	7.5	3.2	0.49	1.6	1.7	1.5	0.36	1.1
	9/9/2019	1,100	290	580	1,200	1,000	140	100	67	59	25	17	16	15	5.6	8.4	6.6	0.49	1.7	2.5	1.7	0.43	1.0
	9/24/2019	1,400	910	640	950	980	200	120	87	64	35	12	9.3	9.4	4.5	5.4	3.7	0.39	0.94	2.0	1.2	0.29	0.82
	10/7/2019	880	520	230	210	280	130	160	90	67	14	8.9	6.8	7.8	2.9	4.1	2.9	0.31	0.74	1.6	0.92	0.22	0.65
	10/21/2019	690	270	260	200	240	100	89	63	50	8.1	5.5	4.0	5.3	3.2	3.9	1.7	0.30	0.95	0.54	0.84	0.27	0.59
	11/4/2019	990	130	120	130	140	120	43	32	24	14	9.3	5.9	6.8	3.5	4.4	2.2	0.29	0.94	1.9	0.81	0.26	0.53
	11/18/2019	640	210	210	180	200	130	82	64	39	13	9.8	6.6	6.0	4.1	4.2	2.4	0.28	1.0	1.4	0.80	0.30	0.58
	12/2/2019	730	240	260	220	240	110	89	68	45	13	8.3	5.6	6.6	3.5	4.2	2.3	0.36	1.2	1.2	0.95	0.30	0.66
	12/16/2019	640	290	250	200	250	130	100	76	44	16	11	8.1	9.9	4.1	5.1	4.1	0.35	1.1	1.4	1.1	0.44	0.79

Modified EPA Method 8260
U = Not detected above reporting limit
J = Estimated concentration

lbs/day = (X)µg/L x 28.32 L/ft3/min x 0.002205 lb/g / 1,000,000 µg/g x 1440 min/day

Table 15
SVE System Analytical Data and Removal Rates
Detected Compounds Only (in µg/L)
2019 Annual Report
Pasco Landfill NPL Site

Sample Location	Date	n-butyl benzene	p-Isopropyl toluene	Sec-Butyl benzene	Dichlorodifluoromethane (CFC-12)	Trichlorofluoromethane (CFC-11)	Chloroform	1,1,1-Trichloroethane	1,2,3-Trichloropropane	1,1-Dichloroethene	Chlorobenzene	Naphthalene	Vinyl chloride	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2,4-Trichlorobenzene	Carbon disulfide	trans-1,2-Dichloroethene	Total VOCs (µg/L)	Flow Rate (scfm)	Removal Rate (lbs/day)
VEW-07S	1/2/2019	0.39	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.60	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.21	<0.020 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	378	21	0.71
	1/14/2019	2.3	2.2	2.2	<0.20 U	<0.20 U	1.5	0.22	<0.20 U	0.24	<0.20 U	0.23	0.040	<0.20 U	0.29	<0.20 U	0.20	<0.20 U	458	20	0.82
	1/28/2019	0.58	0.48	0.46	0.37	<0.20 U	0.84	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.31	0.025	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	326	20	0.59
	2/12/2019	1.2	1.2	1.1	<0.20 U	<0.20 U	0.96	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.32	<0.02 U	<0.20 U	0.25	<0.20 U	<0.20 U	<0.20 U	379	20	0.68
VEW-07D	1/2/2019	0.38	0.35	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.23	<0.20 U	0.22	0.070	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,575	159	23
	1/14/2019	0.29	0.29	0.28	<0.20 U	<0.20 U	0.21	<0.20 U	<0.20 U	0.30	<0.20 U	<0.20 U	0.088	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,770	153	24
	1/28/2019	0.50	0.42	0.46	<0.20 U	<0.20 U	0.26	<0.20 U	<0.20 U	0.44	0.24	0.30	0.17	<0.20 U	<0.20 U	<0.20 U	0.22	0.21	1,851	153	25
	2/12/2019	0.61	0.66	0.72	<0.20 U	<0.20 U	0.23	<0.20 U	<0.20 U	0.29	0.22	0.21	0.080	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,480	153	20
	2/25/2019	0.56	0.45	0.50	<0.20 U	<0.20 U	0.20	<0.20 U	<0.20 U	0.32	0.23	0.51	0.088	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	2,103	212	40
	3/11/2019	0.65	0.41	0.56	<0.20 U	<0.20 U	0.31	<0.20 U	<0.20 U	0.35	0.23	0.37	0.091	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	2,652	257	61
	3/25/2019	0.37	0.30	0.35	<0.20 U	<0.20 U	0.27	<0.20 U	<0.20 U	0.34	<0.20 U	0.22	0.087	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	2,276	278	57
	4/9/2019	2.2	1.6	1.7	<0.20 U	<0.20 U	0.37	<0.20 U	<0.20 U	0.53	0.43	0.46	0.13	<0.20 U	0.36	<0.20 U	<0.20 U	0.26	2,567	234	54
	4/15/2019	1.5	1.3	1.1	<0.20 U	<0.20 U	0.41	<0.20 U	<0.20 U	0.32	0.27	1.8	0.082	<0.20 U	0.28	0.32	<0.20 U	<0.20 U	2,814	214	54
	4/22/2019	0.78	0.58	0.57	<0.20 U	<0.20 U	0.58	<0.20 U	<0.20 U	0.29	0.22	1.0	0.073	<0.20 U	0.27	<0.20 U	<0.20 U	<0.20 U	2,010	248	45
	4/29/2019	2.4	1.6	1.4	<0.20 U	<0.20 U	0.71	<0.20 U	<0.20 U	0.46	0.39	2.2	0.12	<0.20 U	0.28	0.44	<0.20 U	0.29	3,172	254	72
	5/6/2019	0.79	0.66	0.71	<0.20 U	<0.20 U	0.50	<0.20 U	<0.20 U	0.31	0.23	0.43	0.083	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	2,364	200	43
	5/20/2019	0.90	0.60	0.73	0.20	<0.20 U	0.80	<0.20 U	<0.20 U	0.37	0.29	0.44	0.10	<0.20 U	0.23	<0.20 U	<0.20 U	0.26	2,132	176	34
	6/3/2019	2.3	1.5	1.9	<0.20 U	<0.20 U	0.80	<0.20 U	<0.20 U	0.51	0.43	0.76	0.15	<0.20 U	0.33	0.24	0.22	0.23	1,936	121	21
	6/17/2019	0.89	0.65	0.72	<0.20 U	<0.20 U	0.83	<0.20 U	<0.20 U	0.40	0.29	0.47	0.11	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.23	1,755	128	20
	7/2/2019	1.5	1.1	1.1	<0.20 U	<0.20 U	<0.22 U	<0.20 U	12	0.56	0.35	0.52	0.096	0.23	0.31	<0.20 U	0.23	0.31	5,247	137	65
	7/15/2019	0.90	0.64	0.68	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.33	0.30	0.55	0.10	<0.20 U	0.23	<0.20 U	<0.20 U	0.28	3,522	121	38
	7/30/2019	1.2	0.78	0.77	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.40	0.31	0.74	0.10	<0.20 U	0.31	<0.20 U	<0.20 U	<0.20 U	3,231	137	40
	8/12/2019	0.33	0.21	0.23	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.052	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,939	260	45
	8/26/2019	0.80	0.58	0.59	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.28	0.24	0.23	0.090	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.27	4,078	174	64
	9/9/2019	2.0	1.4	1.5	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.36	0.42	0.55	0.11	<0.20 U	0.35	<0.20 U	0.21	0.29	4,645	207	86
	9/24/2019	0.98	0.63	0.80	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.21	0.24	0.57	0.071	<0.20 U	0.21	<0.20 U	<0.20 U	<0.20 U	5,440	263	129
	10/7/2019	0.85	0.59	0.52	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.66	0.040	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	2,622	252	59
	10/21/2019	0.28	0.21	0.22	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.035	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,998	242	43
	11/4/2019	0.74	0.47	<0.20 U	<0.20 U	<0.20 U	0.20	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.55	0.036	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,782	239	38
	11/18/2019	0.74	0.55	0.51	<0.20 U	<0.20 U	0.50	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.52	0.046	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	1,808	239	39
	12/2/2019	0.48	0.45	0.42	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	0.36	0.040	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	2,052	239	44
	12/16/2019	0.86	0.66	0.65	<0.20 U	<0.20 U	0.20	<0.20 U	<0.20 U	<0.20 U	0.23	0.33	0.063	<0.20 U	<0.20 U	<0.20 U	<0.20 U	<0.20 U	2,046	234	43

Modified EPA Method 8260
U = Not detected above reporting limit
J = Estimated concentration

lbs/day = (X)µg/L x 28.32 L/ft3/min x 0.002205 lb/g / 1,000,000 µg/g x 1440 min/day

Table 16
Carbon Monoxide Monitoring Data
2019 Annual Report
Pasco Landfill NPL Site

	VEW-06S	VEW-06I			VEW-06D	VEW-07S	VEW-07I			VEW-07D	VMW-51I
Date	Well Head CO (ppm)	Well Head CO (ppm)	Lab CO (Method 25C) (ppmV)	Lab CO (Method 3C) (%, v/v)	Well Head CO (ppm)	Well Head CO (ppm)	Well Head CO (ppm)	Lab CO (ppmV)	Lab CO (Method 3C) (%, v/v)	Well Head CO (ppm)	Well Head CO (ppm)
1/7/2019[C]	5.0	568	570	<0.10	8.0	36	422	410	<0.10	39	3.0
1/21/2019[H]	0.0	624	630	<0.10	0.0	0.0	452	470	<0.10	19	0.0
2/4/2019[C]	1.0	589	<5.0	<0.10	4.0	21	477	560	<0.10	29	0.0
2/18/2019[C]	0.0	733	760	<0.10	0.0	0.0	434	520	<0.10	13	0.0
3/4/2019[H]	0.0	--	--	--	1.0	0.0	--	--	<0.10	10	0.0
3/11/2019[H]	--	657	--	--	--	--	445	--	--	--	--
3/11/2019[H]	--	626	550	<0.10	--	--	410	390	<0.10	--	--
3/18/2019[H]	0.0	512	--	--	0.0	0.0	345	--	--	9.0	0.0
4/1/2019[H]	0.0	504	450	<0.10	2.0	0.0	352	330	<0.10	11	0.0
4/15/2019[H]	0.0	398	--	--	0.0	0.0	330	--	--	10	0.0
4/29/2019[H]	0.0	297	--	--	0.0	0.0	220	--	--	7.0	0.0
5/14/2019[H]	0.0	270	250	<0.10	0.0	0.0	294	290	<0.10	10	0.0
5/28/2019[H]	0.0	321	--	--	0.0	0.0	221	--	--	16	0.0
6/10/2019[H]	0.0	341	--	--	0.0	0.0	240	--	--	11	0.0
6/24/2019[H]	0.0	311	270	<0.10	1.0	0.0	265	250	<0.10	13	0.0
7/8/2019[H]	0.0	337	--	--	1.0	0.0	217	--	<0.10	12	0.0
7/22/2019[H]	0.0	416	--	--	0.0	0.0	208	--	<0.10	9.0	0.0
7/30/2019	--	--	190	<0.10	--	--	--	200	<0.11	--	--
8/8/2019[H]	7.0	224	--	--	10	8.0	260	--	<0.10	19	13
8/19/2019[H]	2.0	203	--	--	6.0	15	230	--	<0.10	30	4.0
9/2/2019[H]	5.0	401	--	--	9.0	15	241	--	<0.10	27	5.0
9/17/2019[H]	1.0	499	450	<0.10	9.0	3.0	191	< 5.0	<0.10	16	3.0
9/30/2019[H]	1.0	540	--	--	11	2.0	179	--	<0.10	17	3.0
10/15/2019[H]	12.0	593	--	--	21	7.0	253	--	<0.10	21	15
10/29/2019[H]	1.0	547	--	--	11	1.0	212	--	<0.10	19	3.0
11/11/2019[H]	3.0	576	540	<0.10	13	3.0	211	210	<0.10	19	4.0
11/26/2019[H]	14.0	262	--	--	13	39	257	--	<0.10	36	1.0
12/10/2019[H]	14.0	566	--	--	19	11	210	--	<0.10	25	4.0
12/23/2019[H]	4.0	534	--	--	8.0	10	218	--	<0.10	19	0.0

H = Wellhead measurements on this date collected using a H_2S filter in-line with the GEM 5000.

C = Wellhead measurements on this date collected using a carbon filter preconditioned with 50% CH_4 calibration gas in-line with the GEM 5000.

Table 17
Summary of Maximum Temperatures from All Zone A Thermocouples
2019 Annual Report
Pasco Landfill NPL Site, Pasco, WA

PERIOD: 1/1 - 12/31/2019

Sample Location	1/4/19	1/14/19	1/28/19	2/12/19	2/20/19	2/27/19	3/5/19	3/13/19	3/20/19	3/27/19	4/5/19	4/12/19	4/19/19	4/26/19	4/30/19	5/3/19	Fluke Measurement (5/9/19)	5/10/19	5/17/19	5/24/19
TC1-7																				
TC1-14	124	124	123	122	122	121	121	121	120	120	120						115	119	119	118
TC1-24	142	142	141	141	141	141	141	141	141	141	142						138	142	142	141
TC1-29	144	143	143	143	143	143	143	143	143	143	144						140	144	144	143
TC2-16																				
TC2-27	150	150	150	149	149	149	149	149	149	149	149						145	148	148	147
TC2-32	152	152	152	152	152	153	153		151	152	153						149	153	153	151
TC2-36																				
TC3-16	139	138	137	136	135	134	134	133	133	132	131						126	128	128	127
TC3-25	150	149	149	148	148	147	147	146	146	146	147						142	144	144	143
TC3-30	151	150	150	149	149	149	149	148	148	148	149						145	147	147	146
TC3-37	148	148	148	147	147	341														
TC4-14	111	110	109	108	107	107	106	106	105	105	104	103	104	104	103	103		103	103	102
TC4-24	121	120	120	120	119	119	119	119	119	119	119	118	118	118	118	117		119	118	118
TC5-12	130	128	127	126	125	124	123	123	122	121	120	119	119	118	118	118		118	118	117
TC5-21	143	142	141	141	140	139	139	139	139	138	138	137	137	137	136	136		136	136	136
TC5-28	151	151	150	150	150	149	149	149	149	149	149	149	149	148	148	148		149	149	148
TC5-33	153	152	152	151	151	151	151	151	151	151	151	151	151	151	151	150		153	154	154
TC6-12	117	116	115	114	113	112	112	112	111	111	110	109	109	109	109	109		112	112	113
TC6-22	145	144	144	144	143	143	142	142	141	141	140	139	139	138	138	137		141	141	142
TC6-25	149	149	150	149	149	148	148	147	147	146	145	145	144	144	143	143		146	146	146
TC6-29	153	152	153	152	153	153	152	152	152	151	151	150	150	149	148	148		152	153	153
TC6-36	146	146	146	145	146	145	145	146	146	145	145	145	145	145	145	145		148	149	149
TC7-17*											102						97	102	101	102
TC7-23*											124						113	124	125	125
TC7-26*											122						119	124	124	124
TC8-13*											96						94	95	95	94
TC8-17*											105	103					103	104	103	103
TC8-26*											126						126	126	126	125
TC9-19*																		105	106	106
TC9-25*																		114	114	115
TC9-29*																		118	118	119

Notes:

* = Value shown equals most recent reading minus the earliest temperature data for 2019 (i.e. 4/3/2019 or 5/9/2019).

Maximum temperatures are in degrees Fahrenheit (°F).

Location name indicates thermocouple array number followed by depth in feet (i.e. TC1-14 is in array 1 at depth 14).

Grey shading indicates no reading was taken, TC was not monitored, or was not functioning properly. Data has been removed and is not included in calculations.

-37.5 Green shading corresponds to the level of temperature reduction during the comparative period.

- SVE well flow rate changes were made between February 15, 2019 and March 7, 2019.
- Data values collected between 4/9/19 and 5/9/2019 at TC1, TC2, TC3, TC7 and TC8 (all depths) were frozen due to problems with the automated I/O module.
  The I/O module equipment was replaced on 5/9/2019.
- Temperatures were checked with a Fluke meter on 5/9/19 for comparison purposes. Note that the Fluke meter data tend to be a few degrees lower than the manual dataloggers.
- Automated TC data collection stopped at 6/25/2019 at 20:00 hrs, likely due to storm related failure of the I/O equipment on both TC racks.
- Individual dataloggers were reinstalled on June 28 and July 10, 2019.

Table 17
Summary of Maximum Temperatures from All Zone A Thermocouples
2019 Annual Report
Pasco Landfill NPL Site, Pasco, WA

PERIOD: 1/1 - 12/31/2019

Sample Location	5/31/19	6/7/19	6/14/19	6/21/19	6/28/19	7/5/19	7/12/19	7/19/19	7/26/19	8/2/19	8/9/19	8/16/19	8/23/19	8/30/19	9/6/19	9/13/19	9/20/19
TC1-7																	
TC1-14	118	118	117	118	118	117	117	117	117	117	117	118	118	118	118	118	119
TC1-24	140	140	140	140	139	138	137	137	137	137	137	136	136	136	136	136	136
TC1-29	143	143	142	142	142	140	140	140	140	139	139	139	139	139	138	138	138
TC2-16																	
TC2-27	146	146	145	145	145	144	143	143	143	143	142	142	141	141	141	141	141
TC2-32	150	150	150	149	149	148	148	148	147	146	146	146	146	146	146	146	146
TC2-36																	
TC3-16	127	127	126	126	126	125	125	125	125	125	125	125	125	125	125	125	125
TC3-25	143	142	142	141	141	138	138	138	137	137	137	136	136	135	135	135	135
TC3-30	145	145	144	144	144	142	142	141	141	141	140	140	140	139	139	139	139
TC3-37																	
TC4-14	102	102	102	102	102	103	103	103	103	104	104	104	104	105	105	105	106
TC4-24	117	117	117	116	116	115	115	115	114	114	114	114	114	114	113	113	113
TC5-12	118	117	117	117	118	117	117	117	117	117	117	118	118	118	118	119	119
TC5-21	135	134	134	134	133	132	132	131	131	131	131	130	130	130	130	130	130
TC5-28	147	148	147	147	147	146	145	145	145	145	144	144	144	143	143	143	143
TC5-33	154	153	153	153	153	149	149	148	148	148	148	148	147	147	147	147	147
TC6-12	113	113	113	113	114	110	111	111	112	112	112	113	113	114	114	114	115
TC6-22	141	140	140	139	138	134	133	133	133	132	132	132	132	132	132	132	132
TC6-25	145	145	144	144	143	140	139	139	139	138	138	137	137	137	137	137	138
TC6-29	152	151	151	151	150	145	145	145	144	144	143	143	143	143	143	144	144
TC6-36	149	148	148	148	147	143	143	143	143	142	142	142	142	142	141	141	141
TC7-17*	102	101	101	101	101		96	96	96	97	97	97	97	98	98	98	99
TC7-23*	125	127	125	125	126		112	112	111	111	111	112	112	112	112	112	112
TC7-26*	124	124	124	124	123		119	119	119	119	119	119	119	119	119	119	119
TC8-13*	95	95	95	95	95		95	96	96	96	97	97	98	98	99	99	99
TC8-17*	103	103	103	103	103		103	103	103	103	103	104	104	104	104	105	105
TC8-26*	125	125	125	125	125		124	124	124	124	124	124	124	124	124	123	123
TC9-19*	105	105	105	105	105		100	100	100	100	101	101	101	101	101	101	102
TC9-25*	114	114	114	114	114		110	111	111	111	110	111	111	111	111	111	111
TC9-29*	119	119	119	119	119		115	115	115	115	115	115	115	115	115	115	114

Notes:

* = Value shown equals most recent reading minus the earliest temperature data for 2019 (i.e. 4/3/2019 or 5/9/2019).

Maximum temperatures are in degrees Fahrenheit (°F).

Location name indicates thermocouple array number followed by depth in feet (i.e. TC1-14 is in array 1 at depth 14).

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- SVE well flow rate changes were made between February 15, 2019 and March 7, 2019.
- Data values collected between 4/9/19 and 5/9/2019 at TC1, TC2, TC3, TC7 and TC8 (all depths) were frozen due to problems with the automated I/O module. The I/O module equipment was replaced on 5/9/2019.
- Temperatures were checked with a Fluke meter on 5/9/19 for comparison purposes. Note that the Fluke meter data tend to be a few degrees lower than the manual dataloggers.
- Automated TC data collection stopped at 6/25/2019 at 20:00 hrs, likely due to storm related failure of the I/O equipment on both TC racks.
- Individual dataloggers were reinstalled on June 28 and July 10, 2019.

Table 17
Summary of Maximum Temperatures from All Zone A Thermocouples
2019 Annual Report
Pasco Landfill NPL Site, Pasco, WA

Sample Location	9/27/19	10/4/19	10/11/19	10/18/19	10/25/19	11/1/19	11/8/19	11/15/19	11/22/19	11/25/19	12/8/19	12/13/19	12/23/19	Maximum Temperature Since 3/9/2018	Last Reading Minus 3/1/17	Last Reading Minus 3/9/18	Last Reading Minus 2/12/19 (Start of Flow Changes)
TC1-7														--	--	--	--
TC1-14	119	119	120	119	120	120	120	120	120	119	119	119	119	128	-10	-5	-3.0
TC1-24	135	136	136	136	136	135	136	135	135	135	135	135	135	147	-21	-8	-6.0
TC1-29	138	138	138	138	138	138	138	137	138	138	138	138	138	147	--	-8	-5.0
TC2-16														--	--	--	--
TC2-27	141	141	141	140	140	140	140	140	140	140	140	140	140	166	-21	-25.5	-9.0
TC2-32	146	146	146	146	146	146	146	146	146	146	146	146	146	159	--	-12.5	-6.0
TC2-36														--	--	--	--
TC3-16	125	126	126	126	126	126	125	125	125	124	124	124	124	165	-21	-39.5	-11.5
TC3-25	135	135	135	135	134	134	134	134	134	134	134	133	134	172	-24.5	-36.5	-14.0
TC3-30	138	138	138	138	138	138	138	138	138	137	137	137	137	167	--	-29.5	-12.0
TC3-37														--	--	--	--
TC4-14	106	107	107	107	107	107	107	107	107	107	107	106	106	116	-5.0	-6.5	-1.5
TC4-24	113	113	113	113	113	113	113	113	113	113	113	113	113	127	-11.5	-13.5	-6.5
TC5-12	119	119	119	119	119	119	119	119	118	118	118	117	117	147	-10.0	-28.0	-7.5
TC5-21	130	130	130	130	130	130	131	131	131	131	131	131	131	170	--	-39.0	-10.0
TC5-28	142	142	142	142	142	142	143	142	143	143	143	143	143	171	-7.0	-27.5	-7.0
TC5-33	146	146	146	146	146	146	146	147	147	147	147	147	147	163	--	-16.0	-4.5
TC6-12	115	115	115	114	114	114	114	113	113	112	112	111	111	126	--	1.0	-1.5
TC6-22	132	132	133	133	133	133	133	133	134	134	133	133	134	153	-10.5	-17.5	-10.0
TC6-25	138	139	139	139	140	140	140	140	141	141	140	140	141	158	--	-16.5	-8.0
TC6-29	145	146	146	147	147	148	148	148	148	148	148	148	149	161	-4.0	-12.0	-4.0
TC6-36	141	141	142	142	142	142	142	142	143	143	143	143	143	149	--	-6.5	-2.5
TC7-17*	99	100	100	100	100	101	101	101	101	101	101	100	100	107	--	--	-1.2
TC7-23*	112	112	112	112	112	112	112	112	112	112	112	112	113	142	--	--	-11.6
TC7-26*	118	119	119	119	119	119	119	119	119	119	119	119	119	124	--	--	-3.8
TC8-13*	100	100	100	100	100	100	100	100	100	99	99	98	98	105	--	--	3.3
TC8-17*	106	106	106	106	106	107	107	107	107	107	107	106	106	110	--	--	1.2
TC8-26*	123	123	123	123	123	123	123	123	123	123	123	123	123	127	--	--	-3.7
TC9-19*	102	102	102	102	103	103	0	103	103	103	103	103	103	107	--	--	-2.4
TC9-25*	111	111	111	111	111	112	0	111	112	111	112	112	112	115	--	--	-3.3
TC9-29*	114	114	114	114	114	114	0	114	114	114	114	114	114	119	--	--	-4.9

Notes:

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- Automated TC data collection stopped at 6/25/2019 at 20:00 hrs, likely due to storm related failure of the I/O equipment on both TC racks.
- Individual dataloggers were reinstalled on June 28 and July 10, 2019.

