PBS Engineering + Environmental

ENVIRONMENTAL MONITORING PLAN

SOUTHWEST LANDFILL
DESCHUTES COUNTY, OREGON

54580 Highway 97
Deschutes County, Oregon

Prepared for:
Deschutes County
Department of Solid Waste

November 2016 Revision 1
Project No. 80429.007

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November 23, 2016

Mr. Lee Huckins
Oregon Department of Environmental Quality
Eastern Region—The Dalles
400 East Scenic Drive, #307
The Dalles, OR 97058-3434

Re: Environmental Monitoring Plan Update
Southwest Landfill, Deschutes County
DEQ Solid Waste Permit No. 259
PBS Project No. 80429.007 November 2016 Revision 1

Dear Mr. Huckins:

On behalf of the Deschutes County Department of Solid Waste (County), PBS Engineering and Environmental, Inc. (PBS) provided DEQ an updated Environmental Monitoring Plan (EMP) for Deschutes County's Southwest Landfill in accordance with Section 11.2 of DEQ's Solid Waste Site Closure Permit (No. 259). DEQ provided comments to the updated EMP in a letter dated October 26, 2016. PBS has reviewed the DEQ comments and provides the following responses below listed in order of the original comments in the DEQ letter.

1. PBS agrees with the DEQ comment and has removed the sentence from the end of Section 2.2.2.
2. An explanation of the field filtering process is further described in Section 3.2.5.
3. Section 3.3.1. has been clarified to specify semi-annual sampling would be resumed if there was an action point exceedance.
4. PBS believes the clarification made in Section 3.3.1 above addresses DEQ's comment regarding Section 3.3.3 of the EMP.
5. Section 4.2.2 has been updated to clarify the gas wells located on BLM property serve as perimeter monitoring probes.
6. Section 5.0 has been revised to include the scope of the routine inspections conducted by County personnel, including noting any surface drainage issues.
7. Table 5 has been revised to show the correct hazard based action level for 1,1-Dichloroethane.

The revised text and Table 5 are attached for you to replace in your hard copy reports. Please contact me at 541.323.5884 if you have any questions regarding these revisions to the Southwest Landfill EMP.

Sincerely,
PBS Engineering and Environmental Inc.

N. Toby Scott
Sr. Project Manager

Att: Revised Report Pages (2 sets), CD

Cc: Chad Centola, Deschutes County

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APPENDICES

1.0 INTRODUCTION

This Environmental Monitoring Plan (EMP) describes environmental monitoring at Deschutes County's Southwest Landfill (SWLF) located in southern Deschutes County, Oregon. PBS Engineering and Environmental Inc. (PBS) prepared this EMP on behalf of the Deschutes County Department of Solid Waste (County).

The County's renewed DEQ Solid Waste Disposal Site Closure Permit Number 259 (Permit), issued March 9, 2016 (DEQ, 2016), requires environmental monitoring to assess environmental impacts and risks to public health and safety, if any, from possible contaminant releases from the landfill. The EMP describes the rationale, methods, schedule, and analytical requirements for conducting specific environmental monitoring, and it provides documentation for existing environmental control systems (e.g. landfill gas and groundwater monitoring wells). The EMP will be updated or amended, as needed, to document any changes to the monitoring program over time and as monitoring parameters, locations, or methods change.

The plan describes monitoring of groundwater quality beneath the site and the presence and nature of landfill gas. This EMP has been prepared in accordance with 40 Code of Federal Registry (CFR) Part 258, Oregon Administrative Rules (OAR) 340-094 (Solid Waste: Municipal Solid Waste landfills), and 340-040 (Groundwater Quality Protection). As required by Section 11.3 of the Permit, this EMP complies with the DEQ's Solid Waste Landfill Guidance Document (DEQ, 1996) and the Select Remedial Action for the Southwest Landfill prepared by the DEQ's Voluntary Cleanup Program (DEQ, 2003).

1.1 EMP Maintenance

Revisions to this EMP (also referred to as "EMP maintenance" in the Permit) must be made in accordance with Section 11.4 of the Permit. EMP revisions are required if facility conditions, monitoring requirements, or sampling procedures change. EMP revisions must be submitted within 90 days of when conditions change to the DEQ for review and approval. The Submittal Address is listed in Section 11.6 of this EMP.

1.2 EMP Organization

This EMP is divided into seven (7) sections. Sections 1 and 2 introduce the EMP, provide background information on the landfill, and describe the physical characteristics of the site. Section 3 describes groundwater quality monitoring at SWLF, including a description for the monitoring network and the sampling and analysis requirements. Section 4 describes landfill gas monitoring at the landfill, including a description for the monitoring network and the requirements of the Permit. Section 5 describes other environmental monitoring requirements for the landfill. Section 6 describes data analysis and reporting requirements. Section 7 lists cited references.

2.0 BACKGROUND

2.1 Site Setting

2.1.1 Location and Setting

The Southwest Landfill (SWLF) is a closed municipal solid waste landfill. The landfill facility (landfill itself and surrounding property) occupies approximately 40 acres. The site is located in Section 5 of Township 21 South, Range 11 East (Willamette Meridian) and is identified as Tax Lot 2111000000101. The facility address is 54580 Highway 97, Deschutes County, Oregon. The City of Bend, Oregon is located approximately 21 miles to the north, and the City of La Pine is located approximately 9 miles to the south. U.S. Highway 97 is located 500 feet to the west of the landfill (Figure 1).

The footprint of the landfill itself is approximately 6 acres. The elevation of the capped landfill is approximately 4,215 feet above mean sea level (msl). Surface elevations across the 40-acre site vary between 4,200 to 4,230 feet msl. Surface topography at the 40-acre site is variable as a result of site improvements, but topography generally grades to the west away from nearby Newberry Volcano and towards the Little Deschutes River.

The landfill is located on the forested northwest flank of the Newberry Volcano, which is situated in the rain shadow of the Cascade Range. Mean annual precipitation data for SWLF are not available, but the site likely receives about 20 inches per year (in/year), as indicated by data from nearby precipitation gages. In the caldera of the Newberry Volcano, the mean annual precipitation is 30 in/year (Morgan, Tanner, and Crumrine, 1997). Due to Newberry's higher elevation (7,984 feet at Paulina Peak), precipitation at Newberry Volcano is higher than on the surrounding high desert where the landfill is located. Mean annual precipitation is 18 in/year in La Pine (elevation 4,300 feet). Yearly temperatures range from an average high of 82° F in July to an average low of 22° F in January (Western Regional Climate Center, 2005).

The closest surface water body to the landfill is the Little Deschutes River, located approximately ¾ of a mile west of the site (Figure 1). The Little Deschutes River flows northward into the Deschutes River about 4.5 miles northwest of the landfill. A dry streambed runs east to west across the far northern portion of the SWLF property. Surficial features and vegetation growing in the streambed indicate that water rarely flows in the streambed. The dry stream channel extends westward from Newberry Volcano towards the Little Deschutes River but terminates just west of US 97 into a flat-lying forested area less than ¼-mile from the river.

2.1.2 Geology

SWLF lies within the High Lava Plains physiographic province (Orr, et.al., 1992), approximately 20 miles east of the crest of the Cascade Range. As the name implies, the High Lava Plains comprises a broad plain containing a multitude of relatively young volcanic features. Features include volcanic cones and buttes, lava flows and lava tube caves are scattered across the landscape.

SWLF is located northwest of Newberry Volcano in the vicinity of where three major fault zones converge: the northwest trending Brothers fault zone, the north trending Sisters fault zone, and the northeast trending Walker Rim fault zone. Generally, each of the these fault zones consists of a series of smaller subparrallel normal faults that are up to 130 miles long (Orr et al., 1992).

Rock units in the area of the landfill are primarily basaltic and andesitic lava flows and lapilli tuff that originated from the Newberry Volcano. The youngest (and shallowest) deposits at the landfill site, however, consist of pumiceous ash and lapilli air fall deposits (tephra) from the cataclysmic eruption of Mt. Mazama (Crater Lake) located approximately 60 miles to the southwest of the landfill. According to Chitwood (1975), the pumice and ash blanket the area where the landfill is located to a depth of 1 to 2 feet. According to MacLeod, Sherrod, and Chitwood (1982), the Mazama ash contains coarse to fine angular pumice lapilli, very fine brownish ash, and may contain charcoal at the base. The pumice and ash have been locally eroded or reworked by wind and may be intermixed with younger Newberry pumice and ash deposits.

Beneath the tephra are laminated silt, gravel, and sand outwash deposits from Newberry Volcano (Chitwood, 1975). The gravel and sand were described as poorly graded, subangular to subrounded, and loose. These deposits were encountered to a depth of approximately 80 feet at the landfill. MacLeod, Sherrod, and Chitwood (1982) mapped this unit as a Quaternary alluvial fan deposit that grades outward from Newberry Volcano into interbedded fluvial and lacustrine sediments.

Beneath the SWLF facility, the Newberry outwash deposits are underlain by outwash deposits from the Cascade Range and basalt that probably originated from the Newberry Volcano (Chitwood, 1975). The Cascade outwash deposits are approximately 30 feet thick at the landfill (encountered from 80 to 110 feet below ground surface). Cinders and basalts were encountered beneath the outwash deposits at a depth of approximately 110 feet during the drilling of a water supply well at the landfill. The Cascade outwash reportedly consists of laminated silt, sand, and diatomite (Chitwood, 1975). A unit of Quaternary Newberry basalt is mapped approximately 200 feet north of the landfill (MacLeod, Sherrod, and Chitwood, 1982).

2.1.3 Hydrogeology

Southwest Landfill lies within the Upper Deschutes Basin. The Upper Deschutes Basin encompasses approximately 4,300 square miles of the Deschutes River Basin in central Oregon. Groundwater in the Upper Deschutes Basin occurs in aquifers comprised of a variety of volcanic rocks and sediments. Fractured lava, interflow zones, and coarse-grained volcaniclastic sediments are particularly productive units. Groundwater flow has been interpreted from regional water well elevation data, which indicate that regional groundwater flow direction near the landfill is northerly (Lite and Gannet, 2002).

The ten groundwater monitoring wells at SWLF are screened in the uppermost water-bearing unit beneath the site (Newberry Volcano tephra), which screen intervals ranging from approximately 30 to 70 feet below the ground surface (bgs). Well logs for the ten monitoring wells and the water supply well were obtained from the County and the Oregon Water Resources Department (OWRD) and are included in Appendix A. The landfill's water supply well is screened deeper than the monitoring wells (102-107 feet bgs) in what may be the Cascade outwash deposits.

Measured depths to first-occurring groundwater beneath the ground surface at SWLF have historically ranged from approximately 32 feet to 56 feet bgs. The variable depth to groundwater is likely a reflection of variable topography across the site, which has a maximum elevation difference of about 30 feet (see Section 2.1.1). Despite the topographic relief, the horizontal hydraulic gradient for first-occurring groundwater is relatively flat at the landfill. Contemporaneous groundwater elevations have historically varied by about one vertical foot across the site in the ten monitoring wells. The hydraulic gradient is typically approximately 0.001 vertical feet per horizontal foot. Groundwater levels at the facility monitoring wells have fallen by approximately 1.5 feet over the past eleven years (2004 thru 2015).

Groundwater elevations in site wells indicate that groundwater beneath the site flows to the east-northeast, which is opposite of the generalized site topographic slope and away from the Little Deschutes River. Chitwood (1975) suggested that groundwater may be flowing eastward due to the presence of the more permeable Newberry basalts.

2.2 Landfill Background

2.2.1 Site Development

The Southwest Landfill is situated in a primarily rural area with undeveloped forestland. The 40-acre facility is zoned for surface mining and is surrounded to the north and to the east and south by land zoned for forest use. Across Highway 97 to the west is additional forestland, and about one mile further to the west are rural residential properties. The landfill facility is bordered to the north, south, and east by U.S. Forest Service property and to the west by U.S. Bureau of Land Management (BLM) property.

Before use as a landfill, the site was within the Deschutes National Forest and administered by the Forest Service. Site uses until 1975 included a logging railroad and a cinder pit. The County leased the site in 1975 and used it to dispose of municipal solid waste in the unlined cinder pit. The landfill received municipal solid waste from 1975 to the late 1980s.

Subsequent excavations of the cinder pit increased the disposal area to approximately 6 acres. The landfill extends roughly north-south and has a small lobe at the north end that extends to the west onto BLM property (Figure 2). The excavation depths reportedly range between 20 to 30 feet bgs, which corresponds to a floor elevation of approximately 4,195 feet to 4,185 feet msl.

The landfill was reportedly closed in the late 1980s, when a transfer station and recycling facility were constructed on site. The landfill was capped in the late 1980s with a soil and bentonite mixture. In 1991, the County obtained ownership of the site. The landfill was closed and recapped in 1992. In 2008, the cover was 4regarded to correct cover drainage deficiencies resulting from settlement. In September 2010, Deschutes County applied for purchase of the BLM property between the landfill and US 97 under the authority of the Recreation and Public Purposes (RP&P) Act. In March 2014, the BLM notified the County that they would not issue an RP&P lease for the property being sought. The subject property is part of a larger BLM parcel that has been classified for retention in the BLM's Land Use Plan. Amending the Land Use Plan is a substantial effort and the BLM has elected to not pursue an amendment to allow the County to acquire the property. The County has valid easements for the monitoring devices (i.e. monitoring wells and landfill gas probes) that have been constructed on the BLM's property as well as for the access road extending from US 97 to the landfill and transfer station. BLM has indicated to the County that it will continue to allow for those easements.

The site is currently used as a transfer station for municipal solid waste and a collection point for yard debris. Site improvements include four top-load transfer-trailer receiving bays, a recycling center, a truck scale, an attendant's building (scale house), a yard-debris receiving area, and a water supply well pump house (Figure 2). Roads for the transfer station facilities are asphalt-paved. Other gravel and unimproved roads also traverse the site.

2.2.2 Groundwater Monitoring

Groundwater monitoring at the site began in 1975 when the Forest Service investigated groundwater quality near the landfill. The Forest Service installed and monitored groundwater monitoring wells between 1975 and 1984. Low levels of volatile organic compounds (VOCs) were detected, and it appears that leachate from the landfill was impacting groundwater (DEQ, 2003). Five monitoring wells were installed in 1987. The DEQ conducted groundwater monitoring between 1989 and 1993. In 1993, the County began monitoring groundwater conditions at the landfill in accordance with the Permit. This included replacing one of the monitoring wells (MW-2) that interfered with the construction of the transfer station.

In addition to routine monitoring in accordance with the Permit, the County conducted several investigations and assessments at the landfill between 1995 and 2000. Five additional monitoring wells (MW-6 through MW-10) were installed as part the following investigations: a soil and groundwater investigation (1995), a beneficial use survey and risk assessment (1995), and a field investigation with additional well construction (1998). A baseline assessment of human health and ecological risk was completed in (2000). Data from these studies indicate that the shallow aquifer is seasonally in contact with landfill waste (DEQ, 2003). As a result, groundwater is impacted with VOCs (primarily chlorinated VOCs and the reductive chlorination breakdown products) and low levels of common landfill leachate components (e.g., chloride, iron, and manganese). The seasonal fluctuation in the water table results in periodic leachate production and groundwater contamination (DEQ, 2003).

The landfill was placed on the DEQ’s Confirmed Release List in 1998 after landfill contaminants were detected in groundwater at the facility boundary. The DEQ’s Solid Waste Program referred to the site to the DEQ’s Voluntary Cleanup Program (VCP), but monitoring continued in accordance with the Permit. The DEQ VCP used the information from earlier studies to prepare a supplemental risk evaluation for the landfill, in which the DEQ identified the following nine contaminants of interest (COI): benzene, chloroethane, 1,4-dichlorobenzene (DCB), cis-1,2-dichloroethene (cis-DCE), 1,1-dichloroethane (DCA), tetrachloroethene (PCE), trichloroethene (TCE), vinyl chloride (VC), and chromium (DEQ, 2003). The on-site water supply well, located adjacent to the scale house, is considered the most likely exposure pathway for COI (Figure 2). In the 2003 Staff Report, the DEQ concluded that contaminated shallow groundwater beneath SWLF does not create an unacceptable risk to human health. However, because groundwater will continue to be in contact with landfill wastes, and the landfill could be a source of groundwater contamination, the DEQ recommended that monitoring should continue at the landfill.

For the nine COI, the DEQ established calculated action points (CAPs) (DEQ, 2003). Remedial action may be triggered if two out of three consecutive sampling events detect concentrations of COI above the CAPs (DEQ, 2003).

2.2.3 Landfill Gas Monitoring

In late 2006 and early 2007, nine LFG monitoring wells were installed adjacent to the landfill footprint to assess the LFG migration potential. LFG is regularly detected in two wells: GP-3, an internal well which does not serve as a perimeter well for compliance purposes, and GP-8, located immediately adjacent to the southwest corner of the landfill footprint and within 25 feet of the western boundary. Due to the proximity of GP-8 to both the landfill footprint and the property boundary, the County proposed and DEQ approved the installation of a dual completion LFG monitoring well to further assess the extent of methane in the subsurface. The dual completion well, named GP-10A/B, was installed in June 2009 and is located on adjacent BLM property approximately 95 feet southwest of GP-8 and 70 feet west of the property boundary.

2.3 Previous Environmental Monitoring Plans

A previous EMP (DEA, 1993) focused primarily on location and construction of monitoring wells and groundwater monitoring. At the time of the 1993 EMP, the monitoring network consisted of five groundwater monitoring wells (MW-1 through MW-5) located around the landfill footprint and two LFG monitoring points in two on-site structures.

A subsequent EMP (URS, 2007) included new upgrades to environmental monitoring at the facility including the installation of landfill gas monitoring network and upgrades to the groundwater monitoring network. The County has maintained a consistent monitoring program for the site and has made improvements including the installation of additional LFG monitoring probes to maintain compliance with the Permit.

3.0 GROUNDWATER QUALITY MONITORING

This section describes ongoing groundwater quality monitoring at SWLF. Subsections describe the current monitoring network, well construction details, sampling procedures, analytical requirements, data review procedures, QA/QC requirements, and the calculated action point limits.

The objective of the groundwater monitoring program is to obtain reliable and representative information about aquifer characteristics, groundwater elevations, and groundwater quality. The existing groundwater monitoring network satisfies this objective by regular sampling of the shallow groundwater monitoring wells, which penetrate the uppermost aquifer beneath the site (approximately 30 to 70 feet bgs). Historical groundwater gradient maps (1989 to 2015) indicate that groundwater flow is generally to the east-northeast. The monitoring well network has been designed to monitor groundwater conditions both upgradient of the landfill (2 wells) and down gradient of the landfill (8 wells). A water supply well, which is sampled as part of the routine groundwater monitoring, is also located down gradient of the closed landfill.

3.1 Background

In accordance with 40 CFR, Part 258, Subpart E (Groundwater Monitoring and corrective Action), and OAR 340-094-0080, the County is required to conduct groundwater monitoring to ensure that groundwater beneath the site is not impacted by facility operations. This requirement is also stipulated in Section 14 of the Permit. Figure 2 shows the locations of the 10 monitoring wells and the water supply well. Well construction logs are included in Appendix A.

In 1987, the County installed a monitoring network consisting of five wells (MW-1, MW-2, MW-3, MW-4, and MW-5). MW-1 is located north of the landfill footprint (up- to cross-gradient). MW-3 and MW-4 are located down gradient (east) of the landfill footprint. MW-5 is located up-gradient (west) of the landfill. As a result of the expansion of the transfer station facility, a replacement well for MW-2, referred to as “MW-2R” was constructed in 1993. It is approximately 220 feet northeast of the attendant’s building, at the northern property boundary, and is also downgradient of the landfill.

Down-gradient monitoring wells MW-6 and MW-7 were constructed in 1996 and are located near the northeast corner of the property at the northern property boundary. Monitoring wells MW-8, MW-9, and MW-10 were constructed in 1998. Monitoring wells MW-8 and MW-9 are located down gradient and east of the landfill footprint. Monitoring well MW-10 is located adjacent to MW-3 at a deeper screened interval.

The water supply well was constructed in 1989 and is located in the well house near the attendant's building.

3.1.1 Compliance Wells and Background Well

In accordance with Section 14.3 of the Permit, the compliance wells (or compliance points) are groundwater monitoring wells MW-2R, MW-7, MW-8, MW-9, MW-10, and the on-site Water Supply Well. The background well is monitoring well MW-5.

3.1.2 Existing Well Construction

Monitoring well depths range from 40 to 70 feet bgs. The monitoring wells are constructed of Schedule 40 PVC casing and have well screen slot sizes between 0.010 to 0.030 inches. Monitoring well MW-2R is a 4-inch diameter well, and all other monitoring wells are 2-inch diameter wells. Table 1 summarizes well construction details.

The water supply well is 115 feet deep and is constructed of 250-gauge, 6-inch diameter steel pipe. The well screen has a total of 21, 1/8-inch thick slots that were cut using a torch. The well screen interval is from 102 to 107 feet bgs.

3.1.3 Network Modifications

No modifications to the existing groundwater monitoring network are planned at this time. However, modifications may be necessary if the monitored conditions change. Modifications to the network may include abandonment and/or replacement of existing wells, or addition of new monitoring wells. The EMP will be updated as modifications are made to the existing network. Any new construction or modifications will comply with Section 16.6 of the Permit, and modifications will be documented in accordance with Sections 16.5 and 16.7 of the Permit. Recommendations to abandon a well must be submitted to the DEQ per Section 16.8 of the Permit.

3.1.4 Network Maintenance

Inspections during monitoring events will indicate the integrity of the monitoring wells. Per OAR 340-094-00100(4), the post-closure monitoring period may be as long as 30 years, and functional monitoring wells may be necessary for the duration. Any damage to a well must be reported to the DEQ within 14 days of discovery of the damage. Any new construction or modifications must comply with Section 3.1.3 above.

Monitoring wells generally require little maintenance, as most of the well is below ground. The only part of the well that typically requires attention or maintenance is the above-ground security casing. The steel security casings are exposed to the weather and may eventually require maintenance or replacement. The casings could also be damaged by vehicles. Wells should be inspected periodically and the following maintenance performed as needed:

- Wellheads showing evidence of deterioration should be cleaned, rust deposits removed, primed, and coated with a rust-inhibiting paint.
- Wellhead identification numbers should be repainted and kept legible at all times.
- Security locks should be kept clean and the key assembly lubricated.
- Excess vegetation should be cleared from around the wells for ease of access.

- Vehicle access to the well locations must be maintained.

3.2 Sampling and Analysis

The following sections describe the Sampling and Analysis Plan (SAP) for collecting groundwater samples at SWLF. This SAP complies with the Permit. Any subsequent changes to the groundwater monitoring program that differ from the requirements of the Permit will be reflected in revisions to this EMP. Appendix B includes monitoring forms for groundwater sampling and analysis.

3.2.1 Monitoring Schedule and Locations

According to Section 12.4 and Attachment 3 of the Permit, the County must conduct annual groundwater monitoring in the fall of each year. The compliance wells and the background well should be sampled during the Permit-designated fall quarter (between October 1 and November 30).

3.2.2 Field Preparation

For the purposes of this SAP, field preparation involves the appropriate agency notifications and equipment/material procurement for conducting monitoring activities. The following tasks should be completed before conducting field sampling:

- Notify the DEQ in writing of upcoming sampling events at least 10 working days before the scheduled event (Section 12.2 of the Permit).
- If the sampling event coincides with the scheduled DEQ split sampling events, then notify the DEQ laboratory at least 45 days before the split sampling event. According to Section 12.3 of the Permit, the split sampling events are scheduled for Fall 2018, Fall 2022, and Fall 2026.
- Review the Permit and the previous groundwater sampling event reports. Analytical requirements and any pertinent field conditions should be noted and incorporated into equipment/material procurement.
- Conduct a pre-sampling event meeting. The County and the County's contractor will meet before each monitoring event to review the objectives of the event, the sampling and analytical requirements, field equipment operation, and logistical factors which could affect the project.
- Procure field equipment, materials, and field data sheets. Field equipment will be calibrated and tested. Sampling containers of appropriate quantity, type, and preservation should be obtained from the contract analytical laboratory.

3.2.3 Groundwater Monitoring Elevations

The depth to groundwater will be measured in all 10 monitoring wells and the water supply well before the compliance and background wells are purged. The measurements will be collected using an electronic water level indicator capable of measuring water levels to within 0.01 feet. The reading will be collected by lowering the tape through the PVC casing of the monitoring well. For the water supply well, the access port on the well seal cover will be used for groundwater elevation measurements. The groundwater elevation at each monitoring well will be calculated from comparing the depth to water and the surveyed wellhead elevation. The procedure for determining groundwater elevation is outlined on the groundwater level form (Appendix B).

3.2.4 Purge Methods and Field Indicator Parameters

Well purge volumes will be calculated for each well using the static water level measurements. The wells will be purged of at least three volumes, or until field parameters stabilize, using a new or dedicated polyethylene bailer. Purge volumes will be recorded on the groundwater sampling data sheet (Appendix B).

Groundwater field indicator parameters will be measured during well purging. At least two sets of measurements will be obtained for every well volume purged. Field indicator parameters (Group 1a of Attachment 1 for the Permit) include temperature, pH, specific conductance, dissolved oxygen, oxidation potential and turbidity. The water quality field meters will be calibrated with relevant standards and operated according the manufacturer's operations manual.

Wells will not be sampled until field indicator parameters stabilize. Stabilization will be defined when the last three sets of field indicator measurements are within the following criteria:

- Conductivity values vary by less than 10 percent.
- Temperature varies by less than 1 degree Centigrade (°C).
- pH varies by less than 0.3 pH units.

The field indicator data will be entered onto the groundwater sampling data sheet (Appendix B). If the well does not produce sufficient water to produce three casing volumes, the well will be purged dry and sampled as soon as the well recovers within 90 percent of its initial water level.

The water supply well will be purged to the extent practical. According to the water supply well report (Appendix A), the static water level in the water supply well is approximately 53 feet bgs. This static water level corresponds to 62 feet of water in the 6-inch diameter, 115-foot deep well and a well volume of approximately 110 gallons. Before collecting a sample from the supply well, the sampling team will purge the well at the spigot located in the well house for approximately 15 minutes.

3.2.5 Sample Collection

Groundwater samples will be collected using bailers for the groundwater monitoring wells and the dedicated sample port at the wellhead for the water supply well. Before collecting samples, sampling personnel will don clean, nitrile or equivalent protective gloves.

Groundwater will be transferred from the well into the appropriate pre-labeled sample bottles. Samples for VOC analysis will be collected first as they are the most sensitive to volatilization. While filling VOC sample bottles, discharge from the bailer or hose will be controlled so that flow rate into the sampling container is less than 100 milliliters per minute, and the sample water will be poured down the inside of the container to minimize turbulence and volatilization. For VOC samples, a positive meniscus should be formed over the mouth of the vial to eliminate the formation of air bubbles and headspace before capping.

For analyses of dissolved anions, cations, and metals, groundwater will be field filtered for each analysis using a 0.45 micron filter and a peristaltic pump. Purged water will be directly discharged from the bailer into a dedicated clean laboratory-supplied polyethylene container. Dedicated tubing from the peristaltic pump will be extended into the container and sample containers will be directly filled from the filter discharge. New, dedicated filters and disposable pump tubing will be used for each well.

3.2.6 Analytical Parameters and Frequency

3.2.6.1 Calculated Action Points

As described in Section 2.2.2 of the EMP, the DEQ prepared a supplemental risk evaluation and established CAPs for the nine COI at SWLF (DEQ, 2003). The nine COI include eight VOCs (benzene, chloroethane, DCB, cis-DCE, DCA, PCE, TCE, and VC) and one metal (chromium).

Per Attachment 3 of the Permit, the COI will be tested annually in the fall for each compliance monitoring well and the background well.

3.2.6.2 Additional Analytical Parameters

Additional analytical requirements for environmental monitoring at SWLF are outlined in Attachment 3 (Groundwater Compliance Sampling Schedule) and Attachment 1 (Parameter Groups) of the Permit. According to Attachment 1, environmental monitoring parameters are divided into three groups (Parameter Groups 1, 2, and 3) and include the following:

- Group 1a – field indicators
- Group 1b – leachate indicators
- Group 2a – common anions and cations
- Group 2b – trace metals (total and dissolved)
- Group 3 – volatile organic constituents (including tentatively identified compounds)

For each analyte in Parameter Groups 1 through 3, Table 2 lists the analytical method, the reported units, and the method reporting and detection limits.

As indicated in the description for Group 2b (trace metals) in Attachment 1 of the Permit, if the total suspended solids (TSS) concentration in groundwater for a sample exceeds 100 milligrams per liter (mg/L), the sample must be analyzed for both total (unfiltered) and dissolved (field-filtered) constituents. If the TSS concentration in groundwater for a sample is less than 100 mg/L, only total (unfiltered) concentrations need to be analyzed. To meet this requirement, field personnel will submit both unfiltered and filtered samples to the laboratory, in case both are needed.

Table 3 lists the laboratory container, preservation, and holding times for each sample parameter.

3.2.6.3 Analytical Frequency

In accordance with Attachment 3 of the Permit, the monitoring frequency for the CoI will be annual (fall). Although not stipulated in the Permit, routine groundwater monitoring will include Parameter Group 1a for all annual monitoring events. As indicated in Attachment 3 of the Permit, Parameter Groups 1a, 1b, 2a, 2b, and 3 must be analyzed during the split sampling event with the DEQ laboratory in the fall of every other even-numbered year (starting in Fall 2018). Table 4 of this EMP also includes the sampling schedule.

3.2.7 Field Quality Assurance and Quality Control

Field work will follow quality assurance and quality control (QA/QC) procedures specified in Section 10.11 of the *Solid Waste Landfill Guidance* (DEQ, 1999). Standard operating procedures (SOPs) in Appendix C of this EMP specify the sample documentation procedures (SOP1) and procedures for sample packaging and shipping to the analytical laboratory (SOP2). Field QA/QC is summarized below.

3.2.7.1 Field Documentation

Field records will document sampling information such as the site conditions at the time of sampling, sampling methods, and chain-of-custody procedures. The purposes of field documentation are to provide a complete record of procedures performed in the field, identify samples, and document sample chain-of-custody.

Use of chain-of-custody procedures will document sample custody from the field to the laboratory. Field forms and notes will document sample collection preservation, and identification. Permanently bound field logbooks with waterproof paper will be used as the field logbooks. Field sampling data sheets for recording depth to groundwater, groundwater sampling, leachate sampling, and landfill gas monitoring will be maintained in the project file. The SOP1 (Appendix C) specifies field documentation procedures. Appendix B includes field forms.

3.2.7.2 QA/QC Sampling

The following two types of QA/QC samples will be submitted for each annual groundwater monitoring event:

- **Field Duplicate** – A duplicate sample for all analytes should be collected once per sampling day or once every 10 samples. Historically, groundwater monitoring events have been conducted in a single day, and therefore a single field duplicate sample will generally be collected per event. Per the recommendation of the DEQ (2007), the field duplicate will be collected on a rotating basis from well to well. Collection methods will follow the procedures outlined in Section 3.2.5 of this EMP.
- **Trip Blank** – One trip blank sample for VOCs should be prepared for each sample shipment container in which multiple samples are being analyzed for VOCs. Trip blanks will be prepared by the laboratory and will accompany the sample containers to and from SWLF during the sampling event.

An equipment blank sample is not necessary for the proposed groundwater sampling because new or dedicated groundwater sampling materials are used at each monitoring well. SOP1 describes QA/QC sample documentation procedures, and SOP2 (Appendix C) outlines sample packaging and shipping procedures.

3.2.8 Laboratory Quality Assurance and Quality Control

Groundwater samples will be submitted to either BSK Associates of Vancouver Washington or Test America, Inc. of Tacoma, Washington for standard hold time parameters. Two analytical laboratories are necessary to allow flexibility during periods when one laboratory may not be able to meet expected turn-around times. Umpqua Research Company of Bend, Oregon will be utilized for analysis of the short hold time parameters as well as biological parameters. The Oregon Environmental Laboratory Accreditation Program (ORELAP) certification and statements of technical qualifications for each laboratory are included in Appendix D. If the laboratory is changed or a new laboratory is contracted, new certificates and qualifications will be submitted to the DEQ as part of a revised EMP.

3.3 Data Review

A quality assurance/quality control (QA/QC) data review will be conducted on every laboratory data set and is included with each environmental monitoring report. This QA/QC review includes evaluation of representativeness, accuracy, field and analytical precision, comparability, and completeness. These are described as follows:

- Representativeness is the degree to which sample data accurately and precisely describe the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is assessed by examining chain-of-custody documentation and verifying that sample analyses were performed within allowable holding times.
- Accuracy is evaluated using the analytical results for blanks, matrix spike/matrix spike duplicates (MS/MSD), and laboratory control samples (LCS).
- Precision is evaluated by comparing results of primary, field duplicate, and laboratory duplicate analyses.
- Comparability is a qualitative characteristic of the data, expressing the degree of confidence with which one data set can be compared with another.
- Completeness is evaluated by calculating the percentage of acceptable data.

Data is reviewed in accordance with the procedures specified in the United States Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review (EPA, October, 1999) and Inorganic Data Review (EPA, October, 2004) as applicable. The laboratory data is provided in an electronic deliverable dataset (EDD) for direct input in an electronic laboratory database system. Both laboratory data and the field measurements are stored in this electronic database to permit reliable and accessible retrieval of the SWLF groundwater dataset.

3.3.1 CAP Limits and Action Point Exceedance

Data will be reviewed immediately after receiving final data from the laboratory. CAP data will be compared to the Risk-Based Action Limits (RBALs) and the Hazard-Based Action Limits (HBALs) listed in Attachment 2 of the Permit (Table 5 of this EMP). If the detected concentrations exceed any of the RBALs or HBALs, the County must immediately notify the DEQ in writing of the exceeded value and commence semi-annual sampling at that location as specified in Section 13.4 of the Permit.

As described in Section 13.5 of the Permit, an *action point exceedance* occurs when a CoI is detected above the CAPs for two out of three consecutive semi-annual monitoring events. If there is any exceedance of the CAPs, the County must notify the DEQ in writing and implement the *Contingency for Action Point Exceedance* specified in the Selected Remedial Action Staff Report (DEQ, 2003).

3.3.2 Data Review of Split-Sampling Event Parameters

In addition to the annual CAP review discussed above, Sections 14.4 of the Permit specify data review and a range of actions to be taken if there is significant change in monitoring parameters. Table 6 lists data review procedures and resampling actions required by Sections 14.4 of the Permit. Water quality data will be reviewed for significant changes during the split-sampling groundwater monitoring events.

Examples of a significant change in water quality include the following:

- Detection of a VOC or other hazardous constituent not detected in background.
- Exceedance of a Table 1 or Table 3 value listed in OAR 340-40 unless the background water quality is above these numerical limits.
- Exceedance of a safe drinking water standard (EPA National Primary Drinking Water Standards).
- Detection of a compound in an order of magnitude higher than background. Analytical results from up gradient monitoring well MW-5 will be used as background.

Table 2 lists groundwater reference levels in Tables 1 and 3 of OAR 340-40 and the EPA National Primary Drinking Water Standards (i.e., Maximum Contaminant Levels [MCLs]) to which groundwater sampling results will be compared. Table 2 also lists National Secondary Drinking Water Regulation (SDWR) and the Oregon Numerical Groundwater Quality Reference Levels, along with the MCLs, for the analyzed constituents. The data review steps for a split-sampling groundwater monitoring event will consist of the following:

1. Determine whether a VOC or other hazardous constituent is detected in background water samples.
2. Compare detected concentrations to OAR 340-40 Table 1 and 3 values.
3. Compare detected concentrations to the Safe Drinking Water standards.
4. Compare detected concentrations to historical groundwater data for the respective monitoring well at SWLF.

3.3.3 Resampling and Resampling Data Review

If detected concentrations in a well exceed the risk-based or hazard-based concentrations in Table 5, DEQ will be notified in writing immediately and begin semi-annual sampling according to Section 13.4 of the Permit. If two of three semi-annual samples confirm an exceedance, the County must notify the DEQ in writing and implement the *Contingency for Action Point Exceedance* specified in the Selected Remedial Action Staff Report (DEQ, 2003).

3.4 Changing Calculated Action Points

The County can propose to change CAPs at any time. The CAPs can be changed, with DEQ approval per Section 13.6 of the Permit, of the data demonstrate the following:

- Background groundwater quality has changed significantly since CAP establishment.

- Changes in background water quality are not related to any influence from the landfill.

4.0 LANDFILL GAS MONITORING

This section addresses monitoring of landfill gas (LFG) generation at SWLF. Generation of LFG is common at municipal solid waste landfills. The primary components of LFG are methane (CH_4) and carbon dioxide (CO_2) that are generated from the decomposition of refuse under anaerobic conditions. During anaerobic decomposition, complex organic wastes are broken down by microorganisms. Wastes containing organic material (such as food wastes, yard wastes, paper, wood wastes, etc.) are a source of methane generation. Inorganic materials (such as metal, rock, and glass) do not biodegrade.

Many variables influence the generation of LFG. Refuse moisture content is a significant factor affecting generation of LFG. Moisture content can vary widely in landfill waste, ranging from an average of 25 percent moisture by weight to 40 to 50 percent in saturated zones. In the case of SWLF, moisture content is very low given the arid climate. However, given the depth to groundwater (approximately 30 to 50 feet), some of the waste may periodically be in contact with the water-table aquifer. Other important variables in LFG production include refuse placement methods, degree of compaction, refuse composition, and internal and external temperatures.

Methane and carbon dioxide, the principal components of LFG, are present in approximately equal portions. Carbon dioxide may affect groundwater quality and surface vegetation, but impacts to human health and safety are negligible. Methane, like carbon dioxide, is nontoxic to humans. However, methane is an explosive gas when present at levels between 5 and 15 percent by volume. Both carbon dioxide and methane can displace oxygen, so they are classified as simple asphyxiants.

Unlike lined landfill cells, LFG is not necessarily contained within an unlined landfill, such as SWLF. LFG can migrate away from unlined landfills through unconsolidated materials. The Permit requires that landfill decomposition gasses be controlled such that the methane concentration does not exceed 25 percent of the lower explosive limit (“LEL”) within on-site structures or exceed the LEL at the facility boundary. If such conditions exist, the landfill operator must take corrective actions to protect human health and comply with the concentration limits listed above.

4.1 Landfill Gas Monitoring Network

4.1.1 Background

The County has conducted quarterly monitoring of landfill gas at SWLF since 1998 to assess the presence of explosive levels of combustible gases. Monitoring locations initially included the inside of on-site buildings (the Scalehouse [location S-1] and the Pumphouse [location S-2] on Figure 2) and four holes excavated near the landfill boundary (former sample locations FB-1 through FB-4). Until 2005, the shallow (6-inch deep) holes were excavated by hand. In 2005, the County began using a borehole punch to collect samples from shallow holes (FB-1 through FB-4) punched 2 to 3 feet into the ground.

In response to a DEQ request, the County also began monitoring LFG in groundwater monitoring wells. Of the three wells that were monitored during 2005, methane was detected in wells MW-1 and MW-4. Methane concentrations (in percent volume) ranged from 0.7 to 5.2 percent in MW-1 and 9.4 to 13.3 percent in MW-4.

In April 2006, the County installed a network of LFG monitoring wells. In addition, the DEQ requested MW-1, MW-2R, MW-3, and MW-4 be monitored for LFG in lieu of monitoring the bar hole punch locations until LFG monitoring wells were constructed. In late 2006 and early 2007 nine LFG monitoring wells designated, GP-1, GP-2, GP-3, GP-4, GP-5, GP-6, GP-7, and GP-8, and GP-9 were installed to assess the extent of LFG migration at the landfill. The network was augmented with a dual-completion LFG well (GP-10A/B) in 2009 to further assess LFG migration southwest of the landfill.

4.1.2 Network Description

Even though compliance monitoring points for LFG are not established in the Permit, eleven LFG wells at SWLF are monitored. The wells are designated GP-1 through GP-10A/B and are shown on Figure 2 and the LFG logs are included in Appendix A.

The Oregon Water Resources Department (OWRD) classifies gas monitoring wells as cased, permanent geotechnical holes and, therefore, the wells were constructed in general accordance with the requirements specified in Oregon Administrative Rule 690-240-0035(7). The original nine LFG wells were completed as a single well (as opposed to multiple completions monitoring different depths within the borehole). GP-10A/B was constructed as a dual completion well after obtaining a Special Standard from OWRD. Table 7 lists the well construction details and Appendix A includes the well construction logs. Completed well depths are between 16.5 feet and 60 feet below ground surface.

Gas wells were constructed with a 1-inch diameter schedule 40 polyvinyl chloride (PVC) casing and machine slotted PVC screen (0.010-inch wide slots). The screen lengths were 25 feet long for all wells except GP-3 and GP-10A, which each have a 10-foot long screen, and GP-10B which has a 20-foot screen length. The borehole annulus around the well screen was backfilled with 3/8-inch pea gravel. The borehole was then backfilled to a depth of approximately 3-feet below ground surface using bentonite chips. A 6-inch diameter steel well monument was embedded 3-foot below ground surface and sealed within concrete cement. In the case of the dual completion well GP-10A/B, a bentonite seal was placed between the two screened zones. A 6-inch protective well monument extends approximately three feet above the ground surface and has a locking lid. Three 3-inch diameter steel bollards were installed around both of the gas wells for protection.