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI1-24	2019-01-04	-0.34	0.0	6.6	12.2	306
	2019-01-14	-0.39	0.0	7.0	15.2	233
	2019-01-28	-0.44	0.0	6.7	15.4	232
	2019-02-12	-0.21	0.0	5.3	15.4	265
	2019-02-27	-0.40	0.0	9.0	10.8	530
	2019-03-13	-0.60	0.0	7.2	10.8	410
	2019-03-27	-0.21	0.0	10.1	8.1	546
	2019-03-27*	-0.21	0.8	10.1	8.0	610
	2019-04-10	-0.34	0.0	7.7	10.2	694
	2019-04-10*	-0.27	1.8	8.4	10.1	906
	2019-04-11**	-0.13	0.0	9.9	7.8	689
	2019-04-30	-0.26	0.0	9.9	7.3	592
	2019-05-15	-0.08	0.0	11.4	5.4	442
	2019-05-29	-0.25	0.1	10.2	6.2	410
	2019-06-13	-0.18	0.0	11.2	5.2	405
	2019-06-26	-0.13	0.0	10.1	6.6	411
	2019-07-10	-0.55	0.0	9.9	6.5	656
	2019-07-22	-0.26	0.0	10.1	6.9	512
	2019-08-07	0.06	0.0	13.3	3.1	381
	2019-08-20**	-0.19	--	8.9	6.5	271
	2019-09-04**	-0.25	--	8.8	8.2	307
	2019-09-20**	-0.44	--	8.1	10.4	324
	2019-10-02**	-0.34	--	7.5	11.2	335
	2019-10-15**	-0.47	--	7.7	11.2	327
	2019-10-31**	-0.37	--	7.9	10.7	391
	2019-11-13**	-0.37	--	8.0	10.9	350
	2019-11-25**	0.14	--	12.6	5.3	314
	2019-12-9**	-0.33	--	7.9	11.5	310
	2019-12-23**	-0.41	--	7.8	10.9	305
GI1-29	2019-01-04	-0.38	0.0	10.3	7.3	319
	2019-01-14	-0.40	0.0	7.2	11.1	243
	2019-01-28	-0.45	0.0	6.9	10.8	238
	2019-02-12	-0.22	0.0	6.6	11.3	241
	2019-02-27	-0.55	0.0	11.5	5.8	397
	2019-03-13	-0.76	0.0	12.2	4.8	317
	2019-03-27	-0.27	0.0	13.3	4.0	291
	2019-03-27*	-0.27	0.9	13.2	4.1	331
	2019-04-09*	-0.63	0.8	13.1	4.5	362
	2019-04-10	-0.40	0.0	12.4	4.8	476
	2019-04-10*	-0.31	2.2	12.5	5.0	668
	2019-04-11**	-0.14	0.0	11.1	4.4	346
	2019-04-30	-0.35	0.0	13.2	3.2	337
	2019-05-15	-0.10	0.0	13.3	2.7	189
	2019-05-29	-0.32	0.0	13.2	2.9	191
	2019-06-13	-0.24	0.0	12.8	2.8	176
	2019-06-26	-0.19	0.0	13.1	2.9	232
	2019-07-10	-0.29	0.0	13.0	3.2	465
	2019-07-22	-0.30	0.1	12.8	3.5	479
	2019-08-7	0.07	0.0	12.6	2.8	132
	2019-08-20**	-0.23	--	11.7	2.9	96
	2019-09-04**	-0.33	--	12.2	4.1	136
	2019-09-20**	-0.58	--	11.3	6.4	162
	2019-10-02**	-0.49	--	11.1	7.2	174
	2019-10-15**	-0.54	--	11.1	7.1	159
	2019-10-31**	-0.48	--	10.3	7.4	181
	2019-11-13**	-0.46	--	11.0	7.0	164
	2019-11-25**	0.14	--	11.4	6.2	243
	2019-12-9**	-0.45	--	11.0	7.4	183
	2019-12-23**	-0.45	--	10.9	6.8	267

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI2-16	2019-01-04	-0.44	0.0	13.6	1.2	228
	2019-01-14	-0.42	0.0	10.6	5.0	167
	2019-01-28	-0.49	0.0	9.4	4.7	157
	2019-02-12	-0.25	0.0	8.6	5.8	145
	2019-02-27	-0.46	0.0	13.2	1.5	15
	2019-03-13	-0.58	0.0	12.8	1.9	52
	2019-03-27	-0.22	0.0	14.2	0.8	49
	2019-03-27*	-0.18	0.7	14.2	0.9	63
	2019-04-09*	-0.49	1.3	14.3	1.2	157
	2019-04-10	-0.32	0.0	14.0	1.3	108
	2019-04-10*	-0.19	0.7	14.0	1.4	65
	2019-04-11**	-0.11	0.0	12.4	1.1	9
	2019-04-30	-0.24	0.0	13.1	3.5	116
	2019-05-15	-0.03	0.0	14.3	0.9	59
	2019-05-29	-0.21	0.0	14.9	0.6	84
	2019-06-13	-0.19	0.0	14.1	0.6	15
	2019-06-26	-0.10	0.0	15.1	0.5	106
	2019-07-10	-0.19	0.0	15.4	0.5	347
	2019-07-22	-0.20	0.1	15.1	0.8	363
	2019-08-07	0.06	0.0	14.8	0.4	15
	2019-08-20**	-0.22	--	12.8	0.7	10
	2019-09-04**	-0.30	--	13.3	1.4	20
	2019-09-20**	-0.47	--	14.1	2.8	5
	2019-10-02**	-0.36	--	13.5	3.6	5
	2019-10-15**	-0.41	--	13.3	4.3	4
	2019-10-31**	-0.38	--	12.9	4.1	6
	2019-11-13**	-0.30	--	13.3	4.1	9
	2019-11-25**	0.14	--	15.4	1.4	100
	2019-12-9**	-0.29	--	13.2	4.8	46
	2019-12-23**	-0.35	--	15.5	0.9	44
GI2-27	2019-01-04	-0.42	0.1	10.0	3.4	1264
	2019-01-14	-0.37	0.0	9.1	7.4	782
	2019-01-28	-0.45	0.0	9.5	6.8	811
	2019-02-12	-0.22	0.0	7.5	8.1	766
	2019-02-27	-0.52	0.0	11.0	2.2	894
	2019-03-13	-0.63	0.0	11.3	1.6	874
	2019-03-27	-0.24	0.0	11.6	1.3	727
	2019-03-27*	-0.19	3.8	11.7	1.4	1202
	2019-04-10	-0.31	0.0	10.6	1.6	713
	2019-04-10*	-0.24	3.6	11.4	1.7	1212
	2019-04-11**	-0.11	0.0	11.5	1.4	715
	2019-04-30	-0.29	0.0	11.2	1.0	686
	2019-05-15	-0.20	0.0	11.9	0.7	683
	2019-05-29	-0.22	0.0	11.1	0.7	712
	2019-06-13	-0.21	0.0	10.4	0.7	627
	2019-06-26	-0.28	0.0	10.9	0.7	682
	2019-07-10	-0.20	0.1	11.1	0.8	982
	2019-07-22	-0.21	0.1	11.1	0.9	1043
	2019-08-07	0.14	0.0	10.7	0.6	513
	2019-08-20**	-0.18	--	9.6	0.6	526
	2019-09-04**	-0.24	--	10.4	1.1	661
	2019-09-20**	-0.54	--	11.5	2.1	568
	2019-10-02**	-0.45	--	12.0	2.4	596
	2019-10-15**	-0.52	--	12.2	2.3	592
	2019-10-31**	-0.44	--	12.7	2.4	611
	2019-11-13**	-0.34	--	13.0	2.2	588
	2019-11-25**	0.15	--	13.3	1.3	600
	2019-12-9**	-0.40	--	13.3	2.3	445
	2019-12-23**	-0.40	--	13.0	2.1	451

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI2-32	2019-01-04	-0.70	0.1	9.0	2.3	1430
	2019-01-14	-0.72	0.0	7.7	6.9	838
	2019-01-28	-0.80	0.0	8.2	6.4	880
	2019-02-12	-0.46	0.0	7.0	7.4	843
	2019-02-27	-1.15	0.0	10.0	2.0	955
	2019-03-13	-1.31	0.0	10.5	1.6	949
	2019-03-27	-0.68	0.0	10.6	1.2	855
	2019-03-27*	-0.65	6.6	10.4	1.3	1389
	2019-04-10	-0.81	0.0	10.3	1.7	821
	2019-04-10*	-0.69	6.9	10.1	1.8	1364
	2019-04-11**	-0.50	0.0	10.7	1.5	860
	2019-04-30	-0.83	0.0	10.8	1.0	812
	2019-05-15	-0.28	0.0	10.2	0.6	935
	2019-05-29	-0.64	0.0	10.0	0.6	1060
	2019-06-13	-0.58	0.0	9.4	0.7	878
	2019-06-26	-0.50	0.0	9.9	0.6	907
	2019-07-10	-0.58	0.1	9.8	0.8	1197
	2019-07-22	-0.62	0.1	10.0	1.0	1188
	2019-08-07	0.10	0.0	9.3	0.6	951
	2019-08-20**	-0.58	--	9.4	0.7	702
	2019-09-04**	-0.73	--	9.6	1.3	800
	2019-09-20**	-1.18	--	11.0	2.4	622
	2019-10-02**	-0.97	--	11.3	2.7	661
	2019-10-15**	-1.03	--	11.8	2.6	658
	2019-10-31**	-0.99	--	11.8	2.8	682
	2019-11-13**	-0.90	--	12.1	2.7	655
	2019-11-25**	0.19	--	10.2	1.7	944
	2019-12-9**	-0.95	--	12.2	2.8	471
	2019-12-23**	-1.03	--	12.2	2.7	512
GI2-36	2019-01-04	-1.12	0.3	8.0	2.7	1525
	2019-01-14	-1.02	0.0	6.5	8.0	832
	2019-01-28	-1.19	0.0	6.8	7.4	913
	2019-02-12	-0.80	0.0	6.4	8.4	855
	2019-02-27	-1.88	0.0	8.5	3.2	1036
	2019-03-13	-2.14	0.0	8.6	2.8	1141
	2019-03-27	-1.22	0.0	8.8	2.4	1049
	2019-03-27*	-1.21	13.5	8.5	2.4	1625
	2019-04-10	-1.48	0.0	8.6	3.1	1012
	2019-04-10*	-1.39	14.5	8.2	3.2	1594
	2019-04-11**	-1.11	0.0	8.5	2.9	1072
	2019-04-30	-1.52	0.0	8.6	2.3	1038
	2019-05-15	-0.63	0.0	9.3	1.4	1020
	2019-05-29	-1.07	0.1	8.8	1.2	1080
	2019-06-13	-1.06	0.0	8.3	1.3	1169
	2019-06-26	-0.99	0.0	8.6	1.3	1172
	2019-07-10	-1.12	0.1	8.5	1.6	1446
	2019-07-22	-1.02	0.2	8.3	1.9	1398
	2019-08-07	0.18	0.0	9.0	1.1	1034
	2019-08-20**	-1.13	--	8.7	1.3	936
	2019-09-04**	-1.32	--	8.0	2.7	1054
	2019-09-20**	-1.95	--	8.6	5.0	800
	2019-10-02**	-1.76	--	8.5	5.4	833
	2019-10-15**	-1.87	--	9.1	5.1	839
	2019-10-31**	-1.72	--	9.1	5.3	874
	2019-11-13**	-1.65	--	9.2	5.0	860
	2019-11-25**	0.22	--	9.5	3.6	1060
	2019-12-9**	-1.77	--	9.1	5.4	496
	2019-12-23**	-1.83	--	9.0	5.2	1071

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI3-16	2019-01-04	-0.69	0.1	13.8	1.2	261
	2019-01-14	-0.67	0.0	10.4	5.4	124
	2019-01-28	-0.66	0.0	10.2	5.0	134
	2019-02-12	-0.52	0.0	9.8	6.5	139
	2019-02-27	-0.51	0.0	13.5	0.1	52
	2019-03-13	-0.54	0.0	13.2	0.2	103
	2019-03-27	-0.20	0.0	13.0	0.2	82
	2019-03-27*	-0.19	2.0	13.0	0.3	199
	2019-04-09*	-0.47	2.1	13.0	0.4	157
	2019-04-10	-0.28	0.0	12.9	0.3	132
	2019-04-10*	-0.22	1.9	12.6	0.5	184
	2019-04-11**	-0.07	0.0	12.2	0.3	62
	2019-04-30	-0.30	0.0	12.1	0.6	174
	2019-05-15	-0.10	0.0	11.9	0.5	114
	2019-05-29	-0.19	0.2	12.4	0.5	197
	2019-06-13	-0.14	0.0	11.8	0.6	68
	2019-06-26	-0.14	0.0	12.9	0.5	164
	2019-07-10	-0.14	0.1	13.5	0.4	413
	2019-07-22	-0.16	0.1	14.1	0.3	473
	2019-08-07	0.04	0.1	14.5	0.2	28
	2019-08-20**	-0.17	--	13.4	0.3	34
	2019-09-04**	-0.25	--	14.1	0.3	39
	2019-09-20**	-0.43	--	15.3	0.2	15
	2019-10-02**	-0.32	--	16.0	0.2	18
	2019-10-15**	-0.40	--	16.0	0.2	16
	2019-10-31**	-0.29	--	16.6	0.1	20
	2019-11-13**	-0.29	--	16.6	0.1	22
	2019-11-25**	0.10	--	16.3	0.1	42
	2019-12-9**	-0.28	--	16.3	0.1	37
	2019-12-23**	-0.34	--	16.1	0.1	46
GI3-25	2019-01-04	-0.44	0.1	14.2	1.1	704
	2019-01-14	-0.49	0.0	10.8	4.9	424
	2019-01-28	-0.46	0.0	10.6	4.7	466
	2019-02-12	-0.31	0.1	10.2	6.3	453
	2019-02-27	-0.59	0.0	13.4	0.1	714
	2019-03-13	-0.62	0.0	14.7	0.0	601
	2019-03-27	-0.21	0.0	14.4	0.1	492
	2019-03-27*	-0.20	3.9	14.7	0.2	923
	2019-04-10	-0.33	0.0	13.9	0.1	449
	2019-04-10*	-0.22	3.6	14.0	0.2	911
	2019-04-11**	-0.11	0.0	13.1	0.1	466
	2019-04-30	-0.31	0.1	13.6	0.2	507
	2019-05-15	-0.10	0.0	13.6	0.2	501
	2019-05-29	-0.21	0.1	13.1	0.2	548
	2019-06-13	-0.18	0.0	12.4	0.2	415
	2019-06-26	-0.19	0.0	13.0	0.2	475
	2019-07-10	-0.21	0.1	13.1	0.2	793
	2019-07-22	-0.24	0.1	13.0	0.4	717
	2019-08-07	0.10	0.1	13.1	0.2	331
	2019-08-20**	-0.20	--	10.7	0.4	390
	2019-09-04**	-0.25	--	11.7	0.4	404
	2019-09-20**	-0.47	--	12.9	0.7	373
	2019-10-02**	-0.42	--	13.6	0.9	411
	2019-10-15**	-0.50	--	13.9	1.3	418
	2019-10-31**	-0.38	--	13.7	1.4	461
	2019-11-13**	-0.36	--	14.1	0.9	458
	2019-11-25**	0.12	--	15.9	0.0	429
	2019-12-9**	-0.37	--	15.3	0.5	278
	2019-12-23**	-0.41	--	14.6	0.9	284

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI3-30	2019-01-04	-0.69	0.2	13.2	1.1	597
	2019-01-14	-0.62	0.0	10.0	5.2	322
	2019-01-28	-0.76	0.0	10.2	4.7	357
	2019-02-12	-0.47	0.2	9.8	6.3	330
	2019-02-27	-1.11	0.0	13.2	0.1	389
	2019-03-13	-1.20	0.1	12.9	0.1	381
	2019-03-27	-0.57	0.0	12.6	0.1	299
	2019-03-27*	-0.56	3.5	12.5	0.2	589
	2019-04-09*	-0.96	3.8	12.4	0.2	466
	2019-04-10	-0.73	0.0	11.9	0.1	287
	2019-04-10*	-0.65	3.2	12.1	0.3	548
	2019-04-11**	-0.53	0.1	11.8	0.0	288
	2019-04-30	-0.79	0.2	11.5	0.1	332
	2019-05-15	-0.28	0.2	11.6	0.1	310
	2019-05-29	-0.56	0.2	11.2	0.1	379
	2019-06-13	-0.47	0.1	10.2	0.2	271
	2019-06-26	-0.51	0.1	11.1	0.1	342
	2019-07-10	-0.53	0.2	11.0	0.2	652
	2019-07-22	-0.53	0.2	11.0	0.2	701
	2019-08-07	0.11	0.2	11.0	0.2	241
	2019-08-20**	-0.53	--	10.2	0.4	263
	2019-09-04**	-0.70	--	11.0	0.2	326
	2019-09-20**	-1.06	--	12.5	0.2	251
	2019-10-02**	-0.91	--	13.0	0.2	280
	2019-10-15**	-0.92	--	13.5	0.2	281
	2019-10-31**	-0.82	--	13.6	0.1	312
	2019-11-13**	-0.83	--	13.8	0.0	290
	2019-11-25**	0.17	--	13.7	0.0	408
	2019-12-9**	-0.89	--	13.8	0.0	286
	2019-12-23**	-0.95	--	13.7	0.0	299
GI3-37	2019-01-04	-1.05	0.2	12.8	1.2	432
	2019-01-14	-0.98	0.0	9.5	6.2	227
	2019-01-28	-1.10	0.0	9.7	5.6	232
	2019-02-12	-0.75	0.1	9.0	7.3	236
	2019-02-27	-1.76	0.0	12.7	0.1	226
	2019-03-13	-1.91	0.1	12.3	0.1	231
	2019-03-27	-1.09	0.1	12.1	0.1	193
	2019-03-27*	-1.08	4.8	12.0	0.1	316
	2019-04-09*	-1.56	5.1	11.9	0.1	250
	2019-04-10	-1.33	0.1	11.5	0.1	232
	2019-04-10*	-1.18	5.2	11.6	0.2	449
	2019-04-11**	-0.98	0.1	11.4	0.1	178
	2019-04-30	-1.47	0.2	10.7	0.1	245
	2019-05-15	-0.53	0.2	11.0	0.1	237
	2019-05-29	-0.97	0.3	10.6	0.2	341
	2019-06-13	-0.91	0.1	10.0	0.2	201
	2019-06-26	-0.92	0.1	10.5	0.1	267
	2019-07-10	-1.03	0.2	10.4	0.2	536
	2019-07-22	-1.00	0.3	10.5	0.2	619
	2019-08-07	0.16	0.2	10.6	1.1	313
	2019-08-20**	-0.99	--	10.6	0.3	127
	2019-09-04**	-1.22	--	10.8	0.2	134
	2019-09-20**	-1.78	--	11.9	0.2	122
	2019-10-02**	-1.60	--	12.6	0.2	154
	2019-10-15**	-1.65	--	13.1	0.2	167
	2019-10-31**	-1.54	--	13.2	0.0	187
	2019-11-13**	-1.48	--	13.2	0.0	174
	2019-11-25**	0.23	--	12.5	3.6	283
	2019-12-9**	-1.54	--	13.1	0.0	94
	2019-12-23**	-1.65	--	13.0	0.1	89

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI4-24	2019-01-04	-0.45	5.5	20.9	0.9	14
	2019-01-14	-0.44	4.4	16.4	4.2	0
	2019-01-28	-0.51	3.1	15.4	4.3	0
	2019-02-12	-0.23	4.5	11.8	5.4	12
	2019-02-27	-0.45	1.6	18.5	0.1	0
	2019-03-13	-0.72	1.4	17.9	0.1	18
	2019-03-27	-0.25	2.4	18.2	0.2	21
	2019-03-27*	-0.24	3.5	18.8	0.2	27
	2019-04-09*	-0.56	2.4	18.7	0.2	17
	2019-04-10	-0.32	2.0	18.0	0.2	61
	2019-04-10*	-0.35	3.0	18.3	0.3	38
	2019-04-11**	-0.15	2.3	16.9	0.1	0
	2019-04-30	-0.29	2.1	18.1	0.2	37
	2019-05-15	-0.13	3.3	17.9	0.2	21
	2019-05-29	-0.25	3.0	18.3	0.2	64
	2019-06-13	-0.23	2.8	17.7	0.3	8
	2019-06-26	-0.18	2.4	18.6	0.2	23
	2019-07-10	-0.24	2.7	18.5	0.2	135
	2019-07-22	-0.26	2.9	18.4	0.4	93
	2019-08-07	0.01	4.7	18.1	0.3	8
	2019-08-20**	-0.20	--	14.9	0.4	11
	2019-09-04**	-0.24	--	16.7	0.3	10
	2019-09-20**	-0.52	--	18.1	0.2	7
	2019-10-02**	-0.44	--	18.0	0.3	7
	2019-10-15**	-0.45	--	18.1	0.3	6
	2019-10-31**	-0.41	--	18.3	0.2	7
	2019-11-13**	-0.44	--	18.1	0.2	7
	2019-11-25**	0.12	--	18.7	0.2	7
	2019-12-9**	-0.34	--	17.8	0.3	13
	2019-12-23**	-0.47	--	17.3	0.3	0
GI5-12	2019-01-04	-1.16	0.0	5.7	13.4	0
	2019-01-14	-1.04	0.0	7.1	15.8	0
	2019-01-28	-1.07	0.0	3.3	17.2	0
	2019-02-12	-0.91	0.0	2.0	16.8	8
	2019-02-27	-0.68	0.0	4.4	13.5	0
	2019-03-13	-0.51	0.0	4.8	11.9	7
	2019-03-27	-0.67	0.0	5.0	12.7	7
	2019-03-27*	-0.25	0.3	5.2	12.6	14
	2019-04-09*	-0.95	0.0	5.1	13.4	4
	2019-04-10	-0.30	0.0	4.7	13.2	28
	2019-04-10*	-0.35	0.5	4.8	13.6	19
	2019-04-11**	-0.08	0.0	3.5	13.0	0
	2019-04-30	-0.30	0.0	6.7	7.9	13
	2019-05-15	-0.12	0.0	7.4	7.6	7
	2019-05-29	-0.14	0.0	7.7	7.2	25
	2019-06-13	-0.28	0.0	7.3	7.7	0
	2019-06-26	-0.14	0.0	7.7	7.3	0
	2019-07-10	-0.19	0.0	8.3	7.2	84
	2019-07-22	-0.20	0.1	7.8	8.1	38
	2019-08-07	0.06	0.0	7.9	7.0	3
	2019-08-20**	-0.23	--	5.3	7.6	5
	2019-09-04**	-0.15	--	6.8	8.2	4
	2019-09-20**	-0.51	--	7.4	9.4	1
	2019-10-02**	-0.25	--	7.0	10.4	1
	2019-10-15**	-0.40	--	6.5	11.1	1
	2019-10-31**	-0.30	--	6.2	11.9	1
	2019-11-13**	-0.22	--	6.0	12.3	2
	2019-11-25**	0.11	--	5.9	12.0	7
	2019-12-9**	-0.63	--	5.6	12.4	4
	2019-12-23**	-0.46	--	5.5	12.5	0

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI5-21	2019-01-04	-0.52	0.3	13.5	0.9	267
	2019-01-14	-0.47	0.0	10.2	4.8	207
	2019-01-28	-0.67	0.0	10.2	4.3	202
	2019-02-12	-0.31	0.2	9.8	5.7	180
	2019-02-27	-0.71	0.0	13.0	0.0	122
	2019-03-13	-0.57	0.0	14.2	0.1	151
	2019-03-27	-0.23	0.0	14.1	0.1	160
	2019-03-27*	-0.21	1.4	14.3	0.1	365
	2019-04-09*	-0.47	1.5	14.0	0.2	271
	2019-04-10	-0.31	0.0	13.4	0.1	171
	2019-04-10*	-0.28	1.2	13.7	0.2	268
	2019-04-11**	-0.89	0.0	12.3	0.1	118
	2019-04-30	-0.38	0.0	13.9	0.1	177
	2019-05-15	-0.10	0.0	13.8	0.1	124
	2019-05-29	-0.48	0.0	13.5	0.2	188
	2019-06-13	-0.18	0.0	12.4	0.2	70
	2019-06-26	-0.17	0.0	13.2	0.1	180
	2019-07-10	-0.30	0.1	13.0	0.2	463
	2019-07-22	-0.22	0.1	12.6	0.3	505
	2019-08-07	0.09	0.1	12.7	0.2	20
	2019-08-20**	-0.26	--	11.4	0.3	74
	2019-09-04**	-0.39	--	12.4	0.2	89
	2019-09-20**	-0.51	--	12.4	0.2	72
	2019-10-02**	-0.37	--	13.3	0.2	81
	2019-10-15**	-0.45	--	13.4	0.2	79
	2019-10-31**	-0.41	--	13.7	0.1	94
	2019-11-13**	-0.45	--	14.3	0.0	92
	2019-11-25**	0.14	--	14.5	0.0	94
	2019-12-9**	-0.35	--	14.4	0.0	97
	2019-12-23**	-0.48	--	14.5	0.0	95
GI5-28	2019-01-04	-0.53	0.4	12.6	1.0	628
	2019-01-14	-0.51	0.0	9.4	5.1	457
	2019-01-28	-0.56	0.0	9.9	4.6	498
	2019-02-12	-0.30	0.2	9.4	6.1	387
	2019-02-27	-0.72	0.0	12.4	0.0	709
	2019-03-13	-0.77	0.0	13.1	0.0	726
	2019-03-27	-0.27	0.0	13.1	0.0	670
	2019-03-27*	-0.28	2.7	13.1	0.1	1081
	2019-04-10	-0.34	0.0	12.2	0.0	785
	2019-04-10*	-0.33	2.4	12.3	0.3	1210
	2019-04-11**	-0.20	0.0	11.7	0.1	750
	2019-04-30	-0.36	0.0	12.4	0.1	593
	2019-05-15	-0.15	0.0	13.1	0.1	513
	2019-05-29	-0.28	0.0	12.3	0.2	672
	2019-06-13	-0.23	0.0	11.6	0.2	522
	2019-06-26	-0.22	0.0	11.9	0.1	537
	2019-07-10	-0.31	0.0	12.0	0.2	865
	2019-07-22	-0.26	0.1	11.7	0.3	924
	2019-08-07	0.09	0.1	12.1	0.2	273
	2019-08-20**	-0.28	--	10.2	0.3	409
	2019-09-04**	-0.26	--	11.0	0.2	609
	2019-09-20**	-0.58	--	11.3	0.2	674
	2019-10-02**	-0.97	--	12.6	0.2	754
	2019-10-15**	-0.57	--	12.8	0.2	733
	2019-10-31**	-0.42	--	12.7	0.1	826
	2019-11-13**	-0.48	--	13.3	0.0	797
	2019-11-25**	0.15	--	14.4	0.0	375
	2019-12-9**	-0.42	--	13.5	0.0	403
	2019-12-23**	-0.48	--	13.5	0.0	374

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI5-33	2019-01-04	-0.52	0.3	13.2	1.1	242
	2019-01-14	-0.50	0.0	9.7	5.4	107
	2019-01-28	-0.54	0.0	9.4	4.9	118
	2019-02-12	-0.31	0.1	9.4	6.6	105
	2019-02-27	-0.80	0.0	12.5	0.0	196
	2019-03-13	-0.78	0.0	13.3	0.0	270
	2019-03-27	-0.26	0.0	13.6	0.0	174
	2019-03-27*	-0.30	2.5	13.6	0.1	421
	2019-04-09*	-1.10	2.8	13.2	0.2	405
	2019-04-10	-0.14	0.0	12.9	0.0	196
	2019-04-10*	-0.41	2.4	12.9	0.1	341
	2019-04-11**	-0.21	0.0	12.8	0.1	152
	2019-04-30	-0.47	0.0	13.4	0.1	304
	2019-05-15	-0.19	0.0	13.7	0.0	163
	2019-05-29	-0.32	0.0	12.6	0.1	187
	2019-06-13	-0.26	0.0	12.1	0.1	159
	2019-06-26	-0.23	0.0	12.7	0.1	254
	2019-07-10	-0.37	0.1	12.5	0.1	537
	2019-07-22	-0.31	0.0	12.4	0.2	579
	2019-08-07	-0.04	0.1	13.0	0.2	39
	2019-08-20**	-0.26	--	11.9	0.4	159
	2019-09-04**	-0.34	--	12.1	0.2	171
	2019-09-20**	-1.01	--	12.8	0.2	145
	2019-10-02**	-0.51	--	13.4	0.1	138
	2019-10-15**	-0.60	--	13.7	0.1	117
	2019-10-31**	-0.50	--	13.4	0.1	124
	2019-11-13**	-0.54	--	14.0	0.0	117
	2019-11-25**	0.16	--	14.8	0.0	74
	2019-12-9**	-0.48	--	14.1	0.0	98
	2019-12-23**	-0.59	--	13.8	0.1	112
GI6-22	2019-01-04	-0.75	0.0	15.5	1.1	19
	2019-01-14	-0.68	0.0	11.0	5.4	0
	2019-01-28	-0.67	0.0	11.9	5.1	0
	2019-02-12	-0.81	0.2	11.5	6.2	17
	2019-02-27	-0.67	0.0	15.0	0.1	0
	2019-03-13	-0.94	0.0	16.2	0.1	29
	2019-03-27	-0.25	0.0	16.1	0.1	26
	2019-03-27*	-0.26	0.3	16.3	0.2	47
	2019-04-09*	-0.80	0.1	16.8	0.2	36
	2019-04-10	-1.04	0.0	16.7	0.1	102
	2019-04-10*	-0.42	0.4	16.4	0.3	58
	2019-04-11**	-0.19	0.0	15.6	0.1	2
	2019-04-30	-0.74	0.0	15.0	0.2	66
	2019-05-15	-1.03	0.0	14.5	0.1	24
	2019-05-29	-1.60	0.1	14.6	0.2	58
	2019-06-13	-1.26	0.0	13.5	0.3	6
	2019-06-26	-0.96	0.0	14.2	0.2	48
	2019-07-10	-0.86	0.0	13.9	0.2	198
	2019-07-22	-0.50	0.0	14.0	0.3	29
	2019-08-07	-0.27	0.0	14.3	0.3	6
	2019-08-20**	-0.76	--	13.9	0.4	7
	2019-09-04**	-0.23	--	13.6	0.4	10
	2019-09-20**	-0.47	--	13.5	0.6	3
	2019-10-02**	-0.75	--	13.9	0.9	4
	2019-10-15**	-0.72	--	14.0	1.1	4
	2019-10-31**	-0.91	--	14.5	1.2	5
	2019-11-13**	-1.00	--	14.7	1.4	6
	2019-11-25**	-0.67	--	14.8	0.9	22
	2019-12-9**	-1.15	--	14.8	1.8	19
	2019-12-23**	-1.65	--	14.7	1.9	0