Each well has been equipped with a dedicated polyethylene drop tube for probe purging and an air-tight quick-connect fitting for sample collection.

4.1.3 Network Maintenance

Regulatory guidelines suggest a minimum post-closure period of 30 years for gas monitoring. This means gas wells may be required to remain in place and operational for many years.

Gas wells generally require very little maintenance. Most of the well will be below ground, making the only portion requiring attention the security casing and its surrounding area. The security casings proposed for the SWLF gas wells will be fabricated from steel. The steel security casings are exposed to the weather and may eventually require maintenance or replacement. The casings could also be damaged by vehicles. Wells should be inspected periodically and the following maintenance performed as needed:

- Wells showing evidence of deterioration should be cleaned, rust deposits removed, primed, and coated with a rust-inhibiting paint.
- Well identification numbers should be repainted and kept legible at all times.
- Security locks should be kept clean and the key assembly lubricated.
- Excess vegetation should be cleared from around the probes for ease of access.
- Vehicle access to the probe locations must be maintained.

4.1.4 Network Modifications

Future modification to the LFG monitoring network, once installed, may be necessary and could include the installation of additional wells and/or the removal or replacement of wells. If monitoring wells are installed, replaced or abandoned, an updated EMP will reflect the changes. Future changes to the monitoring network will be implemented in accordance with Sections 16.6 and/or 16.7 of the Permit as applicable.

4.2 Sampling and Analysis

4.2.1 Collection Methods

The following parameters will be monitored in each of the LFG monitoring wells:

- Static Pressure
- Percent Methane (CH_4) by volume
- Percent Carbon Dioxide (CO_2) by volume
- Percent Oxygen (O_2) by volume
- Percent LEL of Methane by volume

The presence of CO_2 and the depletion of O_2 from its normal concentrations of 19.5 to 21.5 percent by volume are additional indicators, and in many cases, precursors to finding LFG in structures and/or LFG monitoring wells. Positive static pressure measured in a LFG monitoring well is another indicator or precursor to the occurrence of LFG migration.

LFG will be monitored using the County's Landtec GEM 5000 LFG meter. The instrument will be calibrated according to the manufacturer recommended procedures prior to collecting LFG measurements. The ambient barometric pressure, also measured with the meter, will be recorded in addition to each well's static LFG pressure will also be measured.

Once the physical parameters are recorded, two volumes of the polyethylene drop tubing will be evacuated from each well using the instrument pump. Both peak readings as well as steady state readings shall be recorded on the field data forms.

Once the landfill gas readings have been collected from a well, the LFG meter will be purged with ambient air until the instrument gas concentrations return to ambient air readings. This procedure will be repeated after sampling each well in the gas monitoring network.

Any unusual circumstances encountered during sampling such as damaged wells or wellhead valve apparatus, or any other significant observations will be noted on the field data forms. Any damage will be repaired as soon as practical.

4.2.2 Monitoring Locations

Figure 2 shows the LFG monitoring well locations. It should be noted that LFG Probes GP-1, GP-9 and GP-10A/B are considered perimeter monitoring points even though the probes are located on adjacent BLM property.

4.2.3 Frequency of Sample Collection

In accordance with the *Solid Waste Landfill Guidance Document* (Section 10.10), the minimum LFG monitoring sampling frequency will be quarterly. If possible, monitoring will be conducted during periods when strong barometric lows are anticipated.

More frequent monitoring might be required if monitoring results exceed the limits described in Section 14.5 of the Permit, if necessary to protect human health and safety, or if changing site conditions might affect gas generation and migration (e.g. barometric pressure, temperature, soil moisture, and snow cover).

4.2.4 Data Review/Action Requirements

After each monitoring event, LFG monitoring results will be reviewed for exceedances of methane limits. If methane levels exceed the specified limits described in Section 14.5, the County will take the following actions as required by Section 14.6 of the Permit.

- Immediately take steps to protect human health and safety and notify the Department of the exceeded value.
- Within seven days of detection (unless the DEQ approves an alternative schedule), enter the methane levels in the operating record and describe the steps taken to protect human health and safety.
- Within 60 days of detection, implement a remediation plan for methane releases, incorporate the plan into the operating record, and notify the department that the plan has been implemented.

4.2.5 Standard Reporting Forms

Gas concentrations will be measured in the field and recorded on field forms. A copy of a field data sheet is included in Appendix B. Monitoring data recorded in the field should be transferred later onto permanent forms. In addition to data collected from soil gas probes, information from each sampling event should include the following:

- Date and time of monitoring session.
- Name of person performing the monitoring.
- Instrumentation used.
- Weather conditions, including temperature and barometric pressure.
- Any problems associated with the monitoring equipment that may impact accuracy of the monitoring results.

4.3 Permit-Specified Methane Concentration Limits

The primary constituent of concern in LFG is methane, which in certain concentrations can be explosive. In accordance with Section 14.5 of the Permit, the methane limits for Southwest Landfill must not exceed:

- 25 percent of the lower explosive limit (LEL) for methane in on-site structures (excluding gas control structures) or 1.25 percent methane by volume.

- The LEL for methane at the facility boundary (the LEL for methane is 5 percent by volume).

5.0 OTHER ENVIRONMENTAL MONITORING

No leachate, surface water, or vadose zone monitoring is planned at this time. The County will assess perimeter controls, landfill and vegetation cover issues, and surface drainage issues during the course of conducting quarterly site inspections and include that information in the LFG Probe/Structure Monitoring/Site Inspection field form (Appendix B).

6.0 DATA ANALYSIS AND REPORTING

Section 15 of the Permit specifies recordkeeping and reporting requirements. This section describes the reporting format for the groundwater and landfill gas monitoring networks, and describes additional reporting requirements stipulated in the Permit. In general, environmental monitoring results will be summarized in an Annual Environmental Monitoring Report (AEMR). Two copies of the AEMR will be provided to DEQ before March 31 of each year for the duration of the Permit. The period for reporting will be from January 1st to December 31st of each year.

6.1 Annual Reporting

The AEMR will provide environmental monitoring data to the DEQ in a clear format. The AEMR will assess regulatory and Permit compliance, identify leachate impacts (if any), recommend any corrective actions, and summarize monitoring of any health and environmental effects. The AEMR will be completed as required by Section 15.4 of the Permit, and in general accordance with Section 10.14 of *the Solid Waste Landfill Guidance Document* (DEQ, 1999). The AEMR will provide the following information and analysis:

- Identify significant events that occurred at the site during the past year.
- Review monitoring network performance and recommendations for changes.
- Summarize data collected in the past year into tables, including but not limited to groundwater and LFG data.
- Note any data problems. This information will be incorporated into a laboratory review report and included as an appendix.
- Depict groundwater potentiometric surface on a map representing the annual (fall) sampling event.
- Tabulate box plots for field specific conductivity, dissolved oxygen, and all analyzed parameters during the current year.
- Show trends in time-series plots of all analyzed parameters.
- Tabulate anion-cation balance for each sampling location and event for which there is adequate data (every fourth year).
- Compile field data sheets, laboratory data, and laboratory certification for the past year.

6.2 Split-Sampling Submittal

As described in Section 15.5 of the Permit, a split-sampling submittal is required to be submitted to the DEQ laboratory within 90 days of any split-sampling event. The split-sampling submittal shall include (at a minimum) all pertinent sampling information including field notes, laboratory reports, laboratory QA/QC reports, lab certifications, a groundwater contour map, and any other information requested by the DEQ. This information should be mailed to the following:

Oregon Department of Environmental Quality
Laboratory and Environmental Assessment Section
3150 NW 228th Ave., Suite 150
Hillsboro, OR 97124
Telephone: (503) 693-5700

6.3 Submittal Address

Except where otherwise noted, the AEMR and other submittals should be mailed to the following:

Oregon Department of Environmental Quality
Manager, Solid Waste Program
400 E. Scenic Drive, Suite 307
The Dalles, Oregon 97058
Telephone: (541) 298-7255
Fax: (541) 298-7330

6.4 Statement of Compliance

The AEMR will cover monitoring results from of the previous year. Included with the AEMR will be a one-page compliance letter, which will be stamped by either a registered geologist or a certified engineering geologist, with current Oregon registration. The compliance letter will briefly summarize the following:

- Summarize compliance of analytical results with the relevant monitoring standards.
- List any federal or state standards or any CAPs that have been exceeded for sampled media.
- Identify any significant change in groundwater quality.

6.5 Other Reporting

Other reporting may be required for specific events associated with the environmental monitoring networks at Southwest Landfill. Events requiring additional reporting may include, but are not limited to, the following:

- Monitoring well damage as described in Section 16.5 of the Permit.
- Monitoring well construction as described in Section 16.7 of the Permit.
- Monitoring well abandonment and proposals to abandon wells as described in Section 16.8 of the Permit.

7.0 LIMITATIONS

PBS has prepared this EMP for use by Deschutes County Department of Solid Waste. This plan is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced in total or in part without the expressed written consent of the client and PBS.

PBS Engineering and Environmental Inc.

N. Toby Scott, RG Date
Sr. Project Manager/Hydrogeologist

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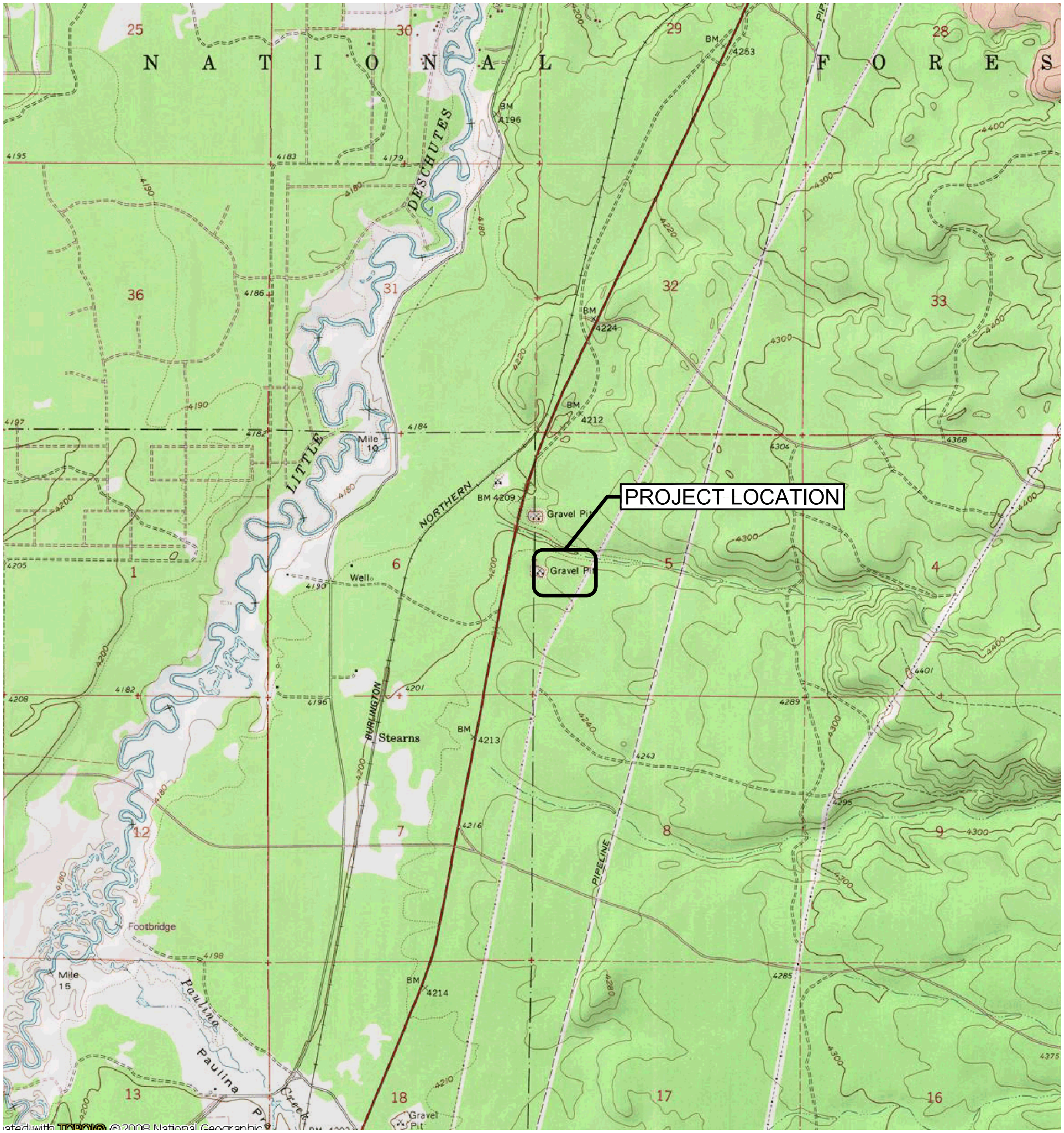
FIGURES



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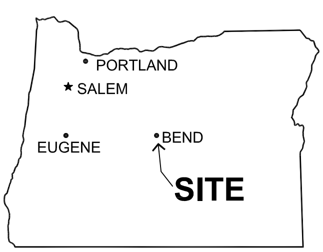

OREGON

0' 1500' 3000' 6000'

SCALE: 1" = 3,000'

PREPARED FOR: DESCHUTES COUNTY, DEPARTMENT OF SOLID WASTE

PBS	PROJECT # 80429.007	SITE VICINITY MAP	FIGURE
	DATE JULY 2016	SOUTHWEST LANDFILL - 54580 US HWY 97 DESCHUTES COUNTY, OREGON	1

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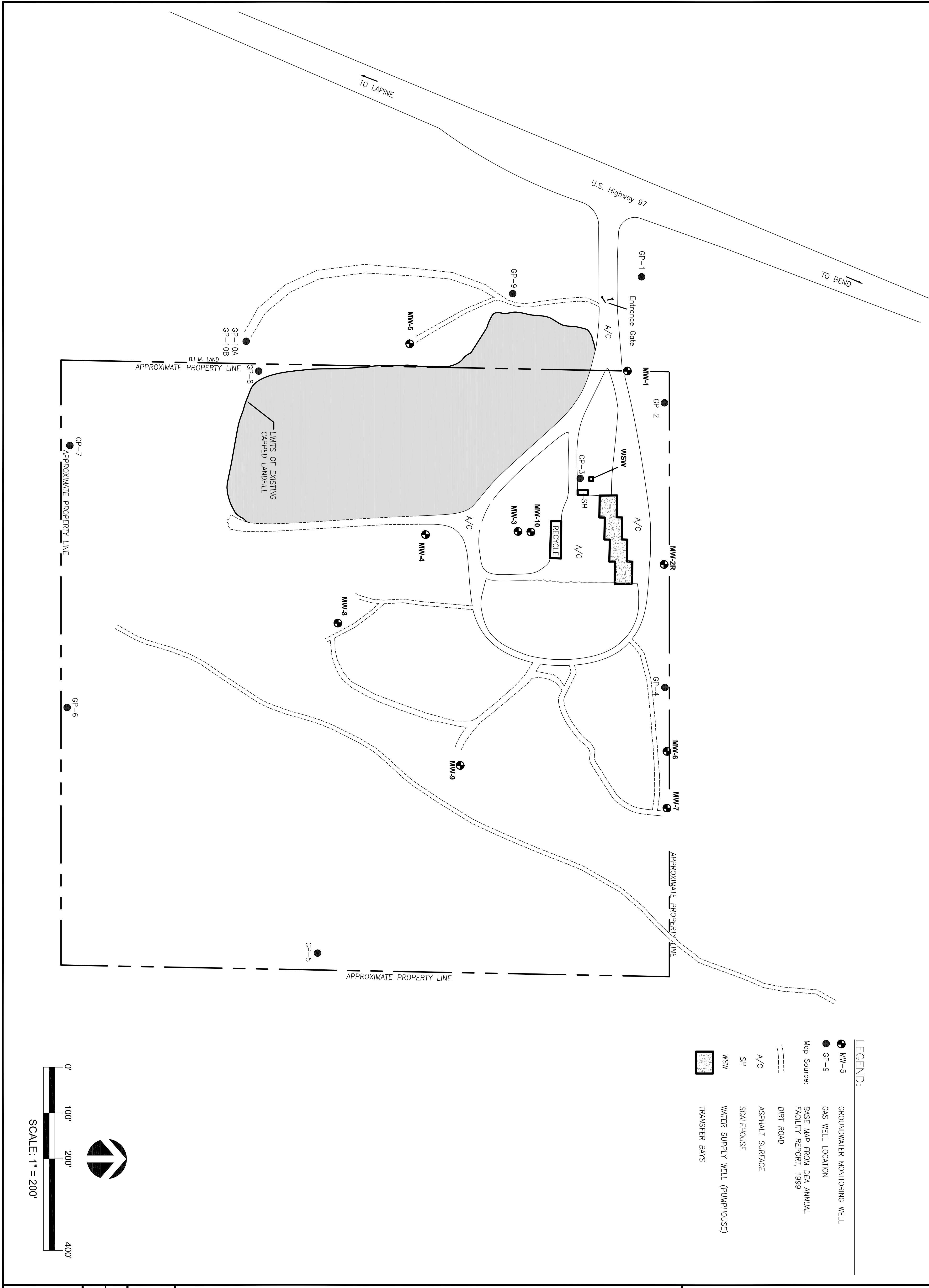

SITE PLAN

SOUTHWEST LANDFILL
DESCHUTES COUNTY, OREGON

ENVIRONMENTAL MONITORING PLAN

PROJECT: 80429.007

DATE: JULY 2016

FIGURE: **2**

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TABLES

TABLE 1
Groundwater Monitoring Well Summary

Well Identification	Date Installed	Well Depth (feet bgs)	Screen Interval (feet bgs)	Casing Diameter (inches)
MW-1	07/15/87	48	38-48	2
MW-2R	12/03/93	53	38-53	4
MW-3	07/15/87	58.5	48-5-58.5	2
MW-4	07/15/87	55	45-55	2
MW-5	07/15/87	43	33-43	2
MW-6	10/22/96	40	30-40	2
MW-7	10/22/96	40	30-40	2
MW-8	11/09/98	60	50-60	2
MW-9	11/10/98	60	50-60	2
MW-10	11/12/98	70	60-70	2
Water Supply Well	11/30/85	115	102-107	6

Notes:
Summary data taken from the State of Oregon Monitoring Well and Water Well Reports prepared for each well, except for MW1, MW-3, and MW-5. Data for MW-1, MW-3, and MW-5 is from field measurements.
Monitoring wells MW-1 through MW-10 are constructed of Schedule 40 PVC casing and well screen.
The water supply well is constructed of 250-gauge steel.
NA = not available
bgs = below ground surface

Table 2
Summary of Monitoring Parameters – Groups 1a, 1b, 2a, 2b and 3
Southwest Landfill – Deschutes County, Oregon

Parameter Groups	Method Reporting Limits(1)	Method Detection Limits(1)	MCL(2)	OAR 340-40(3)
FIELD PARAMETERS (Group 1a)(4)				
pH	—	—	6.5-8.5(5)	6.5-8.5
Temperature, °c	—	—	NR	NR
Specific Conductance, uS/cm	—	—	NR	NR
Dissolved Oxygen, mg/L	—	—	NR	NR
Oxidation-Reduction Potential, mV	—	—	NR	NR
Groundwater Elev., lt above MSL	—	—	--	--
LEACHATE INDICATORS (Group 1b)				
Chemical Oxygen Demand, mg/L	10	10	NR	NR
Hardness, mg/L	2.0	2	NR	NR
pH	--	--	6.5-8.5(5)	6.5-8.5
Specific Conductivity, umhos/cm	10	10	NR	NR
Tannins & Lignins, mg/L	0.2	0.05	NR	NR
Total Alkalinity, mg/L	5.0	5	NR	NR
Total Dissolved Solids, mg/L	10	10	500(5)	500
Total Organic Carbon, mg/L	1.0	0.19	NR	NR
Total Suspended Solids, mg/L	2.0	2	NR	NR
COMMON ANIONS AND CATIONS (mg/L) (Group 2a – Field Filtered)				
Ammonia NH_4)	0.2	0.06	NR	NR
Bicarbonate (HCO_3)	5.0	5	NR	NR
Calcium (Ca)	0.1	0.05	NR	NR
Carbonate (CO_3)	5.0	5	NR	NR
Chloride (Cl)	0.5	0.25	250(5)	250
Fluoride (F)	0.5	0.01	4.0	4.0
Iron (Fe)	0.04	0.01	0.3(5)	0.3
Magnesium (Mg)	0.02	0.01	NR	NR
Manganese (Mn)	0.002	0.00025	0.05(5)	0.05
Nitrate – Nitrogen (NO_3)	1.0	0.1	10.0	10.0
Potassium (K)	0.5	0.25	NR	NR
Silica (SIO_2)	2.5	0.344	NR	NR
Sodium (Na)	0.5	0.25	NR	NR
Sulfate (SO_4)	1.0	0.25	250(5)	250
TOTAL TRACE METALS (u/L) Group 2b)				
Antimony (Sb)	0.4	0.08	0.006	NR
Arsenic (As)	1	0.27	0.010	0.05
Barium (Ba)	1	0.054	2.0	1.0
Beryllium (Be)	0.4	0.102	0.004	NR
Cadmium (Cd)	0.4	0.028	0.005	0.01
Chromium (Cr)	0.4	0.141	0.1	0.05
Cobalt (Co)	0.4	0.032	NR	NR
Copper (Cu)	2	0.603	1.3	1.0
Lead (Pb)	0.4	0.034	0.015	0.05
Nickel (Ni)	2	0.4	NR	NR
Selenium (Se)	1	0.297	0.05	0.010
Silver (Ag)	0	0.03	0.10(5)	0.05
Thallium (Tl)	1	0.142	0.002	NR
Vanadium (V)	1	0.975	NR	NR
Zinc (Zn)	5	1.9	5.0(5)	5.0

Table 2
Summary of Monitoring Parameters – Groups 1a, 1b, 2a, 2b and 3
Southwest Landfill – Deschutes County, Oregon

Parameter Groups	Reporting Limits(1)	Method Detection Limits(1)	MCL(2)	OAR 340-40(3)
VOCS (EPA 8260B (ug/L)) (Group 3)				
Acetone	25	0.4	NR	NR
Benzene	0.2	0.025	5.0	5.0(5)
Bromobenzene	0.5	0.035	NR	NR
Bromochloromethane	0.5	0.025	NR	NR
Bromodichloromethane	1	0.025	NR	100.0(5,6)
Bromoform	1	0.08	NR	100.0(5,6)
Bromomethane	5	0.16	NR	NR
2-Butanone	10	2.5	NR	NR
n-Butylbenzene	5	0.08	NR	NR
sec-Butyl benzene	0.5	0.07	NR	NR
tert-Butylbenzene	1	0.1	NR	NR
Carbon disulfide	10	0.025	NR	NR
Carbon tetrachloride	1	0.025	5.0	5.0(5)
Chlorobenzene	0.5	0.025	100	NR
Chloroethane	1	0.075	NR	NR
Chloroform	0.5	0.03	NR	100.0(5,6)
Chloromethane	5	0.05	NR	NR
2-Chlorotoluene	0.5	0.07	NR	NR
4-Chlorotoluene	0.5	0.05	NR	NR
1,2-Dibromo-3-Chloropropane	5	0.44	0.2	NR
Dibromochloromethane	1	0.025	NR	100.0(5,6)
1,2-Dibromoethane	0.5	0.025	NR	NR
Dibromomethane	0.5	0.025	NR	NR
1,2-Dichlorobenzene	0.05	0.5	600	NR
1,3-Dichlorobenzene	0.05	0.5	NR	NR
1,4-Dichlorobenzene	0.05	0.5	75	75(5)
Dichlorodifiuoromethane	5	0.5	NR	NR
1,1-Dichloroethane	0.5	0.025	NR	NR
1,2-Dichloroethane	0.5	0.025	5.0	5.0(5)
1,1-Dichloroethene	0.5	0.018	7.0	7.0(5)
cis-1,2-Dichloroethene	0.5	0.025	70	NR
trans-1,2-Dichloroethene	0.5	0.025	100	NR
1,2-Dichloropropane	0.5	0.025	5.0	NR
1,3-Dichloropropane	0.5	0.025	NR	NR
2,2-Dichloropropane	0.5	0.06	NR	NR
1,1-Dichloropropene	0.5	0.018	NR	NR
cis-1,3-Dichloropropene	0.5	0.09	NR	NR
trans-1,3-Dichloropropene	0.5	0.025	NR	NR
Ethylbenzene	0.5	0.03	700	NR
Hexachlorobutadiene	1	0.075	NR	NR
2-Hexanone	10	0.038	NR	NR
Isopropylbenzene	2	0.06	NR	NR
p-Isopropyltoluene	2	0.05	NR	NR
4-Methyl-2-pentanone	5	0.5	NR	NR
Methylene chloride	5	0.11	NR	NR
Naphthalene	2	0.1	NR	NR
n-Propylbenzene	0.5	0.025	NR	NR
Styrene	0.5	0.1	100	NR
1,1,1,2-Tetrachloroethane	0.5	0.025	NR	NR
1 ,1 ,2,2-Tetrachloroethane	0.5	0.025	NR	NR
Tetrachloroethene	0.5	0.07	5.0	NR

Table 2
Summary of Monitoring Parameters – Groups 1a, 1b, 2a, 2b and 3
Southwest Landfill – Deschutes County, Oregon

Parameter Groups	Reporting Limits(1)	Method Detection Limits(1)	MCL(2)	OAR 340-40(3)
Toluene	0.5	0.025	1,000	NR
1,2,3-Trichlorobenzene	1	0.1	NR	NR
1,2,4-Trichlorobenzene	1	0.04	70	NR
1,1,1-Trichloroethane	1	0.025	200	200(5)
1,1,2-Trichloroethane	0.5	0.025	5.0	NR
Trichloroethene	0.5	0.025	5.0	5.0
Trichlorofiuoromethane	0.5	0.025	NR	NR
1,2,3-Trichloropropane	0.5	0.05	NR	NR
1,2,4-Trimethylbenzene	1	0.1	NR	NR
1,3,5-Trimethylbenzene	0.5	0.083	NR	NR
Vinyl chloride	0.5	0.013	2.0	2.0(5)
o-Xylene	0.5	0.06	10,000(4)	NR
m,p-Xylene	1	0.05	10,000(4)	NR

Notes:
NR = Not Regulated
NA = Not Analyzed
MCL = Maximum Contaminant Level
ug/L = micrograms per liter
mg/L = milligrams per liter
mV = millivolts
uS/cm = microSiemens per centimeter
"–" = Not Applicable

TestAmerica and BSK Associates Reporting Detection Limits as of May 2016
1 = Reporting/detection limits as of May 2016, unless otherwise noted.
2 = U.S. Environmental Protection Agency Maximum Contaminant Levels for drinking water in a public water system. EPA document: 816-F-03-016, June 2003 revision.
3 = Oregon Administrative Rule 340-40, Tables 1 and 3 (Numerical Groundwater Reference/Quality Levels), November 1997.
4 = End-of-purge values, except for groundwater level data.
5 = National Secondary Drinking Water Regulation standard that is a non-enforceable guideline (see above referenced EPA document).

Table 3
Laboratory Container, Preservation, and Holding Times
Southwest Landfill – Deschutes County, Oregon

Analytical Parameter	Method	Volume / Container	Preservation	Hold Time	Analysis Laboratory
Group 1b: Leachate Indicators					
Hardness	SM2340B	500 mL HDPE	HNO_3 to pH <2.0., Cool to 4°C	6 Months	BSK/Test America
Total Alkalinity	SM2320B	250 mL HDPE	Cool to 4°C	14 Days	
Tannins & Lignins	SM5550B	125 mL HDPE		28 Days	
Chemical Oxygen Demand	SM5220D	250 mL HDPE	H_2SO_4 to pH <2.0, Cool to 4°C		
Total Organic Carbon	EPA 9060	250 mL GAJ			
Specific Conductivity	EPA 9050	250 mL HDPE	Cool to 4°C		
Total Dissolved Solids	SM2540C	1 liter HDPE		7 Days	
Total Suspended Solids	SM2540D	250 mL HDPE			
pH	150.1	250 mL HDPE		ASAP	Umpqua
Group 2a: Common Anions and Cations (Field Filtered)					
Nitrate	EPA 300.0	500 mL HDPE	Cool to 4°C	48 Hours	Umpqua
Ammonia/ Ammonium	EPA 350.1	500 mL HDPE	H_2SO_4 to pH <2.0, Cool to 4°C	28 Days	BSK/Test America
Sulfate/Fluoride/ Chloride	300.0	125 mL HDPE	Cool to 4°C		
Silica	SM4500-SIF	125 mL HDPE			
Bicarbonate	SM2320B	250 mL HDPE		14 Days	
Group 2b: Trace Metals					
Metals – non-filtered	EPA 200.7/200.8	500 mL HDPE	HNO_3 to pH <2.0., Cool to 4°C	180 Days	BSK/Test America
Metals – filtered	EPA 200.7/200.8	500 mL HDPE			
Group 3: Volatile Organic Constituents					
VOCs	EPA 8260B	3x40 ml VOA vials	HCl to pH<2.0 Cool to 4°C	14 Days	BSK/Test America

Notes:
[1]Metals include: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Ni, Se, Ag, Tl, V, Zn
HDPE = high-density polyethylene bottle with Teflon-lined screw cap
GAJ = glass amber jar with Teflon-lined screw cap

Table 4
Environmental Monitoring Locations, Parameters, and Sampling Frequencies[1]

Monitoring Network	Compliance Monitoring Wells	Analyte Group	Monitoring Frequency	Time of Year
Groundwater	MW-2R, MW-5 (background well), MW-7, MW-8, MW-9, MW-10, and the On-Site Water Supply Well	Group Ia and Calculated Action Points[2]	Annual	Fall
		Groups 1a, 1b, 2a, 2b, and 3	Once Every 4 Years	Fall Split Sampling Events
Landfill Gas	GP-1, GP-2, GP-3, GP-4, GP-5, GP-6, GP-7, GP-8, GP-9, and GP10A/B	CH4, CO2, O2, Pressure Quarterly	Quarterly	Winter, Spring, Summer, and Fall

Notes:
[1] Table based on Attachment 3 of the Southwest Landfill Solid Waste Disposal Site Closure Permit No. 259
[2] Calculated Action Points consist of the nine contaminants of interest designated in Attachment 2 of Permit No. 259, which are benzene, chloroethane, 1,4-dichlorobenzene, cis-l ,2-dichloroethene, 1, I-dichloroethene, tetrachloroethene, trichloroethene, vinyl chloride, and chromium).

TABLE 5
Calculated Action Points[1]

Chemical Parameter	Risk-Based Action Limit	Hazard-Based Action Limit	Maximum Contaminant Level
Benzene	21	--	5
Chloroethane	350	--	--
1,4-Dichlorobenzene	45	--	75
Cis-I,2-Dichloroethene	--	4,500	70
1,1-Dichloroethane	--	51,000	--
Tetrachloroethene	16	--	5
Trichloroethene	2	--	5
Vinyl Chloride	1.1	--	2
Chromium	--	4,200	100

Notes:
Concentrations are in micrograms per liter (µg/L)
NL = No limit (calculated action point) for this parameter
[1]Table based on the table presented in Attachment 2 of the Southwest Landfill Solid Waste Disposal Site Closure Permit No.259 dated March 9, 2016, issued by the Oregon Department of Environmental Quality.

TABLE 6
Procedures for the Review of Groundwater Analytical Data[1]

If the data shows results that…	Then…
indicate a significant change in water quality at any monitoring point for Parameter Group 1, 2, or 3 constituents except those constituents with Calculated Action Points listed in Table 4, Note: Examples of significant changes • Detection of a VOC or other hazardous constituent not detected in background; • Exceedance of a Table 1 or 3 value listed in OAR 340-40 unless the background water quality is above these numerical limits; • Exceedance of a Safe Drinking Water Standard; • Detection of a compound in an order of magnitude higher than background.	1. notify the DEQ in writing within 10 days of receipt of laboratory results; and, 2. perform resampling immediately and evaluate results as described below. Note: • If this is a known release, previously confirmed to the department in writing, resampling is not required. The 9 constituents listed in Table 4 are known releases that do not require immediate resampling, The 9 constituents shall be monitored per Section 13 of the Permit.
None of the above,	continue groundwater monitoring with the next scheduled sampling event.

Notes:
[1]Table based on the table presented in Section 14.4 of the Southwest Landfill Solid Waste Disposal Site Closure Permit No. 259, Dated February 26, 2016, issued by the Oregon Department of Environmental Quality.

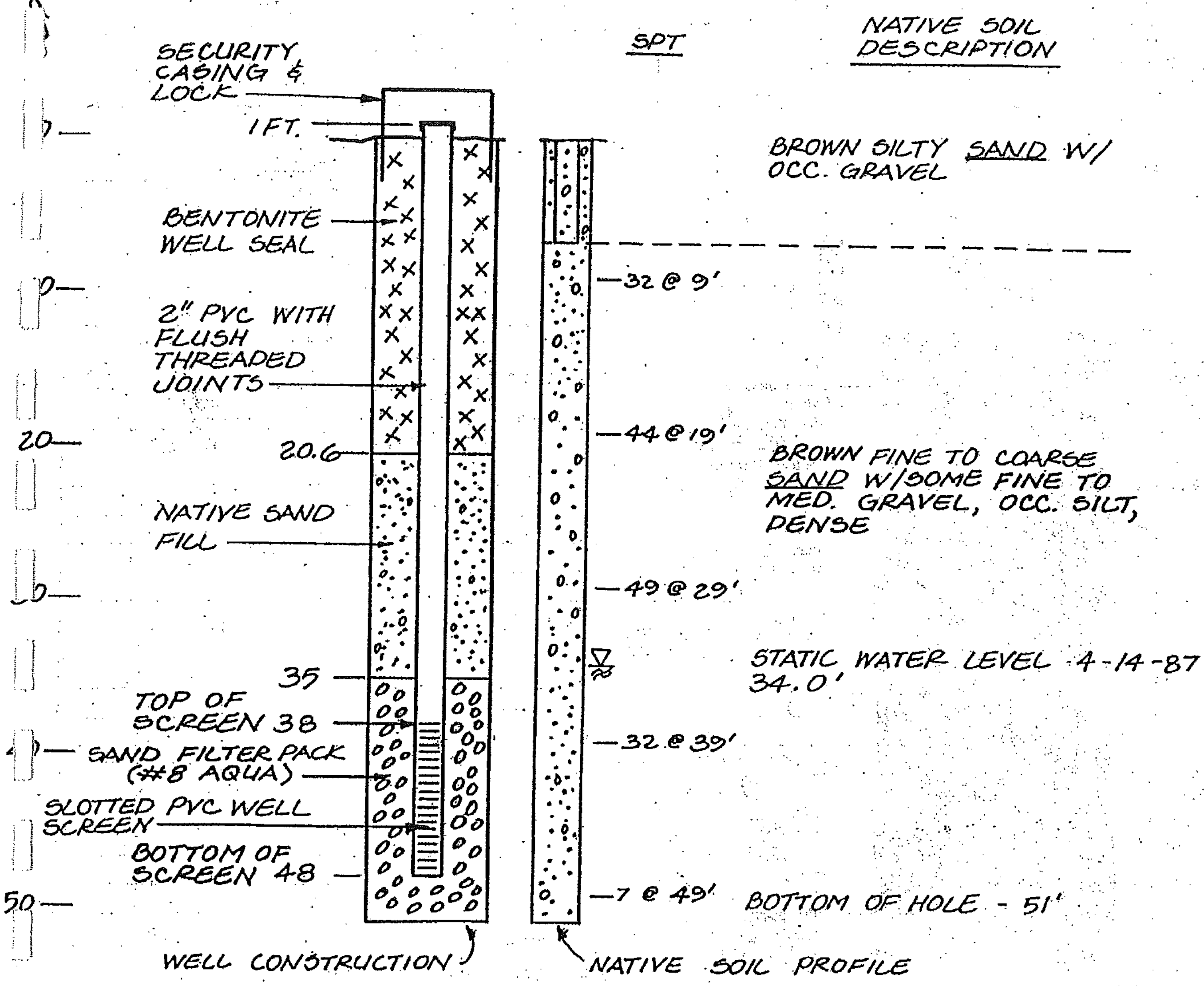
TABLE 7
Gas Monitoring Well Construction Details
Southwest Landfill - Deschutes County Oregon

WELL	BOREHOLE DEPTH	WELL DEPTH[1]	SURFACE SEAL[2]	WELL SEAL INTERVAL[3]	FILTER PACK INTERVAL[4]	WELL SCREEN INTERVAL[5]
GP-1	40	38	0 - 3	3 - 9	9 - 40	13 - 38
GP-2	40	39	0 - 2	2 - 10	10 - 40	14 - 39
GP-3	21.5	20	0 - 2	2 - 6	6 - 21.5	10 - 20
GP-4	36.5	35	0 - 2	2 - 6	6 - 36.5	10 - 35
GP-5	61.5	60	0 - 2	2 - 31	31 - 61.5	35 - 60
GP-6	51.5	50	0 - 2	2 - 21	21 - 51.5	25 - 50
GP-7	51.5	49	0 - 2	2 - 20	22 - 51.5	24 - 49
GP-8	41.5	40	0 - 2	2 - 11	11 - 41.5	15 - 40
GP-9	40	35	0 - 2	3 - 6	6 - 40	10 - 35
GP-10A[6]	45	45	0 - 3	16.5	23.5 - 45	25 - 45
GP-10B[6]		16.5	0 - 3	3 - 5	5 - 16.5	6.5 - 16.5

Notes:
All measurements in feet below ground surface unless otherwise noted.
[1]All wells were constructed with 1-inch diameter Schedule 40 PVC riser pipe and well screens.
[2]Surface seals are constructed with concrete cement.
[3]Well seals consist of hydrated 3/8-inch bentonite chips.
[4]Filter packs consist of 3/8-inch pea gravel.
[5]Well screens are 1 O-slot Schedule 40 PVC.
[6]GP-10A/B is a dual well completion with one borehole

APPENDIX A

Well Construction Logs and Landfill Gas Probe Construction Logs



MONITORING WELL # 1

DESIGN BY	JWF	CHECKED BY	JWF	MONITORING WELLS SOUTHWEST SANITARY LANDFILL	APPROVED	CENTURY WEST ENGINEERING CORPORATION
SURVEY BY		SCALE	AS SHOWN		DATE 5-87	
DRAWN BY	PAM	DWG. NO.				

FIGURE A-1

11

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)

Res 9029 DEC 22 1993 WATER RESOURCES DEPT. SALEM, OREGON

MW-2

21S/ 11E/ 5Cb

Start Card # 62[illegible]2

(1) OWNER/PROJECT: WELL NO.

Name DESCHUTES Co PUBLIC WORKS
Address 61150 S.E. 27th.
City BEND State OR Zip 97702

(2) TYPE OF WORK:

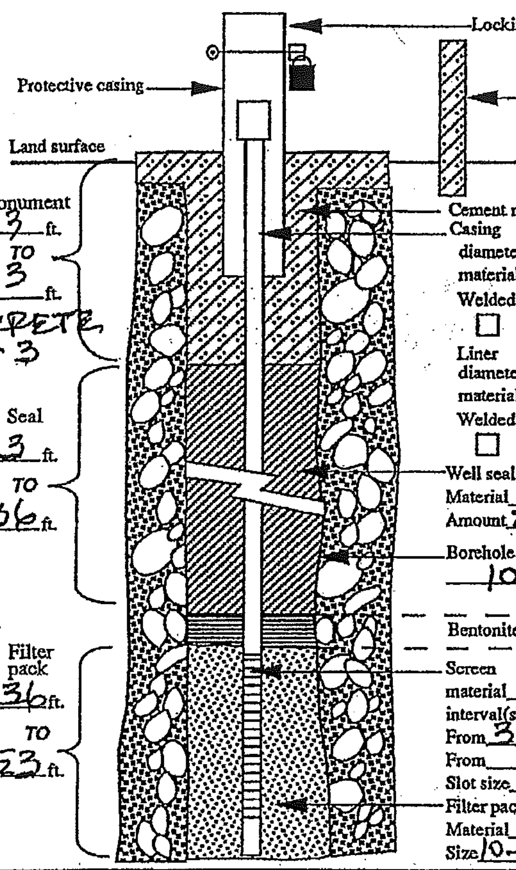
[X] New construction [ ] Repair [ ] Recondition
[ ] Conversion [ ] Deepening [ ] Abandonment

(3) DRILLING METHOD

[ ] Rotary Air [ ] Rotary Mud [ ] Cable
[X] Hollow Stem Auger [ ] Other

(4) BORE HOLE CONSTRUCTION

Special Standards Yes [ ] No [X] Depth of completed well 53 ft.



Monument +3 ft. TO -3 ft. CONCRETE 0-3

Cement monument

Casing diameter 4 in. material P.V.C.
Welded [ ] Threaded [X] Glued [ ]

Liner diameter ___ in. material ___
Welded [ ] Threaded [ ] Glued [ ]

Seal 3 ft. TO 36 ft.

Well seal: Material BENTONITE CHIPS Amount 20 - 50# BAGS

Borehole diameter 10 in.

Bentonite plug at least 2 ft. thick

Filter pack 36 ft. TO 53 ft.

Screen material P.V.C. interval(s): From 38 To 53 From ___ To ___ Slot size .030 in.

Filter pack: Material SAND Size 10-20 in.

(5) WELL TEST:

[ ] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Permeability ___ Yield ___ GPM
Conductivity ___ PH ___
Temperature of water 52 °F Depth artesian flow found ___ ft.
Was water analysis done? [X] Yes [ ] No
By whom? C.E.S.
Depth of strata to be analyzed. From ___ ft. to ___ ft.
Remarks: ___

Name of supervising Geologist/Engineer TOBY SCOTT

(6) LOCATION OF WELL By legal description

Well Location: County DESCHUTES
Township 21 (N or S) Range 11 (E or W) Section 5
1. NW 1/4 of SW 1/4 of above section.
2. Street address of well location MILEPOST 139.5 U.S. 97 SOUTH OF SUNRIVER (WASTE TRANSFER STATION)
3. Tax lot number of well location N/A
4. ATTACH MAP WITH LOCATION IDENTIFIED.

(7) STATIC WATER LEVEL:

42.5 Ft. below land surface. Date 12-3-93
Artesian Pressure ___ lb/sq. in. Date ___

(8) WATER BEARING ZONES:

Depth at which water was first found 44

From	To	Est. Flow Rate	SWL

(9) WELL LOG: Ground elevation ___

Material	From	To	SWL
SAND / SMALL GRAVEL	0	53	

Date started 12-3-93 Completed 12-3-93

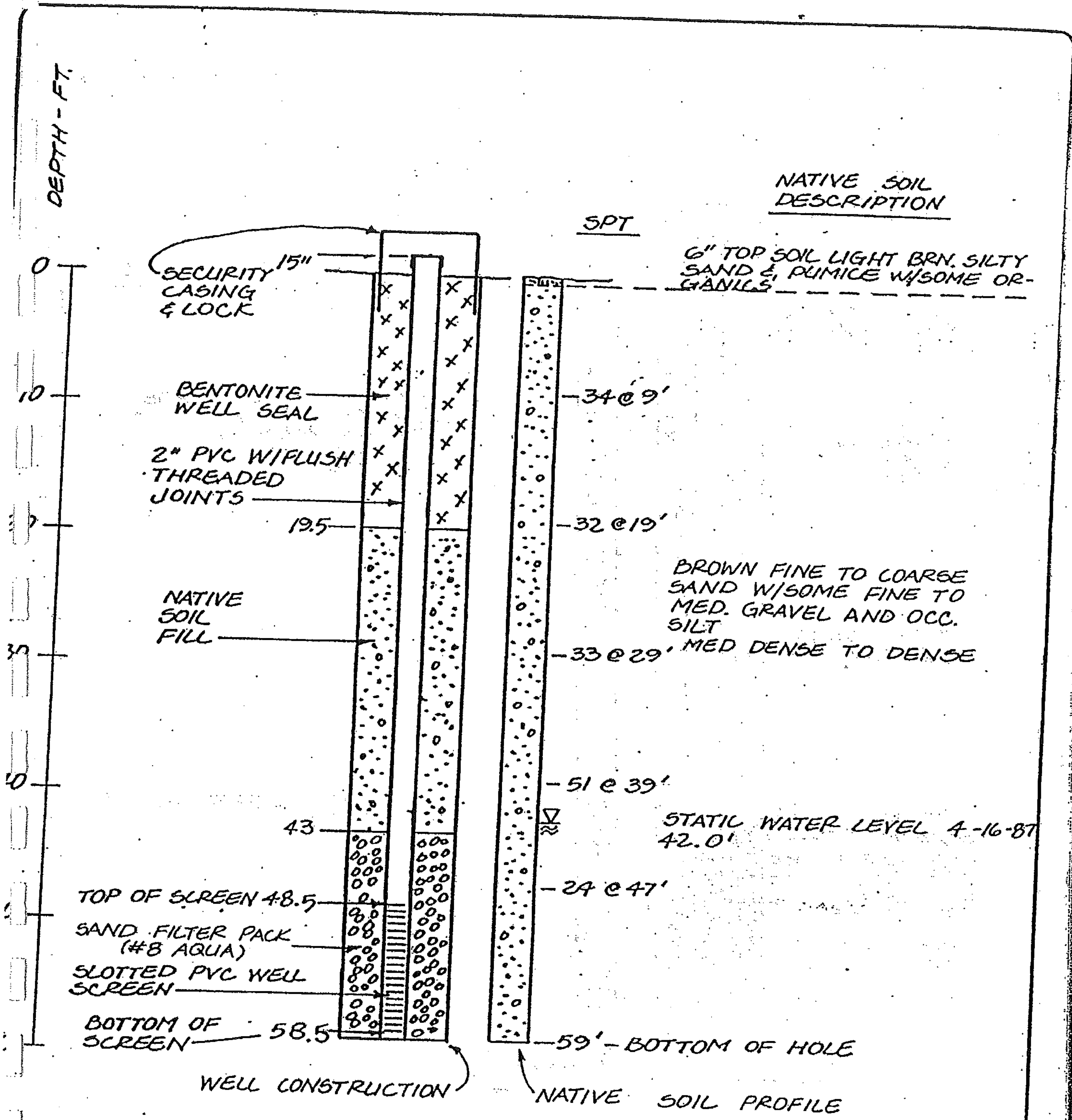
(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

Signed Daniel Abernathy MWC Number 10025 Date 12-3-93

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed [illegible] MWC Number 1001 Date 12/20/93

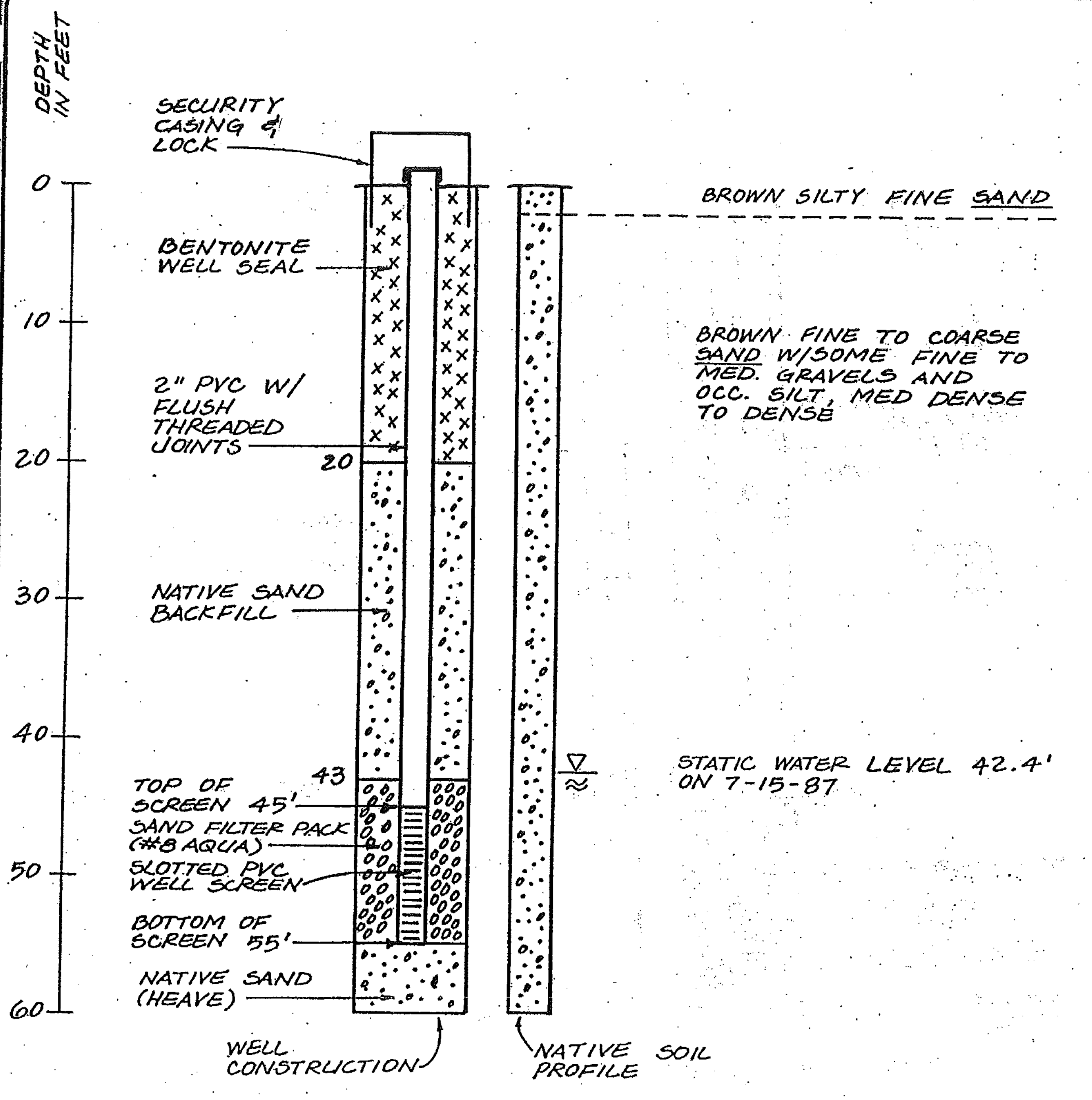
ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER



MONITORING WELL # 3

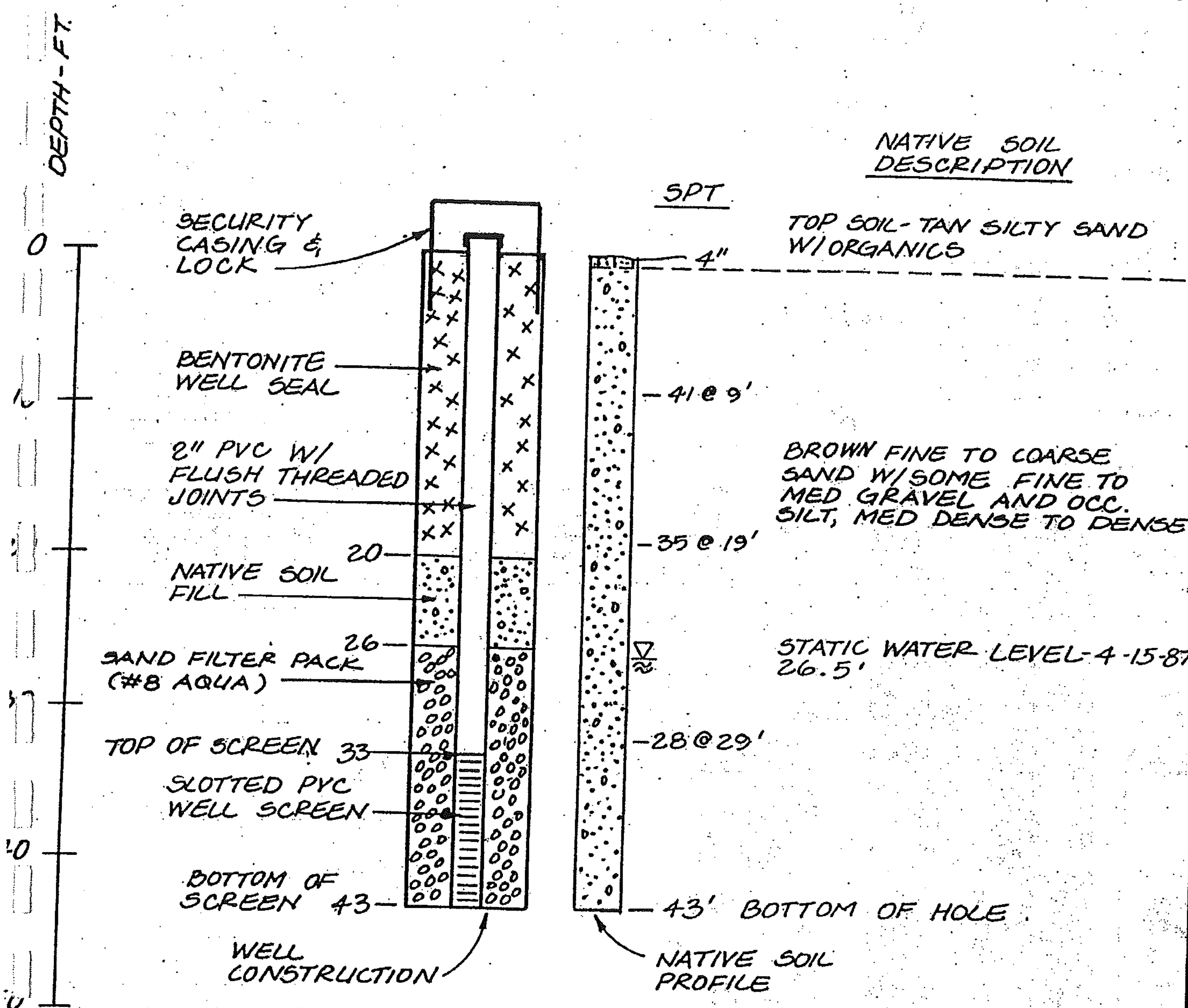
BY	JWF	CHECKED BY	JWF	**MONITORING WELLS**	APPROVED		CENTURY WEST ENGINEERING CORPORATION
VEY BY		SCALE	AS SHOWN	SOUTHWEST			
BY	PAM	DWG. NO.		SANITARY LANDFILL	DATE	MAY 1987	

FIGURE A-3



MONITORING WELL #4

DESIGN BY	JWF	CHECKED BY	JWF	MONITORING WELLS	APPROVED	CENTURY WEST ENGINEERING CORPORATION
SURVEY BY		SCALE	AS SHOWN	SOUTHWEST	DATE	
DRAWN BY	PAM	DWG. NO.		SANITARY LANDFILL	7-87	



MONITORING WELL # 5

...GN BY	JWF	CHECKED BY	JWF	MONITORING WELLS	APPROVED	CENTURY WEST ENGINEERING CORPORATION
...EY BY		SCALE	AS SHOWN	SOUTHWEST	DATE	
...N BY	PAM	DWG. NO.		SANITARY LANDFILL	MAY 1987	

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)
Instructions for completing this report are on the last page of this form.

Desc 50627

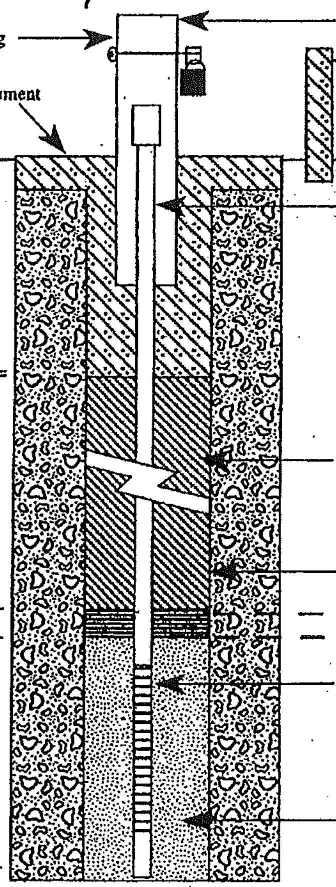
WELL I.D. # L05518
Start Card # 93695

(1) OWNER/PROJECT: WELL NO. MW-6
Name Deschutes Co
Address 61150 SE 27th St
City Bend State OR Zip 97702

(2) TYPE OF WORK:
[X] New construction [ ] Alteration (Repair/Recondition)
[ ] Conversion [ ] Deepening [ ] Abandonment

(3) DRILLING METHOD
[ ] Rotary Air [ ] Rotary Mud [ ] Cable
[X] Hollow Stem Auger [ ] Other ______

(4) BORE HOLE CONSTRUCTION
Special Standards: Yes [ ] No [X] Depth of completed well 40 ft.



Protective casing — Locking cap — Protective post
Cement monument
Land surface

Monument 0 ft. TO 3 ft.
Seal 3 ft. TO 28 ft.
Filter pack 28 ft. TO 40 ft.

Casing diameter 2 in.
material PVC
Welded [ ] Threaded [X] Glued [ ]

Liner diameter ______ in.
material ______
Welded [ ] Threaded [ ] Glued [ ]

Well seal:
Material Bent Chips
Amount 33 50# Bags
Grout weight ______
Borehole diameter 6 5/8 in.
Bentonite plug at least 3 ft. thick
Screen material PVC
interval(s):
From 30' To 40'
From ____ To ____
Slot size .020 in.
Filter pack:
Material Sand
Size 10/20 in.

(5) WELL TEST:
[ ] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian
Permeability ______ Yield ______ GPM
Conductivity ______ PH ______
Temperature of water 50 °F/C Depth artesian flow found ______ ft.
Was water analysis done? [X] Yes [ ] No
By whom? David Evans
Depth of strata to be analyzed. From ______ ft. to ______ ft.
Remarks: ______

Name of supervising Geologist/Engineer John Spracher

(6) LOCATION OF WELL By legal description
Well Location: County Deschutes
Township 21S (N or S) Range 11E (E or W) Section 5
1. NW 1/4 of SW 1/4 of above section.
2. Either Street address of well location SW Landfill Hwy 97 Bend
or Tax lot number of well location 300
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
31 Ft. below land surface. Date 10/22/96
Artesian Pressure ______ lb/sq. in. Date ______

(8) WATER BEARING ZONES:
Depth at which water was first found 31'

From	To	Est. Flow Rate	SWL
31'	40'		31'

(9) WELL LOG: Ground elevation ______

Material	From	To	SWL
Silty sand	0	5'	
Sand	5'	40'	31'

RECEIVED
NOV 14 1996
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 10/22/96 Completed 10/22/96

(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
MWC Number 10189
Signed [signature] Date 11/4/96

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
MWC Number 10011
Signed [signature] Date 11/6/96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)
Instructions for completing this report are on the last page of this form.

DESC 50628

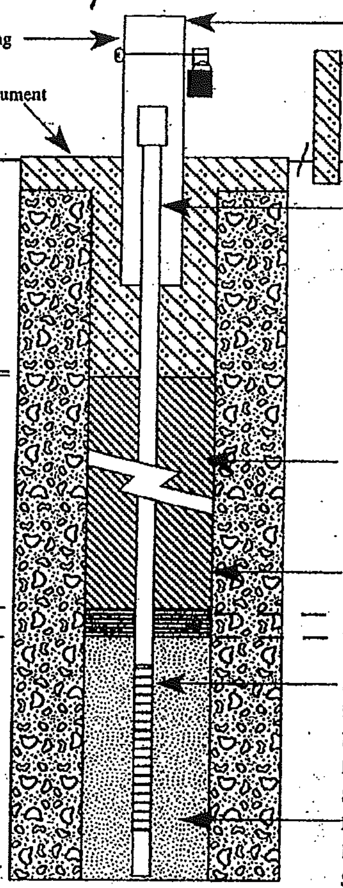
WELL I.D. # L05519
Start Card # 93696

(1) OWNER/PROJECT: WELL NO. MW-7
Name Deschutes Co
Address 61150 SE 27th St
City Bend State OR Zip 97702

(2) TYPE OF WORK:
[X] New construction [ ] Alteration (Repair/Recondition)
[ ] Conversion [ ] Deepening [ ] Abandonment

(3) DRILLING METHOD
[ ] Rotary Air [ ] Rotary Mud [ ] Cable
[X] Hollow Stem Auger [ ] Other ______

(4) BORE HOLE CONSTRUCTION
Special Standards Yes [ ] No [X] Depth of completed well 40 ft.



Protective casing — Locking cap — Protective post — Cement monument — Land surface

Monument 0 ft. TO 3 ft.
Seal 3 ft. TO 28 ft.
Filter pack 28 ft. TO 40 ft.

Casing diameter 2 in. material PVC
Welded [ ] Threaded [X] Glued [ ]
Liner diameter ______ in. material ______
Welded [ ] Threaded [ ] Glued [ ]
Well seal: Material ______
Amount 33 50# Bags
Grout weight ______
Borehole diameter 6 5/8 in.
Bentonite plug at least 3 ft. thick
Screen material PVC
interval(s):
From 30 To 40'
From ______ To ______
Slot size .020 in.
Filter pack: Material Sand
Size 10/20 in.

(5) WELL TEST:
[ ] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian
Permeability ______ Yield ______ GPM
Conductivity ______ PH ______
Temperature of water 50 °C Depth artesian flow found ______ ft.
Was water analysis done? [X] Yes [ ] No
By whom? David Evans
Depth of strata to be analyzed. From ______ ft. to ______ ft.
Remarks: ______

Name of supervising Geologist/Engineer John Sprecher

(6) LOCATION OF WELL By legal description
Well Location: County Deschutes
Township 21S (N or S) Range 11E (E or W) Section 5
1. NW 1/4 of SW 1/4 of above section.
2. Either Street address of well location SW Landfill Hwy 97 Bend
or Tax lot number of well location 300
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
31 Ft. below land surface. Date 10/22/96
Artesian Pressure ______ lb/sq. in. Date ______

(8) WATER BEARING ZONES:
Depth at which water was first found ______

From	To	Est. Flow Rate	SWL
31'	40'		31'

(9) WELL LOG: Ground elevation ______

Material	From	To	SWL
Silty Sand	0	5'	
Sand	5'	40'	31'

RECEIVED
NOV 14 1996
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 10/22/96 Completed 10/22/96

(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
MWC Number 10189
Signed [signature] Date 11/4/96

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
MWC Number 10014
Signed [signature] Date 11/6/96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

MW-8 BPM 8/30/6

STATE OF OREGON

MONITORING WELL REPORT

DESC 52087

Received Date 12/03/1998

Well ID Tag# L 29710

Start Card # 117222

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No. 29710
Co Job No. MW-1

Name COUNTY OF DESCHUTES; DEPT OF PUBLIC WOR
Street 61150 SE 27TH ST
City BEND State OR Zip 97702

(2) TYPE OF WORK

☒ New Construction ☐ Alter (Recondition) ☐ Alter (Repair)
☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☒ Hollow Stem Auger Other *****

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 60 ft.

Diameter	From	To
10.00	0.00	60

Material	Begin Depth	End Depth	Material Amount	Units
Concrete	0.00	1.00	1.00	S
Bentonite	1.00	47.00	7.00	S

Vault
ft.
TO
ft.

Casing Diameter Liner ☐

Monument
3 ft.
TO
-3 ft.

Casing or Liner	Diameter	Begin Depth	End Depth	Gauge	Material	Construction Weld	Threaded	Location Of Shoe
C	2.00				Plastic	■	■	

Seal
ft.
TO
ft.

From	To	Material	Amount	Seal Grout Weight	Units
0.00	1.00	Concrete	1.00		S
1.00	47.00	Bentonite	7.00	9	S

Filter Pack Screen ☐
47 ft.
TO
60 ft.

Diameter	From	To	Gauge	Material	Type	Slot Size
	50	60		PL		.010

Filter Pack
Material SA
Size 20.00 in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water 54 °F/C Depth artesian flow found ft.
Was water analysis done? ☒
By Whom? DAVID EVANS ASSOCIATES
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County
Township 21.00 S Range 11.00 E Section 5
1. SW 1/4 of SW 1/4 of above section.
Legal Desc:

2. Either Street address of well location
8.5 MILES N OF LA PINE ON HWY 97
or Tax lot number of well location 101
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

28.0 Ft. below land surface. Date 11/09/1998
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found 28 ft.

From	To	Est. Flow Rate	SWL
28	60		28

(9) WELL LOG

Ground elevation ft.

Material	From	To	SWL
BROWN SAND AND SILT	0	60	28

Date started 11/09/1998 Completed 11/09/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10440

Signed By PABLO ARMANDO Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

DESC 52088 MW-9 BPM 8/30/6

Received Date 12/03/1998
Well ID Tag# L 29711
Start Card # 117223

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No. 29711
Co Job No. MW-2

Name COUNTY OF DESCHUTES; DEPT OF PUBLIC WOR
Street 61150 SE 27TH ST
City BEND State OR Zip 97702

(2) TYPE OF WORK

☒ New Construction ☐ Alter (Recondition) ☐ Alter (Repair)
☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☒ Hollow Stem Auger Other *****

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 60 ft.

Diameter	From	To
10.00	0.00	60

Material	Begin Depth	End Depth	Material Amount	Units
Concrete	0.00	1.00	1.00	S
Bentonite	1.00	47.00	9.00	S

Vault ft. TO ft.

Casing Diameter Liner ☐

Monument 3 ft. TO -3 ft.

Casing or Liner	Diameter	Begin Depth	End Depth	Gauge	Material	Construction Weld	Construction Threaded	Location Of Shoe
C	2.00				Plastic	■	■	

Seal ft. TO ft.

From	To	Material	Amount	Seal Grout Weight	Units
0.00	1.00	Concrete	1.00		S
1.00	47.00	Bentonite	9.00	9	S

Filter Pack 47 ft. TO 60 ft.

Screen ☐

Diameter	From	To	Gauge	Material	Type	Slot Size
	50	60		PL		.010

Filter Pack Material SA
Size 20.00 in.

(5) WELL TEST

Permeability Yield
Conductivity PH
Temperature of water 54 °F/C Depth artesian flow found ft.
Was water analysis done? ☒
By Whom? DAVID EVANS ASSOCIATES
Depth of strata to be analyzed. From ft. to ft.
Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County
Township 21.00 S Range 11.00 E Section 5
1. SW 1/4 of SW 1/4 of above section.
Legal Desc:
2. Either Street address of well location
8.5 MILES N OF LA PINE ON HWY 97
or Tax lot number of well location 101
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

28.0 Ft. below land surface. Date 11/10/1998
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found 28 ft.

From	To	Est. Flow Rate	SWL
28	60		28

(9) WELL LOG

Ground elevation ft.

Material	From	To	SWL
BROWN SAND AND SILT	0	60	28

Date started 11/10/1998 Completed 11/10/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10440
Signed By PABLO ARMANDO Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011
Signed By GREG MCINNIS Date

STATE OF OREGON

MONITORING WELL REPORT

DESC 52089

MW-10 BFM 8/30/6

Received Date 12/03/1998

Well ID Tag# L 29712

Start Card # 117225

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No. 29712

Co Job No. MW-3

Name COUNTY OF DESCHUTES; DEPT OF PUBLIC WORK

Street 61150 SE 27TH ST

City BEND State OR Zip 97702

(2) TYPE OF WORK

☒ New Construction ☐ Alter (Recondition) ☐ Alter (Repair)

☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☒ Hollow Stem Auger Other *****

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 70 ft

Diameter	From	To
10.00	0.00	70

Material	Begin Depth	End Depth	Material Amount	Units
Concrete	0.00	1.00	1.00	S
Bentonite	1.00	58.00	8.00	S

Vault ft. TO ft.

Casing Diameter Liner ☐

Monument 3 ft. TO -3 ft.

Casing or Liner	Diameter	Begin Depth	End Depth	Gauge	Material	Construction Weld	Threaded	Location Of Shoe
C	2.00				Plastic	■	■	

Seal ft. TO ft.

From	To	Material	Amount	Seal Grout Weight	Units
0.00	1.00	Concrete	1.00		S
1.00	58.00	Bentonite	8.00	9	S

Filter Pack 58 ft. TO 70 ft.

Screen ☐

Diameter	From	To	Gauge	Material	Type	Slot Size
	60	70		PL		.020

Filter Pack Material SA

Size 20.00 in.

(5) WELL TEST

Permeability Yield

Conductivity PH

Temperature of water 54 °F/C Depth artesian flow found ft.

Was water analysis done? ☒

By Whom? DAVID EVANS ASSOCIATES

Depth of strata to be analyzed. From ft. to ft.

Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County

Township 21.00 S Range 11.00 E Section 5

1. SW 1/4 of SW 1/4 of above section.

Legal Desc:

2. Either Street address of well location

8.5 MILES N OF LA PINE ON HWY 97

or Tax lot number of well location 101

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow

(7) STATIC WATER LEVEL

28.0 Ft. below land surface. Date 11/12/1998

Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found 28 ft.

From	To	Est. Flow Rate	SWL
12	70		12

(9) WELL LOG

Ground elevation ft.

Material	From	To	SWL
BROWN SILT AND SAMD	0	70	28

Date started 11/12/1998 Completed 11/12/1998

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10440

Signed By PABLO ARMANDO Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By GREG MCINNIS Date

RECEIVED
JUL 26 1995
WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

DESC 10024

21S/11E/5Cb

(START CARD) # 14785

(1) OWNER: Well Number:
Name Deschutes County Public Works
Address 61150 SE 27th St.
City Bend State OR Zip 97702

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☒ Cable
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes ☐ No ☒ Depth of Completed Well 115 ft.
Explosives used Yes ☐ No ☒ Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10	0	18	Cement	0	18	6 Sacks
6	18	115				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1	115	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☒ Perforations Method ~~Sawed~~ Torch
☐ Screens Type Material Steel

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
102	107	1/8	21	6"		☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
16	26		1 hr.

Temperature of water Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Deschutes Latitude Longitude
Township 21 N or S, Range 11 E or W, WM.
Section 5 NW 1/4 SW 1/4
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:
44 ft. below land surface. Date 11-27-89
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 44'

From	To	Estimated Flow Rate	SWL
44	52	1/2	
100	105		

(12) WELL LOG: Ground elevation

Material	From	To	SWL
Top Soil	0	2	
Plumice	2	4	
Clay	4	7	
Sand & Gravel Dry	9	52	
Clay	52	60	
Clay & Silt	60	100	44
Cynders	110	115	

Date started 11-27-89 Completed 11-30-89

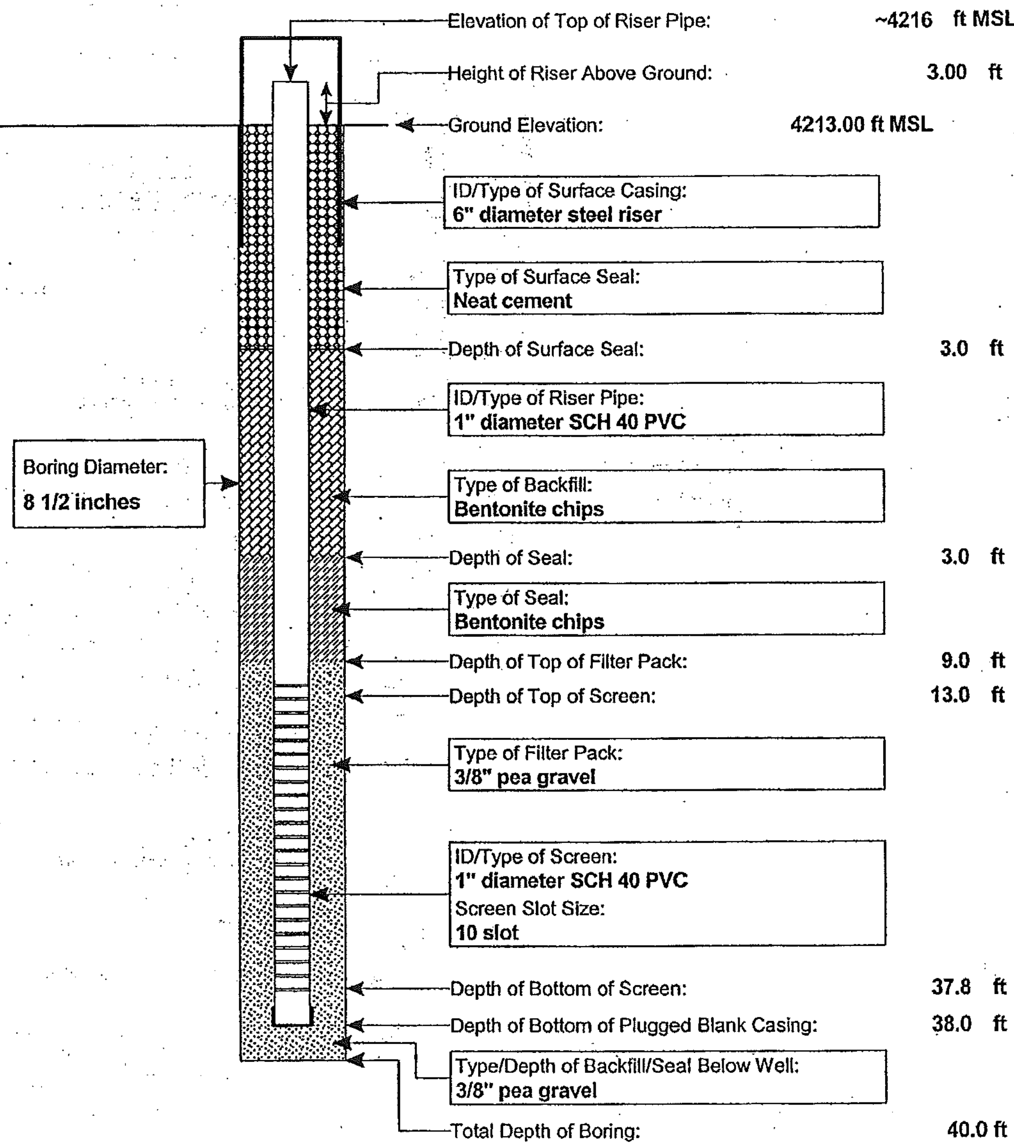
(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 620
Signed Mike Preston Date 12-26-89

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 3/88

Project: Southwest Landfill **Project Location: Deschutes County, Oregon** **Project Number: 25696404**	# MONITORING WELL CONSTRUCTION LOG FOR WELL GP-1

Well Location	**BLM property, NW of landfill footprint**		Date(s) Installed	**2/16/2007**	Time
Installed By	**Cascade Drilling, Inc**	Observed By	**BPM**	Total Depth	**40.0 feet**
Method of Installation	**Hollow Stem Auger Drilling**				
Screened Interval	**13.0 - 37.8 feet bgs**	Completion Zone	**Sand and Gravel**		
Remarks	**Landfill Gas Monitoring Well**				



NOTE: DIAGRAM IS NOT TO SCALE

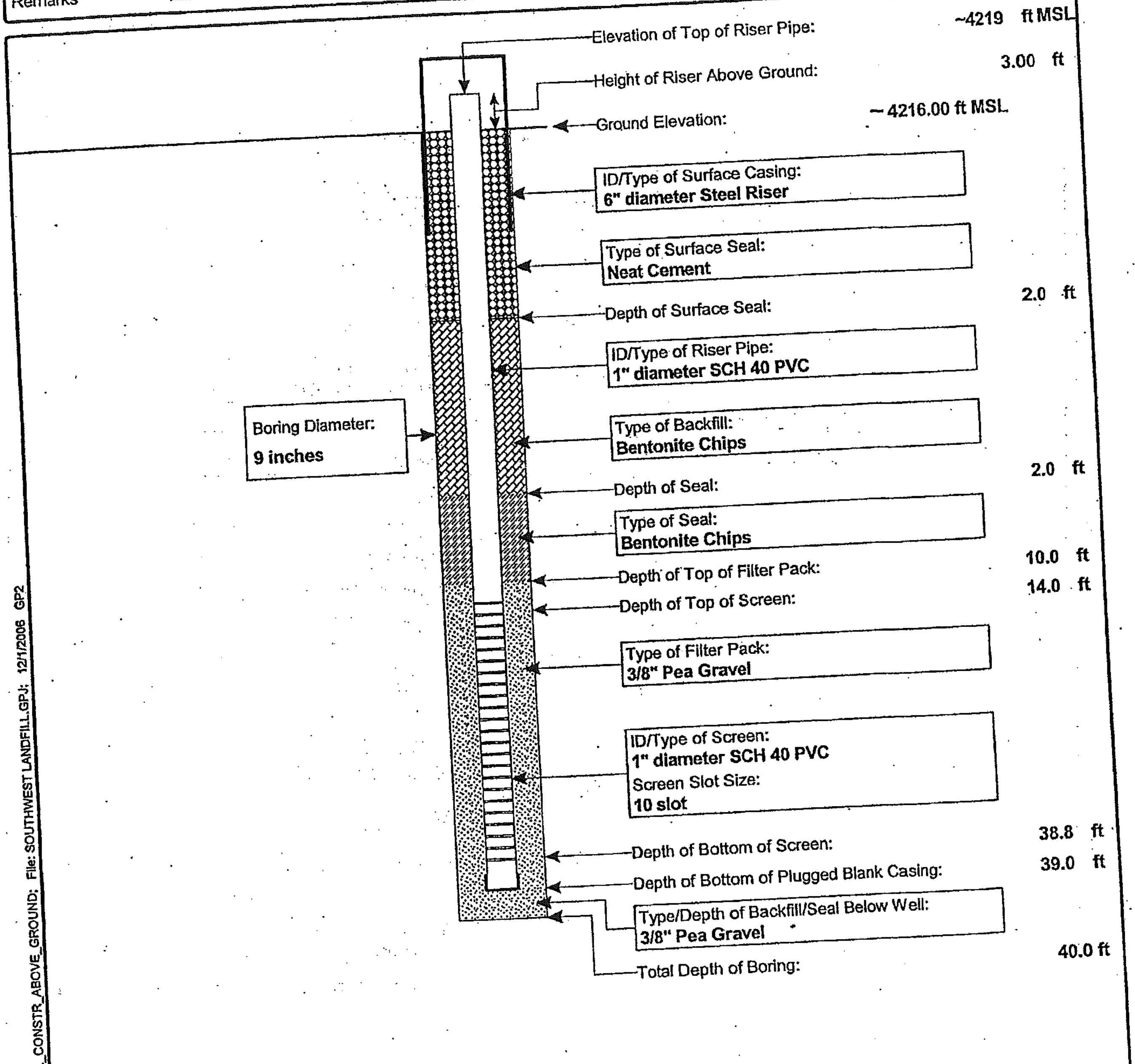
Report: ENV_WELL_CONSTR_ABOVE_GROUND; File: SOUTHWEST LANDFILL_022007.GPJ; 2/26/2007 GP-1

URS

Project: Southwest Landfill
Project Location: Deschutes County, Oregon
Project Number: 25696309

MONITORING WELL CONSTRUCTION LOG FOR WELL GP2

Well Location	North property boundary	Date(s) Installed 11/06/2006	Time
Installed By	Cascade Drilling, Inc.	Observed By BP McNamara	Total Depth 40.0 feet
Method of Installation	Hollow Stem Auger Drill Rig		
Screened Interval	15.0-40.0 feet bgs	Completion Zone Sand and gravel	
Remarks	Landfill Gas Monitoring Well		



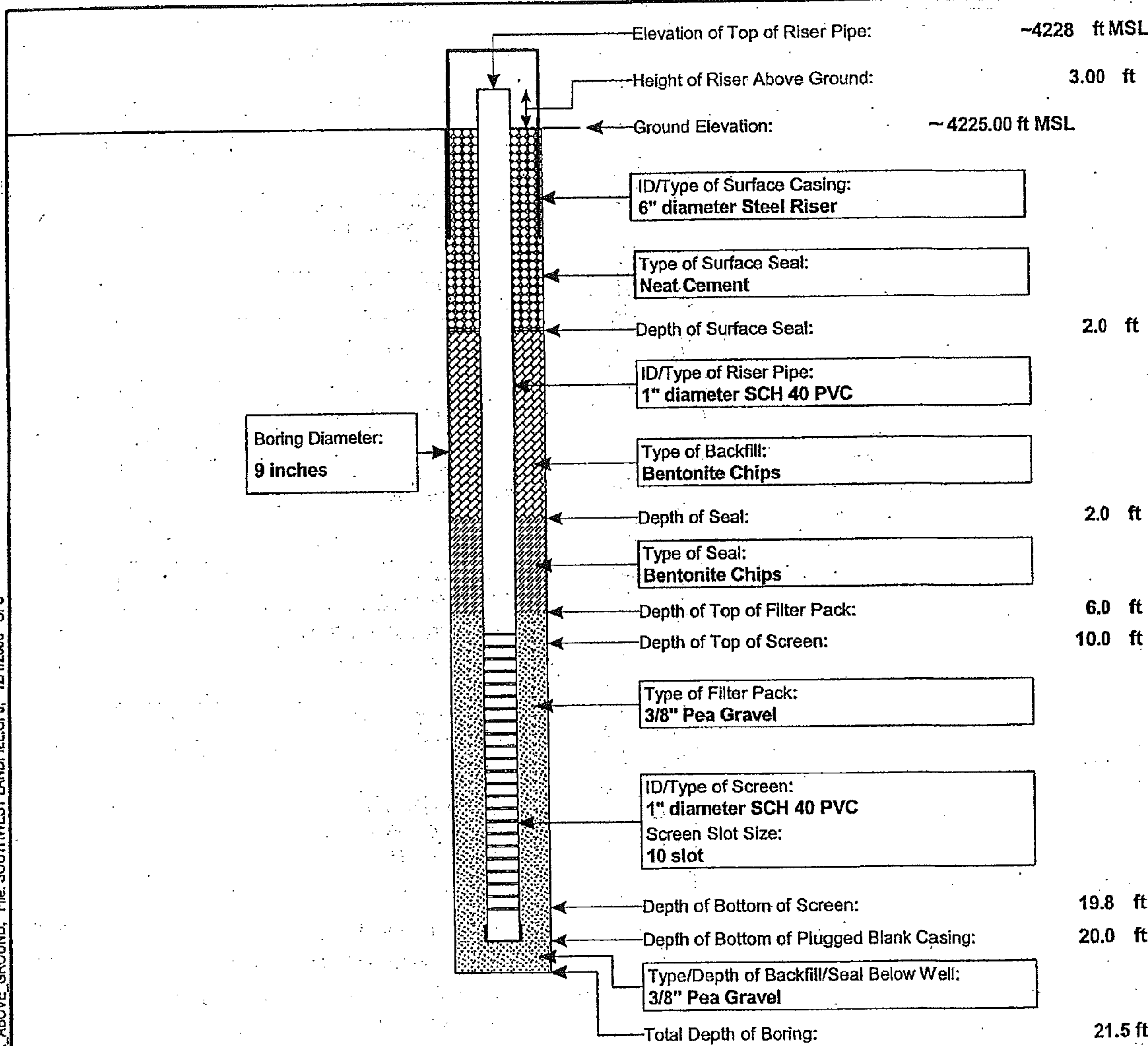
NOTE: DIAGRAM IS NOT TO SCALE

Report: ENV_WELL_CONSTR_ABOVE_GROUND; File: SOUTHWEST LANDFILL.GPJ; 12/1/2006 GP2

URS

Project: Southwest Landfill **Project Location:** Deschutes County, Oregon **Project Number:** 25696309	**MONITORING WELL CONSTRUCTION LOG FOR WELL GP3**