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI6-25	2019-01-04	-0.53	0.0	15.2	1.5	174
	2019-01-14	-0.47	0.0	9.8	7.2	51
	2019-01-28	-0.48	0.0	9.8	6.6	54
	2019-02-12	-0.29	0.0	9.9	8.4	58
	2019-02-27	-0.58	0.0	16.4	0.1	68
	2019-03-13	-0.57	0.0	16.9	0.1	113
	2019-03-27	-0.23	0.0	17.1	0.1	98
	2019-03-27*	-0.22	1.5	17.3	0.1	249
	2019-04-09*	-0.42	1.4	16.9	0.2	169
	2019-04-10	-0.26	0.0	15.3	0.1	146
	2019-04-10*	-0.31	1.3	16.8	0.2	270
	2019-04-11**	-0.13	0.0	15.3	0.1	81
	2019-04-30	-0.25	0.0	16.6	0.1	176
	2019-05-15	-0.13	0.0	16.7	0.1	115
	2019-05-29	-0.25	0.0	16.1	0.2	298
	2019-06-13	-0.23	0.0	14.9	0.3	151
	2019-06-26	-0.24	0.0	16.0	0.1	188
	2019-07-10	-0.22	0.0	15.9	0.1	506
	2019-07-22	-0.22	0.1	15.5	0.3	546
	2019-08-07	0.08	0.0	14.9	0.3	39
	2019-08-20**	-0.21	--	13.2	0.3	99
	2019-09-04**	-0.24	--	14.9	0.2	102
	2019-09-20**	-0.46	--	14.5	0.2	31
	2019-10-02**	-0.38	--	15.2	0.2	31
	2019-10-15**	-0.41	--	15.1	0.2	22
	2019-10-31**	-0.32	--	16.1	0.1	29
	2019-11-13**	-0.51	--	16.5	0.0	25
	2019-11-25**	0.13	--	16.6	0.1	8
	2019-12-9**	-0.34	--	16.5	0.1	6
	2019-12-23**	-0.42	--	17.0	0.0	5
GI6-29	2019-01-04	-0.49	0.1	14.3	1.2	655
	2019-01-14	-0.47	0.0	11.0	5.1	422
	2019-01-28	-0.47	0.0	10.6	4.7	450
	2019-02-12	-0.33	0.0	10.9	6.0	318
	2019-02-27	-0.68	0.0	16.3	0.0	288
	2019-03-13	-0.59	0.0	15.9	0.1	465
	2019-03-27	-0.22	0.0	16.1	0.0	330
	2019-03-27*	-0.19	1.7	16.1	0.2	642
	2019-04-09*	-0.45	1.3	15.8	0.2	623
	2019-04-10	-0.31	0.0	14.0	0.1	432
	2019-04-10*	-0.20	1.7	15.3	0.3	838
	2019-04-11**	-0.15	0.1	14.4	0.1	377
	2019-04-30	-0.22	0.0	15.6	0.1	411
	2019-05-15	-0.15	0.0	16.6	0.1	236
	2019-05-29	-0.30	0.0	15.4	0.2	319
	2019-06-13	-0.22	0.0	14.4	0.2	387
	2019-06-26	-0.19	0.0	15.1	0.2	399
	2019-07-10	-0.25	0.0	15.3	0.1	690
	2019-07-22	-0.40	0.1	14.8	0.3	776
	2019-08-07	0.00	0.1	14.6	0.3	75
	2019-08-20**	-0.30	--	13.5	0.3	331
	2019-09-04**	-0.24	--	13.7	0.2	510
	2019-09-20**	-0.54	--	14.0	0.5	617
	2019-10-02**	-0.37	--	14.3	0.9	742
	2019-10-15**	-0.46	--	14.7	0.8	705
	2019-10-31**	-0.31	--	14.9	0.7	804
	2019-11-13**	-0.39	--	14.9	0.8	728
	2019-11-25**	0.11	--	17.5	0.0	107
	2019-12-9**	-0.34	--	14.8	1.1	397
	2019-12-23**	-0.46	--	14.7	1.1	418

Well	Date	Pressure ("wc)	Well Head CH_4 (˚F)	Well Head CO_2 (%)	Well Head O_2 (%)	Well Head CO (ppm)
GI6-36	2019-01-04	-0.67	0.0	14.7	1.5	60
	2019-01-14	-0.62	0.0	11.2	5.6	17
	2019-01-28	-0.61	0.0	10.8	5.6	10
	2019-02-12	-0.33	0.0	10.3	7.1	40
	2019-02-27	-0.94	0.0	15.7	0.3	14
	2019-03-13	-0.88	0.0	16.1	0.3	65
	2019-03-27	-0.40	0.0	16.2	0.3	47
	2019-03-27*	-0.39	0.6	16.0	0.5	111
	2019-04-09*	-0.73	0.5	15.9	0.5	86
	2019-04-10	-0.47	0.1	15.7	0.3	157
	2019-04-10*	-0.51	0.7	15.3	0.7	143
	2019-04-11**	-0.26	0.0	14.7	0.3	49
	2019-04-30	-0.48	0.0	16.1	0.3	116
	2019-05-15	-0.24	0.0	16.2	0.3	67
	2019-05-29	-0.48	0.1	15.5	0.4	154
	2019-06-13	-0.36	0.0	14.7	0.5	115
	2019-06-26	-0.36	0.0	15.3	0.4	106
	2019-07-10	-0.44	0.0	15.1	0.5	283
	2019-07-22	-0.39	0.1	15.1	0.5	106
	2019-08-07	0.07	0.0	15.5	0.3	29
	2019-08-20**	-0.36	--	14.8	0.6	45
	2019-09-04**	-0.44	--	14.1	0.7	52
	2019-09-20**	-0.75	--	14.3	0.5	19
	2019-10-02**	-0.70	--	14.7	0.4	22
	2019-10-15**	-0.75	--	14.6	0.5	15
	2019-10-31**	-0.60	--	15.0	0.4	18
	2019-11-13**	-0.61	--	15.7	0.3	15
	2019-11-25**	0.16	--	16.0	0.1	0
	2019-12-9**	-0.65	--	15.9	0.2	0
	2019-12-23**	-0.71	--	15.9	0.3	0

Notes:

- Ecology approved elimination of methane monitoring on 8/14/2019 (Tech Memo, 6/28/2019).
- Measurements taken on 8/7 and 8/20/2019 were made while the SVE system was not running.
- Measurements made with a GEM-5000 with preconditioned carbon filter (saturated) with a 50% CH4 calibration gas, unless indicated otherwise.

* Measurement made with no filter connected to the GEM-5000.

** Measurement made with a GEM-5000 with H2S filter.

- 2,000 ppm is the upper limit for CO measurements using the field meter.
- Measurements made on 11/25/2019 while the system was shutdown.

Table 19
Summary of Fourth Quarter 2019
Treatment System Shutdowns and Restarts
2019 Annual Report
PERIOD: 10/1/2019 - 12/31/2019 Pasco Landfill NPL Site

Start	End	Duration (hr)	Reason for Shutdown
11/23/2019 12:30	11/25/2019 15:00	50.5	The system shutdown was due to belts breaking on the air compressor. Belts were replaced on 11/25/2019.

Waste	Shipment Quantity	Units	Disposal or Treatment Facility	Disposal Date	Designation
MW-52S NAPL Sorbent Socks	1	55-gallon Drums	CWMNW for Incineration	1/15/2019	D001 D018 D027 D028 D039 D040
Drummed soil cuttings	47	55-gallon Drums	CWMNW	2/26/2019	Non-dangerous
Drummed soil cuttings	8	55-gallon Drums	CWMNW for Incineration	2/27/2019	D040
Empty drums	2	55-gallon Drums	CWMNW	2/27/2019	Non-dangerous
Drummed soil cuttings	27	55-gallon Drums	CWMNW	2/27/2019	WT02 (Oregon X007)
Drummed soil cuttings	4	Overpack Drums	CWMNW	2/27/2019	WT02 (Oregon X007)
Soil core boxes	5	Pallets of Wooden Core Boxes	CWMNW	2/27/2019	WT02 (Oregon X007)
Drummed saturated soil cuttings	1	55-gallon Drums	CWMNW for Stabilization	2/27/2019	Non-dangerous waste (Oregon X004)
Waste water	1	55-gallon Drums	CWMNW for Stabilization	2/27/2019	Non-dangerous waste (Oregon X004)
Purge Water	550	Gallons	City of Pasco Wastewater Treatment Plant	6/11/2019	Non-regulated
Waste water from SVE well cleanout	2	55-gallon Drums	PRS Group, Tacoma, WA	4/22/2019	Non-hazardous and non-dangerous
Condensate and wash water from BGMS cleanout	8	55-gallon Drums	PRS Group, Tacoma, WA	6/28/2019	Non-hazardous and non-dangerous
NAPL	1, partial	55-gallon Drums	CWMNW	6/28/2019	D001 D018 D027 D028 D039 D040
Condensate	4,500	Gallons	PRS Group, Tacoma, WA	9/27/2019	Non-hazardous and non-dangerous
Condensate	4,176	Gallons	PRS Group, Tacoma, WA	12/3/2019	Non-hazardous and non-dangerous

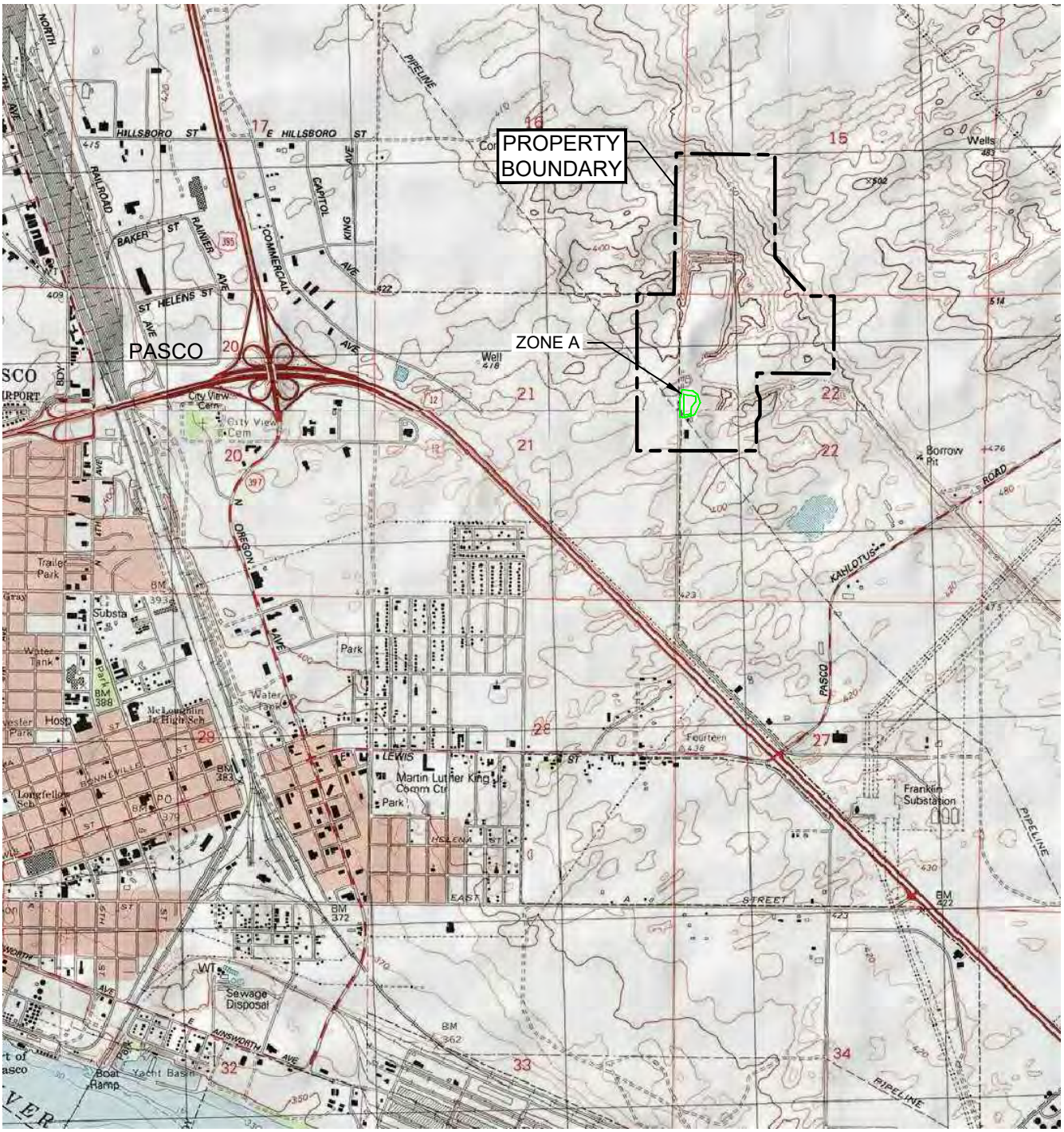
Total waste disposed of during 2019:

8,676 gallons of SVE condensate, characterized as non-regulated waste, was treated and disposed of with PRS Group in Tacoma, WA.

550 gallons of non-regulated purge water from groundwater monitoring was transported to the City of Pasco Wastewater Treatment Plant for treatment and disposal.

CWMNW = Chemical Waste Management of the Northwest in Arlington, OR

FIGURES



SOURCES: USGS PASCO, WA QUADRANGLE 1990,
USGS GLADE, WA QUADRANGLE 1990,
PHOTO REVISED 1992.

WASHINGTON

0' 1/4 mi 1/2 mi 1 mi

SCALE: 1" = 1/2 MILE

PREPARED FOR: IWAG GROUP III

PBS

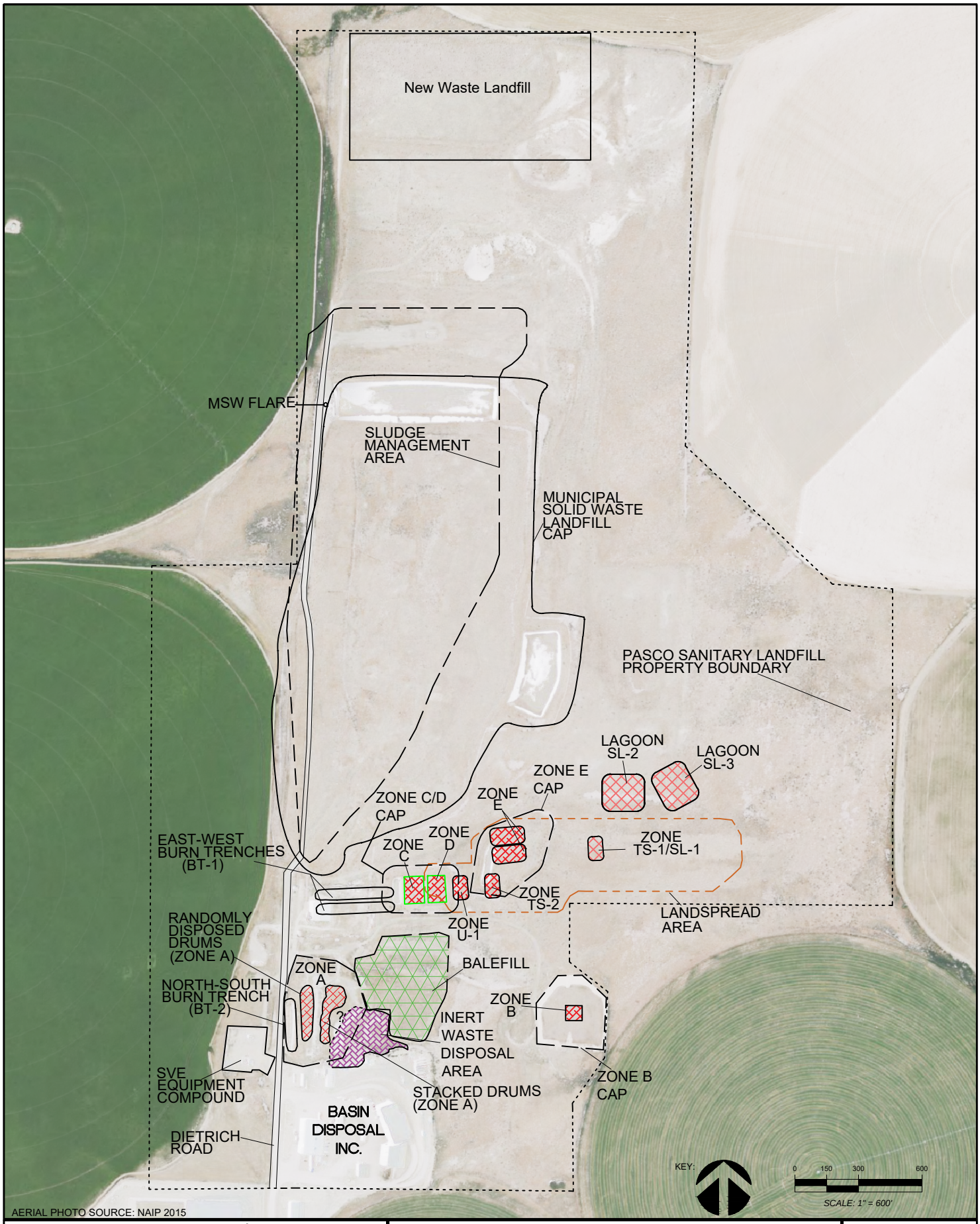
SITE LOCATION MAP

PASCO LANDFILL NPL SITE
PASCO, WASHINGTON

APR 2016
64180

FIGURE
1

C:\Users\patrickb\appdata\local\temp\AcPublish_4600\2016 FIG01.dwg Mar 02, 2017 11:10am patrickb



AERIAL PHOTO SOURCE: NAIP 2015

PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 300
Richland, WA 99352
509.942.1600

pbsusa.com

PASCO LANDFILL NPL SITE PROPERTY

PROJECT:	64180
DATE:	MAR 2017
FIGURE:	2

NEW WASTE LANDFILL

MUNICIPAL SOLID WASTE LANDFILL

PASCO LANDFILL PROPERTY BOUNDARY

MW-16S
MW-23S
4R
MW-17SR
MW-22S
MW-27SR
MW-20S
MW-55S
MW-18S
MW-19S
MW-15S
MW-50S
MW-52S
MW-24S
MW-25SR
MW-47S
MW-47I
MW-13S
MW-26SR
MW-53S
MW-49S
EE-2
MW-49I
2R
2I
NVM-01
MW-51S
MW-10S
MW-11S
MW-11I
MW-12S
MW-12ID
MW-31S
MW-29I
MW-29S
DIETRICH RD
KAHLOTUS ROAD
E. SHEPPARD ST
MW-34S
HIGHLAND ST
MADRONA AVE
MW-46S
PARK VIEW BLVD
N ELM AVE
US - 12
MW-37S
E BROADWAY ST
N. HUGO AVE
N CEDAR AVE
KAHLOTUS HWY
MW-38S
MW-38I
E. ADELIA ST
N. WEHE AVE
YENNEY2
COMMERCIAL AVE
E. ALVINA ST
MW-41SR
MW-40S
MW-45S
RADA
E. LEWIS ST
LEWIS PL
WEST
NORVELL
BRADLEY
LOPEZ
S. CEDAR AVE
HERITAGE BLVD.
NORVELL2
SALINAS
LEWIS PL
E. HELENA ST
E. BUTTE ST
MONTALVO
MW-42S
E. "A" ST
E. "A" ST
MW-43S
MW-43I
MW-44S
HAND
ROAD 40 EAST
E. CRANE ST
S.E. RD 24
NORTHERN PACIFIC RAILWAY R/W
MW-54I

PREPARED FOR: IWAG GROUP III

0 300 600 1200

APPROXIMATE SCALE: 1" = 1200'

MW-12S GROUNDWATER MONITORING WELL (QUARTERLY)

MW-12ID GROUNDWATER MONITORING WELL (SEMI-ANNUAL)

YENNEY2 PRIVATE WELL

PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 300
Richland, WA 99352
509.942.1600

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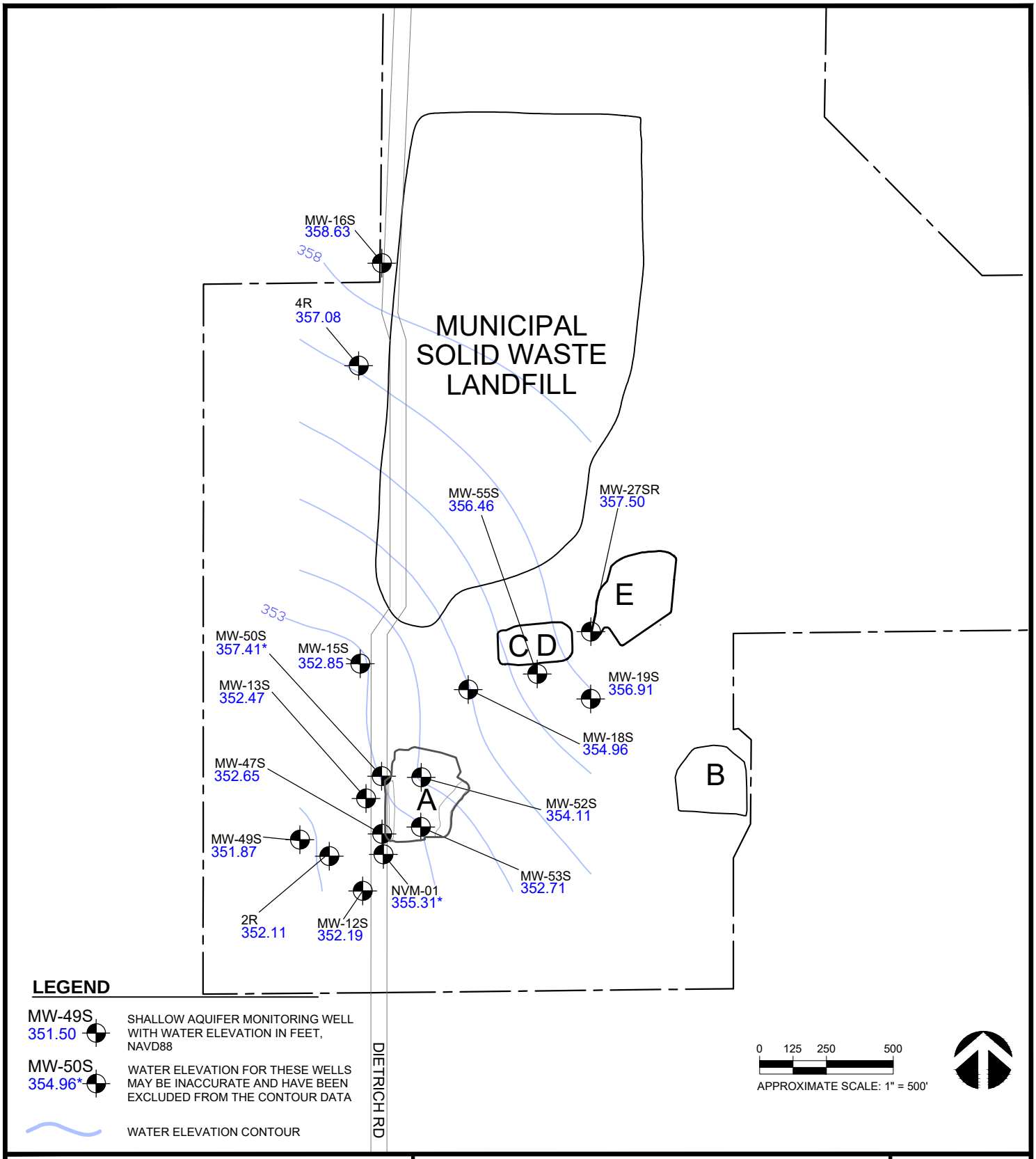
SAMPLED MONITORING WELLS
PASCO LANDFILL NPL SITE
PASCO, WASHINGTON

PROJECT: 64180.019

DATE: 03/04/2019

FIGURE: 3



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400 Bradley Blvd, Ste 300
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509.942.1600
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SHALLOW GROUNDWATER ELEVATIONS
JANUARY 2019
PASCO LANDFILL NPL SITE
PASCO, WASHINGTON

PROJECT:64180

DATE:05/17/2019

FIGURE:
4

MUNICIPAL SOLID WASTE LANDFILL

NEW WASTE LANDFILL

MW-28S 364.07
MW-17SR 355.65
MW-22S 353.95
MW-20S 360.82
#9 359.16
8R 357.22
MW-27SR 358.89
MW-15S 353.82
MW-55S 357.73
EE-6R 357.66
MW-18S 356.05
MW-19S 358.18
MW-25SR 359.04
MW-24S 352.88
MW-50S 353.66
MW-52S 354.15
MW-13S 353.34
MW-47S 353.40
MW-53S 353.73
NVM-04 NM
MW-26SR 358.07
MW-14S 354.87
MW-49S 352.70
EE-2 353.57
2R 352.92
MW-51S 352.29
NVM-03 NM
NVM-02 NM
MW-48S 353.28
NVM-01 353.25
MW-12S 353.10
MW-11S 352.05
MW-10S 352.27
1R 352.83
MW-32S 350.41
MW-30S 350.21
MW-31S 350.50
MW-29S 350.77
MW-34S 349.58
MW-36S 348.89
MW-46S 349.86
MW-37S 348.82
MW-38S 348.51
MW-40S 348.15
MW-41SR 348.29
MW-45S 348.26
MW-42S 347.83
MW-43S 347.90
MW-44S 347.86
NW-1 NM
NW-2 LANDFILL 366.97
NW-3 364.73
NW-4 366.84
NW-5 367.93
4R 858.32
MW-16S 359.94
MW-23S 359.60
365
360
355
350
A
B
C D
E
0' 250' 500' 1,000'
APPROXIMATE SCALE: 1" = 500'
YENNEY3 (KNOPP)
YENNEY2 (KNOPP)
YENNEY1 (KNOPP)
HOMMES (VERA AND SANCHEZ)
RADA
WEST
RINDT (MONTOYA)
BONNIE (DRAMER)
NORVELL (ANGELES)
BRADLEY (MENDOZA)
NORVELL2 (MENDOZA)
LOPEZ (ROBINSON)
SALINAS
REISINGER2 (ROWELL)
MONTALVO
HAND (ROJO VENTURE)
0' 500' 1,000' 2,000'
APPROXIMATE SCALE: 1" = 1,000'

LEGEND

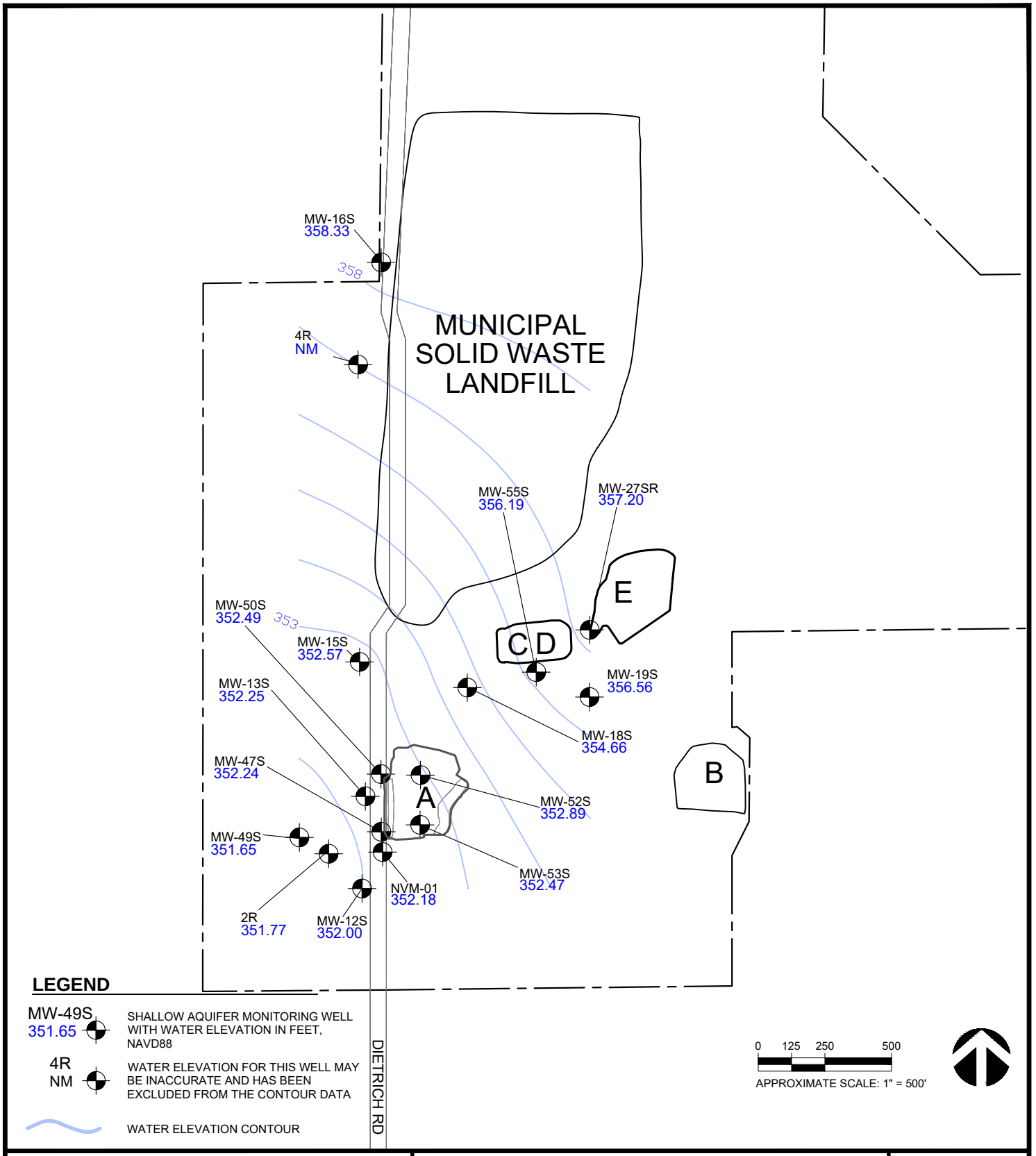
- MW-53S 353.69 — SHALLOW AQUIFER MONITORING WELL WITH WATER ELEVATION IN FEET, NAVD88
- SALINAS — RESIDENTIAL WELL (WITH PROPERTY OWNER) WATER LEVELS NOT MEASURED IN RESIDENTIAL WELLS
- WATER ELEVATION CONTOUR, WATER LEVELS NOT MEASURED IN RESIDENTIAL WELLS.