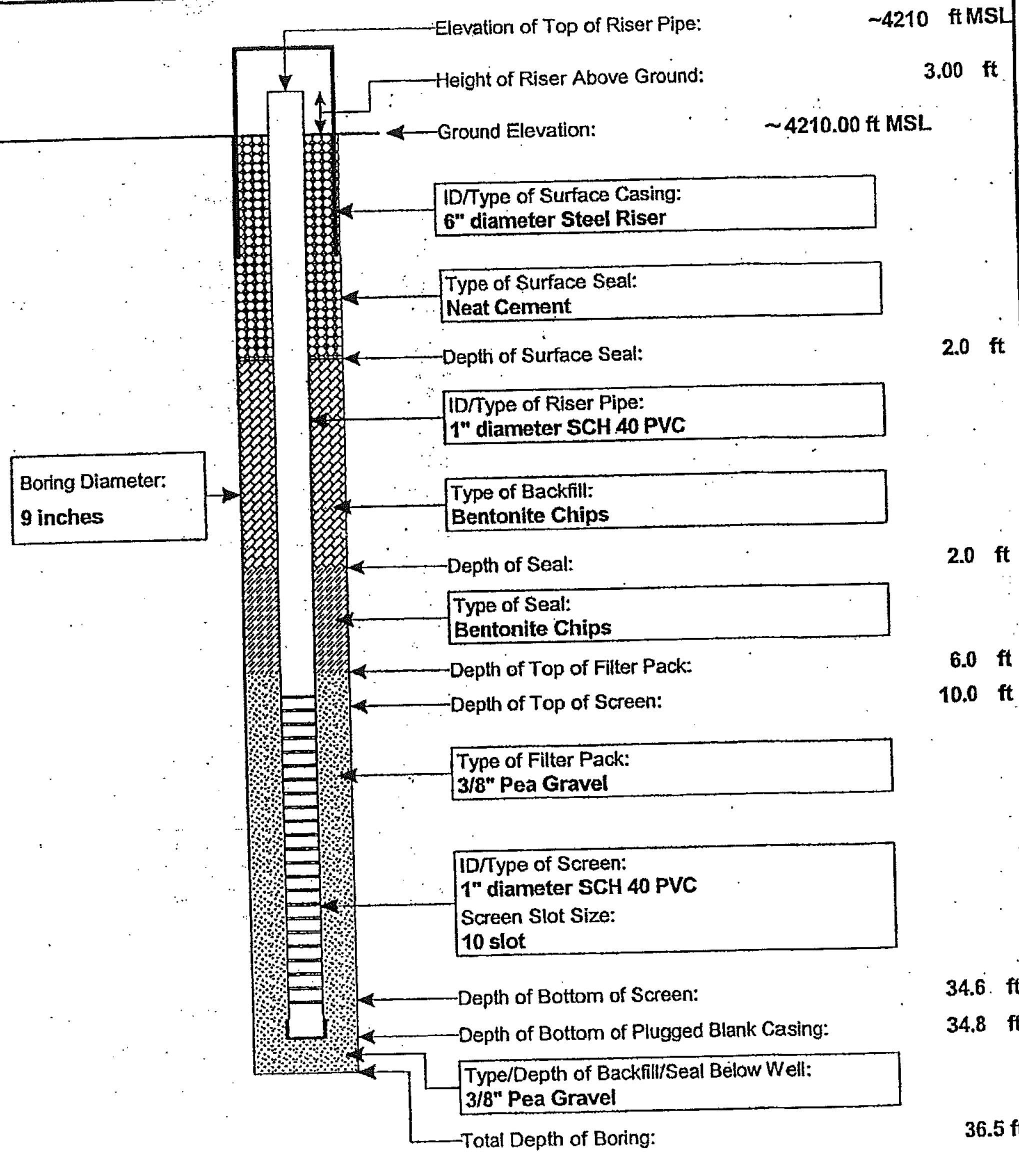
Well Location	Adjacent to onsite water well pumphouse	Date(s) Installed	11/07/2006	Time	
Installed By	Cascade Drilling, Inc.	Observed By	BP McNamara	Total Depth	21.5 feet
Method of Installation	Hollow Stem Auger Drill Rig				
Screened Interval	10.0-20.0 feet bgs	Completion Zone	Sand and gravel		
Remarks	Landfill Gas Monitoring Well				



NOTE: DIAGRAM IS NOT TO SCALE

Project: Southwest Landfill **Project Location:** Deschutes County, Oregon **Project Number:** 25696309	**MONITORING WELL CONSTRUCTION LOG FOR WELL GP4**

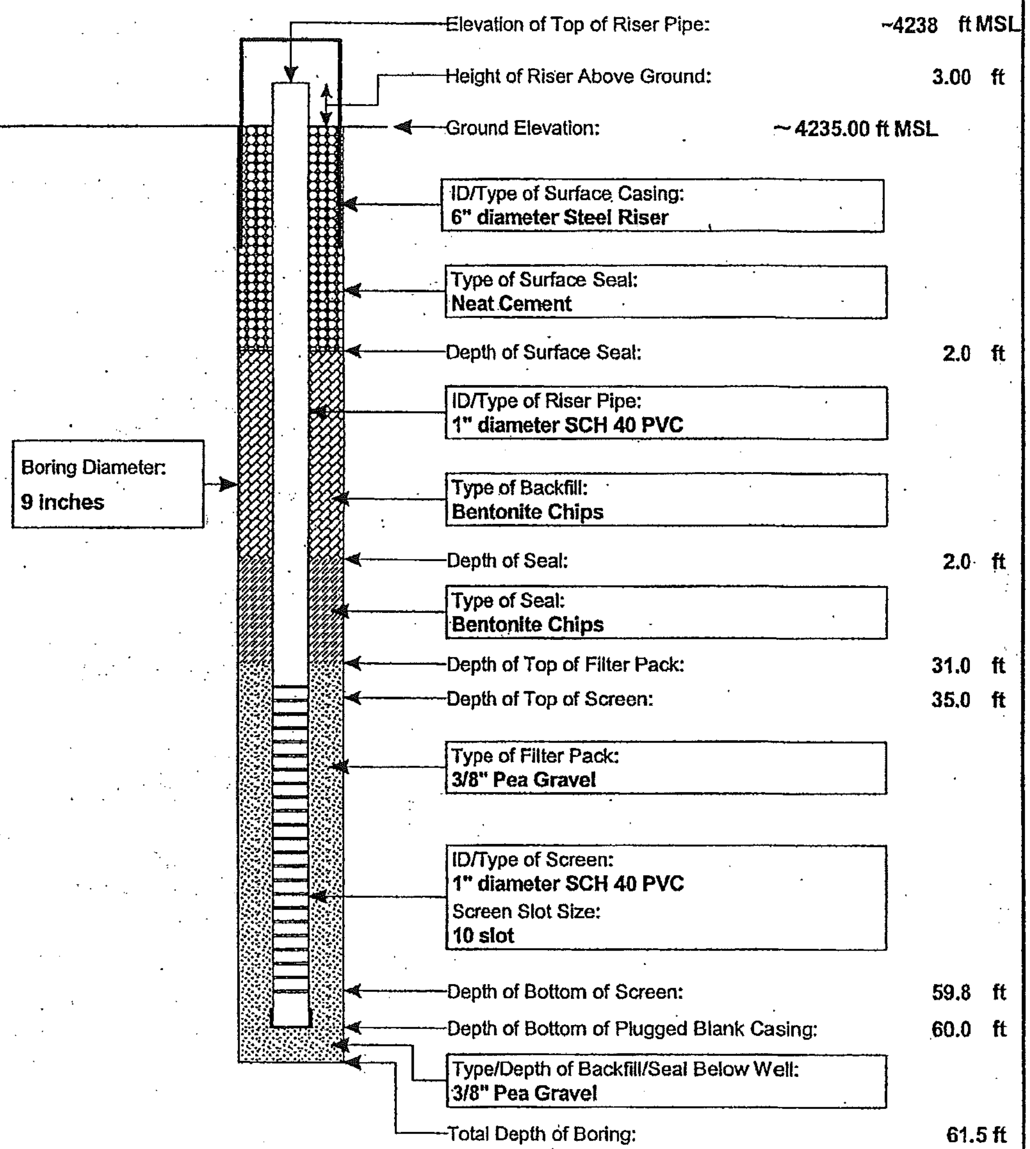
Well Location	~50 feet west of MW6	Date(s) Installed	11/06/2006 Time
Installed By	Cascade Drilling, Inc.	Observed By: BP McNamara	Total Depth: 36.5 feet
Method of Installation	Hollow Stem Auger Drill Rig		
Screened Interval	9.5-34.5 feet bgs	Completion Zone	Sand and gravel
Remarks	Landfill Gas Monitoring Well		



NOTE: DIAGRAM IS NOT TO SCALE

Project: Southwest Landfill Project Location: Deschutes County, Oregon Project Number: 25696309	MONITORING WELL CONSTRUCTION LOG FOR WELL GP5

Well Location	East property boundary		Date(s) Installed	11/08/2006	Time
Installed By	Cascade Drilling, Inc.	Observed By	BP McNamara	Total Depth	61.5 feet
Method of Installation	Hollow Stem Auger Drill Rig				
Screened Interval	35.0-60.0 feet bgs	Completion Zone	Sand and gravel		
Remarks	Landfill Gas Monitoring Well				



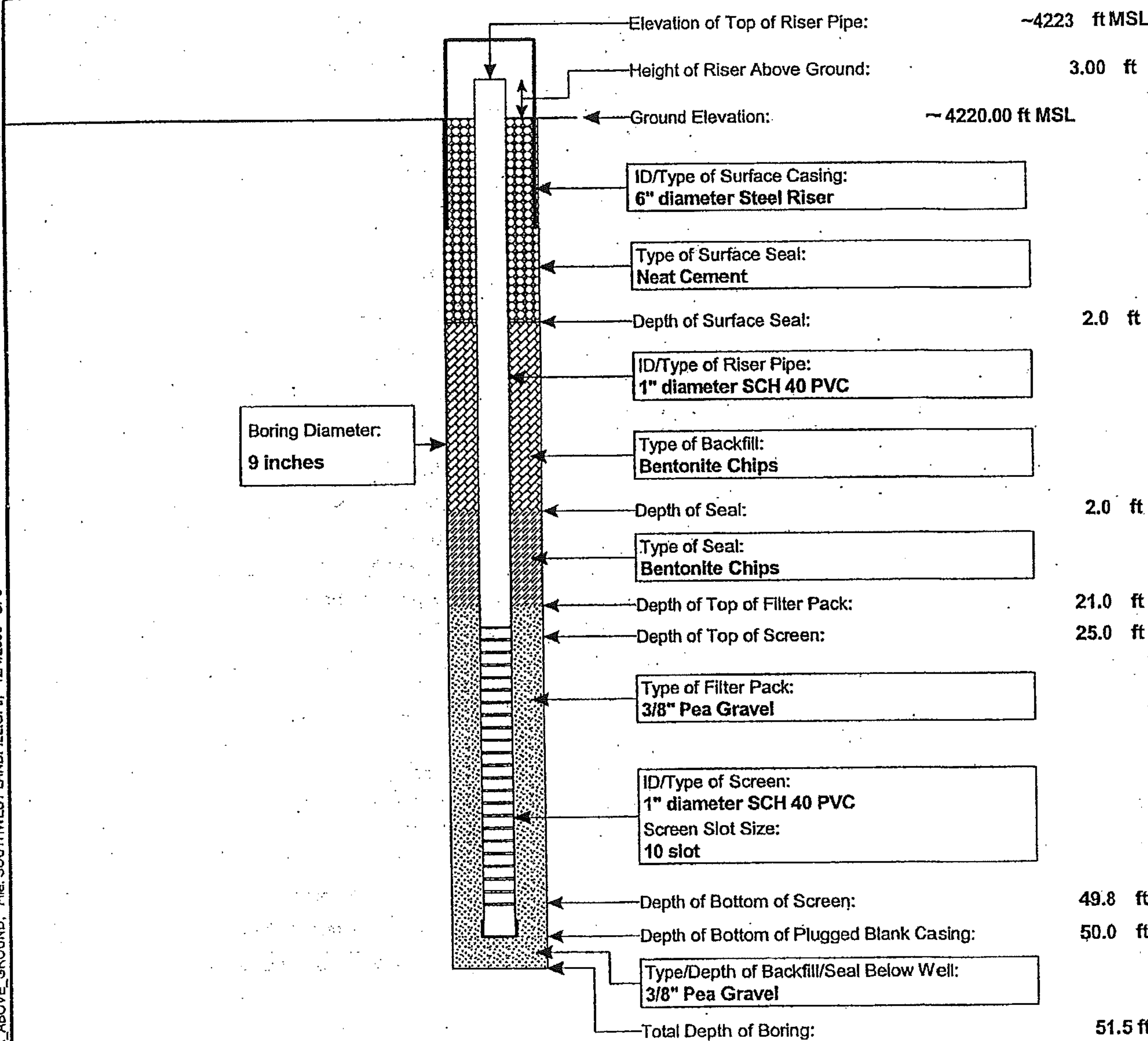
NOTE: DIAGRAM IS NOT TO SCALE

Report: ENV_WELL_CONSTR_ABOVE_GROUND; File: SOUTHWEST LANDFILL.GPJ; 12/1/2006 GP5

URS

Project: Southwest Landfill **Project Location:** Deschutes County, Oregon **Project Number:** 25696309	**MONITORING WELL CONSTRUCTION LOG FOR WELL GP6**

Well Location	**South property boundary**	Date(s) Installed	**11/07/2006**	Time	
Installed By	**Cascade Drilling, Inc.**	Observed By	**BP McNamara**	Total Depth	**51.5 feet**
Method of Installation	**Hollow Stem Auger Drill Rig**				
Screened Interval	**25.0-50.0 feet bgs**	Completion Zone	**Sand and gravel**		
Remarks	**Landfill Gas Monitoring Well**				

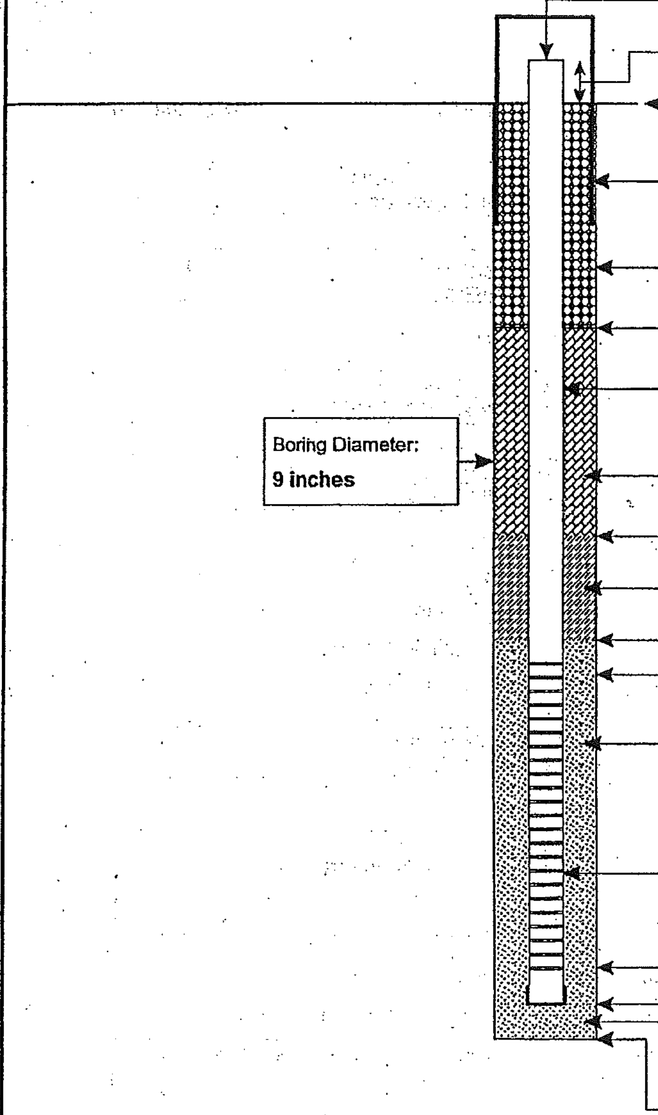


NOTE: DIAGRAM IS NOT TO SCALE

URS

Project: Southwest Landfill **Project Location:** Deschutes County, Oregon **Project Number:** 25696309	**MONITORING WELL CONSTRUCTION LOG FOR WELL GP7**

Well Location	Southwest corner of landfill property		Date(s) Installed 11/07/2006	Time	
Installed By	Cascade Drilling, Inc.	Observed By	BP McNamara	Total Depth	51.5 feet
Method of Installation	Hollow Stem Auger Drill Rig				
Screened Interval	24.0-49.0 feet bgs	Completion Zone	Sand and gravel		
Remarks	Landfill Gas Monitoring Well				



Elevation of Top of Riser Pipe: ~4222 ft MSL

Height of Riser Above Ground: 3.00 ft

Ground Elevation: ~4219.00 ft MSL

ID/Type of Surface Casing: 6" diameter Steel Riser

Type of Surface Seal: Neat Cement

Depth of Surface Seal: 2.0 ft

ID/Type of Riser Pipe: 1" diameter SCH 40 PVC

Boring Diameter: 9 inches

Type of Backfill: Bentonite Chips

Depth of Seal: 2.0 ft

Type of Seal: Bentonite Chips

Depth of Top of Filter Pack: 20.0 ft

Depth of Top of Screen: 24.0 ft

Type of Filter Pack: 3/8" Pea Gravel

ID/Type of Screen: 1" diameter SCH 40 PVC

Screen Slot Size: 10 slot

Depth of Bottom of Screen: 48.8 ft

Depth of Bottom of Plugged Blank Casing: 49.0 ft

Type/Depth of Backfill/Seal Below Well: 3/8" Pea Gravel

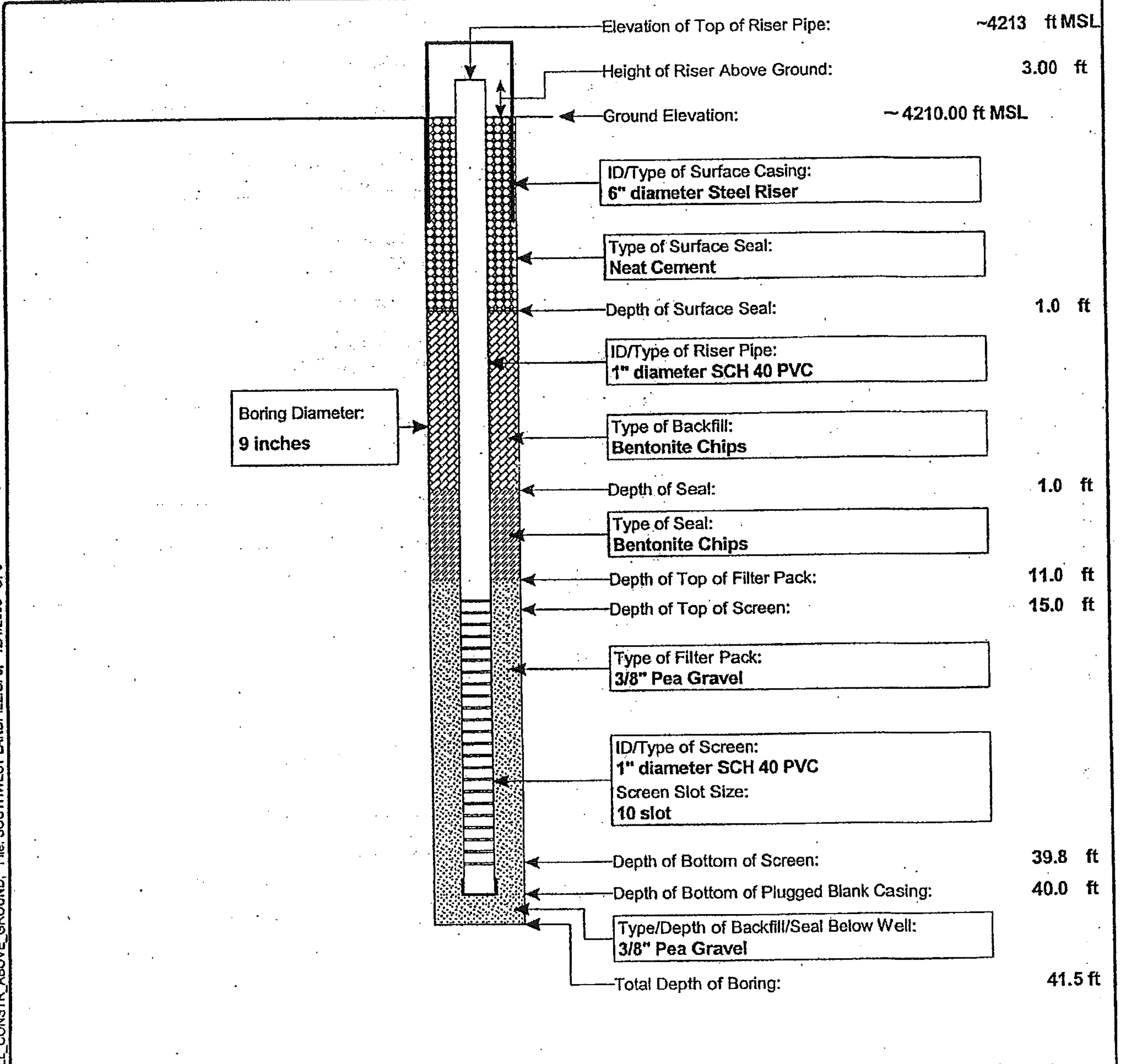
Total Depth of Boring: 51.5 ft

NOTE: DIAGRAM IS NOT TO SCALE

URS

Project: Southwest Landfill **Project Location:** Deschutes County, Oregon **Project Number:** 25696309	**MONITORING WELL CONSTRUCTION LOG FOR WELL GP8**

Well Location	Southwest corner of landfill (not in landfill footprint)	Date(s) Installed	11/07/2006	Time	
Installed By	Cascade Drilling, Inc.	Observed By	BP McNamara	Total Depth	41.5 feet
Method of Installation	Hollow Stem Auger Drill Rig				
Screened Interval	14.0-39.0 feet bgs	Completion Zone	Sand and gravel		
Remarks	Landfill Gas Monitoring Well				

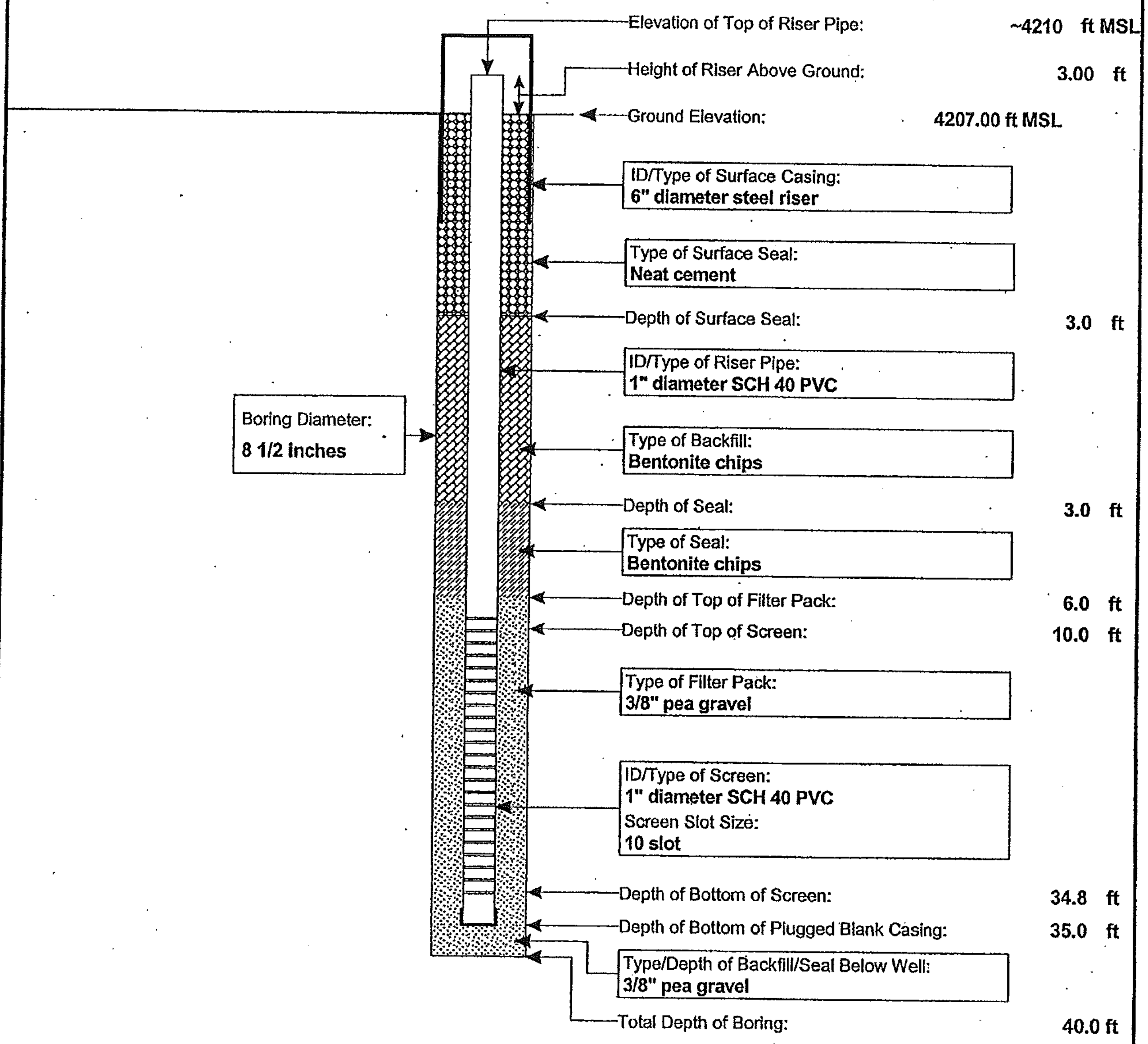


NOTE: DIAGRAM IS NOT TO SCALE

URS

Project: Southwest Landfill **Project Location:** Deschutes County, Oregon **Project Number:** 25696404	**MONITORING WELL CONSTRUCTION LOG FOR WELL GP-9**

Well Location	BLM property, W of landfill footprint		Date(s) Installed 2/16/2007		Time
Installed By	Cascade Drilling, Inc	Observed By	BPM	Total Depth	40.0 feet
Method of Installation	Hollow Stem Auger Drilling				
Screened Interval	10.0 - 34.8 feet bgs	Completion Zone	Sand and Gravel		
Remarks	Landfill Gas Monitoring Well				



NOTE: DIAGRAM IS NOT TO SCALE

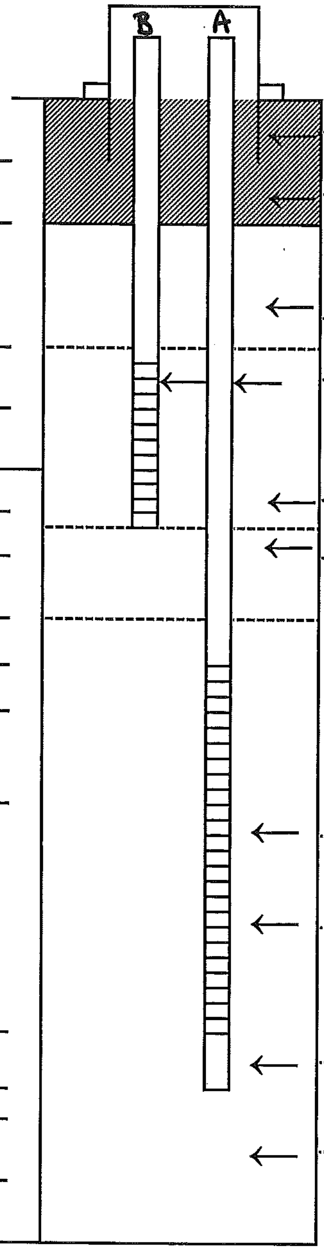
URS

Report: ENV_WELL_CONSTR_ABOVE_GROUND; File: SOUTHWEST LANDFILL_022007.GPJ; 2/26/2007 GP-9

PBS	PBS Engineering + Environmental **GAS MONITORING WELL INSTALLATION** Form Revised: 6-22-09	**PROJECT:** SWLF **PROJECT NO:** 80429.000 **EVENT:** **DATE:** 6/18/2009

Drilled By: Western States Soil Conservation — **Monitoring Well ID:** GP-10

Well Tag ID: L98274 — **Start Card Number:** 1006996



Top of monument to ground surface: 3 ft.
0 ft.
Base of monument: 2.5 ft.
Base of surface seal: 2.0 ft.
Top of sand: 5.0 ft.
Top of screen: 6.0 ft.
Bottom of screen: 16.0 ft.
Bottom of end cap: 16.5 ft.
Bottom of sand: 16.5 ft.
Top of plug: 16.5 ft.
Top of sand: 23.5 ft.
Top of screen: 24.5 ft.
▼ (static): 45.1 ft.
Bottom of screen: 44.5 ft.
Bottom of end cap: 45.0 ft.
Bottom of sand: 45.0 ft.
Top of backfill: 45.0 ft.
Bottom of exploration: 46.5 ft.

Top of concrete base: 0.0 ft.
Type of monument: 6" steel casing
Type of surface seal: cement
bentonite chips

Screen:
Diameter: 1" Type:
Schedule: 80 Slot: 0.01

Type of sand: pea gravel
Type of plug: bentonite chips
Diameter of borehole: 10" O.D.
Type of drill rig: CME-55
Type of Filter Material: pea gravel

Screen:
Diameter: 1" Type:
Schedule: 80 Slot: 0.01

Type of end cap: threaded
Type of base plug: bentonite chips

Comment:

Sand: pea gravel 15 cu. ft. Bentonite: 3/8 chips 400 lbs.

Cement: 150 lbs. Other:

Notes:

1.5"=	0.09	5.5"= 1.23		8"= 2.61	
2"=	0.16	6"= 1.47		8.5"= 2.95	
3"=	0.37	6.5"= 1.75		9"= 3.30	
4"=	0.65	7"= 2.00		9.5"= 3.68	
5"=	1.02	7.5"= 2.29		10"= 4.08	

APPENDIX B

Monitoring Forms

GROUNDWATER LEVEL FORM
Southwest Landfill – Deschutes County, Oregon

Job No. ____________________

Date: ____________________

Personnel: ____________________

Well Identification	Well Elevation[1] (ft)	Depth to Water[1,2] (ft)	Groundwater Elevation (ft)	Comments
MW-1	4216.24	48.25		
MW-2R	4219.01	54.7		
MW-3	4223.19	60.2		
MW-4	4223.93	56		
MW-5	4208.32	43.1		
MW-6	4206.36	42.1		
MW-7	4205.26	42.7		
MW-8	4225.88	62.8		
MW-9	4229.72	61.7		
MW-10[3]	4224.91	72.4		
Water Supply Well	4226.71	115		

Notes:
[1]Referenced from top of steel casing
[2]Total depth based on July 2015 measurements
[3]MW-10 top of steel casing (well monument) elevation corrected to 4224.91 from 4224.68 per March 5, 2004 letter from surveyor John Thomspon
Ft – feet above mean sea level

PBS	PBS Engineering & Environmental **GROUNDWATER SAMPLING FIELD FORM** Revised: 4/4/14	**PROJECT: SW Landfill** **Dechutes County, Oregon** **PROJECT NO: 80429.007 P2, T1** **Date:**

Field Personnel: **Weather Conditions:**

INITIAL WELL DATA & WELL PURGING INFORMATION

Monitoring Well ID: **Well Dia.** inches **Start Time:**

Well Condition/Additional Notes:

Total Depth	________ ft. BTOC	**Gal./Ft.**	________ gal/ft		**Purge Method**	________
Water Depth	________ ft. BTOC	**Well Vol.**	________ gallons		**Sample Method**	________
Feet of Water	________ feet	**Purge Vol.**(3x Well Vol.)	________ gal.		**Water Disposal**	________

Field Param. Meters: **Calibration**

Time (0.00 - 24:00)	Water Temperature (+/-0.50C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Water pH	ORP (mV)	Turbidity (NTUs)	Water Level (feet TOC)	Volume Purged (Gall)

Initial DTW = Time: Final DTW = Time: **Total Purged =**

Purge Pumping Rate (specify gpm or lpm): ________
Gal/Ft Factor (2in=0.165, 4in=0.65)

WELL SAMPLING DETAILS

Sample ID: SW **Time Sampled:**

Parameter Group	**Parameters**	**Preser-vative**	**No. of Bottles**	**Bottle size**	**Filtered Yes/No**	**Destination Laboratory**	**Collection Compl. 'x'**
1b-Lechate Indicators	TSS,TDS,conductivity,Cl, SiO2,SO4, Alkalinity	None		1000-Poly	N	Test America	
1b-Lab Indicators	TOC,COD	H2SO4		250-amber	N	Test America	
	Tannins and Lignins	none		250-poly	N	Test America	
2a-Anions&Cations	HCO3/CO3	None		250-Poly	**Y**	Test America	
2a-Anions&Cations	Ammonia	H2SO4		250-Poly	**Y**	Test America	
2b-Trace Metals (Total)	As,Ba,Cr,Co,Cu,Cd,Pb,Se Ni,Ag,V,Zn,Sb,Be,Ti,Hg, hardness	HNO3	1	250-Poly	N	Test America	
2b-Trace Metals* and cations/anions (Dissolved)	As,Ba,Cr,Co,Cu,Cd,Pb,Se Ni,Ag,V,Zn,Sb,Be,Ti,Hg, Ca,Fe,Mg,Mn,Na,K	HNO3		250-Poly	**Y**	Test America	
3-VOC	8260	HCl	3	40-Glass	N	Test America	
Misc.	ph, nitrate	none		250-poly	N	Umpqua	

QA/QC Sample (circle one): None Duplicate Other (Specify)

Method of Transportation of samples:
All samples were immediately placed into a cooler and packed with ice or "Blue Ice" YES / NO

Field Observations/Notes of Sampling Event:

****Notes for COC - Include TICs on VOC Analysis**

*****Trip Blank for VOCs - [SW(date)TB]**

Signature of Field Personnel:

LFG PROBE / STRUCTURE MONITORING / SITE INSPECTION FIELD FORM

SOUTHWEST LANDFILL – DESCHUTES COUNTY, OREGON

Meter: Landtec GEM 5000		**Weather:**	
Sample Date:		**BP Start:**	**BP Finish:**
Technician:		**Start Time:**	
Calibration Date:		**Finish Time:**	
Calibrated By:			

Station	**% LEL**	**% CH4 By Vol.**		**% CO2 By Vol.**	**% O2 By Vol.**	**Balance**	**Comments**
		High	**Low**				
GP-1							
GP-2							
GP-3							
GP-4							
GP-5							
GP-6							
GP-7							
GP-8							
GP-9							
GP-10A (deep)							
GP-10B (shallow)							
S-1 (Scalehouse)							
S-2 (Pumphouse)							
Perimeter Control (fencing, locks, signage, etc.)							
Landfill Cover (settlement, erosion, surface cracks, etc.)							
Surface Drainage (blockage, ponding, etc.)							
Vegetative Cover (plant health, noxious weeds, etc.)							

TestAmerica Seattle
5755 8th Street East

Tacoma, WA 98424-1317
phone 253.922.2310 fax 253.922.5047

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Sarah Murphy	Site Contact:	Date:	COC No:
Your Company Name here	Tel/Fax: 503.906.9233	Lab Contact:	Carrier:	_______ of ______ COCs
Address	**Analysis Turnaround Time**			Sampler:
City/State/Zip	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
( ) Phone	TAT if different from Below _________			Walk-in Client:
( ) FAX	☐ 2 weeks			Lab Sampling:
Project Name:	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)																Sample Specific Notes:

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____________

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for__________ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (^{o}C): Obs'd:_________ Corr'd:__________ Therm ID No.:____________

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.9, dated 2/2/2016

BSK ASSOCIATES
2517 E. Evergreen Blvd.
Vancouver, WA 98661
P 360.750.0055
F 360.750.0057
www.bskassociates.com

Page ____ of ____

Turnaround Time Request
☐ Standard - 10 business days
☐ Rush (Surcharge may apply)
Date needed:

ANALYTICAL CHAIN OF CUSTODY

***Required Fields** Temp:

Company/Client Name*: | **Report Attention*:** Additional cc's: | **Invoice To*:** PO#: | **Phone*:** **Fax*:** **E-mail*:**

Address*: **City*:** **State*:** **Zip*:**

Project: | Project #: | Reporting Options: ☐ E-Mail ☐ Fax ☐ Mail ☐ Trace (J-Flag) ☐ Swamp ☐ EDD Type:

Sampler Name (Printed/Signature)*:

Compliance?: ☐ Yes ☐ No State: ☐ WA ☐ OR System/PWS ID: ________ DOH Source/Source ID:________

Water System Name: ________ County: ________

Sample Composition: ☐ Single Source ☐ **Blended ☐ **Composite ☐ Distribution Sample

**List sources in Source ID field

Sample Taken: ☐ Before Treatment ☐ After Treatment ☐ No Treatment Group (WA only): ☐ A ☐ B

Matrix Types: SW=Surface Water BW=Bottled Water GW=Ground Water WW=Waste Water STW=Storm Water DW=Drinking Water SO=Solid

#	Sample Description/Location*	Sampled* Date	Sampled* Time	Matrix*	Comments	# of cont.									

Receipt Conditions in Vancouver: Temp: Received Via: UPS WALK-IN FED EX Courier: ________

Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received for Lab by: (Signature and Printed Name)	

Payment Received at Delivery: Check / Cash Date: Amount: PIA#: Init.

Shipping Method: ONTRAC UPS GSO WALK-IN FED EX Alaskan Airlines Courier: ________ Custody Seal: Y / N

Cooling Method: Wet Blue None Chilling Process Begun: Y / N

APPENDIX C

Standard Operating Procedures

The following SOP describes the field documentation procedures that will be implemented for groundwater sampling events at Southwest Landfill.

Field Logbooks
Permanently bound field logbooks with waterproof paper will be used as the field logbooks for this project because of their compact size, durability, and secure page binding. The pages of the logbook should be numbered consecutively and should not be removed for any reason. Entries will be made in black or blue waterproof indelible ink.

Logbooks will document the procedures performed by field personnel. Each entry will be dated, will be legible, and will contain accurate and complete documentation of the individual's activities. Documentation in the field logbook will be in sufficient detail to explain and reconstruct field activities without relying on recollection by the field team members. Because the logbook is a complete documentation of field procedures, it should contain only facts and observations. Language will be objective, clear, concise, and free of personal interpretation or terminology.

No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change.

Field logbooks will be identified by the project name and a project-specific number (e.g., Southwest landfill, Project Number), and stored in the field project files when not in use. After field activities are complete, logbooks will be stored in the permanent project file.

Photographs
Representative photographs will be taken during the field investigation to help identify and locate monitoring wells and to document field activities or field observations.

Sample Numbering System
Groundwater samples collected at Southwest Landfill will be identified by the following numbering scheme:

- "SW" to designate the Southwest Landfill facility
- Month, Day and Year (MMDDYY) of sampling
- Three identifiers will designate the monitoring well location (e.g., "MW01" for monitoring well MW-1, "MW04" for monitoring well MW-4).
- The quality assurance and quality control (QA/QC) samples collected during routine monitoring will be labeled with a similar numbering scheme (e.g. "MW11") and recorded in the logbook as to the type QA/QC sample collected and methodology used in its collection.

Sample Labels
Sample containers will be labeled before a sample is collected using a permanent waterproof marker. The following information will be recorded on each sample label:

- Site name
- Sampling data
- Sampling time
- Sample identification number
- Preservation used, if applicable
- Initials of sampling personnel
- Requested analysis

Chain-of-Custody Records
The primary purpose of a chain of custody (COC) form (see Appendix B) is to document sample custody and to request appropriate analysis from the laboratory. A separate COC form will accompany each shipping cooler, and will contain sample information for only the samples in the cooler. Each COC form will contain the following information:

- Sample identification number
- Date and time of sampling
- Sample matrix
- Number of sample containers and or volume of sample
- Requested chemical analysis
- Names and signatures of sampling personnel
- Project number
- Any additional notes regarding sample collection or preservation (e.g., field-filtered)

Each shipping cooler will be sealed with custody seals showing the sampler’s signature and date. Custody seals will be attached to the left front and right rear side of the cooler so that they will break if the cooler is opened.

The following SOP describes the sample packaging and shipping procedures that will be implemented for groundwater sampling events at Southwest Landfill.

Packaging

The procedure and material used for sample packaging must adequately protect the sample containers from accidental breakage during shipment. Glass containers will be placed in plastic bags and will be wrapped and cushioned inn inert packing material, such as foam or bubble wrap. Plastic samples do not require individual cushioning, but they should be packed well to minimize movement during transport. Caps will be screwed on tightly, and containers will be placed in individual, resealable bags, which will then be sealed. Ice or ice-substitute will be placed in the container so as to promote adequate and equal cooling for all samples.

If ice is used as the cooling medium, it will be packaged in the following manner. Approximately on-half bag of cubed ice will be transferred into a 1-gallon resealable plastic bag.

Shipping

Sample containers will be placed inside a strong shipping container, such as a metal or plastic picnic cooler with a hard plastic liner. The shipping container should be sufficient quality to minimize the potential for leaks or spills of ice water or broken sample containers. The drain plug at the bottom of the cooler will be taped shut so that the contents from any broken containers of prepackaged ice, ice substitute, or sample will not escape. The completed COC form (minus the sampler's copy) will be placed inside a resealable plastic bag and secured with duct tape to the inside lid of the cooler. The shipping container lid will be adequately secured with tape to prevent opening during shipping. A custody seal showing the sampler's signature and date will be attached to the cooler so the seal will be broken if the cooler is opened. The shipping container will be adequately cleaned between shipments to prevent cross-contamination of samples.

In general, samples will be shipped from the project site to the project analytical laboratory by sampling personnel or couriered by the analytical laboratory staff. In the likely event that the samples need to be shipped by overnight courier, field personnel will transport sample shipments from the field to the appropriate courier office. COC forms do not require the signature of the shipping agent.

When possible, samples will be shipped the same day as collection. Because of the project's location and time constraints for overnight shipping, some shipments may not be sent until the following day. Samples will be shipped on Fridays only if required by field circumstances and if sampling personnel have received approval for Saturday delivery from the laboratory.

APPENDIX D

Laboratory Statement of Qualifications and Certifications

BSK Associates
Engineers & Laboratories

Statement of Qualifications

Analytical Laboratory Testing Services

Organic & Inorganic Analyses
Drinking Water Wastewater
Groundwater Soil Hazardous Waste

Introduction

About Us

BSK Associates’ Analytical Laboratory Services (BSK Labs) was established in 1967 as a support service for our geotechnical and engineering division. Over the last half century BSK Labs has grown to become one of the top analytical testing firms in the country. With four laboratory locations and multiple service centers along the West Coast, BSK Labs is a full-service, environmental laboratory network. We offer a broad spectrum of organic and inorganic analyses for groundwater, wastewater, drinking water, soil, and hazardous waste. BSK supports a vast array of clients that include consulting engineers, large and small municipalities, private water systems, wastewater treatment facilities, industrial dischargers, biomass energy providers, and private homeowners.

Our Approach to Service & Success

BSK Labs’ customers vary considerably in size and complexity. In all cases, BSK takes great care in providing the same personal attention to all of these clients, regardless of their size or the sophistication of their projects. To that end, BSK dedicates a project manager matched by skill set to the unique needs of our clients. In training our project managers, we emphasize service in terms of the understanding our clients’ businesses as much as our own. BSK’s staff looks beyond the simple task of providing a laboratory test and, instead, seeks to understand the reasons and driving force behind the request. In achieving this level of understanding, we are better positioned to identify what our clients truly value and those things which we can do as a laboratory to ultimately fulfill their needs.

BSK Labs employs technical professionals with degrees in chemistry, biology and microbiology. Our staff understands and appreciates the significance of the results they produce, recognizing their importance to the environment in which we live. We take a consultative approach to service, striving to be experts in our field so that we may better assist our clients in satisfying their testing requirements.

Finally, with our evolving web and electronic data, BSK simplifies our clients’ needs throughout the analytical process – from bottle order, to sample submission, to reporting, and data management. BSK Labs provides great service, simplified, so that every step of your project is successful.

Great Service, Simplified.

Laboratory Certifications

BSK's laboratories maintain a number of accreditations through numerous state agencies. The Fresno laboratory is accredited nationally under the 2009 NELAC/TNI Standard through the Oregon Environmental Laboratory Accreditation Program (ORELAP). In addition, Fresno is certified in the States of California, Hawaii, Nevada, Oregon and Washington. The Sacramento laboratory is certified under the California Environmental Laboratory Accreditation Program (ELAP). Our Vancouver laboratory is also accredited by ORELAP for work performed in Oregon and maintains reciprocal accreditation in Washington through this national accreditation standard. Lastly, BSK is one of the few laboratories in the country to have been certified by the EPA for all test methods for all three rounds of the Unregulated Contaminant Monitoring Rule (UCMR).

NELAC was established in 1995, with the mission to develop laboratory accreditation standards and implement a certification program - the National Environmental Accreditation Program (NELAP).

NELAP ACCREDITED TNI LABORATORY

Fresno Analytical Lab

- Foreign Soil Permit
- State of California
- State of Hawaii
- State of Nevada
- State of Oregon-NELAC
- State of Washington
- Unregulated Contaminant Monitoring Rule 3 (UCMR3)

Sacramento Microbiology Lab

- State of California

Southern California Microbiology Lab

- State of California

Vancouver Analytical Lab

- State of Oregon-NELAC
- State of Washington

Laboratory Facilities

BSK Associates operates three laboratories and three sample receiving facilities in California and one laboratory and two sample receiving facilities in the Pacific Northwest, one in Oregon and one in Washington.

Fresno Analytical Laboratory

Our Fresno-based laboratory spans four buildings and 16,000 square feet in the downtown area, where it is easily accessible to the local major highways (CA Highways 99, 41 and 180). As our primary laboratory, BSK's Fresno facility offers hundreds of analytical methods using state of the art equipment, operated by our experienced and highly trained scientific staff. Working in close coordination with our additional locations, the Fresno facility serves all of BSK's clients up and down the West Coast.

Sacramento Microbiology Laboratory

Our Sacramento-based laboratory occupies approximately 1,500 square feet in Rancho Cordova, CA. This location provides convenient access to Highways 5, 99, 50 and 80. At the lab, our staff performs microbiological analyses on a variety of matrices from clients in the Northern California region. This laboratory also serves as a drop-off location for our Sacramento-region clients and as base for our Northern Valley samplers and couriers.

Southern California Microbiology Laboratory

Our Southern California laboratory occupies approximately 2,100 square feet in San Bernardino, CA. This location provides convenient access to Highways 10 and 215, located less than mile from their junction. At the lab, our will staff perform microbiological analyses on a variety of matrices from clients in the region. This location will serve as a drop-off location for our clients and as base for our Southern California operations.

Vancouver Analytical Laboratory

Our Vancouver-based laboratory occupies approximately 2,500 square feet in Vancouver, WA. This location provides convenient access to Highways 5 and 205 and the Portland International Airport. At the lab, our staff performs quick turnaround chemical and microbiological analyses on a variety of matrices from the Pacific Northwest (PNW) region. Like the Sacramento and Southern California locations, the Vancouver laboratory works in close coordination with the Fresno laboratory to provide a comprehensive set of testing services for all the markets we serve. This laboratory also serves as a drop-off location for our Portland and Southwestern Washington clients and as a base for our regional samplers and couriers.

Corporate Headquarters
550 W. Locust Avenue
Fresno, CA 93650
Local: (559) 497-2880
Toll-Free: (800) 669-3201

Additional Locations

Along with the fixed laboratory facilities, BSK can receive samples at two additional locations. Our Livermore, CA office serves as the receiving center for our San Francisco Bay area customers. Samples dropped off at this location will be packaged and shipped via overnight delivery to the Fresno laboratory for analysis.

Additionally, BSK operates a self-service, drop off kiosk in Visalia, CA that is co-located with one of BSK's long term business partners, Barnes Welding Supply / Fresno Oxygen. At this location, our customers have access to chains of custodies, shipping containers and an ice machine, allowing them to pack their samples and leave onsite for delivery to the Fresno laboratory. BSK's regional courier stops by the center on a daily basis to pick up samples and route them to the lab for analysis.

Laboratory Addresses

Fresno Analytical Lab
1414 Stanislaus Street
Fresno, California 93706
Local: (559) 497-2888

Sacramento Microbiology Lab
3140 Gold Camp Drive #160
Rancho Cordova, CA 95670
Local: (916) 853-9293

Southern California Microbiology Lab
Address
Address

Vancouver Analytical Laboratory
2517 East Evergreen Blvd.
Vancouver, WA 98661
Local: (360) 750-0055

Drop-Off Locations

Livermore, California
324 Earhart Way
Livermore, CA 94551
Local: (925) 315-3151

Visalia California
Barns Welding Supply
2239 E. Main Street
Visalia, CA 93292

Laboratory Facilities

Our Delivery

BSK recognizes that time is the one resource that cannot be replaced, purchased or recaptured if lost. We understand that one of the hallmarks of a great laboratory is the ability to deliver on time, every time. To that end, BSK uses on time delivery as one of our primary business metrics in gauging our performance. It is a topic discussed at all management meetings, it is a question asked on our annual client survey and it is a metric displayed for all staff to see throughout the laboratory facilities.

BSK Labs sets internal milestones for all turnaround schedules and each department has an on time delivery goal for the year. Our project management group is included in our metrics and we have set standards for on time delivery of reports to our clients. At BSK, we strive to provide our clients the right data, on time, every time.

Our Ethical Standards

For all the importance placed on delivering our results on time to our clients, BSK's staff understands that this goal does not come at the cost of quality in a laboratory setting. As a laboratory, the work we perform goes to assuring the preservation of our environment and the protection of human health. Where this is concerned, there is no substitute for quality and ethical decision making. BSK's staff is trained on how to make the correct choices where data quality is concerned. These choices are discussed in our annual ethics training and all staff attests to following these guidelines when they sign our Ethics and Data Integrity Agreement. In this agreement, BSK's staff asserts our commitment to ethical laboratory practices and agrees to be intolerant of anyone who chooses otherwise. Ethical behavior, above all, is our greatest value and the basis for all the work that we perform.

The BSK Values

Service
Professionalism
Employee Development
Personal Accountability
Teamwork
Safety

Qualifications

Quality Assurance

BSK's Quality Assurance Program (QAP), our "guiding light" for decision making, is a comprehensive ISO-based (ISO 17025) quality assurance plan built on documented standard operating procedures and technical competence. BSK's QAP addresses all aspects of our laboratory operations – everything from sample handling, to chemical analysis, to data review and report generation.

Our QAP provides the basis for all decision points, ensuring that we provide legally defensible data that are of known and documented quality. All our data undergoes three levels of review and periodic internal audits so that our clients can rest assured that BSK's data will withstand the highest level of scrutiny in even the most litigious situations.

Professional Expertise

BSK Labs employs more than 75 chemists, microbiologists, technicians, and support staff, most of which hold degrees in chemistry, biology or microbiology. Our management team is comprised of a group of individuals having well over 150 years combined experience. This team includes staff members having been with the company for as many as 30 years, with others coming from different laboratories within the industry and bringing a set of collective experience that many of our clients find invaluable.

For our clients, BSK offers an internal network of experts, each tasked with knowledge in certain aspects of our industry. We have identified expertise in the area of waste characterization and disposal, wastewater permits and regulations, drinking water compliance, storm water runoff, biomass fuel testing and many other industry topics. As our clients present us with their challenges, we can work through this network to provide them the information needed to ensure successful projects that satisfy the regulatory drivers necessitating our analytical services.

Our Resources

Client Support

BSK Labs offers extensive resources to help our clients with their more challenging analytical problems.

First, BSK employs a full time project consultant that can assist our clients with complex project plans and requirements. Our project consultant has over 30 years' experience in the industry and often provides our clients cost effective alternatives for their projects that can save thousands of dollars in analytical costs and project overruns.

Second, BSK Labs maintains a Technical Services Department that can help address unique problems or provide forensic support for investigations that may go outside the normal course of environmental testing. Our Technical Services Manager has consulted with clients on everything from identifying manufacturing contaminants in final products to identifying the cause of corrosion in a cooling system for a local firm.

Analytical Equipment

BSK recognizes two universal truths about the environmental laboratory industry. Regulations will constantly push our clients for lower reporting limits and we will need to provide results on increasingly shorter time lines in order to meet our clients' needs. With that, BSK continues to add to and upgrade our equipment inventory on a regular basis. We do so to ensure that we have adequate capacity, redundancy and sensitivity to deliver data on time, at the reporting limits needed, regardless of our workload. With this, BSK Labs maintains an extensive list of equipment to meet our analytical needs. We have invested over $1.5M in new equipment over the last 5 years and expect to continue this level of investment.

As we have found and our clients have experienced, regular investment in new technologies results in better on time delivery of results with improved quality control and greater operational efficiency.

Our equipment list includes but is not limited to:

- (3) Agilent 5975 Quadrapole MS (VOA)
- (2) Agilent 5971/5975 Quadrapole MS (SVOA)
- (3) Varian Saturn Ion Trap MS (SVOA)
- (1) AB Sciex 4000 QTrap LC-MS/MS
- (1) Varian 1200 UHPLC-MS/MS
- (9) GCs- FID, ECD
- (3) HPLCs – UVD, FLD, PDA
- (2) PE ELAN 6000 ICP-MS
- (1) PE ELAN 9000 ICP-MS (DRC)
- (2) PE ICP
- (7) Dionex Ion Chromatographs
- (1) Westco SmartChem Discrete Analyzer
- (2) Thomas Cain DEENA Autodigesters

BSK

Information Technology

LIMS

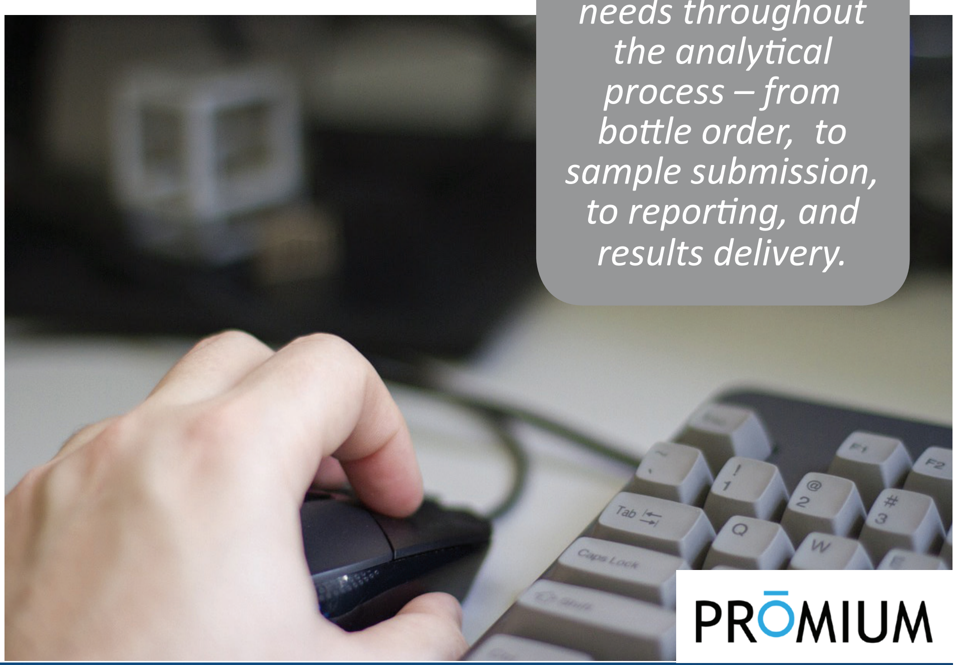
One of the main differentiators for laboratories today is their ability to provide electronic data solutions for their clients. Beginning with the implementation of our first Laboratory Information Management System (LIMS) in 1996, BSK has continued to invest heavily in information technology in order to provide these Information Services to an ever evolving market. In February 2010, BSK made the transition to our next generation LIMS, an event that continues our evolution as a laboratory.

With this new system, BSK recognized three significant advances in our ability to provide data solutions for our clients. First, BSK introduced ClientConnect, our web portal for analytical results, electronic reports (Adobe PDF) and Electronic Data Deliverables (EDDs). Through this portal, our clients can monitor the status of their projects as samples move through the laboratory process. Statuses are updated real-time and, once the data has undergone the tertiary or "rightness" review by the project manager, the results can be view directly on screen. Finally, once the report has been spooled through our automated delivery system, the report and any associated EDDs are available for download within a short time.

With the implementation of the LIMS, BSK greatly expanded our EDD offering. As of today, we have over 95 common EDD formats in our library and maintain the ability to provide custom EDD formats for those clients with proprietary or "home grown" data formats and custom valid value lists (VVLs). Some of the more common ones that we produce on a daily basis include: CA WriteOn, CA GeoTracker (EDF 1.2i), ERPIMS, EQUiS™, WaterTrax™, GIS/Key™, LOCUS EIM™, EXCEL, SWAMP, and CIWQS.

With the added sophistication included in this new LIMS, BSK now can provide higher levels of data deliverables to our clients who wish to receive a greater extent of the quality control data produced by the laboratory. In addition to the industry standard "Level II" deliverable (Sample results with Batch Preparation QC), BSK can now provide summary data associated with the analytical instrumentation, sometimes referred to as a data validation package. This allows our more sophisticated clients the ability to perform their own independent review of the analytical data to ensure it meets the standards and requirements set forth in their Quality Assurance Project Plans (QAPPs).

Our web and electronic data delivery services simplify our clients' needs throughout the analytical process – from bottle order, to sample submission, to reporting, and results delivery.



PRŌMIUM

OREGON

Environmental Laboratory Accreditation Program

NELAP Recognized

BSK Associates

4021

1414 Stanislaus St.

Fresno,CA 93706

IS GRANTED APPROVAL BY ORELAP UNDER THE 2009 TNI STANDARDS, TO PERFORM ANALYSES ON ENVIRONMENTAL SAMPLES IN MATRICES AS LISTED BELOW :

Air	Drinking Water	Non Potable Water	Solids and Chem. Waste	Tissue
	Chemistry	Chemistry	Chemistry	
	Microbiology	Microbiology		
	Radiochemistry			

AND AS RECORDED IN THE LIST OF APPROVED ANALYTES, METHODS, ANALYTICAL TECHNIQUES, AND FIELDS OF TESTING ISSUED CONCURRENTLY WITH THIS CERTIFICATE AND REVISED AS NECESSARY.

ACCREDITED STATUS DEPENDS ON SUCCESSFUL ONGOING PARTICIPATION IN THE PROGRAM AND CONTINUED COMPLIANCE WITH THE STANDARDS.

CUSTOMERS ARE URGED TO VERIFY THE LABORATORY'S CURRENT ACCREDITATION STATUS IN OREGON.

Gary K Ward

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ISSUE DATE: 01/30/2016

EXPIRATION DATE: 01/29/2017

Certificate No: 4021 - 005

Oregon

Environmental Laboratory Accreditation Program

Department of Agriculture, Laboratory Division
Department of Environmental Quality, Laboratory Division
Oregon Health Authority, Public Health Division

NELAP Recognized

ORELAP Fields of Accreditation

ORELAP ID: 4021
EPA CODE: CA00079
Certificate: 4021 - 005

BSK Associates
1414 Stanislaus St.
Fresno CA 93706

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MATRIX : Drinking Water

Reference	Code	Description
ASTM D4374-06 Kelada-01	**30031250**	**Standard Test Methods for Cyanides in Water-Automated Methods for Total Cyanide, Weak Acid Dissociable Cyanide, and Thiocyanate**

Analyte Code	*Analyte*
1645	Total cyanide
2074	Weak Acid Dissociable Cyanide

Reference	Code	Description
EPA 200.2	**10013000**	**Sample Preparation Procedure for Spectrochemical Determination of Total Recoverable Elements - Revision 2.8**

Analyte Code	*Analyte*
8031	Extraction/Preparation

Reference	Code	Description
EPA 200.7 5	**10014003**	**ICP - metals**

Analyte Code	*Analyte*
1000	Aluminum
1015	Barium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1055	Copper
1760	Hardness (calc.)
1070	Iron
1085	Magnesium
1090	Manganese
1105	Nickel
1125	Potassium
1990	Silica as SiO2
1150	Silver
1155	Sodium
1190	Zinc

Reference	Code	Description
EPA 200.8 5.5	**10014809**	**Metals by ICP-MS**

Analyte Code	*Analyte*
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1030	Cadmium
1040	Chromium
1055	Copper

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Analyte Code	Analyte
1075	Lead
1095	Mercury
1105	Nickel
1140	Selenium
1150	Silver
1165	Thallium
3035	Uranium
1190	Zinc

EPA 218.6 3.3 **10028009** **Dissolved Hexavalent Chromium by Ion Chromatography**

Analyte Code	Analyte
1045	Chromium VI

EPA 218.7 1 **10268414** **Determination of Hexavalent Chromium in Drinking Water by Ion Chromatography with Post-column Derivatization and UV-VIS Spectroscopic Determination**

Analyte Code	Analyte
1045	Chromium VI

EPA 300.0 2.1 **10053200** **Methods for the Determination of Inorganic Substances in Environmental Samples**

Analyte Code	Analyte
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N
1870	Orthophosphate as P
2000	Sulfate

EPA 300.1 **10053608** **Ion chromatography - anions.**

Analyte Code	Analyte
1540	Bromide
1570	Chlorate
1595	Chlorite

EPA 314.0 **10277006** **Perchlorate in Drinking Water by Ion Chromatography**

Analyte Code	Analyte
1895	Perchlorate

EPA 317.0 2.0 **10237602** **Inorganic Oxyhalide Disinfection Byproducts in Drinking Water**

Analyte Code	Analyte
1535	Bromate

EPA 504.1 1.1 **10082801** **EDB/DBCP/TCP micro-extraction, GC/ECD**

Analyte Code	Analyte
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)

EPA 505 2.1 **10083406** **Organohalide pesticides/PCBs (Drinking Water)**

Analyte Code	Analyte
7005	Alachlor
7025	Aldrin
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)

Analyte Code	Analyte
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)
7065	Atrazine
7250	Chlordane (tech.)
7470	Dieldrin
7540	Endrin
7120	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)
7685	Heptachlor
7690	Heptachlor epoxide
6275	Hexachlorobenzene
6285	Hexachlorocyclopentadiene
7810	Methoxychlor
8870	PCBs
8125	Simazine
8250	Toxaphene (Chlorinated camphene)

EPA 515.3 1 **10088401** **Chlorinated acids Liquid/Solid and GC/ECD**

Analyte Code	Analyte
8655	2,4,5-T
8545	2,4-D
8560	2,4-DB
8600	3,5-Dichlorobenzoic acid
6500	4-Nitrophenol
8505	Acifluorfen
8530	Bentazon
8540	Chloramben
8550	Dacthal (DCPA)
8555	Dalapon
8595	Dicamba
8605	Dichloroprop (Dichlorprop)
8620	Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)
6605	Pentachlorophenol
8645	Picloram
8650	Silvex (2,4,5-TP)

EPA 515.4 1 **10088503** **Chlorinated acids Liquid/Solid and GC/ECD**

Analyte Code	Analyte
8655	2,4,5-T
8545	2,4-D
8560	2,4-DB
8600	3,5-Dichlorobenzoic acid
6500	4-Nitrophenol
8505	Acifluorfen
8530	Bentazon
8540	Chloramben
8550	Dacthal (DCPA)
8555	Dalapon
8595	Dicamba
8605	Dichloroprop (Dichlorprop)
8620	Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)
6605	Pentachlorophenol
8645	Picloram
8650	Silvex (2,4,5-TP)

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EPA 524.2 4.1 **10088809** **Volatile Organic Compounds GC/MS Capillary Column**

Analyte Code	***Analyte***
5105	1,1,1,2-Tetrachloroethane
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5195	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150	1,2,3-Trichlorobenzene
5180	1,2,3-Trichloropropane
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
4655	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
4665	2,2-Dichloropropane
4410	2-Butanone (Methyl ethyl ketone, MEK)
4535	2-Chlorotoluene
4860	2-Hexanone (MBK)
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4595	Dibromomethane (Methylene bromide)
4625	Dichlorodifluoromethane (Freon-12)
9375	Di-isopropylether (DIPE)
4765	Ethylbenzene
4770	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)
4835	Hexachlorobutadiene
4900	Isopropylbenzene
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
5000	Methyl tert-butyl ether (MTBE)
4975	Methylene chloride (Dichloromethane)
5005	Naphthalene
4435	n-Butylbenzene
5090	n-Propylbenzene
4440	sec-Butylbenzene
5100	Styrene
4370	T-amylmethylether (TAME)
4420	tert-Butyl alcohol
4445	tert-Butylbenzene

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Analyte Code	Analyte
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene
5205	Total trihalomethanes
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5235	Vinyl chloride
5260	Xylene (total)

EPA 525.2 2 **10090003** **Semi-Volatile by SPE extraction and GC/MS**

Analyte Code	Analyte
5500	Acenaphthene
5505	Acenaphthylene
7005	Alachlor
5555	Anthracene
7065	Atrazine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
6062	bis(2-Ethylhexyl)adipate
7130	Bromacil
7160	Butachlor
5670	Butyl benzyl phthalate
7300	Chlorpyrifos
7310	Chlorthalonil (Daconil)
5855	Chrysene
8550	Dacthal (DCPA)
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
7410	Diazinon
5895	Dibenz(a,h) anthracene
6070	Diethyl phthalate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6265	Fluoranthene
6270	Fluorene
6315	Indeno(1,2,3-cd) pyrene
7835	Metolachlor
7845	Metribuzin
7875	Molinate
5005	Naphthalene
6615	Phenanthrene
8035	Prometon
8040	Prometryn
8045	Propachlor (Ramrod)
6665	Pyrene
8125	Simazine
8220	Thiobencarb
8295	Trifluralin (Treflan)

EPA 525.3 1 **10287500** **Determination of Semivolatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Capillary Gas Chromatography/Mass Spectrometry (GC/MS)**

Analyte Code	Analyte
5500	Acenaphthene
5505	Acenaphthylene
7005	Alachlor
5555	Anthracene

Analyte Code	Analyte
7065	Atrazine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
6062	bis(2-Ethylhexyl)adipate
7130	Bromacil
7160	Butachlor
5670	Butyl benzyl phthalate
7300	Chlorpyrifos
7310	Chlorthalonil (Daconil)
5855	Chrysene
8550	Dacthal (DCPA)
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
7410	Diazinon
5895	Dibenz(a,h) anthracene
6070	Diethyl phthalate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6265	Fluoranthene
6270	Fluorene
6315	Indeno(1,2,3-cd) pyrene
7835	Metolachlor
7845	Metribuzin
7875	Molinate
5005	Naphthalene
6615	Phenanthrene
8035	Prometon
8040	Prometryn
8045	Propachlor (Ramrod)
6665	Pyrene
8125	Simazine
8220	Thiobencarb
8295	Trifluralin (Treflan)

EPA 531.1 3.1 **10091006** **Carbamates HPLC with post column derivatization**

Analyte Code	Analyte
7710	3-Hydroxycarbofuran
7010	Aldicarb (Temik)
7015	Aldicarb sulfone
7020	Aldicarb sulfoxide
7195	Carbaryl (Sevin)
7205	Carbofuran (Furaden)
7800	Methiocarb (Mesurol)
7805	Methomyl (Lannate)
7940	Oxamyl
8080	Propoxur (Baygon)
8220	Thiobencarb

EPA 531.2 1 **10091302** **Carbamate Pesticides by Post-column Derivitization HPLC/Fluorescence**

Analyte Code	Analyte
7710	3-Hydroxycarbofuran
7010	Aldicarb (Temik)
7015	Aldicarb sulfone
7020	Aldicarb sulfoxide
7195	Carbaryl (Sevin)
7205	Carbofuran (Furaden)

Analyte Code	Analyte
7800	Methiocarb (Mesurol)
7805	Methomyl (Lannate)
7940	Oxamyl
8080	Propoxur (Baygon)

EPA 547 **10092009** **Glyphosate by Direct Aqueous Injection by Post-column Derivitization and HPLC/Fluorescence**

Analyte Code	Analyte
9411	Glyphosate

EPA 548.1 1 **10092805** **Endothall by Ion Exchange, Methylation and GC/MS**

Analyte Code	Analyte
7525	Endothall

EPA 549.2 1 **10093400** **Diquat/Paraquat by Liquid/Liquid Extraction and HPLC/UV-VIS**

Analyte Code	Analyte
9390	Diquat
9528	Paraquat

EPA 552.3 1 **10239608** **Haloacetic Acid/Dalapon, Microextraction, Derivitization and GC/ECD**

Analyte Code	Analyte
9312	Bromoacetic acid
9315	Bromochloroacetic acid
9336	Chloroacetic acid
9357	Dibromoacetic acid
9360	Dichloroacetic acid
9414	Total haloacetic acids
9642	Trichloroacetic acid

EPA 632 **10108608** **Carbamate and Urea Pesticides by Liquid/Liquid Extraction and HPLC/UV-VIS**

Analyte Code	Analyte
7505	Diuron

Georgia Institute of Technology, GA: Radium 226/228 1.2 **90016005** **Radium-226 and Radium-228 in Drinking Water by Gamma-ray Spectrometry using HPGE or Ge (Li) Detectors**

Analyte Code	Analyte
2965	Radium-226
2970	Radium-228

SM 2120 B-2001 online **20039309** **Color by Visual Comparison**

Analyte Code	Analyte
1605	Color

SM 2130 B-94 online **20042802** **Turbidity by Nephelometric Method**

Analyte Code	Analyte
2055	Turbidity

SM 2320 B-97 1997 **20045607** **Alkalinity by Titration Method**

Analyte Code	Analyte
1505	Alkalinity as $CaCO_3$

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SM 2330 B 20th Ed **20003309** **Calcium Carbonate Indices**

Analyte Code	*Analyte*
1615	Corrosivity

SM 2340 B-97 1997 **20046600** **Hardness by calculation**

Analyte Code	*Analyte*
1750	Hardness

SM 2510 B-97 1997 **20048606** **Conductivity by Probe**

Analyte Code	*Analyte*
1610	Conductivity

SM 2540 C-97 1997 **20050402** **Total Dissolved Solids Dried at 180C**

Analyte Code	*Analyte*
1955	Residue-filterable (TDS)

SM 4500-Cl¯ F 20th ED **20087201** **Chloride by Ion Chromatography**

Analyte Code	*Analyte*
1945	Residual free chlorine

SM 4500-CN E-1999 **20096417** **Cyanide by Colorimetric Method**

Analyte Code	*Analyte*
1645	Total cyanide

SM 4500-F¯ C-97 online **20102403** **Fluoride by Ion-Selective Electrode Method**

Analyte Code	*Analyte*
1730	Fluoride

SM 4500-H+ B-2000 online **20105219** **pH Value by Electrometric Method .**

Analyte Code	*Analyte*
1900	pH

SM 4500-NO3¯ F-97 online **20117606** **Nitrate by Automated Cadmium Reduction Method**

Analyte Code	*Analyte*
1820	Nitrate-nitrite

SM 4500-P E-1999 **20124214** **Phosphorous by Ascorbic Acid Method**

Analyte Code	*Analyte*
1870	Orthophosphate as P

SM 5310 C 21st ED **20138607** **TOC by Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method**

Analyte Code	*Analyte*
1710	Dissolved organic carbon (DOC)

SM 5310 C-2000 online **20138812** **Total Organic Carbon by Persulfate-Ultraviolet Oxidation Method**

Analyte Code	*Analyte*
2040	Total organic carbon

SM 5540 C-93 online **20145000** **Surfactants by Anionic Surfactants as MBAS**

Analyte Code	*Analyte*
2025	Surfactants - MBAS

SM 5910 B-00 online **20146401** **UV--Absorbing Organic Constituents by Ultraviolet Absorption Method**

Analyte Code	*Analyte*
2060	UV 254

SM 7110 C (GPC) 21st ED **20158809** **Radioactivity by Coprecipitation Method for Gross Alpha Radioactivity in Drinking Water**

Analyte Code	*Analyte*
2830	Gross-alpha

SM 9215 B (PCA) 21st ED **20181402** **Heterotrophic Plate Count Pour Plate (plate count agar): Heterotrophic Bacteria**

Analyte Code	*Analyte*
2555	Heterotrophic plate count

SM 9221 B (LTB) + C MPN 21st ED **20187002** **Multiple Tube Fermentation Quantitative (LTB): Total Coliform**

Analyte Code	*Analyte*
2525	Escherichia coli
2500	Total coliforms

SM 9221 B (LTB) + E (EC) 21st ED **20188005** **Multiple Tube Fermentation Qualitative (LTB/EC): Total Coliform and Fecal Coliform**

Analyte Code	*Analyte*
2530	Fecal coliforms
2500	Total coliforms

SM 9221 B (LTB) + F (EC MUG) 21st ED **20189804** **Multiple Tube Fermentation Qualitative (LTB/EC MUG): Total Coliform and E. Coli**

Analyte Code	*Analyte*
2525	Escherichia coli
2500	Total coliforms

SM 9221 B (LTB) 21st ED **20186009** **Multiple Tube Fermentation Qualitative (LTB): Total Coliform**

Analyte Code	*Analyte*
2500	Total coliforms

SM 9223 B (Colilert®-18 Quanti-Tray®) 21st ED **20213405** **Chromogenic/Fluorogenic Quantitative (Colilert®-18): Total Coliform and E. coli**

Analyte Code	*Analyte*
2525	Escherichia coli
2500	Total coliforms

SM 9223 B (Colilert®-18) 21st ED **20214408** **Chromogenic/Fluorogenic Qualitative (Colilert®-18): Total Coliform and E. coli**

Analyte Code	*Analyte*
2525	Escherichia coli
2500	Total coliforms

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MATRIX : Non-Potable Water

Reference	Code	Description
ASTM D4374-06 Kelada-01	**30031250**	**Standard Test Methods for Cyanides in Water-Automated Methods for Total Cyanide, Weak Acid Dissociable Cyanide, and Thiocyanate**

Analyte Code	*Analyte*
1645	Total cyanide
2074	Weak Acid Dissociable Cyanide

Reference	Code	Description
EPA 1664A	**10127603**	**Silica Gen Treated N-Hexane Extractable Material (Oil and Grease)**

Analyte Code	*Analyte*
1860	Oil & Grease

Reference	Code	Description
EPA 1664A (HEM)	**10127807**	**N-Hexane Extractable Material (Oil and Grease) by Extraction and Gravimetry**

Analyte Code	*Analyte*
1803	n-Hexane Extractable Material (O&G)
1860	Oil & Grease
2050	Total Petroleum Hydrocarbons (TPH)

Reference	Code	Description
EPA 1664A (SGT-HEM)	**10261606**	**Silica Gen Treated N-Hexane Extractable Material (Oil and Grease)**

Analyte Code	*Analyte*
1803	n-Hexane Extractable Material (O&G)
1860	Oil & Grease
2050	Total Petroleum Hydrocarbons (TPH)

Reference	Code	Description
EPA 200.2	**10013000**	**Sample Preparation Procedure for Spectrochemical Determination of Total Recoverable Elements - Revision 2.8**

Analyte Code	*Analyte*
8031	Extraction/Preparation

Reference	Code	Description
EPA 200.7 5	**10014003**	**ICP - metals**

Analyte Code	*Analyte*
1000	Aluminum
1015	Barium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1055	Copper
1760	Hardness (calc.)
1070	Iron
1075	Lead
1085	Magnesium
1090	Manganese
1100	Molybdenum
1105	Nickel
1125	Potassium
1990	Silica as SiO2
1150	Silver
1155	Sodium
1175	Tin
1185	Vanadium
1190	Zinc

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EPA 200.8 5.5 **10014809** **Metals by ICP-MS**

Analyte Code	*Analyte*
1000	Aluminum
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1040	Chromium
1050	Cobalt
1055	Copper
1070	Iron
1075	Lead
1090	Manganese
1095	Mercury
1100	Molybdenum
1105	Nickel
1140	Selenium
1150	Silver
1165	Thallium
1175	Tin
1180	Titanium
1185	Vanadium
1190	Zinc

EPA 218.6 3.3 **10028009** **Dissolved Hexavalent Chromium by Ion Chromatography**

Analyte Code	*Analyte*
1045	Chromium VI

EPA 218.7 1 **10268414** **Determination of Hexavalent Chromium in Drinking Water by Ion Chromatography with Post-column Derivatization and UV-VIS Spectroscopic Determination**

Analyte Code	*Analyte*
1045	Chromium VI

EPA 300.0 2.1 **10053200** **Methods for the Determination of Inorganic Substances in Environmental Samples**

Analyte Code	*Analyte*
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N
1870	Orthophosphate as P
2000	Sulfate

EPA 300.1 **10053608** **Ion chromatography - anions.**

Analyte Code	*Analyte*
1540	Bromide

EPA 3010A **10133605** **Acid Digestion of Aqueous samples and Extracts for Total Metals**

Analyte Code	*Analyte*
8031	Extraction/Preparation

ORELAP Fields of Accreditation

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EPA 314.0 **10277006** **Perchlorate in Drinking Water by Ion Chromatography**

Analyte Code	*Analyte*
1895	Perchlorate

EPA 350.1 2 **10063602** **Ammonia Nitrogen - Colorimetric, Auto Phenate**

Analyte Code	*Analyte*
1515	Ammonia as N

EPA 351.2 2 **10065404** **Total Kjeldahl Nitrogen - Block Digest, Phenate**

Analyte Code	*Analyte*
1790	Kjeldahl nitrogen

EPA 365.4 **10071008** **Phosphorous - Colorimetric, automated block.**

Analyte Code	*Analyte*
1910	Phosphorus, total

EPA 608 **10103603** **Organochlorine Pesticides & PCBs by GC/ECD**

Analyte Code	*Analyte*
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)
7115	beta-BHC (beta-Hexachlorocyclohexane)
7250	Chlordane (tech.)
7105	delta-BHC
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7535	Endrin ketone
7120	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)
7685	Heptachlor
7690	Heptachlor epoxide
7810	Methoxychlor
8250	Toxaphene (Chlorinated camphene)

EPA 624 **10107207** **Volatile Organic Compounds by purge and trap GC/MS**

Analyte Code	*Analyte*
5105	1,1,1,2-Tetrachloroethane
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5195	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene

ORELAP Fields of Accreditation

ORELAP ID: 4021

EPA CODE: CA00079

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Analyte Code	***Analyte***
5150	1,2,3-Trichlorobenzene
5155	1,2,4-Trichlorobenzene
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
4655	1,2-Dichloropropane
4615	1,3-Dichlorobenzene
4675	1,3-Dichloropropene
4620	1,4-Dichlorobenzene
4410	2-Butanone (Methyl ethyl ketone, MEK)
4500	2-Chloroethyl vinyl ether
4860	2-Hexanone (MBK)
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4325	Acrolein (Propenal)
4340	Acrylonitrile
4375	Benzene
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4580	Dibromochloropropane
4625	Dichlorodifluoromethane (Freon-12)
4765	Ethylbenzene
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
5000	Methyl tert-butyl ether (MTBE)
4975	Methylene chloride (Dichloromethane)
5005	Naphthalene
5100	Styrene
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5235	Vinyl chloride

EPA 625 **10300002** **Base/Neutrals and Acids by GC/MS**

Analyte Code	***Analyte***
5155	1,2,4-Trichlorobenzene
4610	1,2-Dichlorobenzene
6221	1,2-Diphenylhydrazine
4615	1,3-Dichlorobenzene
4620	1,4-Dichlorobenzene
6165	1,4-Dinitrobenzene
6380	1-Methylnaphthalene
6840	2,4,6-Trichlorophenol
6000	2,4-Dichlorophenol
6130	2,4-Dimethylphenol
6175	2,4-Dinitrophenol
6185	2,4-Dinitrotoluene (2,4-DNT)
6190	2,6-Dinitrotoluene (2,6-DNT)