PREPARED FOR: IWAG GROUP III

PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 300
Richland, WA 99352
509.942.1600
pbsusa.com

SHALLOW GROUNDWATER ELEVATIONS - APRIL 2019
PASCO LANDFILL NPL SITE
PASCO, WASHINGTON

PROJECT: 64180
DATE: 08/10/2019
FIGURE: 5



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400 Bradley Blvd, Ste 300
Richland, WA 99352
509.942.1600
pbsusa.com

SHALLOW GROUNDWATER ELEVATIONS
JULY 2019
PASCO LANDFILL NPL SITE
PASCO, WASHINGTON

PROJECT: 64180.019

DATE: 11/25/2019

FIGURE: 6

MUNICIPAL SOLID WASTE LANDFILL

NEW WASTE LANDFILL

A

B

C D

E

MW-28S 360.33
MW-17SR 353.26
MW-22S 351.98
MW-20S 357.55
#9 356.20
8R 354.64
MW-27SR 356.01
MW-15S 351.71
MW-55S 355.03
EE-6R 354.97
MW-18S 353.63
MW-19S 355.34
MW-25SR 356.14
MW-24S 351.17
MW-50S 351.71
MW-52S 351.97
MW-47S 351.40
MW-13S 351.51
MW-53S 351.58
NVM-04 NM
MW-26SR 355.38
MW-14S 352.72
MW-49S 350.87
2R 351.05
EE-2 351.72
MW-51S 350.66
NVM-03 NM
NVM-02 NM
MW-48S 351.34
MW-12S 351.17
NVM-01 352.79
MW-11S 350.28
MW-10S 350.45
1R 350.94
MW-32S 348.89
MW-30S 348.80
MW-31S 349.10
MW-29S 349.18
MW-34S 348.16
MW-36S 347.59
MW-46S 348.38
MW-37S 347.93
MW-38S 347.31
MW-40S 346.97
MW-41SR 347.18
MW-45S 347.11
MW-42S 346.69
MW-43S 346.83
MW-44S 346.76
NW-1 NM
NW-2 NM
NW-3 NM
NW-4 NM
NW-5 363.59
MW-16S 356.87
MW-23S 356.96
4R 855.48
YENNEY3 (KNOPP)
YENNEY2 (KNOPP)
YENNEY1 (KNOPP)
HOMMES (VERA AND SANCHEZ)
RADA
WEST
BONNIE (DRAMER)
RINDT (MONTOYA)
NORVELL (ANGELES)
BRADLEY (MENDOZA)
NORVELL2 (MENDOZA)
LOPEZ (ROBINSON)
SALINAS
REISINGER2 (ROWELL)
MONTALVO
HAND (ROJO VENTURE)

355
360
350

0' 250' 500' 1,000'
APPROXIMATE SCALE: 1" = 500'

0' 500' 1,000' 2,000'
APPROXIMATE SCALE: 1" = 1,000'

LEGEND

MW-53S 353.69 — SHALLOW AQUIFER MONITORING WELL WITH WATER ELEVATION IN FEET, NAVD88

SALINAS — RESIDENTIAL WELL (WITH PROPERTY OWNER) WATER LEVELS NOT MEASURED IN RESIDENTIAL WELLS

WATER ELEVATION CONTOUR, WATER LEVELS NOT MEASURED IN RESIDENTIAL WELLS.

PREPARED FOR: IWAG GROUP III

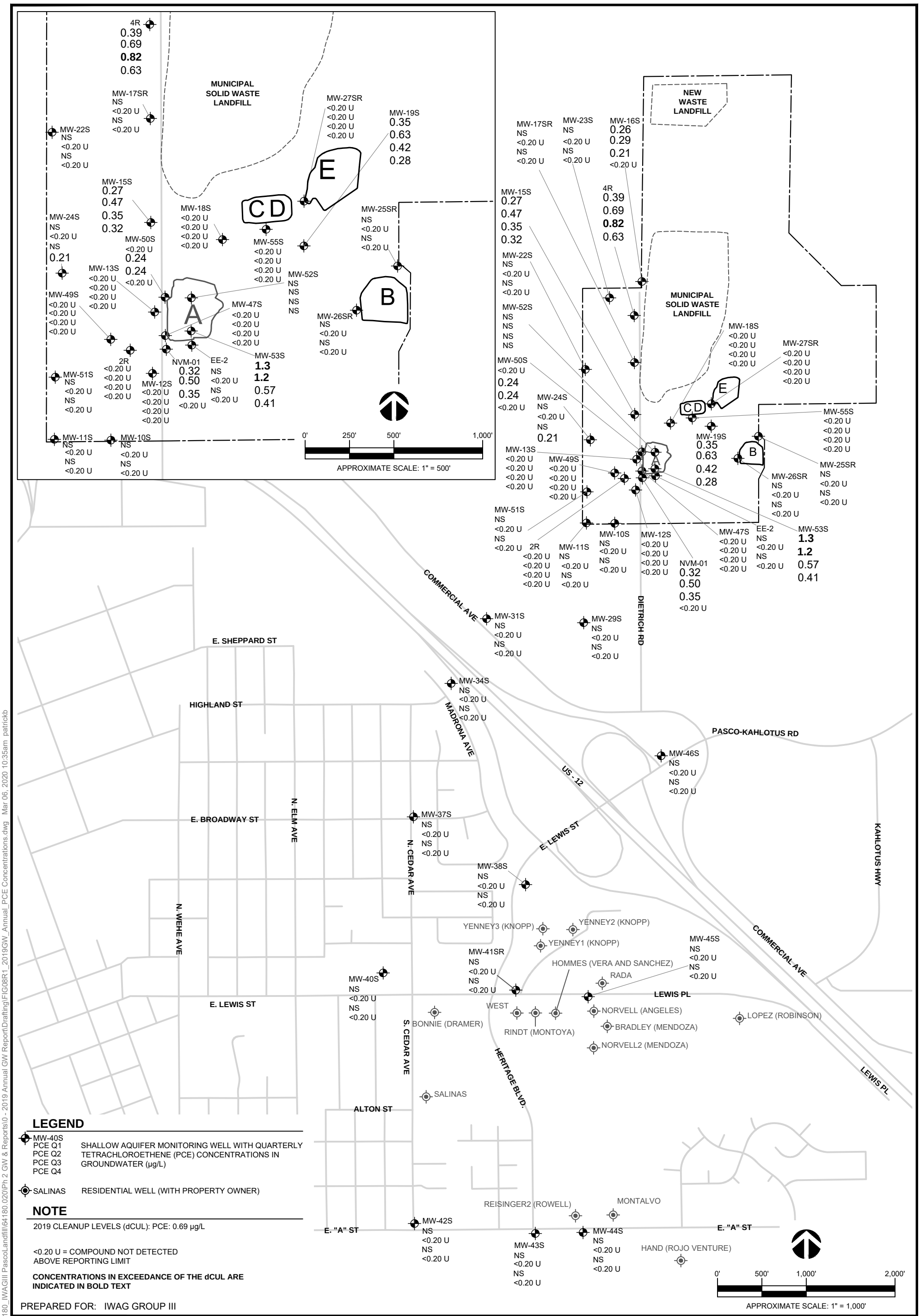
PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 300
Richland, WA 99352
509.942.1600
pbsusa.com

SHALLOW GROUNDWATER ELEVATIONS - OCTOBER 2019

PASCO LANDFILL NPL SITE

PASCO, WASHINGTON

PROJECT: 64180
DATE: 03/06/2020
FIGURE: 7



LEGEND

MW-40S
PCE Q1
PCE Q2
PCE Q3
PCE Q4
SHALLOW AQUIFER MONITORING WELL WITH QUARTERLY TETRACHLOROETHENE (PCE) CONCENTRATIONS IN GROUNDWATER (µg/L)

SALINAS — RESIDENTIAL WELL (WITH PROPERTY OWNER)

NOTE

2019 CLEANUP LEVELS (dCUL): PCE: 0.69 µg/L

<0.20 U = COMPOUND NOT DETECTED ABOVE REPORTING LIMIT

CONCENTRATIONS IN EXCEEDANCE OF THE dCUL ARE INDICATED IN BOLD TEXT

PREPARED FOR: IWAG GROUP III

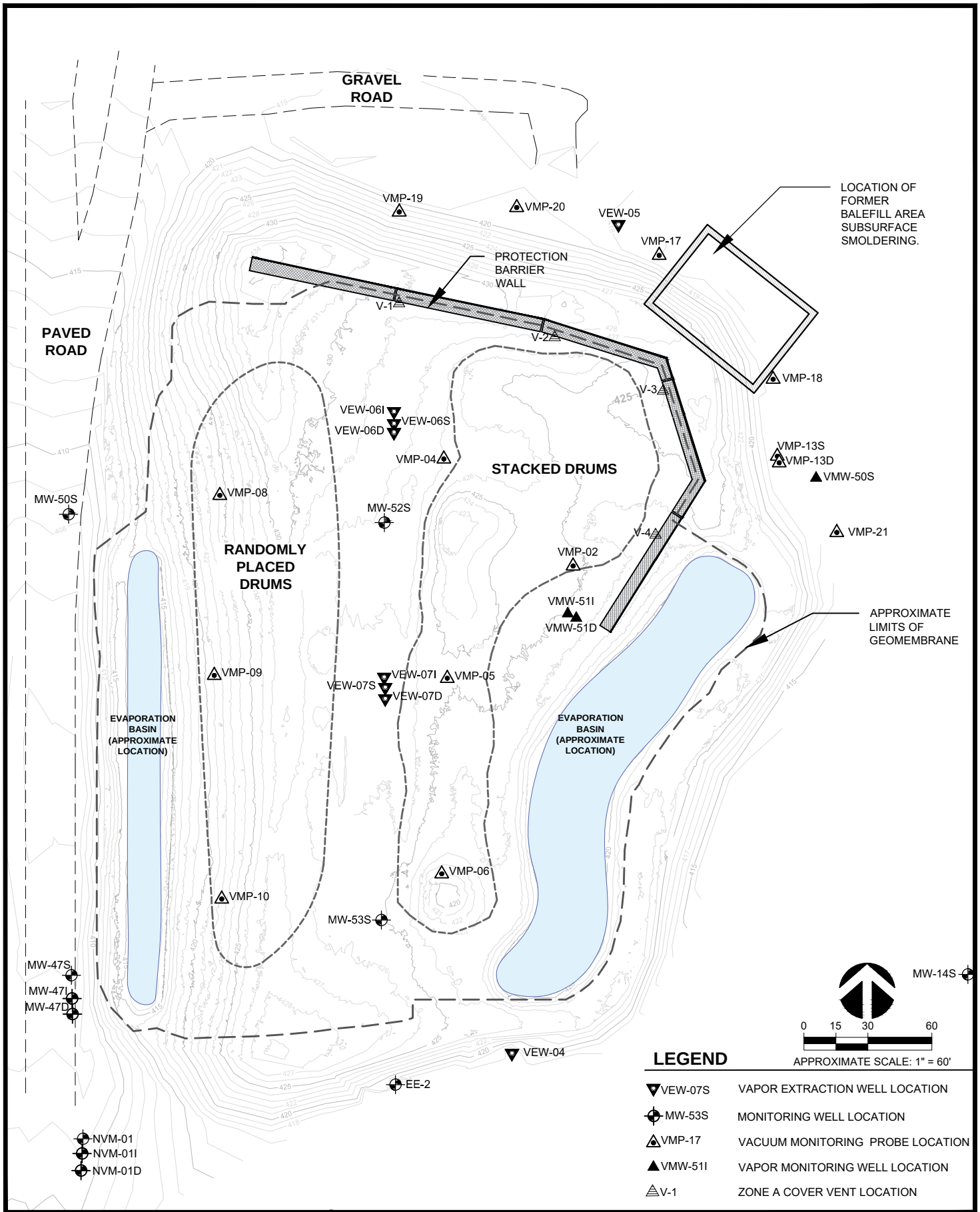
PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 300
Richland, WA 99352
509.942.1600
pbsusa.com

MAP OF TETRACHLOROETHENE CONCENTRATIONS IN SHALLOW GROUNDWATER IN 2019

PASCO LANDFILL NPL SITE

PASCO, WASHINGTON

PROJECT: 64180.020
DATE: 03/06/2020
FIGURE: 8



PBS

SOIL VAPOR EXTRACTION MONITORING LOCATIONS

PASCO LANDFILL NPL SITE
PASCO, WASHINGTON

JAN 2017
64180

FIGURE
9

Figure 10
SVE System Airflow Measurements
2019 Annual Report
Pasco Landfill NPL Site

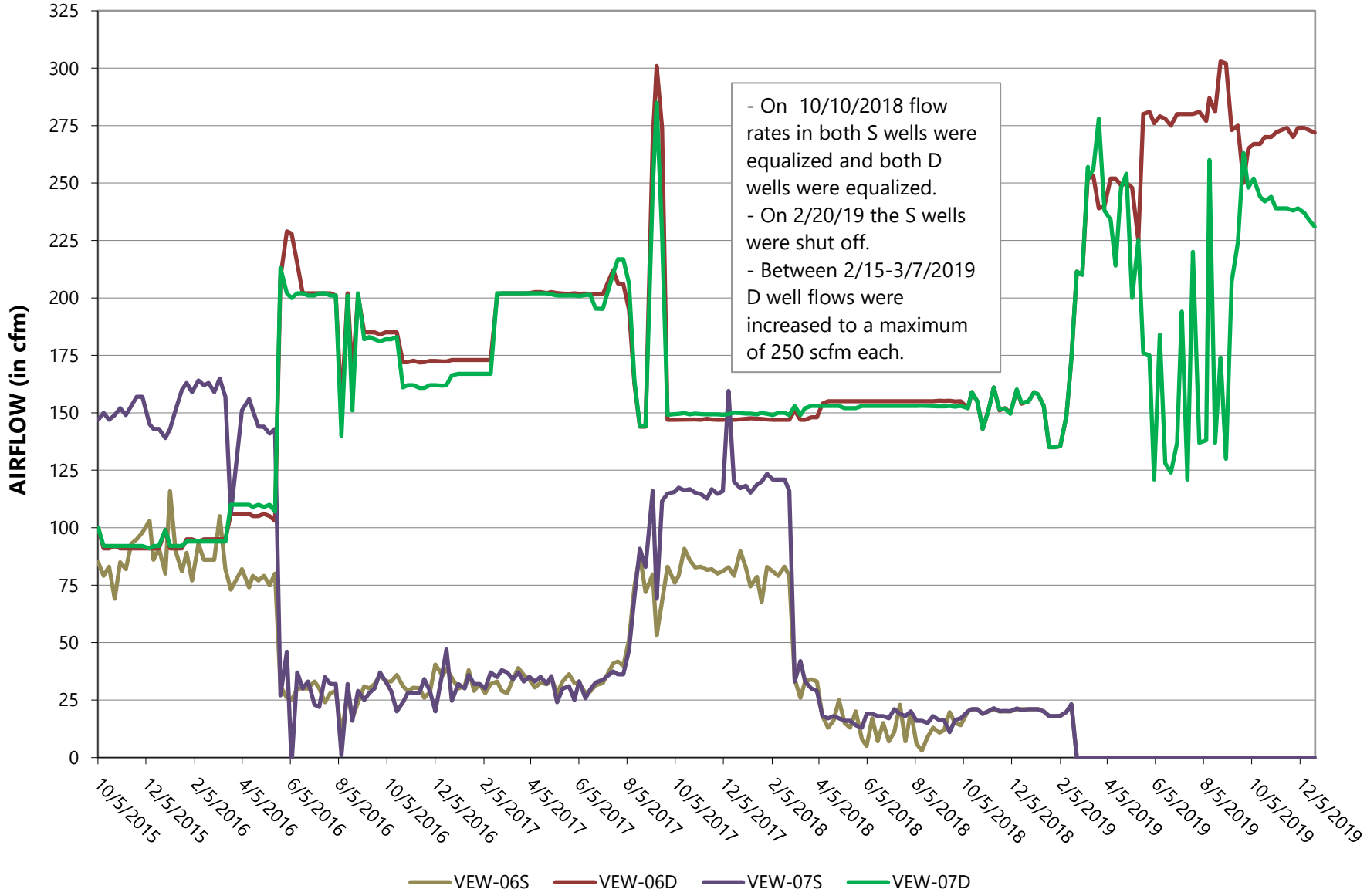


Figure 11
SVE System Vacuum Measurements
2019 Annual Report
Pasco Landfill NPL Site

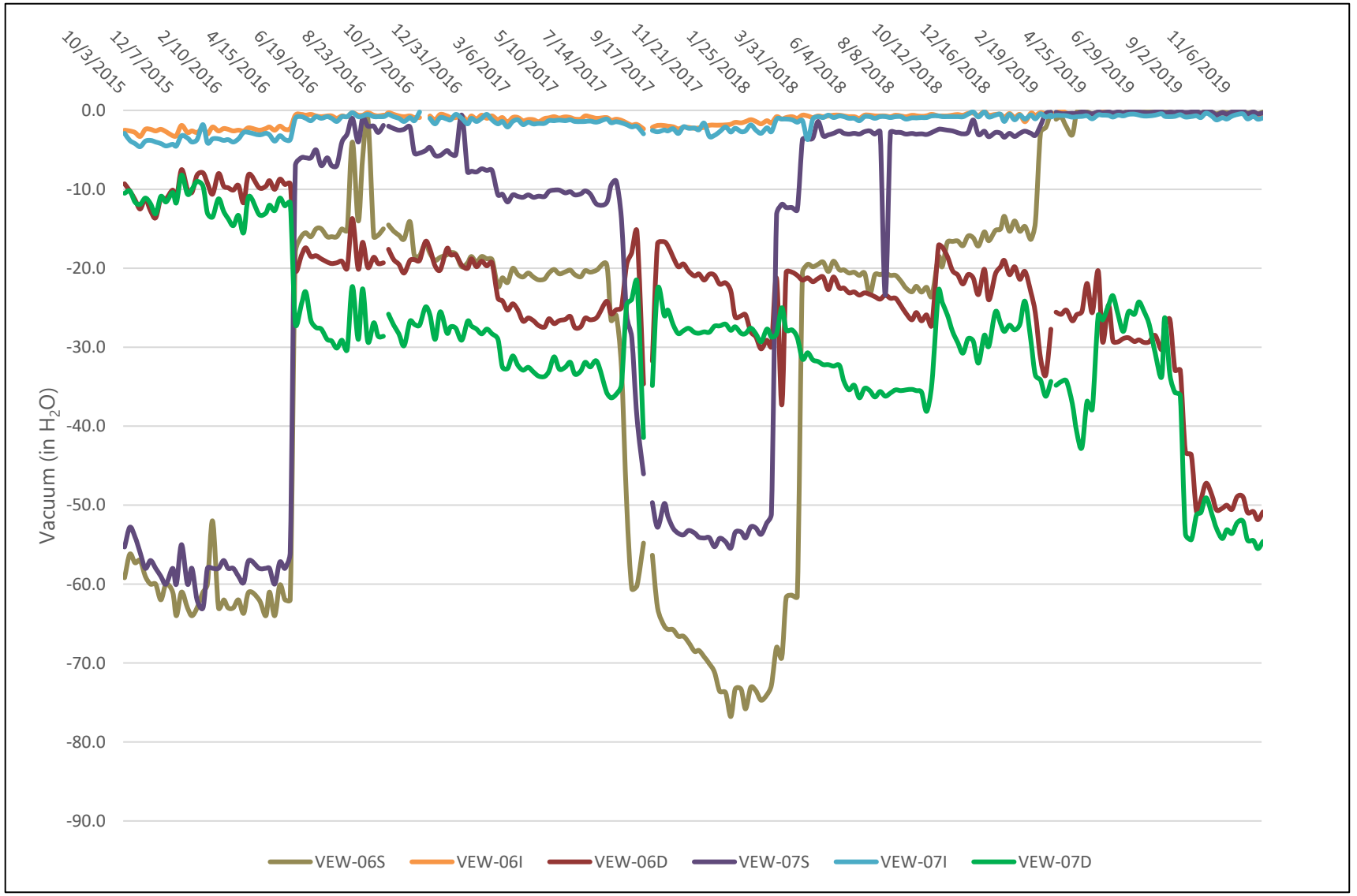
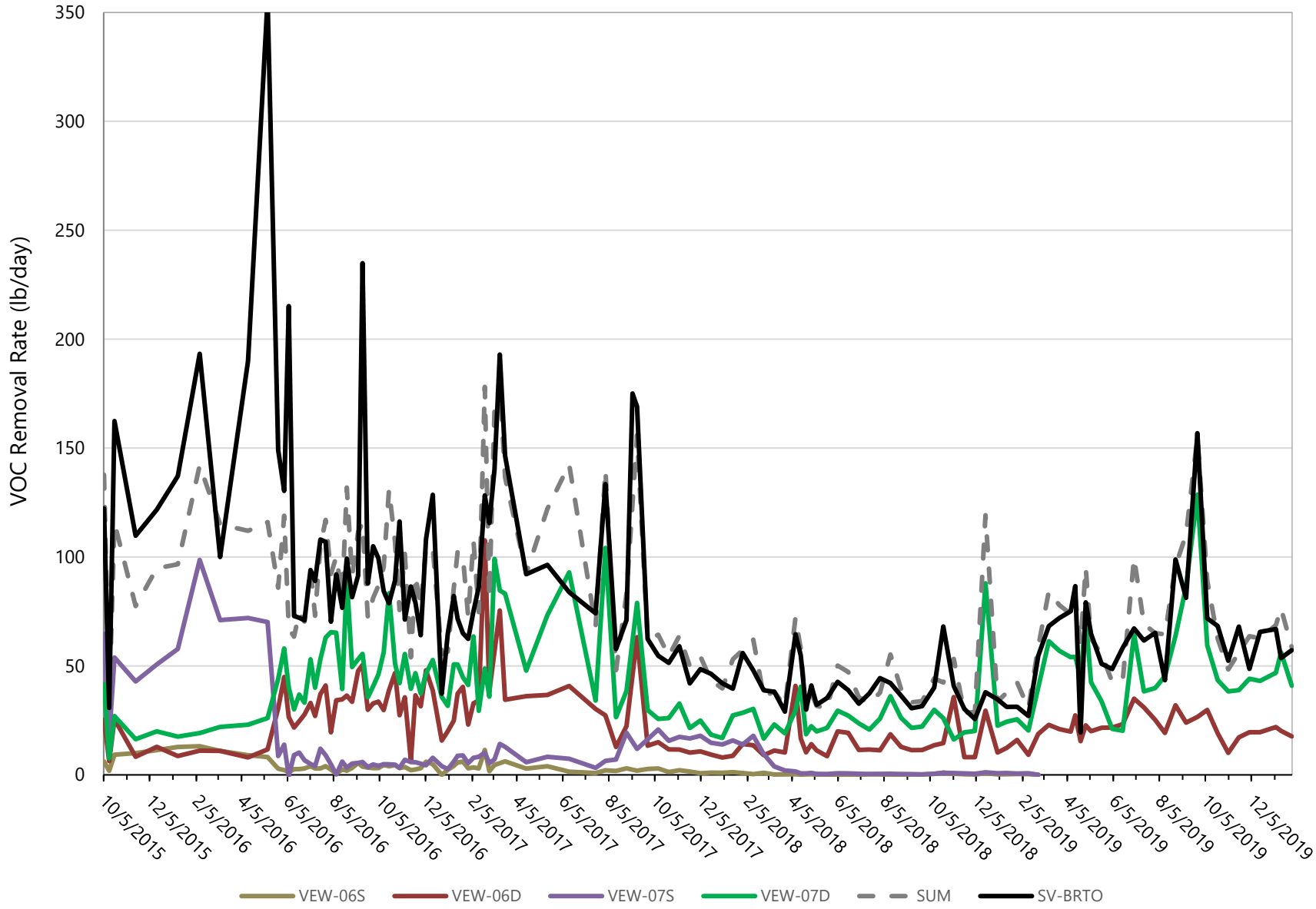


Figure 12
SVE System Removal Rates (in lbs/day)
2019 Annual Report
Pasco Landfill NPL Site



PBS

Figure 13
Cumulative Mass Removed Since May 1997 by Zone A SVE System
2019 Annual Report
Pasco Landfill NPL Site

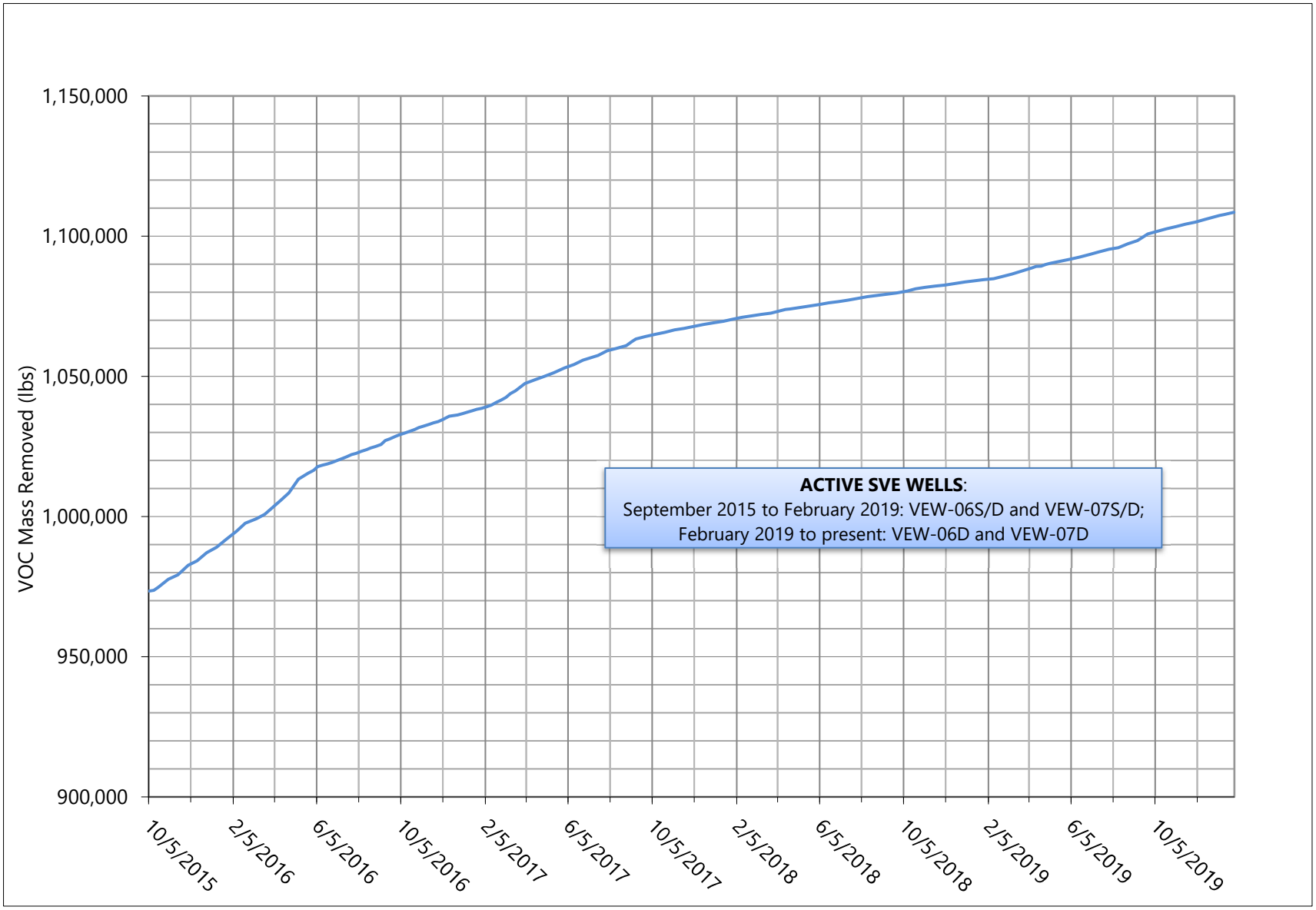


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Figure 14
Temperature by Depth TC1
2019 Annual Report
Pasco Landfill NPL Site