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Analyte Code	*Analyte*
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
6385	2-Methylnaphthalene
6490	2-Nitrophenol
5945	3,3'-Dichlorobenzidine
6355	3-Methylcholanthrene
5660	4-Bromophenyl phenyl ether (BDE-3)
5700	4-Chloro-3-methylphenol
5825	4-Chlorophenyl phenylether
6500	4-Nitrophenol
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5595	Benzidine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
9309	Benzo(j)fluoranthene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5780	bis(2-Chloroisopropyl) ether
5670	Butyl benzyl phthalate
5855	Chrysene
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
9354	Dibenz(a, h) acridine
5900	Dibenz(a, j) acridine
5895	Dibenz(a,h) anthracene
9348	Dibenzo(a, h) pyrene
9351	Dibenzo(a, i) pyrene
5890	Dibenzo(a,e) pyrene
6070	Diethyl phthalate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6265	Fluoranthene
6270	Fluorene
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno(1,2,3-cd) pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6530	n-Nitrosodimethylamine
6545	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6605	Pentachlorophenol
6608	Perylene
6615	Phenanthrene
6625	Phenol
6665	Pyrene

EPA 632 **10108608** **Carbamate and Urea Pesticides by Liquid/Liquid Extraction and HPLC/UV-VIS**

Analyte Code	*Analyte*
7080	Barban
7195	Carbaryl (Sevin)

Analyte Code	Analyte
7205	Carbofuran (Furaden)
7275	Chloropropham
7505	Diuron
7610	Fenuron
7630	Fluometuron
7765	Linuron (Lorox)
7805	Methomyl (Lannate)
7885	Monuron
7915	Neburon
7940	Oxamyl
8075	Propham
8080	Propoxur (Baygon)
8120	Siduron

EPA 9040B **10197203** **pH Electrometric Measurement**

Analyte Code	Analyte
1900	pH

EPA 9045C **10198400** **Soil and Waste pH**

Analyte Code	Analyte
1900	pH

NWTPH-Dx **90018409** **Oregon DEQ TPH Diesel Range**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9488	Jet Fuel
9499	Motor Oil
2050	Total Petroleum Hydrocarbons (TPH)

NWTPH-GX (GC/MS) **90018658** **Oregon DEQ TPH Gasoline Range Organics by GC/MS Purge & Trap**

Analyte Code	Analyte
4375	Benzene
4765	Ethylbenzene
9408	Gasoline range organics (GRO)
5240	m+p-xylene
5000	Methyl tert-butyl ether (MTBE)
5245	m-Xylene
5250	o-Xylene
5255	p-Xylene
5140	Toluene
5260	Xylene (total)

SM 2120 B-2001 online **20039309** **Color by Visual Comparison**

Analyte Code	Analyte
1605	Color

SM 2130 B-94 online **20042802** **Turbidity by Nephelometric Method**

Analyte Code	Analyte
2055	Turbidity

SM 2320 B-97 1997 **20045607** **Alkalinity by Titration Method**

Analyte Code	Analyte
1505	Alkalinity as $CaCO_3$

ORELAP Fields of Accreditation

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SM 2340 B-97 1997 **20046600** **Hardness by calculation**

Analyte Code	***Analyte***
1750	Hardness

SM 2510 B-97 1997 **20048606** **Conductivity by Probe**

Analyte Code	***Analyte***
1610	Conductivity

SM 2540 B-97 1997 **20049405** **Total Solids Dried at 103 - 105C**

Analyte Code	***Analyte***
1950	Residue-total

SM 2540 C-97 1997 **20050402** **Total Dissolved Solids Dried at 180C**

Analyte Code	***Analyte***
1955	Residue-filterable (TDS)

SM 2540 D-97 1997 **20051201** **Total Suspended Solids Dried at 103 - 105C**

Analyte Code	***Analyte***
1960	Residue-nonfilterable (TSS)

SM 2540 E-1997 **20051585** **Fixed & Volatile Solids Ignited at 550 C**

Analyte Code	***Analyte***
1725	Total, fixed, and volatile residue

SM 2540 F-97 online **20052204** **Settleable Solids**

Analyte Code	***Analyte***
1965	Residue-settleable

SM 4500-Cl B-93 online **20078404** **Chlorine by Iodometric Method I**

Analyte Code	***Analyte***
1580	Chlorine

SM 4500-Cl^- F 20th ED **20087201** **Chloride by Ion Chromatography**

Analyte Code	***Analyte***
1945	Residual free chlorine

SM 4500-CN C-1999 **20095652** **Cyanide (Total) after Distillation**

Analyte Code	***Analyte***
1635	Cyanide

SM 4500-CN E-1999 **20096417** **Cyanide by Colorimetric Method**

Analyte Code	***Analyte***
1645	Total cyanide

SM 4500-F^- C-97 online **20102403** **Fluoride by Ion-Selective Electrode Method**

Analyte Code	***Analyte***
1730	Fluoride

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SM 4500-H+ B-2000 online **20105219** **pH Value by Electrometric Method .**

Analyte Code	Analyte
1900	pH

SM 4500-NH3 G-97 online **20111404** **Ammonia by Automated Phenate Method**

Analyte Code	Analyte
1515	Ammonia as N

SM 4500-NO3⁻ F-97 online **20117606** **Nitrate by Automated Cadmium Reduction Method**

Analyte Code	Analyte
1820	Nitrate-nitrite

SM 4500-O C-93 online **20120803** **Oxygen by Azide Modification**

Analyte Code	Analyte
1880	Oxygen, dissolved

SM 4500-O G-2001 online **20121657** **Dissolved Oxygen by Membrane Electrode Method**

Analyte Code	Analyte
1880	Oxygen, dissolved

SM 4500-P B 5 20th ED **20123200** **Phosphorus by Persulfate Digestion Method**

Analyte Code	Analyte
1910	Phosphorus, total

SM 4500-P E-1999 **20124214** **Phosphorous by Ascorbic Acid Method**

Analyte Code	Analyte
1870	Orthophosphate as P

SM 5210 B-2001 online **20135255** **Biochemical Oxygen Demand (BOD), 5-Day**

Analyte Code	Analyte
1530	Biochemical oxygen demand
1555	Carbonaceous BOD, CBOD

SM 5220 D-97 online **20136805** **COD by Closed Reflux, Colorimetric Method**

Analyte Code	Analyte
1565	Chemical oxygen demand

SM 5310 C 21st ED **20138607** **TOC by Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method**

Analyte Code	Analyte
1710	Dissolved organic carbon (DOC)

SM 5310 C-2000 online **20138812** **Total Organic Carbon by Persulfate-Ultraviolet Oxidation Method**

Analyte Code	Analyte
2040	Total organic carbon

SM 5520 B-97 online **20141600** **Oil and Grease by Partition-Gravimetric Method**

Analyte Code	Analyte
1803	n-Hexane Extractable Material (O&G)

Analyte Code	Analyte
1860	Oil & Grease

SM 5520 F-05 online **20143208** **Oil and Grease by Hydrocarbons**

Analyte Code	Analyte
1803	n-Hexane Extractable Material (O&G)
1860	Oil & Grease

SM 5540 C-93 online **20145000** **Surfactants by Anionic Surfactants as MBAS**

Analyte Code	Analyte
2025	Surfactants - MBAS

SM 9215 B (PCA) 21st ED **20181402** **Heterotrophic Plate Count Pour Plate (plate count agar): Heterotrophic Bacteria**

Analyte Code	Analyte
2555	Heterotrophic plate count

SM 9221 B (LTB) + C MPN 21st ED **20187002** **Multiple Tube Fermentation Quantitative (LTB): Total Coliform**

Analyte Code	Analyte
2525	Escherichia coli
2500	Total coliforms

SM 9221 B (LTB) + E (EC) 21st ED **20188005** **Multiple Tube Fermentation Qualitative (LTB/EC): Total Coliform and Fecal Coliform**

Analyte Code	Analyte
2530	Fecal coliforms
2500	Total coliforms

SM 9221 B (LTB) + F (EC MUG) 21st ED **20189804** **Multiple Tube Fermentation Qualitative (LTB/EC MUG): Total Coliform and E. Coli**

Analyte Code	Analyte
2525	Escherichia coli
2500	Total coliforms

SM 9223 B (Colilert®-18 Quanti-Tray®) 21st ED **20213405** **Chromogenic/Fluorogenic Quantitative (Colilert®-18): Total Coliform and E. coli**

Analyte Code	Analyte
2525	Escherichia coli
2500	Total coliforms

SM 9223 B (Colilert®-18) 21st ED **20214408** **Chromogenic/Fluorogenic Qualitative (Colilert®-18): Total Coliform and E. coli**

Analyte Code	Analyte
2525	Escherichia coli
2500	Total coliforms

SM 9230 B (PSE) 21st ED **20217407** **Multiple Tube Fermentation Quantitative: Fecal Streptococci**

Analyte Code	Analyte
2540	Fecal streptococci

ORELAP Fields of Accreditation

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MATRIX : Solids

Reference	Code	Description
EPA 1010	**10116606**	**Pensky-Martens Closed-Cup Method for Determining Ignitability**

Analyte Code	Analyte
1780	Ignitability

Reference	Code	Description
EPA 1311	**10118806**	**Toxicity Characteristic Leaching Procedure**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 300.0 2.1	**10053200**	**Methods for the Determination of Inorganic Substances in Environmental Samples**

Analyte Code	Analyte
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N
1870	Orthophosphate as P
2000	Sulfate

Reference	Code	Description
EPA 3050B	**10135601**	**Acid Digestion of Sediments, Sludges, and soils**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 3060A	**10136604**	**Alkaline Digestion for Hexavalent Chromium**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 350.1 2	**10063602**	**Ammonia Nitrogen - Colorimetric, Auto Phenate**

Analyte Code	Analyte
1515	Ammonia as N

Reference	Code	Description
EPA 3510C	**10138202**	**Separatory Funnel Liquid-liquid extraction**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 3520C	**10139001**	**Continuous Liquid-liquid extraction**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 3540C	**10140202**	**Soxhlet Extraction**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 3550B	**10141807**	**Ultrasonic Extraction**

Analyte Code	Analyte
8031	Extraction/Preparation

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EPA 3620B **10145809** **Florisil Cleanup**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3660B **10148400** **Sulfur cleanup**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 5030B **10153409** **Purge and trap for aqueous samples**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 5035 **10154004** **Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 6010B **10155609** **ICP - AES**

Analyte Code	Analyte
1000	Aluminum
1015	Barium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1055	Copper
1070	Iron
1075	Lead
1085	Magnesium
1090	Manganese
1100	Molybdenum
1105	Nickel
1125	Potassium
1990	Silica as SiO2
1150	Silver
1155	Sodium
1175	Tin
1185	Vanadium
1190	Zinc

EPA 6020 **10156000** **Inductively Coupled Plasma-Mass Spectrometry**

Analyte Code	Analyte
1000	Aluminum
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1040	Chromium
1050	Cobalt
1055	Copper
1070	Iron
1075	Lead
1090	Manganese

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Analyte Code	Analyte
1100	Molybdenum
1105	Nickel
1140	Selenium
1150	Silver
1165	Thallium
1185	Vanadium
1190	Zinc

EPA 6020A **10156408** **Inductively Coupled Plasma-Mass Spectrometry**

Analyte Code	Analyte
1095	Mercury

EPA 7199 **10163005** **Determination of Hexavalent Chromium in Drinking Water, Groundwater and Industrial Wastewater Effluents by Ion Chromatography**

Analyte Code	Analyte
1045	Chromium VI

EPA 8015B **10173601** **Non-halogenated organics using GC/FID**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9488	Jet Fuel
9409	Kerosene
9410	Mineral Spirits
9499	Motor Oil
2050	Total Petroleum Hydrocarbons (TPH)

EPA 8081A **10178606** **Organochlorine Pesticides by GC/ECD**

Analyte Code	Analyte
8580	2,4'-DDD
8585	2,4'-DDE
8590	2,4'-DDT
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)
7240	alpha-Chlordane
7115	beta-BHC (beta-Hexachlorocyclohexane)
7250	Chlordane (tech.)
7310	Chlorthalonil (Daconil)
7105	delta-BHC
7460	Dicofol
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7535	Endrin ketone
7120	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)
7245	gamma-Chlordane
7685	Heptachlor
7690	Heptachlor epoxide
6275	Hexachlorobenzene
6285	Hexachlorocyclopentadiene
7810	Methoxychlor
8250	Toxaphene (Chlorinated camphene)

Analyte Code	Analyte
8295	Trifluralin (Treflan)

EPA 8082 **10179007** **Polychlorinated Biphenyls (PCBs) by GC/ECD**

Analyte Code	Analyte
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)

EPA 8260B **10184802** **Volatile Organic Compounds by purge and trap GC/MS**

Analyte Code	Analyte
5105	1,1,1,2-Tetrachloroethane
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5195	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150	1,2,3-Trichlorobenzene
5180	1,2,3-Trichloropropane
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
4655	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
4622	1,4-Difluorobenzene
4665	2,2-Dichloropropane
4410	2-Butanone (Methyl ethyl ketone, MEK)
4500	2-Chloroethyl vinyl ether
4535	2-Chlorotoluene
4860	2-Hexanone (MBK)
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4320	Acetonitrile
4325	Acrolein (Propenal)
4340	Acrylonitrile
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform

Analyte Code	Analyte
4525	Chloroprene (2-Chloro-1,3-butadiene)
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4580	Dibromochloropropane
4590	Dibromofluoromethane
4595	Dibromomethane (Methylene bromide)
4625	Dichlorodifluoromethane (Freon-12)
9375	Di-isopropylether (DIPE)
4750	Ethanol
4810	Ethyl methacrylate
4765	Ethylbenzene
4770	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)
4835	Hexachlorobutadiene
4840	Hexachloroethane
4870	Iodomethane (Methyl iodide)
4875	Isobutyl alcohol (2-Methyl-1-propanol)
4900	Isopropylbenzene
4925	Methacrylonitrile
4930	Methanol
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
4990	Methyl methacrylate
5000	Methyl tert-butyl ether (MTBE)
4975	Methylene chloride (Dichloromethane)
5005	Naphthalene
4435	n-Butylbenzene
5090	n-Propylbenzene
5040	Pentafluorobenzene
5080	Propionitrile (Ethyl cyanide)
4440	sec-Butylbenzene
5100	Styrene
4370	T-amylmethylether (TAME)
4420	tert-Butyl alcohol
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
4605	trans-1,4-Dichloro-2-butene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5225	Vinyl acetate
5235	Vinyl chloride
5260	Xylene (total)

EPA 8270C **10185805** **Semivolatile Organic compounds by GC/MS**

Analyte Code	Analyte
6715	1,2,4,5-Tetrachlorobenzene
5155	1,2,4-Trichlorobenzene
4610	1,2-Dichlorobenzene
6155	1,2-Dinitrobenzene
6221	1,2-Diphenylhydrazine
6885	1,3,5-Trinitrobenzene (1,3,5-TNB)
4615	1,3-Dichlorobenzene
6160	1,3-Dinitrobenzene (1,3-DNB)
4620	1,4-Dichlorobenzene
6165	1,4-Dinitrobenzene
4735	1,4-Dioxane (1,4- Diethyleneoxide)
6420	1,4-Naphthoquinone
6630	1,4-Phenylenediamine

ORELAP Fields of Accreditation

ORELAP ID: 4021
EPA CODE: CA00079
Certificate: 4021 - 005

BSK Associates

1414 Stanislaus St.
Fresno CA 93706

Issue Date: 01/30/2016 **Expiration Date:** 01/29/2017

As of 01/30/2016 ***this list supercedes all previous lists for this certificate number. Customers. Please verify the current accreditation standing with ORELAP.***

Analyte Code	Analyte
6380	1-Methylnaphthalene
6425	1-Naphthylamine
6735	2,3,4,6-Tetrachlorophenol
6835	2,4,5-Trichlorophenol
9643	2,4,6-Tribromophenol
6840	2,4,6-Trichlorophenol
6000	2,4-Dichlorophenol
6130	2,4-Dimethylphenol
6175	2,4-Dinitrophenol
6185	2,4-Dinitrotoluene (2,4-DNT)
6005	2,6-Dichlorophenol
6190	2,6-Dinitrotoluene (2,6-DNT)
5515	2-Acetylaminofluorene
5795	2-Chloronaphthalene
5800	2-Chlorophenol
5867	2-Fluorobiphenyl
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
5145	2-Methylaniline (o-Toluidine)
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6430	2-Naphthylamine
6460	2-Nitroaniline
6490	2-Nitrophenol
5945	3,3'-Dichlorobenzidine
6120	3,3'-Dimethylbenzidine
6355	3-Methylcholanthrene
6405	3-Methylphenol (m-Cresol)
6465	3-Nitroaniline
5540	4-Aminobiphenyl
5660	4-Bromophenyl phenyl ether (BDE-3)
5700	4-Chloro-3-methylphenol
5745	4-Chloroaniline
5825	4-Chlorophenyl phenylether
6105	4-Dimethyl aminoazobenzene
6410	4-Methylphenol (p-Cresol)
6470	4-Nitroaniline
6500	4-Nitrophenol
6570	5-Nitro-o-toluidine
6115	7,12-Dimethylbenz(a) anthracene
5500	Acenaphthene
5505	Acenaphthylene
5510	Acetophenone
7030	Allethrin
5545	Aniline
5555	Anthracene
7065	Atrazine
7075	Azinphos-methyl (Guthion)
5562	Azobenzene
5595	Benzidine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
9309	Benzo(j)fluoranthene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5610	Benzoic acid
5630	Benzyl alcohol
7117	Bifenthrin
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5780	bis(2-Chloroisopropyl) ether

ORELAP Fields of Accreditation

ORELAP ID: 4021
EPA CODE: CA00079
Certificate: 4021 - 005

BSK Associates

1414 Stanislaus St.
Fresno CA 93706

Issue Date: 01/30/2016 ***Expiration Date:*** 01/29/2017

As of 01/30/2016 ***this list supercedes all previous lists for this certificate number. Customers. Please verify the current accreditation standing with ORELAP.***

Analyte Code	*Analyte*
6062	bis(2-Ethylhexyl)adipate
7125	Bolstar (Sulprofos)
5670	Butyl benzyl phthalate
7260	Chlorobenzilate
7300	Chlorpyrifos
5855	Chrysene
7965	cis-Permethrin
7315	Coumaphos
7340	Cyanazine
7345	Cyfluthrin
7346	Cypermethrin
200	Deltamethrine
7395	Demeton-o
7385	Demeton-s
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
7405	Diallate
7410	Diazinon
9354	Dibenz(a, h) acridine
5900	Dibenz(a, j) acridine
5895	Dibenz(a,h) anthracene
9348	Dibenzo(a, h) pyrene
9351	Dibenzo(a, i) pyrene
5890	Dibenzo(a,e) pyrene
5905	Dibenzofuran
7435	Dichloran
8610	Dichlorovos (DDVP, Dichlorvos)
7460	Dicofol
6070	Diethyl phthalate
7475	Dimethoate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6205	Diphenylamine
8625	Disulfoton
7550	EPN
7565	Ethion
7570	Ethoprop
6260	Ethyl methanesulfonate
7580	Famphur
201	Fenpropathrin
7600	Fensulfothion
7605	Fenthion
7620	Fenvalerate
6265	Fluoranthene
6270	Fluorene
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6295	Hexachloropropene
6315	Indeno(1,2,3-cd) pyrene
7725	Isodrin
6320	Isophorone
6325	Isosafrole
7740	Kepone
202	Lambda-Cyhalothrin
7770	Malathion
6345	Methapyrilene
6375	Methyl methanesulfonate
7825	Methyl parathion (Parathion, methyl)
7850	Mevinphos

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Customers. Please verify the current accreditation standing with ORELAP.

Analyte Code	Analyte
7880	Monocrotophos
7905	Naled
5005	Naphthalene
5015	Nitrobenzene
6525	n-Nitrosodiethylamine
6530	n-Nitrosodimethylamine
5025	n-Nitroso-di-n-butylamine
6545	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6550	n-Nitrosomethylethalamine
6560	n-Nitrosopiperidine
6565	n-Nitrosopyrrolidine
8290	o,o,o-Triethyl phosphorothioate
7955	Parathion, ethyl
7960	Pendimethalin\ (Penoxalin)
6590	Pentachlorobenzene
6600	Pentachloronitrobenzene
6605	Pentachlorophenol
6608	Perylene
6610	Phenacetin
6615	Phenanthrene
6625	Phenol
7985	Phorate
8000	Phosmet (Imidan)
9550	Piperonyl butoxide
203	Prallethrin
8040	Prometryn
6650	Pronamide (Kerb)
6665	Pyrene
5095	Pyridine
8110	Ronnel
6685	Safrole
8125	Simazine
8155	Sulfotepp
8160	Sumithrin (Phenothrin)
204	Tefluthrin
8200	Tetrachlorvinphos (Stirophos, Gardona) Z-isomer
8220	Thiobencarb
8235	Thionazin (Zinophos)
8245	Tokuthion (Prothiophos)
7970	trans Permethrin
8275	Trichloronate
8295	Trifluralin (Treflan)

EPA 8321A **10189001** **Solvent Extractable non-volatile compounds by HPLC/TS/MS**

Analyte Code	Analyte
8655	2,4,5-T
8545	2,4-D
8560	2,4-DB
7710	3-Hydroxycarbofuran
7010	Aldicarb (Temik)
7015	Aldicarb sulfone
7020	Aldicarb sulfoxide
7080	Barban
7130	Bromacil
7195	Carbaryl (Sevin)
7205	Carbofuran (Furaden)
7275	Chloropropham
8555	Dalapon
8595	Dicamba

Analyte Code	Analyte
8605	Dichloroprop (Dichlorprop)
8620	Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)
7505	Diuron
7610	Fenuron
7630	Fluometuron
7765	Linuron (Lorox)
7775	MCPA
7780	MCPP
7800	Methiocarb (Mesurol)
7805	Methomyl (Lannate)
7885	Monuron
7915	Neburon
7940	Oxamyl
8075	Propham
8080	Propoxur (Baygon)
8120	Siduron
8650	Silvex (2,4,5-TP)

EPA 9012A **10193405** **Total and Amenable Cyanide (automated colorimetric with off-line distillation)**

Analyte Code	Analyte
1645	Total cyanide

EPA 9040B **10197203** **pH Electrometric Measurement**

Analyte Code	Analyte
1900	pH

EPA 9045C **10198400** **Soil and Waste pH**

Analyte Code	Analyte
1900	pH

EPA 9214 **10206403** **Potentiometric Determination of Fluoride in Aqueous Samples with Ion-Selective Electrode**

Analyte Code	Analyte
1730	Fluoride

Kelada-01 1.2 **60005303** **Kelada Automated Test Methods for Total Cyanide, Acid Dissociable Cyanide, and Thiocyanate**

Analyte Code	Analyte
1645	Total cyanide

NWTPH-Dx **90018409** **Oregon DEQ TPH Diesel Range**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9488	Jet Fuel
9499	Motor Oil
2050	Total Petroleum Hydrocarbons (TPH)

NWTPH-GX (GC/MS) **90018658** **Oregon DEQ TPH Gasoline Range Organics by GC/MS Purge & Trap**

Analyte Code	Analyte
4375	Benzene
4765	Ethylbenzene
9408	Gasoline range organics (GRO)
5240	m+p-xylene
5000	Methyl tert-butyl ether (MTBE)
5245	m-Xylene

ORELAP Fields of Accreditation

ORELAP ID: 4021
EPA CODE: CA00079
Certificate: 4021 - 005

BSK Associates

1414 Stanislaus St.
Fresno CA 93706

Issue Date: 01/30/2016 ***Expiration Date:*** 01/29/2017

As of 01/30/2016 ***this list supercedes all previous lists for this certificate number. Customers. Please verify the current accreditation standing with ORELAP.***

Analyte Code	Analyte
5250	o-Xylene
5255	p-Xylene
5140	Toluene
5260	Xylene (total)

SM 2320 B-97 1997 **20045607** **Alkalinity by Titration Method**

Analyte Code	Analyte
1505	Alkalinity as CaCO3

SM 2510 B-97 1997 **20048606** **Conductivity by Probe**

Analyte Code	Analyte
1610	Conductivity

SM 4500-NH3 G-97 online **20111404** **Ammonia by Automated Phenate Method**

Analyte Code	Analyte
1515	Ammonia as N

SM 5210 B-2001 online **20135255** **Biochemical Oxygen Demand (BOD), 5-Day**

Analyte Code	Analyte
1530	Biochemical oxygen demand

SM 5540 C-93 online **20145000** **Surfactants by Anionic Surfactants as MBAS**

Analyte Code	Analyte
2025	Surfactants - MBAS

OREGON

Environmental Laboratory Accreditation Program

NELAP Recognized

BSK Associates –Vancouver

WA100008

2517 E. Evergreen Blvd.

Vancouver, WA 98661

IS GRANTED APPROVAL BY ORELAP UNDER THE 2009 TNI STANDARDS, TO PERFORM ANALYSES ON ENVIRONMENTAL SAMPLES IN MATRICES AS LISTED BELOW :

Air	*Drinking Water*	*Non Potable Water*	*Solids and Chem. Waste*	*Tissue*
	Chemistry	Chemistry	Chemistry	
	Microbiology	Microbiology		

AND AS RECORDED IN THE LIST OF APPROVED ANALYTES, METHODS, ANALYTICAL TECHNIQUES, AND FIELDS OF TESTING ISSUED CONCURRENTLY WITH THIS CERTIFICATE AND REVISED AS NECESSARY.

ACCREDITED STATUS DEPENDS ON SUCCESSFUL ONGOING PARTICIPATION IN THE PROGRAM AND CONTINUED COMPLIANCE WITH THE STANDARDS.

CUSTOMERS ARE URGED TO VERIFY THE LABORATORY'S CURRENT ACCREDITATION STATUS IN OREGON.

Gary K Ward

Gary K. Ward, MS
Oregon State Public Health Laboratory
ORELAP Administrator
3150 NW. 229th Ave, Suite 100
Hillsboro, OR 97124

ISSUE DATE : 05/19/2016

EXPIRATION DATE : 05/18/2017

Certificate No : WA100008 - 008

OREGON

Environmental Laboratory Accreditation Program

ORELAP Fields of Accreditation

ORELAP ID: WA100008

BSK Associates –Vancouver

EPA CODE: WA12806

2517 E. Evergreen Blvd.

Certificate: WA100008 - 009

Vancouver, WA 98661

Issue Date: 4/22/2016 Expiration Date: 5/18/2017

As of 4/22/2016 this list supercedes all previous lists for this certificate number.

MATRIX	Reference	Code	Analyte	Code	Description
Drinking Water					
	EPA 300.0 2.1			10053200	Methods for the Determination of Inorganic Substances in Environmental Samples
		1575	Chloride		
		1730	Fluoride		
		1810	Nitrate as N		
		1820	Nitrate-nitrite		
		1840	Nitrite as N		
		1870	Orthophosphate as P		
		2000	Sulfate		
	EPA 365.3			10070801	Phosphorous - Colorimetric, two reagent.
		1870	Orthophosphate as P		
	SM 2120 B-2001 online			20039309	Color by Visual Comparison
		1605	Color		
	SM 2130 B-94 online			20042802	Turbidity by Nephelometric Method
		2055	Turbidity		
	SM 2320 B-97 1997			20045607	Alkalinity by Titration Method
		1505	Alkalinity as CaCO3		
	SM 2340 C-97 online			20047603	Hardness by EDTA Titration Method
		1755	Total hardness as CaCO3		
	SM 2510 B-97 1997			20048606	Conductivity by Probe
		1610	Conductivity		
	SM 2540 C-97 1997			20050402	Total Dissolved Solids Dried at 180C
		1955	Residue-filterable (TDS)		
	SM 2540 F-97 online			20052204	Settleable Solids
		1965	Residue-settleable		
	SM 4500-Cl G-2000 online			20081612	Chlorine (Residual) by DPD Colorimetric Determination
		1945	Residual free chlorine		
		1940	Total residual chlorine		
	SM 4500-H+ B-2000 online			20105219	pH Value by Electrometric Method .
		1900	pH		
	SM 9215 B (PCA) 21st ED			20181402	Heterotrophic Plate Count Pour Plate (plate count agar): Heterotrophic Bacteria
		2555	Heterotrophic plate count		

OREGON

Environmental Laboratory Accreditation Program

ORELAP Fields of Accreditation

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Vancouver, WA 98661

Issue Date: 4/22/2016 Expiration Date: 5/18/2017

As of 4/22/2016 this list supercedes all previous lists for this certificate number.

Drinking Water	SM 9221 B (LTB) + E (EC) 21st ED			20188005	Multiple Tube Fermentation Qualitative (LTB/EC): Total Coliform and Fecal Coliform
		2530	Fecal coliforms		
		2500	Total coliforms		
	SM 9223 B (Colilert® Quanti-Tray®) 20th ED			20211205	Chromogenic/Fluorogenic Quantitative (Colilert®): Total Coliform and E. coli
		2525	Escherichia coli		
		2500	Total coliforms		
	SM 9223 B (Colilert®) 20th ED			20212208	Chromogenic/Fluorogenic Qualitative (Colilert®): Total Coliform and E. coli
		2525	Escherichia coli		
		2500	Total coliforms		
Non-Potable Water	Enterolert®			60030208	Chromogenic/Fluorogenic Quantitative (Enterolert®): Enterococci
		2520	Enterococci		
	EPA 300.0 2.1			10053200	Methods for the Determination of Inorganic Substances in Environmental Samples
		1575	Chloride		
		1730	Fluoride		
		1810	Nitrate as N		
		1820	Nitrate-nitrite		
		1840	Nitrite as N		
		1870	Orthophosphate as P		
		2000	Sulfate		
	EPA 365.3			10070801	Phosphorous - Colorimetric, two reagent.
		1870	Orthophosphate as P		
		1910	Phosphorus, total		
	SM 2120 B-2001 online			20039309	Color by Visual Comparison
		1605	Color		
	SM 2130 B-94 online			20042802	Turbidity by Nephelometric Method
		2055	Turbidity		
	SM 2320 B-97 1997			20045607	Alkalinity by Titration Method
		1505	Alkalinity as CaCO3		
	SM 2340 C-97 online			20047603	Hardness by EDTA Titration Method
		1755	Total hardness as CaCO3		
	SM 2510 B-97 1997			20048606	Conductivity by Probe
		1610	Conductivity		
	SM 2540 B-97 1997			20049405	Total Solids Dried at 103 - 105C
		1950	Residue-total		

OREGON

Environmental Laboratory Accreditation Program

ORELAP Fields of Accreditation

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EPA CODE: WA12806

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Certificate: WA100008 - 009

Vancouver, WA 98661

Issue Date: 4/22/2016 Expiration Date: 5/18/2017

As of 4/22/2016 this list supercedes all previous lists for this certificate number.

Non-Potable Water

SM 2540 C-97 1997			20050402	Total Dissolved Solids Dried at 180C
	1955	Residue-filterable (TDS)		
SM 2540 D-97 1997			20051201	Total Suspended Solids Dried at 103 - 105C
	1960	Residue-nonfilterable (TSS)		
SM 2540 E-1997			20051585	Fixed & Volatile Solids Ignited at 550 C
	1947	Residue - Fixed		
	1970	Residue-volatile		
SM 2540 F-97 online			20052204	Settleable Solids
	1965	Residue-settleable		
SM 4500-Cl G-2000 online			20081612	Chlorine (Residual) by DPD Colorimetric Determination
	1945	Residual free chlorine		
	1940	Total residual chlorine		
SM 4500-H+ B-2000 online			20105219	pH Value by Electrometric Method .
	1900	pH		
SM 5210 B-2001 online			20135255	Biochemical Oxygen Demand (BOD), 5-Day
	1530	Biochemical oxygen demand		
	1555	Carbonaceous BOD, CBOD		
SM 5220 D-97 online			20136805	COD by Closed Reflux, Colorimetric Method
	1565	Chemical oxygen demand		
SM 9215 B (PCA) 21st ED			20181402	Heterotrophic Plate Count Pour Plate (plate count agar): Heterotrophic Bacteria
	2555	Heterotrophic plate count		
SM 9221 B (LTB) + E (EC) 21st ED			20188005	Multiple Tube Fermentation Qualitative (LTB/EC): Total Coliform and Fecal Coliform
	2530	Fecal coliforms		
	2500	Total coliforms		
SM 9222 D (m-FC)-97 online			20210008	Membrane Filtration Quantitative (m-FC): Fecal Coliform
	2530	Fecal coliforms		
SM 9223 B (Colilert® Quanti-Tray®) 20th ED			20211205	Chromogenic/Fluorogenic Quantitative (Colilert®): Total Coliform and E. coli
	2525	Escherichia coli		
	2500	Total coliforms		
SM 9223 B (Colilert®) 20th ED			20212208	Chromogenic/Fluorogenic Qualitative (Colilert®): Total Coliform and E. coli
	2525	Escherichia coli		
	2500	Total coliforms		

Solids

NWTPH-Dx			90018409	Oregon DEQ TPH Diesel Range
	9369	Diesel range organics (DRO)		
	9488	Jet Fuel		
	9499	Motor Oil		
	8641	Percent Moisture		
	9506	Residual Range Organics (RRO)		
	2050	Total Petroleum Hydrocarbons (TPH)		

THE LEADER IN ENVIRONMENTAL TESTING

Seattle

5755 8th Street East
Tacoma, WA 98424
(Tel.) 253-922-2310
(Fax) 253-922-5047
www.testamericainc.com

STATEMENT OF QUALIFICATIONS

February 2016

SECTION 1

COMPANY OVERVIEW

1.1 TestAmerica Overview

TestAmerica is the leading environmental testing firm in the United States, including over 80 laboratories and service centers. TestAmerica provides innovative technical expertise and comprehensive analytical testing services. Specialty analyses include source, ambient and indoor air, water quality and aquatic toxicity, compliance, desalination, shale gas, specialty organics, emergency response, industrial hygiene, dioxins, drinking water, sediments and tissues, PPCPs and emerging contaminants, explosives, Federal/DoD, and radiochemistry and mixed waste testing.

TestAmerica affiliate companies include EMLab P&K, the leader in analytical microscopy and indoor air quality; QED Environmental Systems, Inc., the leading supplier of groundwater sampling equipment and remediation pumping systems; and TestAmerica Air Emissions Corp. (METCO Environmental), specializing in air emissions testing. TestAmerica currently employs nearly 2,800 professionals dedicated to exceptional service and solutions for our clients' environmental testing needs.

Seattle – Customer Assistance

Kris Allen, Manager of Project Management	At the Lab – Tacoma, WA
Rob Greer, Project Manager	Telephone: 253-922-2310
Sarah Murphy, Project Manager	Fax: 253-922-5047
Christabel Escarez, Project Manager	
Wendy Jonas, Project Manager	
Kim Presley, Project Manager Assistant	
Cathy Gamble, Project Manager Assistant	
Kelsey DeVries, Project Manager Assistant	
Diane Vance, Sample Receipt Supervisor	
Steve Gonzales, Portland Service Center Manager	
Kathy Kreps, PNW Client Relations Manager	

1.2 SEATTLE LABORATORY

The Seattle Laboratory began operating as a small environmental testing laboratory in 1985 as Sound Analytical Services, a laboratory that originally specialized in the analysis of transformer oils for PCB content. The laboratory quickly developed a reputation for providing high-quality, cost-effective analytical services and demand for its services led to expansion into UST testing programs, wastewater and groundwater analyses, and hazardous waste characterization. In 1990, the laboratory moved into a new, 15,000 square foot facility and shortly after became one of the first laboratories to be accredited by the Washington State Department of Ecology.

In March of 2001, continued growth lead the company to move into a new 20,000 square foot, custom-designed laboratory facility in Tacoma. In October of 2001, Severn Trent Laboratories acquired Sound Analytical to expand its service offerings to the Pacific Northwest and Alaska. The laboratory became known as STL Seattle. After the merger of STL with TestAmerica in 2007, the laboratory name changed to TestAmerica Tacoma.

It is our objective to be acknowledged as an organization that provides services and deliverables with the qualities of responsiveness, trust worthiness, resourcefulness, timeliness, economy, accuracy and professionalism. The laboratory is NELAP certified in the states of Oregon and California, holds state certifications in Washington, Alaska and Montana, is approved through several client audit programs and has been approved for work under the Federal DoD program, as confirmed by our DoD ELAP and ISO/IEC 17025:2005 Laboratory Accreditation.

TestAmerica Seattle	Fiscal Yr 2014 Revenues	Size (ft^2)	Full Time Employees	Major Equipment Summary			
				GC	GC/MS	AA/HG	ICP/ ICPMS
TestAmerica Laboratories, Inc. 5755 8th Street East Tacoma, WA 98424 Tel. 253-922-2310 Fax. 253-922-5047	$4.5M	20,000	35	14	17	2	3

1.3 CAPABILITIES

The Seattle laboratory utilizes the analytical QA/QC and reporting protocols of the U.S. EPA, SW-846, NELAP and the DoD QSM. Our primary services include full organic, inorganic and geotechnical analyses of water, soil, sediment, biota and hazardous waste. We analyze waste materials for profiling and disposal, including F-listed solvent analyses and have successfully provided analyses for ongoing waste profiling programs (one for over 18 years) and large scale drum removal projects. Many of our clients come to us because of our expertise in pesticide analysis, metals analysis, sediments, waste or simply because our project managers can discuss technical issues and accurately transmit that information to the laboratory staff. Over the last 20 years, the TestAmerica Seattle laboratory has supported government and commercial clients with environmental analyses that meet project requirements at a cost-effective price.

Expertise is a quality you need in your analytical laboratory service provider. Our services are designed to fulfill the requirements of major federal and state environmental programs in various areas of work:

- Washington State Model Toxics Control Act (MTCA)
- Washington State Sediment Management Standards (SMS) and Dredge Material Management Protocols (DMMP)
- Oregon/Washington Joint Source Control Strategy (JSCS) Guidelines
- Pacific Northwest Sediment Evaluation Framework (SEF)
- Clean Water Act (CWA)
- Resource Conservation and Recovery Act (RCRA)
- Toxic Substances Control Act (TSCA)
- Federal DoD Quality Systems Management (QSM)
- Underground Storage Tank (UST) Guidelines in Washington, Oregon, Alaska and Montana

1.4 CAPACITY

Forecasting is critical to our success. Environmental analysis always seems to include ups and downs in workflow into a laboratory. We understand that, even with the best intentions, it is not always feasible to schedule workloads with a laboratory. In cases where there is a large project over a small timeframe, we would appreciate as much heads-up as possible. However, we have a lot of measures in place to deal with excess capacity and still meet a client's needs.

The Seattle Laboratory has the capacity to analyze thousands of samples per month. TestAmerica Seattle constantly monitors commitments made by our laboratory using a sophisticated forecasting database. We can reserve capacity by shifting work to other TestAmerica laboratories or by shifting the work focus of cross-trained staff. By tapping into our national network, we can ensure that the personnel necessary to perform the scope of work will be available.

The following table provides estimated monthly capacity for a variety of analyses performed at the Seattle laboratory.

Routine Analyses

Functional Area	Test	Weekly Capacity	Monthly Capacity
Metals	ICP (6010B/200.7)	400	2000
	ICPMS (6020/200.8)	400	2000
	CVAA-Mercury (245.1/245.5/7470/7471)	300	1500
Wet Chemistry	Various Methods	1160	6050
Gas Chromatography VOC	TPH-GRO (8015B, NWTPH, AK)	300	1200
Gas Chromatography SVOC	TPH-DRO (8015B, NWTPH, AK - Extractable Hydrocarbons)	400	1600
	Pesticides/PCBs (8081A/8082/608)	300	1200
Mass Spectroscopy	VOCs (8260B/624)	500	2000
	SVOCs (8270C/625)	200	800
	Herbicides (8151A)	100	400
	Organotins (Krone)	100	400

SECTION 2

SERVICE

2.1 PROJECT MANAGEMENT

It is our standard practice to assign a single point of contact (i.e. Project Manager) to each of our clients. The Project Manager is supported by a team of experienced laboratory managers to plan, coordinate, integrate and monitor project activities. Efficient and effective project management is of prime importance to the successful execution of any contract and building lasting client relationships. Our Project Managers are involved from project start to finish: from the time of initial client contact; in dialogue with the client during the entire project; and available to answer questions or provide additional information after project completion.

The Project Manager is the principal client contact and has open access to all technical and management positions to obtain technical expertise and/or resolve resource management and scheduling issues on behalf of the client. The Project Manager will:

- Respond to the client in a timely manner to all requests
- Provide pricing and technical information
- Interface with project personnel to plan and schedule sample shipments to the laboratory
- Organize, schedule and attend project meetings with the client as necessary or helpful.
- Serve as consultant for field efforts to optimize batch sizes, arrange sample shipment/receipt, provide bottles and associated materials.
- Document the client's technical requirements to the laboratory staff.
- Monitor conformance of analytical protocols, quality assurance, and data reporting with contract and technical requirements.
- Monitor costs and schedule requirements
- Secure additional laboratory capacity from other TAL facilities as necessary.

When samples are received at TestAmerica Seattle, strict chain of Custody procedures are followed and documented. Any inconsistencies are immediately brought to the attention of the Project Manager for resolution with the client. The resolution is documented in a Sample Discrepancy Report (SDR).