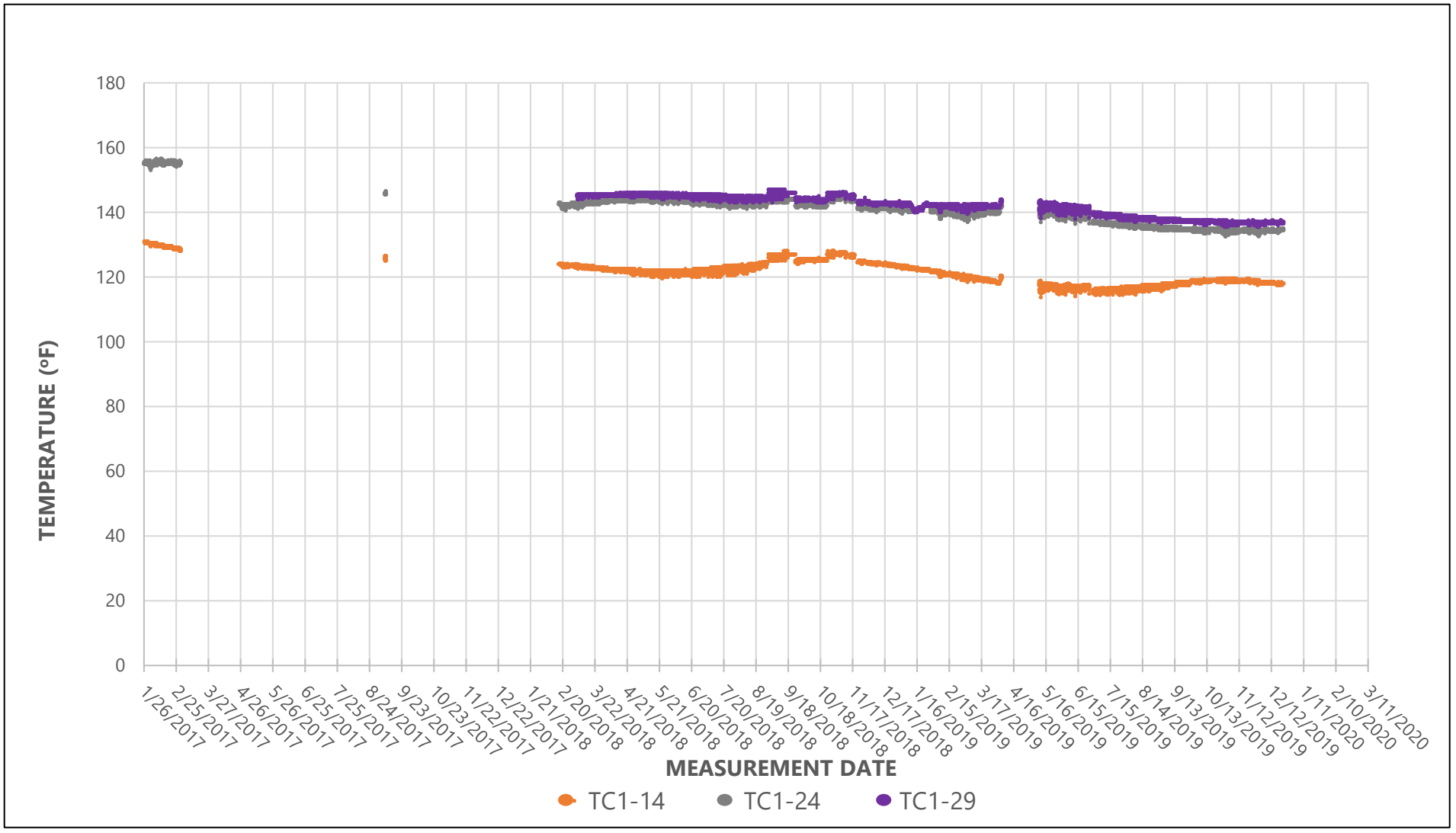


Figure 15
Temperature by Depth TC2
2019 Annual Report
Pasco Landfill NPL Site

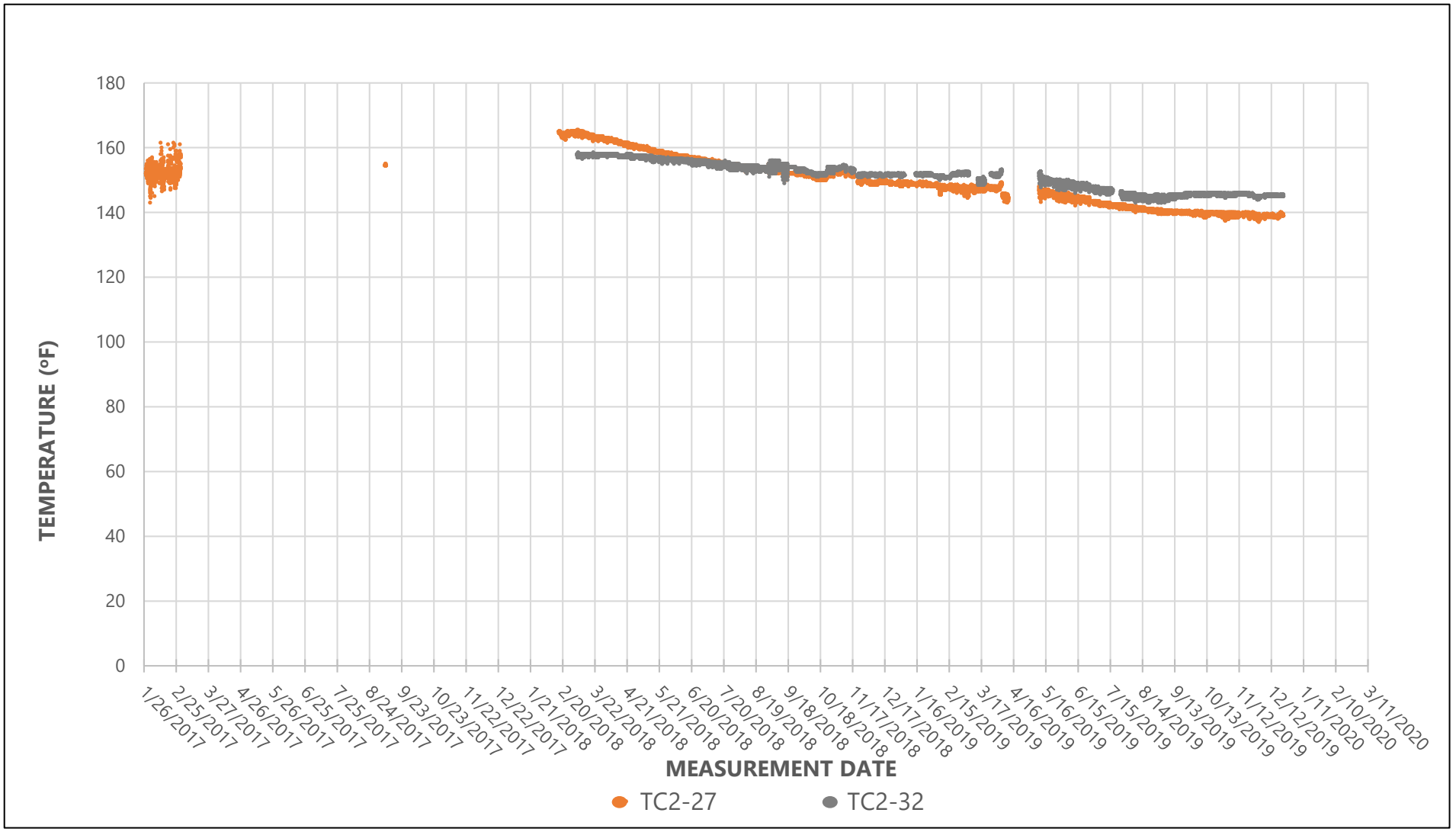


Figure 16
Temperature by Depth TC3
2019 Annual Report
Pasco Landfill NPL Site

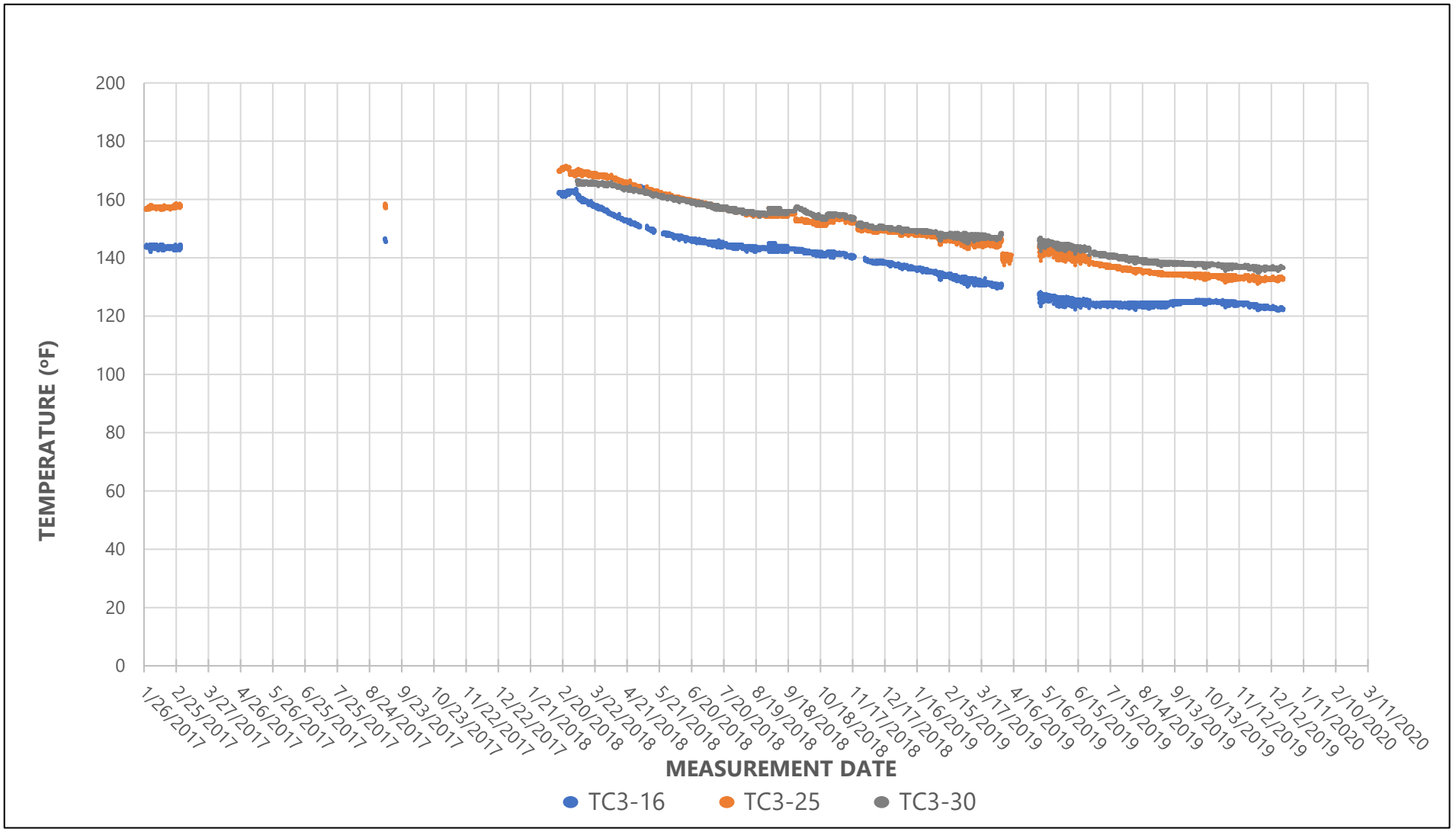


Figure 17
Temperature by Depth TC4
2019 Annual Report
Pasco Landfill NPL Site

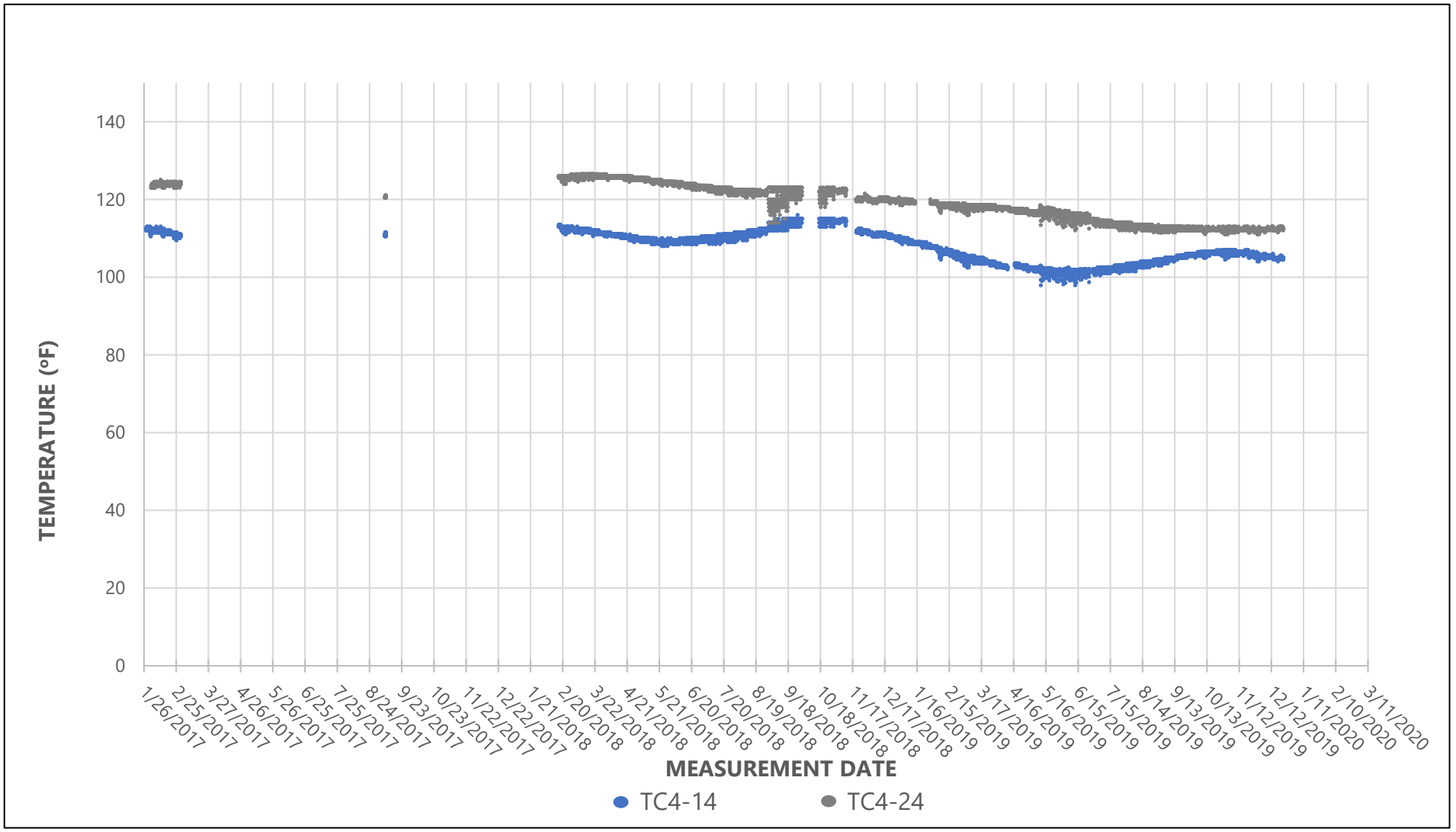


Figure 18
Temperature by Depth TC5
2019 Annual Report
Pasco Landfill NPL Site

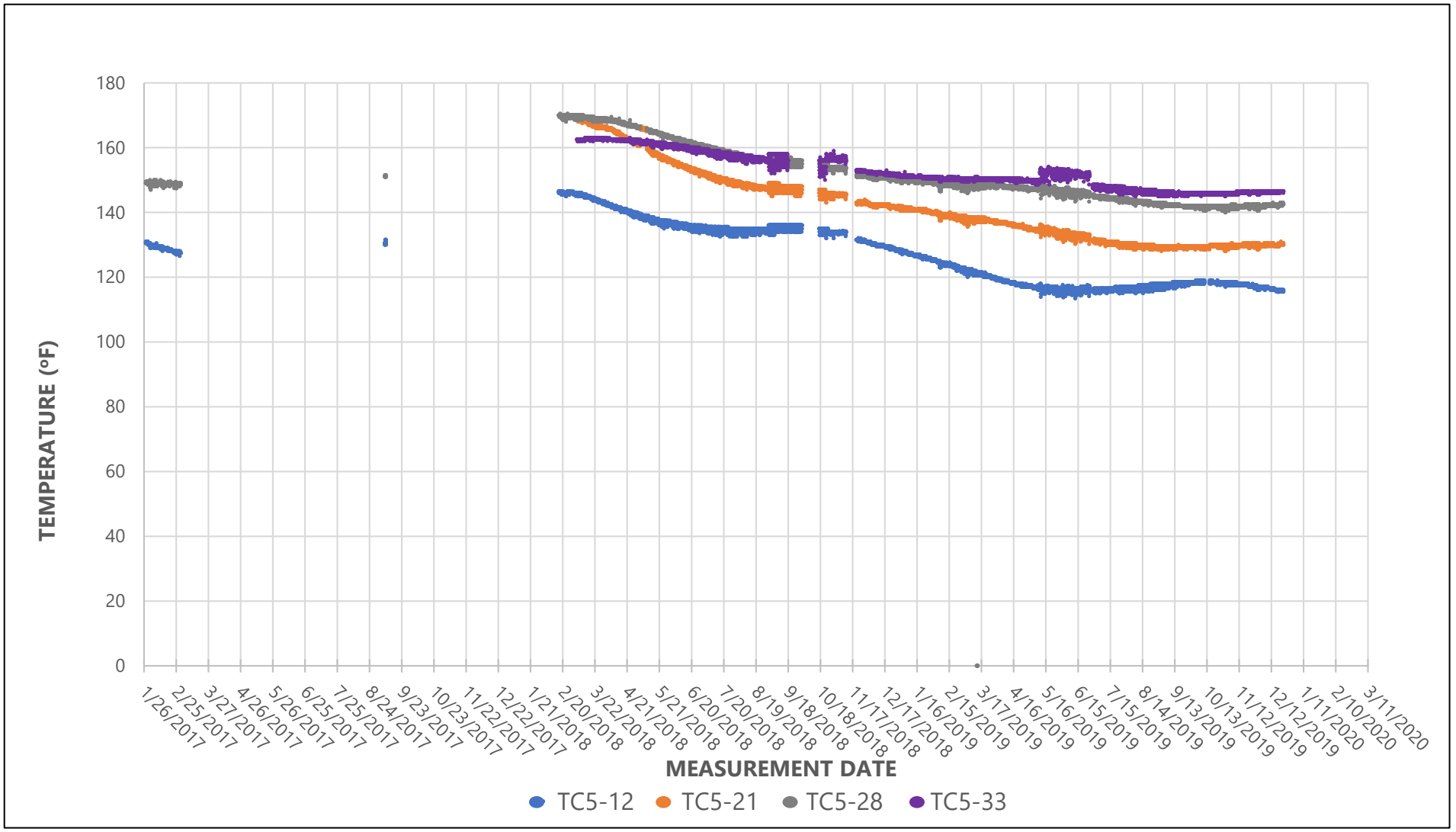


Figure 19
Temperature by Depth TC6
2019 Annual Report
Pasco Landfill NPL Site

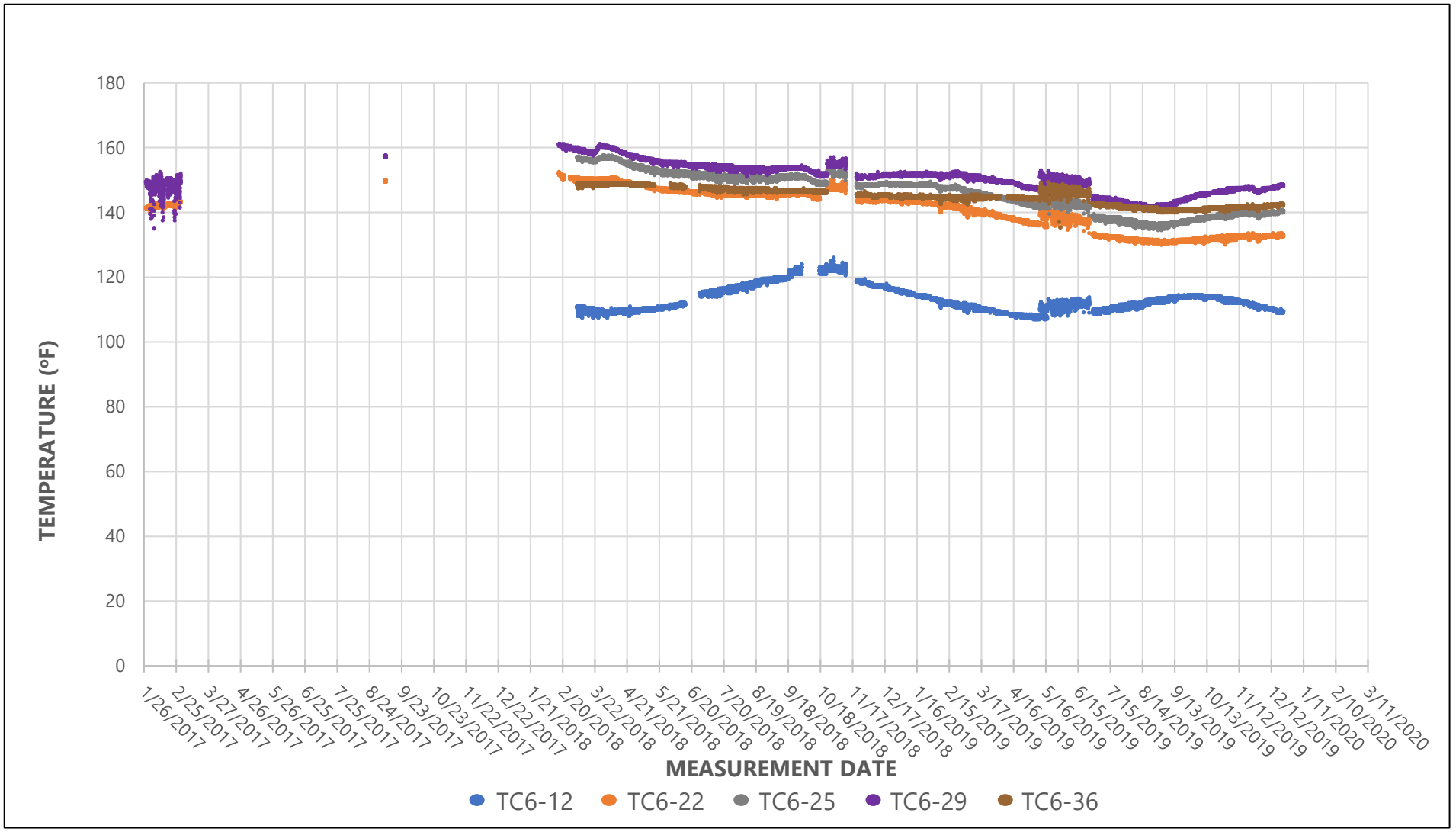


Figure 20
Temperature by Depth TC7
2019 Annual Report
Pasco Landfill NPL Site

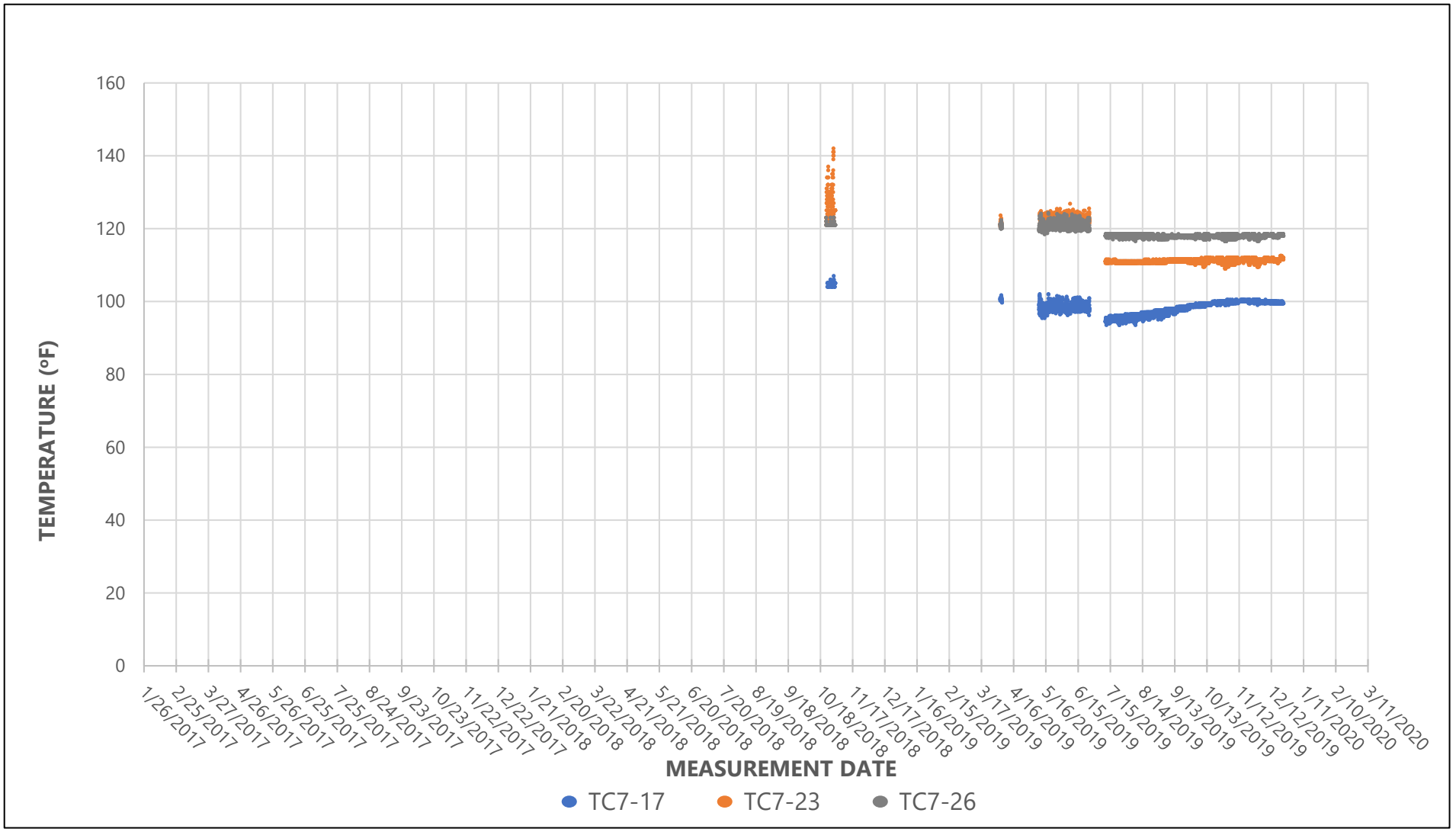


Figure 21
Temperature by Depth TC8
2019 Annual Report
Pasco Landfill NPL Site

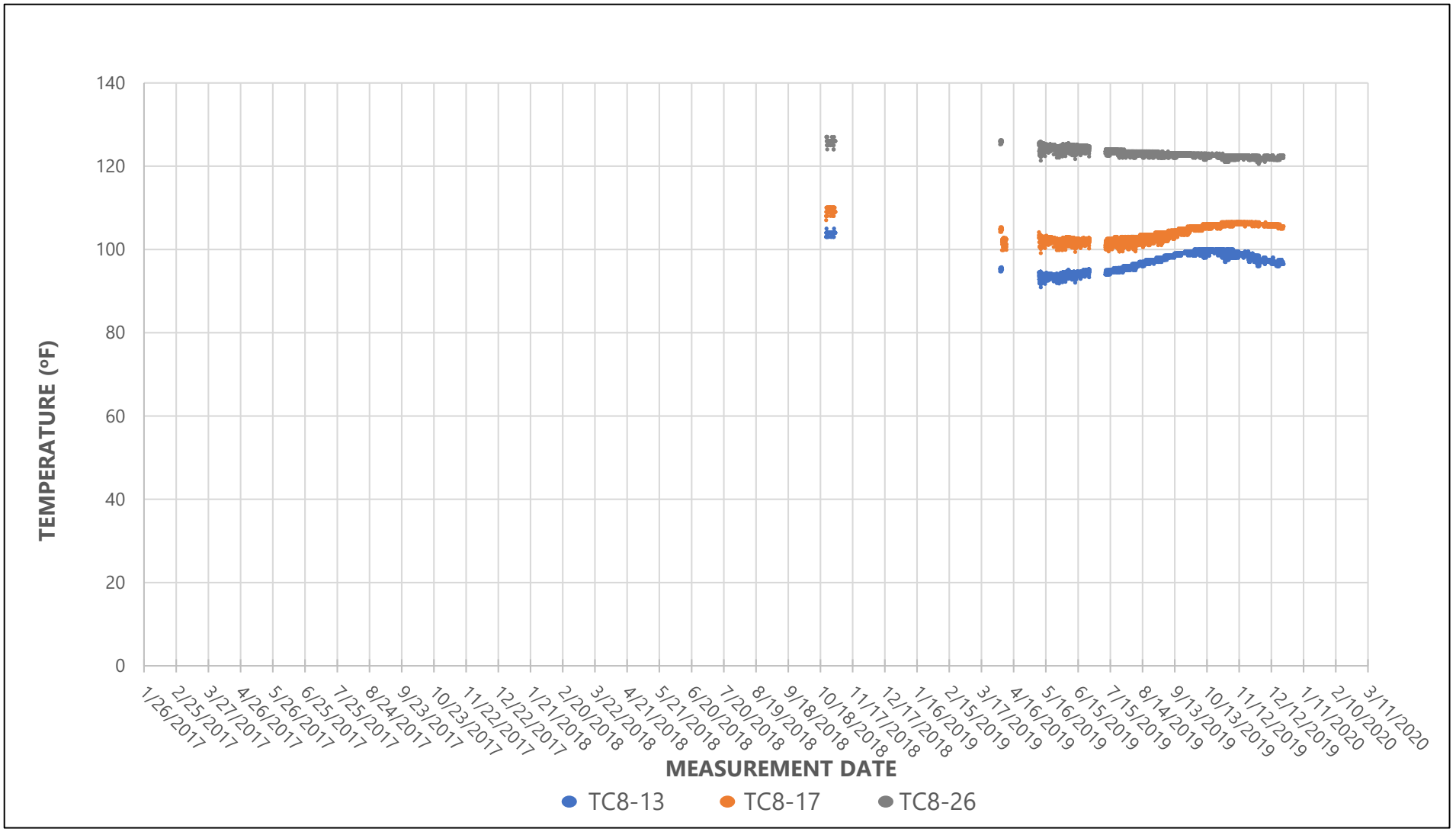
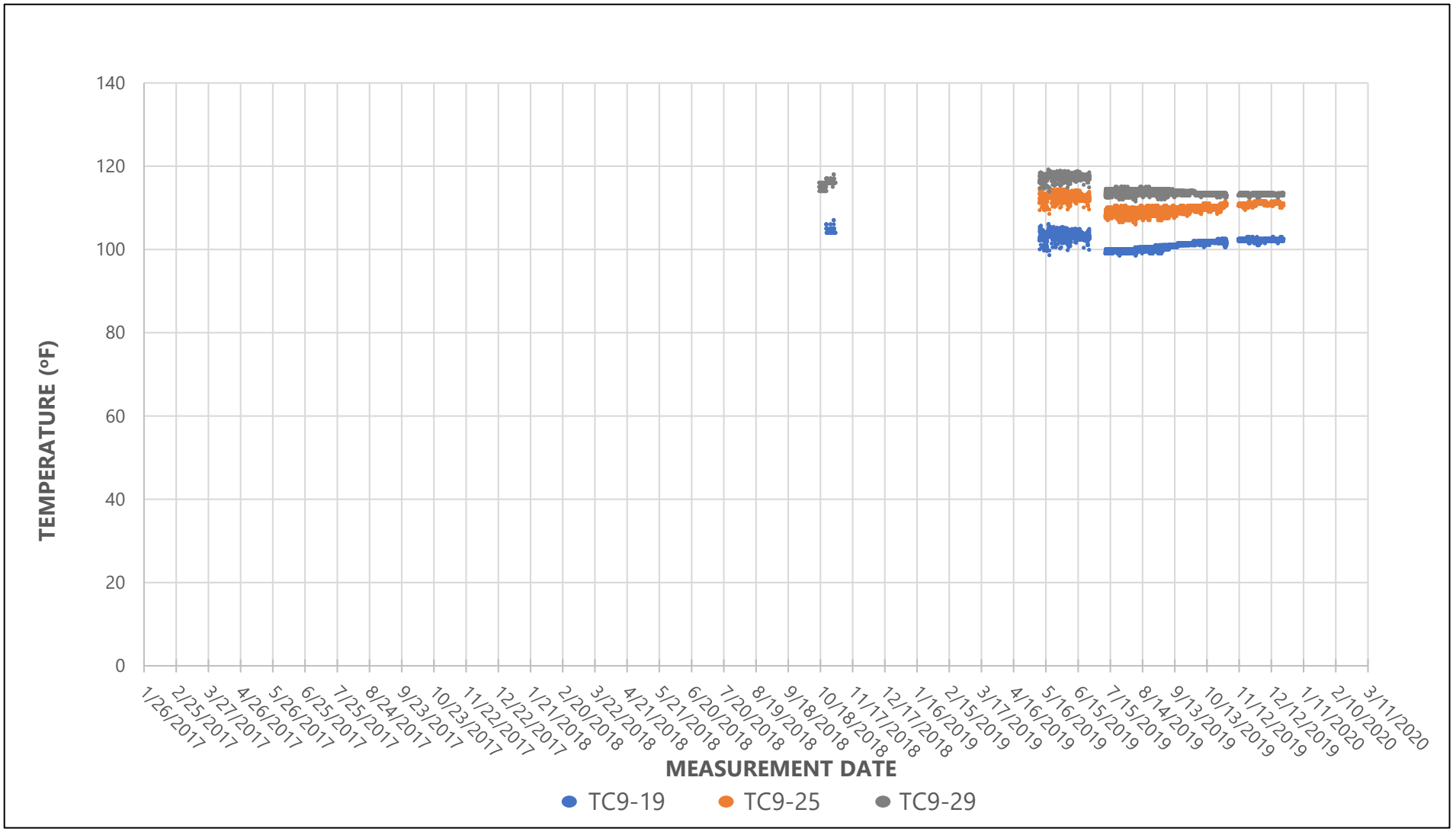


Figure 22
Temperature by Depth TC9
2019 Annual Report
Pasco Landfill NPL Site



ATTACHMENTS

ATTACHMENT A: Data Validation Report, Pasco Sanitary Landfill Groundwater Monitoring, October 2019 Sampling

Data Validation Report

Pasco Sanitary Landfill Groundwater Monitoring
October 2019 Sampling

Laboratory SDG Number: EV19100178

Prepared for:

IWAG Group III
c/o **PBS Engineering and Environmental**
400 Bradley Blvd., Suite 300
Richland, WA 99352

Prepared by:

Pyron Environmental, Inc.
3530 32nd Way NW
Olympia, WA 98502

February 21, 2020

Table of Content

Acronyms

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ALS-Everett	ALS Laboratory Group, Everett, Washington
ALS-Kelso	ALS Laboratory Group, Kelso, Washington
BFB	bromofluorobenzene
CCB	continuing calibration blank
CCV	continuing calibration verification
CF	calibration factor
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody
Cr	chromium
DQO	data quality objective
DFTPP	decafluorotripheylphosphine
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatography/mass spectrometer
ICAL	initial calibration
ICB	initial calibration blank
ICP/MS	Inductively coupled plasma/mass spectrometer
ICS	interference check sample
ICV	initial calibration verification
IDL	instrument detection limit
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
µg/L	micrograms per liter
mg/L	milligrams per liter
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate

NA	not applicable
ND	not detected
OMM	Revised Site-Wide Groundwater Performance and Protection Monitoring Operations and Maintenance Manual
PAHs	polycyclic aromatic hydrocarbons
PAL	Pacific Agricultural Laboratory
QA/QC	quality assurance/quality control
RF	response factor
RL	reporting limit
RPD	relative percent difference
SDG	sample delivery group
SIM	selective ion monitoring
SOP	standard operating procedures
SRM	standard reference material
SVOCs	semi-volatile organic compounds
TDS	total dissolved solids
TOC	total organic carbon
VOCs	volatile organic compounds

I. INTRODUCTION

This report presents and discusses findings of the data validation performed on analytical data associated with the 60 water samples collected during April 23 through 25, 2019 for the referenced project. The validation procedures followed the requirements specified in the following documents, as applicable:

- United States Environmental Protection Agency (USEPA) *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review.* Office of Superfund Remediation and Technical Innovation. January 2017. OLEM 9355.0-135. EPA-540-R-201 7-001.
- USEPA *Contract Laboratory Program National Functional Guidelines for Organic Superfund Data Review.* Office of Superfund Remediation and Technical Innovation. January 2017. OLEM 9355.0-136. EPA-540-R-2017-002.

A level III (or Stage 2B as defined in EPA 2009) validation was performed based on the summaries of sample and quality control (QC) analytical results submitted by the laboratories. The numerical quality assurance and quality control (QA/QC) criteria applied to the validation were in accordance with those specified in the analytical methods, the *Site-Wide Groundwater Performance and Protection Monitoring Operations and Maintenance Manual (OMM), Environmental Partners, Inc.,May2014& Revisions in October 2014),* and the performance-based control limits established by the laboratories (laboratory control limits). The frequency of QC analyses was evaluated according to the OMM and the analytical methods. Sample-specific method detection limits and reporting limits were evaluated against the reporting limits revised in February 2012. Raw data were not reviewed herein unless necessary for clarification purposes.

Validation findings are discussed in **Section II – Data Validation Findings**, pertinent to the QC parameters for each type of analysis. Field duplicate results were compared and data qualified based on the advisory criteria and presented in **Section III**. Qualified data along with proper data qualifiers, qualification reasons, and qualifier definitions are presented in **Section IV - Data Validation Summary**.

A data quality objective assessment summarizing the overall precision, accuracy, representativeness, comparability, completeness, and sensitivity of data collected in this sampling event was prepared and included in **Section V – Data Quality Objective Assessment**. Any additional laboratory submittals requested during the validation are transferred to Environmental Partners, Inc. along with this report.

As part of the validation, the electronic data deliverables (EDDs) were verified against the hardcopy report. Data qualifiers, qualification reasons, and any required corrections identified *via* this validation have been added to the EDDs and submitted along with this report. Samples collected during this sampling event and the associated analyses are summarized below:

Field Sample ID	ALS Laboratory Sample ID	Sampling Date	Matrix	Analysis				
				VOCs	Herb SVOCs	Cr	Metals	Inorganic
PLF-MW15S-1019	EV19100178-01	10/22/19	Water	X				
PLF-MW40S-1019	EV19100178-02	10/22/19	Water	X				
PLF-MW37S-1019	EV19100178-03	10/22/19	Water	X				
PLF-MW34S-1019	EV19100178-04	10/22/19	Water	X				
PLF-MW42S-1019	EV19100178-05	10/22/19	Water	X				
PLF-MW44S-1019	EV19100178-06	10/22/19	Water	X				
PLF-MW43S-1019	EV19100178-07	10/22/19	Water	X				
PLF-MW43I-1019	EV19100178-08	10/22/19	Water	X				
PLF-MW54I-1019	EV19100178-09	10/22/19	Water	X				
PLF-MW45S-1019	EV19100178-10	10/22/19	Water	X				
PLF-MW41SR-1019	EV19100178-11	10/22/19	Water	X				
PLF-MW38S-1019	EV19100178-12	10/22/19	Water	X				
PLF-MW38I-1019	EV19100178-13	10/22/19	Water	X				
PLF-MW31S-1019	EV19100178-14	10/22/19	Water	X				
PLF-MW29S-1019	EV19100178-15	10/22/19	Water	X				
PLF-MW29I-1019	EV19100178-16	10/22/19	Water	X				
PLF-MW46S-1019	EV19100178-17	10/22/19	Water	X				
PLF-EE2-1019	EV19100178-18	10/22/19	Water	X				
PLF-MW12ID-1019	EV19100178-19	10/22/19	Water	X				
PLF-DUP1-1019	EV19100178-20	10/22/19	Water	X				
PLF-MW12S-1019	EV19100178-21	10/22/19	Water	X				
PLF-MW13S-1019	EV19100178-22	10/22/19	Water	X				
PLF-2I-1019	EV19100178-23	10/22/19	Water	X				
PLF-2R-1019	EV19100178-24	10/22/19	Water	X				
PLF-TripBlank1-1019	EV19100178-25	10/22/19	Water	X				
PLF-MW25SR-1019	EV19100178-26	10/23/19	Water	X	X			
PLF-MW26SR-1019	EV19100178-27	10/23/19	Water	X	X			
PLF-MW53S-1019	EV19100178-28	10/23/19	Water	X	X			
PLF-MW47I-1019	EV19100178-29	10/23/19	Water	X				
PLF-MW47S-1019	EV19100178-30	10/23/19	Water	X	X[(A)]	X		
PLF-MW50S-1019	EV19100178-31	10/23/19	Water	X	X[(A)]	X		
PLF-NVM01-1019	EV19100178-32	10/23/19	Water	X				

Field Sample ID	ALS Laboratory Sample ID	Sampling Date	Matrix	Analysis				
				VOCs	Herb SVOCs	Cr	Metals	Inorganic
PLF-Dup3-1019	EV19100178-33	10/23/19	Water	X	X			
PLF-MW16S-1019	EV19100178-34	10/23/19	Water	X		X	X	X
PLF-MW20S-1019	EV19100178-35	10/23/19	Water			X	X	X
PLF-MW19S-1019	EV19100178-36	10/23/19	Water	X		X	X	X
PLF-MW17SR-1019	EV19100178-37	10/23/19	Water	X			X	X
PLF-MW23S-1019	EV19100178-38	10/23/19	Water	X			X	X
PLF-4R-1019	EV19100178-39	10/23/19	Water	X		X	X	X
PLF-MW49I-1019	EV19100178-40	10/23/19	Water	X				
PLF-MW49S-1019	EV19100178-41	10/23/19	Water	X				
PLF-TripBlank2-1019	EV19100178-42	10/23/19	Water	X				
PLF-DUP2-1019	EV19100178-43	10/23/19	Water	X		X	X	X
PLF-MW18S-1019	EV19100178-44	10/24/19	Water	X				
PLF-MW27SR-1019	EV19100178-45	10/24/19	Water	X		X		
PLF-MW55S-1019	EV19100178-46	10/24/19	Water	X		X		
PLF-MW11S-1019	EV19100178-47	10/24/19	Water	X				
PLF-MW11I-1019	EV19100178-48	10/24/19	Water	X				
PLF-MW10S-1019	EV19100178-49	10/24/19	Water	X				
PLF-Lopez-1019	EV19100178-50	10/24/19	Water	X				
PLF-Bradley-1019	EV19100178-51	10/24/19	Water	X				
PLF-Norvell2-1019	EV19100178-52	10/24/19	Water	X				
PLF-TripBlank3-1019	EV19100178-53	10/24/19	Water	X				
PLF-West-1019	EV19100178-54	10/24/19	Water	X				
PLF-Salinas-1019	EV19100178-55	10/24/19	Water	X				
PLF-Montalvo-1019	EV19100178-56	10/24/19	Water	X				
PLF-Hand-1019	EV19100178-57	10/24/19	Water	X				
PLF-TripBlank4-1019	EV19100178-58	10/31/19	Water	X				
PLF-MW22S-1019	EV19100178-59	10/31/19	Water	X		X		
PLF-MW24S-1019	EV19100178-60	10/31/19	Water	X				
PLF-MW51S-1019	EV19100178-61	10/31/19	Water	X				

Notes:

X – The analysis was requested and performed on the sample.
VOCs – Volatile organic compounds
SVOCs – Semi-volatile organic compounds
Metals – Calcium, Iron, magnesium, manganese, potassium, and sodium

Cr – Chromium, Total
Herb – Chlorophenoxy herbicides, pentachlorophenol (PCP), and 4-nitrophenol
Inorganic – Alkalinity (total, carbonate, bicarbonate, & hydroxide), chloride, nitrate, sulfate, total organic carbon (TOC), total dissolved solids (TDS), and ammonia.
(A) – SVOC only

The analytical parameters requested for the samples, the respective analytical methods, and the analytical laboratories are summarized below:

Parameter	Analytical Method	Laboratory
Volatile organic compounds (VOCs)	SW846 Method 8260C - SIM(A)	ALS Laboratory Group (ALS) Everett, Washington
Semi-volatile organic compounds (SVOCs)	SW846 Methods 3510C/8270D full scan and SIM(B)	
Chromium	EPA Method 200.8	
Anions (chloride, nitrate, & sulfate)	EPA Method 300.0	
Total dissolved solids (TDS)	SM Method 2540C	
Calcium, iron, magnesium, manganese, potassium, sodium	EPA Method 200.7	ALS Kelso, Washington
Alkalinity (total, carbonate, bicarbonate, & hydroxide)	SM Method 2320B	
Total organic carbon (TOC)	SM Method 5310C	
Ammonia	SM Method 4500-NH3 G	
Chlorophenoxy Herbicides, 4-Nitrophenol, & PCP	SW846 Method 3535A/8151A	Pacific Agricultural Laboratory (PAL) Portland, Oregon

Notes:
SW846 - *USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, Third Edition, December 1996.
EPA Methods - *USEPA Methods for Chemical Analysis of Water and Wastes,* EPA–600/4-79-020, March 1983 Revision.
SM – Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 20th Edition, 1995.
(A) – Selective ion monitoring (SIM) technique was performed for target compounds to achieve lower detection limits.
(B) – SIM technique was performed for selected SVOCs to achieve lower detection limits.

II. DATA VALIDATION FINDINGS

1. Sample Custody, Preservation, and Analysis Completeness

Sample custody was maintained and documented as required from the sample collection to the receipt at the laboratory. The samples were received properly preserved and consistent with the accompanying chain-of-custody (COC) documentation.

2. Volatile Organic Compounds ([VOCs]; SW846 Method 8260C–SIM)

2.1 Holding Time

Water samples should be analyzed within 14 days of collection. All samples were analyzed within the required holding time.

2.2 GC/MS Instrument Performance Check

Bromofluorobenzene (BFB) tuning analyses were performed at the required frequency. Relative abundance of all required ions met the method requirements.

2.3 Initial Calibration (ICAL)