TestAmerica Project Managers and laboratory Section Managers have a commitment to maintain project schedules with a goal of 100% on-time delivery of quality data packages. If at any time, a delay in the required project turnaround time is anticipated, the Project Manager will immediately contact the client and inform them of the nature of the problem, the corrective action taken and a revised delivery date for the analytical data report.

Normal office hours are 8:00 am to 5:00 pm, Monday through Friday. Sample receipt and laboratory working hours are flexible. Seattle accepts sample shipments Monday through Friday, and Saturdays during the Summer and Fall. After or before hours delivery should be pre-arranged with your Project Manager. TestAmerica realizes that field sampling constraints may dictate a project schedule and are adept at adjusting our schedule to meet the client's needs. Advance notice for weekend receipt is requested to ensure that the appropriate laboratory personnel are available. Should a project require after-hours contact, telephone numbers for the appropriate TestAmerica personnel can be provided.

2.2 DATA MANAGEMENT

TestAmerica's facilities have extensive experience in producing data deliverables that are compliant with the respective federal, state, and project requirements. TestAmerica can provide various types of data reporting based upon a project's needs.

A Standard report typically includes a Case Narrative, Executive Summary, Method Number, Chain of Custody and Sample Summary, Analytical results by sample and a QC section with results for the Method Blank, LCS and any site specific Matrix Spike / Spike Duplicates if submitted. A Level IV or Expanded report includes the items listed for a standard report as well as the shipping documents, and raw data including instrument printouts and chromatograms.

Electronic Data Deliverables (EDDs) are provided to numerous government and commercial clients. EDDs can be provided in TestAmerica's standard format, or can be customized to meet client requirements. EDDs can be transferred on diskette, CD, via e-mail or across the web through our TotalAccess system. We currently provide EDDs in dozens of different formats that include Excel spreadsheets as well as various ASCII and DBF file formats.

While we offer a standard format, we have dozens of complex formats that are available in our LIMS system for clients to choose from. TestAmerica's EDD and Report Generation departments function to ensure that electronic data provided to the client is accurate and formatted to meet the clients' requirements. Our technical personnel are always available for consultation on producing the specific EDD for your program.

2.3 QUALITY ASSURANCE PROJECT PLAN ASSISTANCE

TestAmerica offers assistance to clients in preparing project specific Quality Assurance Plans. Our staff has written and/or assisted in writing numerous Project Specific Quality Assurance Plans for work the laboratory has performed under U.S. EPA oversight. We are knowledgeable regarding the fundamental requirements and have experience with the EPA approval process.

2.4 TotalAccess – VIEW YOUR DATA OVER THE INTERNET

Dedicated to leading the environment testing industry forward, TestAmerica is constantly striving to develop more efficient methods of information gathering and distribution. Investments in information technology have enabled TestAmerica to quickly and efficiently gather, process, and deliver sample results. This saves valuable time and money for our clients through our TotalAccess e-solutions offering.

TotalAccess allows you to track all aspects of your environment data program, rapidly – day or night, at work or on the road – through your own familiar web browser. TotalAccess can get your whole environment data program organized. It's an online resource that will make your job easier, your workflow faster, and your desktop cleaner.

TotalAccess features include:

- Real time access to your sample status and result data in our Laboratory Information Management System (LIMS).
- 24/7 availability to download your Electronic Data Deliverable (EDD) files.
- Convenient organization of all your program information in one place, categorized the way you want it.
- Instant archiving of all documents for secure storage and fast retrieval.
- Dynamic interactive capabilities, enabling you to query and trend data.
- Access to analytical capabilities and methodologies to help you select the best procedures for performing your work.
- Access to lists of Certification programs detailing which TestAmerica laboratories perform work under these programs.
- Online access to your invoices and quotes.
- Ability to compare data results to the regulatory limits.

SECTION 3

DEDICATION

3.1 KEY PERSONNEL

TestAmerica Seattle Laboratory prides itself on the quality of its personnel. The dedicated staff of experienced professional chemists and technicians is the key element in the laboratory's position as a leader in environmental analytical chemistry. The majority of staff have a Bachelors Degree or higher in Chemistry, Biology, Environmental Science or another related field. The section immediately below describes the qualifications and experience of our key management personnel. An Organization Chart is also provided below.

Laboratory Director, Dennis Bean

Mr. Bean has an M.S. in Chemistry from University of Wisconsin - Madison and over 25 years of experience in the environmental laboratory industry that includes extensive GCMS technical knowledge, IT and laboratory information management (LIMS) development, training and implementation experience. As Laboratory Director he holds a management/ leadership position with full profit and loss responsibility for the Seattle facility. Mr. Bean's first 14 years (with a TestAmerica predecessor company) were spent performing GCMS analysis, managing the VOC and SVOC departments, developing methods, evaluating technologies and training. He then became the Operations Manager for the Seattle laboratory. Mr. Bean was promoted into a corporate role which included leading the company-wide LIMS implementations and corporate initiatives. Mr. Bean's extensive depth of technical expertise enables him to support our clients more complex projects.

Quality Assurance Manager, Terri Torres

Ms. Torres has a BS in Biology from The Evergreen State College in Olympia, WA and 21 years experience in the analytical services field. This experience includes a wide variety of both organic and inorganic analysis as well as 3 years previously as Quality Assurance Manager for this lab. Her instrumentation experience includes GS/MS, GC, AA, ICAP, IR, and auto-analyzers. Ms. Torres' diversified experience has provided her with broad-based familiarity with regulatory protocols and methodologies including WA State DOE, State of CA DOH, NELAP, US Army Corps of Engineers, US Navy, and others. Previously as a project manager, Ms. Torres was the primary point-of-contact for her clients. She has particular expertise in computer systems and is involved in LIMS implementation.

Client Relations Manager, Kathy Kreps

Ms Kreps has a BA in Chemistry from Whitman College, Walla Walla, WA. She has 38 years of environmental laboratory experience and is the Client Relations Manager, a senior level operations position with responsibility for business development, technical sales, proposals, quotes, forecasting and market segment evaluations and strategies. In this position, Ms. Kreps also interacts with internal and external clients and is technical liaison for projects, planning and addressing issues. She possesses skills in proposal writing, project management, data validation, method development and evaluation, troubleshooting, consulting and SOP writing and editing. She is well versed in current hazardous waste regulations, including RCRA and TSCA, and their associated analytical requirements. Previously held positions include Laboratory Director and Laboratory Manager for over 18 years. She was initially employed as a chemist, performing GC, HPLC, AA, ICPMS, wet chemistry techniques and process chemistry, and spent time in project management for a wide variety of projects involving full laboratory services for private and government contracts including AFCEE, NFESC, EPA and USACE.

Manager of Project Management, Kristine Allen
Ms. Allen holds a BS in Chemistry from San Jose State University and an MBA from Santa Clara University. She has over 16 years of experience as a chemist as well as project management experience in the pharmaceutical industry. She was a Project Manager at this lab for 2 years before being promoted to Manager of Project Management. Ms. Allen maintains her project management role for a number of clients as well as providing supervision for Project Managers in TestAmerica Seattle and the Pacific Northwest regional labs and service centers. Her clients appreciate her responsiveness, organization and seasoned problem-solving approach to all facets of project management.

Metals and Inorganics Department Manager, Stan Palmquist
Mr. Palmquist has a BS in Chemistry from the University of Puget Sound, Tacoma, WA and over 39 years of experience in the environmental laboratory industry that includes various responsibilities from analyst to supervisor to business owner. He has extensive experience in the analysis of petroleum products, hazardous materials, soils, and wastewater. He has over 20 years experience in the operation and maintenance of AA, ICP, and ICPMS instrumentation for the analysis of trace metals. In addition to his operational lab duties, Mr. Palmquist is also responsible for the laboratory's environmental health and safety program and for waste management. He previously held positions as Operations Manager/Owner of Sound Analytical Services before it was acquired as TestAmerica Seattle and as Laboratory Manager and Refinery Chemist.

Semi-Volatile Organics Department Manager, Joan Protasio
Ms. Protasio holds a BA in Molecular and Cell Biology from the University of California, Berkeley. She oversees the daily activities of the semivolatile and extractions departments. Her duties include ensuring on-time data delivery and method compliance as well as liaison with QA and project management departments, method development and new technology implementation. In addition to her supervisory responsibilities, she also keeps herself proficient in GC and GCMS Semivolatile analyses. She has over 11 years of experience as an analytical chemist in the biotech and environmental industries.

Volatile Organics Department Manager, Bisrat Tadesse
Mr. Tadesse holds an MBA in Technology Management from the University of Phoenix and a BS in Molecular Biology from the University of Washington, Seattle, Washington. He has over 15 years of analytical experience including organic and inorganic analyses, including GCMS semivolatiles, petroleum hydrocarbons, demand, organic carbon, metals, polychlorinated biphenyls and pesticides. Mr. Tadesse's current responsibilities include ensuring on-time data delivery, method and QA compliance, purchasing of all supplies, hiring of staff, ongoing training, employee reviews, collaborating with analysts, project managers and clients to ensure project cohesiveness, managing all samples from time of receipt until time of disposal. He also performs GCMS volatiles analysis, maintenance, peer review of data and troubleshooting instrument issues.

Semivolatile Extractions Department Supervisor, Jerod Romine
Mr. Romine holds a BS in Biology from Truman State University and has a year of experience at TestAmerica. He has developed a depth of knowledge of a range of organic extraction methods and is well respected for his troubleshooting ability and productivity. He is responsible for the daily operations of semi-volatile extractions

department, hiring of staff, ongoing training, employee reviews, collaborating with analysts, project managers and clients to ensure project cohesiveness, managing all samples from time of receipt until time of disposal.

Sample Control Supervisor, Diane Vance

Ms. Vance has an A.A.S. in Water & Environmental Technology and has over one year of experience with TestAmerica. She is responsible for the accurate receipt and computer log-in of samples received by the laboratory. She is also responsible for the daily operations of the Sample Control department, including purchasing of all sample containers and shipping supplies, hiring of staff, ongoing training, employee reviews, coordination of courier services, collaborating with analysts, project managers and clients to ensure project cohesiveness, managing all samples from time of receipt until time of disposal, managing subcontracting of analyses to outside laboratories, distributing samples to correct cold storage units, managing client bottle orders for completion and shipping, generating monthly report of sample totals for senior management and monitoring daily temperatures of the refrigerated storage units.

Project Manager, Robert Greer

Mr. Greer has a BA in Environmental Science from Purchase College, SUNY and over 16 years in the environmental laboratory industry. Mr. Greer has an extensive customer service background and is committed to being thorough and responsive. Pairing this with his analytical science background enables him to successfully work with clients to coordinate all facets of their projects.

Project Manager, Christabel Escarez

Ms. Escarez has over five years experience in the environmental industry and holds a BA in Biology from Lewis & Clark College, Oregon. Her environmental laboratory experience has been primarily as an ICPMS metals analyst. Additionally, she has over ten years of experience in roles dedicated to community and client engagement.

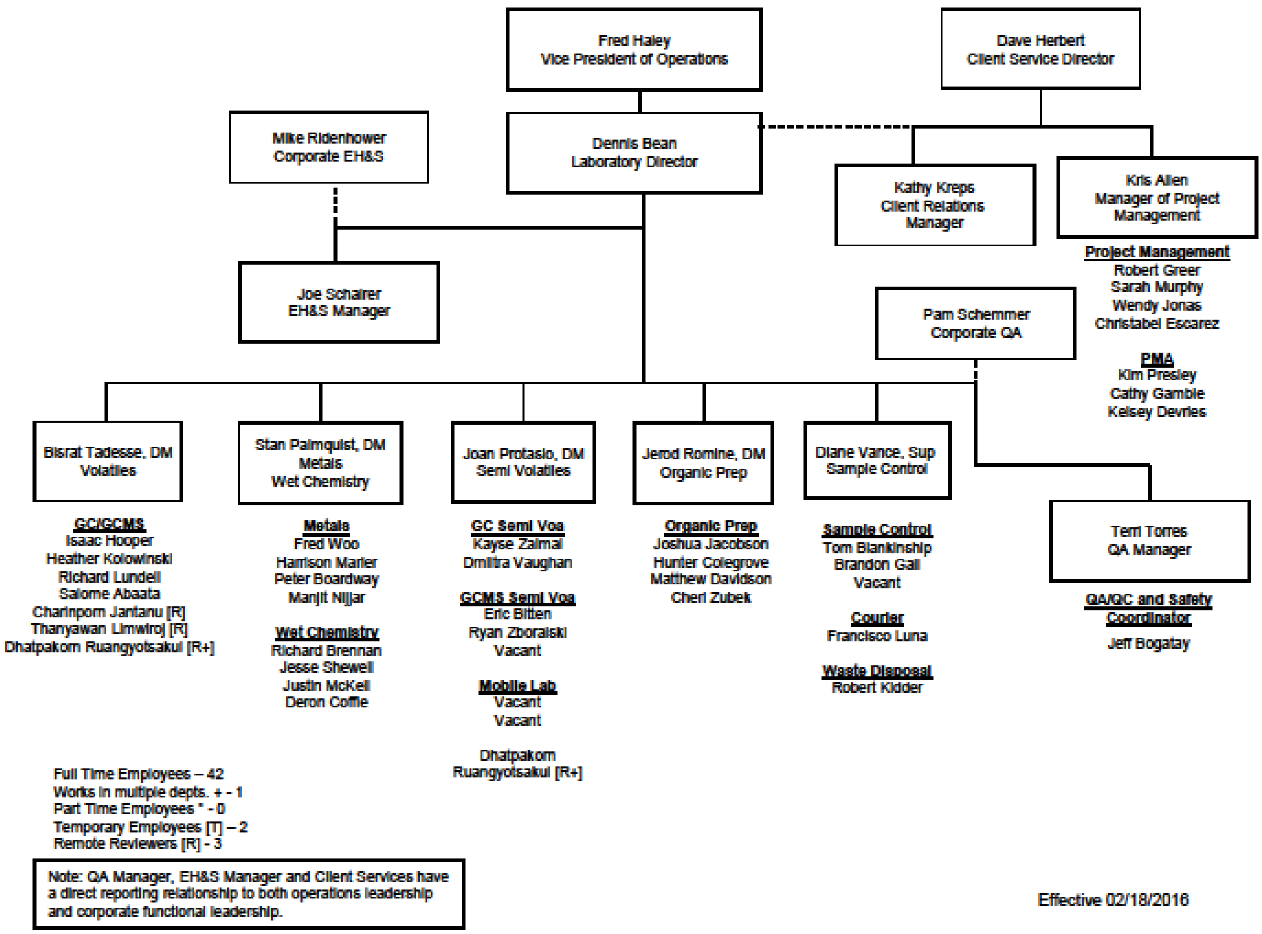
Project Manager, Wendy Jonas

Ms. Jonas has a B.A. in Environmental Health and Policy from Evergreen State College. She joined TestAmerica in April of 2015. Ms. Jonas has brought over 20 years of experience in the environmental industry with certifications in hazardous material coordination, Certified Erosion and Sediment Control Lead (CESCL), in addition to being a low impact development consultant paired with customer service relations. Ms. Jonas also has worked in a laboratory as a microbiologist and wet chemistry technician in addition to quality control which provides a basis for her communication with her clients regarding their analytical data. She has an embedded knowledge of the legislative system which has allowed her the ability to discuss policy and permit changes for municipalities and private industries.

Project Manager, Sarah Murphy

Ms. Murphy has a BS in Social Science and Interdisciplinary Studies from Sacramento State University. She has over five years experience with analytical laboratories and previous five years of experience with an engineering firm in the environmental industry. Ms. Murphy's project and client oriented background supports her customer service focus. Her clients praise her thorough and responsive project management.

Seattle Laboratory Organizational Chart



3.2 HEALTH AND SAFETY

TestAmerica's Management is committed to providing a work environment that is free of recognized environment safety and health hazards. It is TestAmerica's policy, and is fundamental to our management principles, that all work will be conducted in a manner that is safe to the employee, the community and the environment. By empowering each TestAmerica employee with the right, the responsibility, and the resources to make safe decisions, we ensure the success of our health and safety programs.

TestAmerica recognizes that health and safety is a team effort. Safety originates at the highest level of management. However, every employee, regardless of position is expected to assume responsibility for their actions and the actions of others around them. Adherence to Environment Health and Safety procedures is mandatory for every TestAmerica employee and is considered an integral part of each employee's performance.

The Corporate Safety Manual is the primary component of the Hazard Communication/Waste Management Plan for TestAmerica. For regulatory purposes this document serves as the Chemical Hygiene Plan for laboratory activities and the Hazard Communication Program for non-laboratory activities. This document incorporates responsibilities, procedures, protective equipment as well as facility requirements for our operations.

3.3 DISASTER RECOVERY PLAN SUMMARY

In case of a major natural catastrophe, client approved TestAmerica laboratory facilities would be available to provide project continuity and to meet sample holding time or critical project schedule requirements. In the event of instrument failure, portions of the sample load may be diverted to duplicate instrumentation within the facility. In some instances, an alternate approved technique such as manual colorimetric determination in lieu of an automated determination can be accommodated. At the client's direction or approval, samples can also be shipped to another properly certified and approved TestAmerica location for analysis. Detailed procedures for emergency circumstances and a description of emergency systems are located in the TestAmerica Corporate Safety Manual.

SECTION 4

QUALITY

4.1 QA/QC OVERVIEW

An integral part of TestAmerica's successful experience with its clients is the corporate and local commitment to provide quality services. This attitude towards Quality Assurance/Quality Control (QA/QC) is maintained through all of the divisions and departments at TestAmerica. The Seattle laboratory maintains a quality assurance program that is outlined in the laboratory's Quality Assurance Manual and managed by Terri Torres.

TestAmerica Seattle is approved through Oregon and California for the National Environmental Laboratory Accreditation Program (NELAP). TestAmerica's Corporate QA staff work to ensure consistency and uniformity of compliance to the NELAC standard for all our laboratories. TestAmerica Seattle has also been assessed by L-A-B and meet the requirements of the ELAP DoD.

The Quality Assurance Department at TestAmerica Seattle is comprised of professionals experienced in analytical laboratory techniques and quality assurance objectives. This department initiates and oversees audits, corrective action procedures, performs data review, maintains documentation of internal laboratory training, review Quality Assurance Plans for consistency with laboratory operations, tracks and monitors performance evaluation samples, document control, and Method Detection Limits (MDLs). In addition, the preparation of operating practices and quality assurance documentation for the laboratory is coordinated through the QA personnel.

4.2 STANDARD OPERATING PROCEDURES

TestAmerica Seattle maintains extensive documentation of Standard Operating Procedures (SOPs). We understand the need for SOP compliance and perform internal audits to assure that the laboratory staff adheres to the written SOPs, complies with accreditation/certification requirements and meets project objectives. The audit types and frequency are outlined in the Quality Assurance Manual and are scheduled by the QA/QC department.

4.3 CLIENT CONFIDENTIALITY & PROPRIETARY RIGHTS

Data and sample materials provided by the client or at the client's request, and the results obtained by TestAmerica, are held in confidence subject to any disclosure required by law or legal process. TestAmerica's reports and the data and information provided therein, are for the exclusive use and benefit of the client, and are not released to a third party without written consent from the client.

4.4 RECORD RETENTION & ARCHIVAL

TestAmerica Seattle has developed a formal record retention policy that is outlined in the Laboratory's Quality Assurance Manual and in the corporate Record Retention Policy. These documents outline the period of time various record types must be archived. Archives are indexed such that records are accessible on either a project or temporal basis. Archives are protected against fire, theft, loss, deterioration and vermin. Electronic records are protected from deterioration caused by magnetic fields and/or electronic deterioration. Access to archives is controlled and documented.

4.5 LABORATORY QAM

TestAmerica Seattle Quality Assurance Manual (QAM) is a document prepared to define the overall policies, organization objectives and functional responsibilities for achieving TestAmerica's data quality goals. Each TestAmerica laboratory maintains a local perspective in its scope of services and client relations and maintains a national perspective in terms of quality.

The QAM has been prepared to assure compliance with the 2003 National Environmental Laboratory Accreditation Conference (NELAC) standards and International ANS/ISO/IEC Standard 17025:2005. In addition, the policies and procedures outlined in this manual are compliant with TestAmerica's Corporate Quality Management Plan (CQMP) and the various accreditation and certification programs. The CQMP provides a summary of TestAmerica's quality and data integrity system. It contains requirements and general guidelines under which all TestAmerica facilities shall conduct their operations.

4.6 AUDIT AND PERFORMANCE PROGRAMS

TestAmerica Seattle participates in numerous federal, state, and industrial audit and performance sample programs for organic and inorganic analyses, including regular participation in the following performance studies:

- DMR-QA (supplied by client)
- Environmental Resource Associates (ERA) WS/WP/SW (2x yearly)
- U.S. Army Corps of Engineers (double blinds, as required for projects)
- Various Client Specific Programs

4.7 STATE CERTIFICATIONS AND AGENCY APPROVALS

TestAmerica Seattle's list of current state certifications, registrations and agency approvals is provided below.

The certificates and parameter lists (which may differ) for each organization may be found on TestAmerica's website www.testamericainc.com and on TotalAccess.

Organization	Lab ID Number
DoD ELAP	L2236
ISO 17025	L2236
Alaska	UST-022
California (ELAP)	2901
Montana	(UST – no number)
Oregon (NELAP)	WA100007
Washington	C553
USDA Soil Permit	P330-14-00126
USFWS Tissue Import Permit	LE058448-0

SECTION 5

EXPERIENCE

5.1 PROJECT EXPERIENCE

The Seattle laboratory has provided environmental chemical analyses for over 25 years. The management staff has worked together as a team for approximately 12 years, creating an organization with in-depth experience, extensive knowledge of the environmental field, and a high level of internal cooperation. Developing productive, on-going relationships with our clients is the cornerstone of our success. TestAmerica's client base is widely varied; some of the types of clients and projects we serve are listed below.

Government Project Experience

Client	Date	Project Highlights
USACE Alaska District JBER	2004 to Present	TestAmerica Seattle is contracted by the U.S. Army Corps of Engineers, Alaska District, to provide analytical testing services in support of remediation projects at military installations in the State of Alaska. Analyses performed under this contract included volatile and semivolatile organics, Alaska fuel testing methods, pesticides, PCB's, herbicides, TCLP parameters, and metals. All work was performed in accordance with the DOD QSM with full COE-level data packages, EDF 1.2 EDDs and sometimes SEDD EDDs.
USACE FAA Bristol Environmental Remediation Services LLC	2008 to Present	TestAmerica Seattle provides analytical support on various investigation and remediation projects for federal contracts with the USACE and FAA. Soil, water & groundwater samples are analyzed for volatiles, semivolatiles, Alaska TPH methods, metals, PCBs, pesticides, EDB, NWEPH, NWVPH and TCLP parameters. Many times these analyses are provided with quick turnaround of sample results. All USACE work was performed in accordance with the DOD QSM with full COE-level data packages and EDF 1.2 EDDs and SEDD EDDs. Full Level IV reporting is provided for FAA projects.
USEPA Ecology & Environment, Inc. START Emergency Response	2000 to Present	For over ten years, TestAmerica Seattle has provided ongoing analytical support for this client's contracts with USEPA and other federal and state agencies. We provide emergency response services through the START program. We have also performed on ARRA-funded projects. The full range of the laboratory's capabilities have been employed on sample matrices ranging from soil and water to vegetation, aquatic species, wipe samples, concrete cores, and hazardous waste. CLP-type data packages and SEDD electronic deliverables are provided.

Industrial Project Experience

Client	Date	Project Highlights
BP Innovex Environmental Management, Inc.	2014 to Present	TestAmerica Seattle provides analytical support for water and soil matrices for a confidential oil client. Samples are typically analyzed for volatiles, TPH, including EPH/VPH, metals, PAHs, TOC and Geochemistry. Special cleanups and TPH anlayte lists are involved. Involves special sample preparation including sample sieving, metals digestion and metals analysis. Results are provided in Level II reports.
Chevron Conoco-Phillips Arcadis US, Inc	2006 to Present	Quarterly groundwater monitoring for Metals, Volatile Organics, PAH, and TPH. Other Soil and Groundwater projects also included Pesticides, PCB, and general chemistry analyses, Project requirements include modified procedures to meet the low reporting limit requirements of the Portland Harbor Joint Source Control Strategy (JSCS).
Stericycle Environmental Solutions TSD Facilities	2005 to present	TestAmerica Seattle provides analytical services for the TSD plant discharges and RCRA analysis of hazardous waste samples for profiling. Quick turnaround of sample results (same day for plant discharge samples and 3 day TAT for others). Rapid delivery of results from TestAmerica Seattle helps the client meet their discharge requirements and maintain 24-hour operation.
Pierce County Recycling, Compost and Disposal	2005 to present	TestAmerica Seattle provides analytical support on wastewater discharges. Samples are analyzed for 625, total and amenable cyanides, BOD, Hexavalent chromium, O&G, TSS, ammonia, mercury and metals by 6020. We provide Level II reports.
Intel Corporation	2003 to Present	Analysis of wastewater for Volatile, PAH, Pesticides, Fuels, Metals, and Anions. Modified sample preparation and analysis procedures allow lower than normal reporting limits.

OREGON

Environmental Laboratory Accreditation Program

NELAP Recognized

TestAmerica Seattle

WA100007

5755 8th Street East

Tacoma,WA 98424

IS GRANTED APPROVAL BY ORELAP UNDER THE 2009 TNI STANDARDS, TO PERFORM ANALYSES ON ENVIRONMENTAL SAMPLES IN MATRICES AS LISTED BELOW :

Air	*Drinking Water*	*Non Potable Water*	*Solids and Chem. Waste*	*Tissue*
	Chemistry	Chemistry	Chemistry	

AND AS RECORDED IN THE LIST OF APPROVED ANALYTES, METHODS, ANALYTICAL TECHNIQUES, AND FIELDS OF TESTING ISSUED CONCURRENTLY WITH THIS CERTIFICATE AND REVISED AS NECESSARY.

ACCREDITED STATUS DEPENDS ON SUCCESSFUL ONGOING PARTICIPATION IN THE PROGRAM AND CONTINUED COMPLIANCE WITH THE STANDARDS.

CUSTOMERS ARE URGED TO VERIFY THE LABORATORY'S CURRENT ACCREDITATION STATUS IN OREGON.

Gary K. Ward

Gary K. Ward, MS
Oregon State Public Health Laboratory
ORELAP Administrator
3150 NW. 229th Ave, Suite 100
Hillsboro, OR 97124

ISSUE DATE: 11/07/2015

EXPIRATION DATE: 11/06/2016

Certificate No: WA100007 - 011

Oregon

Environmental Laboratory Accreditation Program

Department of Agriculture, Laboratory Division
Department of Environmental Quality, Laboratory Division
Oregon Health Authority, Public Health Division

NELAP Recognized

ORELAP Fields of Accreditation

ORELAP ID: WA100007
EPA CODE: WA00050
Certificate: WA100007 - 011

TestAmerica Seattle
5755 8th Street East
Tacoma WA 98424

Issue Date: 11/07/2015 ***Expiration Date:*** 11/06/2016

As of 11/07/2015 ***this list supercedes all previous lists for this certificate number. Customers. Please verify the current accreditation standing with ORELAP.***

MATRIX : Drinking Water

Reference	Code	Description
EPA 504.1	**10082607**	**EDB/DBCP/TCP micro-extraction, GC/ECD**

Analyte Code	*Analyte*
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)

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MATRIX : Non-Potable Water

Reference	Code	Description
EPA 1020A	**10117007**	**Ignitability Setaflash Closed-cup Method**

Analyte Code	***Analyte***
1780	Ignitability

Reference	Code	Description
EPA 120.1	**10006209**	**Conductance - Specific @ 25 C**

Analyte Code	***Analyte***
1610	Conductivity

Reference	Code	Description
EPA 130.2	**10007202**	**Hardness - Titrimetric, EDTA**

Analyte Code	***Analyte***
1750	Hardness

Reference	Code	Description
EPA 1311	**10118806**	**Toxicity Characteristic Leaching Procedure**

Analyte Code	***Analyte***
8031	Extraction/Preparation

Reference	Code	Description
EPA 1312	**10119003**	**Synthetic Precipitation Leaching Procedure**

Analyte Code	***Analyte***
8031	Extraction/Preparation

Reference	Code	Description
EPA 150.1	**10008409**	**pH - Electrometric Measurement**

Analyte Code	***Analyte***
1900	pH

Reference	Code	Description
EPA 160.1	**10009208**	**Total Dissolved Solids, dried @ 180 C.**

Analyte Code	***Analyte***
1955	Residue-filterable (TDS)

Reference	Code	Description
EPA 160.2	**10009606**	**Total Suspended Solids, 0.2um dried @105C**

Analyte Code	***Analyte***
1960	Residue-nonfilterable (TSS)

Reference	Code	Description
EPA 160.3	**10010001**	**Total Solids, dried @ 103-105 C.**

Analyte Code	***Analyte***
1950	Residue-total

Reference	Code	Description
EPA 160.5	**10010603**	**Settleable solids**

Analyte Code	***Analyte***
1965	Residue-settleable

Reference	Code	Description
EPA 1664A (HEM)	**10127807**	**N-Hexane Extractable Material (Oil and Grease) by Extraction and Gravimetry**

Analyte Code	***Analyte***
1803	n-Hexane Extractable Material (O&G)
2050	Total Petroleum Hydrocarbons (TPH)

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EPA 180.1 2 **10011800** **Turbidity - Nephelometric**

Analyte Code	*Analyte*
2055	Turbidity

EPA 200.7 5 **10014003** **ICP - metals**

Analyte Code	*Analyte*
1000	Aluminum
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1055	Copper
1760	Hardness (calc.)
1070	Iron
1075	Lead
1085	Magnesium
1090	Manganese
1100	Molybdenum
1105	Nickel
1125	Potassium
1140	Selenium
1990	Silica as SiO2
1145	Silicon
1150	Silver
1155	Sodium
1160	Strontium
1165	Thallium
1175	Tin
1180	Titanium
1185	Vanadium
1190	Zinc

EPA 200.8 5.5 **10014809** **Metals by ICP-MS**

Analyte Code	*Analyte*
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1030	Cadmium
1040	Chromium
1050	Cobalt
1055	Copper
1075	Lead
1090	Manganese
1100	Molybdenum
1105	Nickel
1140	Selenium
1150	Silver
1160	Strontium
1165	Thallium
1180	Titanium
3035	Uranium
1185	Vanadium

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Analyte Code	Analyte
1190	Zinc

EPA 245.1 3 **10036609** **Mercury by Cold Vapor Atomic Absorption**

Analyte Code	Analyte
1095	Mercury

EPA 300.0 2.1 **10053200** **Methods for the Determination of Inorganic Substances in Environmental Samples**

Analyte Code	Analyte
1540	Bromide
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N
2000	Sulfate

EPA 3005A **10133207** **Acid Digestion of waters for Total Recoverable or Dissolved Metals**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3010A **10133605** **Acid Digestion of Aqueous samples and Extracts for Total Metals**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 310.1 **10054805** **Alkalinity as CaCO3**

Analyte Code	Analyte
1505	Alkalinity as CaCO3

EPA 335.4 1.0 **10061402** **Methods for the Determination of Inorganic Substances in Environmental Samples**

Analyte Code	Analyte
1635	Cyanide

EPA 350.1 2 **10063602** **Ammonia Nitrogen - Colorimetric, Auto Phenate**

Analyte Code	Analyte
1515	Ammonia as N

EPA 3510C **10138202** **Separatory Funnel Liquid-liquid extraction**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3520C **10139001** **Continuous Liquid-liquid extraction**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 353.2 **10067206** **Nitrate/Nitrite Nitrogen - Automated, Cadmium**

Analyte Code	Analyte
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N

ORELAP Fields of Accreditation

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EPA 3610B **10144602** **Alumina Cleanup**

Analyte Code	*Analyte*
8031	Extraction/Preparation

EPA 3620B **10145809** **Florisil Cleanup**

Analyte Code	*Analyte*
8031	Extraction/Preparation

EPA 3630C **10146802** **Silica gel cleanup**

Analyte Code	*Analyte*
8031	Extraction/Preparation

EPA 365.1 **10069600** **Phosphorous - Colorimetric, Automated persulfate**

Analyte Code	*Analyte*
1870	Orthophosphate as P

EPA 365.1 2 **10070005** **Phosphorous - Colorimetric, Automated persulfate**

Analyte Code	*Analyte*
1910	Phosphorus, total

EPA 3660B **10148400** **Sulfur cleanup**

Analyte Code	*Analyte*
8031	Extraction/Preparation

EPA 3665A **10148808** **Sulfuric Acid / permanganate Cleanup**

Analyte Code	*Analyte*
8031	Extraction/Preparation

EPA 405.1 **10075602** **Biochemical Oxygen Demand (5 days @ 20 C).**

Analyte Code	*Analyte*
1530	Biochemical oxygen demand

EPA 410.2 **10076401** **Chemical Oxygen Demand - Titrimetric (low-level).**

Analyte Code	*Analyte*
1565	Chemical oxygen demand

EPA 415.1 **10078407** **Organic carbon - Combustion or Oxidation**

Analyte Code	*Analyte*
2040	Total organic carbon

EPA 5030B **10153409** **Purge and trap for aqueous samples**

Analyte Code	*Analyte*
8031	Extraction/Preparation

EPA 6010B **10155609** **ICP - AES**

Analyte Code	*Analyte*
1000	Aluminum
1005	Antimony

ORELAP Fields of Accreditation

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Analyte Code	Analyte
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1055	Copper
1760	Hardness (calc.)
1070	Iron
1075	Lead
1085	Magnesium
1090	Manganese
1100	Molybdenum
1105	Nickel
1125	Potassium
1140	Selenium
1990	Silica as SiO2
1145	Silicon
1150	Silver
1155	Sodium
1160	Strontium
1165	Thallium
1175	Tin
1180	Titanium
1185	Vanadium
1190	Zinc

EPA 6010C **10155803** **ICP - AES**

Analyte Code	Analyte
1000	Aluminum
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1055	Copper
1760	Hardness (calc.)
1070	Iron
1075	Lead
1085	Magnesium
1090	Manganese
1100	Molybdenum
1105	Nickel
1125	Potassium
1140	Selenium
1990	Silica as SiO2
1145	Silicon
1150	Silver
1155	Sodium
1160	Strontium
1165	Thallium
1175	Tin
1180	Titanium
1185	Vanadium

Analyte Code	Analyte
1190	Zinc

EPA 6020 **10156000** **Inductively Coupled Plasma-Mass Spectrometry**

Analyte Code	Analyte
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1030	Cadmium
1040	Chromium
1050	Cobalt
1055	Copper
1075	Lead
1090	Manganese
1095	Mercury
1100	Molybdenum
1105	Nickel
1140	Selenium
1150	Silver
1160	Strontium
1165	Thallium
1180	Titanium
3035	Uranium
1185	Vanadium
1190	Zinc

EPA 6020A **10156408** **Inductively Coupled Plasma-Mass Spectrometry**

Analyte Code	Analyte
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1030	Cadmium
1040	Chromium
1050	Cobalt
1055	Copper
1075	Lead
1090	Manganese
1095	Mercury
1100	Molybdenum
1105	Nickel
1140	Selenium
1150	Silver
1160	Strontium
1165	Thallium
1180	Titanium
3035	Uranium
1185	Vanadium
1190	Zinc

EPA 608 **10103603** **Organochlorine Pesticides & PCBs by GC/ECD**

Analyte Code	Analyte
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)

Analyte Code	Analyte
7240	alpha-Chlordane
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)
8912	Aroclor-1262 (PCB-1262)
8913	Aroclor-1268 (PCB-1268)
7115	beta-BHC (beta-Hexachlorocyclohexane)
7250	Chlordane (tech.)
7105	delta-BHC
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7535	Endrin ketone
7120	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)
7245	gamma-Chlordane
7685	Heptachlor
7690	Heptachlor epoxide
7810	Methoxychlor
8250	Toxaphene (Chlorinated camphene)

EPA 624 **10107207** **Volatile Organic Compounds by purge and trap GC/MS**

Analyte Code	Analyte
5105	1,1,1,2-Tetrachloroethane
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5195	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150	1,2,3-Trichlorobenzene
5180	1,2,3-Trichloropropane
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
4655	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4675	1,3-Dichloropropene
4620	1,4-Dichlorobenzene
4665	2,2-Dichloropropane
4410	2-Butanone (Methyl ethyl ketone, MEK)
4500	2-Chloroethyl vinyl ether
4535	2-Chlorotoluene
4860	2-Hexanone
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone

ORELAP Fields of Accreditation

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EPA CODE: WA00050

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Analyte Code	*Analyte*
4320	Acetonitrile
4325	Acrolein (Propenal)
4340	Acrylonitrile
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4600	cis-1,4-Dichloro-2-butene
4595	Dibromomethane (Methylene bromide)
4625	Dichlorodifluoromethane (Freon-12)
9375	Di-isopropylether (DIPE)
4765	Ethylbenzene
4770	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)
4835	Hexachlorobutadiene
4840	Hexachloroethane
4870	Iodomethane (Methyl iodide)
4875	Isobutyl alcohol (2-Methyl-1-propanol)
4900	Isopropylbenzene
5240	m+p-xylene
4925	Methacrylonitrile
4940	Methyl acetate
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
5000	Methyl tert-butyl ether (MTBE)
4965	Methylcyclohexane
4975	Methylene chloride (Dichloromethane)
5005	Naphthalene
4425	n-Butyl alcohol (1-Butanol, n-Butanol)
4435	n-Butylbenzene
5090	n-Propylbenzene
5250	o-Xylene
4440	sec-Butylbenzene
5100	Styrene
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5120	Tetrahydrofuran (THF)
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
4605	trans-1,4-Dichloro-2-butene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5225	Vinyl acetate
5235	Vinyl chloride
5260	Xylene (total)

EPA 625 **10300002** **Base/Neutrals and Acids by GC/MS**

Analyte Code	*Analyte*
5155	1,2,4-Trichlorobenzene
4610	1,2-Dichlorobenzene
4615	1,3-Dichlorobenzene

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Analyte Code	*Analyte*
4620	1,4-Dichlorobenzene
6380	1-Methylnaphthalene
4659	2,2'-Oxybis(1-chloropropane)
6735	2,3,4,6-Tetrachlorophenol
6738	2,3,4-Trichlorophenol
6740	2,3,5,6-Tetrachlorophenol
6742	2,3,5-Trichlorophenol
6830	2,3,6-Trichlorophenol (4C)
6835	2,4,5-Trichlorophenol
6840	2,4,6-Trichlorophenol
6000	2,4-Dichlorophenol
6130	2,4-Dimethylphenol
6175	2,4-Dinitrophenol
6185	2,4-Dinitrotoluene (2,4-DNT)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
6490	2-Nitrophenol
6412	3 & 4 Methylphenol
5945	3,3'-Dichlorobenzidine
6818	3,4,5-Trichlorophenol
6465	3-Nitroaniline
5660	4-Bromophenyl phenyl ether
5700	4-Chloro-3-methylphenol
5745	4-Chloroaniline
5825	4-Chlorophenyl phenylether
6470	4-Nitroaniline
6500	4-Nitrophenol
5500	Acenaphthene
5505	Acenaphthylene
5510	Acetophenone
5545	Aniline
5555	Anthracene
5595	Benzidine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5610	Benzoic acid
5630	Benzyl alcohol
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5670	Butyl benzyl phthalate
5680	Carbazole
5855	Chrysene
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
5895	Dibenz(a,h) anthracene
5905	Dibenzofuran
6070	Diethyl phthalate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6265	Fluoranthene
6270	Fluorene
6275	Hexachlorobenzene
4835	Hexachlorobutadiene

Analyte Code	Analyte
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno(1,2,3-cd) pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6530	n-Nitrosodimethylamine
6545	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

EPA 7196A **10162400** **Chromium Hexavalent colorimetric**

Analyte Code	Analyte
1045	Chromium VI

EPA 7470A **10165807** **Mercury in Liquid Waste by Cold Vapor Atomic Absorption**

Analyte Code	Analyte
1095	Mercury

EPA 7471A **10166208** **Mercury in Solid Waste by Cold Vapor Atomic Absorption**

Analyte Code	Analyte
1095	Mercury

EPA 8000B **10172200** **Determinative Chromatographic Separations**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 8011 **10173009** **1,2-Dibromoethane and 1,2-Dibromo-3-chloropropane by Microextraction and GC/ECD**

Analyte Code	Analyte
5180	1,2,3-Trichloropropane
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4580	Dibromochloropropane

EPA 8015B **10173601** **Non-halogenated organics using GC/FID**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9408	Gasoline range organics (GRO)
9499	Motor Oil

EPA 8081A **10178606** **Organochlorine Pesticides by GC/ECD**

Analyte Code	Analyte
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)
7240	alpha-Chlordane
7115	beta-BHC (beta-Hexachlorocyclohexane)
7250	Chlordane (tech.)

ORELAP Fields of Accreditation

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Analyte Code	Analyte
7105	delta-BHC
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7535	Endrin ketone
7120	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)
7245	gamma-Chlordane
7685	Heptachlor
7690	Heptachlor epoxide
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
7810	Methoxychlor
8250	Toxaphene (Chlorinated camphene)

EPA 8081B **10178800** **Organochlorine Pesticides by GC/ECD**

Analyte Code	Analyte
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)
7240	alpha-Chlordane
7115	beta-BHC (beta-Hexachlorocyclohexane)
7250	Chlordane (tech.)
7105	delta-BHC
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7535	Endrin ketone
7120	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)
7245	gamma-Chlordane
7685	Heptachlor
7690	Heptachlor epoxide
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
7810	Methoxychlor
8250	Toxaphene (Chlorinated camphene)

EPA 8082 **10179007** **Polychlorinated Biphenyls (PCBs) by GC/ECD**

Analyte Code	Analyte
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)
8912	Aroclor-1262 (PCB-1262)
8913	Aroclor-1268 (PCB-1268)

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EPA 8082A **10179201** **Polychlorinated Biphenyls (PCBs) by GC/ECD**

Analyte Code	***Analyte***
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)
8912	Aroclor-1262 (PCB-1262)
8913	Aroclor-1268 (PCB-1268)

EPA 8151A **10183207** **Chlorinated Herbicides by GC/ECD**

Analyte Code	***Analyte***
8655	2,4,5-T
8545	2,4-D
8560	2,4-DB
6500	4-Nitrophenol
8555	Dalapon
8595	Dicamba
8605	Dichloroprop (Dichlorprop)
8620	Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)
7775	MCPA
7780	MCPP
6605	Pentachlorophenol
8650	Silvex (2,4,5-TP)

EPA 8260B **10184802** **Volatile Organic Compounds by purge and trap GC/MS**

Analyte Code	***Analyte***
5105	1,1,1,2-Tetrachloroethane
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5195	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150	1,2,3-Trichlorobenzene
5180	1,2,3-Trichloropropane
5182	1,2,3-Trimethylbenzene
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
4655	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
4665	2,2-Dichloropropane
4410	2-Butanone (Methyl ethyl ketone, MEK)
4500	2-Chloroethyl vinyl ether
4535	2-Chlorotoluene
4860	2-Hexanone
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)

ORELAP Fields of Accreditation

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Analyte Code	*Analyte*
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4320	Acetonitrile
4325	Acrolein (Propenal)
4340	Acrylonitrile
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4600	cis-1,4-Dichloro-2-butene
4595	Dibromomethane (Methylene bromide)
4625	Dichlorodifluoromethane (Freon-12)
9375	Di-isopropylether (DIPE)
4765	Ethylbenzene
4770	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)
9408	Gasoline range organics (GRO)
4835	Hexachlorobutadiene
4870	Iodomethane (Methyl iodide)
4875	Isobutyl alcohol (2-Methyl-1-propanol)
4900	Isopropylbenzene
5240	m+p-xylene
4925	Methacrylonitrile
4940	Methyl acetate
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
5000	Methyl tert-butyl ether (MTBE)
4965	Methylcyclohexane
4975	Methylene chloride (Dichloromethane)
5005	Naphthalene
4425	n-Butyl alcohol (1-Butanol, n-Butanol)
4435	n-Butylbenzene
5090	n-Propylbenzene
5250	o-Xylene
4440	sec-Butylbenzene
5100	Styrene
4370	T-amylmethylether (TAME)
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5120	Tetrahydrofuran (THF)
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
4605	trans-1,4-Dichloro-2-butene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5225	Vinyl acetate
5235	Vinyl chloride

EPA 8260C **10307003** **Volatile Organics: GC/MS (capillary column)**

Analyte Code	*Analyte*
5105	1,1,1,2-Tetrachloroethane

ORELAP Fields of Accreditation

ORELAP ID: WA100007
EPA CODE: WA00050
Certificate: WA100007 - 011

TestAmerica Seattle

5755 8th Street East
Tacoma WA 98424

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Analyte Code	*Analyte*
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5195	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150	1,2,3-Trichlorobenzene
5180	1,2,3-Trichloropropane
5182	1,2,3-Trimethylbenzene
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
4655	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
4665	2,2-Dichloropropane
4410	2-Butanone (Methyl ethyl ketone, MEK)
4500	2-Chloroethyl vinyl ether
4535	2-Chlorotoluene
4860	2-Hexanone (MBK)
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4320	Acetonitrile
4325	Acrolein (Propenal)
4340	Acrylonitrile
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4600	cis-1,4-Dichloro-2-butene
4595	Dibromomethane (Methylene bromide)
4625	Dichlorodifluoromethane (Freon-12)
9375	Di-isopropylether (DIPE)
4765	Ethylbenzene
4770	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)
4835	Hexachlorobutadiene
4870	Iodomethane (Methyl iodide)
4875	Isobutyl alcohol (2-Methyl-1-propanol)
4900	Isopropylbenzene
5240	m+p-xylene
4925	Methacrylonitrile
4940	Methyl acetate
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)

ORELAP Fields of Accreditation

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Analyte Code	*Analyte*
5000	Methyl tert-butyl ether (MTBE)
4965	Methylcyclohexane
4975	Methylene chloride (Dichloromethane)
5005	Naphthalene
4425	n-Butyl alcohol (1-Butanol, n-Butanol)
4435	n-Butylbenzene
5090	n-Propylbenzene
5250	o-Xylene
4440	sec-Butylbenzene
5100	Styrene
4370	T-amylmethylether (TAME)
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5120	Tetrahydrofuran (THF)
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
4605	trans-1,4-Dichloro-2-butene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5225	Vinyl acetate
5235	Vinyl chloride

EPA 8270C **10185805** **Semivolatile Organic compounds by GC/MS**

Analyte Code	*Analyte*
6715	1,2,4,5-Tetrachlorobenzene
4610	1,2-Dichlorobenzene
6221	1,2-Diphenylhydrazine
4615	1,3-Dichlorobenzene
4620	1,4-Dichlorobenzene
6380	1-Methylnaphthalene
4659	2,2'-Oxybis(1-chloropropane)
6735	2,3,4,6-Tetrachlorophenol
6738	2,3,4-Trichlorophenol
6740	2,3,5,6-Tetrachlorophenol
6742	2,3,5-Trichlorophenol
6830	2,3,6-Trichlorophenol (4C)
9363	2,3-Dichloroaniline
6835	2,4,5-Trichlorophenol
6840	2,4,6-Trichlorophenol
6000	2,4-Dichlorophenol
6130	2,4-Dimethylphenol
6175	2,4-Dinitrophenol
6185	2,4-Dinitrotoluene (2,4-DNT)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
6490	2-Nitrophenol
6412	3 & 4 Methylphenol
5945	3,3'-Dichlorobenzidine
6818	3,4,5-Trichlorophenol
6465	3-Nitroaniline
5660	4-Bromophenyl phenyl ether
5700	4-Chloro-3-methylphenol
5745	4-Chloroaniline
5825	4-Chlorophenyl phenylether

ORELAP Fields of Accreditation

ORELAP ID: WA100007

EPA CODE: WA00050

Certificate: WA100007 - 011

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Analyte Code	Analyte
6470	4-Nitroaniline
6500	4-Nitrophenol
5500	Acenaphthene
5505	Acenaphthylene
5510	Acetophenone
5545	Aniline
5555	Anthracene
5595	Benzidine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5587	Benzofluoranthene
5610	Benzoic acid
5630	Benzyl alcohol
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5670	Butyl benzyl phthalate
5680	Carbazole
5855	Chrysene
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
5895	Dibenz(a,h) anthracene
5905	Dibenzofuran
6070	Diethyl phthalate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6265	Fluoranthene
6270	Fluorene
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno(1,2,3-cd) pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6530	n-Nitrosodimethylamine
6545	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

EPA 8270C SIM **10242407** **Semivolatile Organic compounds by GC/MS Selective Ion Monitoring**

Analyte Code	Analyte
6380	1-Methylnaphthalene
6385	2-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5855	Chrysene

Analyte Code	Analyte
5895	Dibenz(a,h) anthracene
6265	Fluoranthene
6270	Fluorene
6315	Indeno(1,2,3-cd) pyrene
5005	Naphthalene
6605	Pentachlorophenol
6615	Phenanthrene
6665	Pyrene

EPA 8270D **10186002** **Semivolatile Organic compounds by GC/MS**

Analyte Code	Analyte
6715	1,2,4,5-Tetrachlorobenzene
4610	1,2-Dichlorobenzene
6221	1,2-Diphenylhydrazine
4615	1,3-Dichlorobenzene
4620	1,4-Dichlorobenzene
6380	1-Methylnaphthalene
4659	2,2'-Oxybis(1-chloropropane)
6735	2,3,4,6-Tetrachlorophenol
6740	2,3,5,6-Tetrachlorophenol
6835	2,4,5-Trichlorophenol
6840	2,4,6-Trichlorophenol
6000	2,4-Dichlorophenol
6130	2,4-Dimethylphenol
6175	2,4-Dinitrophenol
6185	2,4-Dinitrotoluene (2,4-DNT)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
6490	2-Nitrophenol
6412	3 & 4 Methylphenol
5945	3,3'-Dichlorobenzidine
6465	3-Nitroaniline
5660	4-Bromophenyl phenyl ether (BDE-3)
5700	4-Chloro-3-methylphenol
5745	4-Chloroaniline
5825	4-Chlorophenyl phenylether
6470	4-Nitroaniline
6500	4-Nitrophenol
5500	Acenaphthene
5505	Acenaphthylene
5510	Acetophenone
5545	Aniline
5555	Anthracene
5595	Benzidine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5610	Benzoic acid
5630	Benzyl alcohol
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5670	Butyl benzyl phthalate
5680	Carbazole

ORELAP Fields of Accreditation

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Analyte Code	Analyte
5855	Chrysene
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
5895	Dibenz(a,h) anthracene
5905	Dibenzofuran
6070	Diethyl phthalate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6265	Fluoranthene
6270	Fluorene
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno(1,2,3-cd) pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6530	n-Nitrosodimethylamine
6545	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

EPA 8270D SIM **10242509** **Semivolatile Organic compounds by GC/MS Selective Ion Monitoring**

Analyte Code	Analyte
6380	1-Methylnaphthalene
6385	2-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5855	Chrysene
5895	Dibenz(a,h) anthracene
6265	Fluoranthene
6270	Fluorene
6315	Indeno(1,2,3-cd) pyrene
5005	Naphthalene
6605	Pentachlorophenol
6615	Phenanthrene
6665	Pyrene

EPA 9012A **10193405** **Total and Amenable Cyanide (automated colorimetric with off-line distillation)**

Analyte Code	Analyte
1510	Amenable cyanide
1645	Total cyanide

EPA 9012B **10243206** **Total and Amenable Cyanide (automated colorimetric with off-line distillation)**

Analyte Code	Analyte
1510	Amenable cyanide

Analyte Code	Analyte
1645	Total cyanide

EPA 9013 | **10193609** | **Cyanide Extraction Procedure for Solids and Oils**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 9040B | **10197203** | **pH Electrometric Measurement**

Analyte Code	Analyte
1900	pH

EPA 9056A | **10199607** | **Determination of Inorganic Anions by Ion Chromatography**

Analyte Code	Analyte
1540	Bromide
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N
2000	Sulfate

EPA 9060 | **10200201** | **Total Organic Carbon**

Analyte Code	Analyte
2040	Total organic carbon

NWTPH-Dx | **90018409** | **Oregon DEQ TPH Diesel Range**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9499	Motor Oil

NWTPH-Gx | **90018603** | **Oregon DEQ TPH Gasoline Range Organics by GC/FID-PID Purge & Trap**

Analyte Code	Analyte
9408	Gasoline range organics (GRO)

NWTPH-GX (GC/MS) | **90018658** | **Oregon DEQ TPH Gasoline Range Organics by GC/MS Purge & Trap**

Analyte Code	Analyte
9408	Gasoline range organics (GRO)

NWTPH-HCID | **90013200** | **Oregon DEQ Total Petroleum Hydrocarbon ID**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9408	Gasoline range organics (GRO)
9499	Motor Oil

Puget Sound Estuary Program (PSEP): Conventional Sediment Variables | **60006408** | **PSEP: Organotins, TOC, and Sulfide**

Analyte Code	Analyte
5913	Dibutyltin
1206	Monobutyltin
1209	Tetrabutyltin
2040	Total organic carbon
1213	Tributyltin

ORELAP Fields of Accreditation

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SM 2130 B 20th ED **20042404** **Turbidity by Nephelometric Determination**

Analyte Code	*Analyte*
2055	Turbidity

SM 2130 B 21st ED **20042608** **Turbidity by Nephelometric Method**

Analyte Code	*Analyte*
2055	Turbidity

SM 2320 B 20th ED **20045209** **Alkalinity by Titration**

Analyte Code	*Analyte*
1505	Alkalinity as CaCO3

SM 2320 B 21st ED **20045403** **Alkalinity by Titration Method**

Analyte Code	*Analyte*
1505	Alkalinity as CaCO3

SM 2320 B-97 online **20045607** **Alkalinity by Titration Method**

Analyte Code	*Analyte*
1505	Alkalinity as CaCO3

SM 2340 B 20th ED **20046202** **Hardness by calculation**

Analyte Code	*Analyte*
1750	Hardness

SM 2340 B 21st ED **20046406** **Hardness by calculation**

Analyte Code	*Analyte*
1750	Hardness

SM 2340 B-97 online **20046600** **Hardness by calculation**

Analyte Code	*Analyte*
1750	Hardness

SM 2340 C 20th ED **20047205** **Hardness by EDTA Titration**

Analyte Code	*Analyte*
1750	Hardness

SM 2340 C 21st ED **20047409** **Hardness by EDTA Titration Method**

Analyte Code	*Analyte*
1750	Hardness

SM 2340 C-97 online **20047603** **Hardness by EDTA Titration Method**

Analyte Code	*Analyte*
1750	Hardness

SM 2510 B 20th ED **20048208** **Conductivity by Probe**

Analyte Code	*Analyte*
1610	Conductivity

ORELAP Fields of Accreditation

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SM 2510 B 21st ED **20048402** **Conductivity by Probe**

Analyte Code	*Analyte*
1610	Conductivity

SM 2510 B-97 online **20048606** **Conductivity by Probe**

Analyte Code	*Analyte*
1610	Conductivity

SM 2520 B 20th ED **20040055** **Salinity by Electrical Conductivity**

Analyte Code	*Analyte*
1975	Salinity

SM 2540 B 20th ED **20049007** **Total Solids**

Analyte Code	*Analyte*
1950	Residue-total

SM 2540 B 21st ED **20049201** **Total Solids Dried at 103 - 105C**

Analyte Code	*Analyte*
1950	Residue-total

SM 2540 B-97 online **20049405** **Total Solids Dried at 103 - 105C**

Analyte Code	*Analyte*
1950	Residue-total

SM 2540 C 20th ED **20050004** **Total Dissolved Solids**

Analyte Code	*Analyte*
1955	Residue-filterable (TDS)

SM 2540 C 21st ED **20050208** **Total Dissolved Solids Dried at 180C**

Analyte Code	*Analyte*
1955	Residue-filterable (TDS)

SM 2540 C-97 online **20050402** **Total Dissolved Solids Dried at 180C**

Analyte Code	*Analyte*
1955	Residue-filterable (TDS)

SM 2540 D 20th ED **20050800** **Total Suspended Solids**

Analyte Code	*Analyte*
1960	Residue-nonfilterable (TSS)

SM 2540 D 21st ED **20051007** **Total Suspended Solids Dried at 103 - 105C**

Analyte Code	*Analyte*
1960	Residue-nonfilterable (TSS)

SM 2540 D-97 online **20051201** **Total Suspended Solids Dried at 103 - 105C**

Analyte Code	*Analyte*
1960	Residue-nonfilterable (TSS)

SM 2540 F 18th ED **20005009** **Settleable Solids**

Analyte Code	*Analyte*
1965	Residue-settleable

SM 2540 F 20th ED **20051803** **Settleable Solids**

Analyte Code	*Analyte*
1965	Residue-settleable

SM 2540 F 21st ED **20052000** **Settleable Solids**

Analyte Code	*Analyte*
1965	Residue-settleable

SM 2540 F-97 online **20052204** **Settleable Solids**

Analyte Code	*Analyte*
1965	Residue-settleable

SM 3500-Cr B 20th ED **20065809** **Chromium by Colorimetric Method**

Analyte Code	*Analyte*
1045	Chromium VI

SM 3500-Cr D 19th ED **20067009** **Chromium by Colorimetric Method**

Analyte Code	*Analyte*
1045	Chromium VI

SM 4500-CN E 20th ED **20092404** **Cyanide by Colorimetric Determination**

Analyte Code	*Analyte*
1645	Total cyanide

SM 4500-CN G 20th ED **20093203** **Cyanide Amenable to Chlorination after Distillation**

Analyte Code	*Analyte*
1510	Amenable cyanide

SM 4500-CN I 20th ED **20093601** **Weak Acid Dissociable Cyanide**

Analyte Code	*Analyte*
1635	Cyanide

SM 4500-CN¯ E 21st ED **20096202** **Cyanide by Colorimetric Method**

Analyte Code	*Analyte*
1635	Cyanide

SM 4500-CN¯ G 21st ED **20097001** **Cyanide by Cyanides Amenable to Chlorination after Distillation**

Analyte Code	*Analyte*
1510	Amenable cyanide

SM 4500-CN¯ I 21st ED **20097807** **Cyanide by Weak Acid Dissociable Cyanide**

Analyte Code	*Analyte*
1635	Cyanide

ORELAP Fields of Accreditation

ORELAP ID: WA100007

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SM 4500-H+ B 20th ED **20104807** **pH by Probe**

Analyte Code	*Analyte*
1900	pH

SM 4500-H+ B 21st ED **20105004** **pH Value by Electrometric Method .**

Analyte Code	*Analyte*
1900	pH

SM 4500-NH3 G 20th ED **20111006** **Ammonia by Automated Phenate**

Analyte Code	*Analyte*
1515	Ammonia as N

SM 4500-P E 20th ED **20123802** **Phosphorus by Ascorbic Acid Reduction**

Analyte Code	*Analyte*
1870	Orthophosphate as P
1910	Phosphorus, total

SM 4500-P E 21st ED **20124009** **Phosphorus by Ascorbic Acid Method**

Analyte Code	*Analyte*
1870	Orthophosphate as P
1910	Phosphorus, total

SM 5210 B 20th ED **20134809** **Biochemical Oxygen Demand, 5-Day (BOD5)**

Analyte Code	*Analyte*
1530	Biochemical oxygen demand

SM 5210 B 21st ED **20135006** **Biochemical Oxygen Demand, 5-Day (BOD5)**

Analyte Code	*Analyte*
1530	Biochemical oxygen demand

SM 5220 C 20th ED **20135608** **Chemical Oxygen Demand by Closed Reflux and Titration**

Analyte Code	*Analyte*
1565	Chemical oxygen demand

SM 5220 C 21st ED **20135802** **COD by Closed Reflux, Titrimetric Method**

Analyte Code	*Analyte*
1565	Chemical oxygen demand

SM 5220 C-97 online **20136009** **COD by Closed Reflux, Titrimetric Method**

Analyte Code	*Analyte*
1565	Chemical oxygen demand

SM 5220 D 20th ED **20136407** **Chemical Oxygen Demand by Closed Reflux and Colorimetric Determination**

Analyte Code	*Analyte*
1565	Chemical oxygen demand

SM 5220 D 21st ED **20136601** **COD by Closed Reflux, Colorimetric Method**

Analyte Code	*Analyte*

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Analyte Code	Analyte
1565	Chemical oxygen demand

SM 5220 D-97 online **20136805** **COD by Closed Reflux, Colorimetric Method**

Analyte Code	Analyte
1565	Chemical oxygen demand

SM 5310 B 20th ED **20137400** **Total Organic Carbon by Combustion Infra-red Method**

Analyte Code	Analyte
2040	Total organic carbon

SM 5310 B 21st ED **20137604** **TOC by High-Temperature Combustion Method**

Analyte Code	Analyte
2040	Total organic carbon

WA EPH **60015001** **Extractable Petroleum Hydrocarbons**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
6211	EPH Aliphatic >C10-C12
6212	EPH Aliphatic >C12-C16
6214	EPH Aliphatic >C16-C21
6216	EPH Aliphatic >C21-C34
6220	EPH Aliphatic C8-C10
6224	EPH Aromatic >C10-C12
6226	EPH Aromatic >C12-C16
6228	EPH Aromatic >C16-C21
6231	EPH Aromatic >C21-C34
6236	EPH Aromatic C8-C10

WA VPH **60015056** **Volatile Petroleum Hydrocarbons (VPH) by GC/PID Purge & Trap**

Analyte Code	Analyte
4375	Benzene
4765	Ethylbenzene
9408	Gasoline range organics (GRO)
5240	m+p-xylene
5000	Methyl tert-butyl ether (MTBE)
4855	n-Hexane
5250	o-Xylene
5140	Toluene
5300	VPH Aliphatic >C10-C12
5301	VPH Aliphatic >C6-C8
5302	VPH Aliphatic >C8-C10
5303	VPH Aliphatic C5-C6
5308	VPH Aromatic >C10-C12
5309	VPH Aromatic >C12-C13
5310	VPH Aromatic >C8-C10
5260	Xylene (total)

ORELAP Fields of Accreditation

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MATRIX : Solids

Reference	Code	Description
ASTM D2217-85	**30025151**	**Grain sizing**

Analyte Code	Analyte
6118	Distribution of particle sizes

Reference	Code	Description
ASTM D421-85	**30030832**	**Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants**

Analyte Code	Analyte
3915	Particulates

Reference	Code	Description
ASTM D422-63	**30030854**	**Partical Size Distribution (Grain sizing)**

Analyte Code	Analyte
6118	Distribution of particle sizes

Reference	Code	Description
EPA 1020A	**10117007**	**Ignitability Setaflash Closed-cup Method**

Analyte Code	Analyte
1780	Ignitability

Reference	Code	Description
EPA 1311	**10118806**	**Toxicity Characteristic Leaching Procedure**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 1312	**10119003**	**Synthetic Precipitation Leaching Procedure**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 300.0 2.1	**10053200**	**Methods for the Determination of Inorganic Substances in Environmental Samples**

Analyte Code	Analyte
1540	Bromide
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N
2000	Sulfate

Reference	Code	Description
EPA 3050B	**10135601**	**Acid Digestion of Sediments, Sludges, and soils**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 3546	**10141205**	**Microwave Extraction**

Analyte Code	Analyte
8031	Extraction/Preparation

Reference	Code	Description
EPA 3550B	**10141807**	**Ultrasonic Extraction**

Analyte Code	Analyte
8031	Extraction/Preparation

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EPA 3580A **10143007** **Waste Dilution**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3585 **10143201** **Waste Dilution for Volatile Organics**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3610B **10144602** **Alumina Cleanup**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3620B **10145809** **Florisil Cleanup**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3630C **10146802** **Silica gel cleanup**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3660B **10148400** **Sulfur cleanup**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 3665A **10148808** **Sulfuric Acid / permanganate Cleanup**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 5030B **10153409** **Purge and trap for aqueous samples**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 5035A **10284807** **Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 6010B **10155609** **ICP - AES**

Analyte Code	Analyte
1000	Aluminum
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1055	Copper
1760	Hardness (calc.)
1070	Iron

ORELAP Fields of Accreditation

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Analyte Code	*Analyte*
1075	Lead
1085	Magnesium
1090	Manganese
1100	Molybdenum
1105	Nickel
1125	Potassium
1140	Selenium
1990	Silica as SiO2
1145	Silicon
1150	Silver
1155	Sodium
1160	Strontium
1165	Thallium
1175	Tin
1180	Titanium
1185	Vanadium
1190	Zinc

EPA 6010C **10155803** **ICP - AES**

Analyte Code	*Analyte*
1000	Aluminum
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1055	Copper
1760	Hardness (calc.)
1070	Iron
1075	Lead
1085	Magnesium
1090	Manganese
1100	Molybdenum
1105	Nickel
1125	Potassium
1140	Selenium
1990	Silica as SiO2
1145	Silicon
1150	Silver
1155	Sodium
1160	Strontium
1165	Thallium
1175	Tin
1180	Titanium
1185	Vanadium
1190	Zinc

EPA 6020 **10156000** **Inductively Coupled Plasma-Mass Spectrometry**

Analyte Code	*Analyte*
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1030	Cadmium
1040	Chromium

Analyte Code	Analyte
1050	Cobalt
1055	Copper
1075	Lead
1090	Manganese
1095	Mercury
1100	Molybdenum
1105	Nickel
1140	Selenium
1150	Silver
1160	Strontium
1165	Thallium
1180	Titanium
3035	Uranium
1185	Vanadium
1190	Zinc

EPA 6020A **10156408** **Inductively Coupled Plasma-Mass Spectrometry**

Analyte Code	Analyte
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1030	Cadmium
1040	Chromium
1050	Cobalt
1055	Copper
1075	Lead
1090	Manganese
1095	Mercury
1100	Molybdenum
1105	Nickel
1140	Selenium
1150	Silver
1160	Strontium
1165	Thallium
1180	Titanium
3035	Uranium
1185	Vanadium
1190	Zinc

EPA 7470A **10165807** **Mercury in Liquid Waste by Cold Vapor Atomic Absorption**

Analyte Code	Analyte
1095	Mercury

EPA 7471A **10166208** **Mercury in Solid Waste by Cold Vapor Atomic Absorption**

Analyte Code	Analyte
1095	Mercury

EPA 8000B **10172200** **Determinative Chromatographic Separations**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 8015B **10173601** **Non-halogenated organics using GC/FID**

Analyte Code	Analyte
9369	Diesel range organics (DRO)

Analyte Code	Analyte
9408	Gasoline range organics (GRO)
9499	Motor Oil

EPA 8081A **10178606** **Organochlorine Pesticides by GC/ECD**

Analyte Code	Analyte
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)
7240	alpha-Chlordane
7115	beta-BHC (beta-Hexachlorocyclohexane)
7250	Chlordane (tech.)
7105	delta-BHC
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7535	Endrin ketone
7120	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)
7245	gamma-Chlordane
7685	Heptachlor
7690	Heptachlor epoxide
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
7810	Methoxychlor
8250	Toxaphene (Chlorinated camphene)

EPA 8081B **10178800** **Organochlorine Pesticides by GC/ECD**

Analyte Code	Analyte
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)
7240	alpha-Chlordane
7115	beta-BHC (beta-Hexachlorocyclohexane)
7250	Chlordane (tech.)
7105	delta-BHC
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7535	Endrin ketone
7120	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)
7245	gamma-Chlordane
7685	Heptachlor
7690	Heptachlor epoxide
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
7810	Methoxychlor
8250	Toxaphene (Chlorinated camphene)

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EPA 8082 **10179007** **Polychlorinated Biphenyls (PCBs) by GC/ECD**

Analyte Code	Analyte
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)
8912	Aroclor-1262 (PCB-1262)
8913	Aroclor-1268 (PCB-1268)

EPA 8082A **10179201** **Polychlorinated Biphenyls (PCBs) by GC/ECD**

Analyte Code	Analyte
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)
8912	Aroclor-1262 (PCB-1262)
8913	Aroclor-1268 (PCB-1268)

EPA 8151A **10183207** **Chlorinated Herbicides by GC/ECD**

Analyte Code	Analyte
8655	2,4,5-T
8545	2,4-D
8560	2,4-DB
6500	4-Nitrophenol
8555	Dalapon
8595	Dicamba
8605	Dichloroprop (Dichlorprop)
8620	Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)
7775	MCPA
7780	MCPP
6605	Pentachlorophenol
8650	Silvex (2,4,5-TP)

EPA 8260B **10184802** **Volatile Organic Compounds by purge and trap GC/MS**

Analyte Code	Analyte
5105	1,1,1,2-Tetrachloroethane
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5195	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150	1,2,3-Trichlorobenzene
5180	1,2,3-Trichloropropane
5182	1,2,3-Trimethylbenzene
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene

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Analyte Code	*Analyte*
4635	1,2-Dichloroethane (Ethylene dichloride)
4655	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
4665	2,2-Dichloropropane
4410	2-Butanone (Methyl ethyl ketone, MEK)
4500	2-Chloroethyl vinyl ether
4535	2-Chlorotoluene
4860	2-Hexanone
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4320	Acetonitrile
4325	Acrolein (Propenal)
4340	Acrylonitrile
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4600	cis-1,4-Dichloro-2-butene
4595	Dibromomethane (Methylene bromide)
4625	Dichlorodifluoromethane (Freon-12)
9375	Di-isopropylether (DIPE)
4765	Ethylbenzene
4770	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)
9408	Gasoline range organics (GRO)
4835	Hexachlorobutadiene
4870	Iodomethane (Methyl iodide)
4875	Isobutyl alcohol (2-Methyl-1-propanol)
4900	Isopropylbenzene
5240	m+p-xylene
4925	Methacrylonitrile
4940	Methyl acetate
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
5000	Methyl tert-butyl ether (MTBE)
4965	Methylcyclohexane
4975	Methylene chloride (Dichloromethane)
5005	Naphthalene
4425	n-Butyl alcohol (1-Butanol, n-Butanol)
4435	n-Butylbenzene
5090	n-Propylbenzene
5250	o-Xylene
4440	sec-Butylbenzene
5100	Styrene
4370	T-amylmethylether (TAME)
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5120	Tetrahydrofuran (THF)

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Analyte Code	Analyte
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
4605	trans-1,4-Dichloro-2-butene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5225	Vinyl acetate
5235	Vinyl chloride

EPA 8260C **10307003** **Volatile Organics: GC/MS (capillary column)**

Analyte Code	Analyte
5105	1,1,1,2-Tetrachloroethane
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5195	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150	1,2,3-Trichlorobenzene
5180	1,2,3-Trichloropropane
5182	1,2,3-Trimethylbenzene
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
4655	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
4665	2,2-Dichloropropane
4410	2-Butanone (Methyl ethyl ketone, MEK)
4500	2-Chloroethyl vinyl ether
4535	2-Chlorotoluene
4860	2-Hexanone (MBK)
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4320	Acetonitrile
4325	Acrolein (Propenal)
4340	Acrylonitrile
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4600	cis-1,4-Dichloro-2-butene
4595	Dibromomethane (Methylene bromide)

Analyte Code	*Analyte*
4625	Dichlorodifluoromethane (Freon-12)
9375	Di-isopropylether (DIPE)
4765	Ethylbenzene
4770	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)
4835	Hexachlorobutadiene
4870	Iodomethane (Methyl iodide)
4875	Isobutyl alcohol (2-Methyl-1-propanol)
4900	Isopropylbenzene
5240	m+p-xylene
4925	Methacrylonitrile
4940	Methyl acetate
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
5000	Methyl tert-butyl ether (MTBE)
4965	Methylcyclohexane
4975	Methylene chloride (Dichloromethane)
5005	Naphthalene
4425	n-Butyl alcohol (1-Butanol, n-Butanol)
4435	n-Butylbenzene
5090	n-Propylbenzene
5250	o-Xylene
4440	sec-Butylbenzene
5100	Styrene
4370	T-amylmethylether (TAME)
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5120	Tetrahydrofuran (THF)
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
4605	trans-1,4-Dichloro-2-butene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5225	Vinyl acetate
5235	Vinyl chloride

EPA 8270C **10185805** **Semivolatile Organic compounds by GC/MS**

Analyte Code	*Analyte*
6715	1,2,4,5-Tetrachlorobenzene
4610	1,2-Dichlorobenzene
6221	1,2-Diphenylhydrazine
4615	1,3-Dichlorobenzene
4620	1,4-Dichlorobenzene
6380	1-Methylnaphthalene
4659	2,2'-Oxybis(1-chloropropane)
6735	2,3,4,6-Tetrachlorophenol
6738	2,3,4-Trichlorophenol
6740	2,3,5,6-Tetrachlorophenol
6742	2,3,5-Trichlorophenol
6830	2,3,6-Trichlorophenol (4C)
9363	2,3-Dichloroaniline
6835	2,4,5-Trichlorophenol
6840	2,4,6-Trichlorophenol
6000	2,4-Dichlorophenol
6130	2,4-Dimethylphenol
6175	2,4-Dinitrophenol
6185	2,4-Dinitrotoluene (2,4-DNT)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol

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Analyte Code	*Analyte*
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
6490	2-Nitrophenol
6412	3 & 4 Methylphenol
5945	3,3'-Dichlorobenzidine
6818	3,4,5-Trichlorophenol
6465	3-Nitroaniline
5660	4-Bromophenyl phenyl ether
5700	4-Chloro-3-methylphenol
5745	4-Chloroaniline
5825	4-Chlorophenyl phenylether
6470	4-Nitroaniline
6500	4-Nitrophenol
5500	Acenaphthene
5505	Acenaphthylene
5510	Acetophenone
5545	Aniline
5555	Anthracene
5595	Benzidine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5587	Benzofluoranthene
5610	Benzoic acid
5630	Benzyl alcohol
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5670	Butyl benzyl phthalate
5680	Carbazole
5855	Chrysene
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
5895	Dibenz(a,h) anthracene
5905	Dibenzofuran
6070	Diethyl phthalate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6265	Fluoranthene
6270	Fluorene
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno(1,2,3-cd) pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6530	n-Nitrosodimethylamine
6545	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

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EPA 8270C SIM **10242407** **Semivolatile Organic compounds by GC/MS Selective Ion Monitoring**

Analyte Code	Analyte
6380	1-Methylnaphthalene
6385	2-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5855	Chrysene
5895	Dibenz(a,h) anthracene
6265	Fluoranthene
6270	Fluorene
6315	Indeno(1,2,3-cd) pyrene
5005	Naphthalene
6605	Pentachlorophenol
6615	Phenanthrene
6665	Pyrene

EPA 8270D **10186002** **Semivolatile Organic compounds by GC/MS**

Analyte Code	Analyte
6715	1,2,4,5-Tetrachlorobenzene
4610	1,2-Dichlorobenzene
6221	1,2-Diphenylhydrazine
4615	1,3-Dichlorobenzene
4620	1,4-Dichlorobenzene
6380	1-Methylnaphthalene
4659	2,2'-Oxybis(1-chloropropane)
6735	2,3,4,6-Tetrachlorophenol
6740	2,3,5,6-Tetrachlorophenol
6835	2,4,5-Trichlorophenol
6840	2,4,6-Trichlorophenol
6000	2,4-Dichlorophenol
6130	2,4-Dimethylphenol
6175	2,4-Dinitrophenol
6185	2,4-Dinitrotoluene (2,4-DNT)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
6490	2-Nitrophenol
6412	3 & 4 Methylphenol
5945	3,3'-Dichlorobenzidine
6465	3-Nitroaniline
5660	4-Bromophenyl phenyl ether (BDE-3)
5700	4-Chloro-3-methylphenol
5745	4-Chloroaniline
5825	4-Chlorophenyl phenylether
6470	4-Nitroaniline
6500	4-Nitrophenol
5500	Acenaphthene
5505	Acenaphthylene
5510	Acetophenone

ORELAP Fields of Accreditation

ORELAP ID: WA100007
EPA CODE: WA00050
Certificate: WA100007 - 011

TestAmerica Seattle

5755 8th Street East
Tacoma WA 98424

Issue Date: 11/07/2015 ***Expiration Date:*** 11/06/2016

As of 11/07/2015 ***this list supercedes all previous lists for this certificate number.***
Customers. Please verify the current accreditation standing with ORELAP.

Analyte Code	Analyte
5545	Aniline
5555	Anthracene
5595	Benzidine
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5610	Benzoic acid
5630	Benzyl alcohol
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5670	Butyl benzyl phthalate
5680	Carbazole
5855	Chrysene
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
5895	Dibenz(a,h) anthracene
5905	Dibenzofuran
6070	Diethyl phthalate
6135	Dimethyl phthalate
5925	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6265	Fluoranthene
6270	Fluorene
6275	Hexachlorobenzene
4835	Hexachlorobutadiene
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno(1,2,3-cd) pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6530	n-Nitrosodimethylamine
6545	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

EPA 8270D SIM **10242509** **Semivolatile Organic compounds by GC/MS Selective Ion Monitoring**

Analyte Code	Analyte
6380	1-Methylnaphthalene
6385	2-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5855	Chrysene
5895	Dibenz(a,h) anthracene
6265	Fluoranthene
6270	Fluorene
6315	Indeno(1,2,3-cd) pyrene
5005	Naphthalene
6605	Pentachlorophenol

Analyte Code	Analyte
6615	Phenanthrene
6665	Pyrene

EPA 9012A **10193405** **Total and Amenable Cyanide (automated colorimetric with off-line distillation)**

Analyte Code	Analyte
1510	Amenable cyanide
1645	Total cyanide

EPA 9012B **10243206** **Total and Amenable Cyanide (automated colorimetric with off-line distillation)**

Analyte Code	Analyte
1510	Amenable cyanide
1645	Total cyanide

EPA 9013 **10193609** **Cyanide Extraction Procedure for Solids and Oils**

Analyte Code	Analyte
8031	Extraction/Preparation

EPA 9045C **10198400** **Soil and Waste pH**

Analyte Code	Analyte
1900	pH

EPA 9056A **10199607** **Determination of Inorganic Anions by Ion Chromatography**

Analyte Code	Analyte
1540	Bromide
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N
2000	Sulfate

EPA 9060 **10200201** **Total Organic Carbon**

Analyte Code	Analyte
2040	Total organic carbon

NWTPH-Dx **90018409** **Oregon DEQ TPH Diesel Range**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9499	Motor Oil

NWTPH-Gx **90018603** **Oregon DEQ TPH Gasoline Range Organics by GC/FID-PID Purge & Trap**

Analyte Code	Analyte
9408	Gasoline range organics (GRO)

NWTPH-GX (GC/MS) **90018658** **Oregon DEQ TPH Gasoline Range Organics by GC/MS Purge & Trap**

Analyte Code	Analyte
9408	Gasoline range organics (GRO)

NWTPH-HCID **90013200** **Oregon DEQ Total Petroleum Hydrocarbon ID**

Analyte Code	Analyte

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9408	Gasoline range organics (GRO)
9499	Motor Oil

PLUMB 1981 **60006259** **Extraction/Preparation**

Analyte Code	Analyte
6118	Distribution of particle sizes

Puget Sound Estuary Program (PSEP): Conventional Sediment Variables **60006408** **PSEP: Organotins, TOC, and Sulfide**

Analyte Code	Analyte
5913	Dibutyltin
1206	Monobutyltin
1209	Tetrabutyltin
2040	Total organic carbon
1213	Tributyltin

WA EPH **60015001** **Extractable Petroleum Hydrocarbons**

Analyte Code	Analyte
9369	Diesel range organics (DRO)
6211	EPH Aliphatic >C10-C12
6212	EPH Aliphatic >C12-C16
6214	EPH Aliphatic >C16-C21
6216	EPH Aliphatic >C21-C34
6220	EPH Aliphatic C8-C10
6224	EPH Aromatic >C10-C12
6226	EPH Aromatic >C12-C16
6228	EPH Aromatic >C16-C21
6231	EPH Aromatic >C21-C34
6236	EPH Aromatic C8-C10

WA VPH **60015056** **Volatile Petroleum Hydrocarbons (VPH) by GC/PID Purge & Trap**

Analyte Code	Analyte
4375	Benzene
4765	Ethylbenzene
9408	Gasoline range organics (GRO)
5240	m+p-xylene
5000	Methyl tert-butyl ether (MTBE)
4855	n-Hexane
5250	o-Xylene
5140	Toluene
5300	VPH Aliphatic >C10-C12
5301	VPH Aliphatic >C6-C8
5302	VPH Aliphatic >C8-C10
5303	VPH Aliphatic C5-C6
5308	VPH Aromatic >C10-C12
5309	VPH Aromatic >C12-C13
5310	VPH Aromatic >C8-C10
5260	Xylene (total)

OREGON

Environmental Laboratory Accreditation Program

NELAP Recognized

Umpqua Research Company

OR100031

626 NE Division St

Myrtle Creek,OR 97457

IS GRANTED APPROVAL BY ORELAP UNDER THE 2009 TNI STANDARDS, TO PERFORM ANALYSES ON ENVIRONMENTAL SAMPLES IN MATRICES AS LISTED BELOW :

Air	*Drinking Water*	*Non Potable Water*	*Solids and Chem. Waste*	*Tissue*
	Chemistry			
	Microbiology			

AND AS RECORDED IN THE LIST OF APPROVED ANALYTES, METHODS, ANALYTICAL TECHNIQUES, AND FIELDS OF TESTING ISSUED CONCURRENTLY WITH THIS CERTIFICATE AND REVISED AS NECESSARY.

ACCREDITED STATUS DEPENDS ON SUCCESSFUL ONGOING PARTICIPATION IN THE PROGRAM AND CONTINUED COMPLIANCE WITH THE STANDARDS.

CUSTOMERS ARE URGED TO VERIFY THE LABORATORY'S CURRENT ACCREDITATION STATUS IN OREGON.

Gary K. Ward, MS
Oregon State Public Health Laboratory
ORELAP Administrator
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Hillsboro, OR 97124

ISSUE DATE: 01/24/2016

EXPIRATION DATE: 01/23/2017

Certificate No: OR100031 - 015