The method requires that (1) if linear average response factors (RFs) is chosen as the quantitation option, the %RSD of RFs be ≤20% for target compounds, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥0.99, (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥0.99, (4) compound RFs are ≥ the minimum RF specified in Method 8260C, Table 4, and (5) a second source standard (ICV) should be analyzed immediately after the initial calibration and the percent difference (%D) or percent drift ($\%D_f$) values for all target and surrogate compounds should be within ±30%.In few cases where the second source %D or $\%D_f$ values did not meet the criteria, those of the associated calibration verification were within the criteria. The initial calibration met the requirements.

2.4 Calibration Verification

The method requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, (2) the %D or $\%D_f$ values be within ±20%, (3) compound RFs are ≥ the minimum RF specified in Method 8260C, Table 4, and (4) the internal standards in the calibration verification standard changes by a factor of two (-50% to + 100%) from that in the mid-point standard level of the most recent initial calibration sequence. Calibration verification analyses met the frequency criteria. The %D and $\%D_f$ values

either met the criteria or the outliers had no effects on associated data (*e.g.,* bias-high %D value for a compound that was not detected in associated samples).

2.5 Blanks

Method Blanks: Method blanks were analyzed at the required frequency. Target compounds were not detected at or above the reporting limits (RLs) in the method blanks.

Trip Blanks: One trip blank was submitted with each sample shipment for VOCs analyses. Target compounds were not detected at or above the RLs in the trip blanks.

2.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses, named as blank spike and blank spike duplicate by the laboratory, were performed as required. The %R and relative percent difference (RPD) values were either within the laboratory control limits or the %R outliers had no adverse effects on data usability (*e.g.,* biased-high %R values for a non-detected compound).

2.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All %R values were within the laboratory control limits.

2.8 Matrix Spike and Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses were performed on project samples as requested. All %R and RPD values were either within the laboratory control limits or the %R outliers had no adverse effects on data usability (*e.g.,* biased-high %R values for a non-detected compound or the un-spiked sample concentration was >4X the .spiking concentration).

2.9 Internal Standards

Proper internal standards were added to all samples. Internal standard retention times were within the ±0.5-minute window of the associated standard in all samples. All internal standard intensity met the method requirement of –50% to +100% of the associated standard.

2.10 Field Duplicates

Three field duplicate pairs were submitted for VOCs analysis. The RPD (or concentration difference values) and data qualification for detected target compounds are presented in **Section III**.

2.11 Laboratory Reporting Limits

Target compounds specified for the project were analyzed for and reported as required. Reporting limits were supported with proper initial calibration concentrations for all target compounds. The reporting limit goals specified in the OMM and revisions were achieved.

2.12 Overall Assessment of VOCs Data Usability

Naphthalene results for samples also analyzed for SVOCs were to be reported from the SW8270D-SIM analyses in favor of the lower detection limits. The results from the SW8260C analyses were qualified (DNR) and rejected.

VOCs data are acceptable for use as qualified, based on the information submitted by the laboratory.

3. Semi-volatile Organic Compounds ([SVOCs]; SW846 Method 8270D – Full Scan and SIM)

3.1 Holding Time

Water samples should be extracted within 7 days of collection and the extracts analyzed within 40 days of extraction. All samples were extracted and analyzed within the required holding times.

3.2 GC/MS Instrument Performance Check

Decafluorotripheylphosphine (DFTPP) tuning analyses were performed at the required frequency. Relative abundance for all required ions met the method requirements.

3.3 Initial Calibration

The method requires that (1) if linear average response factors (RFs) is chosen as the quantitation option, the %RSD of RFs be ≤20% for target compounds, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥0.99, (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥0.99, (4) compound RFs are ≥ the minimum RF specified in Method 8270D, Table 4, and (5) a second source standard (ICV) should be analyzed immediately after the initial calibration and the %D or $\%D_f$ values for all target and surrogate compounds should be within ±30%. The Initial calibration met the criteria and was considered valid. Note that the r^2 value (0.961) for carbazole was less thgan the criteria of 0.99. Carbazole was not detected in any of the field samples. And the response for the lowest ICAL standard was within 70-130%. Data quality was not adversely affected. No further action was taken in this case.

3.4 Calibration Verification

The method requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, (2) the %D values be within ±20%, (3) compound RFs are ≥ the minimum RF specified in Method 8270D, Table 4, and (4) the internal standards in the calibration verification standard changes by a factor of two (-50% to + 100%) from that in the mid-point standard level of the most recent initial calibration sequence. Calibration verification analyses met the frequency criteria. The %D and $\%D_f$ values either met the criteria or the outliers had no effects on associated data (*e.g.,* bias-high %D value for a compound that was not detected in associated samples), except for the following:

Calibration Verification ID	Analyte	%D	Bias	Affected Sample	Data Qualifier
J3003.D 10/30/2019, 10:07	Hexachlorocyclopentadiene	36.3%	Low	PLF-MW25SR-1019 PLF-MW26SR-1019 PLF-MW47S-1019 PLF-MW50S-1019 PLF-DUP3-1019	**UJ**
J3003.D 10/30/2019, 10:07	3-Nitroaniline	86.1%	Low	PLF-MW25SR-1019 PLF-MW26SR-1019 PLF-MW47S-1019 PLF-MW50S-1019 PLF-DUP3-1019	**R[(A)]**
D2610.D 11/04/2019, 09:57	4-Nitroanaline 3-Nitroaniline	47.8% 90.6%	Low	PLF-MW53S-1019	**UJ** **R[(A)]**

Note: [(A)] - %D value >70%; associated sample results are rejected.

3.5 Method Blanks

Method blanks were analyzed at the required frequency. No target compounds were detected at or above the RLs in the method blank.

3.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required. The %R and RPD values either met the laboratory control criteria or the %R and RPD outliers had no adverse effects on data quality and usability (*e.g.,* high-bias %R or out-of-control RPD for a compound that was not detected in associated samples).

3.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate %R values either met the criteria or the outliers had no effects on associated data (*e.g.,* bias-high %D value for a compound that was not detected in associated samples).

3.8 Matrix Spike and Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses were performed on sample PLF-MW53S-0419 as requested. All %R and RPD values were either within the laboratory control limits or the %R outliers had no adverse effects on data usability (*e.g.,* biased-high %R values for a non-detected compound), except for the following:

Spiked Sample	Analyte	MS %R	MSD %R	Control Limit	RPD	Affected Sample	Data Qualifier
PLF-MW53S-1019	Phenol	66.2%	31.1%	10-84%	62%	PLF-MW53S-1019 PLF-DUP1-1019	**J**
PLF-MW53S-1019	Aniline	15.1%	25.8%	20-150%	52%	PLF-MW53S-1019 PLF-DUP1-1019	**UJ**

Note: RPD control limit: ≤30%

3.9 Internal Standards

Proper internal standards were added to all samples. Internal standard retention times were within the ±0.5-minute window of the associated standard in all samples. All internal standard intensity met the method requirement of –50% to +100% of the associated standard.

3.10 Field Duplicates

Samples PLF-MW53S-1019 and PLF-DUP3-1019 were field duplicates submitted for SVOCs analyses. The RPD (or concentration difference values) and data qualification for detected target compounds are presented in **Section III**.

3.11 Laboratory Reporting Limits

Target compounds specified for the project were analyzed for and reported as required. Reporting limits were supported with proper initial calibration concentrations for all target compounds. The reporting limit goals specified in the OMM and revisions were achieved.

3.12 Overall Assessment of SVOCs Data Usability

All polycyclic aromatic hydrocarbons (PAHs), 1-methylnapthalene, 2-methylnaphthalene, and *bis*(2-chloroethyl)ether results for all samples analyzed for SVOCs were to be reported from the SW8270D-SIM analyses in favor of the lower detection limits. The results from the SW8270D full scan analyses were qualified (DNR) and rejected.

Pentachlorophenol results for samples PLF-MW47S-1019, PLF-MW50S-1019 were to be reported from the SW8270D-SIM analyses in favor of the lower detection limits. The results from the SW8270D full scan analyses were qualified (DNR) and rejected.

1,2-Dichlorobenzene, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, and hexachlorobutadiene results for samples analyzed with both methods SW8260C and SW8270D should be reported from the SW8260C analyses in favor of the lower detection limits. Results from the SW8270D analyses were qualified (DNR) and rejected.

Pentachlorophenol and 4-nitrophenol were to be reported from the SW8151A analyses for samples PLF-MW53S-1019, PLF-MW52S-1019, PLF-MW25SR-1019, PLF-MW26SR-1019, and PLF-DUP3-1019 in favor of the lower detection limits. Results for these compounds reported from SW8270D-SIM and/or SW8270D full scan were to be qualified (DNR) and rejected.

Data qualified in these respects are summarized in **Section IV -1**. SVOCs data are acceptable for use as qualified, based on the information submitted by the laboratory.

4. Chlorophenoxy Herbicides, PCP, and 4-Nitrophenol (SW846 Method 8151A)

4.1 Holding Times

Water samples should be extracted within 7 days of collection and the extracts analyzed within 40 days of extraction. All samples were initially extracted and analyzed within the required holding times. The results for all target analytes, except 4-nitrophenol (analyzed separately), did not meet the laboratory quality control criteria; the results were not reportable. Samples were re-extracted, 13 days past the recommended holding time, and re-analyzed. The re-analyses met the laboratory quality control criteria, and the results were reported. Samples were well preserved in the field and laboratory, and the target analytes are relatively persistent. However, as a conservative measure, these results were qualified (R) since the extraction was performed significantly past the method-required holding time. Qualified data are summarized in **Section IV, Table 1.**

4.2 GC/MS-MS Instrument Performance Check

According to the laboratory standard operation procedure, tuning analyses were not necessary since the method was modified using the GC/MS-MS techniques (rather than the method stated GC/MS technique). Data were not qualified on this basis.

4.3 Initial Calibration

The method and laboratory criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be ≤20% for the compound, (2) if least-square linear

regression is chosen for quantitation, the correlation coefficient (r) be ≥0.99, (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥0.99, and (4) a second source standard be analyzed immediately after the analysis of last calibration standard and the %D values be within±30%. The initial calibration met the criteria.

4.4 Calibration Verification

The method criteria require that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D value be within ±20%. Calibration verification analysis was performed as required. The %D values either met the criteria or the outliers had no adverse effects on data quality and usability (*e.g.,* biased-high recovery for a compound that was not detected in associated samples), except for the following:

Calibration Verification ID	Analyte	%D	Bias	Affected Sample	Data Qualifier
CCV1.D 11/7/2019, 7:41	Dinoseb	-21.1%	Low	PLF-MW25SR-1019 PLF-MW26SR-1019	**UJ**

4.5 Method Blank

A method blank was prepared and analyzed with samples as required by the method. Target compounds were not detected at or above the RLs in the method blank.

4.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required. The %R and RPD values met the laboratory control criteria.

4.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. The surrogate %R values met the laboratory control criteria.

4.8 Matrix Spike (MS) and MS Duplicate (MSD)

MS/MSD analyses were performed on sample PLF-MW53S-1019 as requested. All %R and RPD values were either within the laboratory control limits or the %R outliers had no adverse effects on data usability (*e.g.,* biased-high %R values for a non-detected compound).

4.9 Field Duplicates

Samples PLF-MW53S1019 and PLF-DUP3-1019 were field duplicates submitted for chlorophenoxy herbicides, PCP, and 4-nitrophenol analyses. Target compounds were not detected at or above the reporting limits in both samples. The field precision met the project advisory criteria.

4.10 Laboratory Reporting Limits

Target compounds specified for the project were analyzed for and reported as required. Reporting limits were supported with proper initial calibration concentrations for all target compounds. The reporting limit goals specified in the OMM and revision were achieved.

4.11 Overall Assessment of Chlorophenoxy Herbicides, PCP, and 4-Nitrophenol Data Usability

Chlorophenoxy herbicides, PCP, and 4-nitrophenol data are acceptable for use, as qualified.

5. Metals (EPA Methods 200.7 and 200.8)

5.1 Holding Time

Water samples should be analyzed within 180 days of collection. All samples were analyzed within the required holding times.

5.2 ICP/MS Tune Analysis

Instrument tuning was performed at the required frequency. The stability check (%RSD <5%), mass calibration (mass difference <0.1 AMU), and resolution check (peak width <0.75 AMU at 5% peak height) met the method criteria.

5.3 Initial Calibration

The ICP methods require that (1) a blank and one calibration standard be used in establishing the analytical curve, and (2) the average of replicate exposures be reported for all standards, QC, and sample analyses.

5.4 Initial and Continuing Calibration Verification

Initial calibration verification (ICV) and continuing calibration verification (CCV) analyses were performed at the required frequency. All %R values were within 90-110%.

5.5 Blanks

Calibration Blanks: Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) were analyzed at the required frequency. Chromium was detected in the ICBs and CCBs, where samples were detected at levels >10x the levels found in the ICB/CCBs. No data qualifying was required.

Method Blank: Method blanks were analyzed at the required frequency. Chromium was detected in the method blank, where samples were detected at levels >10x the level found in the method blank. No data qualifying was required.

5.6 ICP Interference Check Sample (ICS)

ICS analyses were performed as required. No false positive or negative detections were observed (no detections of target analytes in ICS Solution A). All %R values were within 80-120% in Solution AB for target analytes.

5.7 Laboratory Control Sample (LCS)

LCS analyses were performed as required. All %R values were within the method control limits.

5.8 Laboratory Duplicate Analysis

Duplicate analyses were performed on project samples as requested. The RPD or concentration difference values met the laboratory control limits.

5.9 Matrix Spike (MS)

MS analyses were performed on project sample PLF-#4R-0419 as requested. The %R values were within the laboratory control limits.

5.10 ICP/MS Internal Standards

At least three internal standards were added to all samples and QC analyses. All percent relative intensity values were within the method control criterion (70 - 125% of those of the calibration blank).

5.11 Field Duplicates

Samples PLF-#4R-1019 and PLF-DUP2-1019 were field duplicates submitted for chromium, calcium, iron, magnesium, manganese, potassium, and sodium analyses. The RPD (or concentration difference values) and data qualification are presented in **Section III**.

5.12 Laboratory Reporting Limits

RLs were supported with proper initial calibration concentrations for target analytes, and met the detection limit goals listed in the OMM and revisions.

5.13 Overall Assessment of Metals Data Usability

Metals data are acceptable for use as qualified, based on the information submitted by the laboratory.

6. Alkalinity, TOC, TDS, Anions, and Ammonia

6.1 Holding Times

The samples were analyzed within the required holding times of 48 hours for nitrate, seven days for total dissolved solids (TDS), 14 days for alkalinity; and 28 days for ammonia, chloride, sulfate, and total organic carbon (TOC). All analyses were performed within the required holding times.

6.2 Initial Calibration

Initial calibration (ICAL) is required for anions (nitrate, chloride, and sulfate by EPA Method 300.0), ammonia, and TOC analyses. The initial calibration correlation coefficients were ≥0.995 and met the method requirements for these parameters.

6.3 Initial and Continuing Calibration Verification

Initial calibration verification (ICV) and continuing calibration verification (CCV) analyses were performed at the required frequency for all inorganic constituents. All %R values were within the control limits (80-120% for anions; 90 – 110% for TOC and ammonia).

6.4 Blanks

Calibration Blanks: ICBs and CCBs were analyzed at the required frequency. Target analytes were either not detected at or above the RLs in ICBs and CCBs, or detected at levels that had no adverse effects on sample results (*e.g.,* sample result was >10x the concentration in the blank).

Method Blanks: Method blanks were analyzed at the required frequency. Target analytes were either not detected at or above the RLs in method blanks, or detected at levels that had no adverse effects on sample results (*e.g.,* sample result was >10x the concentration in the blank).

6.5 Laboratory Duplicate Analysis

Duplicate analyses were performed for all inorganic constituents on project samples. All RPD or concentration difference values met the laboratory control criteria.

6.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and/or MSD analyses were performed for anions, TOC, and ammonia on project samples. All %R and RPD values were either within the laboratory control limits or the %R outliers had no adverse effects on data usability (e.g., biased-high %R values for a non-detected compound, or the analyte concentration in the parent sample was >4x the spiking level).

6.7 Laboratory Control Sample (LCS)

LCS analyses were performed for TDS, alkalinity, anions, TOC, and ammonia at the required frequency. All %R values were within the laboratory control limits.

6.8 Field Duplicates

Samples PLF-4R-1019 and PLF-DUP2-1019 were field duplicates submitted for inorganic constituent analyses. The RPD (or concentration difference values) and data qualification are presented in **Section III**.

6.9 Laboratory Reporting Limits

The reporting limits were supported with adequate ICAL concentrations and met the OMM goals for inorganic constituents.

6.10 Overall Assessment of Inorganic Constituent Data

Inorganic constituent data are of known quality and acceptable for use as qualified, based on the information submitted by the laboratory.

III. FIELD DUPLICATE SUMMARY

Field duplicate RPD is indicative of field and laboratory precision and sample homogeneity in combination. The Functional Guidelines or OMM do not specify criteria for field duplicate evaluation. An advisory criterion of 35 percent was applied to evaluating the RPD values of field duplicate results ≥5xRL. For results <5xRL, an advisory criterion of 2xRL was applied to evaluating the concentration differences. The RPD (or concentration difference) values and data qualification for detected compounds in field duplicate pairs are presented as follows:

Detected Analyte	Unit	RL	Field Duplicate Sample ID & Concentration		RPD (%)	Concentration Difference	Data Qualification
			MW43I	**DUP1**			
Trichloroethene	µg/L	0.053	0.13	0.13		0	
			4R	**DUP2**			
Chromium	µg/L	2	ND	ND		0	
Chloride	µg/L	920	32000	31000	3%		
Nitrate (as Nitrogen)	µg/L	340	11000	11000	0%		
Sulfate	µg/L	2600	63000	61000	3%		
Ammonia	mg/L	0.05	0.05	ND		0	
Alkalinity as $CaCO_3$, Total	mg/L	15	270	270	0%		
Bicarbonate as $CaCO_3$	mg/L	15	270	270	0%		
Carbonate as $CaCO_3$	mg/L	15	15	ND		0	
Hydroxide as $CaCO_3$	mg/L	15	15	ND		0	
Total Dissolved Solids	µg/L	5000	500000	490000	2%		
Total Organic Carbon	mg/L	0.5	1.7	0.93			
Calcium	µg/L	20	90000	89000	1%		
Iron	µg/L	20	20	ND		0	
Magnesium	µg/L	5	27000	27000	0%		
Manganese	µg/L	1	1	ND		0	
Potassium	µg/L	200	7400	7300	1%		
Sodium	µg/L	200	36000	36000	0%		
Tetrachloroethene	µg/L	0.2	0.63	0.7		0.07	
Trichloroethene	µg/L	0.053	0.13	0.13		0	
			MW53S	**DUP3**			
1,2,4-Trimethylbenzene	µg/L	2	11	11	0%		
1,3,5-Trimethylbenzene	µg/L	2	4.7	4.7		0	
2-Butanone	µg/L	14	68	68		0	
Acetone	µg/L	250	370	380		10	
Ethanol	µg/L	710	830	760		70	
Ethylbenzene	µg/L	2	5.9	6.1		0.2	
m, p-Xylene	µg/L	4	20	21	5%		
Methyl isobutyl ketone	µg/L	3.4	45	45	0%		

Detected Analyte	Unit	RL	Field Duplicate Sample ID & Concentration		RPD (%)	Concentration Difference	Data Qualification
o-Xylene	µg/L	2	10	10	0%		
Tertiary butyl alcohol	µg/L	13	34	32		2	
Toluene	µg/L	2	14	15	7%		
1,2-Dichloroethane	µg/L	0.02	0.051	0.054		0.003	
Benzene	µg/L	0.028	0.22	0.23	4%		
Tetrachloroethene	µg/L	0.2	0.41	0.41		0	
Trichloroethene	µg/L	0.053	0.59	0.62	5%		
2-Methylnaphthalene	µg/L	2	2.3	2		0.3	
m,p-Cresol (2:1 ratio)	µg/L	2	7.1	0		7.1	**J/UJ**
Phenol	µg/L	2	3.6	3.2		0.4	
1-Methylnaphthalene	µg/L	0.02	1.4	1.4	0%		
2-Methylnaphthalene	µg/L	0.02	2.1	2.2	5%		
Fluorene	µg/L	0.02	0.022	0.027		0.005	
Naphthalene	µg/L	0.02	6.8	6.7	1%		
Fluoranthene	µg/L	0.02	ND	0.038		0.038	
Fluorene	µg/L	0.02	ND	0.029		0.029	
Indeno(1,2,3-cd)pyrene	µg/L	0.02	ND	0.024		0.024	
Naphthalene	µg/L	0.02	8.2	7.2	13%		
Phenanthrene	µg/L	0.02	0.045	0.074		0.029	
Pyrene	µg/L	0.02	ND	0.044		0.044	

Notes:
mg/L – milligram per liter
ND – Not detected at or above the RL
RL – Reporting limit
RPD – Relative percent difference
µg/L – microgram per liter

IV. DATA VALIDATION SUMMARY

1. Data Qualification

Sample ID	Analyte	Data Qualifier	Reason	Report Section
PLF-MW25SR-1019 PLF-MW26SR-1019 PLF-MW53S-1019 PLF-MW47S-1019 PLF-MW50S-1019 PLF-DUP3-1019	Naphthalene (SW8260C)	**DNR**	Report from SW8270-SIM analysis in favor of the lower detection limit	**Section II, 2.12**
PLF-MW25SR-1019 PLF-MW26SR-1019 PLF-MW53S-1019 PLF-MW47S-1019 PLF-MW50S-1019 PLF-DUP3-1019	Hexachlorocyclopentadiene	**UJ**	CCV %D value biased low.	**Section II, 3.4**
PLF-MW25SR-1019 PLF-MW26SR-1019 PLF-MW53S-1019 PLF-MW47S-1019 PLF-MW50S-1019 PLF-DUP3-1019	3-Nitroaniline	**R**	CCV recovery was <30%	**Section II, 3.4**
PLF-MW53S-1019	4-Nitroanaline	**UJ**	CCV %D value biased low.	**Section II, 3.4**
PLF-MW53S-1019 PLF-DUP3-1019	Phenol	**J**	The MS/MSD RPD value was >30%.	**Section II, 3.8**
PLF-MW53S-1019 PLF-DUP3-1019	Aniline	**UJ**	The MS %R value was <LCL.	**Section II, 3.8**
PLF-MW47S-1019 PLF-MW50S-1019	Pentachlorophenol (SW8270D-Full)	**DNR**	Report from SW8270D-SIM analysis in favor of the lower detection limit.	**Section II, 3.12**
PLF-MW25SR-1019 PLF-MW26SR-1019 PLF-MW53S-1019 PLF-MW47S-1019 PLF-MW50S-1019 PLF-DUP3-1019	1,2-Dichlorobenzene 1,4-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene (SW8270D-Full Scan)	**DNR**	Report from SW8260C analysis in favor of the lower detection limit.	**Section II, 3.12**
PLF-MW25SR-1019 PLF-MW26SR-1019 PLF-MW53S-1019 PLF-DUP3-1019	Pentachlorophenol[(A)] 4-Nitrophenol[(B)] (SW8270D-Full Scan and/or SIM)	**DNR**	Report from SW8151A analysis in favor of the lower detection limit.	**Section II, 3.12**

Sample ID	Analyte	Data Qualifier	Reason	Report Section
PLF-MW25SR-1019 PLF-MW26SR-1019 PLF-MW53S-1019 PLF-MW47S-1019 PLF-MW50S-1019 PLF-DUP3-1019	1-Methylnaphthalene 2-Methylnaphthalene Acenaphthylene Acenaphthene Anthracene Benezo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene *bis*(2-Chloroethyl)ether Chrysene Dibenz(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Pyrene (SW8270D-Full Scan)	**DNR**	Report from SW8270D-SIM analysis in favor of the lower detection limit.	**Section II, 3.12**
PLF-MW25SR-1019 PLF-MW26SR-1019	Dinoseb	**UJ**	CCV %D value biased low.	**Section II, 4.4**
PLF-MW53S-1019 PLF-DUP3-1019	*m,p*-Cresol (2:1 ratio)	**J/UJ**	Field duplicate results did not meet the project advisory criteria.	**Section III**

Note:
CCV – Continuing calibration verification
%D – Percent difference
LCL – Lower control limit
MS/MSD – Matrix spike and matrix spike duplicate
%R – Percent recovery
UJ/J – Non-detects were qualified (UJ) and detections were qualified (J)
[A] – Included both EPA 8270D Full Scan and SIM analyses.
[B] – EPA 8270D Full Scan only.

2. Data Qualifier Definition

Data Qualifier	Definition
DNR	The result for this analyte should be reported from an alternative analysis for optimal result.
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The result was qualified as rejected and could not be fully used as intended.
U	The analyte was not detected at or above the reported value or quantitation limit.
UJ	The analyte is not detected above the sample quantitation limit, and the reported quantitation limit was an estimated value.

V. DATA QUALITY OBJECTIVE ASSESSMENT

The quality of the data collected in this sampling event is assessed against the data quality objectives (DQOs) defined in the OMM. The assessment evaluates whether the DQOs were achieved in various QC elements - precision, accuracy, representativeness, comparability, and completeness, as presented below.

1. Precision

Precision is defined as the degree of mutual agreement among independent measurements as the result of repeated application of the same process under similar conditions. Analytical precision is evaluated via the relative percent difference (RPD) values of LCS/LCSD, MS/MSD, and duplicate sample (inorganic only) analyses. The RPD values of field duplicate analyses are used to evaluate the analytical and field precision in conjunction with sample homogeneity.

The precision of VOCs, SVOCs, chlorophenoxy herbicides, metals. and inorganic constituent (anions, alkalinity, bicarbonate, TDS, ammonia, and TOC) analyses met the project DQOs, except for the following:

1.1 MS/MSD RPD Value – SVOCs

The RPD value for phenol in the MS/MSD analyses performed on sample PLF-MW53S-1019 was outside the laboratory control criteria. The phenol results for sample PLF-MW53S-1019 and its field duplicate, sample PLF-DUP3-1019, were qualified (J) as estimated.

1.2 Field Duplicates – SVOCs

The *m,p*-cresol (2:1 ratio) difference values for the field duplicate pair, samples PLF-MW53S-1019 and PLF-DUP3-1019 were outside the project advisory criteria. *m,p*-Cresol (2:1 ratio) results for samples PLF-MW53S-1019 and PLF-DUP3-1019 were qualified (J) for detects and (UJ) for non-detects as estimated.

2. Accuracy

Accuracy is a statistical measurement of correctness and includes components of random and system errors. Accuracy is defined as the degree of agreement between a measurement and the known reference. Analytical accuracy is evaluated via the percent recovery (%R) for inorganic analyses or percent difference (%D) and percent drift ($\%D_f$) for organic analyses values of initial and continuing calibration (ICV and CCV), surrogate spikes (organic analyses only), MS, MSD, LCS, LCSD, and internal standards (as applicable for the analytical methods) in conjunction with method blank and field blank results. Method and field blanks identify the type and magnitude of effects contributed to the system error through field and/or laboratory procedures. Sample conditions and sample preparation/analysis

timing can affect accuracy of sample results as well. Potential analyte loss can occur if samples were not well preserved or prepared/analyzed significantly past the required holding time, and affect the accuracy of sample results.

The accuracy of VOCs, SVOCs, chlorophenoxy herbicides, metals, and inorganic constituent (anions, alkalinity, bicarbonate, TDS, ammonia, and TOC) analyses met the DQOs of the OMM, except for the following:

2.1 CCV %D Values – SVOCs

The %D value for hexachlorocyclopentadiene in one of the CCVs biased low. Hexachlorocyclopentadiene was not detected in the five samples associated with this CCV, and hexachlorocyclopentadiene results for these samples were qualified (UJ) as estimated.

The %D value for 4-nitroaniline in one of the CCVs biased low. 4-Nitroaniline was not detected in the five samples associated with this CCV, and 4-nitroaniline results for these samples were qualified (UJ) as estimated.

The %D value for 3-nitroaniline in both of the CCVs for SVOCs analysis by Method SW8270D full scan were >70%, indicating a severe low bias of the associated sample results potentially. 3-Nitroaniline was not detected in the six samples associated with these CCVs, and the results were qualified (R) and rejected.

2.2 CCV %D Values – Chlorophenoxy Herbicides

The %D value for dinoseb in one of the CCVs biased low. Dinoseb was not detected in the two samples associated with this CCV. Dinoseb results for these samples were qualified (UJ) as estimated.

2.3 MS %R Value – SVOCs

The %R value for aniline in the MS analysis performed on sample PLF-MW53S-1019 was less than the lower control limit. Aniline was not detected in this sample; aniline results for sample PLF-MW53S-1019 and its field duplicate, sample PLF-DUP3-1019, were qualified (UJ) as estimated.

3. Representativeness

Representativeness is the level of confidence that the analytical data reflect the actual field condition. Representativeness is evaluated via the integrity of the samples during the course from collection through preparation/analysis at the laboratory. The evaluation of associated method and field blanks also assists in identifying artifacts that may skew the representativeness of the samples.

No anomalies were identified in the procedures of sample preservation, handling, preparation, and analyses. Sample preparation and analyses were all performed within the required holding times. The laboratory and field blanks were either free of contaminants or at levels that had no significant effects on sample results. The VOCs, SVOCs, chlorophenoxy herbicides, metals, and inorganic constituent data are assumed representative.

4. Comparability

Comparability is the confidence with which one data set can be compared to another data set. Using standard methods throughout the data generation processes ensures the comparability of data generated in separated sampling events.

Data collected in this sampling event are assumed comparable because standard methods were used for sample preparation and analyses, and the methods were consistent with those specified in the OMM.

4.1 VOCs

Selective ion monitoring (SIM) technique was applied to the analyses of full list VOCs, as opposed to only compounds requiring lower detection limits in all previous sampling events. The reporting limits remained the same as those specified in the OMM. No significant deviations of results from the previous sampling events were observed.

5. Completeness

Completeness is a ratio of the number of valid data to the expected number of data that can be obtained under normal conditions for a given sampling event. Valid data are sample results determined acceptable for use. Rejected results are considered un-useable and thus invalid. In cases where data were rejected in favor of those obtained from a separate valid analysis, the rejection does not affect the completeness.

The overall completeness of this sampling event is 99.9 percent. The overall completeness for this sampling event met the 95 percent completeness goal of the OMM.

6. Sensitivity

Sensitivity depicts the level of ability an analytical system (i.e., sample preparation and instrumental analysis) of detecting a target component in a given sample matrix with a defined level of confidence. Factors affecting the sensitivity of an analytical system include: analytical system background (e.g., laboratory artifact or method blank contamination), sample matrix (e.g., mass spectrometry ion ratio change, co-elution of peaks, or baseline elevation) and instrument instability.

To evaluate if the analytical sensitivity achieved the project expectation, sample-specific PQLs were compared against the RL goals set forth in the OMM and the revisions. In addition, sample results were compared to detections of target analytes in method blanks, trip blanks, and calibration blanks to identify potential effects of laboratory and field background on sensitivity.

The sensitivity associated with the analyses of all samples was attained to the project goals in this sampling event.

VI. REFERENCES

United States Environmental Protection Agency (USEPA). 2017a. *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review.* Office of Superfund Remediation and Technical Innovation. January 2017. OLEM 9355.0-135. EPA-540-R-201 7-001.

USEPA. 2017b. *Contract Laboratory Program National Functional Guidelines for Organic Superfund Data Review.* Office of Superfund Remediation and Technical Innovation. January 2017. OLEM 9355.0-136. EPA-540-R-2017-002.

USEPA. 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*, January 13 2009, EPA 540-R-08-005.

USEPA. 1996. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, Third Edition, December 1996.

USEPA. 1983. *Methods for Chemical Analysis of Water and Wastes,* EPA-600/4-79-020, March 1983 and updates.

American Public Health Association APHA). 1995. *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, 20th Edition, 1995.

Environmental Partners Inc. 2014. *Revised Site-Wide Groundwater Performance and Protection Monitoring Operations and Maintenance Manual – Pasco Landfill Site*, Environmental Partners Inc., May 9, 2014.and October 10, 2014 Revisions.

ATTACHMENT B: Waste Disposal Documentation

Northern ENVIRONMENTAL

2661 North Pearl St. #145
Tacoma, WA 98407
253.503.3096

DATE	WORK ORDER #	TICKET #
12-3-19	60368	28894

OPERATOR	LABORER
Mike L	

Customer PASCO SANITARY LANDFILL Job Phone 970-222-9914

Job Address 1820 DIETRICH RD C, S, Z PASCO, WA 99301

TRAVEL TO SITE		ON SITE		DUMP OUT COMPLETED	RETURN TO SHOP	TRUCK #
START	STOP	IN	OUT			
0800	1300	1300	1330			119

QUANTITY	JOB DESCRIPTION	RATE	TOTAL
	PUMPED OUT GROUNDWATER 4176		
1	ENERGY SUPPLEMENT FEE		

DISPOSAL: ☐ ON SITE ☒ OFF SITE

LOCATION: P25 Group

SUBTOTAL	
TAX	
TOTAL	

SIGNATURE BELOW ACKNOWLEDGES PAYMENT TERMS ON REVERSE:

CUSTOMER NAME: Block Brice As Agent of IWAG Group III : PSL

SIGNATURE: As Agent of IWAG Group III : PSL

Northern ENVIRONMENTAL
EPAID# WAH000039211
USDOT# 2133996
253.212.5446

B.O.L. # 5840

SHIPPING PAPER

DELIVERY DATE	WO #
12-3-19	60368

SHIPPER / CUSTOMER: PASCO SANITARY LANDFILL	CONTACT NAME: PATRICK BRICE
ADDRESS: 1620 DIETRICH RD	PHONE #: 970-222-9914
CITY, STATE, ZIP: PASCO, WA 99301	
CONSIGNEE / FACILITY: PES GROUP	CONTACT NAME: TOM SMITH
ADDRESS: 3003 TAYLOR WAY	PHONE #: 253-383-4175
CITY, STATE, ZIP: TACOMA, WA, 98431	

HM	US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	Containers No.	Containers Type	Total Quantity	UOM	CHLOR	pH
A	**MATERIAL NOT REGULATED BY DOT (USED OIL AND WATER)**						
B	**MATERIAL NOT REGULATED BY DOT (SPENT ANTIFREEZE)**						
C	**MATERIAL NOT REGULATED BY DOT (SPENT OIL ABSORBENTS AND DEBRIS)**						
D	**COMBUSTIBLE LIQUID N.O.S., 3, NA1993, PGIII, RQ (100) (CONTAINS DIESEL & GASOLINE) ERG 128**						
E	MATERIAL NOT REGULATED BY DOT CONDENSATE WATER	001	TT	4,176	G		
F							

Special Handling Instruction and Additional Information:

A. PROFILE #

B. PROFILE #

C. PROFILE #

D. PROFILE #

E. PROFILE # 6400-A

F. PROFILE #

SHIPPER'S CERTIFICATION: "I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations." I also certify that all times listed above are true and correct.

(SHIPPER) PRINT OR TYPE NAME	SIGNATURE	MONTH	DAY	YEAR
X Patrick Brice As Agent of IWAG Group III PSL	X As Agent of IWAG Group III PSL	12	03	19
(CARRIER/TRANSPORTER) PRINT OR TYPE NAME	SIGNATURE	MONTH	DAY	YEAR
X Michael Hardy	X	12	3	19
(CONSIGNEE/FACILITY) PRINT OR TYPE NAME	SIGNATURE	MONTH	DAY	YEAR
X	X			

ATTACHMENT C: Monthly IWA Performance Monitoring Checklists

Zone A Landfill Cover Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	October 10/29/19___						November 11/26/19___						December 12/18/19___					
	Weather: Clear, 28 ° f, wind NE 14, Pressure 30.65						Weather: Clear, 30° f, wind NW 3, Pressure 29.92						Cloudy, 33 °f, wind E 8, Pressure 29.99					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Vehicle Rutting	x				x		x				x		x				x	
Foot Traffic Disturbance	x				x		x				x		x				x	
Other (Define in Inspection Report)	x				x		x				x		x				x	
Animal-Made Disturbance																		
Burrowing	x				x		x				x		x				x	
Consumption of Vegetation		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Wind Erosion		x						x						x				
Stormwater Erosion		x						x						x				
Settlement (including along pipelines)	x			Under Evaluation			x						x			Under Evaluation		
Sparse Vegetation	x				x		x				x		x				x	
Distressed Vegetation		x						x						x				
Other (Define in Inspection Report)		x						x						x				
North Sump(s) Inspection																		
Water in Sump(s)		x						x						x				
Thickness of Water (inches)		0						0						0				
Water pumped out		0						0						0				
Approximate volume pumped (gals)		0						0						0				
Middle Sump Inspection																		
Water in Sump		x						x						x				
Thickness of Water (inches)		0						0						0				
Water pumped out		0						0						0				
Approximate volume pumped (gals)		0						0						0				
South Sump Inspection																		
Water in Sump		x						x						x				
Thickness of Water (inches)		0						0						0				
Water pumped out		0						0						0				
Approximate volume pumped (gals)		0						0						0				
Comments, Remarks, andAction Items:	**Comments, Remarks, and Action Items:** Elevation surveys and visual observations will be used for further evaluation of settlement Holes in the soil cover have developed on the Southeast side near the North end of the East basin at the base of the slope along the fence.						**Comments, Remarks, and Action Items:** Elevation surveys and visual observations will be used for further evaluation of settlement Holes in the soil cover have developed on the Southeast side near the North end of the East basin at the base of the slope along the fence.						**Comments, Remarks, and Action Items:** Elevation surveys and visual observations will be used for further evaluation of settlement Holes in the soil cover have developed on the Southeast side near the North end of the East basin at the base of the slope along the fence.					

Zone C/D Landfill Cover Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	*October 10/29/19___*						*November 11/26/19___*						*December 12/18/19__*					
	Weather: Clear, 28^{o} f, wind NE 14, Pressure 30.65						*Weather: Clear, 30^{o} f, wind NW 3, Pressure 29.92*						*Cloudy, 33^{o}f, wind E 8, Pressure 29.99*					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Vehicle Rutting		x						x						x				
Foot Traffic Disturbance		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Animal-Made Disturbance																		
Burrowing		x						x						x				
Consumption of Vegetation		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Wind Erosion		x						x						x				
Stormwater Erosion		x						x						x				
Settlement		x						x						x				
Sparse Vegetation		x						x						x				
Distressed Vegetation		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					

Zone E Landfill Cover Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	October 10/29/19___						November 11/26/19___						December 12/18/19__					
	Weather: Clear, 28° f, wind NE 14, Pressure 30.65						Weather: Clear, 30° f, wind NW 3, Pressure 29.92						Cloudy, 33°f, wind E 8, Pressure 29.99					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Vehicle Rutting		x						x						x				
Foot Traffic Disturbance		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Animal-Made Disturbance																		
Burrowing		x						x						x				
Consumption of Vegetation		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Wind Erosion	x				x		x				x		x				x	
Stormwater Erosion		x						x						x				
Settlement		x						x						x				
Sparse Vegetation		x						x						x				
Distressed Vegetation		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					
	The following was reported in January 2003, Minor wind erosion on the Eastern side slope.						The following was reported in January 2003, Minor wind erosion on the Eastern side slope.						The following was reported in January 2003, Minor wind erosion on the Eastern side slope.					
	The following was reported in May 2003: Minor wind erosion on the North side slope and crown. Vegetation is sparse to nonexistent on the crown. Vegetation is growing well everywhere else including the erosion on the						The following was reported in May 2003: Minor wind erosion on the North side slope and crown. Vegetation is sparse to nonexistent on the crown. Vegetation is growing well everywhere else including the erosion on the						The following was reported in May 2003: Minor wind erosion on the North side slope and crown. Vegetation is sparse to nonexistent on the crown. Vegetation is growing well everywhere else including the erosion on the					
	Presently the vegetation is growing well on all parts of the cover and the minor erosion reported in 2003 is not detectable.						Presently the vegetation is growing well on all parts of the cover and the minor erosion reported in 2003 is not detectable.						Presently the vegetation is growing well on all parts of the cover and the minor erosion reported in 2003 is not detectable.					

Zone A West Detention/Evaporation Basin Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	October 10/29/19___						November 11/26/19___						December 12/18/19__					
	Weather: Clear, 28° f, wind NE 14, Pressure 30.65						Weather: Clear, 30° f, wind NW 3, Pressure 29.92						Cloudy, 33°f, wind E 8, Pressure 29.99					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Liner Puncture		x						x						x				
Sediment/Water Level Staff Gauge Disturbance		x						x						x				
Other (Define in Inspection Report)	x				x		x				x		x				x	
Animal-Made Disturbance																		
Burrowing		x						x						x				
Foot Traffic Damage to Liner		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Sediment Level Greater than 0.9 feet average		x						x						x				
Water Level Greater than 4.0 feet		x						x						x				
Anchor Trench Disturbed/Exposed/Pull Out		x						x						x				
Ballooning Liner	x				x		x				x		x				x	
Vegetation Growing in Sediment	x				x		x				x		x				x	
Other (Define in Inspection Report)		x			x			x			x			x			x	
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					
	The Sediment depth is 0" to 3", Ave. is 1". The depth of water is puddle.						The Sediment depth is 0" to 3", Ave. is 1". The depth of water is puddle.						The Sediment depth is 0" to 3", Ave. is 1". The depth of water is 3".					
	The basin liner is exposed on the west side of the west berm between the fence and the top of the berm.						The basin liner is exposed on the west side of the west berm between the fence and the top of the berm.						The basin liner is exposed on the west side of the west berm between the fence and the top of the berm.					

Zone A East Detention/Evaporation Basin Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	*October 10/29/19___*						*November 11/26/19___*						*December 12/18/19___*					
	Weather: Clear, 28° f, wind NE 14, Pressure 30.65						*Weather: Clear, 30° f, wind NW 3, Pressure 29.92*						*Cloudy, 33°f, wind E 8, Pressure 29.99*					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Liner Puncture		x						x						x				
Sediment/Water Level Staff Gauge Disturbance		x						x						x				
Other (Define in Inspection Report)		x			x			x			x			x			x	
Animal-Made Disturbance																		
Burrowing		x						x						x				
Foot Traffic Damage to Liner		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Sediment Level Greater than 0.9 feet average		x						x						x				
Water Level Greater than 4.0 feet		x						x						x				
Anchor Trench Disturbed/Exposed/Pull Out		x						x						x				
Ballooning Liner	x				x		x				x		x				x	
Vegetation Growing in Sediment	x				x		x				x		x				x	
Other (Define in Inspection Report)	x				x		x				x		x				x	
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					
	The average sediment depth is approx.1/2". The Depth of water is 3".						The average sediment depth is approx.1/2". The Depth of water is 3".						The average sediment depth is approx.1/2". The Depth of water is 3".					
	Vegetation is growing in the sediment at North end near the inlet pipe. Minor sediment below keystone blocks.						Vegetation is growing in the sediment at North end near the inlet pipe. Minor sediment below keystone blocks.						Vegetation is growing in the sediment at North end near the inlet pipe. Minor sediment below keystone blocks.					

Zone C/D Detention/Evaporation Basin Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	October 10/29/19___						November 11/26/19___						December 12/18/19__					
	Weather: Clear, 28° f, wind NE 14, Pressure 30.65						Weather: Clear, 30° f, wind NW 3, Pressure 29.92						Cloudy, 33°f, wind E 8, Pressure 29.99					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Liner Puncture		x						x						x				
Sediment/Water Level Staff Gauge Disturbance		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Animal-Made Disturbance																		
Burrowing		x						x						x				
Foot Traffic Damage to Liner		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Sediment Level Greater than 0.9 feet average		x						x						x				
Water Level Greater than 4.0 feet		x						x						x				
Anchor Trench Disturbed/Exposed/Pull Out		x						x						x				
Ballooning Liner	x				x		x				x		x				x	
Vegetation Growing in Sediment	x				x		x				x		x				x	
Other (Define in Inspection Report)	x				x		x				x		x				x	
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					
	Depth of Water is 0". The Sediment depth is 0" to 6", ave. is 3" on the bottom, 0" on the side walls.						Depth of Water is 0". The Sediment depth is 0" to 6", ave. is 3" on the bottom, 0" on the side walls.						Depth of Water is Puddle". The Sediment depth is 0" to 6", ave. is 3" on the bottom, 0" on the side walls.					
	Some sediment in North drainage pipe. Some vegetation growth in sediment.						Some sediment in North drainage pipe. Some vegetation growth in sediment.						Some sediment in North drainage pipe. Some vegetation growth in sediment.					

Zone E Detention/Evaporation Basin Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	October 10/29/19___						November 11/26/19___						December 12/18/19__					
	Weather: Clear, 28° f, wind NE 14, Pressure 30.65						Weather: Clear, 30° f, wind NW 3, Pressure 29.92						Cloudy, 33°f, wind E 8, Pressure 29.99					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Liner Puncture		x						x						x				
Sediment/Water Level Staff Gauge Disturbance		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Animal-Made Disturbance																		
Burrowing		x						x						x				
Foot Traffic Damage to Liner		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Sediment Level Greater than 0.9 feet average		x						x						x				
Water Level Greater than 4.0 feet		x						x						x				
Anchor Trench Disturbed/Exposed/Pull Out		x						x						x				
Ballooning Liner	x				x		x				x		x				x	
Vegetation Growing in Sediment	x				x		x				x		x				x	
Other (Define in Inspection Report)		x						x						x				
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					
	Water Depth 0". Sediment is 0" to 5", Ave is 2" on the bottom, 0" on the side walls.						Water Depth 0". Sediment is 0" to 5", Ave is 2" on the bottom, 0" on the side walls.						Water Depth 0". Sediment is 0" to 5", Ave is 2" on the bottom, 0" on the side walls.					
	Vegetation is growing along the edge.						Vegetation is growing along the edge.						Vegetation is growing along the edge.					

Zone A Perimeter Fence Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	October 10/29/19___						November 11/26/19___						December 12/18/19__					
	Weather: Clear, 28° f, wind NE 14, Pressure 30.65						Weather: Clear, 30° f, wind NW 3, Pressure 29.92						Cloudy, 33°f, wind E 8, Pressure 29.99					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Fence Hit by Vehicle		x						x						x				
Fence Cut		x						x						x				
Other (Define in Inspection Report)		x			x			x			x			x			x	
Animal-Made Disturbance																		
Burrowing under Fence	x				x		x				x		x				x	
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Build Up of Blown Vegetation (Tumbleweed)	x				x		x				x		x				x	
Vegetation Growing on Fence		x						x						x				
Fence Leaning or Falling		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					
	Fence is in good condition						Fence is in good condition						Fence is in good condition					

Zone C/D Perimeter Fence Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	*October 10/29/19___*						*November 11/26/19___*						*December 12/18/19__*					
	Weather: Clear, 28° f, wind NE 14, Pressure 30.65						*Weather: Clear, 30° f, wind NW 3, Pressure 29.92*						*Cloudy, 33°f, wind E 8, Pressure 29.99*					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Fence Hit by Vehicle		x						x						x				
Fence Cut		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Animal-Made Disturbance																		
Burrowing under Fence	x				x		x				x		x				x	
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Build Up of Blown Vegetation (Tumbleweed)	x				x		x				x		x				x	
Vegetation Growing on Fence		x						x						x				
Fence Leaning or Falling		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					
	Tumbleweeds along the fence inside and out.						Tumbleweeds along the fence inside and out.						Tumbleweeds along the fence inside and out.					

Zone E Perimeter Fence Inspection Checklist

Project Inspector Name:___EJJ_____

QUARTER 4, 2019	October 10/29/19___						November 11/26/19___						December 12/18/19__					
	Weather: Clear, 28° f, wind NE 14, Pressure 30.65						Weather: Clear, 30° f, wind NW 3, Pressure 29.92						Cloudy, 33°f, wind E 8, Pressure 29.99					
	Disturbance?			Repair Required?			Disturbance?			Repair Required?			Disturbance?			Repair Required?		
Man-Made Disturbance	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**	**Yes**	**No**	**New**	**Yes**	**No**	**NA**
Fence Hit by Vehicle		x						x						x				
Fence Cut		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Animal-Made Disturbance																		
Burrowing under Fence		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Natural Disturbance																		
Build Up of Blown Vegetation (Tumbleweed)	x				x		x				x		x				x	
Vegetation Growing on Fence		x						x						x				
Fence Leaning or Falling		x						x						x				
Other (Define in Inspection Report)		x						x						x				
Comments, Remarks, and Action Items:	**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**						**Comments, Remarks, and Action Items:**					
	Tumbleweeds along the fence inside and out.						Tumbleweeds along the fence inside and out.						Tumbleweeds along the fence inside and out.					

ATTACHMENT D: Annual Institutional Controls Reports

M E M O R A N D U M

DATE: November 18th, 2019

TO: Dave Zabell, City Manager

CC: Rick White, Director, Community & Economic Development

Steve Worley, Public Works Director

Mary McElheron, Senior Environmental/Regulatory Specialist,

PBS Engineering + Environmental

Angela McGuire, PBS-Project Geologist

Dan Ford, PE, City Engineer

James Coleman, Environmental Health Specialist II, B-F Health District

FROM: Troy Hendren, C.B.O, Inspection Services Manager

RE: 2019- East Pasco Plume Area-Well Location Survey

Attachments: 1) Status chart 2) Monitoring Well Map 3) 2013 IWAG Memo

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Please find attached a revised status chart which provides the address, parcel number, property owner information, current water use and status of monitored wells located within a section of East Pasco, inclusive of the area south of East "A" street, determined by the Department of Ecology to be effected by the subterranean plume of ground water contamination. The well names shown in the first column of the chart provided coincide with the names of the wells shown on the attached monitoring wells map, as prepared by the Environmental Partners, Inc.

On Wednesday, November 13th 2019, Neal Schertz, Civil Engineer for the City of Pasco, Mary McElheron, Senior Environmental/Regulatory Specialist for PBS Engineering + Environmental, Angela McGuire, PBS-Project Geologist, James Coleman, Environmental Health Specialist II for Benton-Franklin Health District and I surveyed the target area to verify the exact locations of known Wells and locate any wells not previously known to the city. We also verified changes that have occurred since the previous 2018 survey. The two additional wells discovered during the 2018 survey are still in use. The number of City water connections and the properties upon which they are located and record owners of those properties have been updated in the attached chart. Change of ownership was updated along with additional information. As directed, we will continue performing an East Pasco Well Survey annually and provide you the updated Well status chart and monitoring Well map.

Please advise if you have any questions.

TH

OPERATIONAL WELLS/NOVEMBER-2019
EAST PASCO PLUME IMPACT AREA

NUMBER AND NAME OF WELLS	ADDRESS	PROPERTY OWNER(S)	CITY WATER? WELL WATER? STATUS?	CITY WATER ACCOUNT STATUS	CHANGE FROM 2018
1 WELL BONNIE 1	2508 E. LEWIS ST. TAX PARCEL # 113900057	PASCO APARTMENTS, LLC. 1700 SELAH HEIGHTS RD. SELAH, WA NEW OWNER	CITY WATER AVAILABLE AND IN USE. WELL IS DISABLED	2 ACCTS. W/WATER 13 APARTMENTS RESIDENCES CONNECTED TO CITY WATER 7 OPEN ELECTRICAL ACCOUNTS AND 1 VACANT ACCOUNT	YES
1 WELL WEST	2400 E. LEWIS PL. TAX PARCEL # 113900011	LESTER & MARJORIE WEST 2400 E LEWIS ST. PASCO, WA 99301	CITY WATER AVAILABLE AND IN USE. WELL CAPABLE FOR IRRIGATION USE ONLY	4 ACCTS. W/ WATER 3 RENTALS AND 1 OWNER OCCUPIED HOME ALL CONNECTED TO CITY WATER 5 OPEN ELECTRICAL ACCOUNTS	NO
1 WELL RINDT	2500 E. LEWIS PL. TAX PARCEL # 113870135	ENRIQUE & ELODIA MONTOYA 2500 E. LEWIS ST. PASCO, WA 99301	CITY WATER AVAILABLE AND IN USE. WELL APPEARS NOT TO BE IN USE	1 ACCT. W/WATER 1 SINGLE FAMILY HOME CONNECTED TO CITY WATER 1 OPEN ELECTRICAL ACCOUNT	NO
2 WELLS HOMME'S	2506 E. LEWIS PL. TAX PARCEL # 113870198	RAMON VERA (ETUX) PATRICIA SANCHEZ 2003 ROAD 80 PASCO, WA 99301	CITY WATER AVAILABLE AND IN USE. 1 WELL DISABLED 2ND WELL APPEARS NOT TO BE IN USE	1 ACCT. W/ WATER 3 APARTMENTS AND 1 SINGLE FAMILY DWELLING CONNECTED TO CITY WATER 4 OPEN ELECTRICAL ACCOUNTS	NO
1 WELL NORVELL (ANJELES)	2700 E. LEWIS PL. TAX PARCEL # 113870170	ALEJANDRO ANJELES (ETUX) 2700 E. LEWIS ST. PASCO, WA 99337	CITY WATER AVAILABLE BUT NOT USED. WELL DOES NOT APPEAR TO BE IN USE.	NO WATER ACCT. WELL IS THE ONLY WATER SOURCE. BUILDINGS ARE ABANDONED. NO ACTIVE BUSINESSES ON SITE. 2 OPEN ELECTRICAL ACCOUNTS	NO

OPERATIONAL WELLS/NOVEMBER-2019
EAST PASCO PLUME IMPACT AREA

NUMBER AND NAME OF WELLS	ADDRESS	PROPERTY OWNER(S)	CITY WATER? WELL WATER? STATUS?	CITY WATER ACCOUNT STATUS	CHANGE FROM 2018
1 WELL NORVELL #2	2750 E. LEWIS ST. TAX PARCEL # 113870223	MENDOZA INVESTMENT PROPERTIES LLC. 2750 E. LEWIS ST. PASCO, WA 99301	CITY WATER AVAILABLE AT STREET BUT NOT CONNECTED. WELL WAS DRILLED IN 2005 WITH DOE APPROVAL. NO APPROVAL BY CITY OF PASCO OR BFHD.	NO WATER ACCT. WELL IS THE ONLY WATER SOURCE ON THIS PROPERTY. SINGLE FAMILY DWELLING HAS BEEN REMOVED. WELL IS ACTIVE AND IN USE. 2 OPEN ELECTRICAL ACCOUNTS AND 1 VACANT ACCOUNT	NO
1 WELL BRADLEY	2904 E. LEWIS PL. TAX PARCEL # 113870018	RAMIRO & IRMA MENDOZA 4114 FINNHORSE LANE PASCO, WA 99301	CITY WATER AVAILABLE BUT NOT CONNECTED. WELL USED FOR ENTIRE PROPERTY	NO WATER ACCT. WELL IS THE ONLY WATER SOURCE FOR THIS PROPERTY. 1 OFFICE BATHROOM AND OUTDOOR HOSE BIBS CONNECTED TO WELL 1 OPEN ELECTRICAL ACCOUNT	NO
1 WELL LOPEZ (ROBINSON-FLEA MARKET)	3620 E. LEWIS PL. TAX PARCEL # 113730044	PASCO FLEA MARKET INC. 10120 W. ARGENT RD PASCO, WA 99301	CITY WATER AVAILABLE BUT NOT CONNECTED. WELL IS DISABLED AND HAS NO PUMP OR ELECTRICITY FOR 10+ YEARS	NO WATER ACCT. ON THIS PARCEL CITY WATER IS OBTAINED FROM ADJACENT LOT. (3904 E. LEWIS PL) NO CONNECTIONS TO WELL NO ELECTRICAL ACCOUNT	NO

OPERATIONAL WELLS/NOVEMBER-2019
EAST PASCO PLUME IMPACT AREA

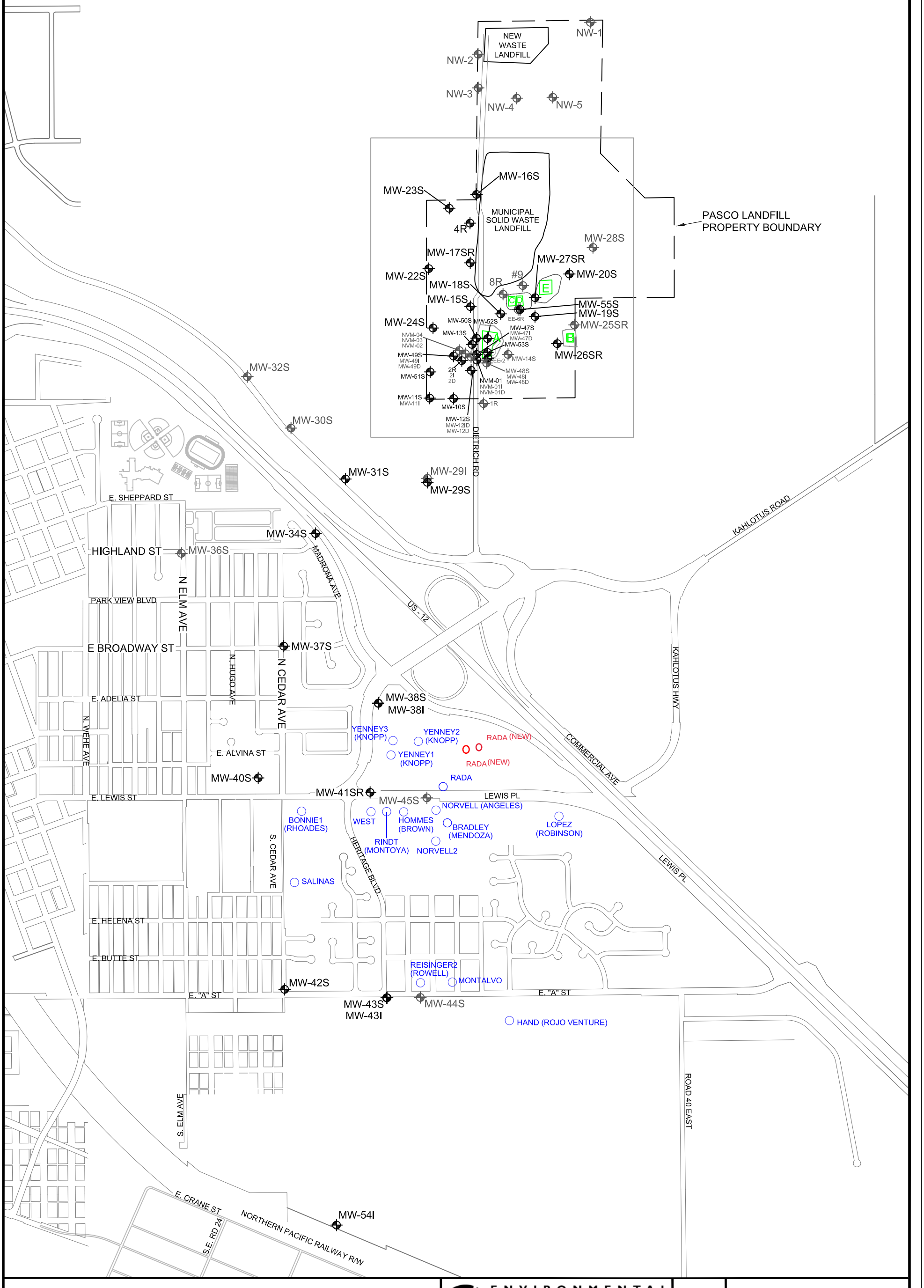
NUMBER AND NAME OF WELLS	ADDRESS	PROPERTY OWNER(S)	CITY WATER? WELL WATER? STATUS?	CITY WATER ACCOUNT STATUS	CHANGE FROM 2018
1 WELL RADA	2707 E. LEWIS PL. TAX PARCEL # 113780053	JOE RADA 2707 E. LEWIS PL. PASCO, WA 99301	CITY WATER AVAILABLE AND CONNECTED. WELL REPORTED AS FAILED	ONE WATER ACCTS. WELL IS NOT ACTIVE NEW WATER SERVICE APPEARS TO ONLY SERVE 1 BUSINESS OFFICE 1 OPEN ELECTRICAL ACCOUNT	NO
CONT. RADA	3004 E. GEORGE TAX PARCEL# 113780104	DAWN YOUNG 3008 E. GEORGE ST. PASCO, WA 99301 NEW OWNER	CITY WATER NOT AVAILABLE. NEW WELL, ILLEGALLY INSTALLED	CONT. NO WATER ACCT. WELL IS THE ONLY WATER SOURCE WELL SERVES MAIN HOUSE, MFH HAS BEEN REMOVED 1 OPEN ELECTRICAL ACCOUNT	YES
CONT. RADA	3012 E. GEORGE TAX PARCEL # 113780113	JOSEPH E. & DEANNE RADA 440 MERRY LANE BURBANK, WA 99301	CITY WATER NOT AVAILABLE. ILLEGALLY INSTALLED WELL	CONT. NO WATER ACCT. WELL IS THE ONLY WATER SOURCE WELL SERVES MFH AND SHOP. 1 OPEN ELECTRICAL ACCOUNT	NO
1 WELL YENNEY #1	900 N. AVERY AVE. TAX PARCEL # 113780035	GLENN & CAROL KNOPP 4172 N. FRONTAGE RD. MOSES LAKE, WA 98837 2 TENANTS, TARP IT AND CEMENT COMPANY	CITY WATER AVAILABLE AND IN USE. WELL IS OPERATIONAL	2 ACCT. W/ WATER WELL IS SUPPOSED TO BE USED FOR IRRIGATION ONLY. CROSS CONNECTION WAS FOUND BY COP AND METER WAS LOCKED. ENTIRE SYSTEM MUST BE CHLORINATED AND RPBA INSTALLED.	YES

OPERATIONAL WELLS/NOVEMBER-2019
EAST PASCO PLUME IMPACT AREA

NUMBER AND NAME OF WELLS	ADDRESS	PROPERTY OWNER(S)	CITY WATER? WELL WATER? STATUS?	CITY WATER ACCOUNT STATUS	CHANGE FROM 2018
1 WELL YENNEY #3	900 ½ N. AVERY AVE. TAX PARCEL # 113780062	GLENN & CAROL KNOPP 4172 N. FRONTAGE RD. MOSES LAKE, WA 98837 TENANT = TARP-IT	CITY WATER AVAILABLE AND IN USE. WELL IS OPERATIONAL	WELL IS SUPPOSED TO BE USED FOR IRRIGATION ONLY. CROSS CONNECTION WAS FOUND BY COP AND METER WAS LOCKED. ENTIRE SYSTEM MUST BE CHLORINATED AND RPBA INSTALLED. 1 OPEN ELECTRICAL ACCOUNT	YES
1 WELL YENNEY #2	3021 E. GEORGE ST. TAX PARCEL # 113780017	GLENN & CAROL KNOPP 4172 N. FRONTAGE RD. MOSES LAKE, WA 98837	CITY WATER NOT AVAILABLE. WELL IS OPERATIONAL BUT HAS NO POWER	NO WATER ACCT. WELL IS ONLY WATER SOURCE ON THIS PROPERTY. ELECTRIC SERVICE TO WELL IS NOT ACTIVE. 1 SINGLE FAMILY HOME IS CONNECTED TO WELL. HOUSE IS VACANT AND DECAYED. 1 OPEN ELECTRICAL ACCOUNT	NO
1 WELL SALINAS	407 S. CEDAR AVE. TAX PARCEL# 113900084	JULIAN SALINAS 407 S. CEDAR AVE PASCO, WA 99301 (PROPERTY WITH WELL HAS BEEN SOLD)	CITY WATER AVAILABLE AND CONNECTED. WELL IS OPERATIONAL	1 ACCT. W/ WATER 1 SINGLE FAMILY DWELLING CONNECTED TO CITY WATER. WELL IS USED FOR IRRIGATION ONLY 1 OPEN ELECTRICAL ACCOUNT WELL WILL BE DECOMMISSIONED UPON NEW DEVELOPMENT	YES
1 WELL REISINGER #1	2505 E. "A" ST. TAX PARCEL # 113884147	TOMAS & LILIANA ELIZONDO 7527 KOHLER RD PASCO, WA 99301 NEW OWNER	CITY WATER AVAILABLE. WELL IS DECOMMISSIONED	1 ACCT. W/ WATER CITY WATER FOR IRRIGATION WATER METER FOR DUST CONTROL. HOUSE IS DEMOLISHED. NO ELECTRICAL ACCOUNT	NO

OPERATIONAL WELLS/NOVEMBER-2019
EAST PASCO PLUME IMPACT AREA

NUMBER AND NAME OF WELLS	ADDRESS	PROPERTY OWNER(S)	CITY WATER? WELL WATER? STATUS?	CITY WATER ACCOUNT STATUS	CHANGE FROM 2018
1 WELL REISINGER #2	2400 E. "A" ST TAX PARCEL # 113883031	EDGAR LECHUGA 2820 N. ROAD 44 PASCO,WA 99301 NEW OWNER	CITY WATER CONNECTED BUT NOT IN USE. WELL APPEARS TO BE OPERATIONAL	1 WATER ACCT. NO DWELLING ONLY PUMP HOUSE. WELL MAY BE USED FOR IRRIGATION ONLY 1 VACANT ELECTRICAL ACCOUNT	YES
1 WELL MONTALVO	2700 E. "A" ST. TAX PARCEL # 113882078	JUAN & MARIA MONTALVO 2700 E. "A" ST. PASCO, WA 99301	CITY WATER AVAILABLE AT STREET. WELL IS OPERATIONAL AND APPEARS TO BE USED FOR DOMESTIC PURPOSES	NO WATER ACCT. WELL IS THE ONLY WATER SOURCE ON THIS PROPERTY. 1 SINGLE FAMILY DWELLING NO LICENSED RENTALS 3 OPEN ELECTRICAL ACCOUNTS AND 1 VACANT ELECTRICAL ACCOUNT	NO
1 WELL HAND	3300 E. "A" ST. TAX PARCEL # 112530057	RONALD & ALICE HJALTALIN DBA ROJO VENTURE LLC 4520 WEST WERNETT PASCO, WA 99301	CITY WATER AVAILABLE AND IN USE. WELL IS OPERATIONAL	1 ACCT. W/ WATER. (FIRE LINE ONLY) 1 ILLEGAL Single Family Dwelling Unit CONNECTED TO CITY WATER. 4 OPEN ELECTRICAL ACCOUNTS	NO



MW-12S GROUNDWATER MONITORING WELL

N

0 300 600 1200

APPROXIMATE SCALE: 1" = 1200'

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

PASCO LANDFILL SITE
MONITORING WELL NETWORK

PROJECT	03912.2		
PREPARED FOR	IWAG GROUP III PASCO LANDFILL		
LOCATION	1901 DIETRICH ROAD PASCO, WASHINGTON		
	DRAWN BY MMMH	REVIEWED BY MMMH	DATE 12/09/2013